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LOMA LINDA UNIVERSITY

Graduate School

TECHNIQUES FOUND IN ADMINISTERING
INTRAGLUTEAL INJECTION

by


Lee Lee Santimalapongse

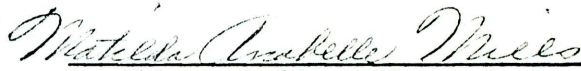
A Thesis in Partial Fulfillment of
the Requirements for the Degree
Master of Science in the Field of Nursing


June 1966

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Each person whose signature appears below certifies that she has read this thesis and that in her opinion it is adequate in scope and quality as a thesis for the degree of Master of Science.


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Lee Lee Santimalapongse

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CHAPTER I

INTRODUCTION AND NEED FOR THE STUDY

Injections, referring to the introduction of a drug into the body by other than the oral route, were first mentioned in the Egyptian Papyrus Ebers of 1552 B.C.¹ The first report of the introduction of medication through the skin appeared to be that of Timonius, a Greek physician.² Hypodermic injections of drugs had been reported by physicians as early as 1844, and the invention of the first hypodermic syringe with a separate slip or joint needle is credited to Charles Gabriel Pravez (1791-1853) of Lyon, France.³

Drugs today can be injected into practically every part of the body by subcutaneous intramuscular injection, intracutaneous, intramuscular and intravenous is the most common of all.⁴

The intramuscular injection was first administered by physicians, but is now regarded as a nursing procedure. Before the introduction of penicillin the physician was trained in the syphilis clinics to give bismuth salts into the gluteus.⁵ One author writes that "the intramuscular injection is best performed by women technicians and nurses,

¹Althel Powers, "Technique of Injection," R.N., 15:30, May, 1952.

²Ibid.

³Ibid.

⁴Ibid., p. 31.

⁵"How to Give Intramuscular Injection," Spectrum, Pfizer and Company, Inc., 12:50, Winter, 1964-1965.

who are lighter of hands and more dexterous than men."⁶ Yet the nurses who perform this function find the following statement to be quite frustrating. "Few of the people who give intramuscular injections today receive adequate formal instruction in the technique."⁷ Lachman pointed out that there has been an increase in accidents and morbidity resulting from the administration of drugs by this route.⁸ The increase of complications and injuries allegedly due to intramuscular injection has led to numerous malpractice suits. In view of this it would seem to be of interest to conduct a study in the area of the technique of administering intramuscular injections. Since the area most commonly used for intramuscular injection is the gluteal region, the observation of the technique, site of injection, and position of the patients that are currently being used by the nurses for the procedure during the injection would seem necessary.

Statement of the Problem

Since literature and experience report an increase in complications and trauma from the intragluteal injection, and since it is the responsibility of nurses to administer the injection, the problem of this study was to find out if nurses were correctly carrying out acceptable technique in administering intragluteal injections.

⁶Ibid.

⁷Ibid.

⁸Ernest Lachman, "Applied Anatomy of Intragluteal Injection," The American Surgeon, March, 1963, p. 236.

Purpose of the Study

Through such a study it was anticipated that the information gained would bring about an awareness of the need for improvement in the technique and it was hoped that this would result in better and safer administration of medication by this route.

Assumptions

It was assumed that the nurses in the study who were involved in the administration of the intragluteal injection had had adequate instruction or had received a course in giving intragluteal injections.

Limitations

The study was confined to fifty registered nurses who were giving medicines by injection in two selected general hospitals in southern California.

The study was directed toward the observation of technique, site of injection and position of the patients with no regard to the kind of medication given.

Method of Study

The descriptive survey method was used in the study and the study was conducted by observing nurses as they gave an intragluteal injection. A check list containing the steps recommended in literature for intragluteal injection was used. The nursing personnel were told that this was a research project, and answers to direct questions concerning the research were avoided. It was reasoned that if the personnel were aware that the investigator was observing the technique of the injec-

tion, their usual technique for intragluteal injections might have been altered. The investigator designed the check list in her own Thai language and used it while doing the observation.

The pilot study was conducted on four students in the basic program of the School of Nursing of Loma Linda University. Refinements of the check list were made by adding a remarks column and by using individual sheets for each nurse observed. The information concerning the nurse, such as year of graduation, where she graduated and the type of school graduated from were eliminated as these were thought to arouse suspicion if the nurses were asked these questions. Permission to conduct the study was obtained from the Director of Nursing Service and the Supervisors of the units from both hospitals.

A review of the literature was made to: (1) have a better knowledge of the gluteal region for which most of the intramuscular injections were administered, (2) gain an understanding of what is a better and safer site for administration of intragluteal injection, and (3) learn what other research has been done in this specific area.

The data collected were categorized, tabulated, and analyzed. Conclusions were drawn and necessary recommendations made.

CHAPTER II

REVIEW OF THE LITERATURE

Literature was reviewed in order to give an understanding of:

1. The anatomical site of the gluteal muscles.
2. The recommended technique associated with intragluteal injections.
3. The dangers in deviating from the recommended techniques.
4. Research that has been done on intragluteal injections.

Many medical and nursing textbooks mentioned the gluteal muscle to be the area of choice for giving intramuscular injections because of its large muscles, its thin overlying skin which could be easily pierced,¹ and its ability to hold fluid.² Because of the frequency with which this site was chosen, it would be necessary to have a thorough knowledge of the anatomy in relation to the gluteal area.

Anatomic Site of Gluteal Region

The gluteal region is the area of soft tissue corresponding to the prominence of the buttock.³ It is bounded above by the iliac crest, below by the deep horizontal furrow of the transverse gluteal fold, medially by the lateral margin of the sacrum and coccyx, and laterally

¹Bertha Harmer and Virginia Henderson, Textbook of the Principles and Practice of Nursing, New York: The Macmillan Co., 1959, p. 728.

²Ella L. Rothweiler and Jean Martin White, The Art and Science of Nursing, Philadelphia: F. A. Davis Company, 1959, p. 375.

³Barry J. Anson and Walter G. Maddock, Gallander's Surgical Anatomy, Philadelphia: W. B. Saunders Co., 1958, p. 923.

by the tensor fascia lateral muscle.⁴

Major Gluteal Muscles

The gluteal region includes all three gluteal muscles: gluteus maximus, gluteus medius, and gluteus minimus.⁵ They extend from the inner quadrant of the buttocks ventrolaterally to the anterior superior iliac spine. These three muscles are active muscles utilized in daily routines as walking, sitting, and standing.⁶ Pitel mentioned that these activities stimulate circulation causing a rapid absorption of injected material from the site. The gluteus maximus arises in the inner quadrant of the buttock and passes obliquely downward and lateralward to be inserted into the iliotibial band and the posterior part of the femur. This muscle occupies all quadrants of the buttock except a small area in the outer angle of the outer quadrant where the gluteus medius and minimus are located.⁷

The gluteus medius is a thick triangular-shaped muscle that lies partly under the gluteus maximus; another triangular-shaped muscle lies under the gluteus medius and is called the gluteus minimus.⁸ Therefore, any injection placed too high in the upper outer quadrant will miss the

⁴Ibid.

⁵Ibid.

⁶Martha Pitel and Mary Wemeit, "The Intramuscular Injection," The American Journal of Nursing, 64:104, April, 1964.

⁷Ibid.

⁸R. D. Lockhart and others, Anatomy of Human Body, Philadelphia: J. B. Lippincott Company, 1948, p. 185.

gluteus maximus and be deposited in the thick gluteal fascia or enter the gluteus medius muscle.⁹

The fat overlying the gluteal muscles, according to Lachman, varies from 9.0 cm. in the very obese individual to 1.0 cm. in the old and emaciated.¹⁰ Thus subcutaneous rather than an intramuscular injection may be the result if a short needle is used. In this event there will be delayed absorption of the medication from the subcutaneous fat.¹¹ In addition, certain medications not soluble in fat will not be absorbed at all and will remain as a foreign body in the subcutaneous tissue.¹²

Nerves and Blood Supplies

The gluteus maximus receives its blood supply from the branches of the superior and inferior gluteal arteries. The main trunk of the former emerges from the pelvis above the piriformis muscle which lies under cover of the gluteus maximus, while the inferior gluteal artery emerges just below. The inferior gluteal nerve accompanies the inferior gluteal vessels.

The location of the sciatic nerve, the largest peripheral nerve of the body lies under cover of the gluteus maximus, appearing just below the piriformis muscle and coursing downward midway between the greater trochanter of the femur and the ischial tuberosity. It enters the thigh at the lower border of the gluteus maximus muscle.¹³

The sciatic nerve is in an extremely vulnerable position, espe-

⁹Loren W. Shaffer, "The Fate of Intragluteal Injections," Archives of Dermatology of Syphilology, 19:347, March, 1929.

¹⁰Lachman, loc. cit.

¹¹Pitel, loc. cit.

¹²Ibid.

¹³Pitel, op. cit., p. 351.

cially if it arises aberrantly in relation to the piriformis muscle, as it may then be located in the inner angle of the upper outer quadrant.¹⁴ The injection made deeply into the lower inner angle of the upper outer quadrant of the buttock, particularly if the needle is slanted downward and inward, may deposit the substance into this nerve and cause severe sciatic neuritis. The small sciatic nerve, however, that overlies this area may become irritated and cause neuralgic pain.¹⁵

Four groups of structures lie under the gluteus maximus, namely, the bursae, muscles, blood vessels, and nerves.¹⁶ The bursae are not of significant concern with injections.¹⁷ The space between the fascia of the opposing muscles is slight except for the sciatic nerve where a fairly thick fibrous sheath rightly interspersed with fat acts as protection for this nerve.¹⁸ Shaffer stated that an injection so placed that it falls within this space tends to seek a lower level and thus invade the region of the nerve.¹⁹

Recommended Site for Intragluteal Injection

In order to avoid serious accidents that may arise through severe trauma of tissue, blood vessels, and sciatic nerves, many authorities

¹⁴Pitel, loc. cit.

¹⁵Shaffer, op. cit., p. 351.

¹⁶Ibid.

¹⁷Ibid.

¹⁸Ibid.

¹⁹Ibid.

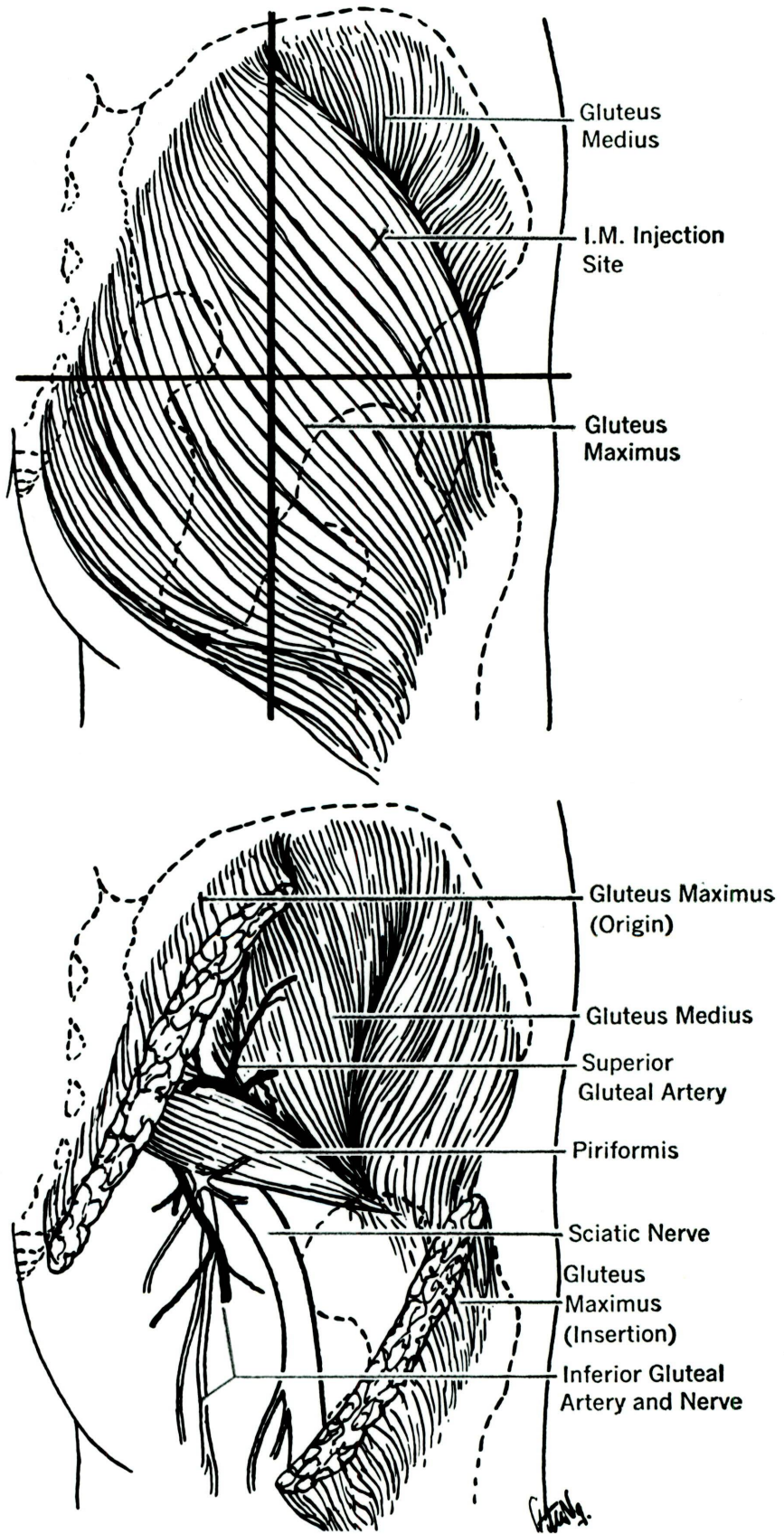


Figure 1. Posterior Gluteal Region Showing the Muscles, Nerves and the Blood Vessels. (From Pitel, The American Journal of Nursing, 64:105, 1964.)

recommended the use of the upper outer quadrant of the buttock, near its inner angles, as an ideal site for the posterior intragluteal injection. This location, according to Dutton and Lake, is found to be remote from the sciatic nerve and the superior gluteal artery.²⁰ Zelman emphasized that no other quadrant of the buttock is acceptable.²¹ Dutton and Lake made the following statement in regard to the danger of using other quadrants.

Injections given into the upper part of the outer quadrant or into the inner quadrant near the sacrum, even with a short needle, are likely to strike the bone. Injection of an irritant substance near the roots of the sacral plexus will give rise to induration and pain. Injection given into either of the lower quadrants are subjected to pressure on sitting and are likely to be painful. Neuritis may result, if injections are made near the great sciatic nerve. The upper outer quadrant should be avoided, except at the inner angle. Injections deposited in the fascia of this region are liable to give rise to superficial nodule formation, abscess or deep firm induration.²²

Lachman stated that nerve injuries have been recorded following practically all intramuscular medication and adds that there is a general agreement that the damage to the sciatic nerve after intragluteal injection is essentially independent of the drug used.²³

A large number of sciatic nerve injuries in infants have been reported in the literature. Gill and French believe this to be more

²⁰Walton Forest Dutton and George Burt Lake, Parenteral Therapy, Springfield, Illinois: Charles C. Thomas Company, 1936, p. 28.

²¹Samuel Zelman, "Notes on Techniques of Intramuscular Injection," American Journal of the Medical Science, 241:563-574, May, 1961.

²²Ibid.

²³Lachman, op. cit., p. 237.

common in the premature and infants,²⁴ while one authority holds it to be responsible for paralytic deformities which may be misdiagnosed as congenital club feet or the sequelae of poliomyelitis.²⁵

Suggested Intragluteal Injection Technique

Nursing textbooks were reviewed to find the technic currently advocated for administering intragluteal injections.²⁶

Aseptic Technique

This is essential: the syringe, needle, and injected substance are to be sterilized and the skin should be cleansed with antiseptic.

Instruments Used

The syringe should be selected according to the amount of fluid injected. The needle should be long enough to reach well into the belly of the muscle, otherwise there is danger of injection into deep subcutaneous tissue. Zelman advocates the use of needles of 1 and 1/2, 2, and 2 and 1/2 inches for average persons and even 3 or 4 inches for an extremely obese person.²⁷

²⁴F. H. Gilles and J. H. French, "Postinjection Sciatic Nerve Palsies in Infants and Children," Journal of Pediatrics, 58:195, 1961.

²⁵M. A. Combes and others, "Sciatic Nerve Injury in Infants," Journal of American Medical Association, 173:1336-1339, July, 1960.

²⁶Bertha Harmer and Virginia Henderson, Textbook of the Principles and Practice of Nursing (fourth edition), New York: The Macmillan Company, 1959, p. 278.

²⁷Zelman, op. cit., p. 568.

Position of the Patients

Many authorities agree with Zelman that the intramuscular injection should be given with the patient in the prone position on a firm bed or an examination table with toes pointed inward and arms hanging over the side.²⁸ This position as explained by many, helps to obtain maximum relaxation and the patient is unlikely to see the approach of the needle. Standing and sitting increase the hazard. Pitel explained that when the patient is in a standing position, the gluteus maximus is contracted and taut. This means that there will be more muscular resistance and pain on the insertion of the needle and may cause backtracking of the medication into the subcutaneous tissue.

The injection site must be fully exposed to locate the proper landmarks.²⁹ If underwear is pulled up from below on one side, only the lower aspect of the buttock is bared and the needle may be thrust into the lower inner quadrant which is a dangerous area as stated before.³⁰

Anatomic landmarks should be identified by palpation and not by the eyes.³¹ Most nursing personnel have been taught to draw a line in dividing the buttock into quadrants and the medication injected into the upper outer quadrant at the inner angle. A study was done on 101 nurses at a Veterans Administration Hospital with regard to selecting

²⁸"How to Give Intramuscular Injection," Spectrum, Pfizer and Company, Inc., 12:50, Winter, 1964-1965.

²⁹Pitel, op. cit., p. 107.

³⁰Spectrum, op. cit., p. 51.

³¹Ibid.

the site for the injection. It was found that 58 did draw to locate the upper outer quadrant and 43 did not.³² Henson recommended that the point of insertion of the needle should be lateral and superior to a line drawn from the posterior superior iliac spine to the greater trochanter.³³ Such a line would be lateral to and parallel with the course of the sciatic nerve. Any injection lateral and superior to this line will be well away from the nerve.

Angles of Intragluteal Injection

All authorities agreed that intragluteal injection could be given at a ninety-degree angle or perpendicular to the skin. Spectrum described the technique as follows:

Hold the syringe by the index finger and thumb of the right hand. With the left hand draw down the skin of the buttock to make it taut. Hold the needle perpendicular to the surface and almost in contact with the skin. To ensure that pain will be minimal, drive it home with a sharp downward flick of the wrist--through skin and muscle in a movement, as though it were a dart.³⁴

Aspiration

Aspiration of the plunger is designed to test for accidental entry of the needle into the blood vessels, and is necessary to avoid intravenous or intra-arterial instead of intramuscular injection. Zelman suggested that the aspiration should continue for five to ten

³²Zelman, op. cit., p. 564.

³³Daniel Henson, "Intramuscular Injection Injuries and Complication," General Practitioner, 27:109-115, January, 1963.

³⁴"How to Give Intramuscular Injection," Spectrum, Pfizer and Co., Inc., 12:52, Winter, 1964-1965.

seconds, particularly with narrow gauge needles.³⁵

Rate of Injection

Most authorities agreed on the slow rate of injection. They believed that the slow rate of injection allows time for distention of an accommodating space within the muscle, sparing the patient the pain sensations of the pressure to sensitive nerves within the muscular tissue.³⁶ Many recommended the use of disposable needles and syringes to prevent certain infectious diseases, particularly hepatitis.

Massage

One author said that:

Deep, firm massage of the muscle tissue favors spread of the medication through a wider area of tissue, increasing the area of absorption and decreasing the intensity of discomfort. The importance of massage in relation to diminishing pain or discomfort will vary with the quantity of medication used; but for the purpose of providing a wider surface for absorption, massage is an important part of all intramuscular injections.³⁷

Injuries and Complications Following Intragluteal Injection

Complications and trauma which follow intragluteal injections are attributed to faulty technique and ignorance of the anatomy of the region.³⁸ These complications include abscess, cyst formation, necrosis and sloughing of the skin, scar formation, lingering pain, intra-

³⁵Zelman, op. cit., p. 570.

³⁶Ibid.

³⁷Ibid.

³⁸Henson, loc. cit.

vascular injection and peripheral nerve injuries. Among these complications and trauma, peripheral nerve injuries seemed to be the most frequently reported injuries, especially the sciatic nerve.³⁹ Henson pointed out that there was one case of nerve injury after intramuscular injection reported every three weeks to insurance companies in Germany during a recent five-year period.

Single or multiple injections of several antibiotics and other agents have caused severe sciatic nerve injuries with paralysis of the legs.⁴¹ Severe nerve injuries have followed injections of many tried and tested drugs of varied chemical structure, including physiologic saline.⁴² There is, therefore, complete agreement of all authors that damage to the sciatic nerve after intragluteal injection is essentially independent of the drugs used.⁴³ Complications following injection in the gluteal area such as paralysis of the sciatic nerve and the gluteal and posterior nerves of the thigh, severe subgluteal hematoma, and arterial embolism probably reflect confusion over the boundaries of the upper outer quadrant.⁴⁴

Mechanical injury usually results from direct puncture of the

³⁹Ibid.

⁴⁰Ibid., p. 110.

⁴¹"How to Give Intramuscular Injection," Spectrum, Pfizer and Company, Inc., 12:50, Winter, 1964-1965.

⁴²Lachman, op. cit., p. 236.

⁴³Ibid., p. 237.

⁴⁴"The Importance of Site Selection in Intramuscular Injection," Spectrum, Pfizer and Company, Inc., 8:210, 1960.

nerve fibers during the injection. Perret, who for many years has focused his attention on nerve damage as a result of injections particularly from a medico-legal point of view, has collected more than ninety cases.⁴⁵ Recently Gillis and French reviewed twenty-one cases of sciatic paralysis following intragluteal injection in infants and children.⁴⁶ According to Lachman, in all these cases the needle actually was inserted into the nerve or adjacent to the nerve, and more commonly though in these cases the injections were given into the wrong quadrant.⁴⁷ Perret quoted from Lachman, this type of paralysis takes place in 16 percent of neuropathies and can be ascribed to faulty technique.⁴⁸

Faulty injection into the perisciatic fat tissue in the medial quadrants of the region causes inflammation. Bay gave his opinion that almost all cases of sciatic neuropathy after injection are due to faulty placing of the injected medication. He warned against injection given when the patient was in the lateral position which may easily lead to misdirection of the insertion point and recommends the prone position.⁴⁹

Beaton pointed out the frequent nerve injury due to the injection given directly on the subdivision of the sciatic nerve, stating that:

Of the two components of the sciatic nerve, the tibial and common peroneal, the latter is considerably more susceptible to injuries by injection, and this leads to paralysis of the dorsi-

⁴⁵Lachman, op. cit., p. 238.

⁴⁶Gillis, loc. cit.

⁴⁷Lachman, loc. cit.

⁴⁸Ibid.

⁴⁹Ibid.

flexors and evertors of the foot with foot drop and sensory and trophic disturbances. More lateral location of the common peroneal nerve makes it more liable to injuries by intramuscular injection. In fifteen per cent of cases the common peroneal division of sciatic nerve passes either cranial to or through the piriformis muscle instead of caudal to it which increases the danger to this division. But even in these cases, injury can be avoided if the injection is properly applied.⁵⁰

Injury to the inferior gluteal nerve is described to be less common. This nerve is the posterior cutaneous nerve of the thigh. With the pudendal nerve they leave the pelvis through the greater sciatic foramen caudal to the piriformis muscle. In association with the sciatic nerve, there is a great danger when the injection is placed in the medial quadrant. The inferior gluteal nerve is an important nerve, being the only motor supply to gluteus maximus muscle. Its paralysis seriously interferes with the extension of the hip.⁵¹

Serious and sometimes fatal consequences have been reported from injections that were wrongly given into the blood stream. Aspiration before injection is the most important maneuver in the execution of intramuscular injection, cited Stokes.⁵² Zelman in his research with 101 nurses reported that 97 always performed this function and only 4 did not do so.⁵³ Arteries and veins in the area are branches and tributaries of the superior and inferior gluteal vessels and ramify in three

⁵⁰L. E. Beaton and others, "The Relation of the Sciatic Nerve to the Piriformis Muscle," Anatomical Record, 70:1, 1937.

⁵¹Lachman, op. cit., p. 240.

⁵²J. H. Stokes and others, Modern Clinical Syphilology (3rd ed.), Philadelphia: W. B. Saunders Company, 1944.

⁵³Zelman, op. cit., p. 569.

planes at various depths. Pulmonary embolism has been reported after intravenous injection of drugs in an oil base.⁵⁴

Recommended Site for the Anterior Gluteal Injection

A simple and safer method of intramuscular injection has become available with the introduction in 1954 by Von Hochstetter of the new area of choice for intramuscular injection, the anterior gluteal region.⁵⁵ This anterior gluteal region actually provides a greater thickness of gluteal muscle into which to inject. It consists of the gluteus medius and minimus muscles, rather than the gluteus maximus muscle found posteriorly.⁵⁶ The advantage of this area for intragluteal injection over the posterior region is that there is no significant penetrating nerves or blood vessels. The layer of subcutaneous fat in the anterior gluteal region is always thinner than that over the posterior buttock, thus reducing the hazard of subcutaneous deposit of medication by a short needle.⁵⁷ At its depth, it is sealed off by bone from underlying vital structures. In this area a needle may be plunged to a depth of from three to four inches entirely within muscular tissue and not endanger any important structure.⁵⁸ Hochstetter was quoted by Spectrum to prefer the anterior gluteal site . . . because:

⁵⁴Axelrod, loc. cit.

⁵⁵Zelman, op. cit., p. 570.

⁵⁶Ibid.

⁵⁷Zelman, loc. cit.

⁵⁸Pitel, loc. cit.

. . . it is farthest from all major nerves and vessels. The subcutaneous fat is thinner and looser than over the rest of the gluteal region. . . . The skin is thin and comparatively insensitive. The muscular tissue (gluteus medius and minimus) is sufficiently thick even in emaciated people. It is surrounded by three characteristic bony prominences, which can be easily palpated--the anterior superior iliac spine, the iliac crest, and the greater trochanter of the femur.⁵⁹

Zelman added an advantage to the use of the anterior gluteal site by saying that it is a clean area, free from fecal organisms on the skin surface. It can be used in any body position, and is especially suitable for use in patient lying on the back.⁶⁰

Technique for Administering Anterior Gluteal Injection

The technique for giving anterior gluteal injection as described by Von Hochstetter quoted from Spectrum that:

In Hochstetter's technique, the anterior superior iliac spine is located, and the tip of the index finger is placed on it. The left hand is pressed on the hip with the palm over the greater trochanter and the fingers pointing toward the head. The index and middle fingers are spread as far as possible . . . The tip of the ventrally placed finger (middle finger on the posterior side of the patient, index finger on the anterior) presses down into the soft tissue over the anterior superior iliac spine, fixing the moveable skin. The puncture is made between these two fingers and aimed immediately below the iliac crest. In very obese patients, it may be necessary to lift the abdominal panniculus upward and inward away from the injection site; this is easily done by the patient or an assistant.⁶¹

The method of anterior gluteal intramuscular injection was used in the Medical Service of the Veterans Administration Hospital since

⁵⁹Spectrum, 8:210, 1960.

⁶⁰Zelman, op. cit., p. 571.

⁶¹Spectrum, loc. cit.

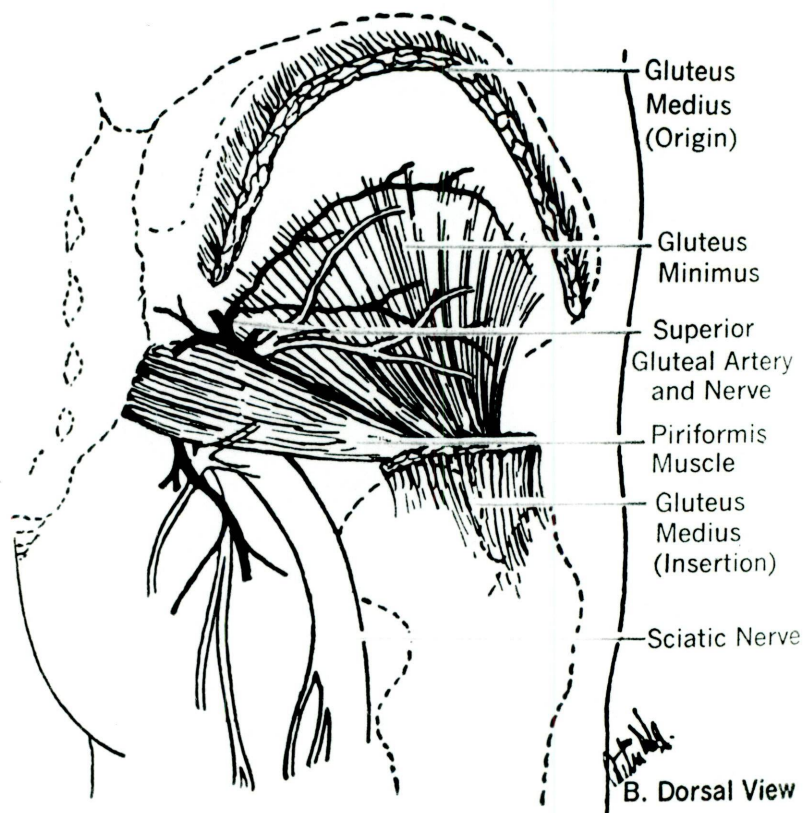
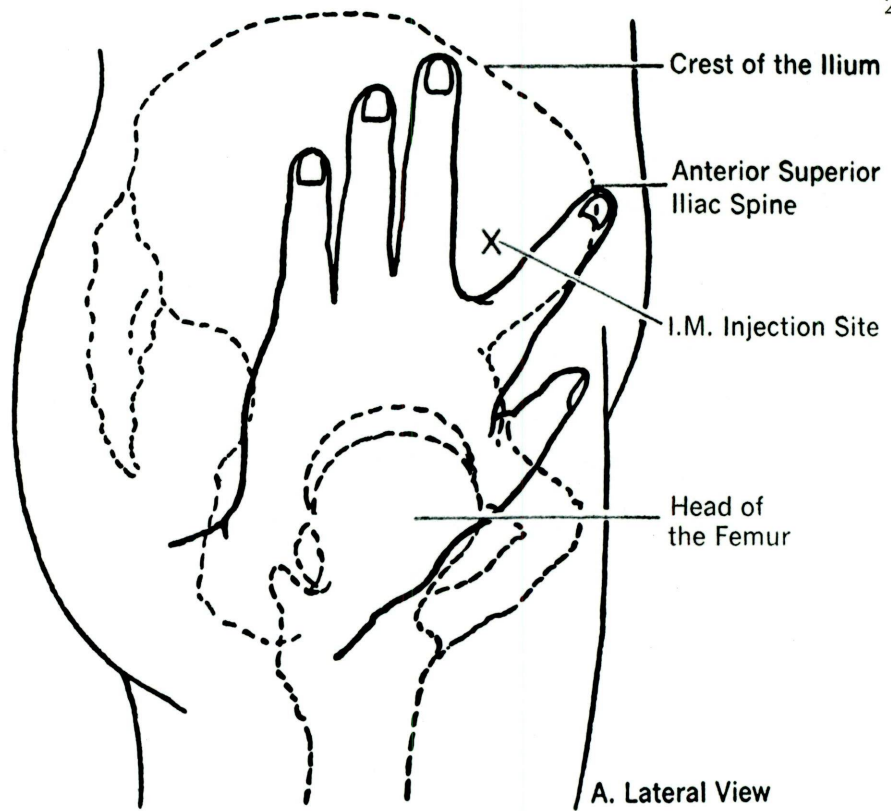


Figure 2. Anterior Gluteal Injection. The Injection Site is Away from Important Nerves and Blood Vessels. (From Pitel, The American Journal of Nursing, 64:106, 1964.)

1959 and for a two-year period there was no morbidity reported.⁶² However, patients who were ambulatory complained of greater pain on walking than they had experienced after posterior gluteal injection, but bed-fast patients had no more pain caused from lying on the injected site after the posterior intragluteal injection.⁶³

Summary

The review of the literature concerning the anatomic site of the gluteal region was made in order to have a better understanding of the location of the muscles, nerves and blood vessels. The authors of the books and periodicals reviewed were physicians and nurses. The material was organized according to the recommended site for intragluteal injection and the consequences in deviating from it. Literature suggested a safer site for intragluteal injection to be the anterior gluteal region instead of the posterior gluteal region and the Von Hochstetter's technique was advocated to be better if not the best technique for giving intragluteal injection. Literature reviewed also disclosed the fact that there is a general agreement in the literature that damage to nerves and muscles in the administration of intragluteal injection can be minimized by prudent selection of the injection site and the use of proper technique.

⁶²Zelman, op. cit., p. 573.

⁶³Ibid.

CHAPTER III

THE DATA COLLECTION, ANALYSIS AND INTERPRETATION

The purpose of this chapter was to show the treatment and interpretation of the data obtained from observing fifty registered nurses administering intragluteal injections in two different general hospitals in southern California. A check list was designed to include the technique, position, location of the area, length of the needles, introduction of needle, solution and aseptic technique. The check list is found in Appendix A.

The data obtained from the observation were tabulated, categorized, analyzed and interpreted.

Position of the Patient

The investigator observed fifty nurses while they were administering the intragluteal injection. The largest number (84 percent) instructed the patients to assume the side lying position with the hands at the sides. Four (8 percent) had the patients lie in the prone position but did not instruct the patients to toe in or toe out while the injection was being given. Six percent gave the injection when the patients were in a sitting position. Of these three sitting patients, one was eating breakfast when the nurse offered to give the intragluteal injection. The second was ambulatory, and the nurse indicated that it would be all right if he sat down to receive the injection. The third patient was in a semi Fowler's position and preferred to remain in this position when the injection was given.

One patient was lying in Sim's position and received the injection in this position. Of the fifty nurses observed, none instructed the patient to lie in the prone position with the toes pointed inward as advocated in the literature by Zelman and others. This would indicate that nurses have patients assume positions convenient to the nurse or the patients. Tables I and II show the numbers and percentage of the body and hand positions of the patients as instructed by the nurses when the injection was given.

Location of the Area

Seven (14 percent) of the fifty nurses observed drew or palpated the area before giving the injection. Forty-three (86 percent) did not do so, as shown:

<u>Location of the Area</u>	<u>Number</u>	<u>Percent</u>
Drew or palpated to locate site	7	14
Did not draw or palpate	43	86
Total	50	100

Among the forty-three who failed to palpate or draw, thirty-one utilized the upper outer quadrant toward the inner angle, making a total of thirty-eight (76 percent) using the correct site. Twelve nurses utilized other quadrants, as shown:

<u>Site</u>	<u>Number</u>	<u>Percent</u>
Upper outer quadrant, inner angle	38	76
Other quadrants and other angles	12	24
Total	50	100

One of the twelve inserted the needle below the spine at a 45°

TABLE I
NUMBER AND PERCENTAGE OF VARIOUS BODY POSITIONS
NURSES ASKED PATIENTS TO ASSUME TO RECEIVE
INTRAGLUTEAL INJECTIONS

Body Position	Number	Percent
Prone toe in	0	0
Prone toe out	4	8
Sim's	1	2
Lateral or Side	42	84
Sitting	3	6
Standing	0	0
Total	50	100

TABLE II
NUMBER AND PERCENTAGE OF HAND POSITIONS
ASSUMED BY PATIENTS WHEN RECEIVING
INTRAGLUTEAL INJECTIONS

Hand Position	Number	Percent
Hand hanging	1	2
Hand under body	7	14
Hand by side of body	42	84
Total	50	100

angle. The investigator did not inquire the reason for doing so, but observed puncture sites on both buttocks where injections had been given previously. This may have caused the observee to want to choose this site. The findings would indicate that most nurses were cognizant of the correct area for intragluteal injection.

Aseptic Technique

The equipment which was used for the injection was assumed to be sterile. Of the fifty nurses who were observed, none contaminated the sterile syringes, needles, or solution during the procedure. One hundred percent cleansed the area with the antiseptic before the administration of the medication and there appeared to be no contamination of the injected area after it had been cleansed. This would indicate an understanding of the principle of maintaining aseptic technique by all the nurses who gave the injections.

Length of the Needles

Forty-three (86 percent) of the nurses used one and a half inch needles for the intragluteal injection regardless of how obese or emaciated the patients were. Fourteen percent utilized two-inch needles for giving the injection. One nurse was asked by the investigator why the two-inch needle was used. The answer was, "To be sure that the penicillin in oil is well deposited in the muscle tissue." No nurse was seen to use a needle less than one and a half inches for the intragluteal injection. This would indicate that the nurses observed were not aware of the need to make individual adjustment in length of the needles used for intragluteal injection.

Introduction of the Needle

Fifty percent of the nurses observed did not make the muscle taut or muscle pinch before the introduction of the needle. Twenty (40 percent) pinched up the muscle of the buttock while only five (10 percent) retracted the muscle as shown in Table III. Zelman advocated that when the needle was introduced, retracting the skin and subcutaneous tissue was necessary. When the needle was later withdrawn, the return of the superficial tissue to the normal position would serve to break the direct needle track.¹ He also advocated that pinching up of the muscle at the upper outer quadrant increased the hazard of injection near the sciatic nerve.² However, no patient observed by the investigator complained of pain or gave any evidence of nerve injury following the injections, but the observation of this technique showed that more than half of the nurses observed were apparently not aware of the fact that it was safer to make the muscle taut than pinch up the muscle when giving intragluteal injection.

Angles of Intragluteal Injection

Forty-nine nurses (98 percent) gave the injection at a 90° angle with the exception of one (2 percent) who pointed the needle in a 45° angle when she injected the medication just below the spine, as shown on page 29.

¹Zelman, op. cit., p. 569.

²Ibid.

TABLE III

NUMBER AND PERCENTAGE OF THE NURSES OBSERVED WHO DID
OR DID NOT MAKE THE MUSCLE TAUT AND THE NUMBER
AND PERCENTAGE WHO PINCHED UP THE MUSCLE

	Number	Percent
Those who made muscle taut	5	10
Those who pinched up the muscle	20	40
Those who neither pinched nor made the muscle taut	25	50
Total	50	100

<u>Angle of Injection</u>	<u>Number</u>	<u>Percent</u>
Injected at 45° angle	1	2
Injected at 90° angle	49	98
Total	50	100

The findings showed that the nurses observed were well aware of the proper angle of the needle for giving intragluteal injections.

Aspiration to Test Before the Injection

Powers stated that medications designed for intramuscular use are dangerous when introduced into the blood vessels.³ To avoid or test for this, one should always aspirate for blood before the injection. Of the fifty nurses who gave the intragluteal injection only eight (16 percent) aspirated before the injection. The majority, forty-two (84 percent), did not do so. Of the forty-two who did not aspirate for blood in the syringe, three (6 percent) were found to have some bleeding after the injection, as shown by the following:

<u>Aspiration for Blood</u>	<u>Number</u>	<u>Percent</u>
Those who aspirated before injection	8	16
Those who did not aspirate before injection	42	84
Total	50	100

This would denote that the nurses observed were not performing the procedure which was advocated by most authorities.

³Althel Powers, "Technique of Injection," R.N., 15:68, May, 1952.

Introduction of the Solution

Thirty (60 percent) of the nurses observed gave the fluid rapidly through the syringe, compared to twenty (40 percent) who gave it slowly:

<u>Administration Rate</u>	<u>Number</u>	<u>Percent</u>
Rapid	30	60
Slow	20	40
Total	50	100

Giving injections slowly was advocated by most authorities but most nurses observed seemed to be hurried with this procedure.

Massage After the Injection

At the completion of the injection, deep massage to provide area for absorption was recommended by all authorities for intramuscular injection. Of the fifty nurses observed, forty-six (92 percent) did massage after the injection and four (8 percent) did not do so:

<u>Massage After Injection</u>	<u>Number</u>	<u>Percent</u>
Those who massaged after injection	46	92
Those who did not massage after the injection	4	8
Total	50	100

Since the study was concerned with the procedure for giving the intragluteal injection, the investigator did not inquire into the specific kinds of medication being injected to determine whether massage was indicated or contraindicated.

Summary of Findings

The findings of the data indicated that the fifty nurses who were observed (100 percent) did not ask the patient to assume prone and toe in position with the hands hanging over the side of the bed for maximum muscle relaxation in giving intragluteal injection. The largest number, forty-two (84 percent), instructed the patients to turn to the side opposite from the injection. The remainder were asked to assume a position convenient for the nurse or patient.

The act of drawing or palpating was not generally practiced, as there were only seven (14 percent) who did this, while the majority (86 percent) based their experience on eye judgment to locate the upper outer quadrant. However, of the 86 percent who did not draw or palpate, 62 percent administered it in the correct site.

All of the nurses observed maintained aseptic technique in performing the procedure. No one was found to have contaminated the syringe, needle solution or area of injection.

The majority (86 percent) of the nurses used one and one half inch needles for the intragluteal injection. Fourteen percent utilized two inch needles for the purpose of administering specific drugs.

The larger number of nurses did not pinch or make the muscle taut as advocated by authorities before the insertion of the needle. The number who pinched up the muscle was 40 percent, compared to 10 percent who retracted the skin and made the muscle taut.

The findings also showed that forty-two (84 percent) of the nurses who were observed did not aspirate to test whether the needle was in the blood vessel before the injection.

All nurses who were observed gave the injections at a 90° angle except one, who pointed the needle at a 45° when she gave the injection in the area below the spine.

CHAPTER IV

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This study was concerned with the problem of determining whether the nurses were using acceptable technique in administering intragluteal injections, since this was the most common type of intramuscular injection given by nurses. With the increase of intragluteal injections, there has been an increase in complications such as sciatic nerve injuries and other trauma due to such injections. A study such as this was needed to ascertain where the weaknesses lie in administration of such injections. The descriptive survey method was used with data obtained by means of a check list. Fifty registered nurses who were giving intragluteal injections in two general hospitals were observed. Prior to the actual study, a pilot study was conducted on four basic students of nursing to test the effectiveness of the check list. A review of literature was done to give a better understanding of the structure of the gluteal region, the recommended site and technique, the danger in deviating from it and the studies done in this area.

Summary

The findings of the data indicated that the fifty nurses who were observed (100 percent) did not ask the patients to assume prone and toe in position with the hands hanging over the side of the bed, for maximum muscle relaxation in giving intragluteal injection. The largest number, forty-two (84 percent) of the nurses instructed the patients to turn to the side opposite from the injection which seemed to be most convenient to the nurses and patients.

The act of drawing or palpating was not generally practiced, as there were only seven (14 percent) who did this while the majority (86 percent) based their experience on eye judgment to locate the upper outer quadrant. However, of the 86 percent who did not draw or palpate, 62 percent administered it in the correct site.

All of the nurses observed maintained aseptic technique in performing the procedure. No one was found to have contaminated the syringe, needle, solution or area of injection.

The majority of the nurses used one and one half inch needles for the intragluteal injection, 14 percent utilized two inch needles for the purpose of administering specific drugs. Forty-two (84 percent) of the nurses did not aspirate to test whether the needle was in the blood vessel before the injection.

All nurses who were observed gave the injection at a 90° angle except one who pointed the needle at a 45° angle when she gave the injection in the area below the spine.

Those who forced the fluid rapidly through the syringe outnumbered those who gave it slowly by 60 to 40 percent. The majority of the nurses massaged the area after the injection.

Conclusions

From the findings of the study it was concluded that the nurses observed in this study were not carrying out acceptable technique in administering intragluteal injection in the area of position, location of the injected site, aspiration to test and retraction of muscle before administering the injection.

Recommendations

It is recommended that:

1. Students in schools of nursing be instructed in the technique of giving injections in the anterior gluteal area as a safer site for intramuscular medication.
2. Nursing service plan inservice education programs demonstrating the technique of intragluteal injections to nursing service personnel.
3. Further study and research be done in the area of positioning of the patient, and length of needles utilized in giving intramuscular injection.

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APPENDIXES

APPENDIX A

CHECKLIST

POSITION OF PATIENT

- Prone, toe in
- Prone, toe out
- Sim's
- Side
- Sitting
- Standing
- Hand hanging
- Hand under body
- Hand, side of body

LOCATION OF AREA

- Draw to locate or palpate
- Do not draw or palpate
- Upper outer quadrant, inner angle
- Other quadrants

ASEPTIC TECHNIQUE

- Skin cleansed
- Skin not cleansed
- Needle sterile
- Needle contaminated
- Syringe sterile
- Syringe contaminated

LENGTH OF NEEDLE

- 1"
- 1 1/2"
- 2"
- 2 1/2"
- 3"

INSERTING THE NEEDLE

- Without making muscle taut or pinched up
- Muscle taut
- Muscle pinched up

ANGLE OF INJECTION

- 45°
- 60°
- 90°

ASPIRATION

- Aspirated
- Not aspirated

APPENDIX A (Continued)

SOLUTION GIVEN

- Slowly
- Rapidly
- Massage
- Massage after injection
- No massage after injection

APPENDIX B

NUMBER AND PERCENTAGE OF NURSES WHO USED VARIOUS
TECHNIQUE IN ADMINISTERING INTRAGLUTEAL INJECTIONS

	<u>Number</u>	<u>Percentage</u>
POSITION OF PATIENT		
Prone, toe in	0	0
Prone, toe out	4	8
Sim's	1	2
Side	42	84
Sitting	3	6
Standing	0	0
Total	50	100
HAND POSITION		
Hand hanging	1	2
Hand under body	7	14
Hand, side of body	42	84
Total	50	100
LOCATION OF AREA		
Draw to locate or palpate	7	14
Do not draw or palpate	43	86
Upper outer quadrant, inner angle	38	76
Other quadrants	0	0
Total	50	100
ASEPTIC TECHNIQUE		
Skin cleansed	50	100
Skin not cleansed	0	0
Needle sterile	50	100
Needle contaminated	0	0
Syringe sterile	50	100
Syringe contaminated	0	0
Total	50	100

APPENDIX B (Continued)

	<u>Number</u>	<u>Percentage</u>
LENGTH OF NEEDLE		
1"	0	0
1 1/2"	43	86
2"	7	14
2 1/2"	0	0
3"	0	0
Total	50	100
INSERTING THE NEEDLE		
Without making muscle taut or pinched up	25	50
Muscle taut	5	10
Muscle pinched up	20	40
Total	50	100
ANGLE OF INJECTION		
45°	1	2
60°	0	0
90°	49	98
Total	50	100
ASPIRATION		
Aspirated	8	16
Not aspirated	42	84
Total	50	100
SOLUTION GIVEN		
Slowly	20	40
Rapidly	30	60
Total	50	100
MASSAGE		
Massage after injection	46	92
No massage after injection	4	8
Total	50	100

LOMA LINDA UNIVERSITY

Graduate School

TECHNIQUES FOUND IN ADMINISTERING
INTRAGLUTEAL INJECTION

by

Lee Lee Santimalapongse

An Abstract of a Thesis
In Partial Fulfillment of the Requirements
for the Degree Master of Science
in the Field of Nursing

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ABSTRACT

This descriptive survey study was concerned with the problem of determining whether nurses were using an acceptable technique in giving intragluteal injections. With the increase of intramuscular injections the complications and injuries resulting from the intragluteal injections have increased. A review of literature disclosed a general agreement among authorities that damage to nerves and muscles in the administration of intragluteal injections could be minimized by careful selection of the injection site and the use of proper technique. Fifty registered nurses giving intragluteal injections in two general hospitals were observed, guided by a check list from the criteria recommended by Zelman. The findings indicated that the technique used varied in the following ways. None of the nurses positioned the patients to secure maximum relaxation with the prone and toe-in position. Eighty-four percent utilized the lateral position. Fourteen percent drew or palpated to locate the upper outer quadrant while 86 percent administered the injections in the site by the use of eye judgment alone. Most of the nurses did not make the muscle taut before injection and only 16 percent aspirated to see whether there was blood in the syringe before injection. Sixty percent of the nurses injected the solution rapidly. The majority of nurses utilized one and one half inch needles and administered the injection at a 90° angle. All nurses utilized aseptic technique and all except 8 percent massaged the injected area.