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The Effect of Cleft Pallate Operation on the Speech of 42 Cleft Cases.

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THE EFFECT OF CLEFT PALATE OPERATION ON THE SPEECH OF FORTY-TWO CLEFT CASES

A Dissertation

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ABSTRACT

For many years the speech rehabilitation of the cleft palate child has been the responsibility of the plastic surgeon, the speech clinician, the orthodontist, the otologist, the psychologist, and the social worker. Present day authorities in the fields of speech correction and plastic surgery are suggesting that the advancement in surgery gives evidence of minimizing or eliminating the speech problem for the cleft palate child.

The purpose of this study is to review the present status of the speech problem of the cleft palate child. As a preparation for the study of actual cases, the experimenter reviewed recent literature on cleft palate cases, particularly on types of clefts and the corresponding operative procedure.

The following described procedure was used: The medical files of the Children's Memorial Hospital of Montreal, Quebec, were checked and letters were sent to the parents of certain former patients, viz., children between the ages of 2 and 16 years who had been operated upon for cleft lip and cleft palate, or cleft palate alone. Sixty parents responded and 42 children were

chosen to serve in the study. Each child was then studied according to the following outline:

1. The medical records were examined for the type of cleft, the number of cleft operations and other operations, the age when the operation was performed and completed, the surgeon for the cleft operation, the operative techniques used, and the number of associated congenital anomalies.
2. A speech analysis was made which consisted of an articulation and voice appraisal, an estimate of controlled and running speech, and an evaluation of the structure and mobility of the peripheral speech mechanism.
3. Hearing acuity was determined by a pure tone test, using the Western Electric Bp Audiometer.
4. Psychometric evaluations were made by application of the Revised Stanford-Binet Intelligence Test Forms L and M.
5. The medical examination (given by the pediatrician) covered the following named items: previous illnesses, previous accidents, previous operations, inoculations; developmental history; functional history, which consisted of general information about the family; functional inquiry, which sought general information about the health of the child; and a comprehensive physical examination.

6. When thought necessary, otological and neurological examinations were given. The otological examination included a check of the nose, throat, ears, and larynx; the neurological examination consisted of a comprehensive neurological evaluation.
7. The environmental conditions were estimated from observations and interviews during the experiment.

So far as may be judged from these 42 cases, it may reasonably be concluded that

1. The size of the cleft does not significantly determine type or degree of the speech difficulty.
2. One primary operation can now take care of the less serious cases, while three or four operations are needed for the more severe cases.
3. The Veau and Langenbeck operative procedures are used most often for the repair of the palate, whereas the Mirault-Blair technique is used most often for the repair of the lips.
4. Multiple secondary operations are rarely needed.
5. Tonsillectomies and adenoidectomies are not routine operations, before or after palate repair.
6. Assuming that the surgery is completed by the time the child is 3 to 3 1/2 years old, speech development generally begins after surgical repair.

7. Without formal speech training, a third of all cleft palate cases will have speech equal to that of the normal speaker. When speech training is given, the majority will show speech improvement.
8. The cases within the ages of 2 and 5 years who have been operated will tend to have delayed speech, or speech rated as normal.
9. Regardless of whether the cases have had formal speech training, the greater percentage are likely to be judged by the lay person to have speech equal to that of the average speaker. Conversely, regardless of whether they have had formal speech training, over a third of the cases will have typical cleft palate speech.
10. The speech problem may not always be caused by the labial and palatal clefts.
11. The peripheral speech mechanism is slightly better functionally than anatomically.
12. Dental attention is inadequate, but in the majority of cases the dental structure does not adversely affect speech.
13. Passavant's cushion and the tongue frenum seemingly do not often influence speech.
14. Pharyngeal muscular movement is greater than palatal movement.

15. The structure and mobility of the palate is about twice as effective for the cleft palate case with normal speech as for the one with typical cleft palate speech.
16. There is evidence of tongue protrusion on the postdental sounds and a tongue thrust movement in swallowing.
17. Intelligence seemingly has a determining influence on the speech of the cleft palate case in the same degree as for the non-cleft palate case.
18. The majority of the cases have scarred, thickened, and retracted ear drums without noticeable affect on hearing acuity.
19. If the congenital anomalies are not considered, the general physical condition of the cleft palate child will not deviate significantly from that of the normal person.
20. The cleft palate case may be found in either the high, medium, or low socio-economic class, but more often is in the medium class.
21. Personality deviations may be expected in about a third of the cases.

CHAPTER I

THE PROBLEM

For several years, great emphasis has been placed on the rehabilitation of the cleft palate child. The plastic surgeon, the speech pathologist, the speech clinician, the orthodontist, prothodontist, the otolaryngolist, the psychologist and the social worker have combined forces in an effort to attain the chief goal, <u>good speech</u>. The speech problem has been considered the responsibility of each of these groups, but in the final analysis, the greatest responsibility has been placed in the hands of the plastic surgeons. Keenly aware of this fact, the surgeons have measured the results of their work by the quality of the patient's speech. There is some evidence that the goal may be in sight. Kantner says,

> It is my belief that many of the children who are now being born with cleft palates will achieve normal speech -- often without any need for speech training. A great deal of credit is due the plastic surgeons who are continually developing better techniques that give more satisfactory operative results. [1]

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[1] C.E. Kantner, "Diagnosis and Prognosis in Cleft Palate Speech," <u>The Journal of Speech and Hearing Disorders</u>, XIII (1948), 211-233.

Fogh-Andersen says,

> . . . the surgical treatment having now a very small mortality of operation in comparison with former days, and the results having been in most cases so good that generally the individual becomes quite natural. [2]

Browne writes,

> Using this method I have had no breakdowns in my three hundred cases, and the speech results are so good I have entirely given up any special postoperative training. [3]

Over a hundred and seventy-five years of plastic surgery have made the previous statements possible. The first successful soft palate closure was performed by a skilful dentist, Monnier, in 1766. The success of the operation can be attributed more to chance or accident rather than to skill or knowledge. Monnier inserted a few sutures in the soft palate area causing an inflamation, which terminated in suppuration and was followed by reunion of the two halves of the palate. In 1816, von Graefe, the founder of modern plastic surgery introduced the first comprehensive surgical procedure for closing the clefts of the soft palate. The first operative attempts were limited only to the soft palate; later in 1826 Dieffenbach designed the first technique for uranoplasty (closure of the hard palate). From this

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[2] Poul Fogh-Andersen, Inheritance of Harelip and Cleft Palate (Copenhagen: Nyt Nordisk Forlag. Arnold Busck, 1942), p. 33.

[3] Denis Browne, Personal Letter to the Experimenter.

date onward the techniques of plastic surgery have advanced from the goal of closing both the hard and soft palate, and now are seemingly approaching the goal of a competent functioning palate.

The present study proposes to review briefly the recent literature on types of cleft, etiology, and operative procedures, and to evaluate a group of 42 representative postoperative cleft lip and cleft palate cases, with the purpose of estimating the present status of the speech problem for the cleft palate child.

CHAPTER II

TYPES OF CLEFTS

Congenital facial anomalies have been known throughout history and "occur among all nationalities and races." [1] They not only afflict man but also animals. Dorrance says,

> . . . of these animals we may mention the lion, the horse, the dog, the cat, and cattle; and split lip has been seen in the house mouse. [2]

In order to understand better how these specific abnormal anatomical developments may occur, a brief review of the normal development seems in order.

About the fourth week of intra-uterine life the primitive mouth of the embryo is bordered by five protuberances, the fronto-nasal process, the maxillary processes, and the mandibular processes. The fronto-nasal process is situated above, the maxillary processes to the sides, and the mandibular processes below. During the course of development, the fronto-nasal process divides into one medial and two lateral elements, which grow downward and merge with each other and with the maxillary processes. On the medial process form two masses, known as the globular processes. They

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[1] G.M. Dorrance, The Operative Story of Cleft Palate (Philadelphia: W.B. Saunders Company, 1933), p. 298.

[2] Ibid., p. 368.

unite with each other to form the central third of the upper lip, including the philtrum, and the premaxilla. The globular processes also fuse bilaterally with the maxillary processes to form the jaw and the remainder of the upper lip. The medial nasal process forms the columella, while the lateral nasal processes join with each other to form the ala and the boundaries of the nasal opening. The maxillary processes grow medialward, but are prevented from joining by the interposition of the fronto-nasal segment. They form, besides the outer thirds of the upper lips, the greater part of the cheeks, palate and maxillae. The mandibular processes fuse with each other in the median line to form the mandible, the lower lip, and the chin. Arey says,

> . . . the development of the human face occurs between the fifth and eighth weeks of intrauterine life. [3]

Four elements combine to form the hard palate, the two median nasal processes and the two maxillary processes. Two shelf-like folds emerge from the maxillary processes to become the lateral palatine processes which go to make up the major portion of the palate. From the median processes develop the median palatine processes which, as has been

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[3] Leslie Brainerd Arey, Developmental Anatomy (Philadelphia: W.B. Saunders Company, 1946), p. 180.

noted earlier, form the premaxilla portion of the upper jaw. During the seventh and eighth weeks, the lateral palatine processes encounter the tongue, which rises at this period, so that the palatine processes bend downward. The tongue is withdrawn a little later and the processes proceed toward the median line. The halves of the palate unite, first with each other and then with the nasal septum. In about the ninth week of intra-uterine life union begins at the front and proceeds backward. Coincidentally bone appears in the front part and forms the hard palate. In the caudal area ossification does not normally take place. This area constitutes the soft palate and uvula. At about the eleventh week the hard palate is formed, and by the third month the velum is completely closed.

Failure or a lack of fusion of any one of these elements with its neighbor may produce a malformation of lips, jaws or palate.[5][10] Faulty fusion of the median nasal and maxillary processes or of the mandibular processes results in cleft lip. The cleft may involve either the fleshy lip or bony upper jaw alone, or both together. According to Arey, hare-lip, as it is commonly called, is one of the most frequent anatomical anomalies in human beings. Most authorities consider this a poor term, since the cleft is seldom median, like the notched lip of the hare, but lateral.

Clefts of the lip are generally placed in three groups, median (in rare instances), unilateral, or bilateral. Oldfield includes only two groups:

> Harelips may be classified as unilateral or bilateral, either of which may be complete or incomplete. The degree of deformity of nostril, lip and prolabium varies considerably within each of these groups and many ill-defined subgroups can be recognized. . . [4]

Padgett has described several clinical types of clefts. The infrequent medium upper cleft lip ranges from a mere notch to complete fissures that separate the two intermaxillaries. The lateral cleft of the lip is the most common form. It can be partial or complete. The partial cleft extends toward the nose in various degrees of severity; it may be a slight notch or it may almost touch the nose. Generally the floor of the nose is slightly widened. The - notch is lined with vermilion border. The complete cleft lip takes in the whole side of the lip, extending to the nostril. In these cases the alveolar border is generally cleft and the fissure may extend onward in the horizontal manner into the mouth.

> In complete alveolar ridge clefts the ala is pulled outward and the base is extremely rotated on a vertical axis. The tip of the nose is flattened on the cleft side and the cartilages are pulled downward, thus slightly increasing the length of the nose on that side. The intermaxillary process often projects toward the uncleft side, and the apex of the nose and septum usually are deflected somewhat to the sound side.[5]

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[4] Michael C. Oldfield, "Modern Trends in Hare-lip and Cleft Palate Surgery," The British Journal of Surgery, XXXVII (1950), 179-192.

[5] E.C. Padgett, Plastic and Reconstructive Surgery (Springfield: Charles C. Thomas, Publishers, 1948), p. 360.

The double cleft lip varies in extent of defect. Both sides may be completely cleft or partially cleft, while one side may be partially cleft and the other side completely cleft.

> The projection of the intermaxilla is not restrained by lateral connections, and the vomer may grow forward in double-sided cleft lip and cleft palate to form a clinical picture that has been described as the "Pope's nose." This projection of the intermaxillaries is often beyond the apex of the nose. The columella may be practically absent. The nose is flattened. The small area of the skin above the maxilla is surrounded with rim of vermilion border. The cleft in the alveolar ridge curve may vary from 0.5 to 2.5 cm. [6]

When the palatine processes fail to unite with each other and the nasal septum, a malformation known as cleft palate is produced. Describing the types of cleft palates is somewhat similar to describing any defect of man. They can be classified into groups but there are any number of variations within each group. Brophy, in an effort to include all the variations, lists fifteen types. In general, an attempt is made toward brevity and simplification.

LeMesurier states that with few exceptions all cleft palates fall into four groups:

1. Cleft limited to soft palate only.
2. Cleft extending forward into the hard palate, but not farther forward than the anterior palatine foramen.
3. Complete unilateral clefts extending the whole length of the palate and continuous with a cleft in the alveolus on one side of the midline.

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[6] Ibid., p. 360.

4. Complete bilateral clefts extending the whole length of the palate and continuous with clefts in the alveolus on both sides of the midline. The nasal septum lies free in the middle of the cleft and is continuous with the premaxilla. [7]

Oldfield considers Veau's classification to be the simplest as well as the most practical one.

Type I: Cleft of the soft palate only
Type II: Cleft involving part of the hard palate as well as the soft palate.
Type III: Unilateral cleft of the alveolus as well as the hard and soft palate, usually associated with unilateral harelip.
Type IV: Bilateral cleft of the alveolus as well as the hard and soft palate, usually associated with the bilateral harelip.

In Type II there often seems to be a defect in the soft-tissue elements, associated with a congenital shortening of the palate. There is a wide gap in the front of the cleft and sometimes there is also an absence of the palatal bone, whereas in Type III and Type IV there is usually no lack of soft tissue, but merely a failure of fusion in the midline. In a fairly high proportion of Type II cases the mandible as well as the maxilla seems to be imperfectly developed, and the success at operation in these cases is sometimes limited by the resulting mandibular regression. [8]

Oldfield suggests that two other types be included in this list.

Submucous clefts and an occult type of cleft which was described by Mengele in 1939. The soft palate in the midline is thin and membranous and contains no muscles; the levator sling is incomplete and the naso-pharyngeal sphincter incompetent. [9]

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[7] A.B. LeMesurier, "The Operative Treatment of Cleft Palate," American Journal of Surgery, XXXIX (1938), 458-459.

[8] Op. cit.

[9] Ibid.

According to Oldfield the occult type of cleft is seldom recognized and the speech defects accompanying it are considered functional rather than organic.

Dorrance and Bransfield have classified cleft palates into six groups:

1. Congenital submucous or congenital insufficiency of the soft palate
2. Cleft of the soft palate
3. Cleft of the soft and hard palate up to the premaxilla
4. Single complete cleft or unilateral lip-jaw-palate split
5. Double complete cleft or bilateral lip-jaw-split
6. Complete bilateral cleft with rudimentary vomer [10]

The submucous palate, in which there is a deficiency in the posterior part of the bony palate, has been recognized as a palatal anomaly since 1825. However, very few writers have classified it as a particular type. Dorrance has recognized the severe speech problem accompanying this defect and has devoted a chapter of his book to a discussion of the congenital insufficiency of the soft palate, in which he includes the submucous palate. In 1854 von Langenbeck differentiated three forms of congenital anomalies of the palate in which there was absence of bony tissue underneath the unaffected mucosa. Dorrance quotes von Langenbeck as follows:

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[10] G.M. Dorrance, and J.W. Bransfield, "The Push-back Operation for Repair of Cleft Palate," Plastic and Reconstructive Surgery, I (1946), 145-168.

1. Cases of cleft of the velum in which the bony palate is almost entirely absent, although the muscosal covering is present.
2. Cases of cleft of the velum and hard palate in which the fissures in the bony palate are more extensive than in the soft parts covering the palatal vault.
3. Cases of cleft of the velum associated with a fine split either in the midline or to either side of the vomer, with the mucosa intact. [11]

According to Dorrance,

> This deficiency may vary from a mere notch to a large V-shaped loss of bone. The palatal mucosa is always intact. The velum in this case is pulled forward with marked shortening in the anterior-posterior diameter of the palate. The central position of the velum which covers the deficiency in the bony palate is composed essentially of mucous membrane. This membrane can be seen to move up and down in the roof of the mouth during respiration. The insertion of the levator palati muscles in these cases is displaced forward. Hence they are unable to raise the velum upward and backward to the desired point against Passavant's cushion, at which point, as previously stated, velopharyngeal closure takes place. It must be remembered that there are cases of submucous cleft in which there is a submucous cleft in the muscular tissues and the palatal aponeurosis which enters to form the velum. [12]

Many American surgeons consider the classification of Ritchie and Davis (1922) as the most useful and most rational. This classification appears most often in the literature. Using the alveolar ridge as a fixed point, the authors divided the clefts into three groups.

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[11] Op. cit., p. 298.

[12] Ibid., p. 300.

Group I. **Prealveolar Process Cleft**
In this group, the alveolar process, and the hard and soft palate are normal. The defect is that of a cleft in front of a normal alveolar process.

Group II. **Postalveolar Process Cleft**
In this group the lip and the alveolar process are normally united. The hard and the soft palate are cleft in varying degrees. There is one definite, constant similarity; the clefts are always symmetrical. They differ in the anterior posterior extent and in the width measured at the junction of the hard and soft palate. There is equal tissue on either side, except in an occasional case . . .

Group III. **Alveolar Process Cleft**
The value of the classification and plan of record is most evident in this group. In Group I and II the combination and degree of the clefts run rather closely to form because the alveolar process is closed. When the process is cleft, as in Group III, there are so many possible combinations and degrees of failures in embryonal growth that the usual terms of description appear most inadequate.
The chart allows the description of each cleft separately, viz., the lip, alveolar process, hard palate and soft palate. Several combinations may be thus accurately described. . . cases which it is not possible to record clearly in any other way. [13]

As investigators classified clefts, many noted the relative incidence of the clefts for each type. Very little disagreement is found among the results of the various surveys. In 1000 cases Fogh-Andersen found these frequency results:

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[13] H. P. Ritchie, "Congenital Clefts of the Face and Jaws," Archives of Surgery, XXVIII (1934), p. 623.

Cleft lip 25 per cent.
Cleft lip and hard and soft palate 50 per cent.
Cleft of soft palate (Cleft of the hard palate alone never occurs) 25 per cent. [14]

For a clearer picture of the incidence of clefts for each type, the writer has given the tables from the studies of Veau, Oldfield, Ritchie, Fogh-Andersen and Beatty.

Table IV. Incidence of the Four Types of Cleft Palate. [15]

	Veau 1000 Cases	Oldfield 412 Cases	
	Percentage	Cases	Percentage
Type I	20.8	57	13.8
Type II	30.8	153	32.2
Type III	38.8	162	39.5
Type IV	9.6	60	14.5

Table II. Sex Distribution Among Cases of Harelip Alone, Cleft Palate with Hare-lip, and Isolated Cleft Palate. [16]

	Males	Females
Hare-lip	53	35
Hare-lip and Cleft Palate	168	77
Cleft Palate	81	86

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[14] Poul Fogh-Andersen, p. 33.

[15] Oldfield.

[16] Ibid.

Ritchie's Chart from Survey of 350 Cases [17]

Classification	Types	Cases	Females	Males
Group I	Right Cleft	11	9	2
	Left Cleft	26	10	16
	Bilateral Cleft	1	1	0
Group II	Hard Palate degree of cleft			
	2/3	22	17	5
	3/3	11	7	4
	1/3	6	5	12
	Soft Palate only	6	4	2
Group III	Left Cleft	110	33	77
	Right Cleft	55	17	38
	Bilateral	51	17	34
	Normal Palate			
	Left Cleft	24	7	17
	Right Cleft	11	7	4
	Bilateral Cleft	7	2	5

About three-fourths of all cases are recorded in the third group.

[17] Ritchie.

Fogh-Andersen Chart with 625 Cases [18]

Types	Cases	Males	Females
Hare-lip	138	90	48
Hare-lip, Cleft of Soft and Hard Palate	360	257	103
Cleft of Soft Palate only	127	43	84

Fogh-Andersen Chart with 703 Cases [19]

	Hare-lip		Hare-lip and Cleft of Soft and Hard Palate		Cleft of the Palate	
	Males	Females	Males	Females	Males	Females
Left	60	28	119	60		
Right	18	15	50	26		
Double	12	5	88	17		
[a]Small					51	68
[b]Large					21	65

[a] The soft palate alone or the posterior 1/3 at most of the hard palate.

[b] A cleft that extends forward through 1/2 or more of the hard palate.

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[18] Fogh-Andersen, Pp. 154-5.

[19] Ibid., p. 162.

Beatty's review of 600 cases suggests that the incidence may occur in this manner:

	Percentage	Cases
	Complete cleft of alveolar process, hard and soft palate.	
Group I	47.8	152
	26.32	40 right cleft
	46.05	70 left cleft
	27.63	42 bilateral
	Cleft of hard and soft palate only.	
Group II	29.24	93
		0 right
	5.38	5 left
	94.62	88 bilateral
	Cleft of hard and soft palate complicated by cleft of one side of hard palate.	
Group III	10.7	34
	Cleft of alveolar process only.	
Group IV	7.23	23
	17.39	4 right
	78.26	18 left
	4.35	1 bilateral
Group V	Cleft of the soft palate only.	
	5.03	16

Of the 282 hare-lip cases in various complications:

7.12	20 were rt. side simple hare-lip cases.
19.14	54 were rt. side harelip and cleft palate.
14.54	41 were left side simple harelip cases.
33.33	94 were left side harelip and cleft palate.
3.9	11 were left side bilateral harelip alone.
21.27	60 were left side bilateral and cleft palate.
7.	2 were associated with soft palate only. (Very rare)[20]

[20] Hugh G. Beatty, "Etiology of Cleft Palate and Hare-lip," Journal of Speech Disorders, 1 (1936), 13-20.

Summary

The classification of clefts are numerous. Brophy lists as many as fifteen types of clefts. In general, an attempt is made toward brevity and simplicity.

It is generally agreed that hare-lip occurs more frequently in males, and that more often the clefts are on the left side. The unilateral clefts of the upper lip and alveolar process are nearly twice as frequent on the left side as on the right, and about twice as frequent in males as in females. Double hare-lip and cleft soft and hard palate also occur more frequently in males, whereas isolated cleft soft palate is more frequent in females.

CHAPTER III

ETIOLOGY

Because cleft lip and cleft palate are directly related pathogenetically, they will be discussed as one anomaly in this chapter.

The anatomical development of the cleft is generally agreed upon, but the "why" of cleft development remains a mystery and a matter of conjecture. From the first cleft palate and lip, man has been proposing reasons. Medical literature abounds in theories; some, after tests and retests, have been placed on the historical shelf, others are in the process of evaluation.

Prenatal maternal impression for many years was considered the most influential cause. In the early months of pregnancy a mother might see a hare, or a hare-lipped child; she might become frightened by a snake, or suffer a fall. Any one of these experiences could result in a child with a cleft palate. It is the old superstitious story of "marking" a child. Pinard, according to Sanders, relates the following case, which is an example of many regarded as substantial proof for belief in this theory.

> A woman in the early stages of pregnancy goes to a museum and on seeing various monsters has a fainting fit. She subsequently has a miscarriage

> and the foetus exhibits several deformities; double hare-lip, cleft palate, perforation of the pharynx. [1]

Kaufman, even in the year 1946, says,

> At present the influence of maternal impression cannot be absolutely denied, but the mother will state positively that she had not the maternal impression during gestation and in many cases where strong maternal impression existed, the offspring was perfectly developed. Many eminent obstetricians have admitted the possibility of maternal impression being the cause. [2]

The majority of the writers agree that all too often the reported unfortunate incident is found to have occurred much later than the embryologic time of union between the several processes. It is felt that this explanation as to cause should be eliminated.

Syphilis and supernumerary teeth, once thought of as primary causes, are now in the process of being discarded. Several investigators have found negative Wasserman in their cases. Ritchie claims that he found only one case of syphilis, and that in the mother. He did not make routine tests, but checked when syphilis was suspected. Perhaps the most significant evidence is that syphilis appears to be decreasing, whereas cleft palate and cleft lip are not decreasing. Fogh-Andersen's study which was made in Denmark, a country with a relatively low incidence of syphilis, showed

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[1] J. Sanders, "Inheritance of Harelip and Cleft Palate," Genetica, XV (1933), 433-445.

[2] 1. Kaufman, "A Treatise on Harelip and Cleft Palate," Orthodontics, XXXII (1946), 47-51.

a rather high incidence (1-665) of cleft palate and hare-lip.

Certain proposed causal factors-- age and mentality of the parents, nationality, cross-breeding, endemic (locality) factors, pathological changes in the reproductive organs, place in the birth series, continue to be checked when an investigation is in progress, with about the same results each time. Grace's study concludes that

> The county distribution did not suggest any significant pattern nor was study of the birthplace of the mother fruitful. The highest percentage of cleft palate infants were born to mothers of 21-25 age group. Of the 250 cleft palate infants 41.6% were primiparaous while 38.6% of Pennsylvania's babies (1940) were primiparaous. [3]

Ritchie's research gives this information:

> Neither the ages of the parents, nor the disparity of ages between the father and the mother apparently have any bearing on the problem. A record was made of nationalities and consequent cross-breed. It is interesting to note the many strains that go to make up the American but I cannot interpret these as having a bearing on the subject. A study of the mentality of the father and the mother was also made. This interpretation is most elusive, and while it is not uncommon to encounter mothers or fathers who are exacting and suspicious, and some that may be loosely described as morons, on the other hand there are many of a high degree of intelligence. There was only 1 case in which there was a history of gross mental disorder. . .[4]

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[3] Linwood G. Grace, "Frequency of Occurrence of Cleft Palates and Harelips," Journal of Dental Research, XX (1943), 495-497.

[4] H. P. Ritchie, "Congenital Cleft of the Face and Jaws," Archives of Surgery, XXVIII (1934), 617-658.

Oldfield found 40 per cent of the cases he checked were first born, while 60 per cent were the result of subsequent deliveries.

According to Fomon, "The age and mentality of the parent, consanguinity, pathologic changes in the reproductive organs, and syphilis do not appear to play a part". [5]

Murphy's study of parental characteristics with special reference to the reproductive process furnishes these data:

> The observations which have been made during the course of the present investigation lead to the general conclusion that gross human congenital malformations arise solely from influences which affect the germ cells prior to fertilization. No evidence is available to indicate that they result from factors which operate for the first time after fertilization has taken place. [6]

Three explanations appear most often in recent literature: mechanical influences, nutritional factors, and heredity. One writer may list mechanical influences and heredity, another will include nutritional factors and heredity while another accepts all three as being contributing factors. Mechanical agents refer to intervening mucosa during dental evolution, amniotic bands, intra-uterine adhesions, hypertrophy of the pharyngeal tonsils, failure of the tongue to

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[5] Samuel Fomon, The Surgery of Injury and Plastic Repair (Baltimore: The Williams and Wilkins Company, 1939), p. 1121.

[6] Douglas P. Murphy, Congenital Malformations (Philadelphia: University of Pennsylvania Press, 1940), p. 93.

descend from between the palatal processes, cord interference, and tumor formation. Schultz, a proponent of this theory offers this information:

> In the fourth or fifth week of intra-uterine life, the first branchial arch closes and forms the lower jaw. This structure, being V-shaped, is forced between the three centers of ossification of the upper jaw, therefore, does not unite. The tongue is relatively enormous at the time, more than filling the oral cavity; this, too may prevent the union of the parts. Other mechanical causes are aminiotic adhesions, cord interference, by being wrapped around head, tumor formation, and interference of hands and feet.[7]

According to Toma, several investigators believe that the tongue develops in an upward direction so as to have normally a great deal to do with the union of the palatal processes, and, therefore, when failing to develop normally, it prevents the union of these processes. This is especially the case in abnormal head position of the fetus.

Sanders says,

> It cannot be denied, that these mechanical causes exist. They seldom occur, however, that in the majority of cases they may be disregarded. Moreover there is the further knotty point: did harelip or cleft palate already exist and therefore cause the mechanical trouble or was the latter the primary factor. [8]

Several writers agree with Sanders' statement. They feel that since the evidence consists only of isolated cases,

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[7] Louis W. Schultz, "The Care of the Cleft Lip and Palate in Babies," Illinois Medical Journal, LXXXVI (1944), 138-157.

[8] Op. cit.

the mechanical factor should not be considered a primary cause, at least not for the majority of the clefts.

Webster's statement on nutrition is often quoted. "It is a well-known clinical fact that cleft palate is rare in the well-to-do, and much more often seen in the children of poor parents". [9] Malnutrition of the mother in the first months of pregnancy is supported by limited clinical evidence which suggests that it may be an important etiological factor in the causation of clefts. Blair states,

> Observation carried on over a number of years has led me to believe that ill health of the mother, excessive vomiting or some tooth infection or dental operation may be followed by an open cleft, but this is hard to prove statistically. [10]

Schultz says,

> Malnutrition is another factor to play an important role in the cause of cleft lips and palates. The time element of this lesion, i.e., the fifth or sixth week of intrauterine life, coincides perfectly with the time of malnutrition induced by hypremesis gravidarum. Both occur in the fifth or sixth week of gestation. Many mothers, however, will say they were sick during the early months and their children have no cleft lip or palate. [11]

Kaufman accepts faulty nutrition as one of the most important causal factors. He asserts,

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[9] Richard C. Webster, "Cleft Palate", Part I, Oral Surgery, Oral Medicine and Oral Pathology, I (1948) 647-669.

[10] Vilray P. Blair, "Correcting Mother Nature's Mistakes", Hygeia, IV (1926), 326.

[11] Op. cit.

> The influence of faulty nutrition has not been clearly proved in the human race. Women who have received the most liberal and nourishing diet during the entire period of gestation have frequently given birth to children with clefts. On the contrary women who have existed on the most meager diet and on one, or two varieties of food during the entire period of gestation have given birth to perfectly normal children. [12]

Shearer's belief is

> . . . that defective nutrition or general debility of the mother during the early months of gestation from any cause, may delay union of the palatal plates. . . Nature does not fail to develop the necessary bone and soft parts to form a normal palate, but it does fail to bring the parts into apposition and unite them. [13]

One of the chief arguments for this theory has been the animal experiments carried on in Berlin and London in zoological gardens with lions and jaguars. Fresh meat without bones was fed to the animals. It was found that in these cases many of the offspring had cleft palates. This has been discredited by Lyons who says,

> Sir Arthur Keith, an officer of the London Zoological garden has stated that it was true that lion cubs born in the garden frequently had cleft palate, but that careful experimentation, both with food and water, failed to show any relationship between the mother's food and the occurrence of the defect. [14]

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[12] Op. cit.

[13] William L. Shearer, "Cleft Palate and Cleft Lip," The Nebraska State Medical Journal, XXX (1945), 125-126.

[14] Chalmers J. Lyons, "Etiology of Cleft Palate and Cleft Lip," The Journal of the American Dental Association, XVII (1930), 827-834.

Oldfield refers to one of the animal experiments in this manner:

> Animal experiments suggest that maternal malnutrition or disease during the first three months of pregnancy may "uncover" a pair of recessive genes bearing the cleft-causing factor. Breeders discovered many years ago that when the diet of lionesses or bulldog bitches during the early weeks of pregnancy was deficient in fresh meat, a high percentage of the cubs or puppies were born with clefts in lip or palate. Adequate supplies of fresh meat reduced the incidence to negligible proportions. (Vevers, 1940). In man little experimental data are available, but it was accepted that in previous generations, before rationing, harelip and cleft palate occurred most frequently in children of poor people and was rare in the families of the well-to-do. Recently, however, Fogh-Andersen found no evidence of this in Denmark. [15]

The mothers of the malformed offsprings in Murphy's study were not especially unhealthy; however, their diets were found to be significantly lacking in adequate amounts of calcium, phosphorus, iron and vitamins B C D. Davis and Grace found that cleft palates occur less frequently in the Negro race in this country; thus, environment, social and nutritional status are apparently of little importance. In the same study made by Grace, the incidence of cleft palate was greater in the public ward, with a ratio of 1-895 as compared to 1-981 in the private ward.

Hereditary influences have for many years been mentioned as a possible causal factor. An isolated case here and there has furnished the evidence. Data have steadily been

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[15] Op. cit.

coordinated and assembled into a pattern that appears to make approximate case for heredity. One piece of evidence is the familial incidence noted in the various studies. The investigators have expressed the feeling that much of the information from parents is false or absent, either because the parents do not wish to reveal the information, or because they are reticent, or they do not know. The writers think that when this fact is taken into consideration, the percentage in the table may be really large.

Familial Incidence Assembled from Various Investigations

Investigator	Date	Percentage	Cases
Sanders[16]	1934	44.6	392
Schroder[17]	1931	20	182
Ritchie[18]	1934	9.2	350
Haentzchel[19]	1935	20.4	
Davis[20]	1935	54	1,000
Shearer[21]	1935	95	Over 1,000
Fogh-Andersen[22]	1942	30 to 40	703
Oldfield[23]	1949	11	500

[16] Op. cit.

[17] Ibid.

[18] Op. cit.

[19] C. E. Padgett, Plastic and Reconstructive Surgery Springfield: Charles E. Thomas, Publishers, 1948), p. 360.

[20] Warren B. Davis, "Congenital Deformities of the Face", Surgery, Gynecology and Obstetrics, LXI (1935), 201-203.

[21] Jacob C. Lifton, "Orthodontics in the Treatment of Cleft Palate," American Journal of Orthodontics and Oral Surgery, XXVII (1941) 423-453.

[22] Oldfield.

[23] Ibid.

The fact that other congenital deformities are common in individuals servesas further evidence for heredity. Dorrance writes,

> It is known that heredity plays an important role, for defects may be handed down from generation to generation. Any type may repeat itself in the offspring and it is well known that persons with congenital anomalies of the palate frequently present malformations in other parts of the body. [24]

As evidence of this statement, Dorrance lists the following-named defects that he has observed in his practice.

Macroglossia
Split tongue
Tumors of the tongue
Adhesion of the tongue to the border of one side of the split palate
Supernumerary teeth, particularly the incisors
Suppression of one or more of the incisors
Maleruption of the teeth and irregularity of the dental arches
Stunting of the teeth, particularly the incisors
Intra-uterine scars of the face
Asymmetry of the skull
Anomalies of the eye
Skull anomalies
Anomalies of the brain
Absence of the olfactory nerve
Microcephalus
Imperforated external acoustic meatus and middle ear
Spina bifida
Webbed toes
Webbed digits
Clubfoot and clubhand
Square thumb nail
Square large toenail
Accessory digits
Deficiency of digits [25]

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[24] Op. cit., p. 356.

[25] Ibid.

In Ritchie's study he found these deformities and conditions.

> Umbilical hernia
> Large birthmark on left hand
> Right inguinal hernia
> Mongolism
> Mentally defective, hydrocephalic
> Subnormal, with big head
> Cleft at each angle of the mouth
> Congenital deformity of right hand
> Coloboma of eyelid
> Dermoid of eyeball
> Extra thumb on right hand
> Equinovalgus: absence of left thumb
> Enlarged thymus
> Mentally subnormal
> Penile Hypospadias, brother with spina bifida
> Eczema and enlarged thymus
> Undescended testicle
> Umbilical and right inguinal hernia [26]

The incidence of these associated deformities varies with each study. Ritchie found 26 cases out of 350, Oldfield listed 20 per cent of the 500 cases he studied. Fogh-Andersen concluded from his study

> . . . that harelip and cleft palate are most likely associated with other severe malformations of any kind in 10 per cent or more of the cases, while the "normal" frequency of these malformations hardly exceed 1 per cent. [27]

He goes on to say that the per centage would be much higher if death did not occur, so that the defects were not recorded.

There is also evidence that associated deformities may or may not be present in the parents or grandparents, or

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[26] Op. cit.

[27] Poul Fogh-Andersen, Inheritance of Harelip and Cleft Palate (Copenhagen: Nyt Nordisk Forlag. Arnold Busck, 1942), p. 187.

a cleft may exist in one member of the family and other deformities in other members. Lyons gives an interesting example as originally told by Haight concerning

> . . . a Malay family of seven children born within ten years and all dying in infancy, only one of which was without external malformation. The six children presented the following deformities:
>
> 1. Absence of cartilage of left ear
> 2. Double cleft palate and harelip
> 3. Absence of left forefinger
> 4. Absence of left great toe
> 5. Dermoid of neck
> 6. Occipital hydroencephalocele [28]

A number of studies and observation on twins give evidence of the possible hereditary factor in cleft lips and cleft palates. Fogh-Andersen studied 131 pairs of twins, partly from literature, and partly from his own material and reached the conclusion that

> There is a frequency of concordance among monozygotic twins which, at least in the case of harelip with hard and soft cleft palate is distinctly greater than among dizogotic twins, among whom the frequency is nearly the same as among other siblings, thus bearing out the assumption that hereditary factors are of considerable importance etiologically. [29]

With more limited data, Ritchie observes,

> In . . . two sets of twins, in both cases apparently not identical, one child had a cleft and the other child was normal. In another set, one child had a double harelip and the other one was normal, while in a pair of true, identical twins both had the same series of clefts, but reversed. [30]

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[28] Op. cit.

[29] Op. cit., p. 209.

[30] Op. cit.

Shea and Nelson report one case of bilateral hare-lip and unilateral hare-lip with cleft palate in fraternal twins. They commented on the rarity of the case. Only one or two other cases of this type have been noted in the literature. Fitzgerald tells of a foetus he observed at the department of embryology, McGill University. "It was born at time, with a single trunk, four extremities, two heads, and two necks. Each head had a cleft lip and cleft palate on the right side." [31]

Clinical observation and experimental results increase the evidence on the side of heredity. From Schultz's experience he has this to say,

> The etiological factor that is most influential is heredity. The frequency of the lesions in parents and children of the same family or in several children of the same family in varying degrees suggest heredity as the likeliest cause. The lesion may very easily be overlooked for a generation or two if the deformity is minor. A bifid uvula, a slight notching of the upper lip or a congenital scar of the lip, may easily escape observation. Such may go unnoticed throughout the lives of immediate kin-- father, mother, uncle, or aunt, and yet all be afflicted. [32]

Fogh-Andersen's recent study on cleft lips and palates has revealed significant information. Using his study and that of Fogh-Andersen as a basis, Oldfield concludes that heredity must be accepted as the most important etiological factor.

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[31] R.R. Fitzgerald, Personal Interview.

[32] Op. cit.

However, he intimates that other factors may have influential effect.

> It seems probable that a recessive gene is responsible in most cases, but not all individuals who inherit the requisite genetic constitution suffer from the deformity, and the classical mendelian figures are not found. It may be that additional influences have to exert their effect before the deformity becomes manifest. Exactly what other factors are involved is not known. Some may be genetic also, and sex genes or relative growth genes may be involved. Some may be purely environmental such as malnutrition or disease, like rubella, occurring early in the mother's pregnancy. It is probably that the double dose of recessive factor makes the developing embryo unduly sensitive at critical periods, especially during the first three months of gestation, to what would otherwise be unimportant variations in uterine environment. From the figures of incidence of the deformity in affected families, apparently only one-quarter bearing the double dose of recessive, develop the deformity. Sex seems to be an additional genetic factor of considerable importance, for when considering all types of deformity boys are much more often affected than girls. There is evidence also that at least one of the gene pairs causing an extensive cleft may be partially sex linked (Haldane, 1936- Mather and Philip- 1940). Harelip, with or without cleft palate, is more common in boys. [33]

Fogh-Andersen's hereditary prognosis has been included because it may shed further light on the question of cause.

> Ha. cl.pa.: [34] The offspring of a patient with this affection is but rarely deformed, even if there are found several cases in the family (the chance is probably about 2 per cent), but marriage with a related person or with a person in whose family there occurs ha. (cl. pa.) [35] should be advised against. . .

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[33] op. cit.

[34] Ha. cl. pa--harelip associated with cleft palate.

[35] Ha. (cl. pa.)--harelip with or without associated cleft palate.

> If first a patient with ha. (cl. pa.) has a child with the affection, the chance is greater for the next children to come (presumably 10 to 15 per cent). . .
>
> If two normal parents have a deformed child, the chance for the future children is only 4 to 5 per cent, so accordingly there is generally no reason to advise against more pregnancies;. . .
>
> Isolated cl. pa.: With regard to this affection a distinction ought probably to be made between solitary and hereditary cases. If the case is the only one in the family, whether it is a parent who has cleft palate, or normal parents have a child with cleft palate, the figures of chance are so small that they do not justify one in taking measures of any kind. [36]

Accepting the fact that a recessive factor is involved, the question arises as to just how it is involved. There are several viewpoints.

Fortuyn asserts that

> The observations of Birkenfeld, Schroder and Sanders on harelip and cleft palate in man can be arranged in such a way that all support the hypothesis that the trait is inherited as a double recessive, one gene being autosomal and the other sex-linked. This explains the fact that harelip is twice as common in the male as in the female. [37]

"Sanders feels that there are multiple factors involved. Reed and Snell think there is one principal gene and several modifying factors." [38] Fogh-Andersen offers this

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[36] Op. cit., p. 246-247.

[37] A.B. Droogleever Fortuyn, "Inheritance of Harelip and Cleft Palate in Man," Genetica, XVI (1935), 349-366.

[38] Thomas J. Hill, A Text-Book of Oral Pathology Philadelphia: Lea & Febiger, 1949), p. 26-27.

suggestion,

> It has been demonstrated that there are two different malformations with no genetic connections, viz.1) harelip with or without associated cleft palate, and 2) isolated cleft palate. Ha. (cl. pa.) occurs most frequently in males. Most cases of ha. (cl. pa.) are hereditary, whereas the same is only the case with a relatively small number of isolated cl. pa. The manner of inheritance has been judged of on the basis of the pedigrees and the empirical figures of genetic prognosis. For ha. (cl. pa.) it is supposed to be that of "conditioned dominance" with sex-limitation to males, and considerably less manifestation of the heterozygotes than of homozygotes, so that the affection is most often of a recessive character. For isolated cl. pa. it is supposed to be that of simple dominance with failing manifestation and sex-limitation to females. [39]

Other hypotheses have been mentioned in the literature: Mutation of genes was suggested as a possible cause by Lyon. He proposes that chemical or physical changes may bring about abnormalities. Kaufman suggests a defective vascular supply as a probable cause. This would account for the more frequent occurrence of clefts on the left rather than the right side. Rh sensitivity has been considered as a possibility. Oldfield says it does not appear to play any important part in the causation of hare-lip and cleft palate. The effect of rubella early in pregnancy has been proposed and is now in the process of investigation.

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[39] Op. cit., p. 240-241.

Summary

Prenatal maternal impression, syphilis, and supernumerary teeth as causal factors have been more or less discarded by the majority of writers. Almost all the authors admit that little is known about the cause of clefts, yet each has his own theory or theories. Mechanical agents, nutritional factors, and heredity are felt to have influencing force, however, of these possible causes heredity is considered to be the most probable causal factor.

CHAPTER IV

OPERATIVE PROCEDURES

The plastic suregon is confronted with several problems when he undertakes to perform an operation for cleft palate or cleft lip. There are the questions of defining the conditions of the mouth, choosing the optimem time for surgery, and determining the objective; and finally there is the choice of the type of surgery used.

For many years there has been a disagreement on whether the clefts and fissures represent arrested development or are only a failure of the developed processes to fuse. In either case, the condition affects the surgeon's plans for the repair. One group of writers contends that it is arrested development and would operate accordingly. Dorrance, a proponent of this belief, says,

> Nearly all cleft palate patients have a short palate. However, individuals with cleft velum alone, and subjects with a cleft which extends as far forward as the junction of the middle third with the anterior third of the hard palate, have shorter palates than those with lip-jaw-palate split. [1]

Wardill, in agreement with Dorrance, says, "In dealing with speech, one has to recognize that the palate is always

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[1] G.M. Dorrance, The Operative Story of Cleft Palate (Philadelphia: W.B. Saunders Company, 1933), p. 403.

deficient in amount, both with regard to its lateral and antero-posterior dimensions." [2]

Another group claims that failure to fuse is the cause of clefts and fissures, and would operate with that in mind. Shearer says he follows the belief of Brophy.

> The deformity is not the result of "defective formation in the palatine plates" nor "congenital deficiencies of the parts in question," nor arrested growth of the palate, nor "absence of portion of the palatine tissues." All children who have congenital cleft palate, with rare exception, have in the palate the normal amount of tissue, although it is not united in the median line; it is cleft. [3]

There are those who think that either condition may occur but the extent of the cleft will be different. Oldfield says,

> In Type II there often seems to be a defect in the soft-tissue elements associated with a congenital shortening of the palate. There is a wide gap in the front of the cleft and sometimes there is also an absence of the palatal bones, whereas in Type III and IV there is usually no lack of soft tissues, but merely a failure of fusion in the midline. In a fairly high proportion of Type II cases the mandible as well as the maxilla seems to be imperfectly developed. . . . [4]

Evidence collected over a period of years seems to indicate that in the majority of cases there is lack of development.

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[2] W. E. Wardill, "The Treatment of Cleft Palate," The British Dental Journal, LVIII (1940), 5 - 11.

[3] William L. Shearer, "Cleft Palate and Cleft Lip," The Nebraska State Medical Journal, XXX (1945), 125-126.

[4] Michael C. Oldfield, "Modern Trends in Harelip and Cleft Palate Surgery," The British Journal of Surgery, Vol. XXXVII (1950), 172-192.

Although fewer surgeons are now adhering to the belief that the normal amount of structure is present, it is still a debatable issue, and the surgeon's personal belief may determine certain phases of his operative procedure.

Padgett, in a summary of the problem of the optimum time for surgery, writes,

> Two situations--the ideal one and the surgically feasible--are to be balanced in selecting the preferable age at which to operate. Up until about the last decade of the last century, cleft palate were operated after the child was several years of age and had learned to talk. Treves recommended the age of five, and earlier surgeons waited until as late as the age of twelve years, and thought that age preferable. At this late age, there was thought to be a relatively large amount of tissue in proportion to the cleft to be bridged, as the alveolar ridge was thought to - come together somewhat, and the arch of the palate to become relatively high. Furthermore, it was argued that the desire for relief by the time this age was reached aided in obtaining a good result. Later, it was argued that the nasopharynx, nasal cavities, and the tongue developed abnormally in the unclosed cleft palate, and that the imperfect speech is never corrected after such a late restoration of the palate. The question of function brought up a point not entirely settled today. Most observers, however, believe that on an average the later the operation, the poorer the function. However, even at the present time Axhausen maintains that the optimum time for a cleft palate operation is about three years of age, and that, function is not decreased by the long wait. Lane and Brophy developed their procedure in the last decades of the past century. As it was at that time theoretically assumed at least, that the sooner the cleft palate was closed, the nearer the approach to normal function, Lane, therefore, closed the deformity almost immediately after birth. Of interest in this connection are the present-day statistics of Veau and Borel who claim 70 per cent normal phonation in children operated within the first year, 69 per cent in the second year, and 26 per cent in the third year. The question on the other side is operative mortality. It decreases as the age increases. Veau's mortality is: in the first year

> 86 cases . . . 9.4 per cent; in the second year
> 122 cases . . . 5.7 per cent; in the third year
> 72 cases . . . 2.7 per cent. [5]

The trend today appears to be to close the palate between the ages of 18 months and 2 years. However, there are those who still contend that even earlier operation is necessary, and there are some who maintain that late operations at five to six years are the most effective. Oldfield thinks that

> The palate should be repaired when the child is between one year and two years old, usually, about eighteen months and two years old, so that the palate and nasopharyngeal valve are already effective when the patient learns to speak. Operations for repair of the palate in infants under a year old are not followed by any better speech results, but are associated with a mortality of over 2 per cent for operations during the second year. [6]

Schultz maintains that

> Closure of the palate before the baby is from 4 to 6 months old goes far to insure normal speech. The operator who defers these operations to ages ranging 16-18 months to what is much worse 5 to 6 years of age has done irreparable harm. [7]

Dorrance says,

> The age of choice for cleft palate operations has always been a subject for discussion. It is our opinion, as to this point, each case of cleft palate is a law unto itself, the decision as to the proper time to operate being influenced by such factors, as the general health of the child, the type and extent of the deformity, and the character of the tissue. We believe that when conditions

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[5] E. C. Padgett, Plastic and Reconstructive Surgery (Springfield: Charles C. Thomas, Publishers, 1948), p. 391.

[6] Op. cit.

[7] Louis W. Schultz, "The Care of Cleft Lip and Plate in Babies," Illinois Medical Journal, LXXXVI (1944), 138-157.

> are favorable, the safest age to operate for cleft palate is about the fifth year of life. In our experience, operations performed after the fifth year are free from mortality and the failures are less frequent. [8]

The preferable age for lip repair is not as controversial as that in respect to the palate. The consensus of opinion is that it is best to perform the operation as soon after birth as the condition of the child and other governing factors will permit. Oldfield possibly speaks for many when he says,

> The repair of the hare-lip should never be undertaken before the baby's feeding is stabilized and it is thriving, and gaining weight; "When the baby weighs 10 lbs," a traditional though arbitrary index of this, is nevertheless, a useful practical guide. [9]

The objectives for an undertaking often change with increasing knowledge and understanding, so it is with the objectives of cleft palate surgery. At first the goal was to close the soft palate and hard palate, later it was to close more effectively both hard and soft palates. Then the pioneers in this field of surgery recognized that perfect speech could be obtained only when nasopharyngeal closure could be achieved. Thus nasopharyngeal closure was added to the list of objectives. Some present-day writers propose a three-fold objective plan, others present a two-fold one. Blair outlines a three-fold objective course.

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[8] Op. Cit., p. 397.

[9] Op. cit.

> First, the preservation or restoration of the normal contour of the palate vault and dental arch; second, to preserve as far as possible the structures, the pliability and the muscle control of the velum. The third and paramount objective, to which all other considerations are secondary, is control of the air leak that occurs not only through the palate cleft but also through an abnormally wide post-velar aperture. [10]

According to Boyne, "Our results today are measured by the quality of speech, by closure with the least deformity to the dental arch, and the alignment of the teeth." [11] Dorrance in a brief statement writes, "The ultimate purpose of operations for cleft palates is to close the defect and establish normal speech." [12] Webster agrees that speech is the most important criterion by which the procedures should be judged, but that other factors should not be overlooked.

> Mortality, immediate postoperative complications, the effects of the operation on the development of the middle third of the face, the teeth, the dental arch, the maxillary sinuses, and the mandible, the effects on the respiratory, swallowing, olfactory, taste, and hearing physiology, . . . [13]

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[10] Vilray P. Blair, "Cleft Palate--Its Surgery," Journal of Speech Disorders, II (1937), 195-198.

[11] Harry N. Boyne, "Modern Results in Cleft Palate Surgery," The Nebraska State Medical Journal, XXX (1948),306-308.

[12] Op. cit., p. 403.

[13] Richard C. Webster, "Cleft Palate," Part II, Treatment, Oral Surgery, Oral Medicine and Oral Pathology, II (1948) 485-542.

It may be said that the proposed solutions to the first three problems formulate the basic philosophy of the surgeon, while the solution of the last will indicate how wisely he has chosen.

In choosing the type of surgery to be used, the majority of surgeons may follow the advice given to Dr. Merrifield by Dr. Gilman when he asked what operative procedure he should use: "The best thing for you to do is to pick out a good operation which you know will work and then build up your own operation around that." [14] Each surgeon is aware that no single procedure will correct every lip or palate and so each makes his own modification and adapts the method or standards to the individual situations. For this reason it is necessary for him to be familiar with the various types of methods that have been devised, so that he borrows a part of the technique or methods of another operator when he feels it will facilitate the closure and give better results.

The fundamental types of palate operations are, operations for closure of the cleft, and operations for lengthening the palate. Any one of the four procedures may be used for closing the cleft.

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[14] Schultz.

a. Mesial displacement of the mucoperiosteum covering the palatal plates, and suture in midposition.

b. Shifting and turnover flaps from one palatal plate to the other.

c. Fracturing the palatal bones mesially and midline suture of the mucoperiosteum.

d. Compression of the palatal plates. [15]

For lengthening the palate, any one of 4 procedures may be used: (1) uniting palatopharyngei muscles, (2) using tissue from the pharynx to form pharyngeal flaps, (3) combining surgery and prosthesis, (4) retro-displacement of the palate.

From the lists above, the writer has included only those operative procedures which seem fundamental to this study, as well as to present-day surgery. Modifications of the basic techniques have not been included except when a definite refinement warranted recognition. For a complete review of operative procedure, the reader is referred to Webster's excellent report on "Cleft Palate Treatment". [16]

Uranoplasty [17] and uranostaphylorrhaphy [18] performed by mesially displacing a flap from each side of the split palate and securing the two flaps together at

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[15] Harold Stearns Vaughn, Congenital Cleft Lip, Cleft Palate and Associated Nasal Deformities (Philadelphia: Lea and Febiger, 1940), p. 120.

[16] Op. cit., Pp. 943-980.

[17] Uranoplasty applies to any plastic operation for the correction of a hard palate cleft.

[18] Uranostaphylorrhaphy indicates the operation for surgical closure of a cleft of the hard and of the soft palate.

> the medial line is commonly known as the von Langenbeck operation.[19]

This operative technique serves as a basis for present-day surgery. In literature the procedure is referred to by some operators as the Dieffenbach-Warren operation, by others as the Dieffenbach-von Langenbeck procedure, others as the Dieffenbach-Warren-von Langenbeck procedure, and by others as the von Langenbeck procedure. The reason for this inconsistency is explained in this statement made by Dorrance:

> "While Dieffenbach dissected the mucosa" in 1826, and Warren "peeled it off" in 1841, and Avery "separated the mucosa from fibrous tissue" in 1853, and Baizeau dissected the "soft tissue" from the bone in 1858, and Hulke did the same in 1859, credit belongs to von Langenbeck--for suggesting in 1861 the dissection of the mucoperiosteum from the underlying bone, in repairing cleft palate. . . . von Langenbeck might well be called the codifier of cleft palate surgery.[20]

Padgett gives a clear description of the typical classic von Langenbeck and Warren operation.

> In the classic types of operation, flaps are formed by incising the mucoperiosteum at the border of the cleft and as far laterally as the alveolar process. The flap is left attached at both the anterior and posterior extremity and the posterior palatine artery is not severed, as its blood supply is needed to nourish the flap. A parallel incision may (von Langenbeck) or may not (Warren) be made parallel to the alveolar ridge. To free the flap entirely at the posterior extremity, the aponeurosis attaching

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[19] Op. cit., p. 44.

[20] Ibid., p. 7.

> the soft palate is usually severed and thus the soft palate and the hard palate soft tissues are converted into a continuous flap. [21]

"While von Langenbeck performed uranostaphylorrhaphy in one operation he advised that uranoplasty be performed before staphylorrhaphy." [22] Although the von Langenbeck operation with its modifications is most effective in closing the palate, it failed to produce the desired speech results demanded by the surgeons. Its chief drawback was that ". . . the bringing to the midline unavoidably shortened the soft palate anteriorposteriorly and thus prevented palatopharyngeal closure necessary for speech." [23] Acting on the premise that the defect in speech is caused by either a shortening in the anteriorposterior length of the palate or an increase in the dimensions of the pharynx, the operators of this period bent their efforts toward constructing a palate that would correct one of these conditions. From this united effort evolved numerous worthwhile procedures and aids. Ganzer in 1920 made a V-shaped incision behind the incisor teeth and shifted the mucoperiosteal flap posteriorly. In this way he was able to lengthen the palate about 1 cm. In 1921 Gillies and Fry suggested the combined surgery and prosthesis method:

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[21] Op. cit., p. 393.

[22] Dorrance, p. 44.

[23] Samuel Foman, The Surgery of Injury and Plastic Repair (Baltimore: The Williams and Wilkins Company, 1939), p. 1139.

> . . . the halves of the soft palate have been separated from the hard and sutured together after producing two raw edges of apposition. This manoeuver leaves a larger hard palate defect than prior to operation, and to prevent the raw anterior edge of the newly-made soft palate scarring over and so contracting forward, two methods have been practiced---one to take a small flap of mucoperiosteum from the hard palate leaving it attached to the soft, and wrap it over, the raw area; the other to over-lay a skin graft (Thiersch) held in position by an apparatus. . . . The gap between the hard and soft palate is more efficiently filled by the dental prothesis. [24]

In 1927 Wardill proposed the one pharyngoplastic technique that has met with any approval:

> . . . an incision is made transversely through the superior constrictor muscle of the pharynx, and this is then sutured in such a way as to narrow the pharynx from side to side, and to bring its wall forward where it is able to meet the soft palate. [25]

The pharyngoplasty operation is often combined with Wardill's V-Y method which is a modification of Ganzer's V-shaped procedure.

> An incision is made from the outer side of the hamular process on each side, and is carried close to the alveolar margin or teeth to a point opposite the anterior palatine foramen. The mucoperiosteum is elevated on each side to the border of the cleft. The hamular process is then separated. The border of the cleft is incised along the whole extent, separating the oral and nasal mucosa. The same procedure is repeated on the opposite side. The mucoperiosteal flaps are then incised on each side, obliquely from the posterior border of the palate bone at the margin of the cleft, and forward to join the anterior end of the lateral incisions.

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[24] H. D. Gillies, and W. Halsey Fry, "A New Principle in the Surgical Treatment of "Congenital Cleft Palate" and Its Mechanical Counterpart," The British Medical Journal, I (1921), 335-338.

[25] Op. cit.

> The posterior flap is picked up and dissected along the posterior border of the palate bone. . . . The nasal mucosa is carefully freed throughout its entire extent. . . . The palatine arteries on each side are . . . incised and twisted. The dissection is continued from the base of the hamular process along the border of the pterygoid plate and maxillary tuberosity on both sides, until the flap is quite loose and free. The mucosa from the nasal surface of the hard palate is brought together and sutured . . . The two anterior hard palate flaps are raised and united . . . The cut surfaces of the posterior flaps are united and sutured; at the anterior end, they join the posterior end of the anterior flaps. [26]

It was also during this period that Dorrance devised his "push-back" operation (1925), a technique which appears best to approach the goal of velopharyngeal closure by lengthening the palate. It was originally designed as a corrective procedure for the congenital insufficiency of the palate, but Dorrance says it has been used by him and his associates for twenty-five years in the treatment of all varieties of cleft palates. Various changes of modifications have been made since it was first introduced. However, essentially it is the same. Because the "push-back" operation seems to be a rather basic one in present-day surgery, detailed description of it is being given here as it is applied today in cases of the congenital insufficiency of the palate and cleft of the soft palate.

First stage of the "push-back" operation.

> The first stage consists of raising the flap by mucoperiosteum detached at edges of bone if we are

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[26] Vaughn, Pp. 173-174.

dealing with a fairly normal, well-developed flap with adequate blood supply. In these cases, the palatine vessels are divided. When the flap is raised, a skin graft is sutured in place on the palatine mucoperiosteum. The flaps are returned to their bed and the edges sutured. In some cases where the palatine mucosa is thin, or where a considerable bony defect is present, or where the blood supply does not appear to be adequate. The palate is raised, leaving a bridge of undivided tissue to insure blood supply. The remaining portion of the flap is freed completely from the bone and the palatine arteries are divided. . . . We deliberately avoid using the nasal mucous membrane, because in performing the second stage of the "push-back" operation it is necessary to divide the nasal mucous membrane and aponeurosis at its attachment to the bone, thus leaving a raw area. If the nasal mucous membrane is not divided, complete velopharyngeal closure will not be obtained in many cases because the muscles responsible for this closure will not be restored to their normal position.

Second Stage of the "push-back" operation.

A flap is raised through the former incision, the nasal mucous membrane being divided from the posterior bony palate. The hamular process is then divided, thus transposing the tensor palati muscle from a tensor to an elevator muscle. The incision is continued around the tuberosity of the maxilla and over the pterygomandibular fold, freeing the palate from the bony attachments. The uvula now rests on the posterior pharyngeal wall. The anterior portion of the flap is sutured to the fibrous membrane at the apex of the defect, and is also immobilized by passing one or two aluminum-bronze wires first through the bony palate, then through the apex of the flap on either side of the midline. Each wire is then twisted until the flap is held securely; the ends of the wire are then bent back, thus preventing any injury to the flap and tongue. . . . When the viability of the palatal tissue is uncertain, a three-stage operation should be formed. First raise the palatal flap, divide the palatine vessels, and suture the flap back in place. Second, six to eight months later, raise the flap through the original incision and insert the skin graft. Third, three to ten weeks later, complete the repair with the "push-back" operation.

Cleft of the soft palate (paraphase of Dorrance and Bransfield).

> The second step in this procedure is to raise the flap, divide the hamular process on either side and thus sever the connections of the soft palate from the nasal surface of the bony palate. The next step is to denude the edges of the cleft and approximate the nasal mucous membrane of the two halves with interrupted sutures. Veau's intramuscular sutures are used, placing them through the muscular later at the middle third of the soft palate. The suture is left untied; the nasal sutures are tied now closing this surface, with the edges everted. The Veau suture is now twisted and the two halves of the cleft are brought into good approximation, without tension. The oral sutures are next inserted and tied. The anterior end of the flap is now sutured to the palate bone or to the fibrous tissue present.

Summary

1. Raise the flap and suture a skin graft in place.

2. Three to ten weeks later, the "push-back" is completed.

If the palatal tissues do not warrant extensive surgery at this time, a three stage procedure should be employed:

1. Raise the flap, sever the palatine vessels and suture back in place.

2. Six to eight months later, raise the flap through the original incision and insert the skin graft . . . resuture.

3. Three to ten weeks later, perform the "push-back" operation. [27]

Through the years, refinement and modification have been added to the "push-back" operation. Several men have made outstanding contributions. Brown's method of elongating the palate in partial clefts is considered useful in the hands of many operators. The principle of the operation is this:

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[27] G.M.Dorrance, and J.W. Bransfield, "The Push-back Operation for Repair of Cleft Palate," Plastic and Reconstructive Surgery, I (1946), 145-169.

> . . . practically the entire soft tissue of the palate is freed from the bone, the major palatine arteries are loosened but not cut, and the entire mass of tissue is immediately set back. . . The closure of the cleft itself is done usually at the same operation. . . as a preliminary step. . . in children, but may be done as a separate operation. In adults two stages are advisable because of excessive bleeding. [28]

Baxter (1947) has suggested a method of minimizing contracture following cleft palate operation. It consists of a split skin graft, taken from a hairless area of the body, wrapped, raw surface outward, about a dental compound stent (a small, cylindrical structure made of dental compound) which has been carefully molded to the space between the hard palate and the mucoperiosteal flap. Two or three weeks after the application of the skin graft, the second operation is performed, whereby the stent is removed and the entire flap of the palate is set back according to the Brown "push-back" method.

There are several other operative methods that appear often in the literature and are found usuable by many surgeons. The aim of each designer was to build a functional plate. The term functional is interpreted by some to mean length by others to mean muscularity and mobility of the palate. Veau (1931) has many followers in Europe and America. Fogh-Andersen found in his recent study that this procedure was most popular in Denmark. Dorrance says,

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[28] James Barrett Brown, "Double Elongations of Partially Cleft Palates and Elongations of Palate with Complete Clefts," Surgery, Gynecology and Obstetrics, LXX (1940),815-818.

> Veau's operations were in France. The French language, unlike the English calls for more nasalizing sounds, and hence complete velopharyngeal closure is not always necessary. The functional results obtained by Veau are remarkable for individuals who speak French.[29]

The principle involved in closing the soft palate by the Veau method is to split its edges and to bring the raw surface together by three layers of sutures. About five steps are involved:

1. Place the intramuscular suture.
2. Split the margin of the cleft.
3. Approximate the edges of the nasal mucosa with horsehair.
4. Suture the uvula.
5. Suture the muscle.

Operations for clefts involving both hard and soft palate are a bit more complex. The operation begins in the soft palate, and the procedure described above is used. To this is added the formation of two rotation flaps deriving their blood supply from the great palatine artery. These flaps are shifted toward the midline to complete the closure of the bony cleft.

Browne devised an orthopaedic (in the sense of muscular activity) operation for cleft palate. His first step in developing this method was to determine how the nasopharynx is normally closed. He concluded that the passage is closed by the action of two overlapping "slings" of muscle.

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[29] Op. cit., p. 410.

> . . . The posterior sling is the superior constrictor, and its action is helped by the simultaneous contraction of the palato-pharyngeus pulling it up into a projecting ruck that is well known as Passavant's ridge. The anterior sling is the levator palati, and it has acting in apposition to it the tensor palati, the only muscle in this region with a nerve supply other than the pharyngeal plexus. [30]

Browne claims that this sling muscle action corresponds with the behavior of a catheter lying in the nasopharynx during the acts of swallowing and speaking. He determined to create a palate that would function according to this theory. He evolved the ring suture method as a suitable technique. His first and preliminary step in the operation is that of removing the tonsils and cutting the posterior palatine arteries. Three months later the final stage is performed. An incision is made on each side from the canine tooth backward, cutting the anterior pillar of the fauces off the tongue and ending in the middle of the empty tonsilar fossa. The mucoperiosteum of the hard palate, the mucosa of the floor of the nose, and the whole side of the nasopharynx (taken with the hamular process) are freed so that they fall backwards toward the posterior wall. The ring suture is then made.

> . . . The suture enters the tissues opposite the tip of the uvula, emerges in the middle of the posterior wall of the pharynx, is reinserted through the same puncture and emerges again through the corresponding point to its insertion of the opposite side. . . . The stitch should run behind the superior constrictor

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[30] Denis Browne, "An Orthopaedic Operation for Cleft Palate," Reprint from the British Medical Journal, II (1935), 1093.

> exactly in the line of Passavant's ridge. . . . The ends of this suture are left hanging out of either side of the mouth, and the edges of the soft palate are deeply split. . . . The continuous nasal surface of soft and hard palate is then joined by interrupted sutures. Then the ring suture is passed through the substance of the soft palate, just in front of the insertion of the tendon palati crossing the half-sutured gap in the middle, and returning to its original insertion in a complete circle round the line of the sphincter. The oral surface of the soft palate and the mucoperiosteum of the hard palate are then joined by vertical mattress sutures, and any tiny gaps in the epithelial junction carefully closed. [31]

A test of the structure is to make the patient gag. The two loops of the ring suture are then tied separately with several knots, tight enough to close the passage completely.

The present day objective in the repair of the cleft lip is two-fold: (1) to construct a normal appearing lip; (2) to construct a functional lip.

The operative procedure for cleft lip repair is built on the principle that the cutaneous portion of the lip has a limited degree of elasticity. This principle was first recognized by the early lip surgeons and many different types of incisions were devised which brought the denuded borders to the point of accurate approximation.

> Some were based upon the principle of the curved incision which, when straightened out, gave length. Some applied the principle of angular incisions in the formation of the flaps, while in other operations a combination of these principles was used.[32]

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[31] Ibid.

[32] Vaughan, p. 70.

The Graefe operation, based upon the curved incision, combined with the Musson, which is based on the concave incision, is considered by some writers to be the most widely used type of operation today.

The Rose procedure is applied in many cases; it is based on the curved incision. Vaughan's description of this technique is as follows:

> The full thickness of the lip is incised. A semi-oval shaped piece is removed from each side of the cleft and the knife is passed through the vermilion border at about its widest part. The nasal ala is adjusted to conform with the opposite side, and sutured in position. The flaps are pulled down, straightening out the curved line. The vermilion borders are sutured at the junction with the skin. [33]

Mirault's operation, which is over a hundred years old, is one of the basic techniques upon which modern day surgery is built. He used the angular incision for the medial flap, and turned down the excessive vermilion border on this side to supplement the border on the alar side. There are numerous modifications of the procedure, but perhaps the Blair-Mirault is considered the most popular version. This operation is referred to in the literature as either the Blair-Mirault or the Mirault-Blair operation. The operation may be described in four steps:

> 1. The three cardinal points are outlined thus: A is placed at the junction of the columella with the inner column of the philtrum. B is marked out at the junction of the outer column of the philtrum with the vermilion border, and point C is placed halfway between A and B. On

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[33] Ibid., p. 75.

the lateral half, side A' corresponds to A on the medial side and is situated just below the site where the alar base passes the lip. C' is placed below and slightly medial to A' and at a distance from the vermilion border equal to the vertical distance from C down to the future level of the vermilion border on the opposite side. B' is placed on the mucocutaneous line at a distance from C' equal to BC.

2. An incision is made which separates the cheek, ala, and columella from the maxillae.

3. The vermilion border on the medial side of the cleft is partially separated by means of an incision through the points ACB. On the lateral side a similar incision is made through the points A'C'B'. At B' the knife is directed upward along the mucocutaneous junction to form a flap of mucosa which will go to reconstruct the floor of the nose.

4. The areas marked A A', C C' and B B' are approximated.

The bilateral cleft lip repair offers a much more difficult job. Here again an operation designed by Rose is used. The incision of the operation for a single cleft of the lip is made bilaterally, and a Y-shaped suture line is obtained. Several operators prefer the Thompson procedure because it conserves the vermilion at the lower end of the prolabium. Often the problem of the premaxilla arises in a bilateral cleft lip repair. What to do with the premaxilla is a controversial question. Some operators say it should be removed, while others think that removing the premaxilla leads to severe cosmetic results. Vaughan thinks that if the projection is not too pronounced, digital pressure can be used to force the premaxilla backward far enough to allow closure of the lip clefts and that the repaired lip will prevent protrusion. When there is pronounced projection,

he uses the Bardeleben method, whereby the vomer is sectioned submucously and the premaxilla is moved backward with a minimum of rotation. Fixation is obtained by a silver wire passed through the maxilla, high up, to avoid the tooth follicles. Oldfield believes.

> In harelip surgery some progress has been made in recent years, but we have still far to go, much farther, I think, than in the surgery of cleft palate. [34]

Summary

From this review it can be noted that there is a tendency away from the greater number of operations for the individual. The ideal today seems to be to give the child the best possible palate and lip and at the same time to subject him to the smallest number of operations. The controversial question of when to operate still persists; however, the majority of the operators choose the ages 18 months or two years for palatal repairs. The lip is generally closed when the baby's feeding habits are established. It can also be seen that modern methods of palatal repair as well as labial repair, are a composite of the contributions of many men, both living and dead. According to Dorrance,

> No one surgeon can have complete claim to any operative procedure since each method resulted from the experiences of many contributors whose efforts are interdependent. [35]

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[34] Op. cit.

[35] Op. cit., p. 9.

CHAPTER V

PROCEDURE IN COLLECTING DATA

This study was designed to examine 42 representative cleft palate cases with the purpose of estimating the present status of the speech problem for the cleft palate child. The investigation consisted of (1) selection of the subjects, (2) review of the medical records of the children, (3) speech analyses, (4) audiometric evaluation, (5) psychometric evaluation, (6) medical examination, (7) otolaryngeal and neurological examination when necessary, (8) environmental evaluation, (9) photographs of the lips and palates.

Selection of Subjects.-- The cases were located through the medium of records in the out-patient department of the Children's Memorial Hospital, Montreal, Quebec. The files were checked from the years 1934 to 1947 inclusive, since it had been decided that only cases within the age limits of two to sixteen would be acceptable. Two other restrictions were made: (1) each child must have a completed postoperative cleft lip and palate, or only cleft palate, isolated cleft lip being excluded; (2) the child must live within about 100 miles of Montreal. From the list of about three hundred, one hundred and fifty cases were selected as

as possible subjects. To the mothers of these the following letter was sent:

> Dear Mrs---
>
> We are writing you to ask your cooperation in a study being conducted by the Speech Clinic at the Children's Memorial Hospital, 1620 St. Antoine Street, Montreal, Quebec. This study is concerned with the speech of children who have had surgical repair on the lips and palates. You can help us by giving us information about your child's speech. We would like you to come for a personal interview. Write on the enclosed postal card the hour and day on which it is convenient for you and your child to come to the clinic, and return it to us as soon as possible. If you wish more information before mailing the card, please call FI. 8684, the Speech Clinic.
>
> Yours very truly,
>
> Sara M. Ivey
> Speech Therapist.

Since the population of this area consists of speakers of both French and English, each mother was addressed in her own language. Out of the 150 cases, 60 responded. These were first interviewed with two questions in mind: (1) would they be willing to carry out the experiment, and (2) was surgery completed. From these sixty, forty-three were chosen; five cases had need of further surgical repair

and the parents of 13 felt that it was impossible to follow through with all the procedure. One case failed to complete all the tests and was dropped from the group, leaving 42 cases. As an incentive to gain the cooperation of the parents, speech training was offered to those who might need it. Of the 42 children used in this study, 15 were females, and 27 were males. The types of cleft palate surgery performed in Montreal are fairly representative: only three cases had received surgical attention outside of Montreal.

Review of the Medical Records.-- The medical records of each of the 42 cases at the children's memorial Hospital were checked for the following information: amount of cleft, number of operations, age when operations were performed, surgeon for cleft operations, operative procedure, other operations, and other congenital anomalies. For the operative procedure of several cases information was obtained from the Royal Victoria Hospital, Montreal; the Montreal General Hospital, Montreal; the Saint Mary's Hospital, Montreal; St. Joseph's Hospital, Saint John, New Brunswick, and from the records of Mr. Dennis Browne, London, England.

Speech Analyses.-- The speech analyses consisted of a history of the child's speech, an evaluation of the speech as to quality of voice, defective sounds, pitch of the voice, and rhythm of speech, an evaluation of controlled and running speech, and an evaluation of the

peripheral speech mechanism in respect to anatomy and function.

Information as to the history of the child's speech was obtained from the mother during an interview. Questions were asked as to speech development and speech training. For the evaluation of the quality of voice, defective sounds, pitch of the voice and rhythm of speech, an articulation test devised by the experimenter was used. This test was constructed in the following manner: For the English speaking group, words were selected from the Horne, Horne, Packer combined child's vocabulary, derived from separate investigations by each of the three writers.[1] This vocabulary, consisting of the words used by children at or below the first grade level in school contained 1,084 words. For the French speaking group, words were selected from the book Echelle de vocabulaire et d'orthographe, by Roland Vinette. This list contained 688 words used by children of the third grade level. The experimenter transcribed each word phonetically in order to check the isolated consonants and clusters in the three positions, initial, medial and final. If a specific consonant sound or cluster occurred within a frequency of 5 times in either position, such sounds were chosen to be included in the test. The words that were finally chosen were such as could be represented by objects, for many of the children were not of school age and could not read. (Note appendices

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[1] National Society for the Study of Education, Yearbook XXIV, Part I (Bloomington: Public School Publishing Company, 1925), Pp. 186-192.

for the articulations test.) For the children who could not read, an attempt was made to get recognizable objects and pictures. The older group was asked to read a paragraph as well as the list of words. The paragraph was "loaded" with the selected words and was scaled for the third or fourth grade levels.

Quality of voice was rated as to nasal, hoarse, husky, and harsh. For the defective sounds, any substitutions, omissions, additions, and distortions were noted. Pitch of voice was rated high or low, and monotonous, and rhythm was rated regular and irregular. There were some cases in which the exact plan of description could not be followed.

The evaluation of the controlled speech was made by nine bilingual lay judges; the evaluation of both controlled and running speech was made by the experimenter. The nine judges met as a group for three Saturday afternoons. Each judge was given a score sheet numbered from one to 42. The following instructions were given:

> Each case will be brought into the room by the experimenter or by the mother. The experimenter will give you the number of the case then ask him to name the objects or to read the selection. You are to score each case on a scale of 1, 2, 3, "1" representing normal speech or speech you would not notice; "2" representing average speech or speech which, though at times is unintelligible, could be usually considered fair; "3" representing

unintelligible speech most of the time. You may make comments on your paper, but the scores are the most important factor.

Only the experimenter estimated the running speech, because it was difficult to motivate speech before such a large group. The running speech consisted of everyday conversation with the experimenter. The experimenter set an appointed time for each case to come to the speech clinic for an appraisal of controlled speech.

The evaluation of the peripheral speech mechanism was carried out in the following manner: the anatomical structure of the tongue was observed and any deviations from the normal were noted; the mobility of the tongue, lips, palate and pharyngeal muscles were ranked (1) good, (2) fair, (3) poor.

(The tests used for estimating the mobility of the tongue, lips, palate and pharyngeal muscles are based on the adjustments made by these organs in the production of certain sounds).

The palate was checked as to length and flexibility. The test is as follows:

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	
	7	l	Draw down sides of tongue	lamp, ball balloon	
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		
Lips	1	ɛ aɪ	Ordinary opening	many, mine	
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	
	3	f, v	Drawing of lower lip against upper front teeth	five, half	
Structure of Tongue					

Palate	Sound spoken	tense	short	flexible	long	rating

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	
	7	l	Draw down sides of tongue	lapin, balai	
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		
Lips	1	ɛ aɪ	Ordinary opening	être, matin	
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	
Structure of Tongue					

Palate	Sound spoken	tense	short	flexible	long	rating

The experimenter spoke the words and sounds then asked the case to imitate them.

An evaluation of the mobility and structure of the soft palate, hard palate, uvula, faucial arches, Passavant's cushion, pharyngeal muscles, and tongue frenum were made by Dr. Fred M. Woolhouse, Director of Plastic Surgery at the Children's Memorial Hospital. These structures were rated on the same scale as previously mentioned. The structures were described according to the following plan:

Tests for Estimating Mobility and Structure of Articulators

Soft Palate			Hard Palate		
1	Size		1	Height	
2	Activity		2	Condition	
3	Tissue		3	Rating	
4	Rating		4		

Passavants Cushion			Faucial Arches		
1	Present		1	Size	
2	Size		2	Activity	

Tongue Frenum			Pharyngeal Muscles		
1	Condition		1	Movement	

Uvula		
1	Size	
2	Condition	

The evaluation of the teeth was made by Dr. Gordon Kelly, Associate Dental Surgeon, at the Children's Memorial Hospital, Montreal. The condition of the teeth and jaws was noted; and the effect of the dental structure on speech was determined. Descriptive terms were used in this examination rather than a ranking system.

The plan is as follows:

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	
2	Dental work necessary	
3	Type of Occlusion	
4	Gaps in teeth	
5	Missing and short teeth	
6	Comments	
7	Opinion as to effect on Speech	

Jaws

1	Size	

Labial Frenum

1	Condition	

Audiometric Evaluation.-- The pure tone audiometric test was administered with a Western Electric BP Audiometer. All tests were given in the department of otolaryngology at the Montreal General Hospital, Montreal, Quebec. Permission was granted to use the equipment as well as the sound-proof room.

Psychometric Evaluation.-- The psychometric tests were administered by Mrs. Frances M. Handford, psychologist at the Mental Hygiene Institute, Montreal. The French speaking group were given Dr. J. E. A. Marcotte's French translation of the Revised Stanford-Binet Intelligence Scale, Form M. The English speaking children were given the Revised Stanford-Binet Intelligence Scale, Form L. All tests were administered at the Children's Memorial Hospital.

Medical Examination.-- Dr. Robert Lennox, one of the staff clinical assistants of the Children's Memorial Hospital, gave each child a complete medical examination. One morning of each week was set aside for this purpose. The mother was requested to accompany the child for this particular examination.

Otolaryngeal and Neurological Examinations.-- The otolaryngeal examinations were made by Dr. Hollis E. McHugh, Director of the Department of Otolaryngology, and Dr. Gordon Cohan, Clinical Assistant in Otolaryngology; both are from the Children's Memorial Hospital. These examinations were not a routine part of this study;

however, they were made when there was a question of causal factors.

When necessary, the neurological examinations were made by Dr. F. L. McNaughton, Neurologist and Dr. J. Preston Robb, Neurologist, both from the Children's Memorial Hospital.

Environment Evaluation.-- The experimenter made this evaluation by observations during the various contacts with the parents and cases.

Photographs.-- For a better presentation of the cases, photographs were made of the postoperative lips and palates when both were cleft; if lips were not cleft, only the palates were photographed. Mr. Harold Coletta, photographer for the Neurological Institute at the Royal Victoria Hospital, Montreal, made the photographs.

C A S E H I S T O R I E S

CASE I

Cleft of Hard and Soft Palate

CASE 1
White, female.

Date of birth.
December 10, 1942.

Amount of cleft.
Partial cleft of soft and hard palate. Not severe.

Number of cleft operations.
Two operations, October 11, 1944; May 5, 1948.

Age when operation was performed.
1. Two years and two months.
2. About six years old.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative procedure.
First operation: Repair of the palate

Flaps were raised as in the Langenbeck procedure, the margins of the cleft were pared and then approximated with interrupted dermal sutures.

Second operation: Secondary repair of the palate.

The flap of the palate which had been previously set back into the nasal aspect in a U-shaped form, was split without perforation and a skin graft which was removed from the left side of the dome was sutured in place after being wrapped about a stent. The repair was of watch head size, opening in the midline between the hard and soft palate.

Post-operative report: There is considerable distance between the posterior pharyngeal wall and uvula. The child speaks with difficulty and is very hard to understand.

Other operations: Cutting of the tongue frenum, June 15, 1945.

Other congenital anomalies.
Short frenum.

History given to experimenter by the mother.

This case has recently been adopted. She was first sent to the foster parents at eight months old; she remained with them for nineteen months, then the mother asked that she be allowed to have the child again. In a year the child was returned to the foster parents; later she was permanently adopted. She is an illegimate child; the father is not known and very little is known about the mother. She was the first of seven children, being born when the mother was seventeen years old. The mother has never married; there have been three miscarriages, and one of the seven children has been institutionalized because of mental deficiency. Further history is not known. The foster mother does not think there is any incidence of cleft palate in the mother's family.

Speech analyses.

1. Speech history.

The child began to say words at eighteen months. Her speech has never been very good. She began speech training eight months before the last operation; it was not continued immediately after the operation.

2. Description of speech.

Quality of voice: Slightly nasal

Defective sounds.-- Substitutions:

(ʃ) for (s) all positions

(r) for (w) initial, medial positions

(w) for (r) initial, medial positions

(d) for (g) all positions

(t) for (k) all positions

(ʔ) for (g) (k) (p) medial position

Omissions:

(l) medial, final positions

She has difficulty with all the clusters

All sounds except (s) and (z) can be made in isolation

There is an excessive amount of nasal blur on all sounds but especially on (s) (ʃ) (z) (tʃ) (dʒ). Nasal grimaces accompany these sounds.

Pitch: She has a very noticeable pitch pattern, going from low to high in almost every sentence.

Rhythm: Every word is emphasized and usually a breath is taken after every three or four words. The rhythm seems to be exceedingly choppy in this child's speech

3. Estimate of the judges.
   Controlled speech--2.33

4. Estimate of the experimenter.
   Controlled speech--2

   Running speech--3.

Tests for Estimating Structure and Mobility of Articulators
(English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	Tongue protrudes 1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	3
	4	ɵ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	2
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	2
	7	l	Draw down sides of tongue	lamp, ball balloon	Tongue protrudes 1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Insensitive palate Poor movement 3
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			**Slightly bifid at the tip Labored movements**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a	Yes	Yes			Poor

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Short - Central fistula and scar
2	Activity	Poor. All of the palate moves to a degree.
3	Tissue	Scarred
4	Rating	3

Hard Palate

1	Height	Shallow
2	Condition	Good
3	Rating	1
4		

Passavants Cushion

1	Present	No
2	Size	

Faucial Arches

1	Size	Anterior normal Posteriors small
2	Activity	Movement limited by central scar

Tongue Frenum

1	Condition	Normal

Pharyngeal Muscles

1	Movement	Excellent

Uvula

1	Size	Small
2	Condition	Fair

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**No**
2	Dental work necessary	**No**
3	Type of Occlusion	**Normal relationship of the molars (class 1) The right incisor is in linguoversion.**
4	Gaps in teeth	**None**
5	Missing and short teeth	**None**
6	Comments	**There is the usual lack of development and the usual crowding in the anterior region. Her teeth are just about as good as teeth of the normal child of her age. She is a mouth-breather.**
7	Opinion as to effect on Speech	**Teeth may effect the (s) sound.**

Jaws

1	Size	**Both jaws are fairly well developed.**

Labial Frenum

1	Condition	**Normal**

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 7-3
M.A. 6-8
I.Q. 92

Behavior and ability:
Behavior was normal. Speech was slow and not very clear, the sounds were mumbled. The slowness seemed to the examiner, to be the result of habit and teaching.

The basal age was reached at 6-0 years. There was one success at near 7 years, and three successes at near 8 years. Her verbal memory was better than her memory for digits.

I.Q. level is low average.

Medical Examination
Previous illnesses: chicken pox, measles, rubeola.

Previous accidents: None

Previous operations: Clipping of the tongue frenum.

Inoculations: W.C. and Diph. No. B.C.G.

Development: She was adopted at fourteen months old. She stood at that time but did not walk; she was malnourished and underfed. She said words at eighteen months; gained bowel and bladder control at eighteen months. She is in the second grade at school and is doing fairly well.

Functional history: The mother's mentality is questionable. The father's whereabouts are unknown. One sibling who is perfectly normal is adopted; one sibling

is possibly mentally retarded; and two siblings are dead.

Functional inquiry: There is the question of diminished hearing; ears often hurt. She has frequent colds with chronic discharge. Her teeth are in poor condition. She has frequent sore throats with coughs.

Physical examination: Height 49". Both ears are obstructed with wax. There is purulent nasal discharge and postnasal drainage. The teeth are staggered and crooked; there are multiple caries. The palate is intact. The cervical glands are in moderate condition. The chest, heart, abdomen, g. u., and reflexes are normal. There is a graft scar on the abdomen.

Impression: She is shy and retiring. The foster mother is extremely dominant.

Otolaryngeal examination. March, 1950.

Question of impaired hearing.

She has frequent sore throats, colds, and ear-aches. She breathes through her mouth most of the time. There is no snoring; there is no discharge from the ears.

Ears; Both drums are intact, dull and retracted. There is no fluid.

Nose: There are narrow airways; the tubes are inflamed; and there is discharge in the middle meatus.

Nasopharynx: There are no adenoids. The eustachian orifice is clear.

Mouth: It is in fair condition; the tongue is clear, the tonsils are small, and submerged.

Glands: They are small at the angles of the jaw.

Diagnosis: Bilateral Eustachian tubal obstruction. Possible sinuitis.

X-ray of sinuses reported negative.

On March 20, 1950, the left nostril was still filled with pus. Penicillin nose drops were prescribed and the condition was cleared up.

Environment.

This family is in the medium socio-economic bracket. The foster father is vice-president of a brick construction company in Montreal. He was not seen by the experimenter. Information concerning him was obtained from the mother. She often complained of his "blind affection" for the child. She informed the experimenter that she had no love for the child and kept her only because the husband insisted that she do so. The problem seemed to be one of jealousy; both the child and mother vying for the affection and approval of the father. The mother was a fairly intelligent person with a most unhappy outlook on life. The child was shy and attractive

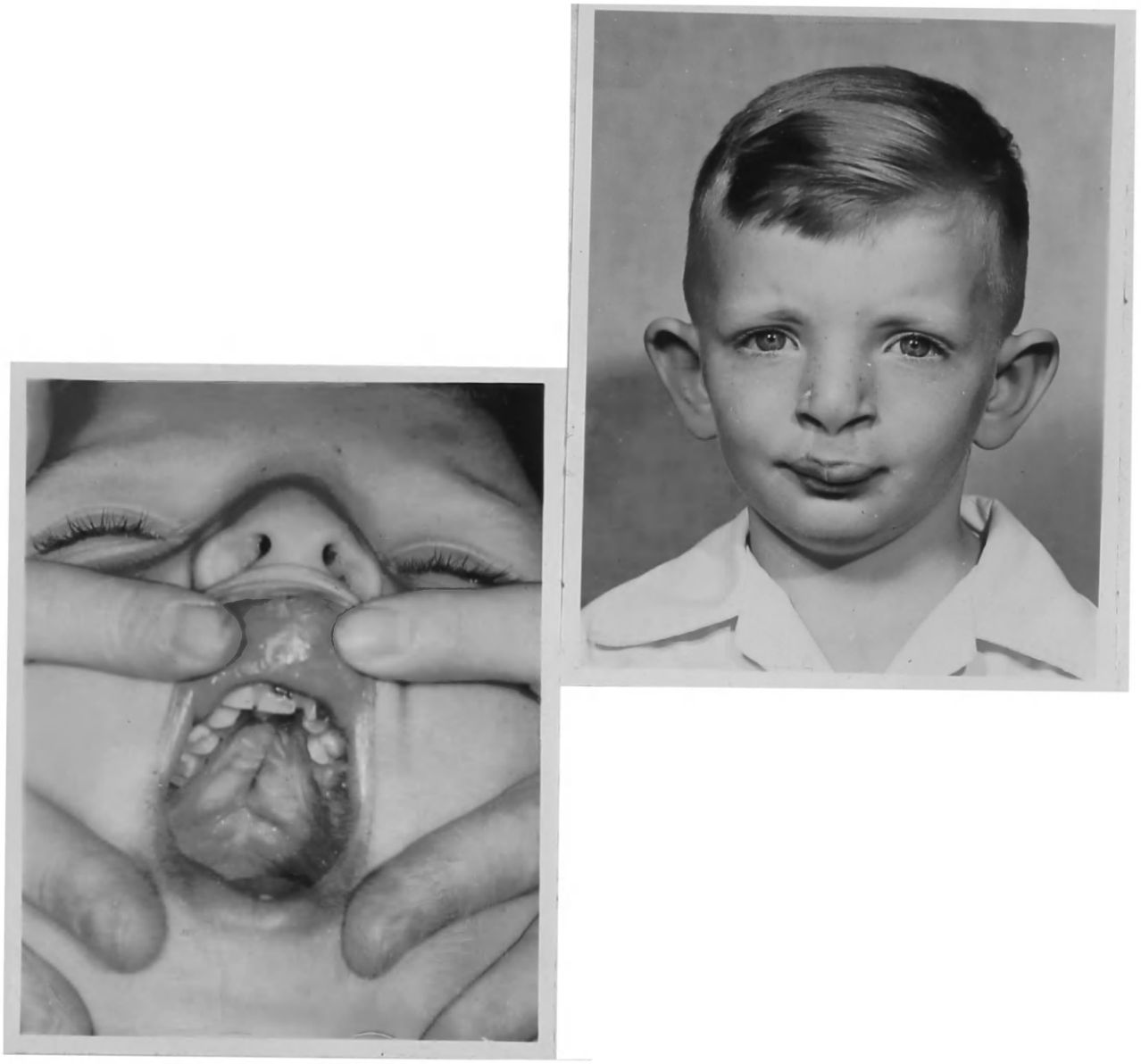
looking. She had a rather stoic disposition; her main defense was silence, at times she appeared not to hear or understand what was said to her. She was socially as well as mentally immature.

Speech Training.

Speech training began April 5, 1950, and continued until July 1. The mother brought the child to the clinic twice weekly. Emphasis was placed on control of the air stream, elimination of nasal grimaces, correction of tongue placement for the sounds (l) (n) (d) (r) and the correction of the production of (s) and (z) sounds. The psychological problem was also recognized. Indirect as well as direct therapy was used. The mother was most cooperative and seemed eager to carry out any suggestions. Some progress was made in both objectives; further rehabilitation was needed.

CASE II

Bilateral Cleft Lip and Cleft of Hard and Soft Palate



CASE 2
White, male.

Date of birth.
January 18, 1945.

Amount of cleft.
Complete bilateral cleft lip.
Complete cleft of the hard and soft palate

Number of operations.
Four operations, May 7, 1945: September 8, 1945;
May 4, 1946; November 6, 1946

Age when operations were performed.
1. Three and a half months.
2. Seven and a half months.
3. One year and three and a half months.
4. One year and nine months.

Surgeon for cleft procedure.
Dr. R. R. Fitzgerald
First operation: Right unilateral cheiloplasty by method of Rocamier.

Medial side was dealt with first. A"Z" shaped incision was made first along the skin, the mucocutaneous edges were cut at a right angle, then the incision was made to the midline and then backwards. The fragment of mucous membrane was then removed. The edges were undercut ¼ inch in all directions. On the lateral side a triangular portion of skin and mucous membrane was removed and the lip liberated from the maxilla. Edges were undercut ¼ inch all around, thus exposing the alar cartilage on the right side. A heavy dermal suture was passed through the alar cartilage and out through the opposite nostril and tied over a pad of gauze. This brought the floor of the nostril nicely together and

it was closed in two layers, the lower layer with catgut aand the upper layer with silk sutures. A buried wire suture was then laid in place in the lip. At the close of the operation the wire sutures were tied and there was a very satisfactory approximation of the fragments of lip.

Second operation: Left unilateral cheiloplasty by the method or Recamier.

The right side incision was made and a small quantity of skin and mucous membrane was removed from this side. The margins were undercut and tissues were liberated from the maxilla. Wire sutures were placed through the tip of the alar cartilage and through the musele and both were drawn out into the opposite nostril and tied over pad of gauze. The margins of skin and mucous membrane were drawn together with plastic tissues. At the close of the operation the lip had been satisfactorily drawn together without tension and the sutures were all nicely in position. The sutures in the lip were removed on September 15, 1945. There was failure of union of the skin sutures of the upper lip and the suture line had opened about 1 mm. All sutures were removed, all crusts taken away and the Logan bow applied for drawing the margins together. On September 22, 1945 a secondary suture operation was performed.

The medial margins of the upper lip processes were freed for a short distance of about ½ ". These were drawn together in the midline and sutured with two mattress sutures of plastic suture material. The Logan bow was then tightened and the flaps were adequately relaxed and at the close of the operation the upper lip appeared to be very satisfactory.

Third operation: Repair of the hard palate by the method of Veau.

The mucous membrane was split along the lower border of the hard palate and mucosa-periosteal flaps were dissected up from each side, swinging posteriorly on the pedicle containing the posterior artery. The child's right was dealt with first and this was rather narrower than the left. A single mattress suture of heavy dermal was passed through and through both flaps, turning left flap over so that its epithelium was upward into the nasal cavity and its raw surface down, and the palatine flap was swung over towards the midline with its epithelial side down and its raw surface up. This mattress suture securely tied in position; the hard palate was reconstructed on the left side. On the right side a similar result was carried out and similar result was obtained. To close the operation, the hard palate had been constructed by four flaps, two from each side, one making the floor of the nostril and the other making the roof of the mouth.

Fourth operation: Repair of the soft palate by the method of Veau.

The previous operation was found to have prepared a very satisfactory hard palate consisting of two flaps which had been swung toward the midline. The Reverdin needle was passed through all the tissues to the nasal submucosa and made to appear in the cleft. The cleft was split on the child's right side and a wire suture was drawn through it. Similar technique was applied on the left side, where the dermal suture was laid in place. The soft palate was then dissected from the hard palate on each side and from the nasal palate on each side and from the nasal and buccal layers of the hard palate. The posterior nasal spine was exposed on each side. An attempt was then made to pass two large mattress sutures through the nasal mucoperiosteum. The needle however was very dull and the catch would not work and considerable tearing of the tissue resulted. However, finally two fairly good sutures were laid in place. The nasal mucosa was then sewn with interrupted dermal, the uvula was constructed, the buccal surfaces and soft palate were sewn up. The wire suture was passed and fastened tightly bringing the two sides very neatly together. Mucoperiosteal flaps were cut from both sides of the hard palate hinged on the posterior portion and were swung towards the midline. These

were then held by two heavy nasal mucoperiosteum. When the operation was finished the palate was long and fairly supple; it barely touched the posterior pharyngeal wall. On each side there was a bare area over the bone and behind the incisor teeth.

Other operations: None

Other congenital anomalies: None

Functional history given to experimenter by mother.

There is no history of cleft palate in the family. The youngest child, a boy, age three, was born with pyloric stenosis. There is no history of thyroid deficiency, or goiter. The baby was carried full term but the mother was very sick during this period. The birth was difficult; instruments were used. The mother thinks she is nervous. She is an only child of fairly prosperous parents. The father is of Irish (Canadian) descent and the mother of English descent.

Speech analyses.

1. Speech history.
   The child was not encouraged to talk until the last operation was performed; thus he did not talk until he was three years old.
2. Description of speech.

   Voice quality: Good.

Defective sounds.--Substitutions:

(ʃ) for (s)

(ʒ) for (z)

(ɸ) for (f)

(w) for (l) (r)

(ʃ) for (tʃ)

(ʒ) for (dʒ)

(β) for (θ)

(b) for (v)

Omissions:
(l) in final positions

Tongue protrusion on (t) (d) (n) (s) (z) (ʃ)
Had difficulty with these clusters: (br) (kf) (fr) (kr) (str) (pl) (sl) (bl) (lf) (gr) (fl) (lf)

Pitch: Good

Rhythm: Good

Comment: Speech seemed delayed rather than cleft palate

3. Estimate of the judges.
Controlled speech--2.22

4. Estimate of the experimenter.
Controlled speech--2
Running speech--3

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	Tongue protrudes 2
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	2
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	2
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	3
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	Tongue protrudes 3
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive Movement similar to normal 1
Lips	1	ɛ aɪ	Ordinary opening	many, mine	2
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	2
	3	f, v	Drawing of lower lip against upper front teeth	five, half	2
Structure of Tongue			**Normal** **Blade of tongue movement better than tip**		

Palate	Sound spoken	tense	short	flexible	long	rating
	ɑ			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Adequate length**
2	Activity	**Excellent. The entire palate moves.**
3	Tissue	**Fairly thin**
4	Rating	**1**

Hard Palate

1	Height	**High arch**
2	Condition	**Scarred - premaxilla in front of alveolar arches.**
3	Rating	**3**
4		

Passavants Cushion

1	Present	**Can not see**
2	Size	

Faucial Arches

1	Size	**Anterior normal Posterior normal**
2	Activity	**Good**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Good**

Uvula

1	Size	**Normal**
2	Condition	**Eccentric to right**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**Not a great deal**
2	Dental work necessary	
3	Type of Occlusion	**Normal relationship of the molars (class 1) The premaxilla is labial, and mobile; all the other teeth are in linguoversion. Lower anterior (6) teeth are in normal occlusion.**
4	Gaps in teeth	**Small opening between the clefts**
5	Missing and short teeth	**None**
6	Comments	**All deciduous teeth Double cleft, opening into the arch of the hard palate. Opening into the vestibule on the left, not on the right. High arched roof of mouth, tent shaped. Upper right deciduous lateral is in the middle of the palate.**
7	Opinion as to effect on Speech	**Does not affect speech.**
	Jaws	
1	Size	**Upper jaw constricted, lower jaw well developed.**
	Labial Frenum	
1	Condition	**Normally attached but mutilated.**

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 5-1
M.A. 5-11
I.Q. 116

Behavior and Ability
He was friendly and cooperative. Attention was good.

Memory was his weakest ability but it was good average.

Speech was good.

Basal age was reached at 4-6 years. Five successes were reached at 7-0 years; these were abstract items.

I.Q. level was superior.

Medical examination
Previous illnesses: chicken pox, scarlatina.

Previous accidents: None

Previous inoculations: Diph. W.C. (booster) vaccination, patch test.

Development: Physical and mental development within normal limits. He is inclined to be shy. There has been no schooling as yet. He plays well with other children. He is now five years old. His speech is fair to poor.

Functional history: Father and mother are alive and well. There is no history of any anomalies; a sibling, age two years, was operated on three weeks after birth for a questionable phloric stenosis. There have been no consanguinity of parents.

Functional inquiry: The child has had mild upper respiratory infections, otherwise negative. He eats and sleeps well. Elimination is good.

Physical examination: Weight 42 lbs., height 46" with shoes, head 21". Right ear drum is normal; the left is thickened. There is a questionable intermittent left internal squint (2^{0} - 3^{0}). Nose is irregular and the columella retracted. There is a crusted, nasal discharge and post-nasal mucous. The chest, heart and abdomen are negative. The long foreskin of the penis retracts normally. The reflexes are psychological. The muscles are flabby. There is a question of muscular dystrophy. The skin is soft and dry with increased subcutaneous fat.

Environment.

The father is a bookkeeper for the Tom Cooke Travelling Agency in Montreal. He is an even-tempered, intelligent man who enjoys his family.

The mother is an attractive, friendly, and highly strung person. Both parents have an overly protective manner toward the child. The boy is rather babyish and shy. He is not inclined to be friendly, but will accept overtures when they are made to him. He is very sensitive about his physical difference; he thinks his appearance is ugly. He was easy to teach in that his responses were quick.

Speech training.

Speech training was begun March 27, 1950, and continued until July 28, 1950. The mother brought the child to the clinic twice weekly. Since his chief difficulty was defective sounds, the time was spent

in correcting them. By the end of the period he had corrected all sounds except (s) and the (r) clusters.

CASE III

Bilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 3
White, male

Date of birth.
November 23, 1944.

Amount of cleft.
Complete bilateral cleft lip and
complete cleft of the hard and soft palate.

Number of cleft operations.
Three operations, February 21, 1945; February 28, 1945;
May 28, 1947.

Age when operations were performed.
1. Three months.
2. Three months and a week.
3. Two and one-half years.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative procedure.
First operation: Repair of the lip.

A small wedge-shaped piece of the vomer was removed from the left. The edges were brought back into position. The mucosa which was elevated was closed with interrupted dermal sutures.

Second operation: Repair of the lip.

Notes were not available.

Third operation: Repair of the palate.

The muco-periosteal flaps were raised as in the Langenbeck procedure, and the margins after having been pared were sutured with interrupted dermal sutures. While the cleft palate was very wide, the flaps were approximated easily in the midline; but it was felt that this palate would be short because of the wideness of the original cleft.

Other operations: None.

Other congenital anomalies: None

History given to experimenter by the mother.

A maternal great aunt had two deafened children; a maternal great uncle had one deafened child; a maternal great aunt had a child with a cleft palate. Of the mother's family she was the only one to have had children with congenital defects. There were several children in the family; the oldest child had a cleft lip; the fourth, which was the child in this experiment, had a cleft lip and cleft palate; the last child which was born at seven months, had a cleft lip and cleft palate. The mother had had three miscarriages. There was no history of thyroid difficulty. There was consanguinity in the family; the grandparents on the mother's side were cousins, the father and mother were cousins. The mother was of Scotch, French descent; the father was of French descent.

Speech analyses.

1. Speech history.
   He began to talk at the age of two years.

2. Description of speech.

   Voice quality: Good

Defective sounds.-- Substitutions:

(t) for (k) initial position

(b) for (f) initial position

(ʃ) for (s) initial position

(b) for (v) initial position

(s) lisp

Tongue protrudes on (n) (l) (d) (t)

Pitch: Good

Rhythm: Good

Comment: More delayed than cleft palate speech

3. Estimates of the judges.
Controlled speech--2.11

4. Estimate of the experimenter.
Controlled speech--2
Running speech--2

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	Tongue protrudes 1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	~~Tongue protrudes~~ 3
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	1
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	~~can, but does~~ not all the time 1
	7	l	Draw down sides of tongue	lapin, balai	~~Tongue protrudes~~ 1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		~~sensitive palate~~ good circular movements. 1
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			Slight bifid tongue tip Tip of tongue movement restricted, other portion good		

Palate	Sound spoken	tense	short	flexible	long	rating
	a			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Adequate
2	Activity	Limited by scar near the midline on the left side. All palate does not move.
3	Tissue	Thick
4	Rating	2

Hard Palate

1	Height	High
2	Condition	Scarred (the premaxilla lies above the alveolar ridge)
3	Rating	3
4		

Passavants Cushion

1	Present	Can not see
2	Size	

Faucial Arches

1	Size	Anterior small not tight Posterior very small
2	Activity	Normal

Tongue Frenum

1	Condition	Loose

Pharyngeal Muscles

1	Movement	Limited by the above mentioned scar

Uvula

1	Size	Normal
2	Condition	Normal

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	None
2	Dental work necessary	None
3	Type of Occlusion	Normal relation of the molars (class 1) The upper anteriors are in linguoversion.
4	Gaps in teeth	Between bicuspids
5	Missing and short teeth	No central incisors. Molars on the lower side have been removed.
6	Comments	Cleft through the left side of the alveolus. No permanent teeth. Upper central incisors are in a mobile premaxilla and not present. Mouth breather.
7	Opinion as to effect on Speech	Lack of central could affect speech.

Jaws

1	Size	The upper jaw is constricted, lower seems normal.

Labial Frenum

1	Condition	Mutilated

Audiometric test.

Hearing is normal in the left ear.

Test results of the right ear are as follows:

frequency	decibels
512	25
1024	25
2048	25
4096	40
8192	20

Psychometric test.

C.A. 5-5
M.A. 5-0
I.Q. 92

Behavior and ability.

This child was very restless and petulant. Responses were good at first, but he tired quickly. The test pattern was regular and normal.

His speech was fair.

I.Q. level was average.

Medical examination.

Previous illnesses: None

Previous accidents: None

Previous operations: Dental extraction.

Inoculations: D.P.T. (3)

Development: Within normal limits (according to father). He is short, small and thin. He is bright and mixes well with other children.

Functional history: Both parents are alive and well. The father is forty-two years and the mother is thirty-nine. There are six siblings; the latest arrival has a cleft lip and palate. On the mother's side there is consanguinity for three generations. There is no other history of

congenital anomalies, and no history of heredito-familial diseases.

Functional inquiry: His hearing and sight are good. He has frequent head colds and sore throats. Occasionally he coughs. He plays actively. His digestion and elimination are good. His skin, joints, and muscles are negative. He is thin.

Physical examination: Both ear drums are scarred, and thickened with multiple perforations; these are visible with surrounding area of thickness. The eyes are prominent; the head measures 30½". The upper lip is pushed out and the lower lip is in a pout formation. The columella of the nose is markedly retracted and the septum deviates to the right. The upper incisors are absent; the premaxilla is missing. The tongue and palate move actively. The throat is bad and the chest is poorly developed. The heart and g.u. are negative. There are no palpable organs. The muscle tone is normal.

Environment.

The father was the owner of a bicycle shop. He seemed to be a rather troubled yet understanding father. Life was very difficult at this time with two cleft palate children, and a physically weak wife.

Although the mother was not physically strong, she

had infinite patience and forbearance. Both parents shared equally in the responsibility of rearing the children.

The child was babyish and uncooperative. He seemed afraid of the hospital and was in an unhappy state most of the time.

CASE IV

Cleft of Hard and Soft Palate

CASE 4
White, female.

Date of birth
January 2, 1934.

Amount of cleft.
Partial cleft of the hard palate and complete cleft of the soft palate

Number of cleft operations
One operation, October 29, 1949.

Age when operation was performed.
1. Fifteen years and nine months

Surgeon for cleft operation.
1. Dr. John W. Gerrie

Operative procedures.
First operation: Repair of the palate by the Wardill method

The usual V-Y Wardill closure was done with the anterior excisions extending in the direction of the first bicuspid tooth. The flaps were mobilized well, the hamular processes were identified but not cut, as it was felt that there was sufficient mobility. The relaxing incisions were deepened down in the region of the internal pterygoid muscle and closure was then carried out with #000 silk throughout. The nasal layers were sutured first, then the uvula; and finally the oral layer was sutured, advancing the "V" into a "Y" anteriorly. Bleeding was a bit bothersome throughout, but it was controlled at the end of the operation.

Other operations: None

Other congenital anomalies: None

History given to experimenter by mother.

There is no known history of cleft palate or thyroid deficiency in the family. Pregnancy and birth were normal. The mother has always been healthy. There are four children in the family; the girl is the third in the birth series. All the children are "perfect." Both parents are of French descent.

Speech analyses.

1. Speech history.
   She began to talk at the age of two.

2. Description of speech.
   Quality of voice: Slightly nasal.

   Defective sounds: Nasal blur on (s) (z) (ʃ)

   (?) is used at times for the plosives

   In general the sounds are good

   There are nasal grimaces on (s) (z) and ( ).

   Pitch: Low

   Rhythm: Good

3. Estimate of the judges.
   Controlled speech-- 1.89

4. Estimate of the experimenter
   Controlled speech--2
   Running speech--2

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	1
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	1
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		**Insensitive Movement fair** 2
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			**Groove in tongue - injured when child Blade movement more active than tip**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a		**Yes**	**Yes**		**Fair**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Short, midline opening in the soft palate**
2	Activity	**Fair. Movement is better on left side.**
3	Tissue	**Scarred**
4	Rating	**2**

Hard Palate

1	Height	**Good size**
2	Condition	**Very rough at anterior end of flap**
3	Rating	**2**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Both normal size**
2	Activity	**Good**

Tongue Frenum

1	Condition	**Fair**

Pharyngeal Muscles

1	Movement	**Excellent**

Uvula

1	Size	**Short**
2	Condition	**Opening**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	A great deal
2	Dental work necessary	Molars need attention. Needs pyorrhea treatments.
3	Type of Occlusion	Normal relationship of the molars (class 1) with almost edge to edge bite
4	Gaps in teeth	Lower left and right first permanent molars and upper right first molar
5	Missing and short teeth	
6	Comments	Opening in the velum
7	Opinion as to effect on Speech	Teeth are not responsible.

Jaws

1	Size	Both are fairly normal.

Labial Frenum

1	Condition	Normal

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 16-5
M.A. 12-10
I.Q. 86

Behavior and ability.
This girl is an attractive-looking person who seems as mature as her years indicate. She speaks little or no English and was not adaptive to the French spoken by the examiner, thus much guidance had to be given and instructions were often repeated. She had little initiative. Her attention was spasmodic.

Her speech seemed adequate.

The Basal age was reached at 11-0 years.

Her memory for digits is at the 12-year level; her sentence and visual memory are at the 11-year level.

I.Q. level is dull normal.

Medical examination.
Previous illnesses: Mumps, whooping cough and measles.

Previous accidents: Cut tongue.

Previous operations: None.

Inoculations:

Development: Within normal limits. She is in the seventh grade in high school. She ranks fourth in a class of fifteen. Her ambition is to do housework.

Functional history: Both parents are alive and well. She has two brothers alive and well. The one sister has T.B. and at present is a bed patient at home. There are no other congenital anomalies or heredito-familial diseases in the family.

Functional inquiry: She had discharging ears as a child; hearing is normal. Her eyes are good. There are frequent head colds; rare sore throats; and there are no coughs. The heart and kidneys are normal. Digestion is good and bowels normal. The menstrual period is negative. The arms and legs are negative.

Physical examination: This is a large framed, fat girl. Her right ear drum is covered with calcium plaque. The left ear drum bulges on the posterior (green) and is thickened and retracted. Eyes and teeth are negative. There is a heavy mucoid discharge in the nose. There is a perforation in the soft palate; the palate moves well. The cervical glands in the neck are very large. Diminished resonance is present in the left apex of the chest. The heart and abdomen are negative. The tongue moves well. Posture is poor, with scoliosis, kyphosis and lordosis. The legs are thick and heavy with genu recurvatum. She has large, thick feet. There is uniform fat distribution.

Environment:

The father is Principal of one of the French grammar schools. The mother is a very attractive-looking person who is more interested in how the girl looks than in how she talks. Her education is possibly above the average, yet she appears to be illiterate.

The girl is well poised and contented with her present position in life. She adjusts well to any situation and

gives the impression of being a very capable person. Her physical defect has not hindered her socially.

CASE V

Unilateral Cleft Lip and Cleft of
Hard and Soft Palate

CASE 5

White, female.

Date of birth.

April 19, 1941.

Amount of cleft.

Partial cleft of the left lip and
Complete cleft of the hard and soft palate.

It was impossible to obtain information as to the number of operations, age of operation, and operative procedures.

Other operations: Adenoidectomy, May 1943.

Other congenital anomalies: None

History given to experimenter by mother.

The child had been with this foster mother for only one year. The mother knew very little of the child's background except that she was an illegimate child who had lived in many foster homes. More accurate data was given by the Protestant Foster Centre of Montreal. The information is as follows:

> There is no information available concerning this child's mother.
>
> She was adopted at the age of 2½ by her uncle who stated that she was the illegitimate child of his brother. He is deeply attached to the child, but since his own marriage in 1946, he has been unable to care for her adequately. His wife does not feel able to cope with a child of this age, and she has been under foster care since July, 1948. She was a full term baby and the mother's condition at birth was good. She was born with a harelip and a cleft

palate which was operated on in Saint John's General Hospital, New Brunswick. *

The father who adopted the child said that the mother had a cleft palate.

Speech analyses.

1. Speech history
   The child was saying a few words when she was adopted by the father; this was at the age of two and a half.

2. Description of speech.
   Voice quality: very nasal

   Defective sounds.-- Substitutions:

   (w) for (l) initial position

   (ʔ) for (k) medial position

   (f) for (θ) initial position

   Omissions:

   (l) for medial and final positions

   Distortions:

   (ʃ)

   Prominent (s) becomes almost a whistle

   Nasal blur on all sounds

   Facial grimaces with fricatives and voiceless plosives

   She could make all the sounds in isolation except (s) (z) (ʃ).

   She had difficulty with clusters.

   Pitch: Good

   Rhythm: Slightly irregular

   Comment: She seemed to have difficulty with language.

* Summary for Speech Clinic from the Protestant Foster Home Centre.

3. Estimate of judges.
   Controlled speech--2

4. Estimate of experimenter.
   Controlled speech--2
   Running speech--2

Tests for Estimating Structure and Mobility of Articulators
(English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	2
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		**Slightly sensitive palate Some movement** 2
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			**Normal structure Can not make fast articulation adjustment.**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a		**Yes**	**Yes**		**Fair**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Short**
2	Activity	**All flexible. All of palate moves.**
3	Tissue	**Excellent quality**
4	Rating	**3**

Hard Palate

1	Height	**Shallow**
2	Condition	**Good**
3	Rating	**1**
4		

Passavants Cushion

1	Present	**Can not see**
2	Size	

Faucial Arches

1	Size	**Anteriors small Posteriors normal**
2	Activity	**Both move well.**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Fair**

Uvula

1	Size	**Practically none**
2	Condition	

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**Several teeth are decayed.**
2	Dental work necessary	**Need to keep teeth clean.**
3	Type of Occlusion	**Forward movement of the whole lower jaw (class 3) All the upper incisors are in linguoversion.**
4	Gaps in teeth	**No gaps**
5	Missing and short teeth	**No missing teeth**
6	Comments	**The left lateral is a supernumerary tooth. She has all the normal teeth for her age. The cleft passes through the upper left lateral area.**
7	Opinion as to effect on Speech	**Difficulty with (s) sound may be due to teeth.**

Jaws

1	Size	**Both jaws are fairly well developed. There is some crowding in the upper jaw.**

Labial Frenum

1	Condition	**Mutilated.**

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 9-0
M.A. 7-6
I.Q. 83

Behavior and ability.
The child was fidgety and distractible throughout the test. Responses were slow, and she needed a lot of urging and repetition of instruction.

Speech was nasal. It was very understandable, but in the examiner's opinion not very good.

The basal age was reached at 6-0 years. There was a regular decline of success to a final success at 10 years.

The I.Q. level was dull normal

Medical examination:
Previous illnesses: acute otitis (suppurative) in 1943; nil in past two years.

Previous accidents: None.

Previous operations: Adenoidectomy, 1943.

Inoculations: D.P.T. (3) and vaccination. Patch test negative.

Development: Unknown. She has been in the second grade for two years. She is weak in all subjects. She plays well. When she first came to foster mother she was worried about people "looking at her" but this has gone in the past year. Her appetite is good and she eats and sleeps well. The foster mother feels that her intelligence is equal to a child of 6-7.

Functional history: Unknown.

Functional inquiry:

Her hearing and sight are good. One headache and sore throat in the past two years. She has had no chronic cough. The heart, skin, arms and legs are normal.

Physical examination:

The right ear drum is scarred. There is a large remote perforation healed with thin transparent membrane covering sight. The left ear drum is thickened. The eyes are normal. The nose is injected and the septum is deviated to the left slightly. The teeth are moderately decayed and the upper deciduous teeth are slightly irregular. The palate moves actively; the tongue protrudes well to the extent that she can touch upper lip with mouth wide open. The chest and heart are normal. The abdomen is prominent and there are fat pads over the hips. There is slight lower quadrant (rib) resistance-- no splinting. The vulva is excoriated and the vaginal orifice is opened. There is a pilonidal dimple. The reflexes are equal but not active. The skin is normal. She is a nail-biter.

Environment:

The foster mother was very kind to this child. She cooperated with all the agencies concerned with the child. There were several children in the family and these played a major role in developing this child's personality.

Although the child did not live with the father (adopted)

she was partially supported by him. He was in the steel business in Tetreaultville, Quebec. His attitude toward the child was rather difficult to interpret; he seemed to feel a responsibility rather than affection.

The child was babyish in her behavior and was not able to do many things expected of an eight-year old. She was extremely sensitive and cried easily when criticized. She had a way of ignoring people when she did not wish to be disturbed; it seemed to be her main defense mechanism.

CASE VI

Unilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 6
White, male.

Date of birth.
July 18, 1941.

Amount of cleft.
Complete right unilateral cleft lip and complete unilateral cleft hard and soft palate.

Number of cleft operations.
Two operations, September 20, 1941; January 23, 1945.

Age when operations were performed.
1. Two months.
2. Three and a half years.

Surgeon for the cleft operation.
Dr. R. R. Fitzgerald.

Operative procedure:
First operation: Cheiloplasty by the method of Veau.

The steps of the procedure were not available.

Second operation: Urano-staphyloplasty by the method of Veau.

Operative notes were not available.

Other operations; Nasopharyngoscope, January 26, 1943.

Other congenital anomalies: None

History given to experimenter by the mother.

A paternal aunt had a cleft palate. There were four children in the family; the second child was a mongol, he was institutionalized and soon died. This boy was the fourth child; the other two children were normal. There was no history of thyroid trouble in either side of the family. The boy was born following a healthy pregnancy and an easy birth. He was a full term baby. The mother had no diseases while she was carrying the child. The

father was of Welsh-English descent; the mother was of English descent.

Speech analyses.

1. Speech History.
   He began to talk at about two years of age. He had much "trouble with speech." His mother thinks the other children helped him.

2. Description of speech.
   Voice quality: Nasal

   Defective sounds.-- Substitutions:

   (β) for (f)

   Tongue is arched in the middle for (l)

   There is a slight nasal blur on the sounds

   (s) (ʃ) (dʒ) (tʃ)

   Nasal grimaces accompany the sounds (s)

   (ʃ) (t) (p) (d) (b) (tʃ) (dʒ)

   (s) was whistled

   Pitch: Normal

   Rhythm: Good

3. Estimate of the judges
   Controlled speech--1.44

4. Estimate of the experimenter.
   Controlled speech--2
   Running speech--2

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	Tongue protrudes 1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	2
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	Can make (l) with tongue up 1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		No gag reflex Not much circular movement 3
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	Can make this adjustment but does not generally 1
Structure of Tongue		Good structure and movement			

Palate	Sound spoken	tense	short	flexible	long	rating
	ɑ		Yes	Yes		Fair

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Tight, little short
2	Activity	Central activity is fair - periphery poor.
3	Tissue	Scarred
4	Rating	3

Hard Palate

1	Height	Medium
2	Condition	Large, midline anterior hole
3	Rating	3
4		

Passavants Cushion

1	Present	Could not see
2	Size	

Faucial Arches

1	Size	Anterior is short. Posterior is tight and thin.
2	Activity	Fair

Tongue Frenum

1	Condition	Loose

Pharyngeal Muscles

1	Movement	Fair

Uvula

1	Size	Small
2	Condition	Truncated

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**None**
2	Dental work necessary	**Nothing can be done at the moment**
3	Type of Occlusion	**All remaining teeth are in linguoversion. Normal relationship of the molars.**
4	Gaps in teeth	**Cleft passes between the upper left central and cuspid; the closure is not complete.**
5	Missing and short teeth	
6	Comments	
7	Opinion as to effect on Speech	**Teeth not totally responsible for speech defect**

Jaws

1	Size	**Upper jaw constricted; lower jaw normal**

Labial Frenum

1	Condition	**Loose**

Audiometric test.
Hearing is normal.

Psychometric test.
C.A. 8-7
M.A. 9-8
I.Q. 113

Behavior and ability.

He was friendly and attentive.

His speech is good.

The Basal age was reached at 8-0 years. The span of success was broad to year 14. There was complete failure at near 12, and single successes at years 13 and 14.

Medical examination.

Previous illnesses: Mumps, measles, whooping-cough, chicken-pox.

Previous accidents: None

Previous operations: None

Inoculations: D.P.T. Patch test negative.

Development: First sat up at six months; walked at one year; gained bowel and bladder control at eighteen months. He is in the third year at school; his school work is good. He is easy to manage.

Functional history: Both parents are alive and well. The mother is thirty-seven years; the father is forty-one years old. There were three siblings; one died, a mongolian idiot, at the age of four. The other two children are alive and well. A paternal aunt has a harelip.

Functional inquiry: There is no discharge from the ears; hearing is normal. The eyes are normal. He rarely has head colds or sore throat. The glands are normal. He has no chronic cough. He can eat anything and everything. The bowels, skin, g.u., are normal.

Physical examination: Both ear drums are thickened and scarred with marked retraction. There is facial asymmetry due to the repair of the lip; the left side is higher than the right. The nasal septum deviates to the left. There is a midline line hole in the anterior portion of the palate. There is heavy post-nasal drainage; the tonsils are infected. The cervical glands are enlarged. The chest, heart, and abdomen are negative. The skin, arms and legs are normal. The tongue and palate move actively.

Environment: The father is employed as a foreman of Welders Canadian Vickers. He and the boy are "boon" fishing companions. Every Saturday the whole family take their boat and spend the weekend at a fishing shack on one of the nearby islands. This is a happy, companionable family. The mother never demands; she suggests. The boy is a normal, active boy who expects to do something that has never been done in their family, go to college.

CASE VII

Cleft of Hard and Soft Palate

CASE 7
White, male.

Date of birth
March 22, 1940

Amount of cleft
Partial cleft of the hard palate and complete cleft of the soft palate.

Number of cleft operations
One operation, December 4, 1943.

Age when operation was performed
1. Two years and eight months.

Surgeon for cleft operation.
Dr. R. R. Fitzgerald.

Operative procedure.

First operation: Urano-staphyloplasty by the method of Veau.

The left side was dealt with first. A Reverdin needle was passed through all the layers of the nasal submucosa; the edge was split and two layers created, nasal and buccal. Similar technique was applied on the opposite side; the wire suture then was passed through. Three mattress sutures were laid in place in the nasal surface at the anterior portion of the cleft. The posterior portion was sewed up on its nasal side with interrupted dermal sutures. The uvula was reconstructed. Wire suture was laid in place. The buccal surface was reconstructed. Two flaps were cut from the mucoperiosteum of the hard palate on each side and swung into position. They were held in place by passing the heavy mattress sutures through them and

tying them securely. At the close of the operation there was a reasonably long palate without tension and a raw area behind the incisor teeth.

Other operations: Tonsillectomy, June 10, 1942.
Tongue frenum cut March 28, 1950.

Other congenital anomalies.
Cleft in the tongue.

History given to experimenter by mother.

An uncle on the paternal side had a child with a cleft palate; it died in infancy.

There is no history of thyroid deficiency. The mother has "kidney trouble." There are five children; this child is the oldest of the group. He was a seven months baby; no instruments were used, but birth was difficult. At birth he had "no finger nails." The mother had no diseases during pregnancy but she was sick and weak during the time. A paternal cousin had two stillbirths. Bladder control was not established until the age of four and one-half. Both parents are of French descent.

Speech analyses.

1. Speech history.
He began to talk at the age of three. His speech has never been good. He attended the speech clinic from January 25, 1944, until March 29, 1946. The clinic notes say that very little progress was made because of the child's shyness and home conditions. The father drank and disappeared from home for periods of time, thus the mother found it difficult to bring

the child regularly.

2. Description of speech.
Voice quality: Nasal, hoarse

Defective sounds:-- Substitutions:

(?) for (s) (z) initial, medial, and final

(?) for (t) initial and medial

(?) for (g) initial

(?) for (tʃ) initial and final

Lateral (s) lisp

Lateral (ʃ) lisp

Lateral (z) lisp

Tongue is arched in middle for (l)

Tongue protrudes on postdentals.

Fails to use the tongue for most of the sounds.

Pitch: Low

Rhythm: Irregular

3. Estimate of the judge.
Controlled speech-- 2.22

4. Estimate of the experimenter
Controlled speech--2
Running speech--2

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	2
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	Tongue protrudes 3
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	3
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	Tongue rises in middle 3
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	3
	7	l	Draw down sides of tongue	lapin, balai	Tongue protrudes 3
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		Insensitive Movement fair 2
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	3
Structure of Tongue			**Cleft to the right center. Heavily grooved and thick. Bifid tip of tongue. Little movement in the production of speech.**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a		**Yes**	**Yes**		**Fair**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Slightly short**
2	Activity	**Good activity; all the palate moves.**
3	Tissue	**Quality is not good.**
4	Rating	**2**

Hard Palate

1	Height	**Shallow**
2	Condition	**Badly scarred**
3	Rating	**2**
4		

Passavants Cushion

1	Present	**Yes**
2	Size	**Very large**

Faucial Arches

1	Size	**Anterior normal in size, short in length** **Posterior small in size, short in length**
2	Activity	**Move well**

Tongue Frenum

1	Condition	**Very short and thick**

Pharyngeal Muscles

1	Movement	**Fair**

Uvula

1	Size	**Short and small**
2	Condition	**Truncated**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	All permanent molars require attention.
2	Dental work necessary	Needs braces
3	Type of Occlusion	Normal relationship of the molars (class 1) Upper left central incisors are in linguoversion Central is rotated and displaced lingually.
4	Gaps in teeth	Space is closed 50% in upper right bicuspid area but interrupted; two teeth should be there. Bicuspid area on left side is also interrupted.
5	Missing and short teeth	
6	Comments	The tongue is thick. He uses the tongue thrust. There is an opening in the midline about center of the hard palate.
7	Opinion as to effect on Speech	Teeth are not bad enough to affect speech.
	Jaws	
1	Size	Both are undeveloped
	Labial Frenum	
1	Condition	Normal

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 10-0
M.A. 7-10
I.Q. 78

Behavior and ability.
This lad responded slowly and rather erratically to the examiner.

The test pattern was of regular span and gradation.

His speech seemed poor; his words were spoken in an unfinished manner.

The basal age was reached at 6-0 years. He had four final successes at year 9.

I.Q. level is high borderline or low dull normal.

Medical examination

Previous illnesses: measles.

Previous accidents: None.

Previous operations: Tonsillectomy and adenoidectomy.

Inoculation:

Development: Within normal limits; began to walk at fifteen months.

Functional history: Both parents are alive and well. The mother is thirty-three and the father is thirty-eight. There are four siblings who are alive and well. There were no miscarriages and no stillbirths. An uncle on the paternal side had a child with a cleft palate; it died in infancy. There are no other congenital defects.

Functional inquiry: Essentially normal.

Physical examination: Both ear drums are obscured by wax. The eyes and nose are negative. The tongue deviates to the right at the tip with suggestion of central division (cleft). The left upper central molar is out of alignment. The skin of the hands and knees is rough (ichthyotic). The chest and heart are negative. The liver edge is questionably palpable. There are preputial adhesions. The cranical and peripheral nerves are intact. His speech is poor, palatal. He is a shy, retiring boy; however, he was fairly co-operative.

Environment:

The father had a job periodically; he worked first at one place and then at another. There was not a friendly relationship between the son and father, nor between the mother and son. This child appeared to be just another burden added to the many they already had. Both parents were unintelligent and poorly educated.

The mother was an ineffectual person who reminded everyone that she was too sick and too weak to carry out any instructions. She allowed her children to dictate their own life and behavior; however, she did try to feed and clothe them.

With an indifferent, shy, and reserved manner, the child lived his life alone. He wore a troubled look on his face and he never "bubbled over" with joy as most children do.

CASE VIII

Cleft of Hard and Soft Palate

CASE 8
White, female

Date of birth
January 20, 1942.

Amount of cleft
Cleft of the posterior part of the hard palate and complete cleft of the soft palate.

Number of cleft operations
One, October 3, 1945

Age when operations were performed
1. Three years and nine months

Surgeon for cleft operation
Dr. Hamilton Baxter

Operative procedure
First operation: Repair of the palate

Mucoperiosteal flaps were raised as in the Langenbeck procedure and the flaps were sutured with interrupted dermal. One large stay was used.

Other operations: Tonsillectomy and adenoidectomy, February 4, 1950

Other congenital anomalies: None

History given to experimenter by the mother

There is no history of cleft palate or thyroid difficulty in the family. This child was the fourth of four children. The third child was born prematurely and died soon after birth. The other two are seemingly normal. This child was born at full term with a spontaneous, normal delivery. It was difficult to get the child to breath immediately after birth and for a time she was not expected to live. She is not a healthy child;"seems to always be complaining of stomach." Both parents are of French descent.

Speech analyses.

1. Speech history.
   She began to talk at the age of four years.

2. Description of speech
   Voice quality: Husky. After the removal of the tonsils and adenoids it became nasal

   Defective sounds.-- Substitutions:

   (t) for (k) initial, medial, final positions

   (tʃ) for (ʃ) final

   (d) for (j) medial

   (d) for (g) initial, medial, final positions

   (t) for (s) initial, medial, final positions

   (t) for (ʃ) initial

   (d) for (z) final

   (d) for (dʒ) final

   (d) for (k) initial

   (b) for (v) initial, final positions

   Omissions:

   (r) medial position

   (k) medial position

   Had difficulty with clusters

   Pitch: Low at times, tend to break

   Rhythm: Irregular

   Comment: More delayed than cleft palate speech

3. Estimate of the judges.
   Controlled speech--2.89

4. Estimate of the experimenter
   Controlled speech--3
   Running speech--3

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	3
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	(tongue tip down) 3
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	3
	7	l	Draw down sides of tongue	lapin, balai	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		sensitive good movement 1
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	2
Structure of Tongue			Normal structure Could not move quickly		

Palate	Sound spoken	tense	short	flexible	long	rating
	a			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Good length and width Wide central scar**
2	Activity	**All the palate moves well.**
3	Tissue	**Appears to be very good quality, though thin**
4	Rating	2

Hard Palate

1	Height	**Shallow and wide**
2	Condition	**Good**
3	Rating	**1**
4		

Passavants Cushion

1	Present	**Yes**
2	Size	**Very small**

Faucial Arches

1	Size	**Anterior very large Posterior small**
2	Activity	**Amazingly good**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Active**

Uvula

1	Size	**Normal**
2	Condition	**Completely bifid**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	Lower first molar
2	Dental work necessary	Teeth not clean, needs dental attention Lower first molar is decayed.
3	Type of Occlusion	Normal relationship of the molars (class 1)
4	Gaps in teeth	Terrific loss of space in the upper jaws due to early extraction of baby teeth.
5	Missing and short teeth	
6	Comments	Slow dental development
7	Opinion as to effect on Speech	Teeth are not responsible for speech defect.

Jaws

1	Size	The upper jaws are constricted; the lower jaws are normal.

Labial Frenum

1	Condition	Abnormally attached

Audiometric test

Hearing is normal for all frequencies except 4096.

This fell below normal for the right ear. Test results are as follows:

frequency	decibels
4096	35

Psychometric test

C.A. 8-2
M.A. 6-8
I.Q. 82

Behavior and ability.

This child was apprehensive of the examiner and the test surroundings

She was restless and tired quickly.

Her speech was not clear.

The basal age was reached at 6-0 years. The final success was reached at eight years.

I.Q. level is dull normal.

Medical examination.

Previous illnesses: whooping cough, measles, chicken-pox.

Previous accidents: None.

Previous operations: Tonsillectomy and adenoideotomy.

Inoculations:

Development: Within normal limits.

Functional history: She is with her aunt, who is unaware of any congenital defect in the family and knows little of patient's previous history.

Functional inquiry: Nil.

Physical examination: Both ear drums are thickened with some retraction. The eyes and nose are negative. The palate is well repaired; moves actively. The uvula is bifid. The tongue is definitely restricted; she is unable to touch the upper lip with tongue. The chest, heart, abdomen, skin, and g.u. are negative. Her speech is poor.

Environment:

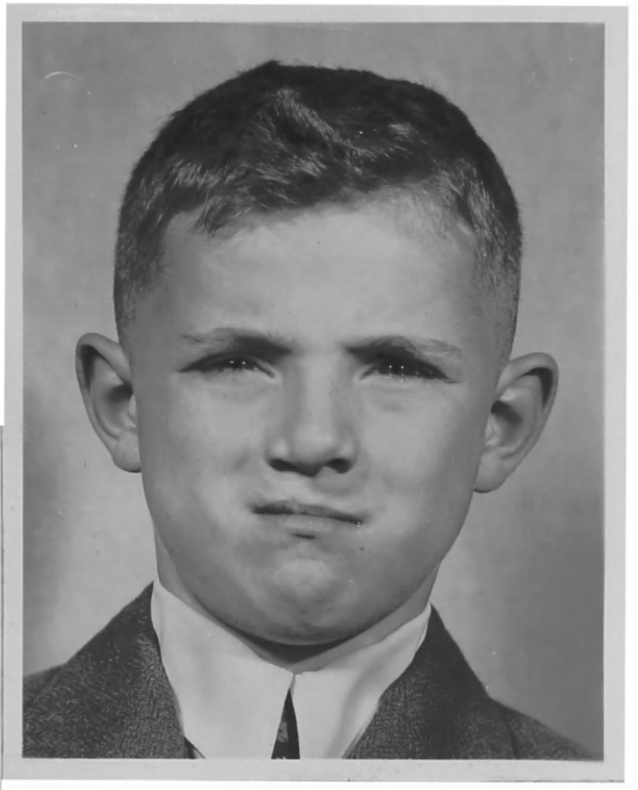
The father was employed as a plumber. The experimenter did not see him.

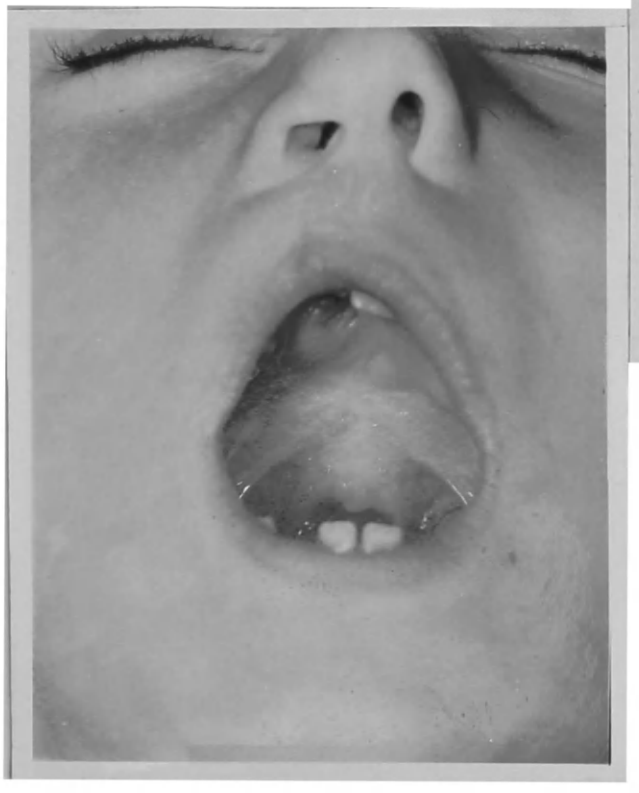
The mother was a very loquacious, undependable type of person who was interested, to a degree, in the welfare of the child. She was not a well-educated person and seemed ignorant about many things, one being general health rules. The child's body was always unclean, although dressed well. Several times the experimenter noted lice in the child's hair.

The child was babyish in manner and at times seemed foolishly silly. She was totally dependent on her mother or the adult who brought her to the clinic.

CASE IX

Unilateral Cleft Lip and Cleft of Hard and Soft Palate





CASE 9

White, male.

Date of birth.

November 4, 1941.

Amount of cleft.

Complete cleft of the right lip with cleft alveolar ridge and complete cleft of the hard and soft palate.

Number of cleft operations.

Two operations, January 10, 1942; May 14, 1943.

Age when operations were performed.

1. Two months.
2. Two years and six months.

Surgeon for the cleft.

Dr. Dudley Ross.

Operative procedure.

First operation: Repair of the bilateral lip.

The cheek and lip were freed as far back as possible and as high as the infra-orbital ridge on both sides. Cleft edges were pared according to the Rose technique, and apposition of the pared edges was obtained and maintained by means of interrupted dermal sutures, without undue tension.

Second operation:

The usual bilateral relaxation incisions were made. The cut edges of the cleft were brought together and held by means of interrupted dermal sutures.

Other operations: Tonsillectomy, 1950 and adenoidectomy.

Other congenital anomalies:

Bilateral hydrocele.

History given to experimenter by the mother.

There is no known history of cleft palate or thyroid

deficiency in the family. There are two children; this child is the second one; the daughter is in fine health. The pregnancy was normal but the delivery was difficult. The child did not cry right away and the doctors did not expect him to live. There were no illnesses while the mother was carrying the child. The mother is of French descent; the father is of English descent.

Speech analyses.

1. Speech history.
   The child did not talk until after the operation which was at about two and one-half years.

2. Description of speech.
   Voice quality: Nasal

   Defective sounds.-- Substitutions:

   (t) for (k) final position

   (?) for (s) medial

   (s) lateral lisp

   (?) for (k) initial position

   Nasal blur on (p) (b) (s) (z) (tʃ) (ʒ) (f) (v) (t) (d)

   The tongue protruded on (l) (n) (s) (ʃ) (z) (t) (d) (tʃ) (j)

   Pitch: Normal

   Rhythm: Irregular

3. Estimate of the judges.
   Controlled speech--2.11

4. Estimate of the experimenter.
   Controlled speech--2
   Running speech--3

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	Tongue protrudes 2
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	2
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	1
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	Tongue protrudes 2
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		Sensitive Poor movement 2
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue		**Normal structure** **Tip movements poor; asymmetrical back movements for (k) (g) sounds.**			

Palate	Sound spoken	tense	short	flexible	long	rating
	a	**Yes**	**Yes**			Poor

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Short. Marked scarring in the center**
2	Activity	**Poor mobility**
3	Tissue	**Scarred**
4	Rating	**3**

Hard Palate

1	Height	**High**
2	Condition	**Small arch. Anterior fistula (small). Left alveolus operlaps.**
3	Rating	**3**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Both very small**
2	Activity	**Fair**

Tongue Frenum

1	Condition	**Normal**

Pharyngeal Muscles

1	Movement	**Good**

Uvula

1	Size	**Small**
2	Condition	**Eccentric to the right**

Tests Estimating Structure and Condition of Teeth

	Teeth	
1	Amount of decay	None
2	Dental work necessary	Needs to have the roots of several teeth removed.
3	Type of Occlusion	There is an edge to edge bite. Normal relationship of the molars (class 1)
4	Gaps in teeth	Space between the cleft which passes between the upper right central and the right cuspid
5	Missing and short teeth	None
6	Comments	None
7	Opinion as to effect on Speech	Dental structure should not affect speech.
	Jaws	
1	Size	Both jaws are fairly well developed.
	Labial Frenum	
1	Condition	Normal

Audiometric test.
Slight hearing loss. The results of the tests are as follows:

	frequency	decibels
Right ear	512	40
	1024	30
	2048	25
	4096	50
	8192	30
Left ear	512	40
	1024	30
	2048	25
	4096	40
	8192	15

Psychometric test.
C.A. 8-9
M.A. 7-8
I.Q. 89

Behavior and ability.
He was cooperative and methodical but slow in his performance.

His speech was fair.

The basal age was reached at 7 years. There was gradual decrease in successes until year 10.

I.Q. level was dull normal.

Medical examination:

Previous illnesses: Mumps, whooping cough, chicken-pox.

Previous accidents: None.

Previous operations: None

Inoculations: inoculation for diphtheria, No. B.C.G.

Development: Within the normal limits. He is in the third grade at school. Plays well and is obedient.

Functional history: Both parents are alive; the father is in poor health. There is one sibling, age eleven. She

has chronic bronchitis. There were no miscarriages, or stillbirths. A first cousin on the mother's side had a club foot. Pregnancy was normal throughout. Delivery was normal.

Functional inquiry: He had two bouts of ear infection. The mother thinks his hearing is less acute than normal. He is having trouble with his teeth. He eats and sleeps well.

Physical examination: The left ear drum is thickened, scarred and retracted. The right ear drum is retracted. The tarsal glands of the eyelids are infected. The nose is deformed with depressed columella. There are several carious teeth. The tonsils are moderate. The anterior and cervical glands are palpable. His speech is fair. There are no other points in the physical findings.

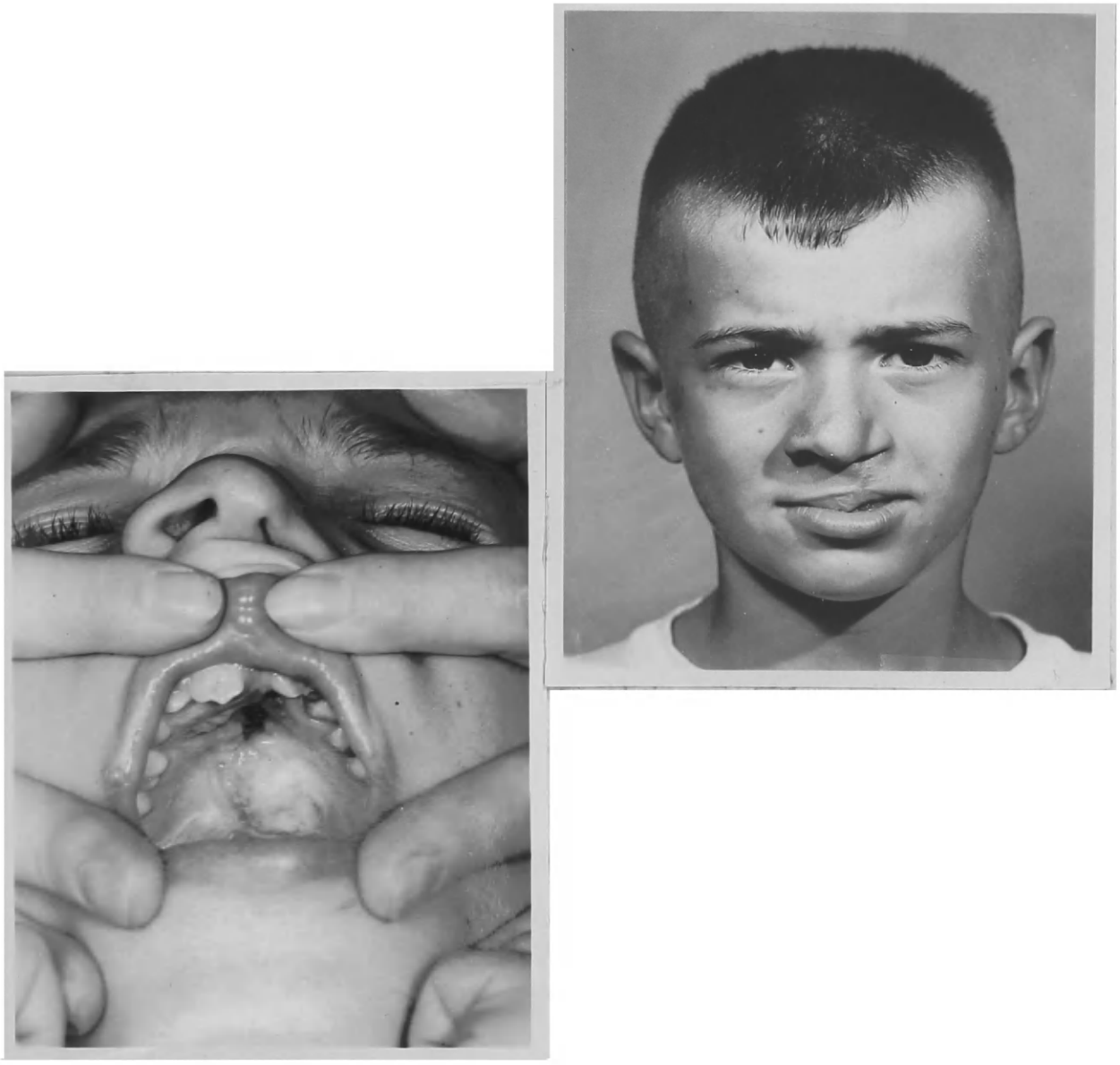
Environment:

The father is an engraver for a textile plant in Magog, Quebec. He has been under a doctor's care for the entire year because of a nervous disorder. The mother is very efficient in rearing her children as well as managing her household. There is a companionable relationship between the son and mother.

The boy is friendly and easy-going. His physical difference has not created any personality deviations. He accepts the test procedures readily and without suspicion.

CASE X

Unilateral Cleft Lip and Cleft of
Hard and Soft Palate



CASE 10
White, male

Date of birth
November 17, 1941.

Amount of cleft.
Unilateral complete left cleft lip and complete cleft of the soft palate stretching into the hard palate.

Number of cleft operations.
Three operations, December 20, 1941, October 27, 1942, May 10, 1947.

Age when operations were performed.
1. One month.
2. About eleven months.
3. Six years and six months.

Surgeon for cleft operation.
Dr. R. R. Fitzgerald.

Operative procedure.
First operation: Cheiloplasty and uranoplasty by the method of Veau.

Incisions were traced on the medial and the lateral sides removing a triangular portion of skin on the left side. The mouth was opened. A vomerine flap was cut from the right side and swung into position. The mucoperiosteal flap on the right side was hinged on the posterior palatine artery and swung into position. These two flaps were held together with a mattress dermal suture. The margins of the incisions on the lips were then undercut on both skin and mucous membrane sides. The alar cartilage exposed and transfixing sutures were placed through the opposite nostril. Suture of the lip was begun by passing the wire suture first; then two catgut stitches in the posterior surface, and the edges

and the edges were drawn together with plastisute sutures. The wire suture was tightened last. The condition of the child was good at the close of the operation.

Second operation: Staphylo-uranoplasty by the method of Veau.

A Reverdin needle was passed through to the right side as far as the nasal submucosa and was made to emerge in the margin of the cleft. The cleft was split and a wire suture was drawn through. Similar technique was applied on the left side where a dermal ligature was drawn through. The margins were split and the mucoperiosteum dissected off the hard palate and the buccal and nasal surfaces on both sides. This turned out to be a very difficult manoeuvre on both sides, as there appeared to be extra spicules of bones on the posterior border of the hard palate. Two mattress sutures were laid in place in the anterior end of the cleft, then the nasal layers were sutured with interrupted dermal. The uvula was reconstructed. A wire suture was passed and tied. The defect in the anterior portion on the buccal side was covered with a mucoperiosteal flap cut from the child's left side with its base posteriorly. This was swung into place and tied in with the two mattress sutures. The condition was good at the close.

Third operation: Adjustment of the floor of the nostril.

A tooth was found to be erupting in the floor of the left nostril and this was extracted. In the nasal passage itself there were some remains of dental compound inserted by the dentist and this was also removed. An eliptical incision was made in the floor of the left nostril; scar and skin was removed; the skin was undercut on each side. The suture was then passed through the lower margin of the alar cartilage of the left side and out to the right nostril and tied firmly over a pad, narrowing the floor of the nostril and drawing the alar cartilage medially. The closure of the skin was completed with interrupted catgut sutures.

Other operations: None

Other congenital anomalies: None

History given to experimenter by mother.

The mother had a complete cleft palate and cleft lip. Her operative work was done in Japan by a German surgeon; the result from the standpoint of speech was excellent. The mother thought she had a thyroid deficiency. Pregnancy and birth of this child were normal. There were four children in the family, one girl and three boys. This child was the oldest in the family. The father was of French Swiss descent; the mother is of Irish-English descent.

Speech analyses.

1. Speech history.
   He began to talk at eighteen months. At nineteen months he was speaking in sentences. There has been no speech training.

2. Description of speech.
   Voice quality: Nasal

   Defective sounds: The (l) sound is made by raising the middle portion of the tongue; sometimes it is omitted in the final position and with clusters. (n) (ʃ) (z) (t) (d) are made with the tongue protruding.

   The (s) sound is his worst one. It is lispy, and there is nasal escape of air.

   Pitch: Good

   Rhythm: Good

3. Estimate of the judges.
   Controlled speech--2

4. Estimate of the experimenter.
   Controlled speech--2
   Running speech--2

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	Tongue protrudes 1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	3
	4	ɵ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	3
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Fair sensitivity Fair movement 2
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			**Normal** **Uses the blade more than the tip.**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a		Yes	Yes		Fair

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Short
2	Activity	Good central activity
3	Tissue	Scarred
4	Rating	3

Hard Palate

1	Height	Shallow
2	Condition	Thick, scarred Large anterior opening
3	Rating	3
4		

Passavants Cushion

1	Present	No
2	Size	

Faucial Arches

1	Size	~~Anterior large and tight~~ Posterior normal, slightly tight
2	Activity	Tight

Tongue Frenum

1	Condition	Loose

Pharyngeal Muscles

1	Movement	Fairly good

Uvula

1	Size	Short
2	Condition	Bifid

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	
2	Dental work necessary	General dentistry is needed.
3	Type of Occlusion	From the first deciduous molars all the teeth are in linguoversion. Normal relationship of the molars (class 1)
4	Gaps in teeth	A gap between the upper left deciduous cuspid and the upper left permanent central
5	Missing and short teeth	Upper lateral in the edge of cleft has been extracted.
6	Comments	Cleft passes between the left upper central and cuspid. Mixed denture with all deciduous in place
7	Opinion as to effect on Speech	Teeth possibly but opening probably more

Jaws

1	Size	Upper jaw is constricted, lower is well developed.

Labial Frenum

1	Condition	Abnormally attached

Audiometric test.
Hearing is normal.

Psychometric test.
C.A. 8-3
M.A. 11-2
I.Q. 135

Behavior and ability.

He was relaxed, friendly and interested in the test. His vocabulary was particularly advanced. Reading was normal but below his general intellectual level. General comprehension and information were excellent. His speech was good.

The basal age was 8-0 years. His successes covered a broad range from 8-0 to near 14 years and they were rather irregular. There was complete failure at 13 years and 2 successes at near 14 years. This may indicate that actual intellectual functioning suffers interference from some psychological factor.

I.Q. level was very superior.

Medical examination.

Previous illnesses: measles, mumps, chicken pox and colds.

Previous accidents: None

Previous operations: None.

Inoculated: D.D.T. No. B.C.G.

Development: He sat up at five months; walked at fourteen months and talked at eighteen months. He is in the third grade at school and doing well. He likes sports, such as baseball and skating. He is

now ten years old. His speech is fair. He likes to play the piano and violin.

Functional history:

Both parents are alive and well; the mother is forty-four years old and the father is forty-six years. There are three siblings, a boy five years, a boy three years, and a girl two years. The mother has a cleft palate and lip but there is no other history of any congenital defects on either side. There is no history of epilepsy, congenital intracranial or heredito-familial diseases.

Functional inquiry:

The child had one bout with catarrhal otitis as an infant, but there has been no recurrence. His hearing and sight are normal. The nose, chest, heart and abdomen are negative. He eats and sleeps well. He had four bouts of enuresis this winter. He is flat-footed and wears arch supports. His arms and legs are normal.

Physical examination:

His ear drums are retracted. The left naso-labio field is depressed with crusted mucous. The right nares are practically obstructed by mucous. There is a 2 cm. midline anterior cleft in the hard palate. The upper central incisors are displaced about 0.5 cm. The upper teeth are carious. The anterior cervical glands on the left are enlarged. The chest, heart, abdomen and g.u. are negative. The reflexes are good. Muscle tone and power are good. The feet and skin are normal.

Environment:

The father is the rector of a French Presbyterian church in Montreal. The church is extremely poor financially; therefore, the minister is poorly paid. Both parents are intelligent and keenly interested in their children. The home is a happy one. The mother is more protective toward the boy than the father. This may be because she understands the problem more thoroughly. There are three siblings. All are perfectly normal and healthy. The relationship among them is easy and pleasant. The child is well poised and independent in manner. At times he exhibits aggressive as well as suspicious tendencies. There is always a desire to excel in every test situation.

CASE XI

Unilateral Cleft Lip and Cleft of Soft Palate

CASE 11
White, male

Date of birth.
December 13, 1940

Amount of cleft.
Partial right cleft lip and alveolus
Partial cleft of the soft palate (small submucous cleft).

Number of operations.
Two operations, May 3, 1941; June 17, 1947.

Age when operations were performed.
1. Four and one half years old
2. Seven years and six months.

Surgeon for cleft operation.
Dr. R. R. Fitzgerald.

Operative Procedure:
First operation: Chieloplasty by the method of Veau

Incisions were traced first on the lateral and then on the medial sides. The margins of the skin and mucous membrane were undercut one-fourth inches on all sides. Restraining sutures were passed through the alar nasi and out through the opposite nostril and tied over a pad. Wire suture were laid in place. Two catgut sutures were made posteriorly. The edges then united with plastisute sutures, starting at the muco-cutaneous edge. Interrupted plastisute sutures were used throughout. The wire sutures were then tied.

Second operation:

Operative procedures were not available. Post-operative report gave this information; palate well healed and well set back, uvula being

approximately 1 cm. away from the post-pharyngeal wall.

Other operations. Tonsillectomy.
Adenoidectomy.

Other congenital anamolies: None.

History given to experimenter by mother.

There is no history of cleft palate in the family. The grandmother and aunt (maternal) had goiter. This case is the oldest of three children. There were three miscarriages before his birth. During this pregnancy, the mother was extremely nauseated and had to be on a diet because of a kidney disorder. The child was a full term baby with spontaneous birth. The mother said she was an extremely nervous person. Both parents are of French descent.

Speech analyses.

1. Speech history.
He began to talk at the age of two. At first his speech was very bad, then it became better.

2. Description of speech.

Voice quality: Good

Defective sounds.--Substitutions:

(?) for (t) (d) in the initial position

The (?) is particularly noticeable if a phrase has many plosives.

Omissions:

(f) in final position

(t) in clusters

(k) in clusters

The tongue protrudes on the (n) sound.

All sounds could be made in isolation and in combinations; he needed to be reminded to say them.

Pitch: Good

Rhythm: Irregular, if sentence was "loaded" with plosives.

3. Estimate of the judges
Controlled speech--1.89

4. Estimate of the experimenter
Controlled speech--2
Running speech--2

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	2
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	1
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	1
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	2
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		Sensitive palate Good circular movement 1
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			Slightly fissured tongue Movement labored		

Palate	Sound spoken	tense	short	flexible	long	rating
	a	Yes	Yes			Poor

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Very Short**
2	Activity	**Fair and only the posterior central part moves**
3	Tissue	**Scarred**
4	Rating	**3**

Hard Palate

1	Height	**Anterior arch very high**
2	Condition	**Average**
3	Rating	**1**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Posterior arches are incomplete; anterior is normal. Posterior is small.**
2	Activity	**Both are tight; the anterior is tighter than the posterior. Fair activity.**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Good**

Uvula

1	Size	**Short**
2	Condition	**Constricted at base**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**Badly in need of dental work**
2	Dental work necessary	**Lower left first molar, upper left and right first molars need attention.**
3	Type of Occlusion	**Upper right central is in linguoversion. Normal relationship of molars (class 1), appears to be Class 2 (distal occlusion) due to the early loss of the upper second deciduous molars.**
4	Gaps in teeth	**Lower bicuspid area have no teeth**
5	Missing and short teeth	**Upper right lateral is missing.**
6	Comments	**Cleft passes between the upper right central and cuspid. Opening in the vestibule**
7	Opinion as to effect on Speech	**Teeth not responsible**

Jaws

1	Size	**Both fairly well developed**

Labial Frenum

1	Condition	**Abnormally attached--involved in the scar tissue**

Audiometric test
Hearing is normal

Psychometric test.
C.A. 9-3 years
M.A. 8-10 years
I.Q. 95

Behavior and ability.
This lad showed little interest in the test. He needed constant coaxing from the mother and the examiner. He concentrated for only brief periods. He seemed tense and apprehensive. Mother said he had not been feeling well for a few days. She was not very helpful in impressing the lad with the desirability of trying.

Speech was fair.

Basal age reached at 7-0 years. There was a final success at year 11; visual memory, numerical concept are well developed.

Vocabulary is average.

I.Q. level is low average.

Medical Examination.

Previous illnesses: Measles, chicken pox, mumps, pneumonia.

Previous accidents: None.

Previous operations: Tonsillectomy and adenoidecomy.

Development: He is nine years old and in the fourth grade at school, (upper 1/3 of class). He plays actively. Most of his speech is good; there is a nasal twang on some words. He is shy, retiring, unstable. Other children teased him about his lip.

Functional history:

Mother is thirty-seven years old; father's age is forty-four. Both are alive and well. Three siblings are alive and well. Two miscarriages at two months and one month. On the paternal side, the uncle of the patient was club-footed; another uncle (paternal) had an infant born with multiple anomalies; another paternal uncle had badly defective (mentally) child. The maternal aunt died with post partum psychosis (after birth of baby).

Functional inquiry:

The child had frequent head colds; frequent sore throats; and occasional, in the left lower quadrant, abdominal pains. He has pimply rash on the buttock. Digestion is good; elimination is good; g.u. is normal.

Physical Examination:

The drums are irregularly thickened with blister-like area. Nose is pulled down on the right. The eyes are normal; the lip is O.K. He is unable to touch tongue to upper lips; the palate is intact and moves actively. The tonsils are large, and there is a bilateral glandular enlargement. Chest, heart, abdomen, and g.u. are negative. Arms and legs are negative. Hands are chapped and there is rash between the

buttock.

Environment:

The father of this boy was a taxi driver who supported his family adequately. The mother and children were always well dressed. Neither parent had finished high school; however, the mother was natively intelligent, and very anxious for her child to be given opportunities which were not available to her. She was a very attractive, and friendly person with whom it was a great joy to work.

This boy was the older of three children. Although he was not keenly interested in developing better, he endured the procedure because his mother wanted it. His chief interests were baseball and skating. He was a rather sweet, shy child, who evidently received a great deal of affection at home. Recently he had developed rheumatic fever and he had very little energy for outside activities.

Speech Training:

Beginning the last of May, this child was brought to the speech clinic twice weekly by his mother, until July 10, 1950. The mother was allowed to sit in on the lessons. Special emphasis was given to tongue placement for ( ) (l) (z) and (d) and recognition of his use of glottals for

all plosives. He could produce the sounds fairly acceptably, but needed to be reminded. Some attempt was made to clear up the nasal quality. On July 10, 1950, he was dismissed, because the experimenter felt that he could carry on alone.

CASE XII

Unilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 12
White, male.

Date of birth
January 28, 1944.

Amount of cleft.
Complete unilateral left cleft lip and complete cleft of the hard and soft palate.

Number of operations.
Two operations, March 29, 1944; September 26, 1945.

Age when operations were performed.
1. Two months old
2. One year and eight months.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative procedure.
First operation: Repair of the harelip.

The points A, AI, B, BI and C, CI were outlined as in the Mirault-Blair procedure. The margins of the cleft were pared and approximated, the vermilion was imbricated and a Logan lip bow was applied. Pneumonia occurred post-operatively.

Second operation: Repair of cleft palate.

The mucoperiosteal flaps were raised as in the method of Langenbeck. The margins of the cleft were pared and were approximated with interrupted dermal sutures. The child had pneumonia post-operatively.

Other operations:

Repair of the lower lip, September 3, 1944.
Congenital fistula of the lower lip.

An excision was made around the edge of the fistula and a tract was excised. The wound in the lower lip was closed with interrupted dermal sutures.

Excision of mucocoele of the lip. November 8, 1944. The mucosa was excised transversely. The cyst was opened and the entire mucosal wall was excised. The wound was closed with interrupted plastic sutures.

Other congenital anomalies.
Congenital fistula of the lower lip.

History given to experimenter by the mother.

There is no history of cleft palate or thyroid deficiency in the family. The mother has a nephew who was born with two extra fingers. The mother says she has been healthy all her life; however, she considers herself a very nervous person. The child was born at full term preceded by an uncomplicated pregnancy and birth.

Speech analyses.

1. Speech history.
He began to say words at the age of four. At that time words had little meaning, and even at the present age he has little or no understanding of their meaning.

2. Description of speech.
Voice quality: Husky, tense, nasal (negative).

Defective sounds-- Substitutions:

(w) for (r) in all positions

(t) for (k) in initial position

The sounds (s) (z) (ʃ) are lispy. Most of the clusters are mutilated. He is able to make all the sounds, except those mentioned, in isolation; however, when the sounds are combined into words,

he may omit, substitute, or distort any sound.

Two-syllable words are most difficult.

Pitch: His voice is rather low and quite often breaks into a very high pitch.

Rhythm: Irregular

Comment: This seems to be linquistic as well as a cleft palate problem.

3. Estimate of the judges.
   Controlled speech--2.33

4. Estimate of the experimenter.
   Controlled speech-2
   Running speech--3

Tests for Estimating Structure and Mobility of Articulators
(English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	Tongue protrudes 2
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	3
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	Tongue protrudes 1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive Movement similar to normal 1
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			**Normal structure. Average movement, uses blade more than the tip.**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a			**Yes**	**Yes**	**Good**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Long and big**
2	Activity	**Good in central area**
3	Tissue	**Good quality**
4	Rating	**1**

Hard Palate

1	Height	**Shallow**
2	Condition	**Normal**
3	Rating	**1**
4		

Passavants Cushion

1	Present	**Yes**
2	Size	**Medium, well developed**

Faucial Arches

1	Size	**Both are short in length, medium in size, Posterior pulls close together.**
2	Activity	**Fair peripheral movement**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Fair**

Uvula

1	Size	**Right side normal Left side small**
2	Condition	**Partially bifid**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**None**
2	Dental work necessary	**None**
3	Type of Occlusion	**All upper teeth are in linguoversion; normal relationship of the molars (class 1)**
4	Gaps in teeth	
5	Missing and short teeth	**Lateral left is short. Two lower centrals and three permanent molars are missing.**
6	Comments	**Cleft is between the left lateral and cuspid. There is an opening in the vestibule.**
7	Opinion as to effect on Speech	**Teeth are not responsible.**

Jaws

1	Size	**Upper jaw is constricted. Lower jaw normal**

Labial Frenum

1	Condition	**Abnormal, heavy**

Audiometric test.
Impossible to get an accurate measurement.

Psychometric test.
C.A. 6-1 years
M.A. 3-6 years
I.Q. 59

Behavior and ability.

This lad was very restless and excitable. He shouted during the entire test period, usually using single words or short groupings. He showed little understanding of language. Attention was almost nihil. His mother reported that the behavior during testing was his usual behavior. She made no attempt to help the examiner control him.

Speech is poor.

Basal age was reached at 3-0 years.

There were complete failures at 4-0 years and one final success at 4-6 years - a digit memory item.

I.Q. level is moron.

Medical Examination.

Previous illnesses: pneumonia post-operatively.

Previous accidents: None.

Previous operations: Nil.

Inoculation: D.P.T. and vaccination with booster.

Development: First sat at seven months and walked at two and one-half years old. First talked at three or four. Bowel and bladder control established at two years. He loves music. His attention span is limited; he is fairly disobedient. Hyperactive to

excess. He is six years old. His speech is fair to poor.

Functional history:

Both mother and father are alive and well. There is one sibling, a girl, who is two weeks old and seems normal. There were no miscarriages, or stillbirths. There are no known congenital anomalies or heredito-familial diseases in either side of the family.

Physical examination:

This is a well developed, well nourished child. The ear drums are bilaterally thickened. The eyes are negative. The left septum of the nose is deviated. The palate is intact and moves well. The tongue movements are good. The chest, heart, abdomen, and g.u., are negative. The child has a good memory, but he has a short concentration span and is unable to utilize available facts.

Impression: Is this a congenital anomaly of the brain?

Environment:

This family is in the medium socio-economic bracket. The father is a salesman for millinery goods in Montreal. He brings the child to the speech clinic for the tests and manifests a great concern over his welfare. The mother is an attractive, well poised person. She is equally interested in the child, but his wild behavior is beyond her control during this period of pregnancy with another child. Both parents are afraid to recognize the extent of the problem. Often the father would say,

"but he remembers everything".

The boy has the appearance of a normal child. He had many characteristics of the brain injured child. He was uncontrollable (loved to make noise), lacking in power of concentration, and exhibited tendencies of echolalia. He didn't play well with children; usually pulled their hair or fought them. His mother said he had outbursts of laughter for no reason at all.

Neurological test:

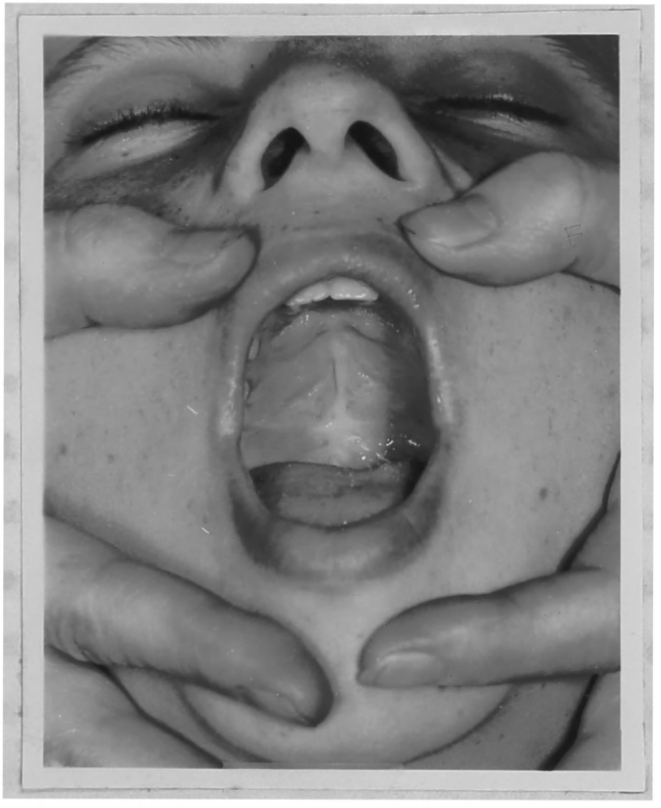
Question of neurological differences.

He had a cleft palate but I also got the impression from the way he speaks that his hearing is not good. The fundi are normal, visual fields are full. There is no facial asymmetry. His running and movements of the hands are awkward, but could be within normal limits, and there are no specific ataxic or abnormal movements. The deep reflexes are present and equal. There is planter flexion of the toes.

Apart from an attempt to further check his hearing, I have nothing to suggest. I do not think he has any specific motor disability.

CASE XIII

Cleft of Hard and Soft Palate



CASE 13
White, female.

Date of birth
September 11, 1937

Amount of cleft
Cleft of the soft palate and most of the hard palate

Number of cleft operations
One operation, February 27, 1940

Age when operation was performed
1. About two and a half years old

Surgeon for cleft operation
Dr. J. W. Gerrie

Operative procedure
First operation: Repair of the palate by a V-Y displacement after the method of Wardill.

The incision was made in the anterior extremity of the cleft, laterally in the palate on the left side to about the cuspid tooth, and then carried around the necks of the teeth backward, across the tuberosity region, across the pterygo mandibular raphe and into the side wall of the pharynx. This was deepened to provide sufficient relaxation. A similar incision was made on the right side. Bleeding was moderate, the palatine vessels were clamped for a few moments on both sides. Considerable relaxation was secured without severing the anterior palatine vessels. The hamular processes were severed free at their bases. The nasal mucosa was mobilized and suturing began at its anterior extremity. An aluminum bronze wire suture, after the method of Veau, was placed around the palatine muscles and brought out in the incision on the

right side. This was tightened and twisted into a correct position. The nasal sutures were carried backwards with interrupted black silk to the point of the uvula. The oral sutures were then carried from before backwards also to the point of the uvula. The wire suture was tightened and the oral sutures were clipped. There appeared to be little tension on the flaps.

Other operations: None

Other congenital anomalies: None

History given to experimenter by sister:

The mother refused to come in for an interview because she did not speak English; therefore, the information was given by the older sister. A cousin on the maternal side has a cleft palate, and she is also mentally deficient. The mother has had thyroid trouble; a sister of the child has a goiter. There were thirteen pregnancies; two died at birth, both boys; this child is the ninth in the birth series. The daughter says the mother is extremely nervous and spends most of her time at home. This child was a full term baby

Speech analyses.

1. Speech history.
   She did not talk until she was four years old. At first her speech was very bad. The sister thinks that the big family "helped her learn to talk well."

2. Description of speech.
   Voice quality: Good

Defective sounds: None

Pitch: Good

Rhythm: Good

3. Estimate of the judges.
   Controlled speech--1

4. Estimate of the experimenter.
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	1
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	1
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		**Insensitive palate Movement fair 2**
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			**Normal structure Very flexible**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a			**Yes**	**Yes**	**Good**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Slightly short**
2	Activity	**Tight and not too flexible. Good peripheral movement but poor central movement**
3	Tissue	**Good quality except for thin central scar**
4	Rating	**2**

Hard Palate

1	Height	**Normal**
2	Condition	**Good, except area of push back just posterior to alveolus is thin followed by thick anterior flap**
3	Rating	**2**
4		

Passavants Cushion

1	Present	**Yes**
2	Size	

Faucial Arches

1	Size	**Both are small.**
2	Activity	**Slightly tight**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Good**

Uvula

1	Size	**Small and symmetrical**
2	Condition	**Good**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	Several teeth
2	Dental work necessary	The permanent upper right six year molar should be extracted.
3	Type of Occlusion	Normal relationship of the molars The upper right cuspid is in linguoversion.
4	Gaps in teeth	There are no teeth in the lower jaws back of the first bicuspid. In the upper jaws there is a gap between lateral and first biscuspid. These have been extracted.
5	Missing and short teeth	
6	Comments	The upper right bicuspid is impacted.
7	Opinion as to effect on Speech	Good speech

Jaws

1	Size	Both are almost normal.

Labial Frenum

1	Condition	Normal

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 12-6
M.A. 10-4
I.Q. 83

Behavior and ability.

This child was not apparently interested in the test. She was inattentive and her thoughts seemed to be anywhere but with the examiner and the task at hand.

Speech was good.

The basal age was reached at 9-0 years. There was a regular decline of success to a final year of 12 on abstract words.

The I.Q. level is dull-normal.

Medical examination:

Previous illnesses: Chicken-pox, measles, whooping cough, mumps.

Previous accidents: None

Previous operations: None

Inoculation: D.P.(3), Vaccination

Development: Within normal limits except for speech.

Functional history:

A female cousin has cleft palate (mother's sister's child). Both parents are alive and well. There are four brothers and seven sisters; all are alive and well. There were two miscarriages. The half sister is a T.B. suspect. There is no epilepsy in the family. No mental diseases or heredito-diseases are known.

Functional inquiry:

The ears and eyes are negative. Hearing is good. She is in the sixth grade at school; she stands about 17th to 20th in class. The remainder of the inquiry is negative.

Physical examination:

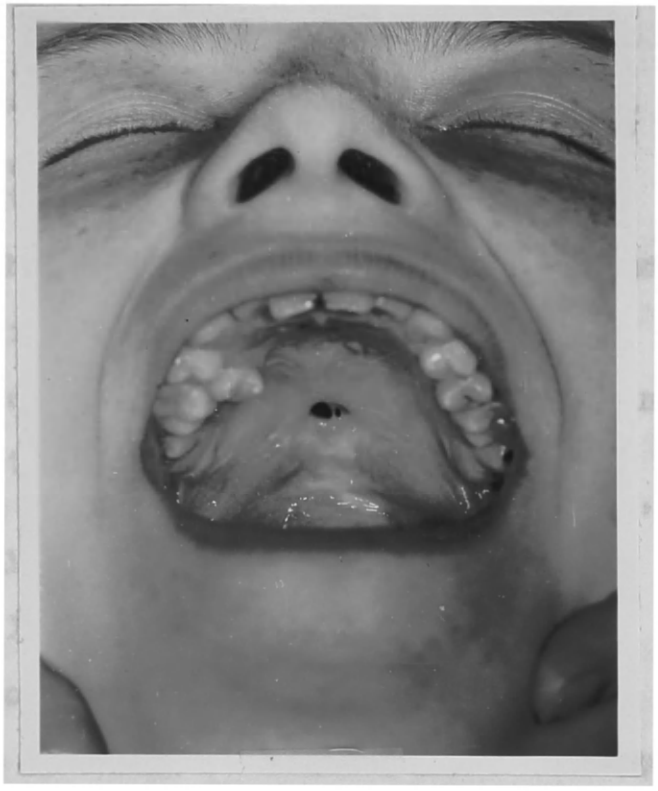
This is a thin, wiry female with good muscles and poor posture. Both ears are thickened and retracted. The eyes are negative. There is a slight inflamation of the nasal mucosa. The lower 6-year molar is gone and several upper teeth are carious. The palate is intact and moves well. The tongue moves well and speech is good to excellent. The chest, heart, abdomen, skin, reflexes, joints are negative. This is a normal girl. She is emotionally mature for her age.

Environment:

The experimenter did not see either parent. The sister seemed to be the guiding factor. She had a keen desire that the girl have all the opportunities available. This girl was very reserved and passive. She appeared much older than her years.

CASE XIV

Cleft of Hard and Soft Palate



CASE 14
White, female.

Date of birth
September 17, 1933.

Amount of cleft.
Cleft of the soft palate, and in its anterior portion there is a very soft blue membrane, apparently just two layers of mucous membrane. There is a V-shaped cleft in the bone in the hard palate, midline.

Number of cleft operations.
One operation, March 31, 1948

Age when operation was performed.
1. Fourteen and a half years.

Operative procedure.
First operation: Repair of the palate.

The technique used was LeMesurier's modification of the Dieffenbach-Warren.

Outlined steps of the procedure were not available.

Other operations: Tonsillectomy and Adenoidectomy, July 31, 1935.

Other congenital anomalies.

Slight umbilical hernia

History given to experimenter by mother.

There is no history of cleft palate or thyroid deficiency in the family. Pregnancy and birth were normal. The baby was full term. There have been no miscarriages or stillbirths. There are four children in the family; this child is the youngest. The mother has always had good health. Both parents are of Polish descent.

Speech analyses.
1. Speech history.
She began to speak at the age of two. She was sent

to the clinic for a speech evaluation on May 14, 1948. The report is as follows:

> Speech is intelligible, but it has the usual cleft palate characteristics; glottal stops for (g) (k) (p) (b) (t) (d). The sibilants are defective and the voice is nasal.

Very little speech training has been given; she came to the clinic approximately five times.

2. Speech Description
Quality of voice: Nasal, husky

Defective sounds-- Substitutions:

(?) for (t) medial, initial, and final positions

(?) for (k) medial and final positions

(?) for (p) medial position

(?) for (g) initial and final positions

Lateral (s) lisp

Defective (ʃ) and (z)

A great deal of air escapes through the nose. There are also facial grimaces. All sounds can be made in isolation.

Pitch: Normal

Rhythm: Irregular breath pattern

3. Estimate of the judges.
Controlled speech--1.78

4. Estimate of the experimenter
Controlled speech--2
Running speech--2

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	1
	4	ɵ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		**Insensitive Limited movement** 2
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue		**Geographic, fissured Flexible**			

Palate	Sound spoken	tense	short	flexible	long	rating
	a		**Yes**	**Yes**		**Fair**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Slightly short. 5 mm. hole in junction of hard and soft palate
2	Activity	Good activity; all of the palate moves.
3	Tissue	Thin and scarred
4	Rating	2

Hard Palate

1	Height	Wide, shallow arch
2	Condition	Good
3	Rating	1
4		

Passavants Cushion

1	Present	No
2	Size	

Faucial Arches

1	Size	Anterior normal Posterior slightly normal
2	Activity	Good

Tongue Frenum

1	Condition	Loose

Pharyngeal Muscles

1	Movement	Excellent

Uvula

1	Size	Short
2	Condition	Bifid

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**Number of fillings needed**
2	Dental work necessary	**Decay in central incisors**
3	Type of Occlusion	**Normal relationship to the molars (class 1) but mutilated. Upper left lateral, central and right central are in linguoversion.**
4	Gaps in teeth	**Between lower left second bicuspid and first molar Between lower right second bicuspid and first molar**
5	Missing and short teeth	
6	Comments	**All of the upper teeth are present. The upper right second bicuspid is displaced lingual, and should be extracted. Cleft in the soft palate**
7	Opinion as to effect on Speech	**Teeth are not responsible.**

Jaws

1	Size	**Both jaws are well developed.**

Labial Frenum

1	Condition	**Normal**

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 16.6
M.A. 15.9
I.Q. 105

Behavior and ability:

This girl was very cooperative. Her interest and attention were good.

Her speech was quite clear, but there were some traces of a defect.

The basal age was reached at 14-0 years. Final success was at Superior Adult II.

I.Q. level is high average.

Medical examination:

Previous illnesses: Mumps, chicken-pox

Previous accidents: None

Previous operations: Tonsillectomy and adenoidectomy.

Inoculation: D.P.T. and patch test.

Development: Within normal limits. She is in the fourth year in high school and ranks in the middle third of the class. She likes to play baseball, and she likes to swim, skate, and dance.

Functional history: Both parents are alive and well. There are three siblings, two sisters, and one brother; all are alive and well. There are no known congenital anomalies in the family on either side nor are there any familial-hereditary diseases.

Functional inquiry: completely negative.

History of past information: The delay in operation was due to the fact that the father would not sign the operation consent form until the child was "of age."

Physical examination:

Height 5' 2⅝", weight 112 lbs.

The right drum is scarred and retracted with calcium plaques. The left drum is thickened. Her hearing is grossly normal. The ears, throat and nose are negative. There is a midline perforation in the palate. The six year molar (rt. lower) is absent. Two upper right molars are side by side, giving malocculusion. Chest and heart are normal. The abdomen is negative. The reflexes, g.u., and skin are normal.

Impression: She is normal physically except for the palate. Speech is fair.

Environment: This family has been known to social agencies for many years. At the present, the father is employed as a laborer at Molsom's Brewery, the mother is working at a hat factory and the child will soon take a job with the telephone company.

The home situation is most unsatisfactory for the child. She and her sister are constantly quarreling.

Both parents are illiterate and seemingly unambitious.

This child is attractive and makes friends readily. She is ambitious and would like to "be somebody." She is very sensitive about her speech and quite often refuses to go on a date or party if she thinks she will be ridiculed.

CASE XV

Cleft of Hard and Soft Palate

CASE 15
White, female.

Date of birth
July 31, 1941

Amount of cleft
Complete cleft of the soft palate and partial cleft of the hard palate.

Number of cleft operations
One operation, July 15, 1943

Age when operation was performed.
1. Almost two years.

Surgeon for cleft operation.
Dr. R. R. Fitzgerald.

Operative procedure:
First operation: Urano-staphyloplasty by the method of Veau.

The right side was dealt with first. A Reverdin needle was passed through the nasal submucosa and was made to emerge in the cleft. The cleft was split into two layers and the wire was drawn through. Similar technique was applied on the left side. The tissues were separated from the posterior edge of the hard palate and the posterior nasal spine of this side. Nasal layers and buccal layers were created by stripping up the tissues from the upper and lower surface of the hard palate. Two mattress sutures were laid in place in the anterior edge of the cleft. The posterior part of the nasal layer was united with interrupted silk sutures. The uvula was reconstructed. The soft palate was sewn on its buccal surface. The wire was laid in place and tied,

drawing the two sides satisfactorily together. Two flaps were cut and the mucoperiosteum from the anterior surface of the hard palate was swung into position and tied in place with a mattress suture. At the close of the operation the palate was sufficient in length, and there was no tension. There was a raw area behind the incisor teeth.

Other operations: None.

Other congenital anomalies: None

History given to experimenter by mother:

There is no history of cleft palate or thyroid deficiency in either side of the family. This child is the oldest of four children. The other children appear much stronger than this child. There were no illnesses during pregnancy and the birth was normal. The child was a full term baby. The mother is of Scotch descent, the father English.

Speech analyses.:

1. Speech history.
   She began to talk as soon as the operation was completed, which was at the age of two.

2. Description of speech.
   Quality of voice: Tense, nasal (slight)

   Defective sounds: A slight lateral lisp on (s) (z)

   Pitch: Higher than the average

   Rhythm: Good

3. Estimate of the judges.
   Controlled speech--1.22

4. Estimate of the experimenter
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	1
	4	ɵ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive Movement limited 2
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ,u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			**Normal structure** **Excellent movement of complete tongue**		

Palate	Sound spoken	tense	short	flexible	long	rating
	ə		**Yes**	**Yes**		**Fair**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Slight short**
2	Activity	**Good activity All the palate moves.**
3	Tissue	**Adequate**
4	Rating	**2**

Hard Palate

1	Height	**Normal**
2	Condition	**Normal**
3	Rating	**1**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Anterior normal Posterior normal**
2	Activity	**Good**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Good**

Uvula

1	Size	**Normal Eccentric to the right**
2	Condition	**Good**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	Three molars are decayed.
2	Dental work necessary	Molars need to be filled.
3	Type of Occlusion	Normal relationship of the molars (class 1) Upper right laterals are in linguoversion.
4	Gaps in teeth	There are gaps from the cuspids on back on the lower right side. The permanent teeth are not in.
5	Missing and short teeth	The lower right first molar has been extracted. The bicuspid is unerrupted.
6	Comments	The upper jaw is quite crowded. The permanent molars in the lower jaw have been extracted. There is a tongue thrust.
7	Opinion as to effect on Speech	Speech is good.

Jaws

1	Size	The upper jaw is constricted; the lower jaw is normal.

Labial Frenum

1	Condition	Abnormally attached

Audiometric test
Hearing is normal

Psychometric test
C.A. 8-8
M.A. 8-10
I.Q. 102

Behavior and ability:

She seemed nervous and shy. Her attention was spasmodic but she was easily and quickly recalled to the task at hand.

Speech seemed good.

The basal age was reached at 7-0 years. There was a gradual pattern of decline to two final successes at year 11.

I.Q. level is average.

Medical examination:

Previous illnesses: chicken pox

Previous accidents: None.

Previous operations: None

Inoculation:

Development: Within normal limits. First talked at two years; walked at ten and a half months.

Functional history:

Both parents are alive and well. The mother is thirty-nine years old; the father is forty-two. There are three siblings, viz., twins, girls, and a boy. There are no known congenital anomalies or heredito-familial diseases. She is in the third grade at school.

Functional inquiry:

Hearing is good. Vision is normal. She rarely has sore throats, head colds, or coughs. Her appetite is good, but she is a "picky" eater. Elimination is good. G.u., skin, arms and legs are negative.

Physical examination:

Both ears are slightly thickened. The eyes are negative. There is a crusted nasal discharge. The palate is well closed. Many of the teeth are decayed. Both cervical glands are enlarged. The chest, heart, g.u. skin, reflexes, are normal. There is a mild to minimal right lower quatrant tenderness. Locomotor power is good. Posture is poor, speech is good.

She is a normal child except for her teeth.

Environment:

This family lived on a farm about seventy-five miles from Montreal. The child was generally brought in every Saturday by one of the neighbors, or else she came on the bus, sometimes with her mother, and other times alone. All the family looked well cared for and healthy.

The mother was a hard working person with a keen sense of honesty and integrity. Her children seemed to reflect these characteristics. All of the children were given the same affection and attention; this child

was accepted as being perfectly normal.

The girl was a sensitive, highly strung, attractive child. She adjusted well and quickly to any new situation. Her relationship with other children as well as adults was easy and pleasant. She took an active part in music, sports, and church work. There was about her, however, a feeling of restraint and pent-up emotions.

Laryngoscopic examination:

The larynx and epiglottis are twisted somewhat toward the left. The vocal cords move symmetrically, but the tension in both cords seems to be inadequate; that is thyro-arytenoid weakness. There is no gross pathology.

Recommendation: Prostymine injections once a week (in adequate dosage) would possibly result in some improvement.

CASE XVI

Unilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 16
White, male

Date of birth.
August 11, 1942

Amount of cleft
Partial left cleft lip (does not include the alveolus) and partial hard palate and complete soft palate.

Number of operations
Two operations, March 5, 1943; October 17, 1945.

Age when operations were performed.
1. Eight months.
2. Three years and two months.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative procedure:
First operation: Points A, AI and B and BI were outlined as in the Thompson procedure. The margins of the cleft were then pared and the skin margins were approximated with interrupted wire sutures. The vermilion was imbricated as usual and a Logan lip bow was applied.

Second operation: The margins of the cleft were pared. The skin graft which had been placed on the palate was exposed and found to have taken 100%. The palatal flap was then set back as in the Brown procedure, the arteries being saved. The margins of the cleft, having been pared, were sutured with interrupted dermal sutures.

Other operation: Plastic repair of the right ear, September 28, 1943. Tonsillectomy and adenoidectomy in 1945.

Other congenital anomalies:

Deformity of right ear. Auricle adherent to scalp and no medial aspect.

History given to experimenter by the mother:

The mother's brother had a cleft of the palate and lip. He lived only eleven days. The mother thinks she had an uncle who was"neither man nor woman" (hermaphrodite). There is one other child in the family, a girl, age nine. The girl was a premature baby, born at seven months. The boy was a full term baby; the birth and pregnancy were normal. There is no history of thyroid. Both parents are of French descent.

Speech Analyses.

1. Speech history.

He began to talk at the age of three but he could not be understood until the age of five. His mother had worked hard on his speech. The clinical notes on the speech evaluations are as follows:

March 22, 1946. The child's speech seems to be generally good except for a marked nasality of sibilants and plosives. There is a marked tendency towards echolólia and little spontaneous speech. I would suggest that he be referred to the Laurier clinic for psychometric testing and attend speech clinic twice a week. The child needs stimulation

in general speech as well as therapeutic measures in the speech clinic.

April 2, 1948. His speech exhibits the usual characteristics of the cleft palate child. The plosives are weak; (k) and (g) cannot be produced. He is unable to make the (s) sounds and there is a nasal blur on all sounds.

The mother seems very cooperative. The child responds in a passive manner. I would suggest that the child be sent to Social Service for psychometric testing, and afterward to the speech clinic.

The child did not return to the clinic.

2. Description of speech.
   Voice quality: Good

   Defective sounds: A slight lisp to the (s) (z) and (ʃ) sounds.

   Pitch: Tends to be high

   Rhythm: Good

3. Estimate of the judges.
   Controlled speech--1.44

4. Estimate of the experimenter.
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	2
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	1
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		Did not check
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			**Good** **Good activity**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a	**Yes**			**Yes**	**Fair**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Normal**
2	Activity	**Good. All palate moves, but it is eccentric to left.**
3	Tissue	**Scarred**
4	Rating	**2**

Hard Palate

1	Height	**High and narrow**
2	Condition	**Rough and fissured. Small fistula at the anterior of the flap**
3	Rating	**3**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Posterior is small. Anterior is normal.**
2	Activity	**Good**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Poor**

Uvula

1	Size	**Short**
2	Condition	**Small hole in midline**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	Decay is rampant.
2	Dental work necessary	Care of teeth
3	Type of Occlusion	Distal occlusion (class 2)
4	Gaps in teeth	Deciduous lower molars have been extracted; the permanent teeth have not erupted.
5	Missing and short teeth	The upper right lateral deciduous is congenitally missing.
6	Comments	The upper right deciduous molar has been extracted and the permanent upper molar has drifted forward into the space. The upper left central deciduous is rotated. There is a tiny hole in the uvula. He is a mouth-breather.
7	Opinion as to effect on Speech	Teeth are not responsible.

Jaws

1	Size	Both jaws are underdeveloped.

Labial Frenum

1	Condition	It is normal except for scar tissue.

Audiometric test.
Hearing is slightly defective. The results of tests are as follows:

	frequency	decibels
right	512	20
	1024	30
	2048	15
	4096	20
	8192	20
left	512	30
	1024	30
	2048	20
	4096	20
	8192	20

Psychometric test.
C.A. 7-6
M.A. 7-0
I.Q. 93

Behavior and ability

The child seemed to be hard of hearing. This was a difficult test because of the hearing handicap and the inattention of the child.

The test pattern was rather irregular; success increased from basal age at 6-0 years to three final successes at near 9 years.

His speech was very good.

I.Q. level was low average.

Medical examination:

Previous illnesses: Measles and chicken pox.

Previous Accidents: Fractured left radius. Operation was done at the Children's Memorial Hospital; result was good.

Previous operations: The right auricle was released from side of the scalp.

Inoculation: D.P.T. No. B.C.G. Patch test negative.

Development:

He first sat alone at eight months; he stood up at twelve months; and he walked at eighteen months. He began to talk at three years old. His development was noticeably slower than the sibling. He is in the second grade in school and is doing well; he stands fourth in his class. He plays well, eats well and sleeps well. He is obedient.

Functional history:

Both parents are alive and well. The father is fifty-four years old; the mother is thirty-six years old. There is a question of the mother having gall stones. There is one sibling, girl, age nine, who is alive and well. The mother's brother had hare-lip and cleft palate. He lived only eleven days. There are no other anomalies or heredito-familial diseases. The child was born following normal pregnancy, labour and delivery. There were no neo-natal diseases.

Functional Inquiry:

The mother thinks that the child is deafened in the right ear. There is a history of frequent ear-aches. The distant vision is weak. There is a chronic nasal discharge but few head colds. His teeth are bad.

Physical examination:

His weight is 43 lbs.; his height is 40". The ear drums are retracted and thickened. He can hear a watch at the distance of 5" -6" bilaterally. The vision should be checked. There is chronic nasal

discharge and hyperemia of the right nares. The left is normal. The teeth denote multiple caries; the alignment is good. The palate is intact. The tonsils are moderate in size. The chest, heart, abdomen, and g.u. are negative. The donor area is on the right lower quadrant and left buttock. There are chicken pox scars over the abdomen and back. The reflexes, arms and legs are normal.

Environment:

This family is in the low socio-economic bracket. The father is a laborer in a nut and bolt factory in Montreal. The mother is a dominant, motherly type of person. Her whole life is completely taken up with the two children. She is a hard worker and demands a great deal of her children. The boy is practically compelled to speak well and to do good school work. The boy is a babyish, shy child. He is quite dependent on his mother and responds passively to requests.

Otological examination: Question of hearing.

The child had tonsillectomy and adenoidectomy at the age of three; however, there are large tags in both fossae, and an infected small adenoid, with enlarged lateral pharyngeal bands hypertrophied. The ear drums are dull and retracted. There is no fluid. I recommend a check of the sinuses.

The sinus report read:

There is no X-ray evidence of disease of the para-nasal sinuses. However, we are unable to visualize the sphenoidal sinuses clearly in this projection.

CASE XVII

Cleft of Hard and Soft Palate with Associated Congenital Anomalies

CASE 17
White, female

Date of birth
November 13, 1942.

Amount of cleft.
Bilateral midline 2/3 cleft of the hard palate and complete cleft of the soft palate.

Number of cleft operations.
One operation, May 15, 1944.

Age when operation was performed.
1. A year and a half.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative procedure.
First operation: Repair of the palate

The mucoperiosteal flaps were raised as in the Langenbeck procedure. The margins of the cleft were pared. These were then approximated with interrupted dermal sutures.

Other operations: Tonsillectomy and adenoidectomy, November 26, 1946.
Tongue frenum was cut in June, 1950.

Other congenital anomalies.

Medical record of June 2, 1944 states-- Examination shows definite spasticity on the right side although tendo achillis is not shortened when she walks nor is there any adductor interference.

History given to experimenter by the mother:

There is no history of cleft palate or thyroid difficulty in the family. There were no illnesses during pregnancy with this child. The mother has always been comparatively healthy and had no outstanding illness at any time.

The child was born following easy, natural delivery. She has scarcely ever been free of colds. She is a mouth breather; she is sensitive to eggs; and there is an excessive amount of salivation at all times.

Speech analyses.

1. Speech history.
She began to talk at the age of two years. At the age of three years the mother brought her to the speech clinic for instructions. The child attended the speech clinic from September, 1945, until June 1948. Her attendance was fairly regular; it was interrupted only by illness. She made some progress but the voice quality remained the same, and glottal stope were substituted for plosives.

2. Description of speech.
Voice quality: Nasal, rasping, husky

Defective sounds-- Substitutions:

(?) for (k) initial, medial, final positions
(?) for (f) initial, medial, positions
(?) for (t) medial, final, positions
(?) for (p) medial, final positions
(?) for (d) medial position
(?) for (g) initial, medial positions
(?) for (s) medial position
(j) for (l) initial, medial
(ə) for (l) final position

Omissions:
(h)

A lateral lisp on (ʃ) (s) (z); also nasal blur.

The (l) and (s) (z) could not be imitated.

Clusters with (s) are difficult.

Little pressure on plosives when made.

Pitch: Monotonous. Low and tended to break at times.

Rhythm: Irregular breath patterns.

3. Estimate of the judges.
Controlled speech--2.

4. Estimate of the experimenter.
Controlled speech--2
Running speech--3

Tests for Estimating Structure and Mobility of Articulators
(English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	3
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	3
	4	ɵ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	2
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	made with tip down 3
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	2
	7	l	Draw down sides of tongue	lamp, ball balloon	2
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive Good movement 1
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	2
Structure of Tongue			**Front portion seemed undeveloped Lazy movements**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a			**Yes**	**Yes**	**Good**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Average, routine size
2	Activity	Entire palate moves
3	Tissue	Pliable but not thin
4	Rating	1

Hard Palate

1	Height	High
2	Condition	Rough, follows previous defect in palate
3	Rating	2
4		

Passavants Cushion

1	Present	No
2	Size	

Faucial Arches

1	Size	Anterior and posterior normal
2	Activity	Fair

Tongue Frenum

1	Condition	Short Tight

Pharyngeal Muscles

1	Movement	Excellent

Uvula

1	Size	Short
2	Condition	Truncated

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	Only three molars present; cavities in all first molars Upper left first molar--question of saving it
2	Dental work necessary	
3	Type of Occlusion	Normal relationship of molars (class 1)
4	Gaps in teeth	Wide open spacing from 6 year molars on back (deciduous teeth behind molars are absent)
5	Missing and short teeth	Lower right six year molar has been extracted.
6	Comments	Extreme crowding in the lower anterior area; there is room for only three where four should be. Very lax lower lip
7	Opinion as to effect on Speech	Teeth are not responsible for poor speech.

Jaws

1	Size	Extreme lack of development in both jaws

Labial Frenum

1	Condition	Abnormal, but doesn't cause separation.

Audiometric test

Hearing is normal except for the following:

Right ear	frequency	decibels
	4096	30

Psychometric test.

C.A. 7-4
M.A. 7-4
I.Q. 100

Behavior and ability

Behavior was normal.

Her speech was understandable if one were attentive but enunciation wasn't precise. Words were understood more from total content than as individual words.

The basal age was reached at 6-0 years. The span was average.

I.Q. level is average.

Medical examination

Previous illnesses: Measles and frequent colds.

Previous accidents: None.

Previous operations: Tonsillectomy and adenoidectomy.

Inoculations: D.P.T. Vaccination.

Development: She first talked after the operation, which was at the age of one and a half. Bowel and bladder control was gained prior to two years. She is doing fairly well in school; she is in the second grade at school. There are no temper tantrums; the mother feels that she is an ordinary, normal child.

Functional history:

Both parents are alive and well. The mother is forty years old and the father is forty-two years old. Pregnancy was normal. There was no measles while carrying the child. There have been no miscarriages, or stillbirths. She is the only child. There are no heredito-familial defects or diseases.

Functional inquiry: The child has had right otitis media with suppuration after measles; her hearing is good. There is a chronic nasal discharge. The teeth are of poor quality (lack of calcium). There have been rare sore throats since tonsillectomy and adenoidectomy. She does not have a chronic cough. Her appetite is good; digestion is good, and she sleeps and eats well. G.u., skin, arms, and legs are negative. She has good coordination and power. The mother thinks she is as bright as other children of her age; she is an independent type.

Physical examination:

She weighs 50 lbs.; her head measures 20". The right ear is scarred and retracted; the left ear is scarred. There is a heavy purulent postnasal discharge. The palate is intact. There are multiple caries. The fossa is clear. The tongue is tied at the tip with heavy fibrous band, and with muscle tissues to the floor of the mouth. She is unable to raise tongue tip to upper lip or touch teeth (upper). There are hilar rales in the chest bilaterally; they are coarse moist rales. The heart,

abdomen, and g.u., are negative. The reflexes, and skin are negative. There are callouses on the lateral margin of 5th metatarsal (bilaterally); these are prominent calcaneal spurs. There are peri-umbilical scars due to infection in infancy.

Her speech is poor; it is palatal (cleft palate).

Environment:

This family is in the medium socio-economic bracket. The father is a pressman and printer at the Southern Company in Montreal.

The mother is a jolly, friendly, unsuspicious person. She tries to the best of her ability to help the child with speech; however, her mind is also on gardening and other domestic problems.

Her education is limited and she can carry out some recommendations only under supervision.

The girl is very friendly and agreeable. Her power of concentration is limited. She exhibits the characteristics of an only child in the sense that she demands a great deal of her mother, and shows very little independent thinking.

Otological examination: (Ear, nose and throat examination)
Question of nasal discharge.

Ears: The canals are clear; the drums are intact but atrophic and retracted. The incus easily seen in both. There are bubbles of fluid in both.

Nose: The septum is deviated to the right; the turbinates are turgescent and inflamed. The middle meatus is clear.

Nasopharynx: There are no adenoids; the eustachian orifice is slightly swollen.

Mouth: There is excessive salivation: the palate is well repaired.

Diagonosis: Bilateral tubal obstruction. Secretory otitis media in the right ear. Possible sinusitis.

X-ray of sinuses was negative.

Second examination: Ears: The drums are intact and retracted with fluid in both.

Nose: The mucosa is slightly pale; it is a mucoid discharge.

Pharynx: It is injected; there is profuse postnasal discharge. The larynx is not visible.

Diagnosis: I believe that there is probably an allergic factor.

Laryngoscopic examination: It was attempted but was unsuccessful.

Speech Training: In June, 1950 (after the frenum was clipped), speech training was resumed. Emphasis was placed on learning the (l) sound and building up pressure for the plosives. The time of retraining was too short to make an accurate estimate of the value of clipping the frenum. It

seemed that she was able to build up more pressure for the plosives (t) (d). She has never been able to blow with any force.

CASE XVIII

Unilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 18
White, male

Date of birth.
May 2, 1943.

Amount of cleft
Incomplete right cleft lip (a thin alveolar defect) and complete cleft of the hard and soft palate.

Number of operations
Four operations, March 28, 1944; October 23, 1944; June 2, 1945; March 22, 1949.

Age when operations were performed
1. About ten months
2. One year and about five months
3. Two years
4. Five years and about ten months

Surgeon for cleft operation
Dr. R. R. Fitzgerald for the first three
Dr. F. M. Woolhouse for the fourth

Operative procedure.
First operation: Cheiloplasty

An incision was made on the medial side and a fragment of the periosteum was removed. An incision was made on the lateral side and a small piece of skin and mucous membrane was removed. A dermal suture was passed through the tip of the maxilla and the base of the nasal septum and into the opposite nostril where it was tied over a pad while wire sutures were laid in place. The skin and the mucous membranes were closed with interrupted plastic sutures and the wire was tied at the close of the operation. The operation was very satisfactory, with a good construction of the nostril.

Second operation: Uranoplasty

A flap was cut from the vomer of the child's right side, lifting the mucoperiosteum and swinging it towards the right so that the epitheliel surface was up in the nose and the raw surface downward toward the mouth. A second flap was cut from the child's right side pedicle posteriorly on the long palatine artery. This consisted of mucoperiosteum of the right side. This flap was then swung across the child's left side. A through and through mattress suture was placed through the two flaps holding the raw surfaces together. This was reinforced by a second suture and a marginal suture was passed to close the edges. At the close of this manoeuvre the hard palate had been reconstructed on its posterior two thirds, the anterior third was still missing and there was a defect through to the nasal chamber just behind the incisor teeth. This will be allowed to remain open and will be closed with an obturator at a future date.

Third operation: Staphyloplasty by the method of Veau

A Reverdin needle was passed through the tissues on the child's right side and through the nasal submucosa and nasal margin of the cleft. The cleft was split into two layers. The wire suture was passed. A similar technique was used on the left side, where a silk thread was passed through. The layers

were then separated and carefully dissected off the posterior margin of the hard palate. The posterior nasal spine was dissected clear and the muco-periosteal flaps were raised from the buccal and nasal surfaces of the hard palate. Two mattress sutures were laid in place through the anterior edge of the cleft and the nasal layers were sewn together. The nasal layer was completed by interrupted fine dermal sutures. The uvula was reconstructed and a wire suture was passed. The two flaps that were cut from the muco-periosteum of the hard palate were swung into position and anchored in place with heavy silk sutures. At the close of the operation the palate was long and supple and appeared to be satisfactory.

Fourth operation: Secondary repair of the palate.

Clinic notes were not available.

Other operations: None.

Other congenital anomalies: None

History given to experimenter by the mother:

There was no history of cleft palate or thyroid difficulty in the family. The mother was in "poor health" generally. There were four pregnancies; one child died of meningitis, at two months; one was a still-birth; and two were living, a girl age eleven and this child. The child was a full term baby; he was born following normal pregnancy and spontaneous delivery.

The child was comparatively healthy. Both parents were of French descent.

Speech analyses.

1. Speech history.
He began to speak when he was about eighteen months old. A speech evaluation was made on April 19, 1949. The report is as follows:

> On the whole, his speech is rather good. He seems to need help mainly on (s) (ʃ) (r) (g). He was brought to the speech clinic about six times.

2. Description of speech.
Voice quality: Good

Defective sounds -- Substitutions:

(d) for (g)

(w) for (r)

(t) (n) are made with the tongue protruding

(s) is not always clear

Can imitate all sounds well but (s)

Has difficulty with clusters

Pitch: Good

Rhythm: Good

Tests for Estimating Structure and Mobility of Articulators (French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	3
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	3
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			Normal Flexible		

Palate	Sound spoken	tense	short	flexible	long	rating
	a			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Long
2	Activity	All the palate moves well.
3	Tissue	Good quality
4	Rating	1

Hard Palate

1	Height	Shallow
2	Condition	Scarred
3	Rating	1
4		

Passavants Cushion

1	Present	Yes
2	Size	Can not tell

Faucial Arches

1	Size	Posterior extremely small Anterior about normal
2	Activity	Good

Tongue Frenum

1	Condition	Loose

Pharyngeal Muscles

1	Movement	Good

Uvula

1	Size	Normal
2	Condition	Normal

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**Reasonably clean**
2	Dental work necessary	**No**
3	Type of Occlusion	**Molars in normal relationship (class 1) From upper left cuspid to upper left molar in linguoversion**
4	Gaps in teeth	**Between central and lateral on the right**
5	Missing and short teeth	**Mixed denture; right central deciduous is missing.**
6	Comments	**The cleft is well closed; it passes between the right central and lateral - through the alveolar ridge.**
7	Opinion as to effect on Speech	**Teeth not responsible for speech defect, if there is one.**

Jaws

1	Size	**The top jaw is constricted.**

Labial Frenum

1	Condition	**Abnormally attached**

Audiometric test
Hearing is normal

Psychometric test
C.A. 7-10
M.A. 6-10
I.G. 87

Behavior and ability:

He tires quickly, but he was cooperative and friendly.

His speech is good.

His basal age was reached at 6-0 years. The success pattern is regular and normal in span.

The I.Q. level is dull normal.

Medical examination:

Previous illnesses: chicken pox.

Previous accidents: None.

Previous operations: None.

Inoculations:

Development: Within normal limits.

Functional history: Both parents are alive and well. There were three siblings; one died with meningitis; one was a stillbirth, and the other is alive and well. There is no history of any familial disease or congenital abnormalities.

Functional inquiry: Completely negative in careful questioning.

He is bright.

Physical examination:

Both ear drums are slightly thickened,- almost normal. The septum deviates to the left; there is a crusted mucous in the nose. The palate and tongue move well.

There are several caries. The tonsils are large. There is a postnasal drip. The chest, heart, abdomen, and g.u. are normal. Speech is good.

Environment:

The father is a shoe cobbler; he owns his place of business. He is friendly and cooperative. With his keen sense of humor, he was able to laugh away a number of disturbing thoughts. He and the child enjoyed each other.

The mother was a complaining type of person; she never felt well enough to follow any instructions. She treated the child as if he were an infant.

The child was babyish in manner, and yet there was a sense of independence in some of his actions. He was good-natured and completely unaware of his physical defect.

CASE XIX

Cleft of the Soft Palate with Associated Congenital Anomalies

CASE 19
White, female

Date of birth
May 28, 1945

Amount of cleft
Partial cleft of the hard palate and complete cleft of the soft palate.

Number of cleft operations
Two operations, June 5, 1947; June 29, 1947

Age when operations were performed
1. Two years and one month
2. Two years and one and a half months

Surgeon for cleft operation
Dr. F. M. Woolhouse

Operative procedure
First operation: The Dieffenbach-Warren procedure was used, but the steps of the operation were not outlined in the clinical notes.

Other operations: None

Other anomalies:

Torticollis with facial asymmetry

Pits in lower lips

History given experimenter by the mother:

An uncle of the mother "had something wrong with his palate". A sister of the mother was born with a "paralyzed hand". The mother says she has been generally well, but that she had an over-active thyroid gland. There were four children in the family; all were premature. The oldest and the youngest were premature, eight months babies; the other two were breech as well as seven months premature. This child was the third in the family birth series.

There was one miscarriage before the first of these four was born. There were no illnesses during the pregnancy with this child but the birth was difficult. The child is very seldom sick. The mother is of Scots descent and the father of Irish descent; originally the father's name was Boyle.

Speech Analyses.

1. Speech history.
   She did not begin to talk until after the operation, which was around the age of two. At the age of three and a half she was brought in for a speech evaluation. It was suggested that she be brought in for special instruction. The mother felt that she could not follow this suggestion because of financial reasons. They were not eligible for the clinic; thus the child would have to come as a special case.

2. Description of speech.
   Voice quality: Nasal and husky (not to extreme)

   Defective sounds-- Substitutions:

   (f) for (o) in the initial position

   (w) for (l) in the medial position

   (w) for (r) in the initial and medial position

   (ə) for (l) in the medial position and final position

   (j) for (l) in the initial position

   Comment: Delayed speech instead of cleft palate

3. Estimate of the judges
   Controlled speech--1.89

4. Estimate of the experimenter
   Controlled speech--2
   Running speech--2

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	1
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	3
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	3
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	3
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive palate Good movement
Lips	1	ɛ aɪ	Ordinary opening	many. mine	2
	2	ɔ, u ou	Opening to form small orifice and protruding lips	water, moon boat	2
	3	f, v	Drawing of lower lip against upper front teeth	five, half	3
Structure of Tongue			Normal structure Flexible		

Palate	Sound spoken	tense	short	flexible	long	rating
	a			Yes (what she had)	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Long (Has a sharp angle to the posterior border of the hard palate)
2	Activity	Fair. Only a part of the palate moves
3	Tissue	Scarred. Small opening in junction of hard and soft palate
4	Rating	2

Hard Palate

1	Height	Long and narrow
2	Condition	Narrow dental arch
3	Rating	1
4		

Passavants Cushion

1	Present	Can not see
2	Size	

Faucial Arches

1	Size	Both are normal
2	Activity	Fair mobility

Tongue Frenum

1	Condition	Normal

Pharyngeal Muscles

1	Movement	Fair

Uvula

1	Size	Large-left is the largest
2	Condition	Asymmetrical

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	None
2	Dental work necessary	None
3	Type of Occlusion	Generally normal for a child this age. The upper right lateral is in linguoversion (one tooth across the bite)
4	Gaps in teeth	None
5	Missing and short teeth	None
6	Comments	The expanding which should have started for normal teeth has not begun. She has a very small, narrow mouth.
7	Opinion as to effect on Speech	Teeth are not responsible for speech.

Jaws

1	Size	Both jaws are normal

Labial Frenum

1	Condition	Normal

Audiometric test
Hearing is normal

Psychometric test
C.A. 4-10
M.A. 4-2
I.Q. 86

Behavior and ability:

No comments were made on behavior

Basal age was reached at 3-0 years. There was a regular decline of success to year 5. She had a grasp of numerical concepts to four and vocabulary was slightly higher than the total test result indicated.

I.Q. level is dull average.

Medical examination:

Previous illnesses: Chicken pox, rubeola.

Previous accidents: None.

Previous operations: None.

Inoculations: No B.C.G.

Development:

She first sat up at seven months; first walked at fifteen months; first talked at two years. She plays well with other children. Bowel and bladder control was established at two years. Her speech is poor.

Functional History:

Mother is thirty-nine years old; father is thirty-six years old. Both parents are alive and well. The maternal aunt had hemiplegia at birth; maternal great uncle had palate defect. There are three siblings who

are alive and well. There was one miscarriage at three months. There were no stillbirths.

Physical examination:

Height 43", head 20". There are prominent frontal bosses. The ears are plugged with wax. There is congenital torticollis with facial asymmetry. There is a mass in the right sternocleidomastoideus. The nose, tonsils, heart, chest, abdomen are negative. There is a pin point perforation of the soft palate. The clitoris is absent. She is knock-kneed with abduction and eversion of the feet. Neurology and locomotor systems are intact. The skin is pigmented. There are right anterior pectoral folds.

Environment:

This family is in the high medium socio-economic bracket. The father is Secretary and Treasurer of the Canada Granite Construction Company. Both parents are equally interested in the welfare of their children and both share equally in the responsibilities of rearing them. The child was brought to the clinic more often by the father, because the mother had to care for the younger children. His manner with the child is easy, gay, and friendly; they enjoy being together. Unlike the father, the mother finds life a serious situation; she treats the child as if she were an adult. It is her belief that the child is not seriously handicapped and in time the physical defect will scarcely be noticeable.

The little girl is an odd child; she is a combination of the droll and the serious. With the poise of an adult, she attempts any task and feels confident of her ability.

Speech Training:

The child was brought to the speech clinic twice weekly from April 10, 1950 to May 22, 1950. At this time it was decided to bring her only once a week. Emphasis was placed on correcting the defective sounds. She was dismissed on July 15, 1950, with all sounds learned and used in running speech.

CASE XX

Cleft of the Hard and Soft Palate

CASE 20
White, female

Date of birth
February 8, 1941

Amount of cleft
Partial cleft of the hard palate and complete cleft of the soft palate

Number of cleft operations
One operation, June 16, 1944

Age when operations were performed.
1. Three years and four months.

Surgeon for cleft operation.
Dr. Phillips

Operative procedure.
First operation: Repair of the palate.

An incision was made along the gum margins extending one fourth of an inch distal to the last molar. The palate was well freed from its bed by means of periosteal elevators, the blood supply kept intact. 1/32 of an inch on the edges of the cleft were then excised, the excision including the bilateral uvular edges. Interrupted dermal sutures were then used to close the defect in the palate, the sutures being so placed that the knots were tied on the nasal aspect. The two halves of the uvula were sutured together, both on the aural and nasal aspect. The defect has been closed by the interrupted sutures; a vertical mattress suture which had previously been placed across the one side of the palate to the other, approximately to the mid-portion of

the cleft, was pulled tight, thus relieving all tension on the interrupted sutures. Patient was returned to the ward in good condition.

Other operations: Adenoidectomy, March 1950.

Other congenital anomalies: None

History given to experimenter by the mother:

There is no history of cleft palate or thyroid deficiency in the family. There are eight children in the family; this child is the seventh. One child had rheumatic heart; the others are well. The mother had no diseases while carrying the child, but there were hemorrhages at birth. This child is comparatively healthy. The mother is of German and French descent; the father of French.

Speech analyses.

1. Speech history.
   She began to talk a little before the operation, but her speech improved after the operation, which was at the age of three.

2. Description of speech.
   Voice quality: Good (after adenoidectomy slightly nasal)
   Rating was made before the operation.

   Defective sounds: None

   Pitch: Good

   Rhythm: Good

3. Estimate of the judges.
   Controlled speech--1.44

4. Estimate of the experimenter.
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	Tongue protrudes 1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	1
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	1
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	Tongue protrudes 1
Palate and Pharyngeal Muscles	1	a	Gagging reflex circular and upward movement		Sensitive palate Poor movements 2
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			**Slightly bifid tongue tip, slight tendency to be fissured. Tip of tongue movements restricted.**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a		**Yes**	**Slightly**		**Fair**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Slightly short**
2	Activity	**Fair All of the palate moves**
3	Tissue	**Good tissue-not thin**
4	Rating	**1**

Hard Palate

1	Height	**Shallow arch Wide alveolar arch**
2	Condition	Good
3	Rating	**1**
4		

Passavants Cushion

1	Present	No
2	Size	

Faucial Arches

1	Size	**Both wide**
2	Activity	**Good**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	Good

Uvula

1	Size	**Truncated to the point of practical absence**
2	Condition	

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	All (four) permanent molars are badly decayed.
2	Dental work necessary	Permanent molars will have to be extracted. Teeth are not clean.
3	Type of Occlusion	Normal relationship of the molars (class 1).
4	Gaps in teeth	There is space on both sides in the lower bicuspid region (unerrupted teeth). Two gaps in the upper right jaw; between the bicuspid and cuspid (unerrupted).
5	Missing and short teeth	
6	Comments	There is considerable loss of space because of early loss of teeth. Crowding in both jaws is to be expected.
7	Opinion as to effect on Speech	Speech is good.
	Jaws	
1	Size	Both jaws are fairly well developed.
	Labial Frenum	
1	Condition	Loose and normal

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 9-1
M.A. 9-4
I.Q. 103

Behavior and ability:

She was timid and polite. Her responses were given quietly.

There are no other comments.

Her speech was good.

The basal age was reached at 7-0 years. There was a regular pattern to two final successes at year 11.

I.Q. level is average.

Medical examination:

Previous illnesses - mumps, measles, scabies.

Previous accidents-- none.

Previous operations-- none

Inoculations-- Immunized against whooping cough and diphtheria.

Development: Within normal limits. She is in the third grade at school and is bright; is the third in the class. Her speech is good.

Functional history: Both parents are alive and well. The mother is forty-seven years old and the father is fifty. The mother has cancer of the womb of three years duration; radium has been used. The father had pleurisy in 1942. D.V.A. with no trouble. There are six siblings alive and well. One died at fifteen and

a half years with rheumatic heart. There are no heredito-familial disorders.

Functional Inquiry:

Sometimes she complains about hearing; says she can't hear. There is nasal discharge for the past year; it is worse at night. She has frequent sore throats and colds. The remainder of the functional inquiry is negative.

Physical examination:

She is a pale, thin girl. Her right ear drum is scarred, thickened and retracted. Evidence of old purulent otitis. The left ear drum is thickened and moderately retracted.

There is nasal mucous and hyperemia. The six-year molar is decayed. The palate is perfect. From the pharynx the mucoid is clear. The chest is clear. The heart has a functional apical systolic murmur. The abdomen, g.u., skin, locomotor system and tongue is negative.

Environment:

This family is in the medium socio-economic bracket. The father is employed at the Post Office in Montreal. He is a typical French father, assuming and performing the duties of the head of the family. He came with the mother and daughter and manifested interest in everything that was done.

The mother is also a typical French mother, warm and kind. She is not an educated person, but she plans to

give her children all that she did not get. Both parents cooperated in every test and the experimenter found working with them a pleasure.

The child is petite and delicate, with a shy and reserved manner. The mother always wanted to talk for the child and so the experimenter found it rather difficult to know her. She seemed to enjoy the tests and cooperated with every examiner.

CASE XXI

Bilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 21
White, male.

Date of birth.
December 9, 1940.

Amount of cleft.
Complete bilateral cleft lip and complete cleft of the hard and soft palate.

Number of cleft operations.
Two operations (Accurate dates unknown).

Age when operations were performed.
1. About three months.
2. About nine months or one year.

Surgeon for cleft operation.
Mr. Denis Browne, London, England.

Operative procedure.
Notes outlining the steps of the operations were not available.

The following information was sent by Mr. Browne, *

> I am afraid the notes of this child cannot be traced, and probably disappeared with many others during the bombing of London.
>
> However, if he was one of my cases, he was certainly operated upon by the technique described in the enclosed paper.

This procedure referred to is called an orthopaedic operation.

Other operations: Tonsillectomy; herniarrophy.

Other congenital anomalies.
Umbilical hernia.

History given to experimenter by mother.:

There is no history of cleft palate or thyroid deficiency in the family. There are three children in the

* - Denis Browne, personal letter to the experimenter.

family; this one is the second in the birth series. There were no miscarriages. The mother had no illnesses while she was carrying the child. He was born during a blitz and the delivery was spontaneous. Both parents are of German descent.

Speech analyses.

1. Speech history
   He began to talk at one and one-half years of age. At the age of three he was referred to the speech clinic for an evaluation. At that time he was having difficulty with the following sounds:

   (s) (ʃ) (tʃ) (ks) (z)

2. Description of speech.

   Quality of voice: Good

   Defective sounds: (s) slightly lispy

   Pitch: Good

   Rhythm: Good

3. Estimate of the judges.
   Controlled speech--1

4. Estimate of the experimenter.
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	1
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive Excellent movement 1
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			Good Very flexible tongue.		

Palate	Sound spoken	tense	short	flexible	long	rating
	a			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Normal length
2	Activity	Good but eccentric to the right. All of palate moves
3	Tissue	Slightly scarred
4	Rating	3

Hard Palate

1	Height	High and narrow
2	Condition	Small fistula in the hard palate
3	Rating	3
4		

Passavants Cushion

1	Present	No
2	Size	

Faucial Arches

1	Size	Anteriors are tight Posteriors are very short
2	Activity	Fair

Tongue Frenum

1	Condition	Loose

Pharyngeal Muscles

1	Movement	Good (in spite of scar in the soft palate)

Uvula

1	Size	Truncated
2	Condition	Eccentric to the left

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	None
2	Dental work necessary	None
3	Type of Occlusion	Normal relationship of the molars (class 1). All upper teeth are in linguoversion beginning from the upper left second deciduous molar to the upper right first deciduous molar.
4	Gaps in teeth	No teeth are present between the upper deciduous buspids. Permanent teeth have not erupted; he is wearing a retaining appliance.
5	Missing and short teeth	None
6	Comments	None
7	Opinion as to effect on Speech	Defective (s) possibly due to teeth.

Jaws

1	Size	The upper is small; the lower is almost normal.

Labial Frenum

1	Condition	None

Audiometric test.
Hearing is good.

Psychometric test.
C.A. 9-5
M.A. 14-2
I.Q. 150

Behavior and ability:

The child was friendly and cooperative. He was very enthusiastic about the test. Responses were quick, thoughtful, and well expressed.

Manipulations were excellent.

He was pleased by his successes, and at one point became very upset by a failure, an item at Superior Adult I., and appeared to be near tears.

His speech is excellent.

The basal age was reached at 12-0. Final success was reached at Superior Adult I

I.Q. level is genius or near genius.

Medical examination

Previous illnesses: chicken pox, measles, mumps, influenza.

Previous accidents: None

Previous operations: Tonsillectomy, herniarrophy.

Inoculations: D.P.T.

Development: Within normal limits. He is in the fourth grade at school, and ranks in the upper ten. He does not engage in "rough-house" sports. He is moderately active.

Functional history: Both parents are alive and well. There are no known congenitel anomalies

no consanguinity, no diabetes, no epilepsy or any heredito-familial diseases.

Functional inquiry:

There were discharging ears in infancy but not for the last eighteen months. Deafness was associated with acute suppurative otitis media. Adenoids were shrunken by X-ray. Hearing is normal and there has been no recurrence of discharge. The eyes are normal. He has head colds more frequently than the other children. There is rare sore throat. The teeth are irregularly distributed. There is some swelling of glands in the neck. There is no cough. His digestion, elimination, and locomotion are good. The skin and g.u. are negative.

Physical examination:

There is a large perforation of the posterior right drum; it is also scarred and retracted. The old perforation is visible in the posterior area of the left drum. The eyes are negative; the nose is retracted and snubbed. Tongue and palate move actively; speech is good. The upper central incisors are absent; there is a prosthesis to improve the occlusion. The glands, heart, chest, abdomen and skin are negative. There is a small umbilical hernia. Foreskin of penis retracts easily; external rings are normal. There is congenital anomaly of the thumb; he is unable to extend fully at distal

phalangeal joints: also full extension at metatarso-phalangeal joints is impossible. He is mentally bright, intelligent.

Environment:

The father is a lawyer. He has very little time to give to his family, but the two boys spend a great deal of their time in his office. Both parents are intelligent and practical in their way of thinking. The mother is one with her children; the home situation is easy and pleasant.

The boy is most active and somewhat boisterous in his manner. He has a most inquisitive mind. He adjusted quickly and easily to any situation.

CASE XXII

Unilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 22
White, male.

Date of birth
September 8, 1945.

Amount of cleft.
Complete unilateral left cleft lip and complete hard and soft palate.

Number of cleft operations.
Two operations, November 8, 1945; October 7, 1947.

Age when operations were performed.
1. Two months.
2. Two years.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative procedure
First operation:

Clinical notes on procedure were not available.

Second operation: Repair of the palate.

The margins of the cleft were paired. The muco-periosteal flaps were freed as in the Langenbeck procedure. The cleft was then sutured with interrupted dermal sutures and one long stay was used.

Other operations: Herniarrophy, June 1946.
Adenoidectomy June 1950.

Other congenital anomalies:

Right inguinal hernia.

History given to experimenter by mother:

There is no history of cleft palate in the family. The mother has allergy and a slight thyroid deficiency; she is also an Rh. negative blood type. There are four

children in the family; this is the third one. All the others are normal. There were no illnesses during this pregnancy, and the baby was born at full term with spontaneous delivery.

The mother is of English descent; the father is of Scots descent.

Speech analyses.

1. Speech history.
   He began to talk at two and one-half years. His speech has never been very defective.

2. Description of speech.
   Voice quality: Good

   Defective sounds: None

   Pitch: Good

   Rhythm: Good

3. Estimate of the judges.
   Controlled speech--1

4. Estimate of the experimenter.
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	1
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive Good movement 1
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			Normal Excellent movement		

Palate	Sound spoken	tense	short	flexible	long	rating
	a			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Good length
2	Activity	Good central movement
3	Tissue	Good quality
4	Rating	2

Hard Palate

1	Height	Shallow except the fissures. Alveolar is narrow and high
2	Condition	Deep fissures
3	Rating	2
4		

Passavants Cushion

1	Present	No
2	Size	

Faucial Arches

1	Size	Both normal
2	Activity	Good centrally

Tongue Frenum

1	Condition	Loose

Pharyngeal Muscles

1	Movement	Case would not co-operate

Uvula

1	Size	Normal
2	Condition	Bifid

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	None
2	Dental work necessary	Some dental work is necessary.
3	Type of Occlusion	Normal relationship of the molars (class 1). The upper and lower incisors have edge to edge bite. The upper molars on the left are in linguoversion.
4	Gaps in teeth	A gap between the left lateral and cuspid.
5	Missing and short teeth	None
6	Comments	There is a tiny opening in the vestibule.
7	Opinion as to effect on Speech	Speech is good.

Jaws

1	Size	The lower jaws are normal; the upper jaws are collapsed.

Labial Frenum

1	Condition	Mutilated but normally attached.

Audiometric test.
Hearing is normal.

Psychometric test.
C.A. 4-6
M.A. 5-11
I.Q. 131

Behavior and ability:

This child seemed older than his age. He had unusual self-confidence and aplomb. He was attentive and interested in the test.

Speech was very good.

The basal age was reached at 4-0 years and he had full success at near 5 years. The digit memory was the final success at near 7 years.

I.Q. level was superior.

Medical examination:

Previous illnesses: chicken pox and measles.

Previous accidents: Stuck a stick in his cheek.

Previous operations: Herniarrophy.

Inoculations: D.P.T. and vaccination.

Development: Within normal limits. He is normally active and plays well with other children. There is no behavior problem.

Functional inquiry:

There is no discharge from the ears; his hearing is normal. A temporary strabismus occurred after palate operation. He has frequent head colds, with chronic nasal discharge. He had frequent sore throats, but

no cough. His digestion, appetite, and elimination are good. Skin, g.u., arms and legs are negative. Coordination is good. He is a bright child.

Physical examination:

Both ear drums were thickened but not scarred. The nasal septum deviates to the left. The upper teeth on the left side are out of alignment. His tongue and palate move well. Chest and heart are normal. There is a rt. herniarrophy scar. The right testicle is atrophied; there was almost a hypospadias. The skin and muscle tone are normal.

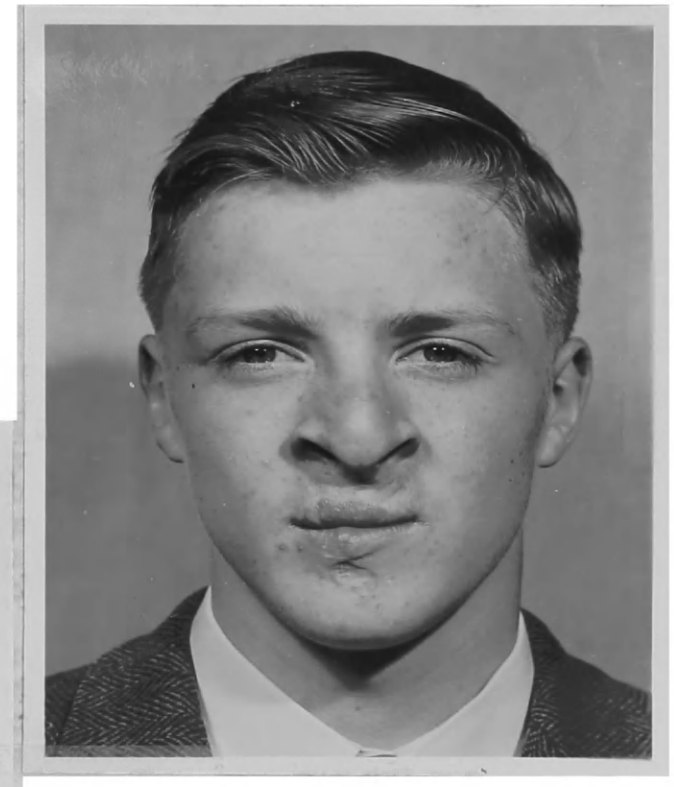
Environment:

This family is in the higher socio-economic bracket. The father is a lawyer for Canadian Pacific Railways. Both parents are stable and intelligent.

The child is very shy, suspicious, and uncooperative. For the first two visits he would not say a word. His many visits to the hospital may account for his fear and uncooperative manner. His mother seems to think that he is having a difficult time adjusting to the new baby who arrived in March of this year. However, his behavior seemed to improve as we proceeded from the first test to the final one.

CASE XXIII

Bilateral Cleft Lip and Cleft of Hard and Soft Palate



CASE 23
White, male.

Date of birth.
December 29, 1934.

Amount of cleft.
Bilateral cleft lip and complete hard and soft palate.

Number of cleft operations.
Twelve operations.

Lip repaired by D. S. McIntosh in 1935.
Palate repaired by Dr. Scrimger in 1936.
Palate secondary repair by Dr. Scrimger in 1936.
Palate repair by Dr. S. McIntosh in 1936.
Further repair of palate by Dr. McIntosh in 1937.
Lip repair by Dr. R. Fitzgerald in 1941.
Lip repair by Dr. R. Fitzgerald in 1942. (two lip repairs in this year)
Lip repair by Dr. Fitzgerald in 1943.
Plastic repair of nose by Dr. Fitzgerald in 1943.
Adjustment of lip by Dr. Fitzgerald in 1944.
Further repair of cleft lip by Dr. Fitzgerald in 1945.

Age when operations were performed:

1. Six weeks old
2. Two years and four months
3. Two years and five months
4. Two years and eight months
5. Three years and five months
6. Seven years and five months
7. Eight years and six months
8. Eight years and seven months
9. Nine years and two months
10. Nine years and seven months
11. Ten years and seven months
12. Eleven years and six months

Operative procedure.
First operation:

Notes were not available for this lip repair.

Second operation: Repair of the palate.

This was closed according to the Langenbeck procedure. The flaps were well freed and sutured without tension.

Third operation: Palate repair.

A second attempt to repair the cleft palate was carried out according to the Langenbeck technique.

The flaps were very thoroughly freed. They were thick. The only difference between this and the second operation was that two thick chromium steel wires were used as stay sutures in the hope that they would take the tension off the midline sutures or protect the suture line.
The patient left the hospital with the palate completely healed with the exception of the small opening on the anterior part of the hard palate which was deliberately left open. This can be closed at a later period if the palate is consolidated.

Fourth operation: Palate repair.

The soft palate had satisfactorily healed and at the junction of the hard and soft palate a remaining suture was removed and an area of dimpling, surrounded by infection, was encountered. The flaps were raised, following the Langenbeck principle, but the medial margins could be mobilized only with difficulty, as they were well turned in by scar tissue. The medial margins were freed, however, slightly undercut and fairly satisfactory apposition obtained. Anteriorly the flaps were not completely freed from the alveolar margin, but the anterior portion of the medial edge of the flap was sewed to the posterior surface of the premaxilla, where the gum was freed sufficiently to make a raw surface. The anterior palate was then closed completely. It is possible, however, that a small perforation may persist at either the posterior or anterior end of the suture line.

Fifth operation: Palate repair.

The defect remained in the anterior part of the palate at its junction with the cleft through the alveolus on either side. An attempt was made to close this defect by raising the anterior portions of the flap, after cutting the palate close to the teeth and likewise by separating a small flap behind the incisor teeth of the premaxilla, raising the flap with its pedicle toward the teeth. It was necessary to remove one tooth, the right lateral incisor, as it encroached upon the hard palate and would have interfered with the union. The raised up flaps were brought together proximally, but it was debatable whether the union would be satisfactory.

First lip Operations: The Abbe transplantation method was used for all.

Later lip Operations: Information was not available.

Other operations: Tonsillectomy

Other Congenital Anamolies: None

History given to experimenter by mother.

There is a history of cleft palate in the family. The mother has a cleft lip (right), grandmother (maternal) of the child had eleven children; the last two were girls with cleft lips. The grandmother's (maternal) brother had a unilateral partial cleft palate. There is no history of thyroid deficiency or goiter. Sister of the mother died with T.B. No history of premature, still-births or miscarriages in the family. Pregnancy was un-complicated. Child was a full term baby and has been comparatively healthy all of his life except after the operations. Mother says she is a very nervous person, but she seems to think that was because she had a very unhappy home life. Mother and father never agreed on anything. Mother and father are English; the father took the name of his step-father.

Speech Analyses.

1. Speech history:
   Began to talk at two and one-half years old. He began speech training in 1940 and continued until summer of 1948.
2. Description of speech:
   Voice quality: Extremely nasal. Nasal grimaces.
   Defective sounds: All sounds except (s) (z) and (ʃ) can be made reasonably well. There is an

excessive amount of air escapage on the sibilants. In running speech the plosives (g) (k) and (b) become distorted. (?) is used for (b) (g)

Pitch: Good

Rhythm: Good

3. Estimates of the judges.
   Controlled speech--2.44

4. Estimates of the experimenter
   Controlled speech--2
   Running speech-- 2

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	Tongue protrudes 2
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	2
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	2
	7	l	Draw down sides of tongue	lamp, ball balloon	Protrudes tongue 1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive Slight movement 2
Lips	1	ɛ aɪ	Ordinary opening	many, mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			Fissured tongue. Doesn't move the tip of tongue.		

Palate	Sound spoken	tense	short	flexible	long	rating
	ɑ	Yes	Yes			Poor

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Short**
2	Activity	**Poor peripheral movement. Tight--all the palate does not move.**
3	Tissue	**Thick**
4	Rating	**3**

Hard Palate

1	Height	**Normal**
2	Condition	**Fistula behind premaxilla**
3	Rating	**2**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Anterior normal Posterior small**
2	Activity	**Tight for the posterior**

Tongue Frenum

1	Condition	**Normal**

Pharyngeal Muscles

1	Movement	**Fair**

Uvula

1	Size	**Normal**
2	Condition	**Constricted at base**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	None
2	Dental work necessary	None
3	Type of Occlusion	What he has is about normal.
4	Gaps in teeth	Between cuspids
5	Missing and short teeth	
6	Comments	He has a cuspid, one bicuspid and 2 molars in the upper jaw. Lower teeth are all in place and in good condition. Teeth in the mobile premaxilla haven't come down.
7	Opinion as to effect on Speech	Teeth affect speech.

Jaws

1	Size	Upper jaw is constricted, lower jaw is well developed.

Labial Frenum

1	Condition	Mutilated

Audiometric test.
Hearing loss in the left ear.

frequency	decibels
512	30
1024	35
2048	30
4096	50
8192	30

Psychometric test.
C.A. 15-4
M.A. 19-1
I.Q. 131

Behavior and ability:

This lad was very enthusiastic about the test. Attention and concentration were excellent. His responses were quick and full. At times he got carried away and responses were too full; not that they were incorrect, but they were inappropriately worded and detailed.
Vocabulary was superior.
Speech was slurred and not always clear.
Basal age reached at 14-0. He had five successes at superior adult level. He failed only the digit memory items in the levels sampled.
I.Q. level very superior.

Medical Examination:

Previous operations:	Many- cartilage removed from rib to nose.
Previous illnesses:	Measles, scarlet fever, mumps, chicken pox, whooping cough.
Previous accidents:	None.
Development: Normal.	Is in the first year of high school. His rating is 80 per cent. His taste lies in mechanical studies. He likes sports.
Functional History	Mother and father alive and well. No siblings No diabetes, mental disease, epilepsy, T.B. No congenital defects, hereditofamilial illnesses in the family.
Functional Inquiry	Hearing fluctuates according to time; sometimes he hears better than others. Rare sore throat, rare head colds, appetite good. Digestion good. Elimination good. g.u. good. Locomotor system good. Adolescent acne.

Physical examination: Right incus is visible, drum scarred and retracted. Left drum thickened. Eyes and nose negative. Wide nares. Upper premaxilla small, partially absent. Lower teeth normal. Prosthesis for separating upper molars. There is a hole in the forward part of the palate; it measures about ½" long. The palate and tongue move actively. The chest and heart are negative. Abdomen shows keloid in left anterior rib. G,u, is negative. The locomotor system is negative.

Environment:

This family is in the lower medium socio-economic bracket. The mother is a shy, conscientious person who feels a great responsibility toward her son. She broke three appointments before she finally gained the courage to come in for an interview. Her whole life revolves around this child. She has worked hard on his speech problem and feels a certain satisfaction in the fact that his speech is understandable. There were no more children because she feared that a repeat of cleft palate would follow. The experimenter did not see the father. He works in the Reproduction Department of Canadair Stationery and Printing Company. The boy is a mature, refined person. He is far above the average in his approach to any problem. He possesses leadership and is diplomatic in his relationship with boys his age and adults. To a degree, he has accepted his physical handicap.

CASE XXIV

Bilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 24
White, male

Date of birth
March 8, 1946.

Amount of cleft.
Complete bilateral cleft lip and
complete hard and soft palate

Number of cleft operations.
Three operations, May 21, 1946; June 1948;
June 22, 1949.

Age when operations were performed.
1. Two months
2. Two years
3. Three years and about three months.

Surgeon for cleft operation.
Dr. Hamilton Baxter

Operative procedure.
First operation: Repair of the cleft lip

The points A,B,C, and AI, BI, CI were outlined as in the feather steel procedure. Margins of the cleft were repaired and the points A, AI, B, BI, C, CI were approximated as in that operation. The vermilion was imbricated and sutured with interrupted dermal sutures. A Logan lip bow was applied.

Second operation:

Clinical notes were not available as to the procedure.

Third operation:

Clinical notes were not available.

Other operations: None

Other congenital anomalies: None

History given to experimenter by the mother:

There is no history of cleft palate or thyroid deficiency in the family. This child is the third of three

children. The oldest child had a thymus condition at birth. On the maternal side there is an uncle who is considered mentally deficient. The child was born at full term following a normal pregnancy and delivery. His head appears rather large and his body seems generally out of proportion. The mother is Irish, French descent; the father French.

Speech analyses:

1. Speech history.
   The child began to talk at the age of two.

2. Description of speech.
   Quality of voice: Nasality occasionally

   Defective sounds: (s) (z) (ʃ) were distorted

   (n) (d) (l) were made with the tongue protruding

   (0) was not learned

   Pitch: Good

   Rhythm: Breath pattern were irregular

   For a child three and a half years old, his speech was generally good.

3. Estimate of the judges.
   Controlled speech--1.44

4. Estimate of the experimenter
   Controlled speech--1
   Running speech--2

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	Tongue protrudes 1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	2
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	3
	5	r̠	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	Tongue protrudes 2
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive palate Good movement 1
Lips	1	ɛ aɪ	Ordinary opening	many, mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			Normal structure Tip of tongue not as active as normal		

Palate	Sound spoken	tense	short	flexible	long	rating
	ə			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Long
2	Activity	Good Mobility All of palate moves
3	Tissue	Good quality
4	Rating	1

Hard Palate

1	Height	Normal
2	Condition	Good
3	Rating	2
4		Premaxilla is anterior to alveolar arch continuing to the right

Passavants Cushion

1	Present	Can not see
2	Size	

Faucial Arches

1	Size	Anterior normal Posterior small
2	Activity	Good

Tongue Frenum

1	Condition	Tight

Pharyngeal Muscles

1	Movement	Good

Uvula

1	Size	Normal
2	Condition	Normal

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	Not a great deal
2	Dental work necessary	Teeth need to be checked. More care with cleaning.
3	Type of Occlusion	Open bite Normal relationship of the molars (class 1)
4	Gaps in teeth	Gap between the upper left lateral and incisor
5	Missing and short teeth	
6	Comments	All the teeth are deciduous and all are in place except the upper lateral. There is a high wedged shaped arch. The premaxilla is fixed on the right and left side but it is still mobile. There is a tongue thrust.
7	Opinion as to effect on Speech	The high vault, the open bite, the tongue tip could cause speech difficulty.

Jaws

1	Size	Both are small; normal development is not taking place.

Labial Frenum

1	Condition	Normal

Audiometric test
Hearing is normal

Psychometric test
C.A. 4-0
M.A. 3-7
I.Q. 90

Behavior and ability:

No comments were made on behavior.

Speech was rather babyish but not unusually so.

The basal age was reached at 3-0 years. There was a gradual decline of success to the year 4-6. The final success was a digit recall.

I.Q. level is low average.

Medical examination:

Previous illnesses: chicken pox

Previous accidents: None

Previous operations: None.

Inoculations: D.P.T. (3)

Development: Within normal limits. Bowel and bladder control established at the same time as siblings, two years old.

Functional history: Both parents are alive and well. The mother is thirty-four years old and the father is thirty-seven. There are two living siblings (boys). A maternal uncle is said to be mentally deficient. The grandmother is asthmatic. There are no other heredito-familial diseases.

Functional inquiry:

For two years his ears discharged. When they were cleaned, there was no recurrence. His hearing is good. The eyes,

heart, and chest are negative. He has the usual head colds; there is no sore throat, no swollen glands nor abdominal pains. His appetite is good; he eats and sleeps; and his bowels move regularly. Skin, g.u., muscles and joints are negative. His coordination is good for age.

Physical examination:

The right ear drum is scarred and retracted; the left is normal. The head measures 20". The eyes are negative. The columella of the nose is pulled downward and inward. The palate is intact. The tongue moves well and so does the pharyngeal muscle. There is a bald spot (congenital) on the right temporal area. Hair is fine, thin and sparse. The lower teeth are normal. The upper are crooked and staggered; there is poor alignment. The chest and abdomen are negative. There is a functional systolic murmur in the heart. The reflexes are equal and physiological. The muscle tone is good. The skin is negative.

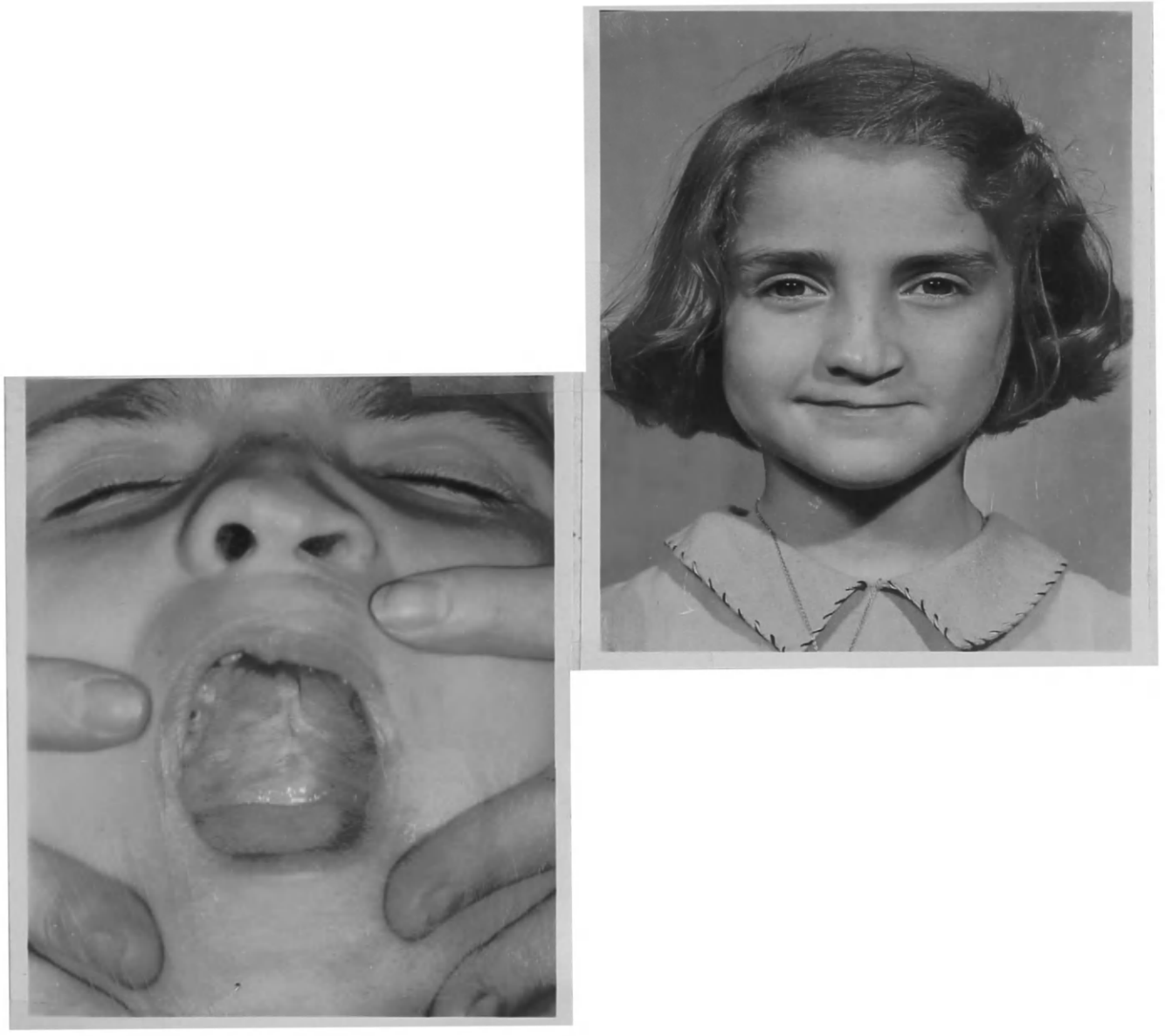
Environment:

The father is an electrician in the Canadian National Railways. This family appears to be adequately cared for. The mother is an attractive, sociable person. She is proud of his speech progress and thoroughly enjoyed bringing him for the various tests.

The little boy is friendly and completely unaware of his physical difference. He loves saying words and his speech improved day by day.

CASE XXV

Unilateral Cleft Lip and Cleft of
Hard and Soft Palate



CASE 25
White, female.

Date of birth.
May 31, 1941

Amount of cleft.
Complete unilateral left cleft lip and
Complete cleft of the hard and soft palate.

Number of operations.
Two operations, September 29, 1941; June 29, 1943

Age when operations were performed.
1. Four months.
2. Almost two years old.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative procedure.
First operation: Repair of the lip

After the usual measurements of the Blair-Mirault procedure, the margins of the cleft were pared, and the raw edges were approximated with interrupted sutures of wire. The vermilion border was imbricated and a Logan bow was applied.

Second operation: Repair of the palate.

The margins of the cleft were pared. The muco-periosteal flaps were elevated and the major palatine arteries were saved. The cleft was then sutured with interrupted dermal sutures. The patient was discharged home on the 14th day postoperatively. The wound healed by primary intention, and condition was satisfactory.

Other operations: Tonsillectomy and Adenoidectomy, January 24, 1945.

Other congenital anomalies: None.

History given to the experimenter by the mother:

On the maternal side, the grandmother's brother had a cleft palate or lip. The mother had a goiter which had not been removed. She was also having trouble with cysts and tumors on the legs and pelvis. The child was born at full term following a normal pregnancy but a difficult birth. There was one other child, a daughter, age twenty-three. The mother was of Welsh, English descent; the father was of English descent.

Speech analyses.

1. Speech history
   She began to say words at eighteen months and to talk at two years. Clinic notes on a speech evaluation given April 23, 1948 read:

   In general the speech is good.

2. Description of speech.
   Voice quality: Good

   Defective sounds.-- Substitutions:

   (ɔ) for (l) in the medial and final positions
   The middle portion of the tongue is raised for the initial (l), producing something like a (j) sound.

   There is a slight lateral lisp on the sounds (s) and (ʃ)

   Pitch: good

   Rhythm: good

3. Estimate of the judges
   Controlled speech--1.44

4. Estimate of the experimenter
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators
(English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	2
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	3
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		**Sensitive Movements similar to normal 1**
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue		**Normal** **Movement good in blade area--has tongue thrust.**			

Palate	Sound spoken	tense	short	flexible	long	rating
	a			**Yes**	**Yes**	**Good**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Long
2	Activity	Good, all the palate moves
3	Tissue	Thin tissue
4	Rating	1

Hard Palate

1	Height	High
2	Condition	Narrow and thick Small fistula in anterior, may not be patent.
3	Rating	2
4		

Passavants Cushion

1	Present	Yes
2	Size	Small

Faucial Arches

1	Size	Anterior wide Posteriors normal
2	Activity	Good

Tongue Frenum

1	Condition	Loose

Pharyngeal Muscles

1	Movement	Good

Uvula

1	Size	Practically none
2	Condition	Truncated

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	Six year molar is decayed.
2	Dental work necessary	Yes
3	Type of Occlusion	Relationship of jaws is good. The upper centrals are in linguoversion. Normal relationship of the molars (class 1)
4	Gaps in teeth	Deciduous all out except the upper two second deciduous molars. The bicuspid (upper) on the left is unerrupted.
5	Missing and short teeth	Upper left lateral is missing.
6	Comments	Opening in the vestibule Would advise correcting the centrals.
7	Opinion as to effect on Speech	Teeth are possibly responsible for the (s) defect.

Jaws

1	Size	Both fairly normal

Labial Frenum

1	Condition	Abnormally attached -- attached lingually.

Audiometric test
Hearing is normal.

Psychometric test.
C.A. 8-0
M.A. 8-8
I.Q. 98

Behavior and ability:

There are no comments beyond speech impressions. Her speech is nearly perfect. There is no timidity or hesitation in speech. There is a slight defect on (s) and (s) mixtures occasionally.

The basal age was reached at 7-0 years. There was a gradual decline of success to year 11.

I.Q. level is average.

Medical examination:

Previous illnesses: chicken pox, bronchitis, frequent colds associated with deafness.

Previous accidents: None

Previous operations: Tonsillectomy and Adenoidectomy.

Inoculations: D.P.T. Patch test negative, X-ray of chest negative.

Development:

She sat up at six months; talked and walked at eleven months; and bowel and bladder control was established at about two years. She is eight years old and in the second grade at school; she is first in the class. Her speech is good.

Functional history:

Both parents are alive and well. The mother is forty-eight years old and the father is fifty-three years old.

There is one girl, age twenty-three. There were no miscarriages or stillbirths. The mother's great uncle had a harelip; the mother has diabetes; the father has bronchitis. There is no other heredito-familial defects known. The majority of the relatives are in England.

Functional Inquiry:

There is a history of otitis (suppurative) as an infant and deafness frequently associated with colds. The eyes and nose are negative. The teeth are crooked and some of them bad. The glands are negative and so is the heart. There is a chronic cough associated with colds. She eats fairly well; elimination is generally good, but there is a tendency toward constipation. She has had pyelitis on several occasions; the last attack was two years ago. The skin and joints are negative.

Physical examination: Height 50" and weight 50 lbs.

The ear drums bilaterally are thickened, retracted and scarred. Hearing appears grossly diminished. The eyes are negative. The columella is pulled down and the mucosa is inflamed. The teeth are crooked and some are carious. The palate is intact. The tongue moves well. There is poor expansion for the chest. The heart, the abdomen, g.u., reflexes, and the skin are negative. There is early pesplanus (flat feet). Posture is extremely poor, possibly because of fatigue. A recommendation was made that she be sent to physiotherapy.

Environment:

The father worked for the Canadian National Railways and seemingly earned enough to take care of his family adequately.

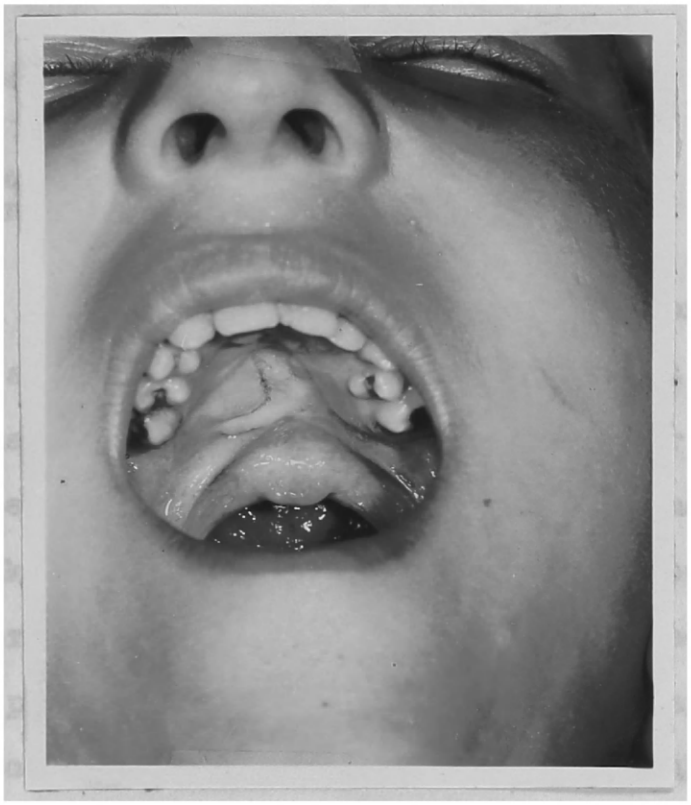
The mother was a kind, motherly type person. She took life seriously; every problem or project was weighed and carefully considered before any action was taken. Her code of ethics was extremely high; she expected the child to live by it and eventually adopt it. At times she humored the child, but never to the point of indulgence.

The child was a polite "little lady". She was quiet and well poised. There was always a sense of restraint and control in her manner. She also took life seriously. Every task was performed in a conscientious manner.

There is one other child in the family, a daughter. She is married and has a family.

CASE XXVI

Cleft of the Hard and Soft Palate



CASE 26
White, male

Date of birth
June 22, 1934.

Amount of cleft
Complete soft palate and incomplete hard palate

Number of operations
One Operation,- June 27, 1936

Age when operation was performed
Two years old

Surgeon for cleft operation
Dr. R. R. Fitzgerald

Operative procedure.
First operation: Uranostaphyloplasty by the method of Veau.

Using a large Reverdin needle, a bronze wire suture was passed through the child's right side first, and the margin of the cleft split as far as the hard palate. The same was repeated on the left side, using a silk suture. Splitting the soft palate, the posterior nasal spine was dissected free on each side, thus preparing a nasal and buccal layer for the closure of the hard palate. Four dermal sutures were used in the hard palate area, and left untied. The nasal layer of the soft palate then united with interrupted chromosized sutures. The uvula was reconstructed after the method of Veau, with fine dermal sutures. The muscular wire suture was then placed and tied. The buccal surface of the soft palate was reconstruced with fine dermal sutures. A flap was then cut of mucoperiosteum on each side

of the hard palate and swung towards the centre. The four sutures that had been passed through the nasal layer of the hard palate were then threaded, in a mattress fashion, through the two flaps, drawing them up into place. At the close of the operation, the hard and soft palate were satisfactorily closed. The child was in good condition.

Other operations: Tonsillectomy, May 6, 1936
Adenoidectomy

Other Congenital anomalies: None

History given to experimenter by mother:

There were only two living children in the family; the other is case 27. The mother had three pregnancies, but the oldest child, a girl, died at birth from an unknown cause. There was no history of thyroid difficulty. This pregnancy was uncomplicated and the child was born at full term with spontaneous delivery. The mother and father were of French descent.

Speech analyses.

1. Speech history.
   Speech development began at eleven months. The mother said his speech was much better after the operation. He began speech training in 1939, and continued for about a year. The mother attributes the success in speech to her effort.

2. Description of speech
   Voice quality: Good

   Defective sounds: None

Pitch: Good

Rhythm: Excellent

3. Estimate of the judges.
   Controlled speech--1

4. Estimate of the experimenter.
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	1
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	1
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		Sensitive Movement limited 2
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			**Seems coarse in texture** **Movement somewhat restricted**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a		**Yes**	**Yes**		**Fair**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Short
2	Activity	Good--thick scar in the junction of hard and soft palate prevent all from moving.
3	Tissue	Scarred
4	Rating	2

Hard Palate

1	Height	Shallow
2	Condition	Good
3	Rating	1
4		

Passavants Cushion

1	Present	Yes
2	Size	Slight

Faucial Arches

1	Size	Anterior large and tight Posterior normal
2	Activity	Good

Tongue Frenum

1	Condition	Tighter than normal

Pharyngeal Muscles

1	Movement	Good, but not as good as brother's

Uvula

1	Size	Truncated (more so than brother's)
2	Condition	

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	None
2	Dental work necessary	None
3	Type of Occlusion	Teeth are in good alignment. Has an edge to edge bite--mutilated case.
4	Gaps in teeth	
5	Missing and short teeth	Upper lateral, upper right first bicuspid, lower right first molar, lower left molar and second left bicuspid are missing.
6	Comments	Good usuable denture
7	Opinion as to effect on Speech	Good speech

Jaws

1	Size	Upper jaw is constricted, lower seems well developed.

Labial Frenum

1	Condition	Normal

Audiometric test.
Hearing is normal.

Psychometric test.
C.A. 15-10
M.A. 14-9
I.Q. 99

Behavior and ability:

He was confident and mature. He seemed much more mature socially and mentally than his brother. The examiner thought his speech was good.

The basal age was reached at 13-0 years. The final success was attained at superior adult II.

The I.Q. level was average. The examiner's impression was that of high average to slightly superior.

Medical examination:

Previous operations: Tonsillectomy
Adenoidectomy

Previous accidents: None

Previous illnesses: Measles, mumps, and chicken pox.

Development: Normal. He is in the tenth grade at school. He ranks 20 in a class of 30. He does not like sports. He is in early adolescence.

Functional history:

Mother did not accompany child, and the child did not know the family history.

Physical Examination:

Birthmark (naevus) over sacrum. The ears and eyes are negative. The palate is intact and moves well. The tongue movements are restricted on touching upper lip

with mouth wide open as it is with the sibling. Chest, abdomen and heart are negative. G.U., puberty. The remainder of the examination, negative. He is a nervous, tense individual, who perspires freely.

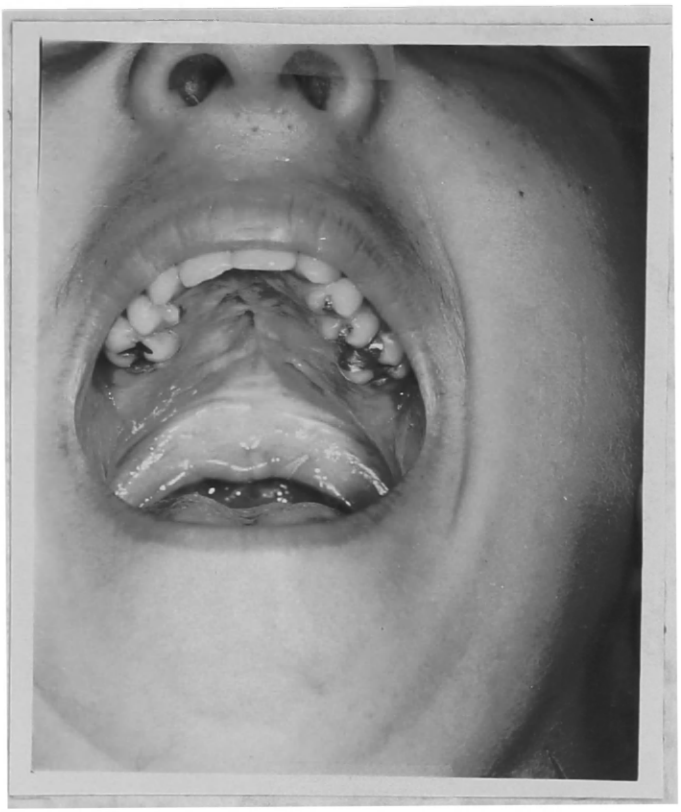
Environment:

Before April of 1950, the father of this family was a chauffeur with a salary of $15 a week. The mother seemed to be extremely clever at handling finances and the boys gave the impression of coming from a well-to-do family. In April, the father bought a restaurant in a neighboring town.

The mother was a shy and apparently unassuming person. She would make any sacrifice so that her children could have the best in life. The relationship within the family group was pleasant and easy. This boy was polite, attractive and mature beyond his years. He possessed qualities of leadership which were aptly demonstrated in his relationship with his brother.

CASE XXVII

Cleft of Hard and Soft Palate



CASE 27
White, male

Date of birth
July 16, 1935.

Amount of cleft
Incomplete hard palate and complete cleft of the soft palate.

Number of cleft operations.
One operation, June 12, 1937.

Age when operation was performed.
1. One year and seven months.

Surgeon for cleft operation.
Dr. R. R. Fitzgerald.

Operative procedure.
First operation: A staphylouranoplasty by the method of Veau and a pharyngoplasty by the Wardill technique were performed.

The steps in the procedure were not described.

Other operations: Tonsillectomy, April 3, 1937
Adenoidectomy

Other congenital anomalies: None.

History given to experimenter by mother:

There is no history of cleft palate outside the immediate family. The mother has had three pregnancies; two children are living. One girl, the oldest, died at birth from an unknown cause. There is no history of thyroid trouble or goiter in the family. The mother has always been in good health. No diseases or illnesses occurred during this pregnancy. The baby was full term and the delivery was spontaneous. Mother and father are of French descent.

Speech analyses.

1. Speech history.
   The mother said the child began to speak at the age of ten months; however, he could not speak well until he was four years old. He began speech training in 1941 and continued for about six months. Here again the mother accepts the credit for the speech progress, or the good speech. She did say, however, that his speech was much worse than his brothers, and that the information gained from the doctor was very beneficial.

2. Description of speech
   Voice quality: Good for French, which uses many nasal sounds.

   Defective sounds-- Slight lateral (s) lisp

   Pitch: Good

   Rhythm: Good

3. Estimate of judges.
   Controlled speech--1

4. Estimate of experimenter
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators (French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	**Tongue tends to turn to side** 1
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	1
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	**Elevation higher on right side** 1
	7	l	Draw down sides of tongue	lapin, balai	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		**Sensitive** Movements fair 2
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			**Normal** **Average flexible**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a		**Yes**	**Slightly**		**Fair**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Short and scarred**
2	Activity	**Good movement in the posterior area**
3	Tissue	**Scarred**
4	Rating	**2**

Hard Palate

1	Height	**Shallow**
2	Condition	**Rough**
3	Rating	**2**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Anterior large but tight Posterior normal**
2	Activity	**Anterior tight Posterior good**

Tongue Frenum

1	Condition	**Just tighter than normal**

Pharyngeal Muscles

1	Movement	**Excellent**

Uvula

1	Size	**Short**
2	Condition	**Truncated**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	No decay
2	Dental work necessary	
3	Type of Occlusion	Normal relationship of the molars (class 1) The upper left bicuspid is in linguoversion.
4	Gaps in teeth	No gaps
5	Missing and short teeth	Upper right lateral, upper left bicuspid, are missing. Lower first molars have been extracted.
6	Comments	Lower front teeth are crowded.
7	Opinion as to effect on Speech	Good speech

Jaws

1	Size	Both jaws are constricted to a degree.

Labial Frenum

1	Condition	Normal

Audiometric test
Hearing normal

Psychometric test
C.A. 14-9
M.A. 12-10
I.Q. 91

Behavior and ability:

He was not very friendly; in fact, he seemed rather resentful. His responses were slow and many times he asked the examiner to help him finish.

Speech was good.

Basal age was reached at 11-0 years. There was a final success at the average adult level, on several comprehension types of items.

I.Q. level is low average.

Medical Examination:

Previous accidents: None

Previous operations: Tonsillectomy, adenoidectomy.

Previous illnesses: Childhood diseases; measles, mumps, chicken pox.

Development: Very little of his history was obtained because the mother did not come with him.

The boy is in the eighth grade at school. Is 18 in rank in a class of 20. Plays hockey and baseball.

Physical Examination:

The ears, eyes, and nose were negative. Palate is intact; it is short but moves actively. Teeth are staggered. There is evidence of caries, but teeth are in fair condition. Chest, heart are negative. Nipples are full; there is a small amount of breast

tissue. G.u. denotes pubic changes. The skin is negative. Tongue protrudes with ease, but there is difficulty in touching upper lip with mouth wide open.

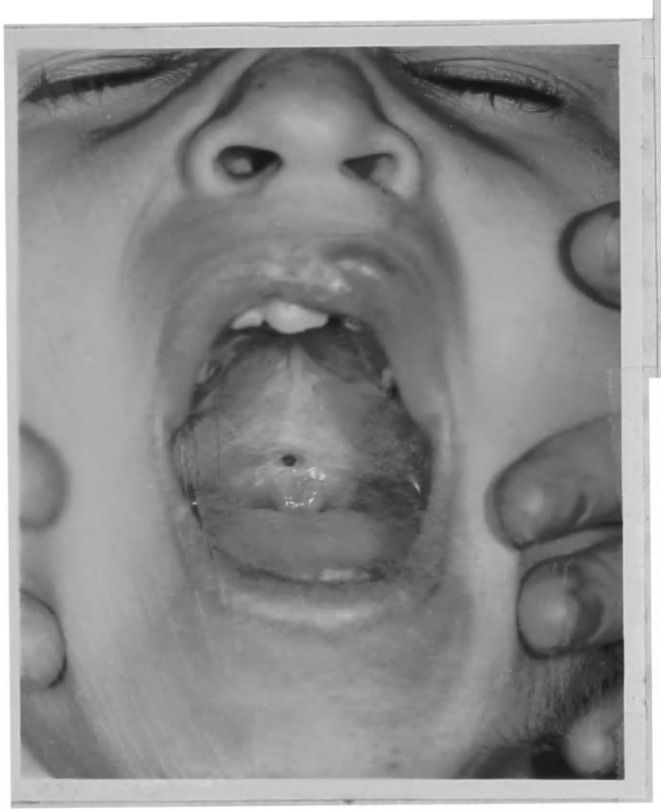
Environment:

Most of the environmental history is given in the case history of Case 26.

This boy was exceedingly shy. He never volunteered any information; that responsibility he left to his brother. He cooperated well with the experimenter and seemed to enjoy some of the tests that were given.

CASE XXVIII

Unilateral Cleft Lip and Cleft of Hard and Soft Palate



CASE 28
White, male.

Date of birth
February 21, 1942.

Amount of cleft
Complete left unilateral cleft lip and complete cleft of the hard and soft palate

Number of cleft operations
Three operations, April 13, 1942; September 13, 1943. June 12, 1944.

Age when operations were performed.
1. About two months.
2. About one year and a half.
3. Two years and three months.

Surgeon for cleft operation.
Dr. J. W. Gerrie.

Operative procedure.
First operation: Repair of harelip.

When the baby was about six weeks old. A modified Mirault-Blair operation was done on the lip. Bleeding was moderate from a relaxing incision on the left side. A small amount of vermilion was excised and discarded. Condition of baby was satisfactory throughout.

Second operation: Repair of the palate.

The cleft was a complete left-sided type, the alveolar process brought together by the lip closure. A modified Langenbeck operation was done with lateral incisions extending far back. The clefts were mobilized nicely and it was not necessary to cut the hamular or anterior palatine arteries. There was a vomerine flap with the vomer attached to the right side. This was cut and united through

and through with a black mattress suture. The palate was then closed in the usual manner with black silk throughout. It was closed without appreciable tension by interrupted sutures in the soft palate and mattress sutures in the hard palate. On September 20, 1943, the sutures were removed from the palate. The mucous membrane on the oral side had separated midway back for about ½".

The baby was then again admitted on June 11 and discharged on June 17, 1944.

Third operation: Frenectomy-- removal of scar from lip.

There was an irregularity of the vermilion border with a drooping bit of mucous membrane along the previous closure. The vermilion border was adjusted, some skin was excised from the mucous membrane, and it was sutured together in position along a better line. An ellipse of mucous membrane was then taken from the drooping part and brought into position with black nylon suture. An upper labial frencetomy was also done; it was closed with nylon sutures.

Other operations; None.

Other congenital anomalies: None

History given to experimenter by the mother:

A male paternal fourth cousin had a cleft palate. The mother had thyroid difficulty and says because of this

she has lost all her hair, eyebrows, and eyelashes. She said she was extremely nervous and that her husband was under the care of a doctor because of a nervous disorder. There were four children; the oldest child died from infection after an apendectomy. The child used in this experiment was the second in the birth series; the two younger than he were normal. He was born following a normal pregnancy and an easy natural birth. The mother had no diseases while carrying the child. The mother was of French and English descent; the father was of French descent.

Speech analyses.

1. Speech history
   He began to talk at the age of three years. His speech was very poor at first. The family has always been concerned about his speech and has constantly corrected him when he made an error.

2. Description of speech.
   Voice quality: Good

   Defective sounds: The (s) sound tends to become a lateral lisp.

   Pitch: Good

   Rhythm: Good

3. Estimate of the judges.
   Controlled speech--1.44

4. Estimate of the experimenter.
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	1
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	1
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		Fair gag reflex. Good circular movement 1
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			**Normal structure Flexible**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a			**Yes**	**Yes**	**Good**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Midline hole just anterior to uvula Long
2	Activity	Good, all the palate moves
3	Tissue	Fair
4	Rating	2

Hard Palate

1	Height	High arch in front
2	Condition	Good
3	Rating	1
4		

Passavants Cushion

1	Present	Yes
2	Size	A small shadow

Faucial Arches

1	Size	Posterior short but not tight, anterior normal
2	Activity	Good

Tongue Frenum

1	Condition	Loose

Pharyngeal Muscles

1	Movement	Good

Uvula

1	Size	Normal
2	Condition	Normal

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	Cavity in the upper and lower molars
2	Dental work necessary	All permanent should be checked.
3	Type of Occlusion	Normal relation of the molars (class 1). The upper anterior teeth are in linguoversion.
4	Gaps in teeth	Lost deciduous lower molars with no loss of space. Lost upper first deciduous molars with loss of space.
5	Missing and short teeth	
6	Comments	Cleft through the upper left central and lateral incisors. Opening in the vestibule. Upper left central incisor is rotated.
7	Opinion as to effect on Speech	Teeth may have some effect on (s) sound.

Jaws

1	Size	On the whole well developed; maxillary has lacking in upper area.

Labial Frenum

1	Condition	Normal

Audiometric test
Hearing is normal

Psychometric test.
C.A. 8-0
M.A. 8-2
I.Q. 102

Behavior and ability:

This lad was restless and he needed prodding and coaxing to finish the tasks; however, in the examiner's opinion, it was a good test.

His speech is good.

The basal age was reached at 7-0 years. The span of success was normal and fairly regular.

I.Q. was level average.

Medical examination:

Previous illnesses: Measles, mumps, chicken-pox.

Previous accidents: None

Previous operations: Appendectomy.

Inoculated: D.P.T. Patch test.

Development: Within normal limits. He is in the second grade at school and is doing fairly well. He plays actively. He is not self-conscious; his behavior can be considered normal.

Functional history: Both parents are alive. The mother thinks she has a goiter. The mother is thirty-five years old, and the father is thirty-nine. There are two siblings; both are alive and well. The oldest child died post-operatively (appendectomy.) There are no congenital anomalies or heredito-familial diseases on either side of the family.

Functional inquiry: Negative.

Physical examination:

The lips are negative. Both ear drums are thickened but do not appear grossly abnormal. The nose and eyes are negative. There is a slight perforation anterior to the uvula, otherwise the palate is intact. The tongue movements are restricted; he cannot touch the upper lip with his tongue when his mouth is opened. The upper left incisor is crooked. The tonsils are fair. Chest, heart, skin and g.u. are negative. His posture is poor. His speech is good.

Environment:

This family is in the high-medium socio-economic bracket. The father is the general manager for a clothing chain store. He is a well-poised person and seems to be interested in his children. The mother also seems interested in her children, but will not exert a great deal of energy or effort in their behalf. The examiner had to work very hard to gain her cooperation in this study. She is extremely nervous and sensitive. Her education is limited and she hopes that her children will take advantage of the opportunities offered to them.

The child is a rather shy, sweet boy who is easy to handle when his confidence has been gained. He is not aware of his physical defect; he has been told that he cut his lip when he was a baby. His chief interests are football and hockey.

CASE XXIX

Cleft of Soft Palate

CASE 29
White, female.

Date of birth
March 26, 1937

Amount of cleft
Complete soft palate

Number of cleft operations
One operation, August 12, 1938

Age when operations were performed
1. One year and about five months

Surgeon for cleft operation.
Dr. Dudley Ross.

Operative procedure.
First operation: Repair of the palate.

Relaxing incisions were made opposite the posterior molar teeth and the palate was freed with elevators. This permitted sufficient mobilization to give good apposition without tension. The edges of the cleft were then excised and a mattress suture of heavy dermal was placed about the middle of the cleft. Interrupted heavy dermal sutures were then used to suture the cleft back in its entire length. The palate fell back well into the pharynx and the repair seemed satisfactory.

Other operations: None

Other congenital anomalies: None

History given to experimenter by the mother:

The mother thought a paternal uncle had a child with a cleft palate. There was no history of thyroid difficulty. The mother had no diseases while carrying the child. Pregnancy was uncomplicated and delivery was

spontaneous. She was an only child. The child fell while skating and knocked out the upper front teeth; a plate was made for her.

The mother is Irish-English; the father is German.

Speech analyses.

1. Speech history.
She began to talk at the age of two years. A social service report made when the child was two years old gives this information:

> The child is a very healthy-looking child whose speech sounds almost normal, and it is thought that with very little speech training she would be a normal speaker.

2. Description of speech.
Quality of voice: Good

Defective sounds-- Dominant (s) sound (possibly caused from the dental plate)

Pitch: Good

Rhythm: Good

3. Estimate of the judges.
Controlled speech--1

4. Estimate of the experimenter.
Controlled speech--1
Running speech--1

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	1
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive palate Movement similar to normal 1
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ,u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Draving of lower lip against upper front teeth	five, half	1
Structure of Tongue			**Normal Good movement**		

Palate	Sound spoken	tense	short	flexible	long	rating
	ɑ			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Normal
2	Activity	All palate moves well. Eccentric to the left
3	Tissue	Thin
4	Rating	2

Hard Palate

1	Height	Normal
2	Condition	Normal
3	Rating	1
4		

Passavants Cushion

1	Present	No
2	Size	

Faucial Arches

1	Size	Anterior is normal. Posterior is small.
2	Activity	Good--wide

Tongue Frenum

1	Condition	Loose

Pharyngeal Muscles

1	Movement	Good

Uvula

1	Size	Normal
2	Condition	Partially bifid

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**Rampant dental decay throughout the mouth**
2	Dental work necessary	**Yes (Teeth are not clean)**
3	Type of Occlusion	**Distal occlusion (class 2)**
4	Gaps in teeth	
5	Missing and short teeth	**Lower and upper first molars have been extracted. Upper central incisors have been extracted.**
6	Comments	**Dental plate for upper central incisors**
7	Opinion as to effect on Speech	**Speech is good.**

Jaws

1	Size	**Both jaws well developed**

Labial Frenum

1	Condition	**Normal**

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 13-1
M.A. 12-8
I.Q. 97

Behavior and ability.

The girl seemed very nervous. Physically she was jumpy and there appeared to be occational involuntary jerking movements of the muscles. Her responses were slow and indecisive.

Her speech was excellent.

The basal age was reached at 11-0 years. The test pattern was regular and even.

I.Q. level is average.

Medical examination:

Previous illnesses: Scarlet fever, measles (2), mumps.

Previous accidents: Concussion at age five.

Previous operation: Nil.

Inoculations: No inoculation against D.P.T. Patch test.

Development: Within normal limits. She is in the fifth grade at school; she started to school at nine years old. She is repeating this year; she is poor in arithmetic. Behavior is no problem. She figure skates, reads a little, rides her bicycle and belongs to many clubs.

Functional history: Both parents are alive; the father has duodenal ulcers. There are no siblings. A maternal great cousin had cleft palate; a paternal great-cousin was born with club foot.

Functional inquiry: Negative.

Physical examination:

Both ear drums are thickened; hearing is normal. The eyes are negative. There is a slight nasal discharge. There are several dental caries; she wears an upper partial denture. The glands in the neck are enlarged. The chest, heart, abdomen and skin are negative. The tonsils are infected clinically. There are no secondary sexual changes. The joints and muscles are normal. Her responses are slow. The palate and tongue move actively. Her speech is excellent.

Impression: Dull, bobby-sox type.

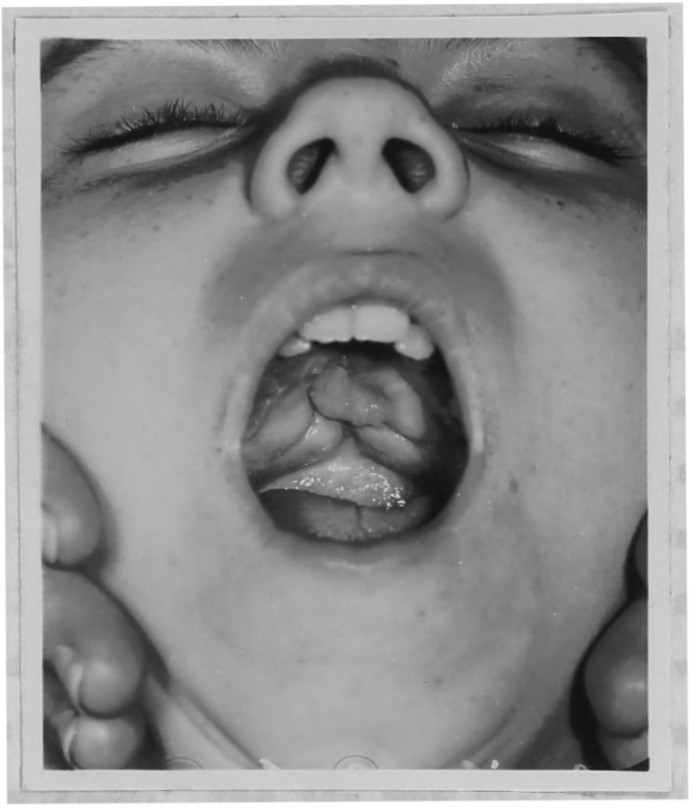
Environment:

The father is employed as a claims clerk for General Motors in Canada. The family seem to be taken care of adequately. The mother is an extremely meticulous, conscientious person, who has spent considerable time on the child's speech. Up until this year, when she volunteered to care for one of the foster home children, the child has been the center of attraction in the home. Now her time is divided between the two.

The girl is quiet, restless, and attractive in appearance. She adjusts well to adults, but she has very little self-confidence. She has many friends and she prefers physical recreation to the sedentary type.

CASE XXX

Cleft of the Uvula and Congenital Short Soft Palate



CASE 30
White, female.

Date of birth.
July 27, 1941.

Amount of cleft.
Cleft of the uvula and congenital short palate.
(Submucous)

Number of cleft operations.
One operation, April 30, 1947.

Age when operation was performed.
1. Five years and nine months.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative procedure.
First operation: Repair of the palate

A U-shaped incision was made through the anterior portion of the flap, which was raised and a stent covered graft was inserted beneath this. This was sutured with interrupted dermal sutures.

A month later the U-shaped incision was raised, the skin graft on the palate side was removed, the arteries were received and the whole palate was retrodisplaced. The tip was held in place with two interrupted dermal sutures.

Other operations: Tonsillectomy and adenoidectomy, 1944.

Other congenital anomalies: None.

History given to the experimenter by the mother:

There was no known history of cleft palate or thyroid deficiency in the family. The child was born following normal pregnancy and delivery. The mother had no diseases while carrying the child. The child is an only

child.

The mother is of Irish descent: the father is of French-English descent.

Speech analyses.

1. Speech history.
The child began to talk at the age of eighteen months. Her speech was very defective before the operation. She began speech training before the operation but there was no evidence of improvement. Speech training was continued after the operation until June of 1949. All sounds were learned but not always used in spontaneous speech.

2. Description of speech.
Voice quality: Nasal

Defective sounds-- Substitutions:

(d) for (g) initial position

(r) for (w) initial position

(w) for (r) medial position

(ʔ) for (t) medial position

(s) for (ʃ) initial, final positions

She has difficulty with clusters.

Pitch: High

Rhythm: Normal

Comment: Delayed speech as well as some evidence of cleft palate. Tends to talk too fast.

3. Estimate of the judges.
Controlled speech--2.56

4. Estimate of the experimenter
Controlled speech--2
Running speech--3

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	2
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	2
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	Can but doesn't always 1
	7	l	Draw down sides of tongue	lamp, ball balloon	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Insensitive Movement fair 2
Lips	1	ɛ aɪ	Ordinary opening	many, mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			**Slightly fissured Tip of tongue doesn't function well**		

Palate	Sound spoken	tense	short	flexible	long	rating
	ɑ			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate		
1	Size	Adequate in length
2	Activity	Good All the palate moves
3	Tissue	Good
4	Rating	1

Hard Palate		
1	Height	Normal
2	Condition	Hypertrophic muco-periosteum
3	Rating	2
4		

Passavants Cushion		
1	Present	No
2	Size	

Faucial Arches		
1	Size	Both are normal
2	Activity	Good

Tongue Frenum		
1	Condition	Loose

Pharyngeal Muscles		
1	Movement	Good

Uvula		
1	Size	Normal
2	Condition	Normal

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	Not a great deal
2	Dental work necessary	Lower first permanent molars need attention. Need to have some of the deciduous teeth removed.
3	Type of Occlusion	Normal relationship of the molars. (class 1) The upper centrals are end to end. The laterals are in linguoversion.
4	Gaps in teeth	None
5	Missing and short teeth	None
6	Comments	There is a tongue thrust movement.
7	Opinion as to effect on Speech	Teeth are not responsible for defective speech.

Jaws

1	Size	Upper jaw is constricted; the lower jaw is somewhat constricted but tends to be normal.

Labial Frenum

1	Condition	Normal

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 8-9
M.A. 7-8
I.Q. 88

Behavior and ability:

She was an untidy looking girl; she was not very clean. She talked to herself while formulating an answer. The lip movement was quite noticeable but ofter the examiner could not hear what she said. She at one time told herself that she "didn't answer that question very well." Her speech was not very good. There were several words that were lost, although she was asked to repeat them. The basal age was reached at 6-0 years. There was a gradual decline of success to a final success at near 10 years. At this age level she was able to name 28 things in one minute.

I.Q. level is dull normal.

Medical examination:

Previous illnesses; measles (2), mumps, chicken-pox, scarlet fever.

Previous accidents: cut head just behind the left ear, fractured mid-third of the left forearm (2) and dislocated the elbow on two occasions.

Previous operations: Tonsillectomy and adenoidectomy.

Inoculations: D.P.T. and vaccination.

Development: She first sat up at six months; stood at ten months; walked at ten months; gained bowel and

and bladder control at fifteen months. She is in the third grade at school. The mother thinks she is as bright as the child next door.

Functional history: Both parents are alive and well. The mother is thirty-five years old; the father is forty-five years old. There are no siblings. There were no miscarriages, and no stillbirths. The mother does not know of any congenital defects, or heredito-familial diseases, in the family.

Functional inquiry: As an infant, she had suppurative otitis; this has cleared with no recurrence. Her hearing is good. The eyes are within normal limits. The nose is stuffy but there is no discharge. She rarely has sore throat. The chest, heart, skin, and g.u., are negative. Her appetite fluctuates (dislikes fruit); the bowels move 2 to 3 times a day. There is marked loss in the carrying angle of the elbow. She is not a behavior problem.

Physical examination: She weighs 49 lbs. Her head measures 19". Both ear drums have a thin scar but there is no gross thickening. The eyes and nose are negative. The teeth are badly decayed. The palate is intact and moves well. The tongue movements are restricted to the extent that there is difficulty in elevating tip to touch upper lip. Both cervical glands are enlarged. The chest, heart, g.u., and skin are negative. There is a wide carrying angle for the left elbow. Power and

function are good. The child is hyperkinetic, loquacious and scatter-brained.

Environment:

The family is in the low socio-economic bracket. The father is employed in the Sherwin-Williams paint plant. Both Mother and child always look untidy and unclean; this did not appear to be completely due to laziness. The mother is poorly educated as well as unintelligent; however, she faithfully carries out instructions to the extent of her ability.

The child has an undernourished appearance, pale and wan. She is jumpy, talkative, and "bird-witted." Because of her friendly manner, as well as her loquaciousness, she is well known by all the hospital staff.

CASE XXXI

Unilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 31
White, male.

Date of birth.
September 13, 1935.

Amount of cleft.
Complete right unilateral cleft of lip and complete unilateral cleft of hard and soft palate.

Number of cleft operations.
Seven operations, October 28, 1935; May 2, 1936
December 7, 1937; June 9, 1938;
April 1, 1940; June 14, 1947;
August 25, 1948.

Age when operations were performed.
1. One month and a half.
2. Nine months.
3. One year and nine months.
4. Two years and nine months.
5. Four years and five months.
6. Eleven years and nine months.
7. About thirteen years.

Surgeons for cleft operations.
Dr. R. R. Fitzgerald for the first six.
Dr. F. M. Woolhouse for the seventh.

Operative procedure.
First operation: Cheiloplasty and Uranoplasty by the method of Veau.

The vomerine leaf was first raised by blunt dissection and packed into place. Three incisions were then made on the lateral lip element, the first along the mucocutaneous border, the second around the ala of the nose and the third at the junction of the lip and alveolar process, extending up into the nostril along the lateral wall. The mucosa was then lifted off the nasal surface of the hard palate on that side. The mouth was again opened and the leaf of the palatine side was then marked out with the knife and raised with a periosteal elevator. This

flap was then swung into place and stitched with a single silk suture, thus reconstructing the hard palate with a buccal and nasal layer. Two catgut sutures were used to reconstruct the anterior portion of the hard palate; the catgut sutures being passed through the nasal mucosa on each side. An incision was then made on the medial lip element along the mucocutaneous border and a descending incision was made near the end of this one as far as the junction of the lip on the alveolar process. The lip was then split on each side along the line of the incision and the soft tissue separated from the surface of the maxilla as far as the infra-orbital foramen on the outer side, and the nasal spine was exposed on the inner side. The tissues were then drawn together across the cleft. Two bronze wire sutures were then laid in place, the one high up at the base of the nose, uniting the muscles at the floor of the nostril on each side; the other one lower down, uniting the orbicularis oris muscles. Suture of the lip was begun on the posterior surface with several stitches being placed in the mucosa. The floor of the nostril was then reconstructed on its upper side, using dermal sutures. With plastosute, the lip was then reconstructed, beginning at the mucocutaneous edge and using magnifying binoculars,

sutures were placed to reconstruct the lip on its skin surface. The mucosa was then adjusted after the method of Veau. A Logan bow was laid in place. Twice during the operation, the child ceased to breathe, and artificial respiration had to be resorted to. At the close of the operation, the child ceased breathing again, and artificial respiration was carried on for some time. During the using of artificial respiration, several of the sutures were accidently torn out of the mucous membrane and had to be replaced. The child left the table in fairly good condition.

Second operation: Plastic adjustment of the right nostril and upper lip.

Inside the right nostril a vertical incision was made and a fragment of the right alar cartilage removed, together with a portion of skin, thus opening up a good airway. A diamond portion of skin was removed from the floor of the right nostril. The sides were then undercut on each side and a through and through dermal suture was passed after separating the cartilaginous nasal septum from the nasal spine by the scalpel. This suture was then tied, drawing the lateral side of the right alar cartilage towards the mid-line and drawing the septum toward the right. This was tied in the left nostril over a small gauze pad. A triangular portion of skin was then removed from the left side of the upper lip in order to make the two sides equal. The margins were then united with plastosute sutures. The operation was well tolerated.

Third operation: Pharyngoplasty by Wardill method followed by a Staphyloplasty by the Veau method.

A transverse incision through the mucous membrane was drawn together with two sutures of dermal. The right side was transfixed with the Reverdin needle. A wire suture was laid in place. The margin was split and dissected up off the hard and soft palate. The posterior nasal spine was visible on both sides. Two mattress sutures were laid in place at the anterior end of the cleft. The posterior nasal surface was closed with inter-fine dermal sutures. To close the anterior defect, the flap was cut from the right side with the base swung into position and held in place with the two first mattress sutures which were laid in place.

Fourth operation: Adjustment of the right nostril

Clinical notes were not available.

Fifth operation: Adjustment of right nostril.

A marginal incision was made along the orifice of the right nostril. The skin was dissected upward and downward and the edge of the ali partially excised together with a small piece of skin. The edges were drawn together with plastosute, thus correcting the curve of the nostril edge. The scar of the previous operation was then excised; the skin undercut on each side; the scar removed from the deep layers of the lip; the ali cartilage exposed; the suture placed to the tip of the ali cartilage was exposed and drawn out to the opposite

nostril and tied over a pad. The margins were then adjusted and drawn together with plastosute sutures. A Logan bow was laid in place.

Sixth operation: Nasal plastic.

Notes not available.

Seventh operation: Rhinoplasty.

Notes not available.

Other operations: Herniorrophy, April 16, 1945.

Operation for torticollis, January 18, 1947

Extraction of teeth for insertion of plate.

Tonsillectomy and adenoidectomy, June, 29, 1950.

Other congenital anomalies:

Hernia
Torticollis

History given to experimenter by the mother.

This information was given by the person who has taken care of the child since his mother's death. There was no history of cleft palate or thyroid trouble in the family. The mother died from a spinal disease when the child was about two years old. There were several miscarriages before the oldest child, a girl, now eighteen, was born. In order to have the girl, the mother had to stay in bed during the complete term. There were only two children, the girl and this boy. He was born following a complicated pregnancy and a difficult birth; instruments were used. He had a difficult time teething

and has always had trouble with his teeth. There was a great deal of ear trouble and nasal discharge until he was recently fitted with a dental plate. The mother was of English descent and the father is of Scots descent.

Speech Analyses.

1. Speech history.

He began to talk at the age of four. When he went to kindergarten at the age of five, his speech was very bad. He began speech training at the age of three and continued it spasmodically until he was ten. His last speech evaluation indicated that he could articulate all the consonants except (s) and consonantal clusters.

2. Description of speech.

Voice quality: Slightly nasal

Defective sounds-- Substitutions:

(w) for (r) initial, medial position

(ʔ) for (k) medial position (seldom)

These sounds become a lateral lisp

(ʃ) (s) (z)

The (tʃ) is distorted.

Pitch: Normal

Rhythm: Good

3. Estimate of the judges.
Controlled speech--1.78

4. Estimate of the experimenter.
Controlled speech--2
Running speech--2

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	2
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	3
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	2
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		No gag reflex No circular movement 3
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1

Structure of Tongue	Normal	Flexible

Palate	Sound spoken	tense	short	flexible	long	rating
	a		Yes	Yes		Fair

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Short**
2	Activity	**Good**
3	Tissue	**Scarred**
4	Rating	2

Hard Palate

1	Height	**High anteriorly**
2	Condition	**Medium midline sized fistula**
3	Rating	3
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Anterior and Posterior normal**
2	Activity	**Good**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Good**

Uvula

1	Size	**Normal**
2	Condition	**Normal**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**None**
2	Dental work necessary	**None**
3	Type of Occlusion	**Class 1 - normal relationship of the molars**
4	Gaps in teeth	**Between upper cuspid and bicuspid on the right side**
5	Missing and short teeth	**Lower right cuspid removed, lower left bicuspid removed. Upper left cuspid removed, upper right cuspid and bicuspid removed.**
6	Comments	**Cleft passes between the central and lateral cuspids on the right side.**
7	Opinion as to effect on Speech	**Teeth are not responsible for speech defect.**

Jaws

1	Size	**Upper underdeveloped**

Labial Frenum

1	Condition	**Normal**

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 14-7
M.A. 15-0
I.Q. 107

Behavior and ability:

His behavior was normal. He seemed a nice lad; there was nothing unusual in his manner or reactions to test. His speech seemed good.

The Basal age was reached at 13-0 years. The test pattern was regular in span and gradation.

I.Q. level is high average.

Medical examination:

Previous illnesses: Whooping cough, chicken pox, mumps, poliomyelitis(no residual paresis).

Previous accidents: None.

Previous operations: Herniorrhaphy and orchiorrhaphy at seven years.
Correction of torticolis at nine years.

Inoculations: D.P.T.

Development: First stood at one year; walked at eighteen months; and talked at four years. Bowel and bladder control were gained at eighteen months to two years. He is in the eighth year at Bishop College. He is a good student; ranks in the upper third of the class. He is fair at sports; plays a piano and sings in the choir. He should play more with children his own age.

Functional history: The mother died at the age of thirty with tuberculosis of the spine. The father is alive

and well. There are no congenital deformities on either side of the family nor are there any heredito-familial diseases.

Functional inquiry: He had discharging ears as an infant (9 months). Last winter he had six teeth removed and subsequent otitis media (suppurative). It cleared and has not recurred. His hearing is normal. There is no chronic discharge or bleeding from the nose. The displaced teeth have been removed and a plate put in. His glands were swollen in infancy. He rarely has a head cold or sore throat. The chest and heart are negative. His appetite is fickle, but he can eat anything and everything. His bowels move regularly. His muscles are negative. His ambition is to become a doctor.

Physical examination: The left ear drum is thickened. The eyes are negative. There is facial asymmetry and the septum is deviated markedly to the right. The right airway is completely obstructed. The teeth are irregular; uses an obturato to cover small opening in anterior hard palate. Tongue and palate move actively. The heart, lungs, and abdomen are negative. There is a four inch herniorrhaphy scar. The foreskin of the penis is not retractable; the right testicle is small. Muscle tone is good bilaterally. The reflexes are normal and equal. The skin is dry but normal. Muscle power, hearing and sight are normal.

Environment:

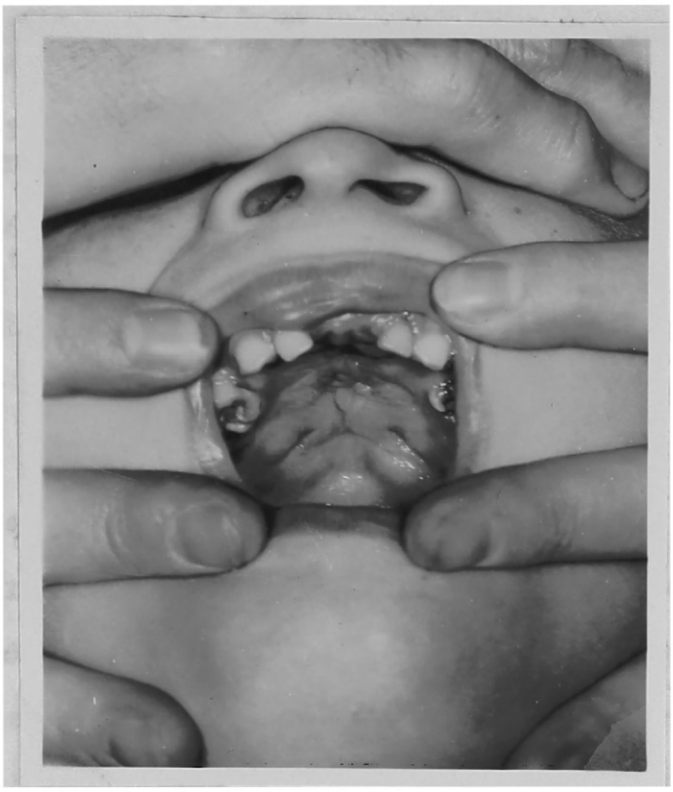
This family is in the high socio-economic bracket. The housekeeper, whom the boy called Nanny, has taken care of him since the death of his mother. She is very fond of the boy and exhibits keen interest in him. She does not understand the boy's feelings toward his handicap, but she is anxious to cooperate and gives him constant encouragement.

The father is the secretary and treasurer of a paper plant in Montreal. He has little time for his family. The boy seems fond of his father, but there is little companionship between them.

The boy has a strong sense of civic responsibility; this was evident throughout the experiment. He is more mature socially than the average boy of his age. Speech has always been a major problem and it is especially so now, since he wants to become a doctor.

CASE XXXII

Cleft Uvula and Congenital Short Soft Palate



CASE 32
White, male.

Date of birth.
January 26, 1943.

Amount of cleft.
Cleft uvula and a very small cleft of the soft palate (submucous cleft)

Number of cleft operations.
One operation, May 20, 1948.

Age when operations were performed.
1. Five years and three and one half months.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative procedure.
First operation: Repair of the palate

On May 20, a first stage procedure was done in the form of a skin graft of the anterior part of the palate.

Post-operatively he was maintained on penicillin for four days. On his eighth post-operative day, a second stage repair of the palate was done, which consisted mainly of a "push-back" operation. Following this procedure he was placed on penicillin until his ninth post-operative day.

Other operations: Tonsillectomy and adenoidectomy, September 28, 1947

Other congenital anomalies: None

History given to experimenter by the mother:

The child was adopted at the age of eight months. The mother does not know any of the history except that he was the first of two children.

Speech analyses.

1. Speech History

At eleven months he could say mama; at one and a half years he began to say phrases. A speech evaluation given before the operation gives the following defective sounds: (p) (t) (b) (k) (g) (ʃ) (l) (d) (s) (f) (θ) (tʃ) (dʒ).

He substituted glottals for the consonants and his voice was very nasal.

After the operation he began speech training. There was some progress to the extent that he learned to make the sounds (p) (b) (t) (d); however, these were not carried over into spontaneous speech. He discontinued speech training in February, 1949.

2. Description of speech

Quality of voice: very nasal

Defective sounds-- Substitutions

(j) for (dʒ) initial position

(ʔ) for (ʃ) final position

(b) for (f) initial, final positions

(ʔ) for (k) initial, medial, final positions

(r) for (l) initial

(w) for (l) initial, medial

(ʔ) for (z) medial position

(p) for (f) final position

(d) for (g) initial, medial position, and final position

(j) for (tʃ) in initial position

(ʔ) for (p) medial position

(b) for (θ) medial and final positions

(d) for (ð) initial position

(?) for (t) medial position

(b) for (v) medial position

(t) for (s) initial position

Omissions:

(s) initial

(l) medial

(ʃ) initial

(b) initial

(θ) final and initial

Pitch: High

Rhythm: Irregular. Inclined to stutter.

Comment: delayed, as well as cleft palate speech

3. Estimate of the judge
Controlled speech--2.78

4. Estimate of the experimenter
Controlled speech--3
Running speech--3

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	3
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	2
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	3
	7	l	Draw down sides of tongue	lamp, ball balloon	3
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive Slight movement 2
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	3
Structure of Tongue			**Normal Good movement**		

Palate	Sound spoken	tense	short	flexible	long	rating
		Yes	**Yes**			Poor

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Slightly short**
2	Activity	**Fair** **All of palate moves**
3	Tissue	**Fairly good quality**
4	Rating	**2**

Hard Palate

1	Height	**Normal**
2	Condition	**Piece of flap is lost**
3	Rating	**2**
4		

Passavants Cushion

1	Present	**Yes**
2	Size	**Small**

Faucial Arches

1	Size	**Anterior normal** **Posterior is tight**
2	Activity	**Good within the limit of the posterior arch**

Tongue Frenum

1	Condition	**Normal**

Pharyngeal Muscles

1	Movement	**Good**

Uvula

1	Size	**Normal**
2	Condition	**Normal**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	None
2	Dental work necessary	None
3	Type of Occlusion	Can not classify because there are no permanent molars.
4	Gaps in teeth	Gaps for central incisors and first deciduous molars. No posterior teeth in lower jaw
5	Missing and short teeth	
6	Comments	Two lower incisors are the only permanent teeth. There are no permanent teeth in the upper jaw. This is a case of slow development. He is a mouth-breather.
7	Opinion as to effect on Speech	Teeth may be partially responsible.

Jaws

1	Size	Both jaws are small.

Labial Frenum

1	Condition	Abnormally attached.

Audiometric test.
Hearing is normal

Pyschometric test.
C.A. 7-3
M.A. 6-7
I.Q. 91

Behavior and ability:

The child was restless and inclined to be distractible. He anticipated the requests of the examiner and by so doing, he got off on the wrong track several times. He was impatient. His speech was very poor. It was not always possible to understand what he said.

The basal age was reached at 4-6 years. The pattern was normal.

The final success was at 8 years, a vocabulary and memory-comprehension item.

I.Q. level is low.

Medical examination:

Previous illnesses: chicken pox, measles.

Previous accidents: Injury to left shoulder.

Previous operations: Tonsillectomy and adenoidectomy.

Inoculations: D.P.T. Patch test negative.

Development: He walked at eleven months old; gained bowel and bladder control at twelve months. He is nervous and shy. His speech is poor; has a peculiar nasal twang. He has an inferiority complex. His foster mother thinks he is bright.

Functional history: He is an adopted child and the antecedent history is not known.

Functional inquiry: Negative.

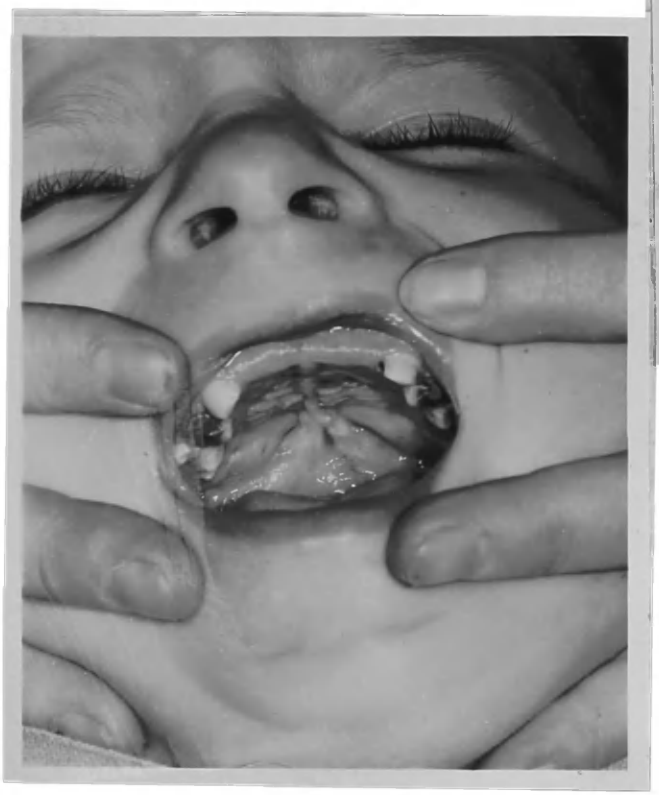
Physical examination: The ears and eyes are negative. The mother thinks there is a squint present when his eyes are tired. His head measures 19⅛". Nose, glands, and chest are negative. His palate and tongue move well. There is a functional systolic murmur in the heart. There was almost hypospadias; testicles are in the scrotum. The area of the graft is on the left thigh. The reflexes are physiologic, bilateral and equal. He is a nail-biter. This child is jumpy, repressed, and over protected. The mother is in an anxiety state all the time.

Environment: The foster father is a bookkeeper at Bordin's Dairy.

The mother is most inadequate as a mother. She is tense, anxious, and unintelligent. The child is constantly being either nagged or threatened by her. The boy is a behavior problem. He has possibilities of becoming a nice child, if taken away from his foster parents.

CASE XXXIII

Cleft of the Hard and Soft Palate with Associated Congenital Anomalies



CASE 33.
White, male

Date of birth.
May 7, 1945.

Amount of cleft
Partial cleft of the hard and soft palate.

Number of cleft operations.
One operation, November 4, 1949.

Age when operation was performed.
1. Four years and six months.

Surgeon for cleft operation.
Dr. F. M. Woolhouse.

Operative procedure. Repair of the palate.
First operation:

Some difficulty was encountered in the anaesthesia and posturing of this patient because of his many congenital anomalies. Incision was first made into the gaping cleft in the region of the uvula to split the soft palate into two layers, consisting of the buccal mucous membrane and half the musculature on the other. The incision was next made through the mucosa of the hard and soft palate along the line of and close to the alveolar process of the maxilla. A V of mucoperiosteum was left anteriorly for subsequent closure, but other than this, the two lateral flaps were dissected free anteriorly. The exposure was most difficult and some difficulty was encountered in elevating the periosteum from the hard palate and in sectioning the palatal aponeurosis from the posterior edge of the hard palate. The

closure was begun using interrupted sutures of 000 chronic catgut, which were tied on the nasal side of the palate. These sutures began at the junction of the hard and soft palates and included the mucous membrane of the naso-palatal surface, along with the adjacent muscular layer. This portion of the palate was slowly closed, working toward the uvula which, in turn, was brought together. The closure continued anteriorly along the buccal surface of the palate, using interrupted sutures of No. 000 black silk for the buccal mucous membrane and adjacent muscular layer of the soft palate. When the hard palate was reached, the mucoperiosteum was approximated by means of horizontal mattress sutures. Prior to the closure of the mucoperiosteum of the hard palate, a No. 30 wire suture was passed in horizontal mattress fashion through the soft palate by means of a Reverdin suture passer. The anterior end of the elevated mucoperiosteum was then sutured to the V of mucoperiosteum which had been left attached to the hard palate, and a single mattress suture was placed between the reconstructed palate and the remaining mucoperiosteum on the alveolar ridge on either side. In spite of difficulties with anaesthesis, the child appeared to be in excellent condition at the end of the procedure. He received blood

during the operation.

Other congenital anomalies:

Defect in occiput (dermoid of meningocoele)

Torticollis with deformed cervical spine

Pigeon chest

Congenital malformation of internal left ear

Congenital malformation of external right ear

Family history given to experimenter by mother:

There is no family history of cleft palate, other congenital anomalies, or thyroid deficiency. This child was a premature eight months baby. He is the youngest of three children. The sister and brother are alive and well. The mother is said to be very healthy, and she was not sick during this pregnancy. The birth was uncomplicated. The child is never sick and eats well. He is left handed. Both parents are of French descent.

Speech analyses.

1. Speech history

The child began to say words at two years. Before the repair of the palate there were medical notes to the effect that the child's speech was fair. An evaluation of his speech in December, 1949, after the repair in November, reads as follows:

> The child walked at two years, and began using words at about the same time. According to the mother he now uses sentences of about three words. It is difficult to evaluate his speech development, since it is difficult to gain a rapport with this child. Observation of the child in a play situation with his mother shows that there is no doubt of the necessity for speech therapy.

2. Description of speech
Voice quality: Nasal and husky

Defective sounds.-- Substitutions:

(?) for all plosives in all positions

(?) for (s) initial position

(h) for (ʃ) and (s) initial, medial, final positions

(h) for (ʃ) initial position

(h) for (z) final position

(h) for (f) initial position

(w) for (v) initial position

(w) for (r) in all positions

(n) for (v) in initial position

Omissions:
(f) final position

(r) medial position

(v) initial position

(r) initial position

Distortions:
All clusters were distorted

Pitch: Lower than normal for a child of his age

Rhythm: Breath patterns were irregular and explosive.

Comment: This was typically cleft palate speech

3. Estimate of the judges--2.44

4. Estimate of the experimenter
Controlled speech--3
Running speech--3

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	2
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	3
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	3
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		Insensitive Very little movement 3
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	3
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	3
Structure of Tongue		**Tip of tongue looks as if a string had been tied around it - small tongue Movements labored. Deviates to the right**			

Palate	Sound spoken	tense	short	flexible	long	rating
	a	**Yes**			**Yes**	Fair

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Long More midline scar than normal**
2	Activity	**Fair movement - Good musculature in palate All of palate moves.**
3	Tissue	**Fair**
4	Rating	**1**

Hard Palate

1	Height	**Average**
2	Condition	**Good**
3	Rating	**1**
4		

Passavants Cushion

1	Present	**Can not see**
2	Size	

Faucial Arches

1	Size	**Anterior small Posterior normal**
2	Activity	**Moderate**

Tongue Frenum

1	Condition	**Normal**

Pharyngeal Muscles

1	Movement	**Fair**

Uvula

1	Size	**Large, normal**
2	Condition	**Good**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**There is considerable amount of decay in the mouth.**
2	Dental work necessary	**Have dentist check teeth**
3	Type of Occlusion	**Normal relationship of the molars (class 1)**
4	Gaps in teeth	**There is a gap between the upper incisors and the cuspids. The teeth have been extracted.**
5	Missing and short teeth	**None**
6	Comments	**All are deciduous teeth.**
7	Opinion as to effect on Speech	**Teeth may be partially responsible.**

Jaws

1	Size	**Both jaws are small; the normal lateral development hasn't taken place.**

Labial Frenum

1	Condition	**Normal**

Audiometric test
Experimenter was unable to obtain an accurate measurement.

Psychometric test.
C.A. 4-10
M.A. 3-5
I.Q. 71

Behavior and ability:

He was a peculiar looking child and appeared considerably younger than his actual age. He was shy and needed constant encouragement as well as constant repetition of instructions. He became frightened if the examiner allowed the atmosphere to be "business like."

His speech was poor.

The basal age was reached at 3-0 years. There were two final successes at the year 4-0,--a memory item and discrimination of visual form.

The I.Q. level is borderline (next to dull normal).

Medical examination:

Previous illnesses: Chicken pox, measles.

Previous accidents: None

Previous operations: Teeth removed.

Inoculated: Diphtheria, No. B.C.G.

Development: First sat up at nine months; first talked at two years old; first walked at two years old. Mother thinks he is as bright as other. Bowel and bladder control now established.

Functional History: Mother is thirty-five years of age; the father is thirty-seven years of age. Both are alive and well. There are two siblings, both alive and well. Pregnancy was normal, baby was premature. No congenital deformities or heredito-familial diseases.

Functional Inquiry: Hearing is good. There is no discharge from the ears, or any inflamation. The child rarely has sore throat, head-colds, or coughs. He eats and sleeps well. g.u., arms, legs, and skin are negative.

Physical examination: He is a curious-appearing child with a height of 36" and a head measurement of 20". There is a midline, soft, non-tender, fluctuant mass in mid occipital region with palpable bony defect. Abnormalities such as, hemiatrophy of the face with tight sterno-mastoid on the right side, asymmetrical eyes, marked cervical scoliosis, marked deformity of the chest, left testicle atrophied, and

large feet (7") were observed. The nose was filled with mucous-pus. There was a purulent post-nasal drainage. The tongue slurs to the right; the palate is intact and moves well. The left nipple is higher than the right; the abdomen is small, and there is marked phimosis. The pelvis tilts 3/4" higher on the left side. His muscles are soft and flabby and the teeth are decayed. There is a pilonical dimple; the hands are moist and the heart and skin are negative. The chest sounds clear.

Impression: Seems mentally retarded.

Environment:

The father is a clerk for the Canadian Pacific Railways. He is a friendly, rather mild person. The condition of this child did not seemingly provoke any evidence of anxiety.

The mother is a quiet, unassuming person. She has very little initiative and force. With "blind faith" she follows any advice given. Both parents accept this child; there is no evidence of rejection.

The child is odd-looking, and immature both mentally and socially. There are no signs of independent thinking; he seems to be completely dependent on his mother for everything.

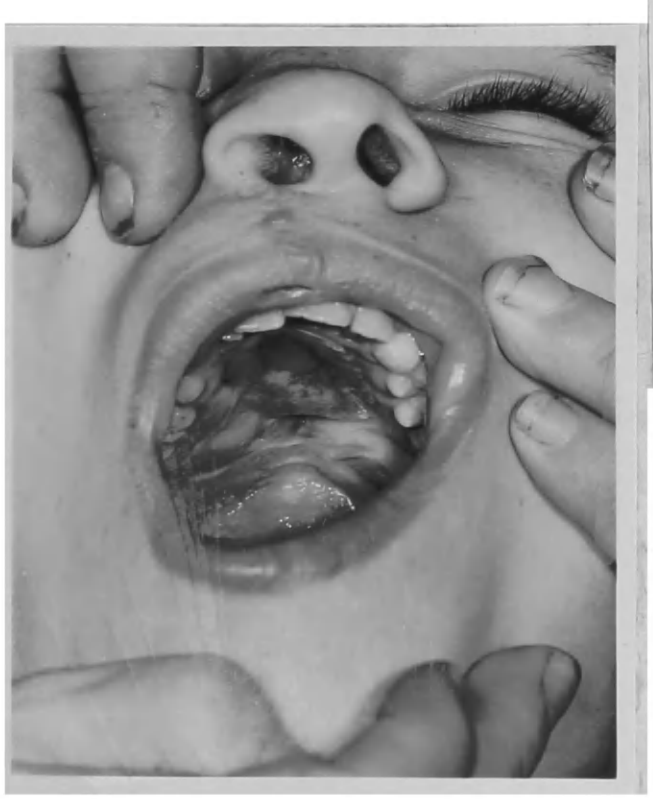
Speech training:

The mother brought the child to the clinic twice weekly for about a month. Emphasis was placed on control of the

air stream and the production of the plosives. Little or no progress was noted at the end of this period.

CASE XXXIV

Unilateral Cleft Lip and Cleft of Hard and Soft Palate



CASE 34
White, male.

Date of birth
May 6, 1940.

Amount of cleft.
Right partial unilateral cleft lip and complete cleft of the soft and hard palate.

Number of operations.
Three operations, July 2, 1940, September 19, 1942, January 28, 1948.

Age when operations were performed.
1. About two months.
2. Two years and four months.
3. About seven years and eight months.

Surgeon for cleft operation.
Dr. R. R. Fitzgerald.

Operative procedure.
First operation: Cheiloplasty by the method of Veau. Incisions were traced on the lateral side first, and a small segment of skin and mucous was removed at the mucocutaneous edge. An incision was made on the medial side and a considerable portion of mucous membrane was removed. The skin and mucous membrane flaps were then undercut all around the incision. The tip of the alar cartilage was exposed and transfixed with a dermal suture, which was drawn out through the opposite nostril and tied over a gauze pad. The wire suture was laid in place. Suturing of the mucous membrane began posteriorly. Three sutures were laid in place. The mucocutaneous edge was united and the mucous membrane was closed with the same material. The wire suture was then tightened, and the two sides of the lip thus held together. The operation was

well tolerated.

Second operation: Uranoplasty by the method of Veau.

Two flaps were cut after the method of Veau, one for the vomer and the other for the hard palate on the child's right side. These were swung into position, raw surface to raw surface, and held in place with a single mattress suture of silk worm gut. At the close of the operation, the hard palate had been reconstructed in its posterior three quarters. The anterior quarter was represented by raw area which was left to granulate. The soft palate was not touched at this operation.

Third operation: Staphyloplasty by the method of Veau.

Incisions were made on both sides according to the method of Veau. The edges were split into two layers; wire suture was passed through on the right side and silk on the left. The edges were separated; the edge was completely dissected away from the posterior border of the hard palate and from the nasal and buccal surfaces of the hard palate. Two mattress sutures of silk were then passed through at the anterior edge through the nasal layer. The nasal layer was constructed by interrupted silk sutures proceeding backwards. The uvula was constructed by the Veau method; the wire suture was drawn through; the buccal surface was also constructed with silk stitches.

The flaps were then cut from the surface of the hard palate on each side and swung back into position and anchored there with mattress sutures. These sutures held the hard palate sutures well back and prevented any opening between the junctions of the hard and soft palate. At the close of the operation the palate was sufficiently long to touch the posterior pharyngeal wall without tension and the child received a blood transfusion during the operation. His condition at the close was excellent.

Other operations: Tonsillectomy and adenoidectomy, 1941

Osteotomy, February 12, 1948.

Other congenital anomalies.
Abnormal tragus over right anterior ear.

Family history given to experimenter by mother:

There is no family history of cleft palate or thyroid deficiency. Out of sixteen pregnancies, eight children are living. There were two miscarriages at three months and the first five children died in early childhood and infancy. This child's birth was normal, but the mother was sick during the pregnancy. Because of a feeding difficulty, the child was placed in a foundling home from August 7, 1940, until December 31, 1940.

Speech Analyses.

1. Speech history.
He began to talk at the age of eleven months. At the age of two and one-half years the hospital notes say, "he talks a peculiar garble, hardly interpretable."

At the age of seven, the notes read, "child talks with nasal phonation".

A speech examination on January 21, 1934 (before the closure of the soft palate) listed the following defective sounds: (k) (d) (s) (g) (ʃ) and clusters including these sounds. There was a nasal blur on all sounds. After the operation, the child returned to the clinic for another speech examination. It was suggested that an obturator be obtained to close the opening in the midline of the hard palate. The same sounds were defective as were noted before the operation, and it was suggested that the child attend the speech clinic. The mother felt that this was impossible as well as unnecessary; therefore, the child received no speech training. The obturator was fitted and the child was not seen until January, 1950.

2. Description of speech
   Voice quality: Good

   Defective sounds: There is a very slight lisp on the (s) sound. The (?) sound is substituted for the (k) in some initial and final positions.

   Pitch: Good

   Rhythm: Good

3. Estimate of the judges.
   Controlled speech--1.11

4. Estimate of the experimenter.
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators
(English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	Tongue protrudes 1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	2
	4	ɵ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	Tongue protrudes 1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Did not check
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1

Structure of Tongue

Normal structure

Better movement in medium area than tip

Palate

Sound spoken	tense	short	flexible	long	rating
a			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Short**
2	Activity	**Good** **All the palate moves.**
3	Tissue	**Good except for scar**
4	Rating	**1**

Hard Palate

1	Height	**Shallow arch**
2	Condition	**Large hole in anterior third filled with acuclic obturator**
3	Rating	**3**
4		

Passavants Cushion

1	Present	**Can not see**
2	Size	

Faucial Arches

1	Size	**Anteriors normal** **Posterior very tight**
2	Activity	**Poor**

Tongue Frenum

1	Condition	**Fair**

Pharyngeal Muscles

1	Movement	**Poor**

Uvula

1	Size	**Small**
2	Condition	**Symmetrical. Good quality**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**Several cavities beginning in teeth**
2	Dental work necessary	
3	Type of Occlusion	**Normal relationship of the molars (class 1)** **Open bite in incisors region because of tongue thrust**
4	Gaps in teeth	**None**
5	Missing and short teeth	None
6	Comments	**Mixed denture with permanent incisors and with first permanent molars in place; other are deciduous.** **Abnormal tongue thrust** **Almost a geographic tongue**
7	Opinion as to effect on Speech	**The tongue is more responsible than the teeth for speech.**

Jaws

1	Size	**Both jaws are not well developed; cannot accomodate the teeth.**

Labial Frenum

1	Condition	**Mutilated but normally attached.**

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 9-11
M.A. 9-2
I.Q. 92

Behavior and ability:

This lad seemed to the examiner a nice type; however, the test reaction was not very satisfactory. He was restless and seemed unconcerned with success or failure.

Speech was good.

Basal age was reached at 8-0 years. There were two successes at year 11, on sentence memory and abstract items.

I.Q. is low average.

Medical examination:

Previous illnesses: measles, chicken pox, whooping cough, mumps.

Previous accidents: fractured the left supracondyle.

Previous operations: Repair of forearm.

Inoculations: D.P.T.

Development: Sat at eight months; stood at nine months; walked at eleven months. All other developments were also within normal limits. He is in the second grade in school and doing well. He has a bad temper. His speech is good.

Functional inquiry: His ears are normal. There has been no acute otitis. He has frequent colds, but rarely has sore throat or coughs. Digestion is good; bowels move regularly; g.u. is negative.

Functional history: His mother is alive and well. The father has recently died from a thrombosis (cerebral). The mother is fifty years old; the father was fifty-five at the time of his death. Eight children are alive and well; six are dead. Causes for death of the six are as follows; one premature set of twins-- convulsions and diarrhea.

One was killed in the war.

Two died of measles and pneumonia.

One girl died from strangulated bowels.

There is no known congenital anomaly in the family. There is no history of diabetes, mental diseases, or epilepsy.

Physical examination: The ear-drums are thickened but normal. There is asymmetry of the face with an aberrant tragus over right ear (anterior). The right cleft lip and palate are intact; the palate moves actively. The right septum is deviated; the columella of the nose is deformed and pulled down to the right. The teeth are in good condition. There is a coarse rib at the right base. The heart and abdomen are negative. There is long foreskin on the penis; the testicles are small; the penis is large. Muscular development is fair to poor. There is postural scoliosis, and loss of carrying power on the left ankle. The skin is very coarse.

Environment: This family had been known to numerous agencies in the city over a period of years. At first the mother was in ill health and always had difficulty in training the children. During the war, the father was overseas, and now since the father's death there is practically no means of support. The mother is an unattractive, ineffectual person, who nags rather than guides. She is interested in the child's welfare only because it is demanded in order for her to receive financial aid. Her education as well as intelligence is limited. This boy has been a social problem in school and out of school for several years. He is a bold child, with a false, solicitious manner.

CASE XXXV

Bilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 35
White, male

Date of birth
March 20, 1942

Amount of cleft.
Bilateral cleft lip-- a complete cleft into the nose on the left side-- not complete on the right side. The alveolar is seemingly intact. Complete cleft of the hard and soft palate.

Number of cleft operations.
Three operations, July 8, 1942; July 18, 1945; March 31,1948.

Age when operations were performed.
1. Three and one half months.
2. Three years and three months.
3. Six years.

Surgeon for cleft operation.

Dr. Hamilton Baxter.

Operative procedure.
First operation: Repair of harelip.

The margins of the cleft on each side were pared, and the points AI, BI and A and B were united on each side. Subsequently the wound was closed with interrupted wire sutures. The vermilion was then imbricated and a Logan bow was applied.

Second operation: Repair of the palate.

The margins of the cleft were pared. Relaxation incisions were made on each side as in the Langenbeck procedure and the palate was sutured with interrupted dermal sutures.

Third operation: Secondary repair of the lip.

Notes were not available.

Other operations: Tonsillectomy and adenoidectomy in 1945.

Other congenital anomalies: None.

History given to experimenter by mother:

Only the father could speak English, thus all the information was obtained from him. The baby, five months old, had no uvula (aiguillette). There was no history of thyroid deficiency in the family. There were five children in the family; this child was the third one. Both parents were of French descent.

Speech analyses.

1. Speech history.
He made sounds at two years old; he began to talk really after the operation. Speech training began October 1945, and continued until June 14, 1946. He did not attend regularly and very little, if any progress was noted.

2. Description of speech.
Quality of voice: Nasal, hoarse

Defective sounds: The (s) and (z) become lateral lisps. Sometimes the glottal stop was substituted for (k).

There were nasal grimaces on all fricatives.

Pitch: Good

Rhythm: Irregular

3. Estimate of the judges.
Controlled speech--1.78

4. Estimate of the experimenter.
Controlled speech--2
Running speech--2

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	Tongue protrudes 2
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	3
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	(Uvular) 2
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	Tongue protrudes 1
Palate and Pharyngeal Muscles	1	a	Gagging reflex circular and upward movement		Sensitive Movement fair 2
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			**Thick** **Movement labored, deviation to right, tongue thrust**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a	Slightly	Short			Fair

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Short**
2	Activity	**Good central, poor peripheral**
3	Tissue	**Scarred and thin**
4	Rating	**2**

Hard Palate

1	Height	**Shallow arch**
2	Condition	**Good**
3	Rating	**1**
4		

Passavants Cushion

1	Present	**Yes**
2	Size	**Medium**

Faucial Arches

1	Size	**Both small and tight**
2	Activity	**Fair**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Good**

Uvula

1	Size	**Normal**
2	Condition	**Bifid, right half side in front of faucial arch**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**None**
2	Dental work necessary	**None**
3	Type of Occlusion	**Normal relationship of the molars (class 1) The upper left side of the maxillary and central incisors are in linguoversion.**
4	Gaps in teeth	
5	Missing and short teeth	**Mixture denture - deciduous and permanent**
6	Comments	**The cleft passes between the central and cuspids on each side. There is an opening into the vestibule. The supernumerary and lateral are still present. There is diastrema (separation of the upper incisors). There is a tongue thrust. He is a mouth breather.**
7	Opinion as to effect on Speech	**Teeth not responsible**

Jaws

1	Size	**Upper is constricted; lower is normal.**

Labial Frenum

1	Condition	**Abnormally attached.**

Audiometric test.
Hearing is normal

Psychometric test.
C.A. 8-0
M.A. 7-4
I.Q. 92

Behavior and ability:

He was restless and distractible, however, when aroused he showed good power of concentration.

His speech was fair.

The basal age was 6-0 years. There was a regular pattern to the final success at year 9; this was an arithmetic problem item. I.Q. level is low average.

Medical examination:

Previous illnesses: None.

Previous accidents: None.

Previous operations: Tonsillectomy and adenoidectomy.

Inoculations: D.P.T.

Development: He first sat up at eight months; first walked at fourteen months and gained bowel and bladder control about two years. He is in the second grade at school and ranks about ninth in the class. He is average to below average in his school work.

Functional history: The father is forty years old; he has cataracts. The mother is thirty-eight; she is in fair health. There are four siblings; all are alive and well. There are no congenital deformities on either side, nor is there any T.B. A great uncle had

diabetes; a cousin (paternal) had epilepsy and was committed to a mental institution.

Functional inquiry: He has the toothache. There is no other trouble. The inquiry was answered by the father.

Physical examination: He has a large-framed, muscular, laborer type of build. There are prominent supra-orbital ridges and prominent mastoid processes which bulge bilaterally. The head measures 20" and the occiput is flat. There is a bilateral (slight) divergent intermittent strabismus (partially in the left). The upper lid droops on the eye with curious movements; this is associated with masticatory movements. Both ear drums are thickened, scarred and retracted. The mucosa of the nose is inflamed; the septum deviated slightly to the left. The lips are fair. The tongue movements are good. The palate seems intact. Both cervical glands are enlarged. The chest is clear. There is a functional systolic murmur to heart which disappears in sitting and in phases of respiration. The abdomen, and reflexes are negative. The testicles are short. The skin is dry and coarse. Muscle tone, power and coordination are good.

Environment:

This family is in the low socio-economic bracket. The father is a carpenter for a steel company in Montreal. There is positive evidence of poverty yet the family is not maintained by a social agency. The father is a

quiet, unassuming person with a dignity and self-assurance that demands respect from all.

The mother had a very kind and understanding manner with her children. She very seldom came to the clinic, because she spoke little English; however, she was interested in the welfare of the child. Both parents treated the child as if he were perfectly normal. At first the boy appeared rather stupid and shy. On acquaintance, he was found to be friendly and talkative. He was more interested in sports than in books. His physical differences did not seem to affect his personality.

Report from the X-ray of the upper anterior jaw:

There was irregularity of the teeth in the maxilla and fairly wide spaces lateral to the two central incisors. There is apparent deficiency of the hard palate, extending posteriorly from the right upper incisor.

CASE XXXVI

Unilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 36
White, female.

Date of birth
July 26, 1938.

Amount of cleft.
Complete unilateral left cleft lip and complete cleft of hard and soft palate.

Number of operations performed.
Six operations, November 29, 1938, May 31, 1941.
September 20, 1944, October 3, 1944.
April 9, 1945, April 20, 1946.

Age when operations were performed.
1. Four months.
2. Two years and about nine months.
3. Six years and about two months.
4. Six years and about three months.
5. Seven years and about four months.
6. Seven years and about four and a half months.

Surgeon for cleft operation.
Dr. R. R. Fitzgerald.

Operative procedure.
First operation: Cheilo-uranoplasty by Veau and Plessier.

Incision on the internal and external margin were carried out after the Veau method. The incisions were deepened. The bone was exposed on the left side and the flaps were well undercut. The mouth was then opened. The vomer flap was cut from the side of the cleft. The palatal flap was cut from the patient's left side and swung over into position. The two flaps were sutured together with a single and mattress dermal suture after Veau's method. The margins of the incisions on the left were then undercut to expose the muscle on each side.

The floor of the nostril was reconstructed with two layers, using catgut sutures. The alar cartilage was transfixed with a dermal suture. The suture was drawn out through the opposite nostril. The wire suture was laid in place. The suture of the lip was begun on the posterior surface. Two dermal sutures were laid in place in the mucous membrane. The gap was very wide and it was with some difficulty that the two elements of the lip were drawn across and fitted together. The mucocutaneous membrane was sutured; the lip was reconstructed; the vermilion border was finally sutured last and the wire suture tied. A Logan bow was placed to hold the two sides of the lip together. At the close of the operation, the nostril had been constructed in a satisfactory way with a very agreeable curve. The opening of the nostril, however, was almost completely blocked by the alar cartilage, which was rotated to 90 degrees. The lip was rather long and there was a depression at the tip of the alar cartilage on the left side which was not agreeable to look at but could not be avoided. At the edge of the lip the difficulty seemed to be scant tissue. There was not sufficient mucous-membrane to make a full rounded lip, but by drawing the two sides together satisfactory repair was made.

Second operation: Staphyloplasty by the method of Veau.

The child's right side was dealt with first. A Reverdin needle was passed through all the layers as far as the nasal submucosa, and then out through the edge of the cleft. The cleft was split, creating two layers, the nasal and the buccal, and the wire suture was drawn through. Similar technique was applied on the left side, where two layers were created. The edges were then separated and carefully dissected away from the posterior border of the hard palate until the posterior nasal spine was displaced. The nasal layer was dissected off the nasal surface of the hard palate, and off the buccal surface of the hard palate. The suture was begun in the anterior portion of the cleft, where the through and through mattress sutures for the nasal layers were first passed. The nasal layer of the soft palate was sutured with fine dermal sutures. The uvula was reconstructed. The wire suture was tied in place. The buccal layer was sutured and two flaps were cut from the mucoperiosteum of the hard palate and swung into position, being anchored with a mattress suture which was first passed through the nasal layer. At the close of the operation there was a long, supple palate, quite satisfactory in shape and position.

Third operation: Staphyloplasty by the Veau technique. The child's right side was dealt with first. A Reverdin needle was passed through the tissues into the nasal submucosa and made to emerge in the cleft. The cleft was split into two layers and a wire suture was drawn through. Similar technique was used on the left side, where a heavy silk suture loop was drawn through. The layers were then cut; the soft tissues were dissected from the posterior wall of the hard palate and also from the nasal and buccal layers of the hard palate on each side. Two mattress sutures were passed through the anterior portions of the cleft through the nasal mucoperiosteum. The nasal layers of the soft palate were united with interrupted fine dermal sutures. The uvula was constructed; the wire suture was laid in place and tied. Just as the wire suture was tied, it broke 1 cm. from the end. It was, however, completed in a satisfactory way. The remainder of the soft palate was constructed by suturing the upper layer. Two flaps were cut from muco-periosteum of the hard palate, one on each side, hinged on the posterior palatine artery, and swung into position to close the defect of the mid-line. A few sutures of fine dermal were used to complete the approximation of the edges. The child's condition was

excellent at the close. The palate was long and supple and reached the posterior pharyngeal wall.*

Fourth operation: Secondary urano-staphyloplasty.

The posterior part of the soft palate was found to be still united, but the remainder of the soft palate and the hard palate had broken apart completely. Two wire sutures were passed after the method of Veau to join the two sides together. They could not be tied, however, without first making a lateral incision on the right side after the method of Langenbeck. After this was done, the two sides were drawn together and the two wire sutures completed. Two more wire sutures were then used, simple through and through sutures reinforcing the two Veau sutures. At the close of this the palate had been drawn together on the two sides and held together in the mid-line under a slight degree of tension. There was a lateral relaxing incision of the child's right side.

Removal of sutures from cleft palate repair.

There was a breakdown in the repair of about 1 cm. in diameter just behind the reconstructed hard palate. About 1 cm. of the posterior part of the soft palate had healed satisfactorily. Three steel wire sutures were removed and no dermal sutures were visible.

*The operations of May, 1941, and September 1944, are very similar. It could be that there was an error in the hospital notes.

Fourth operation: Plastic adjustment of the left nostril.

The left nostril was adjusted by the method of Kilner. As an additional stop, a heavy dermal suture was passed through the lower part of the alar cartilage at its lower end, brought out through the opposite nostril, and tied over a pad of gauze. This narrowed the floor of the nostril, and appeared to bring the tissues together satisfactorily.

Sixth operation: Congenital cleft lip adjustment.

A triangular portion of skin was removed from the child on the right side to correspond with the abnormal appearance of the left side, which turned up with a reasonably symmetrical bow. The margins were cut only a quarter of an inch and the edges drawn together with plastic sutures.

Other operations: Tonsillectomy, October 16, 1939.

Other congenital anomalies: None

Family history given to experimenter by mother.

There are two cleft cases in this family, this case and a younger brother. The younger brother has a cleft lip only on the left side. The other children are apparently normal. There is no history of thyroid difficulty, but there is a history of T.B., on the maternal side.

The birth of this child was normal and without difficulty,

Both parents are of French descent.

Speech analyses.

1. Speech history.
   She began to talk at about two years old. Speech training was begun in September of 1945 and was continued until until July of 1949. At this time it was felt that continued instruction was of no value; she had accomplished about as much as could be expected of her.

2. Description of speech.
   Voice quality: Very nasal, and hoarse.

   Defective sounds: (s) (z) (ʃ) were breathy.

   (t) was omitted in the cluster of (str).

   Nasal grimaces accompanied sibilants.

   Pitch: All her sentences were made with a rising inflection.

   Rhythm: Good

3. Estimate of the judges.
   Controlled speech--2

4. Estimate of the experimenter.
   Controlled speech--2
   Running speech--2

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	2
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	1
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		**Insensitive palate Movement fair** 2
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1
Structure of Tongue			**Big tongue Not flexible**		

Palate	Sound spoken	tense	short	flexible	long	rating
	a	**Yes**	**Yes**			**Poor**

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Short - eccentric to left because of scar**
2	Activity	**Normal except for pull to the left--all does not move.**
3	Tissue	**Scarred**
4	Rating	**2**

Hard Palate

1	Height	**High, narrow**
2	Condition	**Small central opening Two retrodisplaced teeth**
3	Rating	**3**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Both are of normal size. Posterior tends to be narrow.**
2	Activity	**Fair**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Fair**

Uvula

1	Size	**No uvula**
2	Condition	

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	No decays
2	Dental work necessary	
3	Type of Occlusion	Normal relationship of the molars (class 1) All teeth are in linguoversion except the upper first molar and the upper right central.
4	Gaps in teeth	Between the left bicuspid and centrals
5	Missing and short teeth	
6	Comments	There is an opening in the roof and practically no palate.
7	Opinion as to effect on Speech	Teeth may play small part in defective speech.

Jaws

1	Size	Upper is small, lower is normal.

Labial Frenum

1	Condition	Mutilated but almost normal.

Audiometric test.

For one frequency her hearing was below normal. The results are as follows:

Left	frequency	decibels
	512	30

Psychometric test.

C.A. 11-8
M.A. 7-2
I.Q. 61

Behavior and ability:

She seemed uninterested in the test and attention was superficial.

It was necessary to repeat instructions many times. Responses were slow and lazy.

Her speech was good.

The basal age was reached at 6-0 years. Final success occurred at 10 years; this was the digit memory item.

The I.Q. level was moron.

Medical examination.

Previous illnesses: Measles, mumps, and chicken pox. She has also had a "sore tummy."

Previous accidents: None.

Previous operations: Tonsillectomy.

Development: The mother did not accompany this child; this and other information is limited.

Functional history: There are seven children, four brothers and two sisters. All of these are presumably well. The father and mother are alive and well. The child is in the third grade at the School for the Crippled Children. She has attended this school all her life.

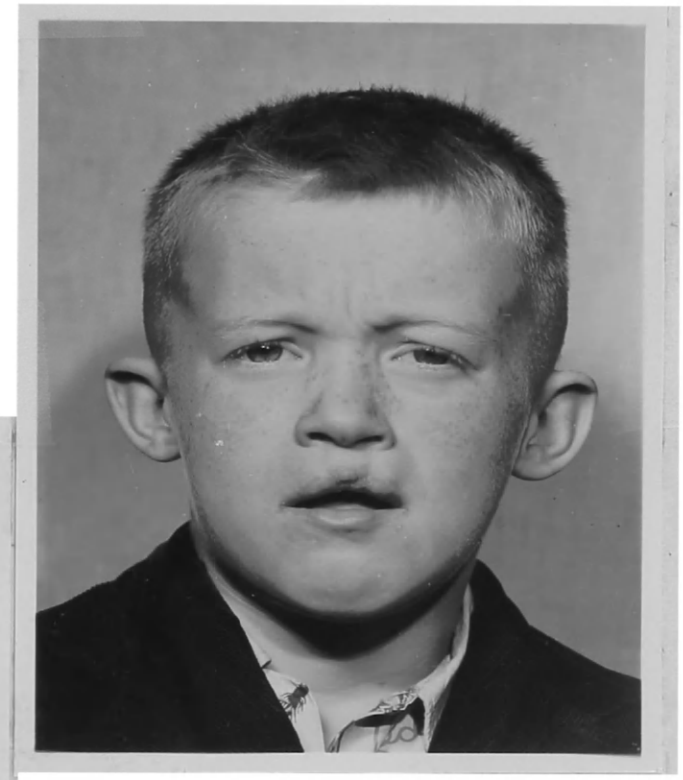
Physical examination: This is a blonde, thin female, The right ear drum is thickened, scarred, retracted, and green in color. The left ear drum is thickened. The nasal septum is deviated markedly to the left. The teeth are staggered, in a rather helter-skelter manner. The palate is intact and moves well. Tongue movements are restricted. The right chest and shoulder are low and flat. The chest and heart are negative. Question of abdominal tenderness in the lower left quadrant. Puberty hairs are present. Reflexes are normal and muscle power is fair to poor. The skin bruises easily.

Environment:

This family is in the low socio-economic bracket. The father is a day laborer in the shops at the Canadian Pacific Railway Company. Both parents have received very limited educational opportunities; both are ignorant of general health rules. For the first few months of life, this case was placed in a foundling home because the feeding problem could not be handled at home. The nurse at the School for Crippled Children is constantly ridding the child's hair of lice. The mother appears sick and poorly nourished. She seems to expect guidance and support from the Children's Memorial Hospital. The child is sweet and rather attractive. She does very little independent thinking; however, she is never a disciplinary problem. She appears much younger, socially and mentally than her years.

CASE XXXVII

Bilateral Cleft Lip and Cleft of Hard and Soft Palate



CASE 37
White, male.

Date of birth.
October 2, 1942.

Amount of cleft.
Bilateral cleft lip; the left side of the lip has almost complete cleft, while the right side has only a small indentation.
Complete cleft of the hard and soft palate.

Number of operations.
Three operations, December 21, 1942; June 6, 1943; July 18, 1944.

Age when operations were performed.
1. Two and one-half months.
2. Eight months.
3. One year and nine months.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative Procedure.
First operation: Repair of the lip.

The only notes available were the following:

The left side of the lip was repaired, but the child's condition at the end of the operation did not permit the repair of the partial cleft on the right side. The lip healed satisfactorily and the child was discharged home in two weeks after the operation.

Second operation: Repair of the right lip. Notes on technique were not reported.

Third operation: Repair of the palate.

The margin of the cleft was pared and the muco-periosteal flaps were elevated, so that they came together freely in the midline. The margins of the cleft were then sutured with interrupted dermal

sutures, and a large stay was put through from side to side.

Other operations: None.

Other congenital anomalies: None.

History given to the experimenter by the mother.

An aunt on the paternal side had a cleft palate; she died at birth. An uncle on the paternal side has club-foot. A brother on the maternal side has T.B. The oldest child in the family has T.B. There are five children in the family, four boys and one girl. This child is the second in the birth series. The pregnancy and birth of this child were normal. The mother had no illnesses when carrying the child. A cousin on the maternal side has thyroid deficiency. Both parents are of English descent.

Speech analyses.

1. Speech history.
   He began to talk after the operation on the palate which was at the age of twenty-four months.

2. Description of speech.
   Quality of voice: Slightly nasal - Tense

   Defective sounds-- (s) lisp
   (z) lisp
   (ʃ) lisp

   Pitch: Good

   Rhythm: Breath patterns tended to make his rhythm irregular.

3. Estimate of the judges.
   Controlled speech--1.56

4. Estimate of the experimenter.
   Controlled speech--2
   Running speech--2

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	3
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Did not check
Lips	1	ɛ aɪ	Ordinary opening	many, mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			**Fissured** **Movement average**		

Palate	Sound spoken	tense	short	flexible	long	rating
	ɑ			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Long and of normal size**
2	Activity	**Good activity, all the palate moves.**
3	Tissue	**Good quality**
4	Rating	**1**

Hard Palate

1	Height	**Shallow**
2	Condition	**Deep fissures**
3	Rating	**2**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Both small**
2	Activity	**Good**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Good**

Uvula

1	Size	**Large**
2	Condition	**Eccentric to left**

Tests Estimating Structure and Condition of Teeth

	Teeth	
1	Amount of decay	**Decay is rampant.**
2	Dental work necessary	
3	Type of Occlusion	**Normal relationship of the molars (class 1) Upper left side is in linguoversion.**
4	Gaps in teeth	**From cuspid to cuspid**
5	Missing and short teeth	
6	Comments	**Cleft passes through the alveolus on the left side.**
7	Opinion as to effect on Speech	**Teeth should affect speech.**
	Jaws	
1	Size	**Both jaws are undeveloped.**
	Labial Frenum	
1	Condition	**Abnormally attached.**

Audiometric test.
Slight hearing loss. The results of the test are as follows:

	frequency	decibels
right ear	512	25
	1024	20
	2048	20
	4096	20
	8192	10
left ear	512	30
	1024	35
	2048	30
	4096	45
	8192	10

Psychometric test.
C.A. 7-5
M.A. 7-10
I.Q. 106

Behavior and ability:

This child was very active during the test, although not in a restless manner. He talked fast and responses were given quickly. He was exuberant over his successes. He seemed to enjoy the experience and his attention was good.

His speech is good.

The basal age was reached at 6-0 years. There was a gradual decreasing and two final successes at the year 9.

I.Q. level is high average.

Medical examination:

Previous illnesses: measles, rubeola, chicken pox and pneumonia.

Previous accidents: fractured skull, uncomplicated.

Previous operations: None.

Inoculation: D.P.T.

Development: He sat up at six months; stood at eight months; walked at fourteen months; and bowel and bladder control was established at eighteen months. He is doing well in school and is considered as bright as the other children. He is alert, and active. He is a nervous child who cries a great deal of the time. The mother thinks he is not conscious of his lip.

Functional history: Both parents are alive and well. The mother is thirty-two years old; the father is thirty-seven. There are four siblings who are alive and well; one died with T.B. A paternal uncle has a club-foot; a paternal aunt had hare-lip and cleft palate; a maternal uncle and sibling of patient had T.B. There are no mental diseases, epilepsy or heredito-familial diseases.

Functional inquiry: His hearing is reduced. There is a slight discharge from the left ear with severe head colds. His eyes are negative and he rarely has sore throat, colds or coughs. His appetite and elimination are good. The skin, g.u., arms and legs are negative.

Physical examination: Bilaterally the ear drums are thickened, infected and retracted. The nose is deviated to the left. The teeth are indescribably decayed and staggered. The tongue moves actively. The palate is intact and moves actively. There are

coarse rhondi over the hilar areas of the chest. He has chronic pin worms. The arms and legs are negative. He is a nail-biter.

Environment:

The father is a pipe-fitter in Massena, New York. He is a quiet, calm, friendly man, who takes his family responsibility very seriously. He does not outwardly display any concern about the child. The mother is sociable, cooperative and highly strung. All of her concern is outwardly displayed, although, she repeatedly says that she never allows the child to know of her anxiety. The boy is a restless, suspicious, and seemingly unhappy child. He attempts to cover his feelings of inadequacy by aggressive behavior which is leveled at the parents. In the present experiment he is very cooperative and seems to enjoy some of the tests.

Otological test:

There is a chronic infected ear on the left side. The drum to the left ear is perforated. The septum deviates to the left. The drum of the right ear is dull. These are typical cleft palate ears, dull and retracted.

CASE XXXVIII

Unilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 38
White, male.

Date of birth.
June 22, 1946.

Amount of cleft.
Complete right unilateral cleft lip and partial cleft of the hard palate and complete cleft of the soft palate.

Number of cleft operations.
Three operations, January 29, 1947; November 10, 1948; January 26, 1949.

Age when operations were performed.
1. Five months
2. Two years and five months.
3. Two years and seven months.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative procedure.
First operation: Repair of the lip by the Mirault-Blair method.

Points A,B,C, and AI, BI, and CI were outlined as in the Mirault-Blair procedure. The margins of the cleft were pared and outlined points were approximated with interrupted wire sutures. The vermilion was imbricated and a Logan lip bow applied.

Second operation: Repair of the palate by a "push-back" method.

The steps were not outlined. The notes give only the following:

The sutures were removed on the 26th of November, 1948, revealing the palate to be well healed with a slight bifid uvula remaining.

Third operation: Secondary repair of the lip.

Clinic notes did not outline the steps of the procedure.

Other operations: Circumcision, January, 1949.

Other congenital anomalies.
Second and third toes webbed on both feet.

History given to experimenter by the mother.

The child has been with the foster parents since, June, 1947, but he has just recently been adopted legally. He is an illegitimate child and very little is known about his history. There is no history of cleft palate in the mother's hospital record.

This was the first pregnancy, which was uncomplicated. The baby was born at full term with instruments.

Speech analyses.

1. Speech history.
He began to say words at fifteen months, but could not actually talk until the operation was performed. The clinical report on the speech evaluation of November, 1948, is as follows:

> The only sounds he cannot imitate are: (k) (g) (s) (ʃ) (ʧ) (r) (l). This child's voice is good and fairly clear from nasality. This child attended the speech clinic several times, but the clinician could not get him to cooperate, and so the mother decided not to return with him to the clinic.

2. Description of speech.
Quality of voice: Hoarse

Defective sounds - Substitutions:

(t) for (k) initial, medial and final position

(w) for (r) initial and medial

(v) for (b) medial

(b) for (f) initial and final

(ʔ) for (k) medial

(d) for (g) initial, medial

(w) for (f) initial

(b) for (θ) initial

(d) for (ð) initial

(s) (z) (ʃ) are not learned

Pitch: Uncontrolled, tends to break at times

Rhythm: Normal

3. Estimate of the judges
Controlled speech--1.67

4. Estimate of the experimenter.
Controlled speech--2
Running speech--3

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	3
	4	ɵ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	3
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	3
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	2
	7	l	Draw down sides of tongue	lamp, ball balloon	2
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Did not check
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	2
Structure of Tongue			Geographic tongue Flexible		

Palate	Sound spoken	tense	short	flexible	long	rating
	a			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Long**
2	Activity	**Good - all the palate moves.**
3	Tissue	**Good quality**
4	Rating	**2**

Hard Palate

1	Height	**High arched**
2	Condition	**Good**
3	Rating	**1**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Both normal**
2	Activity	**Good**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Fair**

Uvula

1	Size	**Normal**
2	Condition	**Bifid**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	
2	Dental work necessary	None
3	Type of Occlusion	Normal relationship of the molars (class 1) Lateral are in linguoversion.
4	Gaps in teeth	
5	Missing and short teeth	
6	Comments	Supernumerary on the upper right side Tendency for alveolus to be cleft
7	Opinion as to effect on Speech	Teeth may affect (s) sound.

Jaws

1	Size	Both are normal.

Labial Frenum

1	Condition	Normal

Audiometric test.
The experimenter could not obtain an accurate measurement.

Psychometric test.
C.A. 3-10
M.A. 3-7
I.Q. 93

Behavior and ability:

The child was very restless; he was in a state of constant movement throughout the entire test. Nevertheless, his responses were adequate.

His speech was loud and fast; at times he could not be understood.

The basal age was 3-0 years. Final success was reached at year 4-6.

The I.Q. level is low average.

Medical examination.

Previous illnesses: chicken pox, measles, and whooping cough.

Previous accidents: None.

Previous operations: Circumcision in January, 1949.

Inoculations: D.P.T. (3) B.W. negative.

Development: He first walked at sixteen months; gained bowel and bladder control at eighteen months. He is good with his hands. The foster mother thinks he is an average child.

Functional history: Information unknown.

Functional inquiry:

Physical Examination: Both ear drums are thickened and retracted.

His eyes are normal. Palate movements are good. He has difficulty touching the upper lip with his tongue when his mouth is open. The tonsils are in moderate condition. There is a post-nasal drip. The cervical glands are large. The chest is clear; heart, abdomen, and g.u., are negative. The teeth are staggered. He has webbed second and third toes on each foot and a geographic tongue.

He seems silly; maybe he is slightly below average in I.Q. He doesn't answer simple questions and is in a state of nervous tension all the time. He may have reduced hearing; he turns radio on loud and speaks loudly.

Environment:

The foster father is employed as a truck driver by a produce company.

The foster mother is a fairly intelligent person who knows nothing about child care. In fact, both parents act as if they had a toy to play with; one moment he is being overwhelmed with affection, the next moment he is being punished. The child is bewildered and insecure.

CASE XXXIX

Cleft of Soft Palate

CASE 39

White, male.

Date of birth.

February 25, 1935.

Amount of cleft.

Complete cleft of the soft palate.

Number of cleft operations.

One operation, October 18, 1937.

Age when operation was performed.

1. Two years and eight months.

Surgeon for cleft operation.

Dr. J. W. Gerrie.

Operative procedure.

First operation: Repair of the palate by the method of Veau.

A pharyngoplasty was done on the posterior pharyngeal wall, after the method of Veau. A horizontal incision was made about the level of the second vertebra, extending from the tubo-palatine muscles on either side. The mucosa and superior constrictor muscles were elevated for a considerable distance, and the wound closed by suturing it in a vertical direction.

The edges of the cleft were incised with a scalpel, a heavy white silk thread inserted by a Reverdin needle was tied in the side of the palate through to the median incision, and a loop of aluminum bronze was brought through from both sides, after the method of Veau. The nasal layer was closed with interrupted black silk sutures. The wire loop was tightened and twisted, bringing the muscular elements

to meet in the midline. The buccal layer was also closed with interrupted black silk sutures. The palate appeared somewhat short, but closure was fair. The anesthesia was quite unsatisfactory throughout, the patient's condition being too light, and movement of the soft palate very bothersome. Bleeding was moderate.

Other operations.

Osteotomy right femur, July, 1941.

Osteotomy left femur, August, 1941.

Bilateral wedge osteotomies on the right and left tibia, August, 1948.

Repair of funnel chest, March, 1949.

Appendectomy, 1945.

Tonsillectomy, 1937.

Paracentesis, 1937.

Other congenital anomalies.

Funnel chest.

Bilateral genuvalgum.

Valgus deformity of the upper end of each femur. (contour of all bones, suggests a generalized disturbance of bone growth. No evidence of rickets).

Apparent arachnodactyli.

Myopia.

History given to experimenter by mother.

There was no history of cleft palate or thyroid deficiency in the family. The mother had always been extremely healthy; however, she was very sick when she

was carrying this child. She felt that the sickness was due to low blood pressure and the "beatings" given by her husband. The child was a full term baby by spontaneous delivery. He weighed 11 lbs. at birth and the mother thought "he looked fine." According to her, "when he began to grow up, he began to have crooked feet." At the age of three years he was placed in a foster home because the mother would not care for him properly, and was not returned until he was six years old. He was the youngest of seven children. Both parents were of Armenian descent.

Speech analysis.

1. Speech history.

He began to say words after the operation for cleft palate, which was at the age of two and a half years. His speech training began in the year 1940, and was continued until 1949.

2. Description of speech.

Quality of voice: Nasal, hoarse.

Defective sounds-- Substitutions:

(d) for (g) all positions

(t) for (k) all positions

(ʔ) for (t) (d) (k) (g) medial position

Omissions:
Drops endings of words

Additions:
(s) becomes (ts) initial position

(ʃ) becomes (tʃ) initial, final position

Distortions:
Vowels are distorted.

All sounds except (s) can be produced in isolation.

Pitch: Tended to be monotonous.

Rhythm: Slightly irregular.

3. Estimate of the judges
   Controlled speech--1.44

4. Estimate of the experimenter
   Controlled speech--2
   Running speech--2

Tests for Estimating Structure and Mobility of Articulators
(English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	2
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive Not much movement 2
Lips	1	ɛ aɪ	Ordinary opening	many. mine	1
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	1
Structure of Tongue			Good Good movement		

Palate	Sound spoken	tense	short	flexible	long	rating
	a		Yes	Yes		Fair

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Adequate size Hypertrophic area in the soft palate suture line**
2	Activity	**Good Almost all the palate moves.**
3	Tissue	**Slightly scarred**
4	Rating	**2**

Hard Palate

1	Height	**Normal**
2	Condition	**Normal**
3	Rating	**1**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Posterior is abnormally wide. Anterior is normal.**
2	Activity	**Good**

Tongue Frenum

1	Condition	**Normal**

Pharyngeal Muscles

1	Movement	**Excellent**

Uvula

1	Size	**Small and symmetrical**
2	Condition	**Good**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**No decay**
2	Dental work necessary	
3	Type of Occlusion	**Normal relationship of the molars (class 1) Appears like class 3. The lower jaw is forward.**
4	Gaps in teeth	**Upper right first molar extracted--space still there**
5	Missing and short teeth	**Two lower bicuspids missing with spaces closed Apparently congenitally missing**
6	Comments	**Tongue is a little large. Teeth have had good care; they are reasonably clean.**
7	Opinion as to effect on Speech	**Teeth not responsible for defects**

Jaws

1	Size	**Both jaws well developed**

Labial Frenum

1	Condition	**Normal**

Audiometric test.
Hearing is poor. The result of the test is as follows:

	Frequencies	decibels
Right ear	512	25
	1024	50
	2048	60
	4096	85
	8192	70
Left ear	512	30
	1024	30
	2048	35
	4096	85
	8192	70

The boy had been fitted with a hearing aid, but he refused to wear it.

Psychological test:
C.A. 15-1
M.A. 10-2
I.Q. 71

Behavior and ability:

This lad gave good attention, although it was superficial. He appeared to be trying hard to respond adequately to questions from the examiner. Several times he seemed aware of his inadequacy.

His speech was not good, but was understandable. His vocabulary was very poor; he failed most of the words beyond the six-year level. The examiner wondered if his eyesight and hearing were up to normal.

The basal age was reached at 7-0 years. He had two successes at near 13 years. These were a visual memory item and visual imagery.

The I.Q. level is borderline.

Medical examination:

Previous illnesses: Measles, whooping cough, mumps, chicken pox.

Previous accidents: None.

Previous operations: Pectus excavation, triple arthrodesis of the left ankle, genu valgus (osteotomy and wedging of the right tibia).

Development: He held up his head at three months; sat alone at six months; walked at one year; and had his first tooth at nine months. He was first able to talk at two and one half years old. He is now in the fifth grade and doing moderately well. He seems dull.

Functional history: There are three brothers; one brother was sick for a year with a chest condition. The father has heart disease; he is separated from the family. There are no known congenital anomalies, or heredito-diseases. (This information was given by the boy).

Functional inquiry: He has worn glasses for four or five years. He has had difficulty with his ears since the age of two or three years. There seem to be periods of deafness. He has always had difficulty walking; he has had several operations on his legs.

Physical examination:

Hearing acuity is moderately reduced. The ear drums are bilaterally thickened. There is marked

hypermetropia. The nose is negative. The palate is intact and moves well. The tongue movements are unrestricted to the degree that he can touch the upper lip with mouth open. The lungs and heart are negative. There is a 10" chest midline scar and a 4" appendectomy scar. The right leg is 1½" longer than the left. There is triple arthrodesis of the right ankle, meaning osteotomy and wedging, and tendon transplantation. The teeth and g.u., are normal. His speech is fair to poor.

Environment:

The mother and father are Armenians by birth. They were married in Turkey and later came to Canada. At the present the mother is legally separated from the father, who has never assumed the support of the family. A major portion of the support of the family has been assumed by charitable organizations.

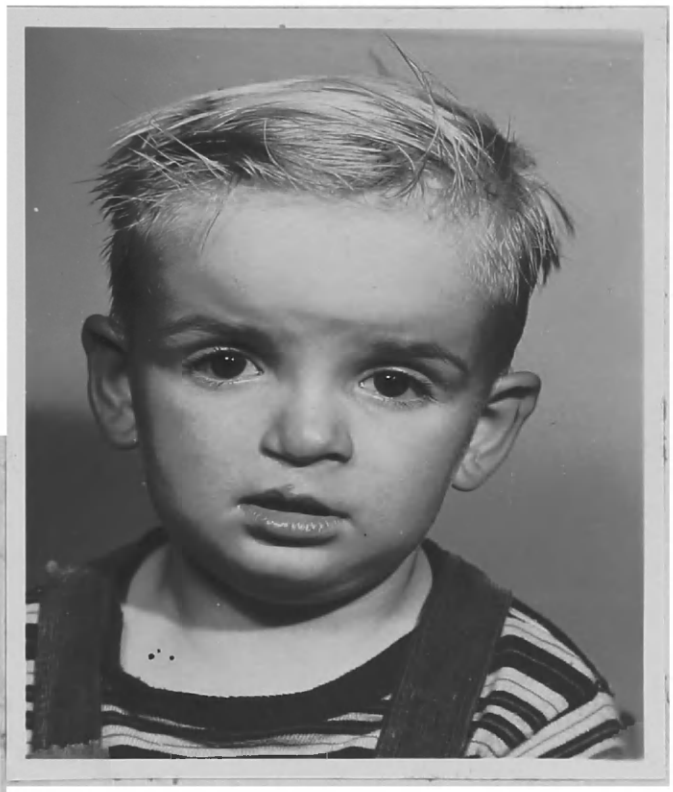
The mother is a healthy, attractive-looking woman. She enjoys her family; however, she does not feel that her sacrifices have been fully appreciated. She is anxious about the boy's future. Her ambition is to have a little store where she and he can work together.

The boy is an unattractive-looking person, partially because of his many anomalies. He is good-natured and well liked by his class mates. He is a student at the School for Crippled Children and is keenly interested

in manual arts. He has had to repeat several grades, but school reports say his progress is fair considering his many handicaps.

CASE XL

Unilateral Cleft Lip and Cleft of Hard and Soft Palate



CASE 40
White, male.

Date of birth.
December 11, 1947.

Amount of cleft.
Complete right unilateral cleft lip, complete cleft of the tip of the alveolus and complete cleft of the hard and soft palate.

Number of cleft operations.
Two operations, April 27, 1948; January 14, 1949.

Age when operations were performed.
1. About four and a half months
2. Two years and one month.

Surgeon for cleft operation.
Dr. F. M. Woolhouse.

Operative procedure.
First operation: Repair of the lip by the method of LeMesurier.

This patient had a rather wide cleft with moderate deformity of the nostril on the left side. The cleft side of the lip was short and thick. The skin marks were placed in the usual fashion; the first mark "A" being placed at the junction of the columella and lip, "B" being placed at the vermilion border on the cleft columella, and "C" being placed two-thirds of the way across the philtrum at a right angle to the first line. The points on the cleft side of the lip were marked out according to the LeMesurier technique. The flaps were developed, using a long pointed blade which went through all thicknesses of the lip. The deep layers of the lip were sutured with interrupted stainless steel wire No. 38. The skin was sutured with No. 40 wire.

The alar cartilage on the cleft side of the nostril was completely freed and the nostril molded over a rubber tube which was sutured in place with stainless steel wire sutures.

Second operation: Repair of the palate.

Two muco-periosteal flaps were raised in the usual manner and the fibrous attachment of the soft to the hard palate severed. The flaps were freed until they were attached only by the vascular bundles of the posterior palatine vessels. These were teased out by traction from a distance of about one-half inch. The hamulus on each side was then transected at its base and the tensor tendon slid over the transected hamulus to allow for a long push-back. Because of the completeness of the cleft which ran through the alveolus anteriorly, a vomer flap was raised from the left side and turned under the right flap. This was closed with interrupted 5-0 chronic catgut. The oral half of the mucosa and muscle was sutured with interrupted 6-0 deknatel silk. The hard palate was sutured with horizontal mattress sutures of 4-0 deknatel silk and two sutures were placed on the tips of the flap to anchor it to a small V-shaped projection of the periosteum, which was left for this purpose. The palate was steadied also by two loosely placed

silk sutures which ran from the alveolus to the side of the palate flap. The child returned to the ward in good condition.

Other operations: None

Other congenital anomalies: None

History given to experimenter by mother.

There is no known history of cleft palate or thyroid deficiency in the family. The maternal grandmother of the child lost ten children at birth; eight children are living. The mother has had four pregnancies; three children are living; the fourth child died at birth. This case is the third child in the family. Birth and pregnancy were uncomplicated. The mother is often sick; at the present she has gall stone difficulty. The mother is of English-French descent; the father is French.

Speech analyses.

1. Speech history.
   He began to talk at eleven months of age.

2. Description of speech.
   Voice quality: Good

   Defective sounds--None. He could say all the sounds that are normally acquired at his age.

   Pitch: Good

   Rhythm: Good

3. Estimate of the judges.
   Controlled speech--1.44

4. Estimate of the experimenter.
   Controlled speech--1
   Running speech--1

Tests for Estimating Structure and Mobility of Articulators
(French Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	oignon soulier fille	1
	2	n, t	Flatten and broaden forepart of tongue	nez, tasse banane bateau	Tongue wants to protrude. 1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	soucoupe, tasse couche, maison chapeau, chaise	3
	4		Protrude tongue, turn tip and sides up, groove, depress middle		
	5	r	Elevate tongue, retract tip slightly, turn sides up	garage, radio	3
	6	g, k	Draw root of tongue up	gomme, cafe bague, coco	1
	7	l	Draw down sides of tongue	lapin, balai	Tongue protrudes 1
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex circular and upward movement		(Did not check)
Lips	1	ɛ aɪ	Ordinary opening	être, matin	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	non, mutaine marteau	1
	3	f	Drawing of lower lip against upper front teeth	neuf faim vache	1

Structure of Tongue: **Normal**
Flexible

Palate

Sound spoken	tense	short	flexible	long	rating
a			Yes	Yes	Good

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Long**
2	Activity	**Good** **All of the palate moves.**
3	Tissue	**Good quality**
4	Rating	**1**

Hard Palate

1	Height	**Normal**
2	Condition	**Rough**
3	Rating	**2**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Both normal**
2	Activity	**Good**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Good**

Uvula

1	Size	**Normal**
2	Condition	**Normal**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**None**
2	Dental work necessary	**None**
3	Type of Occlusion	**Normal relationship of the molars (class 1)** **All teeth in linguoversion except upper left second deciduous molars.**
4	Gaps in teeth	**Upper right lateral is displaced causing a gap in teeth.**
5	Missing and short teeth	
6	Comments	**All the teeth are in good shape except the upper right central which is broken down (enamel is gone).** **Cleft passes between the upper right central and cuspid.**
7	Opinion as to effect on Speech	**Teeth do not affect speech.**

Jaws

1	Size	**Upper jaw is constricted, lower jaw is well developed.**

Labial Frenum

1	Condition	**Mutilated and abnormally attached.**

Audiometric test.

Experimenter was unable to make an accurate evaluation.

Psychometric test.

C.A. 2-6
M.A. 2-8
I.Q. 107

Behavior and ability:

The boy was well behaved and cooperative. He seemed interested in the suggested tasks and followed directions nicely.

Vocabulary is well developed.

Speech is good.

Basal age was established at 2--6 years. There were two final successes at the year 3; these were memory digits, and an item involving motor coordination.

I.Q. level is high average.

Medical examination.

Previous illnesses: whooping cough, bad colds.

Previous accidents; None.

Previous operations: None.

Inoculation: No D.P.T.

Development: He sat up at six months; walked at eleven months; talked at eleven months; and bowel and bladder control were established at twelve months. There are no behavior difficulties. He plays well with other children. He is now two and one-half years old. His speech is fair to good.

Functional history:

Both parents are alive and well. The father is thirty-eight years old; the mother is twenty-six years old. There are two other children, one eleven, and one nine years old. The mother is suffering from gall stones.

There are no congenital anomalies, or heredito-familial diseases in the family history.

Functional inquiry:

His hearing and eyes are negative. There is no nasal discharge since the second operation. He seldom has sore throat or coughs. Digestion, skin, bowels, g.u., arms and legs are negative.

Physical examination:

Head measures 20". Bilateral drums are thickened and scarred. Prominent frontal bosses. His eyes are normal. The right nostril of the nose is almost obstructed; the columella is pulled down. The palate is intact. There is a heavy post-nasal purulent drip. The chest is clear. The heart has a functional systolic murmur. The arms, legs and the reflexes are normal. The teeth are decayed.

Environment:

The father is a printer and pressman at the Premier Paper Box Company in Montreal. As the typical French man, he loves his family and has a major role in any

enterprise. Both parents are very proud of this child and love to exhibit his good speech to anyone.

The mother was a most fluent and uninhibited person. She gave this child most of her time.

The little boy was a sweet child, who like his mother liked to talk. However, he was not always ready to be placed on display.

CASE XLI

Bilateral Cleft Lip and Cleft of Hard and Soft Palate

CASE 41
White, male.

Date of birth.
December 13, 1944.

Amount of cleft.
Complete bilateral cleft lip and complete unilateral cleft of the hard and soft palate.

Number of cleft operations.
Three operations, January 27, 1945; July 22, 1946; April 7, 1947.

Age when operations were performed.
1. One month and a half.
2. About a year and a half.
3. About three years and a half.

Surgeon for cleft operation.
Dr. C. F. Skinner, Saint John's, New Brunswick.

Operative procedure.
First operation: Mirault-Blair repair of bilateral hare-lip.

The steps were not outlined in the clinic report.

Second operation: Repair of bilateral hare-lip previously repaired.

The complete bilateral lip was narrowed by removing a V-shaped incision with the apex at the lip margin. The lip edges were brought together at the midline and the V flap used to raise the nose by freeing the nose and suturing the whole V into the upper half of the lip.

Third operation: Repair of cleft palate.

The nasal mucosa was separated from the oral mucosa along the cleft. The mucosa from the septum was separated with lateral relaxing sutures. The oral mucosa was lifted from the hard palate. A repair was made with two complete layers of interrupted

black silk.

Other operations: None

Other congenital anomalies: None

History given to experimenter by the mother.

There is no known history of cleft palate or thyroid deficiency in the family. The mother had always had "kidney trouble". Aside from this there were no other complications during pregnancy. Delivery was difficult; instruments were used. She reports that she "lost her mind when the baby was born." There were no other children; there were no miscarriages. The child still drools and the eyelids are inflamed. He is seemingly healthy. Both parents are of English descent.

Speech Analyses.

1. Speech history.
   The child did not speak until after the palate operation, which was at the age of three.

2. Description of speech.
   This is typical cleft palate speech. He was able to make only the following consonant sounds:

   (m) (n) (ŋ) (r) (j) (h)

   There was a great deal of nasal escape of air when he attempted to use the consonants. The vowels were well made, and strangely enough, not nasalized. The glottal stop was used for all plosives and most of the other consonant sounds were omitted.

3. Estimate of the judges.
   Controlled speech--2.78

4. Estimate of the experimenter.
   Controlled speech--3
   Running speech--3

Tests for Estimating Structure and Mobility of Articulators
(English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	2
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	3
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	3
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	3
	7	l	Draw down sides of tongue	lamp, ball balloon	Tongue protrudes 3
Palate and Pharyngeal Muscles	1	ɑ	Gagging reflex, circular and upward movement		Sensitive Poor movement 2
Lips	1	ɛ aɪ	Ordinary opening	many, mine	1
	2	ɔ, u ou	Opening to form small orifice and protruding lips	water, moon boat	1
	3	f, v	Drawing of lower lip against upper front teeth	five, half	3
Structure of Tongue			Normal structure Very little tongue tip movement		

Palate	Sound spoken	tense	short	flexible	long	rating
	a	Yes	Yes			Poor

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	**Short. Point of fixation at the junction of the hard and soft palate**
2	Activity	**Tight; left side moves well. Right side restricted**
3	Tissue	**Thin and scarred**
4	Rating	**3**

Hard Palate

1	Height	**Normal height**
2	Condition	**Good**
3	Rating	**1**
4		

Passavants Cushion

1	Present	**No**
2	Size	

Faucial Arches

1	Size	**Anteriors normal Posteriors small**
2	Activity	**Poor**

Tongue Frenum

1	Condition	**Loose**

Pharyngeal Muscles

1	Movement	**Fair**

Uvula

1	Size	**Right side normal Left is half size.**
2	Condition	**Bifid Midline is thin.**

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**Several cavities**
2	Dental work necessary	**Yes**
3	Type of Occlusion	**Normal relationship of the molars (class 1) The upper right centrals and laterals have an edge to edge bite.**
4	Gaps in teeth	**There is space between cuspids on both sides and a space between lateral and cuspids on both sides.**
5	Missing and short teeth	
6	Comments	**The upper right and left laterals are supernumerary teeth. The cleft passes between the left cuspid and the lateral.**
7	Opinion as to effect on Speech	**Teeth are not responsible for speech.**

Jaws

1	Size	**Both jaws are fairly well developed.**

Labial Frenum

1	Condition	**Normally attached but badly scarred.**

Audiometric test.
Hearing is normal.

Psychometric test.
C.A. 5-5
M.A. 5-0
I.Q. 92

Behavior and ability:

His attention was adequate but unsustained per item. The general impression this lad gave the examiner was of an intellectual level lower than the test results indicated. He seemed immature and to be under-developed socially.

Speech was poor.

The basal age was reached at 4-6 years.

I.Q. level is low average.

Medical examination:

Previous illnesses: Chicken pox.

Previous accidents: Nil

Previous operations: Nil

Inoculations: Nil.

Development: It is within normal limits; sat up at six months; walked at fourteen months; talked at eighteen months. He is a bright, normal boy. His speech is poor.

Functional history: Both parents are alive and well: the mother is thirty-one years old and the father is thirty-three. There were no miscarriages or stillbirths. There are no siblings. The mother had toxemia while carrying the child and post-partum

psychoses. There are no known congenital defects or heredito-familial diseases.

Functional inquiry: There is no discharge from ears and hearing is good. He rarely has head colds, sore throats, or coughs. His vision is good. His appetite and elimination are good. Skin, arms and legs are normal. He plays well.

Physical examination:

He is a well developed boy with cauliflower ears. His eyes and ears are normal. His nose is negative. The tongue does not move well in the sense that he cannot touch the upper lip with mouth open. The palate does not move actively. The remainder of the examination is negative. His posture is poor. He is a nail-biter.

Impression: He is bright.

Environment:

The father was a sargeant in the regular Canadian army. He disciplined his son with the same degree of severity as that of the soldiers under him. He was determined that his child should learn to talk well, if he had to use force, and that he did. The mother shared this opinion with her husband. She gave the child most of her time and expected good results. There was never any outward display of affection for the child from either parent.

The child was unattractive and at first appeared stupid. At times there was extreme aggressive behavior toward the mother, but on the whole he was rather subdued in behavior. He had a sweet manner on acquaintance and for his age cooperated well in all the procedure.

Speech training.

He was brought to the speech clinic daily, beginning May 22, 1950. Special emphasis was placed on direction of air stream, and on the production of the plosives and other consonants namely, (f) (l) (w). By the end of July, when speech training was discontinued, the breath patterns were much smoother and he was able to make the plosives as well as (f) with effort. The (l) and (w) were fairly well established.

CASE XLII

Cleft of Soft Palate with Associated Congenital Anomalies

CASE 42
White, female.

Date of birth.
June 19, 1942.

Amount of cleft.
Partial cleft of the soft palate.

Number of cleft operations.
One operation, September 20, 1944.

Age when operation was performed.
1. Two years and three months.

Surgeon for cleft operation.
Dr. Hamilton Baxter.

Operative procedure.
First operation: Repair of cleft soft palate.

The margins of the cleft were pared and relaxation incisions were made in the lateral aspect of each flap. The margins of the cleft were then sutured with interrupted dermal sutures.

Other operations:

Operation on eye for muscle strengthening.

Other congenital anomalies.

Asymmetry of the skull

Internal strabismus

Mild microcephaly

Cerebral dysplasis, including an absence of the 7th nerve nucleus.

History given to experimenter by mother.

There is no history of cleft palate or thyroid deficiency in the family. Twins were conceived; one was aborted in October and this child was born prematurely at seven months. Pregnancy was uncomplicated except

for the abortion; instruments were used at birth. The mother's health is generally good. The mother is of Scotch descent, the father of English.

Speech Analyses.

1. Speech History.

She began to speak at about two years of age. Speech training was begun January 3, 1946, in an effort to get the child to move her lips. There was such a lack of concentration that it was difficult to give the child much training. Marked improvement in speech was noted when the child was placed in the School for Crippled Children in January of 1948. The last speech evaluation was given in March of 1950.

I would say that this child's speech is adequate. The only sounds she cannot make are those requiring movements of the lips, which, with her paralysis is impossible to make. However, she has made adequate substitutions for these and her running speech is intelligible. I suggest that she be dismissed from the speech clinic.

2. Description of speech.

Quality of voice: Tended to be nasal, had a hollow sound.

Defective sounds.-- Substitutions:

(d) for (b) in all positions

(t) for (p) in all positions

(t) for (f) in medial position

(n) for (m) in all positions

(r) for (w) initial and medial

blowing sound for (f) (v) in initial and final positions

These sounds were substituted so adeptly that close observation was necessary to detect their usage.

At times the (k) and (g) sounds were weak.

Pitch: Tended to be monotonous.

Rhythm: Slightly irregular.

3. Estimate of the judges.
   Controlled speech--2.89

4. Estimate of the experimenter.
   Controlled speech--2
   Running speech--3

Tests for Estimating Structure and Mobility of Articulators (English Speaking Cases)

		Sounds Spoken	Required Articulator Movements	Test Words	Rating
Tongue	1	j	Upward bulge and transverse spread of tongue	onion, you	1
	2	n, t	Flatten and broaden forepart of tongue	nanny, tie water, one night	1
	3	ʃ s, z	Retract tongue, turn tip and sides up, groove tongue	shoe, wash soap, nice zoo, nose	1
	4	θ, ð	Protrude tongue, turn tip and sides up, groove, depress middle	thumb, tooth, they nothing	1
	5	r	Elevate tongue, retract tip slightly, turn sides up	run, door	1
	6	ŋ g, k	Draw root of tongue up	ring, cookie cow, tongue	1
	7	l	Draw down sides of tongue	lamp, ball balloon	1
Palate and Pharyngeal Muscles	1	a	Gagging reflex, circular and upward movement		Insensitive palate Little movement 3
Lips	1	ɛ aɪ	Ordinary opening	many, mine	3
	2	ɔ, u oʊ	Opening to form small orifice and protruding lips	water, moon boat	3
	3	f, v	Drawing of lower lip against upper front teeth	five, half	3
Structure of Tongue			Normal structure (slightly small) Very flexible		

Palate	Sound spoken	tense	short	flexible	long	rating
	a		Yes	Yes		Fair

Tests for Estimating Mobility and Structure of Articulators

Soft Palate

1	Size	Short
2	Activity	~~Good range of movement~~ Distorted by fixation to left
3	Tissue	~~Good except for the~~ medium stellate scar
4	Rating	2

Hard Palate

1	Height	High arch
2	Condition	Excellent
3	Rating	1
4		

Passavants Cushion

1	Present	No
2	Size	

Faucial Arches

1	Size	~~Anteriors normal~~ Left posterior eccentric to right Right posterior normal
2	Activity	~~Anteriors move well.~~ Left posteriors move well. Right posteriors tight and scarred

Tongue Frenum

1	Condition	Loose

Pharyngeal Muscles

1	Movement	Good

Uvula

1	Size	Normal
2	Condition	Eccentric to left Fissure in the left

Tests Estimating Structure and Condition of Teeth

Teeth

1	Amount of decay	**Several teeth are decayed.**
2	Dental work necessary	**Upper deciduous molars are decayed.** **The teeth are not clean.**
3	Type of Occlusion	**Normal relationship of the molars (class 1)**
4	Gaps in teeth	**Gap where the lower bicuspids have not errupted.**
5	Missing and short teeth	**The upper second deciduous on both sides have been removed and the space has closed.**
6	Comments	**Lower anterior teeth are crowded; there is almost an edge to edge bite.** **The tongue is small.**
7	Opinion as to effect on Speech	**Teeth do not affect speech.**

Jaws

1	Size	**Upper jaw is fairly well developed; lower jaw is undeveloped.**

Labial Frenum

1	Condition	**Abnormally attached; there is no space between teeth.**

Audiometric test
Hearing is normal.

*Psychometric test.
C.A. 7-6
M.A. 6-8
I.Q. 89

Behavior and ability:

The results of the test indicated that the child had a mental age of 6 years, 8 months, which gave an intelligent quotient of 89.

The child's speech was quite readily understood. This facilitated an orderly test procedure. Her behavior on the sub-test indicated some lack of concentration, since she answered, I don't know, to any questions for which she did not have a ready answer. Throughout the testing she was in a hurry to be finished with each item.

Medical examination:

Previous illnesses: Whooping cough, chicken pox, measles.

Previous accidents: None.

Previous operations: Three operations on eyes for strabismus (bilateral convergent).

Inoculation: D.P.T. and booster.

Development: She first sat at one year; walked at eighteen months; talked at two years.

* This test was administered by a psychometrician of the Children's Memorial Hospital. The Stanford-Binet, Form 1, was administered on December 7, 1949.

Bladder control at six and one half years; bowel control was established at two years. The bilateral facial nuclei are absent. There is lack of power of concentration. She is in the third grade in school. She plays well.

Functional history: Both parents are alive and well. There are two siblings alive and well, a boy and a girl. The mother had a partial miscarriage several months before the present child was born. The patient weighed 2 lbs., 11 oz. at birth. There are no congenital anomalies on either side of the family. There are no heredito-familial diseases.

Physical examination: The ears are negative. There is a right convergent strabismus. The nose is negative. The palate and tongue move normally. There is no facial expression; she is unable to close lips, smile, laugh or close eyelids; she uses the platysma muscles. The chest and heart are negative. The umbilicus is over to the right side. The left leg muscle (calf) is $\frac{1}{8}$" smaller than the right; the left leg is 3/4" shorter than the right. There are moderate patch hairs on the left leg. Her muscular movement is awkward and her coordination is poor. The skin is moist; the hips normal; and the posture is poor. Early pubic changes are noted.

Environment:

The father is employed as a mechanic at the Canadian Pacific Railways.

The mother is a dynamic person who follows through with any task she undertakes. She is ambitious for this child, and possibly puts too much pressure on her. She enjoys her children and lavishes affection on them.

The child is an odd-looking little girl; she is sensitive, hyperactive, friendly and restless. She loves to be with other children and she has a degree of leadership which makes them respect her and quite often follow her suggestions.

Neurological examination.

The head measures 19". This child was born with a cleft palate and apparently a bilateral 6th and 7th nerve aplasis. She has done well under Dr. Baxter's treatment with speech therapy and schooling at the School for Crippled Children. She is entering the third grade this fall. She is referred to here because the mother is asking advice with regard to her tenseness and lack of concentration.

On neurological examination, apart from the defects mentioned above there may be a bilateral positive Chaddock response. The problem was discussed with the mother in general terms, It was suggested that she might find more satisfaction in the new psychometric clinic, when it is organized.

Chapter VI

OBSERVATIONS AND SUMMARY

Since the sampling is relatively small in this study, the data must be considered as indicating no more than general tendencies. The aim has been to determine the general trends in the speech problem of the cleft palate case, and the data must be evaluated from that point of view.

As indicated in the chapter on procedure, the age when operations were performed, the operative procedure, and other operations, and the congenital anomalies were obtained from the hospital charts of the Children's Memorial Hospital, Montreal. The operative procedures for eight cases were secured from the hospitals referred to in the procedure.

For convenience and because minute information was not given as to the extent of the clefts, this sampling has been divided into five groups, namely: Type I, cleft of the soft palate and congenital short soft palate; Type II, cleft of the hard and soft palates; Type III, unilateral cleft of the lip and cleft of the hard and soft palates; and Type IV, bilateral cleft of the lip and cleft of the hard and soft palates.

In Table I, it may be seen that within this group there were 27 males and 15 females. Of this number 21 males and 3 females were in Types III and IV, while there were 12 females and only 6 males in Types I and II. This comparison shows that the severer and more complicated forms of clefts occurred more frequently in males, whereas the lesser forms occurred more frequently in females.

The greatest number of clefts is in Type III, which contains 8 cases with clefts on the right side, and 8 cases on the left side. The fact that the largest number of cases is in Type III agrees with the general belief that unilateral cleft lip and palate occur most frequently; however, the fact that left and right sided clefts of the lip were equally distributed is contrary to the findings in any previous study. The discrepancy may be accounted for on the basis of limited sampling.

Inspection of Table II does not seemingly indicate that there is any significant relationship between the speech ratings and the amount of cleft. Proportionally, in Type IV the greatest number of cases is rated as having average speech, and in Type I the greater number of cases is rated as having unintelligible speech. The sampling here appears too small for a valid conclusion.

TABLE I

DISTRIBUTION OF TYPES OF CLEFTS
ACCORDING TO MALES AND FEMALES

	TYPE I		TYPE II			TYPE III		TYPE IV	
	M	F	M	F	LIPS	M	F	M	F
Number of Cases	2	3	4	9	Right	8	-	8	
					Left	5	3		

TABLE II

DISTRIBUTION OF SPEECH RATING
ACCORDING TO TYPE OF CLEFT

Rating	Type I	Type II	Type III	Type IV
1	2	5	7	2
2		7	9	5
3	3	1		1

It was possible to secure information as to the number of operations and the age when surgery was completed for all the cases except Case 5. These data are given in Table III. It may be seen that the mean score for the number of operations performed in Type I is 1; for Type II it is 1.15; for Type III, it is 3; and for Type IV, it is 4.25.

In the greater number of cases the maximum age for the completion of surgery was around the age of 3 1/2 years, regardless of the amount of the cleft. For Type I the maximum age was 2 years, 8 months, with the exception of the two congenital short soft palate cases where the operations were completed around the age of 5 years. A possible explanation for the delay in operating may be that with these cases speech was the only function disturbed, and the cause of the disturbance was not recognized at first. In Type II, 4 cases were retained beyond the age of 3 1/2 years; two of these cases were unusual in that the parents would not allow them to be operated upon until they reached an age to make the decision themselves, which was around the age of 15 years. Seven cases in Type III were completed before or by the age of 3 1/2 years. In Type IV, 6 cases were operated on before the age of 3 1/2 years, and 4 out of the 6 were completed by the age of 2 1/2 years.

It may also be noted that out of the 41 cases

TABLE III

DISTRIBUTION OF NUMBER AND AGE OF OPERATIONS FOR FOUR TYPES OF CLEFTS

TYPE I				TYPE II			
No. of Operations		Age		Number of Operations		Age	
Primary	Secondary	Completion of Surgery	Present Age	Primary	Secondary	Completion of Surgery	Present Age
1	-	1 yr. 5 mos.	13 yrs	1	-	3 yrs. 9 mos.	8 yrs.
1	-	2 yrs. 3 mos.	7 yrs	1	-	14 yrs 6 mos.	16 yrs.
1	-	2 yrs 8 mos.	15 yrs.	1	-	2 yrs.	8 yrs.
1	-	5 yrs. 3 mos.	7 yrs.	1	-	2 yrs. 8 mos.	10 yrs.
1	-	5 yrs. 9 mos.	8 yrs.	1	-	15 yrs.	16 yrs.
-	-	-	-	1	-	2 yrs. 6 mos.	12 yrs.
-	-	-	-	1	1	6 yrs.	7 yrs.
-	-	-	-	1	-	2 yrs.	15 yrs.
-	-	-	-	1	-	3 yrs. 4 mos.	9 yrs.
-	-	-	-	2	-	2 yrs.	4 yrs.
-	-	-	-	1	-	1 yr. 7 mos.	14 yrs.
-	-	-	-	1	-	4 yrs. 6 mos.	4 yrs.
-	-	-	-	1	-	1 yr.	7 yrs.
-	-	-	-	-	-	6 mos.	-
						-	-
-	-	-	-	-	-	-	-

TABLE III

DISTRIBUTION OF NUMBER AND AGE OF OPERATIONS FOR FOUR TYPES OF CLEFTS

TYPE III				TYPE IV			
Number of Operations		Age		Number of Operations		Age	
Primary	Secondary	Completion of Surgery	Present Age	Primary	Secondary	Completion of Surgery	Present Age
2	-	6 yrs. 6 mos.	8 yrs.	3	9	11 yrs.	15 yrs.
2	-	7 yrs. 4 mos.	9 yrs.	3	1	6 yrs.	8 yrs.
2	-	2 yrs. 1 mo.	4 yrs.	4	-	11 yr.	5 yrs.
2	-	2 yrs.	2 yrs.	2	-	1 yr.	9 yrs.
2	-	7 yrs. 8 mos.	9 yrs.	3	-	3 yrs. 6 mos.	5 yrs.
4	3	13 yrs.	14 yrs.	3	-	3 yrs.	4 yrs.
2	4	7½ yrs.	11 yrs.	3	-	1 yr. 9 mos.	7 yrs.
3	-	2 yrs. 3 mos.	8 yrs.	3	-	2 yrs. 6 mos.	5 yrs.
2	-	1 yr. 8 mos.	6 yrs.	-	-	-	-
2	-	2 yrs.	8 yrs.	-	-	-	-
2	-	2 yrs. 6 mos.	8 yrs.	-	-	-	-
2	-	3 yrs 2 mos.	7 yrs.	-	-	- -	-
2	-	3 yrs 6 mos.	8 yrs.	-	-	-	-
3	-	2 yrs. 7 mos.	3 yrs.	-	-	-	-
3	1	5 yrs. 10 mos.	7 yrs.	-	-	-	-

represented in Table III, 6 cases needed secondary repair. All the secondary operations except one were performed on the cases in Type III and Type IV. Only one secondary operation was needed for three of the cases.

These data indicate that one operation alone can now take care of the less serious cases while 3 or 4 operations are still needed for the more severe cases. It also seems that secondary operations are often less frequently necessary.

Scar tissue in the throat makes it more difficult for adequate velopharyngeal function, thus preventing good speech. The number of operations seems to determine to a degree the amount of scar tissue. The 3 cases in this study with multiple secondary operations were classified as typical cleft palate cases with a speech rating of 2.

The general belief is that the palate should be repaired when the child is between the ages of 2 and 5years, if good speech is to be obtained.

Out of the 42 cases represented in Tables IV, V, VI, it was possible to obtain the operative technique used in repairing the palate for 37 cases. Out of the 24 cases requiring lip repair, the operative technique was ascertained for 19 cases.

The methods used most often for the palate repair were the Langenbeck in several modifications of that

TABLE IV

SHOWING OPERATIVE PROCEDURE FOR THE TYPE I AND II CLEFTS WITH THE RESPECTIVE CASES

TYPE I

Case No.	Operative Procedure For Palate
30	Brown "Push-back"
32	Brown "Push-back"
39	Veau
42	Langenbeck
29	Langenbeck

TYPE II

Case No.	Operative Procedure For Palate (Primary) (Secondary)
1	Langenbeck; Brown "Push-back"
4	Wardill V-Y
7	Veau
8	Langenbeck
13	Wardill V-Y
14	LeMesurier Modification of Warren Dieffenbach
15	Veau
17	Langenbeck
19	Lieffenbach Warren
20	Langenbeck
26	Veau
27	Veau; Pharyngoplasty (Wardill)
33	Ganzer

TABLE V

SHOWING OPERATIVE PROCEDURE FOR THE TYPE III CLEFT WITH THE RESPECTIVE CASE

TYPE III

Case No.	Operative Procedure for Lip	Operative Procedure for Palate
6	Veau	Veau
9	Rose	Langenbeck
10	Veau	Veau
11	Veau	?
12	Blair-Mirault	Langenbeck
16	Mirault-Blair (?)	Brown "Push-back"
18	?	Veau
22	?	Langenbeck
25	Blair-Mirault	Langenback
28	Blair-Mirault	Modified Langenbeck
31	Veau	Veau; Pharyngoplasty (Wardill)
34	Veau	Veau
36	Veau and Plessier	Veau
38	Mirault-Blair	Brown "Push-back"
40	LeMesurier	Dieffenbach-Warren
5	?	?

TABLE VI

SHOWING OPERATIVE PROCEDURE FOR THE TYPE IV CLEFT WITH THE RESPECTIVE CASE

TYPE IV

Case No.	Operative Procedure for Lip	Operative Procedure for Palate
2	Recamier Method	Veau
3	?	Langenbeck
21	Denis Browne Procedure	Orthopaedic operation
23	Abbe' Transplantation	Langenbeck
24	Feather Steel Procedure	?
35	Mirault-Blair	Langenbeck
37	?	Langenbeck
41	Mirault-Blair	?

method, and the technique originated by Veau. The "push-back" method was used for the congenital short soft palate cases in Type I, for 2 cases in Type III and for one secondary operation in Type II. The Wardill V-Y method was applied to 2 cases in Type II, and orthopaedic operation was used with one case in Type IV.

The Mirault-Blair and the Veau methods were used for the majority of the lip repairs, as can be noted in Tables V and VI.

These data seem to indicate either that the Langenbeck and Veau procedures have been found successful, or too few surgeons were represented in this study.

The Veau and the Langenbeck methods have been generally condemned because the palates constructed by these methods are too short. Dorrance maintains that the Veau palate is excellent for French-speaking people. Six of the 16 French-speaking cases used in this study support this thesis.

A part of the information on the other general or specific operations that had been performed was obtained from the parents. Seventeen tonsillectomies and 14 adenoidectomies were performed on the cases. A number of the operations represented repairs for other congenital defects; Case 39 had had as many as eight operations.

There is a question as to whether the tonsils and

adenoids should be removed before or at the time of the palate repair. In this study there was no set pattern; if the tonsils or adenoids were infected they were removed, but that was generally done after the palate was repaired. In the majority of the cases tonsillectomies and adenoidectomies were performed several years after the palatal operation.

The information that was obtained from the medical records concerning the associated anomalies was supplimented by the pediatrician's report. Since there were only 2 cases, 2 and 6, in which associated anomalies appeared within the family, only the associated anomalies within the case have been considered. The associated anomalies within the case have been listed in Table VII. It may be observed that 17 out of 42 cases (or 40%) had associated anomalies, and in only 3 cases were multiple anomalies evident. Eleven cases in this group received speech ratings of 2, 5 received ratings of one, and one case received a rating of 3. These data indicate that the associated anomalies do not significantly influence the production of good speech except in the case, rated as 3. In this case the absence of the seventh nerve nucleus rather than the cleft of the palate prevented good speech.

The following questions were asked of the mothers in obtaining the case histories:

TABLE VII

REPRESENTING THE CASES WITH ASSOCIATED CONGENITAL ANOMALIES

Case No.	Associated Anomalies
1	Short tongue frenum
7	Cleft of the tongue
9	Bilateral hydrocele
12	Congenital fistula of the lower lip
14	Umbilical hernia - geographic tongue
16	Deformity of the right ear (the auricle was adherent to the scalp)
17	Short tongue frenum
19	Torticollis with facial asymmetry Pits in the lower lips Absence of clitoris
21	Umbilical hernia Congenital anomaly of the thumb
22	Right inguinal hernia Atrophy of right testicle
24	Congenital bald spot on right temporal area
31	Umbilical hernia Torticollis
34	Abnormal tragus over the right anterior ear
38	Webbed second and third toes on each foot Geographic tongue
39	Funnel chest Bilateral genuvalgum Valgus deformit of the upper end of each femur

TABLE VII (Con't.)

Case No.	Associated Anomalies
	Apparent arachnodactyle Myopia
42	Asymmetry of the skull Internal strabismus Mild microcephaly Cerebral dysplasia, including an absence of the 7th nerve nucleus
33	Defect of occiput Torticollis with deformed cervical spine Pigeon chest Congenital malformation of the internal left and external right ear Marked phimosis

1. Is there a history of cleft palate and thyroid deficiency in the family?
2. Were pregnancy and birth normal?
3. Did the mother have any diseases while carrying the child?
4. When did speech develop? Has the child had speech training? If so, for how long?
5. What is the nationality of the parents?

In answering these questions the interviewee often gave other information such as the number of associated congenital anomalies in the family, the health of the mother and the child, etc.

It may be noted that a part of this material was duplicated in the medical report of the pediatrician. The history of speech development is a part of the speech analyses and will be discussed later. Out of the 42 cases, only 38 were considered because 4 of the group were adopted children and the history was not known. Three of these were illegimate children. The cases according to the four types of cleft with the familial incidence of cleft are given in Table VIII.

Thirty-eight per cent of the cases had a family history of cleft palate. In proportion to the number of each group, Type I showed the smallest number of known incidence, and Type IV showed the largest number. Fogh-Anderson's study suggests that the cleft of the lip

TABLE VIII

TABLE SHOWING THE CASES ACCORDING TO TYPE OF CLEFT WITH FAMILIAL INCIDENCE OF CLEFT PALATE

Case No.	Incidence of Familial Cleft Palate
	TYPE I
29	Paternal great uncle had a cleft palate
	TYPE II
7	Child of paternal uncle has cleft palate
13	Female maternal cousin has cleft palate
19	Maternal uncle has a palate defect
26	Brother has a cleft of the palate
27	Brother has a cleft of the palate
	TYPE III
6	Paternal aunt had cleft palate
10	Mother has a cleft of the lip and palate
25	Mother's great uncle had a cleft lip and palate
28	Male paternal cousin had cleft palate
36	Younger brother has a cleft lip
16	Maternal uncle had cleft lip and palate
	TYPE IV
3	Maternal great aunt had a cleft palate Three children in the family including this child have clefts; the older has cleft lip; the younger and this child have cleft of the lip and palate

TABLE VIII
(Con't.)

Case No.	Incidence of Familial Cleft Palate
	TYPE IV
23	Mother was cleft lip Two great aunts had cleft lips Maternal great uncle had cleft palate
35	The last child, fifth, had a bifid uvula
37	The paternal uncle had cleft palate

(with or without cleft of the soft and hard palate) may be considered hereditary, while that of the soft palate (with or without partial cleft of the hard palate) may not be. These data are not descriptive enough to allow for extensive speculation; however, it does appear to agree with the statement in so far as Type I and IV are concerned.

When considering heredity as a causal factor for facial clefts, it is interesting to note Case 3. In this case history there were three examples of clefts; a maternal great aunt had two congenitally deafened children, and another great aunt had one congenitially deafened child. The mother had had three miscarriages; the last child was born prematurely; and there was history of consanguinity, the only one found in this study.

Seven of the mothers in this sample claimed to have a thyroid difficulty. One mother had a goiter, which had not been removed. The others were either cases of hyperthyroidism or hypothyroidism.

The majority of the mothers considered pregnancy and birth to be normal and easy; nine indicated that the birth was complicated, while five had been noticeably sick during the pregnancy. Three of the mothers had had a kidney disorder which seemed to make the carrying of the child more difficult.

None of the mothers reported diseases during the pregnancy. One mother was classified as an Rh negative blood type.

As to nationality -- there was an intermingling of French, English, Scotch, Irish, German, and Welsh with no indication that the incidence of clefts occurred more often in one mixed marriage than in another. These data are in agreement with Ritchie's statement, "It is interesting to note the many strains that go to make up the Americans, but I cannot interpret these as having a bearing on the subject."[1]

The speech analyses consisted of the speech history, an evaluation of the speech as to quality, defective sounds, pitch and rhythm, an evaluation of the controlled and running speech, and an evaluation of the peripheral speech mechanism in respect to anatomy and function.

The following questions were asked in obtaining information on speech development:

1. When did your child begin to talk?
2. Has he had speech training? If so, for how long?

In this sample most of the cases developed speech after the operation took place, between the ages of 2 and 3 years. In one case, Case 1, the parents were asked to

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[1]H. P. Ritchie, "Congenital Clefts of the Face and Jaws," Archives of Surgery, XXVIII (1934), 617-658.

discourage the child from talking until surgery was completed. In thirty-six per cent of the cases the child began to talk at the age of 2 years. In 5 per cent of the cases the child developed speech at as early an age as ten months. There is no significant difference noted in the speech development when the cases are considered according to the degree of the cleft. It may be observed that the 4 cases who developed speech at the age of 4 years are in Types II and III, and the two cases who developed speech at the age of ten months are also in Types II and III.

Thirty-three per cent of the cases have had some formal speech training ranging from a period of one month to 9 years. All of these made some progress except cases 35, 1, 7, 32, 14, and 17. For these 6 cases the clinical notes read, "Little Progress noted."

For the evaluation of quality of voice, defective sounds, pitch and rhythm of voice each subject read a selection or named a prepared list of objects. The words for the selection and objects were chosen from the vocabularies of Horne, Horne, and Packer for the English-speaking group, and from Echelle de vocabulaire et d'orthographe, by Roland Vinette for the French-speaking group. Each consonant sound or cluster was chosen on the basis of occurrence.

Using as a basis the description of cleft palate

speech given in Rehabilitation of Speech, by West, Kennedy, and Carr, an examination of the data revealed that 40% of the cases could be considered typical cleft palate cases. The articulatory defects noted in the other cases seemed to have causal factors other than the cleft of the palate and lip. Of these 19% could be diagnosed as delayed speech (meaning defects of articulation due to faulty learning, oral inactivity, malocclusion, mental deficiency, and psychological factors). Six cases out of 8 within the ages of 2 and 5 years, either had delayed speech, or speech rated as normal. Thirty-three per cent of the cases had speech rated as normal. No member in this group had received any formal speech training.

When the cases are considered according to the Type of cleft, it may be seen that in Type I there were 2 cases with both the speech characteristics of the cleft palate and the articulatory defects of delayed speech. It might also be noted that these were cases with congenital short soft palates. Two cases had adequate or normal speech and one had a defective speech greatly influenced by paralysis of the lip.

In Type II there were 6 cases with the speech characteristics of the cleft palate, five cases with adequate speech, and 2 cases with delayed speech.

There were 6 cases of cleft palate speech in Type III. These varied in degree of severity, the voice quality of

Cases 31 and 6 was more indicative of the cleft than was the defects of sounds. Six cases in this group were classified as having normal speech and 4 classified as delayed speech.

Three cases in Type IV had cleft palate speech, two had adequate speech, and two had delayed speech. Case 37 had poor dental structure which could have partially accounted for his defective speech.

Delayed speech in cleft palate cases is generally recognized. Cobb and Lierle found 28% of the cases in their study presented delayed speech. Kantner says, "Mixed in with these articulatory symptoms that can logically be attributed to the cleft palate, one frequently finds others that are more characteristic of a general speech retardation or loss of hearing."[2]

Nine bilingual lay people (meaning people who are not specialists in speech)were chosen to evaluate the controlled speech of these cases on a three-point scale: (1) normal speech, meaning speech that is considered intelligible most of the time, and that has no noticeable defects, different from those of the normal speaking people; (2) average speech, meaning speech that may deviate from the normal, but is intelligible if careful

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[2]Claude E. Kantner, "Diagnosis and Prognosis in Cleft Palate," The Journal of Speech and Hearing Disorders, XIII (1948), 211-233.

attention is paid to the speaker; (3) unintelligible speech.

The average intercorrelation among the 9 judges on this sample was .641, which means that the judges agreed 21% better than chance.

Each case read the same selection or named the same objects previously described. The mean score for each child was obtained and treated in this manner; scores 1 to 1.44 were considered as 1; those from 1.44 to 2.44 were considered 2; and those above 2.44 were considered as 3.

An examination of the data shows that 34% of the cases were judged by the lay judges as having normal speech, 54% as having average speech, and 11% as having unintelligible speech. The experimenter's judgments on the controlled speech were: 33% normal speech, 58% average speech, and 9% unintelligible speech. The scores for normal speech in controlled material and in running speech were identical; the scores for average and unintelligible speech of controlled material were significantly higher than those of the running speech with a difference of 20% for average and 17% for unintelligible. This difference could be attributed to the fact that many of the cases who had had formal speech training did not carry over the good speech habits into running speech.

According to Fomon, Veau "estimates that normal

speech occurs in 27.8 per cent of the cases and improved speech in 47 per cent."[3] In this sample the percentage for normal speech is slightly higher than the estimate given by Veau.

The findings here indicate that 88% of the cleft palate cases received a rating of average speech. Within the group with typical cleft palate speech, 83% of the cases received a rating of average speech. The figures for the average or improved speech are about twice as high as those given by Veau. The percentage for the entire group in this study is higher than that given by Oldfield.[4]

The evaluation of the peripheral speech mechanism consisted of (1) an estimate of the anatomical structure of the tongue, hard and soft palates, the uvula, the faucial arches, the teeth, the jaws, the Passavant's cushion; (2) an evaluation of the mobility of the tongue, the lips, the soft palate, the faucial arches, and the pharyngeal muscles. Each structure, except the teeth, was evaluated as to size and general condition. The

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[3]Samuel Fomon, The Surgery of Injury and Plastic Repair, (Baltimore: The Williams and Wilkins Company, 1939), p. 1138.

[4]Oldfield found in his study of 183 cases that 7% had good speech (meaning speech that could be easily understood by strangers yet on careful investigation was defective in articulation and voice quality).

teeth were rated as to the effect on speech and the need for dental attention. It was assumed that the only dental conditions which would influence speech production are: "a marked protrusion or retraction of the upper or lower jaw; a marked open bite and wide spaces between or marked irregularity in, the upper central teeth."[5] The evaluations were either made in description terms or else rated on a three-point scale of (1) normal, (2) fair, (3) poor.

An inspection of the data concerning the anatomical structures revealed the following results:

Tongue: Sixty per cent of the cases did not show any deviations from the normal tongue structure. Forty per cent deviated from the normal showing various conditions, such as geographic tongue, fissured tongue, and slightly bifid tongue. In one case the tongue was slightly cleft.

Soft palate: Twenty-nine per cent of the cases had normal soft palates; 50% had soft palates rated as fair; 20% had poor structural soft palates. When considered in the classified groups, it is seen that in Type I, 37% of the cases were rated as having normal soft palates. This was the highest percentage for the three groups.

Hard Palate: Fifty per cent had normal hard palates;

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[5]Kantner.

29% had hard palates that were rated as fair; 21% had anatomically poor hard palates.

Uvula: Forty-seven per cent had small uvulas; 19% had normal uvulas; 21% had bifid uvulas; 7% had large uvulas; and 7% had partially normal uvulas. The best constructed uvulas seemed to belong to Type I which had a score of 83%.

Teeth: The dental structure in 67% of the cases was found to be adequate in the sense that it did not affect speech in an adverse manner. Dental attention was needed for 55% of the cases.

Jaws: Thirty-six per cent had well developed jaws; 21% had undeveloped jaws; and 41% had normal lower jaws and undeveloped upper jaws.

Although only 33% of the cases have a dental structure which would affect speech, the fact that 55% are in need of dental work is noteworthy. An inspection of the data concerning the development of the jaw did not show any significant difference in the jaw development of the cases when considered according to the Types of clefts. It may be noted, however, that the cases with well developed upper and lower jaws tended to fall into Types II and III. Two cases in Type II were not operated on until they had reached the ages of 14 and 15 years.

Passavant's cushion: Passavant's cushion was absent in 59% of the cases; in 24% of the cases it was

present in medium and very small size; and in 13% of the cases it could not be seen because the cases would not co-operate. Only in one case was it found to be of any size.

Tongue frenum: Thirty-five per cent of the cases have normal tongue frenums, and 7% have tight frenums.

The influence of these two structures on speech production is debatable. In this sample the speech of the cases in which Passavant's cushion was found present was judged as follows: 4 received ratings of 2; 4 received a rating of one; 2 received a rating of 3. In 2 cases the tongue frenum was clipped, one of these cases received speech training afterward in an effort to develop the habit of elevating the tongue. The training period was too short for an accurate estimate as to the value of the operation. A follow-up letter from the mother says that she feels the child's speech has benefited from the operation. Two of the cases with tight frenums received a speech rating of one.

The tests used for estimating the mobility of the tongue and lips were based on the adjustments made by these organs in the production of certain sounds. The rating was determined by adjustments, not by usage in speech. The experimenter feels that this is not a valid test especially if young children are being tested. Many

of the young cases had not learned the (s) and (r) adjustments; therefore, the test only indicated that the sound could not be made, not the mobility of the tongue. The mean score of the tongue and lips were obtained and used in the manner previously mentioned. The mobility of the palate, faucial arches and pharyngeal muscles was determined by the extent of movement in producing the sound (a). One case did not co-operate well, therefore, the mobility of the pharyngeal muscle was not checked.

The percentage estimates for the entire group for each structure are shown in Table IX. An inspection of the data reveals that the percentage score for normal mobility is higher than average for all the parts except the palate, which received the score of average. If the scores of the mobility of the faucial arches and pharyngeal muscles are compared with that of the palate it appears that the mobility of the faucial arches and pharyngeal muscles, with scores of 63% and 55% respectively, is superior to the mobility of the palate with a score of 50%. It may be noted that the muscular movement of the pharyngeal muscles for cases 14 and 4 rated excellent. Surgical repair for these cases was not performed until they reached the ages of 14 and 15 years, respectively.

The functional aspect of the speech mechanism is superior to that of the anatomical aspect when the two are compared. In general it is always desired and hoped

TABLE IX

SHOWING THE RATING OF THE MOBILITY OF PERIPHERAL SPEECH STRUCTURES IN TERMS OF PERCENTAGES OF CASES

Rating	Tongue	Lips	Soft Palate	Faucial Arches	Pharyngeal Muscles
1	63	84	50	55	63*
2	36	14	36	38	29
3	None	2	14	7	5

*Two per cent of the cases could not be examined because of lack of cooperation.

that the speech mechanism will function better than its anatomical aspect justifies. Oldfield says, "The anatomical results are considered to be of minor importance in comparison to speech." In his review of 187 cases, he found 94.7% of the 'primary cases' to have complete closure of the hard and soft palate. In these cases he also found the soft palate well arched, and the nasopharyngeal valve competent."[6] The figures in the present study are lower than those given by Oldfield.

The factors which are thought to influence the speech of the cleft palate case have been tabulated so as to compare the cases with normal speech with those with typical cleft palate speech. The ratings of one for the cases with normal speech are as follows:

67% palatal mobility
83% tongue mobility
40% palate structure
83% pharyngeal muscles

The ratings of one for the cases with typical cleft are as follows:

18% palatal mobility
58% tongue mobility
12% palate structure
63% pharyngeal mobility

The structure and mobility of the palate show the greatest degree of difference.

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[6] Michael C. Oldfield, "Modern Trends in Hare-Lip and Cleft Palate Surgery," The British Journal of Surgery, LXVII (1950), 179-192.

Berry states that in the cleft palate cases which she observed, "....certain sounds, (t), (d), (l), (s), (z), (s), and (ʃ), were found to be defective because the tongue did not make the proper articulatory adjustments."[7] The measurements of mobility of the tongue in this study were not accurate enough to form the basis of definite statements, but in 24% of the cases it was noted that the tongue protruded on the post-dental sounds. It was also noted that the blade of the tongue seemed to be much more active than the tip in 28% of the cases. Twelve per cent had a tongue thrust movement, which was particularly noticeable in swallowing and tended to push the dental structure out of alignment.

The audiometric evaluation was made by a pure tone Western Electric Bp Audiometer. Hearing was considered normal when the case could hear the frequencies from 512 to 8192 at 20 decibels. Four cases could not be tested because of the lack of co-operation and understanding of the test situation. An inspection of the data shows that the majority of the cases have normal hearing with a score of 76%. Nineteen per cent show a slight loss for one ear in one or more frequencies, 5% had defective hearing. It

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[7]Mildred Freburg Berry, "Lingual Anomalies Associated with Palatal Clefts," The Journal of Speech and Hearing Disorders, XIV (1949), 359-362.

appears that in only 5% of the case will the hearing deficiency noticebly affect speech.

Deviations in anatomical structure, subject cleft palate cases to infection of the Eustachian tube and infection of the middle ear. "If the cases are not properly treated this may result in a hearing loss."[8]

The cases in this study were either receiving adequate medical treatment or competent anatomical repair.

The Revised Stanford-Binet Intelligence Scale, Forms L and M, were used for the psychometric evaluation. If it seemed necessary for any reason, the mother was allowed to sit with the child during the test procedure. The classifications were as follows:

50	-	70	Moron
70	-	80	Borderline
80	-	90	Dull or low average
90	-	110	Average
110	-	150	Superior and above

An inspection of the data reveals a comparatively normal distribution curve with 52% of the cases classified as normal, 24% classified as dull average, 12% classified as borderline and moron, and 12% classified as superior and above. These results are not in agreement with Cobb and Lierle, who found the mental capacity of their

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[8]Oldfield.

group "to be at best only low average."[9]

The general belief is that the intelligence of the cleft palate case partially determines his speech. Cobb and Lierle found that "at every comparable age level those with average intelligence or above had better speech than did those with borderline rating or above."[10] It may be noted in these data that of the 5 cases judged as having unintelligible speech, 2 are classified as average, while 3 are classified as dull average. If the entire group is considered; it will be found that 52% are classified as average in intelligence and 58% are rated as average in speech.

An examination of Tables X and XI shows that 10 cases with typical cleft palate speech are classified as average or above in intelligence, while 13 cases with normal speech are classified as average or above in intelligence.

These findings indicate that intelligence has a determining influence on the speech of the cleft palate case but possible not to any greater extent than on the speech of the non-cleft palate.

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[9]Lois H. Cobb and Dean M. Lierle, "An Analysis of the Speech Difficulties of 36 Cleft Palate and Harelip Cases," Archives of Speech, I, (1936), 217-230.

[10]Ibid.

TABLE X

SHOWING THE RATING OF THE PERIPHERAL SPEECH STRUCTURES, INTELLIGENT QUOTIENT, AND HEARING ACUITY OF 15 NORMAL-SPEAKING CLEFT PALATE CASES

Case No.	Tongue Mobility	Palate Mobility	Palate Structure	Pharyngeal Muscle Mobility	I.Q.	Hearing	Type of Cleft
13	1	1	2	1	83	Normal	II
15	1	1	2	1	102	Normal	II
16	1	2	2	3	93	Approx. Normal	III
20	1	2	1	1	103	Normal	II
21	1	1	3	1	150	Normal	IV
22	1	1	2	1	131	Couldn't Check	III
24	2	1	1	1	90	Normal	IV
25	1	1	1	1	98	Normal	III
26	1	2	2	1	99	Normal	II
27	1	2	2	1	91	Normal	II
28	1	1	2	1	102	Normal	III
29	1	1	2	1	90	Normal	I
34	1	1	1	3	92	Normal	III
39	1	2	1	1	71	Slight loss in Acuity	
40	2	1	1	1	107	Couldn't Check	III

TABLE XI

SHOWING THE RATING OF THE PERIPHERAL SPEECH STRUCTURES, INTELLIGENCE QUOTIENT, AND HEARING ACUITY OF 17 REPRESENTATIVE CLEFT PALATE CASES, WITH AN INDICATION OF THE TYPE OF CLEFT

Case No.	Judgments	Tongue Mobility	Palate Mobility	Palate Structure	Pharyngeal Muscle Mobility	I.Q.	Hearing	Type Cleft
1	2	1	3	3	1	92	Normal	II
4	2	1	2	2	1	86	Normal	II
5	2	1	2	3	2	83	Normal	III
6	1	1	2	3	2	113	Normal	III
7	2	2	2	2	2	78	Normal	II
9	2	2	3	3	1	89	Slight loss in acuity	III
11	2	1	3	3	1	95	Normal	III
14	2	1	2	2	1	105	Normal	II
17	2	2	1	2	1	100	Approx. Normal	II
30	3	1	1	2	1	88	Normal	I
31	2	2	2	2	1	107	Normal	III
32	3	2	1	2	1	91	Normal	I
33	2	2	2	1	2	71	Couldn't Check	II
36	2	1	3	2	1	61	Approx. Normal	III
23	2	1	3	3	2	131	Slight loss in acuity for left ear	IV
35	2	1	2	2	1	92	Normal	IV
41	3	2	3	3	2	92	Normal	IV

Each case received a routine medical examination. The items covered are as follows:

> Previous illnesses, previous accidents, previous operation, inoculations; developmental history; functional history, which consisted of general information about the family; functional inquiry, which sought general information about the health of the child; and physical examination.

The majority of these cases had had various childhood diseases with the usual inoculations and accidents. Excluding the palate and lip repairs, the majority of these cases had had more general, as well as specific operations than the normal child. Only 3 cases had a history of slow development, the others were within the normal limit. The history of cleft palate, and other congenital anomalies have been previously noted in this study. The postnatal and prenatal history was negative; there was a history of five miscarriages, one stillbirth within the immediate family, and five premature births, four being those of the cases in this study. As a whole, the health of these cases had been good, there was a history of frequent colds and earaches. One child had chronic pin worms.

The physical examination revealed that twenty-five of the cases had thickened, scarred and retracted ear drums, varying in degree of severity. Five cases had functional systolic heart murmur; 4 cases had slight abnormalities of the genitalia; in one case there was the

question of muscular dystrophy, in another there was a question of congenital anomaly of the brain. Six cases had poor posture and 3 had facial asymmetry. With exception of the thickened, scarred and retracted ear drums, the physical condition of these cases does not seem to deviate markedly from what might be expected in 42 non-cleft palate cases.

The otological and neurological examinations that were given did not report any pathological findings.

The estimate of the socio-economic class, the environmental conditions in general, and the personality deviations which may have been caused by the physical handicaps or environmental conditions were determined through observation of and interviews with the parents during the experiment. The socio-economic judgments were determined by the educational and financial status of the family.

Inspection of the data indicates that 4 families can be placed in the high socio-economic class, 23 families in the medium socio-economic class, and 15 in the low socio-economic class. The environmental condition can be rated as good for 25 of the cases, fair for 8 of the cases, and poor for 9 of the cases.

Personality deviations were noted in 15 cases, the more pronounced deviations being in the 4 foster cases.

These data indicate that for the majority of the

cases the environmental conditions were good. In only six cases were the environmental condition suspected as being the most important factor for poor speech production.

CHAPTER VII

CONCLUSIONS

So far as may be judged from these 42 cases, it may be reasonably said that:

1. The size of the cleft does not significantly determine the type or degree of speech difficulty.
2. One primary operation can now take care of the less serious cases, while three or four operations are needed for the more severe cases.
3. Multiple secondary operations are rarely needed.
4. The Veau and Langenbeck operative procedures are used most often for the repair of the palate, whereas the Mirault-Blair technique is used most often for the repair of the lips.
5. Tonsillectomies and adenoidectomies are not routine operations, before or after palate repair.
6. Assuming that surgery is completed by the time the child is 3 to 3½ years old, speech development generally begins after surgical repair.
7. Without formal speech training, a third of all cleft palate cases will have speech equal to that

of the normal speaker. When speech training is given, the majority will show speech improvement.

8. The cases within the ages of 2 to 5 years who have been operated will tend to either have delayed speech, or speech rated as normal.
9. Regardless of whether the cases have had formal speech training, the greater percentage are likely to be judged by the lay person to have speech equal to that of the average speaker. Conversely, regardless of whether they have had formal speech training, over a third of the cases will have typical cleft palate speech.
10. The speech problem may not always be caused by the labial and palatal clefts.
11. The peripheral speech mechanism is slightly better functionally than anatomically.
12. Dental attention is inadequate, but in the majority of cases the dental structure does not adversely affect speech.
13. Passavant's cushion and the tongue frenum seemingly do not often influence speech.
14. Pharyngeal muscular movement is greater than palatal movement.
15. The structure and mobility of the palate is about twice as effective for the cleft palate

case with normal speech as for the one with typical cleft palate speech.

16. There is evidence of tongue protrusion on the postdental sounds and a tongue thrust movement in swallowing.
17. Intelligence seemingly has a determining influence on the speech of the cleft palate case in the same degree as for the non-cleft palate case.
18. The majority of the cases have scarred, thickened, and retracted ear drums without noticeable affect on hearing acuity.
19. If the congenital anomalies are not considered, the general physical condition of the cleft palate child will not deviate significantly from that of the normal person.
20. The cleft palate case may be found in either the high, medium, or low socio-economic class, but more often in the medium class.
21. Personality deviations may be expected in about a third of the cases.

In view of the following, it is evident that speech therapy is not automatically indicated for the postoperative case; instead, each child must be considered as presenting an individual problem, which must be dealt with on its merits.

APPENDIX

Articulation Test

The little round stove burned cheerily. Santa Claus sat sleeping quietly in his favorite chair after supper of bread and jelly. Suddenly the toy frog jumped up on the window -- "get up you lazy toys, let's help Santa get things ready for next Christmas. On this card I have written what we should do to help him. Come, old lady put the flower on the girl's dress; she also needs a sweater. Rabbit take this knife, you can finish the wheel on the carriage, and wagon. Monkey, elephant, duck and horse get busy. There is the clock and watch without hands; the broom needs straw; and the banana, the lemon, and the grapes need coloring. Puppy stop winding the string around the scissors. Go, bring the wood for the blocks." Up the stairs ran puppy. Suddenly there was a loud clash; dishes seemed to fly down the steps. Then came the wood, an unfinished fish, a shovel, a bicycle, a cradle, a trunk, a sled, a skate, and a little fence. The toys stood still. Santa opened his eyes. "Not for a minute can I trust these toys," he said, "they are always getting into trouble. Ah, there's puppy half hidden under a plate, and only one cookie left. Oh, dear, he broke the tooth and thumb of the mother doll. Yes, I shall have to lock these toys up, then they will be good. Who put the sand in my

pipe?" A tiny twinkle came from puppy's eyes. "Ho-hum, it's seven o'clock; I must get back to work."

Words

1.	stove	20.	plate	38.	girl
2.	wheel	21.	sled	39.	pipe
3.	jelly	22.	blocks	40.	puppy
4.	carriage	23.	grapes	41.	scissors
5.	shovel	24.	skate	42.	dress
6.	dishes	25.	knife	43.	sweater
7.	fish	26.	wagon	44.	yes
8.	trunk	27.	monkey	45.	lemon
9.	clock	28.	sand	46.	broom
10.	Santa Claus	29.	banana	47.	thumb
11.	breakfast	30.	rabbit	48.	tooth
12.	card	31.	cookie	49.	they
13.	old	32.	duck	50.	mother
14.	lady	33.	chair	51.	seven
15.	frog	34.	watch	52.	half
16.	cradle	35.	lady	53.	bicycle
17.	window	36.	elephant	54.	fence
18.	stairs	37.	flower	55.	horse
19.	string				

Articulation Test

La Veille de Noël

M. Buchanan

Il était une fois un ferblantier très pauvre. Il travaillait toujours bien fort dès la premiere lumière du jour, mais comme ils étaient neuf dans la famille, il n'y avail jamais assez à manger. Au dîner, comme au déjeuner ce n'était que des fèves, des pruneaux, et du fromage, avec quelquefois des oignons et un peu de poisson, mais jamais de viande, jamais de biscuits sucres, jamais de bananes.

La veille de Noël le ferblantier était triste et découragé. Dehors la moitié des troncs des arbres étaient recouverts de neige. Le pinceau du bonhomme Hiver avait décoré de petits dessins toutes les vitres et au toit pendaient de grands glaçons. Dans la maison il faisait presque aussi froid que dehors, car il n'y avait plus de charbon. Dans le fourneau rien que des cendres. Sur la table il n'y avait que des plats vides, une tasse et une soucoupe vides aussi. Rien dans le panier aux provisions, rien dans les marmites.

Tout d'un coup, on entendit comme trois coups de marteau. La porte qui n'était pas fermée à clef s'ouvrit et un petit monsieur bien rond entra. Toute surprise, la mère se leva et lui offrit une chaise.

"Excusez-moi," dit-il. "Je voudrais savoir s'il demeure ici un petit garçon qui s'appelle Pierre."

"Oui, monsieur," repondit la dame, "mais il est au lit car mes enfants se couchent toujours de bonne heure."

"Tant mieux," dit-il, le sourire aux lèvres. Je suis le facteur; Pierre a écrit une lettre au Père Noël, mais comme il avait oublié le timbre, le la lui rends. Puis il remit son chapeau et sortit.

"Quel malheur'" s'écria la mère. "J'ai vendu ma montre pour acheter de quoi manger. Il ne me reste que la bague que ma mère m'a donnée avant mon miriage. Nous n'avons même pas d'argent pour faire venir le docteur quand les enfants sont malades. Et maintenant le Père Noël ne viendra pas."

A ce moment le bébé se mit à pleurer. Se mettant à genoux à côté de son berceau, la mère lui parla doucement.

"Petite bouche, petit nez, petits bras mignons! Qu'est-ce que tu as, mon pauvre petit? Ah voilà! Cette élastique est serrée comme un cordon!"

Puis, soudainement, elle vit briller une épingle par terre.

"Mais d'ou vient cette épingle. "s'écria-t-elle, allumant une allumette pour mieux voir. Elle est en or et ornée de pierres précieuses!"

"Quelle chance!"s'écria le père. "Maintenant nous

pouvons acheter ce qu'il nous faut pour Noël. Une fée a dû la placer là."

Le lendemain matin les enfants se levèrent tous de bonne heure. Quelle fut leur surprise! Au radio on entendait de la musique. Le salon était beau comme une image dans un magazine. Un beau tapis bleu couvrait le plancher. Un nouveau balai avait nettoyé toute la maison qui était belle comme un palais. C'était comme la citrouille de Cendrillon changée en carrosse.

"Vite, mes enfants, voici du savon pour vous laver," dit la mère, "et n'oubliez pas de vous servir aussi de votre peigne." Bientôt les enfants furent tous prêts et ils commencèrent à ouvrir les cadeaux. Pour les enfants en âge d'aller à l'école il y avait du papier, des crayons, et des gommes; pour Pierre un livret d'images de toutes sortes d'animaux -- des vaches, des cochons, des lapins, des grenouilles, des singes; puis des vetements -- chandails, souliers, mitaines pour tout le monde; et des jouets -- une petite pelle, une voiture, un aéroplane, et un petit téléphone.

Le soir lorsque les enfants furent à nouveau endormis, le père et la mère parlaient encore du miracle de l'épingle. "Je ne comprends pas encore d'où elle est venue," fit la mère.

"C'est moi qui l'a laissee,"fit une voix.

Ils se retournèrent et vivent le Père Noël.

"Mais vous n'êtes pas venu...." s'écria la mère.

"Si, madame," répondit-il. "C'était moi, le facteur!"

Words

1.	cochon	23.	elastic	45.	citrouille
2.	bouche	24.	chapeau	46.	docteur
3.	couche	25.	nez	47.	timbre
4.	crayon	26.	neuf	48.	bras
5.	chandail	27.	furneau	49.	cendre
6.	dejeuner	28.	bague	50.	biscuit
7.	genon	29.	savon	51.	lumiére
8.	singe	30.	pinceau	52.	berceau
9.	lapin	31.	tasse	53.	cordon
10.	balai	32.	chaise	54.	plat
11.	pelle	33.	poisson	55.	aeroplane
12.	soucoupe	34.	vache	56.	glaçon
13.	banane	35.	feve	57.	épingle
14.	téléphone	36.	marmite	58.	sucré
15.	allumette	37.	mariage	59.	soulier
16.	montie	38.	viande	60.	ferblantier
17.	gomme	39.	clef	61.	panier
18.	mutaine	40.	bleu	62.	papier
19.	grenouille	41.	table	63.	charbon
20.	bébé	42.	fromage	64.	pierre
21.	oignon	43.	marteau	65.	voiture
22.	peigne	44.	tronc	66.	savoir

Words (Con't.)

67. radio
68. levre
69. livret
70. magazine
71. pruneau

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VITA

Sara Mack Ivey was born in Hartford, Alabama, October 30, 1911. When she was two years old, her family moved to Bluffton, Georgia. She received her primary and secondary education in the public schools of Bluffton and Americus, Georgia. After being graduated from the Wesleyan Conservatory, Macon, Georgia (1931), she taught Dramatics in the Chase Conservatory, Columbus, Georgia, for seven years. In 1939 she received the A.B. degree from Duke University, Durham, North Carolina. The next two years she taught Speech in the Thomasville High School, Thomasville, Georgia. From 1941-'42 she was employed as Associate Educational Director of Dental Health for the Georgia Public Health Department. In September of 1942, she entered Louisiana State University, and became a candidate for the degree of Master of Arts in August, 1943. After receiving the M.A. degree from Louisiana, she became Assistant Professor of Speech at Wesleyan College, Macon, Georgia. She returned to Louisiana State University in September, 1946, to begin the work toward the degree of Doctor of Philosophy. In July, 1947, she went to Montreal, Quebec, where she served as acting Director of the Speech Clinic at the Children's Memorial Hospital, returning to Louisiana State University in September, 1948, to continue her graduate work.

From December, 1949, to August, 1950, she again assisted in the Speech Clinic at the Children's Memorial Hospital, Montreal, Quebec, and gathered data for the dissertation. In September of 1950, she became Professor of Speech at Weselyan College, Macon, Georgia. She returned to Louisiana State University the summer of 1951 to complete the work for the degree of Doctor of Philosophy.

EXAMINATION AND THESIS REPORT

Candidate: Sara M. Ivey

Major Field: Speech

Title of Thesis: Forty-two Cleft Palate Case Histories, with a Précis of Recent Literature on Types, Etiology, and Operative Procedures

Approved:

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

Date of Examination:

August 2, 1951