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Team Teaching in Operative Dentistry

Matthew J. Pozen
Loyola University Chicago

TEAM TEACHING IN OPERATIVE DENTISTRY

by

Matthew J. Pozen

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LIFE

Matthew J. Pezen was born in Chicago, Illinois, on November 11, 1936. He graduated from St. Joseph High School, Chicago, in June, 1954, completed the predental curriculum and received the Doctor of Dental Surgery degree in June, 1962, from Loyola University, Chicago. He served as a Lieutenant in the dental corps in the United States Navy from 1962 to 1966. He taught in the operative dentistry department at Loyola Dental School, Chicago, from 1966 to 1967. In September of 1967 he returned to active duty in the navy with the rank of Lieutenant-Commander and was appointed assistant director at the Naval Dental Assistants School, San Diego, California.

DEDICATION

The author wishes to dedicate this paper to the following two faculty members at Loyola University:

DR. PAUL T. DAWSON

PROFESSOR EMERITUS AND FORMER CHAIRMAN

DEPARTMENT OF OPERATIVE DENTISTRY

and

DR. MELVIN P. HELLER

ASSOCIATE PROFESSOR, DEPARTMENT OF EDUCATION

Both of the above two men fulfill the true role of a teacher. . . to inspire students.

PREFACE

This study will investigate the various facets of team teaching and conduct an inquiry into its basic tenets as formulated by professional educators. The application of these principles will be directed to the subject of operative dentistry. The purpose in preparing this thesis is to utilize basic principles of a psychology of learning and curriculum construction to improve student learning in an operative dentistry technique course by adhering to the concepts of team teaching.

The authorities in a given facet of team teaching will be researched in the educational journals and textbooks and will thereby provide the basis for the theoretical background of team teaching. Specialists in operative dentistry will be researched in dental journals and textbooks to determine what they consider to be of importance in learning this dental discipline. By applying the rationale of team teaching to operative dentistry the attempt will be made to show how effective teaching can improve student performance.

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CHAPTER I

INTRODUCTION

The primary functions of an educational institution are teaching, learning, and research. All three aspects ought to be properly balanced if the colleges are to truly educate the young adults who are to be the informed members of our society and from which creative and imaginative leaders will emerge. The liberal education experienced by students during their four years of undergraduate study will provide them with the opportunity to free their minds, to recognize alternatives, to make a choice and then to act on that choice. In such a manner they can thus rationally pursue their individual preferences by continuing their education in a graduate or professional school, or perhaps seek a position with an establishment. Businessmen, industrialists, military strategists, and coaches of sports activities have realized that whenever two or more people working together in a cooperative manner plan according to a common set of objectives, there is an increase in achievement. A team effort presents more people with new ideas, different approaches to problem solving, and a keen awareness of alternatives.

The administration of a dental school presents unique situations which must be properly managed if a smooth and continuous operation is to be maintained. A part time faculty is a necessity in some areas of the country where insufficient full time men might not be procured. The usual reply to

the question of why more full time men are not employed is that the dentist can receive a remuneration for his services that cannot be equalled anywhere but in private practice. As a result the part time faculty member provides an important function in a dental school setting but because of his personal commitment to his practice he is restricted in contributing continuous informative and creative criticism within the school environment. Since his primary interest is his practice, he may not be able to direct his time to such areas as dental curriculum, the application of learning theories, and the proper evaluation of student performance. Their presence is a necessity in many instances and as such ways must be devised to pool their talents with the full time faculty.

A team approach to teaching courses in a dental school is tacit but there has been little accomplished to present a sound rationale which would implement a truly cooperative effort of dental educators in the instruction of dental students. Each course which has a laboratory session usually has a director of the subject and three or four dentists who are instructors in the laboratory aspect of the course. This is an ideal condition for team teaching to exist, for the necessary prerequisites of common objectives and a team to cooperatively work together in the attainment of goals is present.

With this as a general setting a method of teaching a course in operative dentistry technique will be proposed. First the theoretical framework of team teaching will be presented and then this will be applied to operative dentistry.

Historical Background

In 1956 J. Lloyd Trump, secretary of the National Association of Secondary School Principals provided the leadership to present the main concepts of team teaching. The School and University Program for Research and Development at Harvard University conducted a number of projects and issued reports encompassing team teaching.[1]

Definition

Many definitions of team teaching have been formulated by various investigators but the one evolved by Heller will be utilized in this paper. For him "team teaching exists when two or more teachers regularly, purposefully, and deliberately work cooperatively in the planning, presenting, and the evaluating of learning experiences."[2] Team teaching provides the opportunity for instructors to share ideas, recognize problem areas, and thereby plan cooperatively with one another. The single most important problem that exists in a team situation is the personal relationships. In order for a team to operate at maximum efficiency clear and open communications must be maintained at all times.

Objectives

The immediate and ultimate aim of team teaching is the improvement of instruction. There is a concentration on the attainment of an instructional

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[1] Judson T. Shaplin and Henry F. Olds, Jr. (eds.), Team Teaching (New York: Harper and Row, 1964), pp. 1-3.

[2] Melvin P. Heller, Team Teaching: Questions and Answers (Cleveland: Educational Research Council of Greater Cleveland, 1963), p. 1.

objective by more than one professional person. The team members soon become aware of their assets and weaknesses and thereby complement one another; this causes an increase in the actual professionalization of teaching. This enhances the quality of the content which the students receive. With a team effort teachers must focus on common instructional problems with the result that there is an improvement in the quality of instruction for the student. Another desirable outcome of team teaching is the actual individualization of instruction that is accomplished. In this manner students are able to initiate responsibility for their own learning.[3]

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[3]Melvin P. Heller, Team Teaching: A Rationale (Dayton: National Catholic Educational Association, 1967), pp. 5-6.

CHAPTER II

FACETS OF TEAM TEACHING

Class Organization

There are three basic phases of instructional procedures utilized in a team teaching situation. They are large group presentation, small group discussion, and individualized pursuits. In a large group presentation one person prepares the topic to all the members of the class in a lecture room which can adequately accommodate the students. The major features may be any of the following: 1) a presentation of important facts and concepts; 2) a demonstration via closed circuit television; 3) a film; 4) testing. It is necessary to stimulate inquiry into the various aspects of the material being presented. The instruction can be enhanced by such means as the overhead projector, use of charts, drawings, or a guest lecturer may speak. The teacher who is most competent in any given area will emerge as the leader in a particular phase of instruction. Even though one person presents the large group presentation in the form of a lecture, all the team members contribute their knowledge and ideas to the lecture content. Besides competency in content area it is mandatory that the teacher possess the necessary technical skills for the aspect of instruction he is providing, i.e., a presentation to a large group requires a good speaker who is well organized and is at ease in this setting. We also find that one teacher

is more experienced in a given phase of a subject than another teacher. In this manner students can become highly motivated by being in contact with the best qualified teacher for a particular aspect of a subject.[4] Lectures must be dynamic and meaningful while the facilities are of such a nature that there is optimal visual and auditory accommodations.[5]

The small group discussion or seminar is student oriented and consists of seven to fifteen people. Its primary objective is to stimulate group discussion and to provide an adequate learning environment. The teacher's role in this setting is one of subtle participation; he plans and structures the seminar to achieve a predetermined purpose but he should not dominate the group. In this setting the students have the opportunity to discuss the principles they have heard in the lecture, read in a book, or a problem encountered in the laboratory. They are induced to examine previously held concepts, to clarify issues, and to alter when necessary a mistaken approach to a given problem. The students can become involved in the subject matter, discover its significance, and discuss its true potentiality, rather than just sit passively and accept the material presented by the teacher and return it in a test.[6] The student will be able to report his experiences to the group and they in turn will inject their thoughts, thereby causing an

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[4]J. Lloyd Trump and Dorsey Baynham, Focus on Change--Guide to Better Schools (Chicago: Rand McNally and Company, 1961), p. 30.

[5]David W. Beggs, (ed.), Team Teaching: Bold New Venture (Bloomington: Indiana University Press, 1965), p. 107.

[6]Trump and Baynham, Focus on Change, pp. 24-25.

interchange and acceptance of new ideas. The teacher must have knowledge and experience in group dynamics, he should guide the discussion, stimulate the student to think at a deeper level and to consider the basis for his opinion. He serves as a resource for the group, not a source.[7] It requires time and patience for a teacher to conduct a small group effectively. He must learn to listen to what other people less knowledgeable than he have to say. In this way he can witness how perhaps erroneous concepts are derived and can correct it then or in another large group lecture. He can learn when to enter the discussion and how he can aid students in the thinking and discussion of important ideas. He can identify group leaders, see how students interact with one another, and to what degree they can profit by verbalizing concepts.[8] In essence both students and teachers have much to gain in seminar discussions for both can learn from one another. This arrangement can help students to develop critical reading, to think logically, and to utilize the scientific method of inquiry. They will be able to clarify misunderstandings and gaps in information.

The third instructional procedure in team teaching is the individualized pursuit aspect. This is divided into individual projects and independent study. An individual project is an activity performed by a student which is teacher directed and is of a routine nature. The teacher is not dominant but is readily available for guidance. Independent study is a creative, intellectual inquiry initiated by a student, which is not of a routine nature, but

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[7] Beggs, Bold New Venture, p. 89.

[8] Ibid., p. 107.

rather a self directed depth pursuit free from teacher influence, but whose consultation is given if requested. This form of learning is basically research oriented and it involves students who are seeking a greater depth of knowledge and have the ability and interest to pursue it. This form of instruction can enlarge the student's capacity for self development, for we know that as one learns it is at the level of inquiry that individual differences are allowed their greatest freedom of action.[9]

Individualized pursuits as fostered by teachers will provide for differences in individual interests and abilities. The teacher should attempt to instill within the student the adoption of an attitude which will enable them to want to develop a curiosity beyond the basic content and skills required for a course. The teacher can act as a guide who can suggest further reading and research. Learning is most meaningful and significant to a student whenever he pursues an idea, problem, or experiment which is important to him. What is of interest to him impels him to seek information in related areas. By doing he learns, and by analyzing, synthesizing, and imagining, he utilizes his creative ability and sense of inquiry to generate ideas.

Instructional media and materials

The use of educational media within a dental school is of utmost importance in the learning situation. The team members can decide which

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[9]Trump and Baynham, Focus on Change, p. 45.

medium will fulfill the proper function in any of the three learning situations. Current material aids which can be utilized as a source of learning are closed and open circuit television, radio, tapes, program readers, auto tutors, books, records, films, slides, laboratories, libraries, clinics, hospitals, pictures, charts and mock ups. With the use of visuals the teacher can portray a given idea in a graphic and interesting manner. The overhead projector is one of the best means of demonstrating procedures to students. The teacher can have some students who are artistically inclined to actually produce some visuals while all are welcome to contribute their ideas; in this manner more involvement is produced in the teaching-learning situation. The actual selection and decision of how and where various media will be used is of concern to the entire team even though one person may present it.

Curriculum

The team members must be concerned with the way in which the course they teach blends with the total curriculum. There should be a disciplined approach employed in the development of a unified curriculum rather than a personal preference which a team has accumulated and accepted due to their experience in the field. The attempt to improve the dental curriculum may be provided by adhering to the rationale as formulated by the educator Ralph W. Tyler. Improvement has as its basic tenet the stimulation of growth and learning as well as an alteration of perceptions and values. We must study existing programs and then determine what modifications are required to improve these conditions. Change and improvement are complementary and in

order for this to become a reality effective leadership is a prerequisite for its implementation. The team's purpose in this phase of the study is to investigate each of the facets which comprise the curriculum of a dental student. It should be an inquiry into the basic needs of a professional student which will enable him to understand himself in a unified and integrated way as a person. It will also raise questions which will enable dental educators to seek answers for improving dentistry as a health profession, and to seek ways by means of which the dental profession can provide for the needs of society.

There are four main steps which Tyler utilizes in the design or the improvement of an existing curriculum. They are:

1. Formulation of educational objectives. This is concerned with the knowledge, skills, abilities, attitudes, habits and personality traits a dentist should possess. Educational objectives can be attained by conducting research in the following areas:

a) Characteristics of the learner -- usually young adult males.

(1) A list of sixty to ninety descriptive terms which best depict the learner is compiled by simple recall.

(2) A search of the literature is made to properly determine what knowledge about the learner has been researched.

(3) An open end questionnaire can be devised by the curriculum worker directed toward dental

students. This questionnaire will provide one with the prevailing attitudes, motivations, interests, etc., of the students.

(4) Records from the administrative office are compiled; the following statistical information is obtained: total enrollment, marital status, veterans, pre-dental education, cost of professional education, states represented.

b) Characteristics of the Community

(1) Through recall one simply describes the immediate community of which the institution is a constituent part.

(2) Booklet reports or pamphlets will provide a more intensive description of the community.

(3) The literature via texts, journals, etc., will provide a background for the entire city of which the community is a part. Since a professional student cannot limit himself to the immediate community of which he is a member, it is essential for him to broaden his experiences by participating in the many cultural opportunities that the metropolitan area has to offer.

c) The Content Specialist -- It is mandatory that we seek various opinions of men trained in a specific area in order to determine what is important to know in the field. Information of this nature can be obtained by:

(1) Searching the literature for specialists in operative dentistry to determine what they consider to be important. This can be obtained from textbooks, journals, etc.

(2) Conducting an interview with experts to obtain specific information which may be recorded, tabulated, and analyzed.

With each of these three areas properly researched the curriculum planner then formulates educational objectives that he feels should be attained by the learner.

d) A teacher must present his own philosophy of education.

e) A provision is made for a scientific psychology of learning.

2. Choice of learning experiences. This implies a selection of the main elements of the total educational process. It includes the subject matter to be studied, and its methods of presentation, be it lectures, seminars, technic experiences, and/or clinical procedures. The learning experiences must be of such a nature that through them the student is able to attain the objectives which have been previously outlined. The manner in which this is accomplished is determined by the team members involved within the course. Coupled with this is the educational media and materials

utilized during the learning experience.

3. Organization of learning experiences. There are three ways in which learning experiences can be effectively organized; they are through the achievement of continuity, sequence, and integration within a curriculum. Continuity is viewed as an effective vertical organization; this means that there is a recurring factor in a student's experience with a given subject. Sequence provides for an increase in the breadth and depth of the subject matter. Integration, the horizontal organization of learning experiences, seeks a unified view of the subject with other areas and the behaviour of the student in relation to these areas.[10]

4. Throughout his entire professional education a dental student is continuously evaluated. The evaluation process encompasses such areas as written exams, oral participation, clinical progress, proper patient diagnosis, treatment planning and practical examinations.

Psychology of Learning

As part of the team's development of a sound curriculum it was noted that there should be a provision for a scientific psychology of learning. The modification of behaviour through experience and activity is an acceptable definition of learning. This modification of behaviour in learning occurs in the following manner:

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[10]Ralph W. Tyler, Basic Principles of Curriculum and Instruction (Chicago: The University of Chicago Press, 1965), p. 55.

1. Skill development. The student learns to manipulate wax, handle various filling materials and proper instrumentation.

2. Habit formation. The student develops his own way to carve restorations, set teeth, and examine the mouth.

3. Modification of perception. Increased clinical experiences enables the student to understand the broad implication of occlusion and its effect on the total oral environment.

4. Memorization. The student must know basic facts about science in order to comprehend and interrelate other concepts.

5. Cue reduction. Small, discrete aspects of an experience can produce a given response.

6. Insight improvement. A proper diagnosis can be ascertained by combining radiographic, clinical, and laboratory findings.

7. Change of ideals and attitudes. The views a student holds toward his profession and society must be a part of the dental curriculum.[11]

Additional learning principles which may be utilized by dental educators are provided by the following authors:

A. Eastburg, F. E.[12]

1. Learning periods, of whatever length, have been found most economical when distributed over a prolonged

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[11]Benjamin H. Bailey and Carroll G. Bennett, "Psychology of Learning Applied to Dental Education," Journal of Dental Education, XXX (September, 1966), 298.

[12]Frederick E. Eastburg, General Principles of Psychology (Boston: Bruce Humphries, Inc., 1951), pp. 121-125.

time, with alternating periods of rest.

2. We should consider the whole or part method in learning according to the nature of the material to be learned; if it is comparatively easy to comprehend, the whole method might be preferable; if it is difficult the part method could be employed.
3. The more frequently a given lesson is reviewed, the stronger will be the retention and the greater will be the facility of recall.
4. Learning is rendered more secure by accelerated repetition.
5. Learning is greatly advanced when attended by a purpose to remember what is read.
6. What is previously learned may interfere with subsequent acquisition.
7. Learning is by general principles, just as true memory is of meanings.
8. The ratio of speed of learning to that of forgetting depends upon the subject matter and the individual.
9. Learning which has been hastened is likely to be erroneous, because the material will not be covered to an adequate and representative extent, and will thus be incorrectly remembered.
10. The attitude in which a person learns something will determine to an appreciable degree how he recalls it.

B. Arnold, M. A.[13]

1. Human learning consists in setting up a new goal of knowing or doing and finding rationally appropriate means to achieve it.
2. Learning is favorable when the situation is such that it can be intellectually grasped, that it can be understood.
3. Conditions for learning are favorable when the person is in such a psychological state that he can use his understanding, and that he himself will decide to use it.
4. A human being tries to understand the conditioning situation in some way and thus most adults become conditioned in one or two trials, some do not become conditioned at all, and only a minority need several trials.
5. The most important factor in human learning is human functioning, which includes understanding and deliberate choice.
6. Association is necessary for all learning; recognition of the present situation as requiring the same response as a similar one in the past would be impossible without it.

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[13]Magda B. Arnold and John A. Gasson, The Human Person (New York: The Ronald Press Company, 1954), pp. 331-348.

C. Hall, C. S. and Lindzey, G.[14]

1. Events which strengthen the connection between a given response and a particular cue are called reinforcements or rewards.
2. Learning takes place only under conditions of drive reduction.
3. The more often a given response is made in the presence of a given cue and a particular drive state with no reduction in the drive stimuli, the less likely that cue is to elicit this response in the future.
4. Habits learned in one situation will tend to be transferred or generalized to other situations to the extent that the new situations are similar to the original situation.
5. Reasoning is essentially a process of substituting internal, cue producing responses for overt acts.
6. Planning is a special variety of reasoning, where the emphasis is upon future action.
7. The ability to use language and other response produced cues is greatly influenced by the social context in which the individual develops.

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[14]Calvin S. Hall and Gardner Lindzey, Theories of Personality (New York: John Wiley and Sons, Inc., 1957), pp. 430-439.

Purpose

Educators have realized for some time that the innate ability of each student varies in degree and kind. The approach to teaching, however, has not met this need for individual difference. Students are grouped into a heterogeneous class whereupon mass presentation is the keynote; there is little concern for actual learning by the slow learner or any true accomplishment for the challenging mind of the intelligent pupil. There should be a homogeneous grouping of students. It is felt that team teaching can provide this definite need for individual instruction.

Team Composition

Team teaching can best be described by presenting its many functions and resulting inter-relationships. Essential to its success is continued cooperation among team members. The interests and abilities of each teacher is important. A diversified team includes graduates from different colleges, wide age spans, and experience. A necessary adjunct to team teaching is a responsible secretary who can provide the required clerical duties as filing, typing, etc., for the team. Proper functioning audio visual aids are also of paramount importance for increased student learning. A basic reorganization of instruction is mandatory for team teaching, i.e., the various ways of instruction, namely large group presentation, small group discussion, and individualized pursuits, must be implemented.

Flexible Scheduling

Flexible scheduling implies that the team decides who does what to whom, when, and for what specified duration. The instructional approaches will vary depending upon the needs of the students as determined by the team. The derived benefits from flexible scheduling can be ascertained from teachers and students alike. By its explicit definition flexibility allows periods to be of such a duration that they can be altered to meet the needs of a given objective. Teachers actually have additional time to plan and to be a consultant.[16] A flexible schedule gives the teacher time to aid the slow learner while the rapid learner can experience independent study. In essence the schedule's primary concern should be the individual student and what innovations can be implemented to improve the quality of instruction in order to enhance student learning.[17]

Team Cooperation

One of the most important aspects of team teaching is the existing cooperative attitude among the team members; this is produced by the team actually experiencing perpetual interaction, communication, and coordination. The team must possess an inherent flexibility which allows for the uniqueness of students and the fulfillment of their needs through the individualization of instruction.

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[16]William Georgiades and Joan Bjelke, "An Experiment in Flexible Scheduling in Team Teaching," Journal of Secondary Education, XXXIX (March, 1964), 136-143.

[17]James Angrave, "Team Teaching and Nongrading," Canadian Education and Research Digest, V (March, 1965), 48-49.

There are some specific outcomes which team teaching produces. The staff should be able to contribute their ideas and the administration should view them as means of attaining instructional goals. Since there is an equal sharing of the load the competency of each member will emerge at the appropriate time. The members support one another without fostering dependency needs and the flexibility of the group allows for the unique needs of the students to be adequately met through individualized learning experiences. The team must be properly organized in order to attain its commitment and it must be able to look at itself in an objective manner and thus evaluate its existing program.[18]

The team works together in a cooperative manner, has implied responsibilities, and is able to meet its goals with an objective understanding of its inherent strength. The actual teaching is presented by one member of the team but all have contributed substantially at the planning sessions.[19]

The existing attitude of the teachers involved in a team approach to educating students is important. Those teachers who generally would not blend well in this manner of teaching are those who prefer to teach in the self contained classroom and does well in so doing; the insecure teacher may have some inner difficulties when confronted with his colleagues; the expert

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[18] R. W. Reasoner and H. R. Wall, "Developing Staff Interaction in Team Teaching," XXXXIV (January, 1965), 84-86.

[19] Judson T. Shaplin, "Cooperative Teaching: Definitions and Analysis," Education Digest, XXX (April, 1965), 25-28.

will not work well with the other team members. A team will function to its maximum if each member is enthusiastic, willing to experiment, and has a cooperative attitude.[20]

A potential team should investigate the following areas before teaming is inaugurated within a school: 1. Read the literature and discuss the problems with the teachers. 2. Be sure that adequate facilities are available. 3. The personnel who comprise a team must be compatible with one another. It is better when leadership emerges within a team rather than assigning a team leader; if the latter is the policy it must be done on a democratic basis. Each team member must be aware of his individual responsibilities and assignments. 4. The resource center of the institution must be revamped. Additional reading material must be supplied, as books, journals, manuscripts, etc. 5. The evaluation of the entire program must be a continuous ongoing process. Proper planning is of utmost importance and coupled with this is clear and open communication among team members.[21]

The relationship among team teachers must be of such a nature that they share instructional tasks and goals. They must plan together and assign appropriate tasks to the individual team members. They must witness one another teach and join together in the evaluation of instruction by conducting discussions based on their observations of students, teaching, and teachers.[22]

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[20]Carl H. Peterson, "Team Teaching's Three Variables," The American School Board Journal, CIL (November, 1964), 15-17.

[21]Stanley Seaberg, "Team--But Teach," Clearing House, XXXVIII (November, 1963), 167-169.

[22]Shaplin and Olds, Team Teaching, p. 9.

Team Meetings

The team meeting is a tool to plan and improve team teaching and as a tool the members must learn how to utilize it in an effective manner. They must be willing and able to work together. The primary purpose of the meeting is planning and evaluating of the learning experiences. Here they can discuss present and future revisions in the curriculum, the preparation of the daily projects, and the formulation of policies concerning grading and assignments.[23] The team analyzes the instructional needs of students, the provisions necessary for the optimum groupings for instruction, and what way the curriculum and teaching methods must be adapted to implement these new arrangements.[24] A concern of each team member is a willingness to implement something new which will become directly beneficial to the student.

The three components of the teaching configuration, large group, small group, and individualized pursuits need not necessarily follow in the order mentioned. In some instances they may be reversed or repeated. The objective must first be determined and then the configuration can be decided upon by the team.[25]

Constructive criticism of team performance is essential for team efficiency. Each member must not only criticize in a constructive manner but

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[23]D. E. Rens, "What is the Role of the Team Meeting?," Wisconsin Journal of Education, LXXXVIII (September, 1965), 24.

[24]Shaplin and Olds, Team Teaching, pp. 12-13.

[25]J. E. Morlan, "The Team Approach to Large Group Instruction," Audio Visual Instruction, IX (October, 1964), 520.

he must present an alternative to improve the object of criticism. He must be honest, direct, impersonal and have the criticism remain within the team meeting. Since the members function as a team a failure in any of its operational endeavours is a reflection of the entire team and not one individual member.[26]

Role of the Administrator

Whenever the question of team teaching arises, administrators should not be indecisive about its worth, but rather they should be concerned about its organization and implementation. Two aspects of team teaching must be understood if it is to achieve its goals; they are managerial and technical functions. The managerial function is concerned with the grouping of pupils and the resources of personnel. The limits involved in student grouping are the time factor, the number of students, and the number of teachers. The technical functions attained are curricular development, instructional organization, effective teaching methods, and the appraisal of the program.[27]

Team teaching must be clearly understood if an effective program is to be inaugurated within a school. Administration intent is of utmost importance for without genuine leadership the program will be ill directed and failure is a certainty. The administrator must be cognizant of the many existing programs of team teaching; he can thus select the one which will fulfill the needs of his school. The objectives he desires to attain and the proper

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[26]Rens, "Role of the Team Meeting," p. 24.

[27]Shaplin, "Cooperative Teaching," pp. 25-28.

structuring of means by which this can be accomplished is also outlined by the administrator. At the outset one team should be implemented first to keep the degree of confusion at a minimum.[28]

The administrator has a definite role in creating a cooperative atmosphere among his staff. He must encourage an expression of teacher ideas; he must have a definite faith in their competencies and experiences. He must seek their opinion in certain areas concerning improvement; he must be able to delegate authority. The administrator must encourage more involvement among his staff members and thereby produce a more effective attainment of instructional goals through a team effort.[29]

Communication

Whether ideas are conveyed by team members, students, and/or administrators through verbalized or written exchanges, this must be accomplished through free and open communications. We may define communication as the "transmission of facts, ideas, values, feelings and attitudes from one person or group to another."[30] The basic elements in communications are the sender, the message, the receiver, the channel, and the effect produced. Barriers to effective communication are variable meanings of words, perceptions of the sender, and motivation of the receivers. Inaccuracies in communication

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[28]Peterson, "Team Teaching's Three Variables," pp. 15-17.

[29]Reasoner and Wall, "Developing Staff Interaction," pp. 84-86.

[30]Ronald C. Doll, Curriculum Improvement: Decision Making and Process (Boston: Allyn and Bacon, Inc., 1966) p. 233.

are due to various social backgrounds, multiple definitions of words, and unique experiences of people. Some receivers desire general superficial information while others want specific, thorough and complete messages.[31] Much communication occurs informally outside formal, prepared channels. True communication occurs only when we give ample opportunity for feedback from receiver to speaker. Communication does not automatically teach.

Leadership

The educational leader, be he administrator or team chairman, must perform such tasks as the setting of goals, facilitating teaching and learning, plan productive organization, and create a stimulating environment for change. A creative professional leader is a person who "purposely and significantly influences the actions, experience, and development of others."[32] Leadership qualities must be developed in those people who possess the basic ingredients. There are certain recognized traits which leaders are said to have in common. He must be empathetic, i.e., he must be able to respond to and identify with the emotional needs of the group while the group must surely identify with him. He must be enthusiastic, alert, and expressive. He should be emotionally controlled which is evidenced by his ability to deal effectively with aggressors and tension producing

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[31] Ibid., pp. 234-235.

[32] R. S. Poor, "The Social, Economic, and Political Responsibilities of a Health Profession," Journal of Dental Education, XXV (March, 1961), 23.

situations. He must be socially adept and intelligent but not too intelligent so that the group feels inferior to him.[33] The leader accepts his responsibilities because he desires tasks which provide a challenging and stimulating environment.

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[33]Doll, pp. 153-154.

CHAPTER III

APPLICATION OF TEAM TEACHING TO OPERATIVE DENTISTRY

It is at the team meeting that each member can constructively contribute to the planning phase of the entire program. Here the team together decides which learning experience will be presented first and what sequence will be followed for the entire course. In some colleges having one hundred students in a laboratory course in operative dentistry, there usually are five instructors involved as team members. The manner in which they can plan, present, and evaluate learning experiences in the form of large group, small group, and individualized pursuits will be presented after a brief description of operative dentistry is given.

Operative dentistry is that branch of dentistry concerned with those procedures which when applied to the exposed surfaces of the teeth, prevent pathologic processes in these areas, or if disease and deterioration have occurred, restore them to normal physiologic and esthetic appearance. Its functions are thus preventive and restorative.[34] Basically the course has as its primary objective to teach the students the diagnosis, classification, principles, and techniques employed in the treatment of caries and defects of the teeth. It is concerned with the principles of cavity preparation and design in relation to the histologic structure of the teeth and the occlusal

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[34] H. O. McGehee, H. A. True, and E. F. Inskipp, A Textbook of Operative Dentistry (New York: McGraw Hill Book Co., Inc., 1956), pp. xvi-xvii.

forces that the restoration will receive. It deals with the physical, chemical, and esthetic properties of the various filling materials, methods of manipulation, and the indications and contraindications of their use.

Large Group

In the large group presentation one dentist lectures but all of the team members have significantly contributed to its content. The dentist who is most competent in a given area of operative dentistry should be the speaker for a particular class session. He presents major concepts which provide the theoretical basis for operative dentistry as well as providing the necessary information which will enable students to understand and do the requisite technical projects in the course. The following list is a series of suggested topics which could be emphasized for a two semester course in operative dentistry. The team may add, delete, or alter the sequence of the topics presented. These topics can be referred to as units which contain main concepts encompassing the theoretical basis for operative dentistry and are best presented in a large group setting.

Suggested Topics -- Theory.

1. Introduction to Operative Dentistry.

    a. Definition
    b. Objectives of the course.
    c. General overview of course content.

2. Instruments.

    a. Classification according to use.
    b. Proper instrument grasps.
    c. Use of instruments in various operative procedures.
    d. Care and sterilization of instruments.

3. Dental Caries.

   a. Etiology
   b. Sequelae of hard tissue diseases.
   c. Prevention.
   d. Recent research findings.

4. Cavity Preparation.

   a. Classification of cavities.
   b. Forms of cavities
      (1) Outline Form
      (2) Resistance Form
      (3) Retention Form
      (4) Convenience Form
   c. Proper cavity design.
   d. Steps involved in cavity preparation.

5. The selection, advantages, disadvantages, and recent research findings of restorative materials.

   a. Amalgam.
   b. Cast Gold.
   c. Gold Foil
   d. Resins
   e. Silicate Cement.

6. The use of temporary fillings.

   a. Zinc oxide and eugenol.
   b. Gutta percha.
   c. Zinc oxyphosphate.
   d. Cavitec.

7. The use of lining materials.

8. The use of the rubber dam.

9. The use of matrices.

10. Manipulation, insertion, and finishing of restorations.

11. The use of impression materials.

   a. Types
   b. Advantages
   c. Disadvantages.

12. Factors of dental histology related to operative dentistry.

13. Techniques of administration of local anesthesia as it relates to operative procedures.

14. Pulpal and periodontal considerations in operative dentistry.

15. Diagnosis and treatment planning in operative dentistry.

The general sequence of cavity preparations proceeds from the simple skills to the more complex. The team decides the number and types of cavity preparations each student will perform. The following list is a series of suggested projects that students may perform in a laboratory and which would require large group instruction.

Suggested Projects -- Laboratory.

1. Introductory skills in cavity preparation.

   a. Class I Amalgam
      (1) Mandibular bicuspids and/or molars.
      (2) Maxillary bicuspids and/or molars.
   b. Class I Foil
      (1) Mandibular first bicuspid.
      (2) Maxillary bicuspid.

2. Fundamental Skills.

   a. Class V Foil - mandibular cuspid.
   b. Class V Silicate Cement - maxillary lateral incisor.

3. Application of restorative materials to operative dentistry.

   a. Amalgam
      (1) Proper trituration.
      (2) Expression of mercury.
      (3) Condensation, carving, and finishing.
   b. Silicate Cement
      (1) Sufficient spatulation.
      (2) Proper insertion and finishing.

4. Intermediate skills.

   a. Class III Silicate - mesial surface maxillary cuspid.
   b. Class II Amalgam - MOD maxillary molar.
   c. Class II Foil - MO mandibular bicuspid.

5. Advanced skills.

   a. Class IV Inlay - DI inconspicuous central incisor.
   b. Class II Inlay - MODBL mandibular molar.
   c. Class IV Inlay - MID mandibular central incisor.
   d. Class III Foil - distal surface maxillary lateral incisor.
   e. Class III Foil - lingual approach maxillary central incisor.

6. Application of advanced skills to new situations.

   a. Amalgam.
      (1) Matrix retainers and their use.
      (2) Proper placement of wedge.
      (3) Insertion and reconstruction of proper contact and contour.
   b. Cast Gold Inlay
      (1) Direct and indirect techniques.
      (2) Impression materials.
      (3) Fabrication of dyes.
      (4) Carving, sprueing, and burnout procedures.
      (5) Finishing, polishing, and cementation.
   c. Gold Foil
      (1) Annealing process.
      (2) Serrated plugger points.
      (3) Correct line of force for proper insertion.
      (4) Finishing and polishing.

Anderson[35] states that there is a great difference in human capacities, levels of preparedness and the motivations of students and as such the attempt to have all students move at the same rate is outdated. He advocates that a student ought to be educated in a manner that is compatible with his

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[35]Percy G. Anderson, "Practical Applications in Accelerated Preclinical and Clinical Teaching," Journal of Dental Education, XXVIII (June, 1964), 130.

abilities. A study of an intensive course in operative dentistry was completed by Darby, Chen, and Podshadley, and they concluded that ways must "be found which will make possible a reduction of the bulk of the curriculum without sacrificing content."[36] The course had four main components: time compression, correlation between classroom and clinical procedures, increased complexity of skills, and the implementation of audio-visual aids in the lectures.[37]

Vanek, Chen, and Podshadley determined that a concept or skill should be taught in terms of the logical relationships of the component parts, a synthesizing of these parts into meaningful wholes for student participation, and selecting a medium which will provide for adequate delivery. For any innovation they feel that the benefits which students derive is of utmost importance.[38] The components which constitute the essence of preclinical technique are:

1. Symptom identification of pit and fissure defects.
2. Opening into the tooth.
3. Cavity preparation, with attention called to conservation of tooth structure, proper design of the preparation, and elimination of undermined enamel rods.

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[36]D. W. Darby, M. K. Chen, and D. W. Podshadley, "Experimental Study of an Intensive Course in Operative Dentistry," Journal of Dental Education, XXIX (December, 1965), 419.

[37]Ibid., p. 420.

[38]H. G. Vanek, M. K. Chen, and D. W. Podshadley, "Evaluation of a Self-instructional Method Used in Preclinical Operative Dentistry," Journal of Dental Education, XXXI (March, 1967), 34-35.

4. Restoration, with attention called to mixing and placing the amalgam, condensing, removing excess mercury, and carving.[39]

The lectures presenting the technical aspects of operative dentistry should be of such a nature that a full use of media is properly utilized. Slides should be presented via an overhead projector upon a screen for all students to view. This series should contain first a large scale drawing of a tooth, second, carious lesions on the surface of the tooth, and third, a completed preparation for the tooth. A picture of a carious lesion of this same tooth in a clinical patient's mouth should be projected on the screen followed by a radiograph of this lesion, and a completed preparation of the patient's tooth. Since the students are to complete the preparations in ivorine teeth arranged in a dentec, slides depicting the preparation for each ivorine tooth should be projected on the screen. The theoretical framework explaining the various forms of cavity preparation, i.e., outline form, resistance form, retention form, and convenience form, should be presented throughout this entire series.

Through such media as a movie or closed circuit television the students should be able to witness a dentist actually prepare a tooth for a patient or on a manikin. The students can view the various stages, steps, and procedures involved in proper instrumentation, bur selection, and drilling as it relates to the finished product. Each phase of the operation should be explained as the procedure is being performed. Principles, techniques,

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[39] Ibid., p. 36.

and problems encountered should be stressed. The students will be able to see and understand what excellent performance and standards are and thus will have a firm basis and an idea of what they should strive for when they perform a given project.

Individual Projects

A most important phase of learning occurs for the students when they actually perform the individual project. They are anxious and willing to begin work but in some instances the students do not know precisely how to begin or what to do. While an instructor has presented the lecture and given a demonstration and thus may feel his task is finished, unfortunately this is not what causes a student to learn. The lecture and demonstration are necessary adjuncts to the learning process but it is a concept that must be grasped by the student. The teacher must present analogies to the student in order for a concept to be formed and thereby cause effective learning.

At a designated area in the laboratory there should be some means provided where students can view each project that is to be completed in the two semesters. On a table could be gypsum models of teeth with finished cavity preparations indicating the dentin, enamel, and pulp in yellow, white, and red colors. Since these models are seven times the size of natural teeth the student would be able to visualize the depth, width, inclination of the walls, etc., with respect to these anatomic relationships. Mounted sections of extracted teeth should be available for the student to gain insight into the actual reality of tooth form and variations in anatomic structure. Charts and placards strategically placed along the walls could provide

information showing the various steps in cavity preparations and filling insertions. All of these models and charts could be changed with each new project or perhaps a small room could be available where these are always available and a student could inspect them at his own pace.

Since one instructor is in charge of twenty students he should have a large plaster tooth with the cavity preparation completed for each project. Each instructor should have a model for the group assigned to him. In addition, each instructor should have a cavity preparation completed in a natural and ivorine tooth for every project so that each group of students can view and inspect them. The students will have heard the lecture in the large group presentation with proper diagrams, radiographs, slides, etc., studied the charts, models, and tooth sections in the laboratory, and inspected the preparations as completed by the instructors. They then can pursue the individual project themselves.

The instructors can walk among the students, answer questions as they arise and provide necessary demonstrations. This can include such areas as instruction on the use of the contra-angle handpiece, correct finger rest positions, proper instrumentation, effective filling, finishing and polishing procedures, ease of rubber dam placement, etc. Demonstrations should be limited to three or four persons as the confined area of the dentec is not amenable to a much larger group of observers. A given procedure may thus have to be repeated several times if all students are to benefit from the demonstration. The instructor cannot be an authoritarian figure nor can he adopt a laissez faire attitude. He must be actively involved in the

situation as it exists, thereby becoming an effective teacher who can produce a dynamic learning environment for the student.

Independent Study

The independent study aspect of learning was presented in a previous part of this paper. Any attempt to structure the task for the student would defeat its purpose. Since this is research oriented the teacher must have a knowledge of research methods, statistical concepts, and experimental design. He acts as a consultant for a student who desires to pursue his own interests in greater depth.

Small Group

The small group situation, as it applies to the dental school setting, can exist in one of these forms: clinical observation, field trips, or seminars. Not all of the concepts gained in operative dentistry need to be limited to the laboratory. An emphasis of having only one way to learn a subject is quite outmoded. To continuously have one project in the laboratory followed by another is repetitious, boring and non-stimulating to the student. A means must be provided for an integration and correlation of the various dental disciplines.

Each student should be assigned to a senior clinical student during his freshman year. The informal setting of the clinic should provide a working relationship which is conducive to learning. The senior student can point to the carious lesions as they exist in the mouth and how they appear on the radiographs. He can present his method of diagnosis and

demonstrate proper chair positions and instrumentation procedures. Through observation the learner can see a local anesthetic being given, proper clamp and rubber dam placement, the steps and procedures in cavity preparation, selection and placement of a base, and insertion, carving, and finishing of restorative materials. There can be a significant increase in achievement in the laboratory after a student has had minimal contact with clinical observation.

Field trips can also be an integral part of the learning experience. Small groups could visit the operative departments of other dental schools and observe their general procedures and techniques. A visit to a local hospital could be planned to have students witness the operatory procedures as provided for the patient in this setting. Students can attend table clinics, dental society meetings, and dental programs of similar interest to broaden their experiences.

The seminar discussions, consisting of seven to fifteen people, will enable the student to formulate generalizations and draw conclusions without the direct assistance of the instructor. The teacher can ask questions which will bring about answers for the students by allowing them to discover facts, principles, and relationships. In this setting there can be a correlation of lecture material, experiences with projects and independent study, observation of clinical patients, and outside reading. They can discuss and obtain clarification of such topics as the effective utilization of a dental assistant, the problems they encountered when they performed the cavity preparations, questions of clinical procedures, recent developments in

materials used for operative dentistry and give reports of their respective field trips, meetings, hospitals, community projects, etc.

A very important outcome of the seminars is an improvement in interpersonal skills. Perceptions, communications, critical thinking, and evaluation of experiences is a continuous ongoing process. The students can discuss the behaviour of the patient in the dental clinic and office. They should determine the motives which patients have in seeking dental care. They should become adept at discerning such emotional reactions as tension, anxiety, fear, and what they can do to allay apprehension. Comparisons of various patient experiences can be evaluated. Most important is how the student reacts and feels about providing treatment for patients and what precautions he takes to improve his skills.

By far the most important purpose of the seminar is to discuss the problems of operative dentistry per se. This can best be accomplished by having the students read the literature and bring their ideas to the seminar room for proper discussion and evaluation. Here current thinking and research relevant to the field is discussed.

Such areas as those presented below are conducive to stimulating, genuine interest and participation by students. When considering the pulp with respect to operative dentistry, Gilmore[40] draws the following conclusions: Retention should be placed 0.5mm pulpal to the dentino-enamel junction. If there is 400 microns of dentin present between the pulp and

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[40] H. W. Gilmore, "Pulpal Considerations in Operative Dentistry," The Journal of Prosthetic Dentistry, XIV (May-June, 1964), 753-755.

filling material the inflammatory response produced is caused by the cavity preparation and not the restoration. The temperature at the cutting area of the tooth reaches 270°F in excess of the body temperature. Handpieces with a water coolant running above 50,000 revolutions per minute cause less damage to the pulp than ranges between 6,000 to 20,000 rpm.

One of the functions of a lining material is to protect a tooth from thermal shock and according to Braden[41] it is the thickness of this lining which actually determines its efficiency. Brass[42] believes that the preparation must be so designed that the greater portion of the occlusal force is directed toward the gingival seat. Increased resistance is provided by having a flat gingival floor with square angles. McEwen[43] states that the most important consideration in a Class I or II restoration is to assure that the occlusal margins are not in direct contact with opposing cusps when there is occlusal contact.

The most universally employed restorative material is amalgam and every dentist has seen the results of poor amalgam restorations. Gibb[44] states that 96% of amalgam failures are due to the dentist in that 56% are due to poor cavity preparation and 40% are due to improper handling of

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[41] M. Braden, "Heat Conduction in Teeth and the Effect of Lining Materials," Journal of Dental Research, XXXXIII, 315.

[42] G. A. Brass, "Common Problems Arising from New Developments in Operative Dentistry," The Journal of the Canadian Dental Association, XXX (May, 1964), 299.

[43] R. W. McEwen, "Efficient Restorative Procedures," Dental Clinics of North America, (July, 1965), 346.

[44] G. H. Gibb, "Methods for Achieving Improved Amalgam Restorations," The Journal of the Canadian Dental Association, XXX (July, 1964), 417.

the amalgam itself. He says that the three most frequent errors in cavity preparation are "inadequate extension for prevention, excessive flare of the buccal and lingual walls, and lack of retention walls."[45] Kasloff[46] states that research indicates that the axio-pulpal line angle should be rounded in Class II preparations and a greater depth should be created in the isthmus. This produces a greater resistance to fracture of the amalgam restoration in this area. Brown[47] found that an important factor causing amalgam fracture was occlusal interference. He also concluded that the occlusal portion of the preparation should be conservative because the masticatory forces will be directed to increased tooth area and not to the small area of the restoration. Hammons and Jamison[48] state that amalgam restorations should be evaluated in the following aspects: anatomical carving, marginal ridge relations, contact, contour, marginal integrity, condensation, occlusion, tissue integrity, postoperative lavage, surface smoothness, consistency, mix and polish.

We can readily see that any discussion about these various aspects of dentistry will truly stimulate student thought and participation. The

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[45] Ibid., p. 414.

[46] Z. Kasloff, "Review of Recent Developments in Materials Used for Operative Dentistry," The Journal of the Canadian Dental Association, (May 1, 1964), 292.

[47] Russell V. Brown, "Pedodontic Utilization of Contributions Made by Operative Dentistry, Dental Materials, and Prosthodontics," Journal of Dental Education, XXX (June, 1966), 228.

[48] P. E. Hammons and H. C. Jamison, "Expanded Functions for Dental Auxiliaries," The Journal of the American Dental Association, LXXV (September, 1967), 669.

ramifications of subject area and experiences are endless and as many facets can be incorporated as the imagination allows. The involvement of all the group members causes an interaction of ideas producing a maximum learning environment.

Correlation

While the primary objective of the course is to teach technical skills in operative dentistry, the correlation of this subject area to other dental disciplines is imperative for proper student learning. Integration of subject matter can be achieved in all instructional procedures of team teaching. One of the most basic concepts in dentistry is occlusion. In a large group setting the lecturer can present the effects of a high restoration on the periodontal membrane. A slide showing the high spot of an amalgam restoration on a clinical patient can be presented. Slides can also depict the effect on the surrounding gingiva of a filling that does not have contact with an adjacent tooth. The results of too great a contact on the periodontium can be related as well. The periodontist in the school should present this aspect of the lecture series and incorporate salient concepts of periodontics as they relate to operative dentistry.

In the small group discussion concepts concerning the operative dentist and the pulp are important to understand. What effect does high speed have on the pulp? How can this instrument or filling materials cause a hypermic pulp? What medicaments and procedures are required to alleviate this condition? During the independent study aspect the role of the biologic, chemical, and physical sciences are all related to the oral environment

as the student pursues an area of inquiry that is of interest to him. The endodontist can present recent research findings of the dental pulp as related to the operative dentist. He can aid in the coordination of further research by interested students.

We can readily see that no one phase provides the best opportunity for correlation and integration of learning experiences. The questions which students raise at a given time can easily become the basis for correlation of related disciplines. Other areas of importance related to operative dentistry are the following:

1. Oral Diagnosis. Through the use of radiographs and a clinical examination the student can locate existing carious lesions and restorations and chart them on the patient's record. A proposed treatment plan can be placed as indicated on another area of the record.

2. Oral Pathology. The etiology of dental caries can be studied which entails the various cariogenic theories, bacterial influences, periodontal diseases and the microscopic studies and slides supporting these scientific disciplines.

3. Dental Materials. The dimensional alterations in amalgam placed in a tooth where saliva was present can be studied. Correct investment materials and casting techniques as they relate to cast gold inlays should be illustrated and discussed.

4. Radiodontics. Bite wing and periapical radiographs will aid the student in locating carious lesions, overhanging fillings and their relationship to bone resorption, and the relation of the depth of cavity preparation to the pulp.

5. Dental Assistants. The proper utilization of an assistant and the role she has during cavity preparation and restorative procedures is emphasized.

Evaluation

The performance of each student must reflect the opinion of each team member. Evaluation includes such areas as written mid-term and final exams, participation in small group discussions, completed individual projects, results achieved in independent study, written assignments, oral reports, and practical examinations. An overconcern for a weekly quiz is not conducive to learning for it may be interpreted as just a routine weekly affair, or the amount of studying required in other courses produces defensive learning by the student.

Evaluation of laboratory work should truly be the effort of a team approach. Each instructor can evaluate the work of every student in the class by rotating the instructors at periodic intervals. For practical examinations students can be assigned a number randomly selected from one to one hundred. When the student completes the cavity preparation he can place the dentec in the appropriately numbered box which has been previously so marked. Each of the five instructors can evaluate the finished preparation independent of one another without consultation and then place a numerical grade on a sheet which has been numbered from one to one hundred. The five grades from each instructor are added and the average is the grade the student receives for the practical. In this manner of evaluation the

instructors do not know which student they are grading, the method is objective, and is fair since all instructors have inspected the preparation and even allowing for individual differences in grading procedures, all the students are affected by it equally.

Since there are discrepancies in the evaluation of student performance it is imperative that a team approach to evaluation be inaugurated as soon as possible. Many students raise complaints concerning the inconsistencies of various instructors in evaluating student performance. The team can rectify this situation by maintaining communication and identifying the criteria in evaluation. Natkin and Guild devised a formal grading system which

> 1.) required that a grade of A be awarded unless an error could be precisely identified; 2.) required errors to be categorized as slight, moderate, serious, or critical; 3.) limited the range of seriousness which could be assigned to some errors; and 4.) defined the relation between identified errors and letter grades.
> ...the evaluation system does not...educate evaluators in initial detection of performance deficiencies; it merely provides guides for behaviour after an error has been detected.[49]

Darby, Chen, and Podshadley[50] state that a student can be evaluated clinically on such traits as removal of caries, outline form, depth of

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[49] Eugene Natkin and Robert E. Guild, "Evaluation of Preclinical Laboratory Performance: A Systematic Study," Journal of Dental Education, XXXI (June, 1967), 157-158.

[50] Darby, Chen and Podshadley, "Intensive Study in Operative Dentistry," p. 421.

preparation, proper retention, margins, contour, contact, and finished restoration. The team members can incorporate other evaluative criteria as they see fit and their concerted efforts can become a truly realistic evaluation of student performance.

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

The general assets of team teaching produces the following conclusions:

1. Team teaching has as its primary objective the improvement of instruction and teaching techniques, and to make better use of teacher time.

2. A diversified team with different backgrounds and experience can cause at the proper time the emergence of an effective leader who will help students attain a given educational objective. Team teaching insures the effectiveness and continuity of working relations by formalizing responsibilities.

3. There is an in-service training program that is an integral aspect to this approach to instruction. The interaction with one's colleagues provides for continued professional growth.

4. With the existence of team teaching within a school there is a high degree of flexibility and open mindedness with the teaching staff. It enables teachers to obtain new ideas from team members and students alike. There is an increased efficiency of materials and equipment.

5. By combining proper curriculum concepts, methodology, and class scheduling, the students will directly benefit from the multiple learning activities which have been adequately designed by team efforts.

6. The amount and depth of subject matter covered will be of greater intensity due to increased research and contributions by all the team members.

7. The increased use of audio visual aids will enable students to have more than one sense tapped and thereby increase their rate and amount of learning.

8. The students can learn from one another as in the small group discussions. In addition, they should be allowed and encouraged to walk about the lab and see what and how another student performs a given task.

9. A team is as strong as its weakest link and that bad link is the uncooperative team member. His uncooperativeness is detected by his silence, which is a lack of communication between him and the team. Communication is of utmost importance; each team member must feel free to express his dissatisfaction with some phase at the planning sessions or the team is doomed to failure. He must be able to do so without fear of retribution. Cooperation must exist in all three phases of planning, presenting and evaluating. Through proper communication knowledge can be related, correlated and integrated.

10. In the seminars students can become aware of their assets and liabilities; they will be subjected to peer group pressures. They will learn to become less dependent upon the teacher. They will see the inter-relationships that exist, begin to correlate and thus integrate their

knowledge. They will be able to think for themselves and thereby direct their own learning. Their main concern will be the clarification of lecture material and the problems that have arisen with their individual projects.

11. Team teaching encourages the extension of the educational process into such informal settings as the laboratory and seminar rooms. This reduces the impersonal aspect of the teaching-learning situation and creates a productive relationship between students and teachers.

12. The team members must air their ideas constantly in order for the instructional goals to be attained. Ideas from students should have some channel by means of which they can be presented to the team. Their ideas may have true merit or perhaps they can be informed as to why they cannot be incorporated into the course. Ideas from all concerned can stimulate involvement which increases morale and can directly affect efficient teaching and increase student learning.

It is recommended that each dental school speculate about the possibility of introducing team teaching in their school. A pilot study of a team in one department can aid the administration in deciding upon its full potential. The team teaching approach as presented in this paper incorporated other dental disciplines and this was specifically intended. Students cannot learn isolated facts without some form of correlation. If a school fully utilizes team teaching, members of various teaching teams can share information about students, their progress, difficulties and

learning ability. They become aware of the total demands made on the students by the entire curriculum and are thus able to schedule major assignments, projects, and examinations accordingly. Through a complete team effort the faculty is aware of the nature of the other courses and thus can seek new ways to correlate and integrate knowledge. It is to this end that dental educators should direct their attention and it is to this challenge that team teaching may provide the answer.

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APPROVAL SHEET

The thesis submitted by Matthew J. Pozen has been read and approved by the director of the thesis. Furthermore, the final copies have been examined by the director and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

February 6, 1968
Date

W P Feller
Signature of Adviser