

site. In these instances, the vaccine can be given in the anterolateral thigh (vastus lateralis muscle). 1,5-8 Active immunizing agents, including COVID-19 vaccines, should not be administered in the buttock (gluteal) muscle as an alternative site to the deltoid muscle. 1 Figure 1: Landmarking for Intramuscular Injections in the Deltoid Muscle



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Nursing guidelines : Intramuscular Injections - The Royal Children's .

INTRAMUSCULAR (IM)**		Location of Injection	Needle Length	Needle Gauge	Needle Angle
Pediatric	Infants < 18 months	<ul style="list-style-type: none"> Vastus lateralis muscle (<0.5 mL vol.) 	7/8" - 1"	25 - 27 G	90°
	Children (>18 months and walking to 18 years)	<ul style="list-style-type: none"> Deltoid muscle Ventrogluteal site Dorsogluteal site—not recommended for <3 years Vastus lateralis muscle 	7/8" - 1 1/4"	22 - 25 G	90°
Adult	> 18 years	<ul style="list-style-type: none"> Deltoid muscle, Ventrogluteal site—may be best site for cachectic adults Dorsogluteal site—avoid in obese adults Vastus lateralis muscle 	1" - 1 1/2" (up to 3" for large adults)	19 - 25 G	90°

* Adapted from Fundamentals of Nursing: Human Health and Function, 8. Claven, C. Hinkle, 4th ed. Lippincott Williams & Wilkins, 2003
 ** Prior to administering an IM injection, refer to your procedure manual to determine the injection site utilizing body landmarks.



Intramuscular (IM) Injection Guidelines:

Injection Route:

Injection Sites:

The **ventrogluteal site**: place the palm over the greater trochanter, form a "V," with the middle finger toward the iliac crest and the index finger toward the anterior superior iliac spine. Inject within the center of the "V," below the anterior superior iliac crest.

Injection Procedure:

- Spread the skin taut, (except in vastus lateralis which requires lifting the muscle) and insert the needle at a 90° angle.
- Pull back plunger slightly. If blood appears, remove needle, dispose properly and prepare a new injection.
- If no blood is present inject medication slowly.

The **deltoid muscle** is 2.5-5cm (1-3 finger breadths) below the lower edge of acromion process of the scapula over the midaxillary line.

The **dorsogluteal site** is above an imaginary line between the greater trochanter and the posterior superior iliac crest. The injection is administered laterally and superior to this imaginary line.

Intramuscular (IM) injections are shots delivered to a large muscle. They can be given by a healthcare provider or self-administered to the upper arm, thigh, buttock, or hip. IM injections are used for people of all ages, including infants.

ACIP Vaccine Administration Guidelines for Immunization | CDC

TABLE 1

2022-2023 COVID Vaccine Timing Recommendations

Age	Vaccine	Type	Not immunocompromised		Moderate to severe immunocompromise	
			Dose	Interval	Dose	Interval
6 months to 5 years	Moderna	Monovalent (blue cap, magenta label border)	1 and 2	At least 4 to 8 weeks	1 and 2 2 and 3	At least 4 weeks At least 4 weeks
		Bivalent (dark pink cap, yellow label border)	2 and 3	At least 8 weeks	3 and 4	At least 8 weeks
6 months to 4 years	Pfizer-BioNTech	Monovalent (maroon cap, maroon label border)	1 and 2	At least 3 to 8 weeks	1 and 2	At least 3 weeks
		Bivalent (maroon cap, maroon label border)	2 and 3	At least 8 weeks	2 and 3	At least 8 weeks
6 to 11 years	Moderna	Monovalent (blue cap, purple label border)	1 and 2	At least 4 to 8 weeks	1 and 2 2 and 3	At least 4 weeks At least 4 weeks
		Bivalent (blue cap, gray label border)	2 and 3	At least 8 weeks	3 and 4	At least 8 weeks
5 to 11 years	Pfizer-BioNTech	Monovalent (orange cap, orange label border)	1 and 2	At least 3 to 8 weeks	1 and 2 2 and 3	At least 3 weeks At least 4 weeks
		Bivalent (orange cap, orange label border)	2 and 3	At least 8 weeks	3 and 4	At least 8 weeks
12 years and older	Moderna	Monovalent (red cap, blue label border)	1 and 2	At least 4 to 8 weeks	1 and 2 2 and 3	At least 4 weeks At least 4 weeks
		Bivalent (blue cap, gray label border)	2 and 3	At least 8 weeks	3 and 4	At least 8 weeks
	Pfizer-BioNTech	Monovalent (gray cap, gray label border)	1 and 2	At least 3 to 8 weeks	1 and 2 2 and 3	At least 3 weeks At least 4 weeks
		Bivalent (gray cap, gray label border)	2 and 3	At least 8 weeks	3 and 4	At least 8 weeks
	Novavax	Monovalent	1 and 2	At least 3 to 8 weeks	1 and 2	At least 3 weeks
		Bivalent (Moderna or Pfizer-BioNTech)	2 and 3	At least 8 weeks	3 and 4	At least 8 weeks

Note: Different vaccine formulations are available for each age group.

Adapted from Centers for Disease Control and Prevention. COVID-19 vaccine: interim COVID-19 immunization schedule for persons 6 months of age and older. Accessed January 23, 2023. <https://www.cdc.gov/vaccines/covid-19/downloads/COVID-19-immunization-schedule-ages-6months-older.pdf>

The patient can be standing, sitting, or lying down. To locate the landmark for the deltoid muscle, expose the upper arm and find the acromion process by palpating the bony prominence. The injection site is in the middle of the deltoid muscle, about 1 inch to 2 inches (2.5 cm to 5 cm) below the acromion process.

Preparing and Administering Intramuscular Injections - JoVE



Aqueous solutions can be given with a 20- to 25-gauge needle; oily or viscous medications should be administered with 18- to 21-gauge needles. A smaller gauge needle (22 to 25 gauge) should be used with children. . The deltoid muscle has a triangular shape and is easy to locate and access. To locate the injection site, begin by having the .

Can 2 ml of fluid be administered in deltoid muscle?

Table 1. Injectable volumes per site in adults	
Site	Maximum volume
Ventrogluteal (recommended)	2.5ml
Vastus lateralis (recommended)	5ml
Deltoid	1ml
Rectus femoris	5ml
Dorsogluteal (not recommended)	4ml
Source: Adapted from Dougherty and Lister (2015)	

Locations How to give an intramuscular injection Tips Complications Takeaway An intramuscular injection delivers medication into a muscle. Doctors frequently use intramuscular injections to.

Inadequate deltoid muscle penetration and concerns of improper COVID .



Begin by having the patient relax the arm. The patient can be standing, sitting, or lying down. To locate the landmark for the deltoid muscle, expose the upper arm and find the acromion process by palpating the bony prominence. The injection site is in the middle of the deltoid muscle, about 2.5 to 5 cm (1 to 2 inches) below the acromion process.

PDF Vaccine Administration: Intramuscular (IM) Injection Adults 19 years of .

Avoiding shoulder injury related to vaccine administration

Shoulder injury related to vaccine administration (SIRVA) is a rare complication of incorrect vaccine administration, when the vaccine is given too high into the shoulder joint. This can cause shoulder pain and restricted range of movement. Diagnoses include bursitis, tendinitis and rotator cuff tears. Bursitis is the most commonly reported diagnosis on ultrasound. Symptoms often begin at the time of injection and can last from weeks to years.

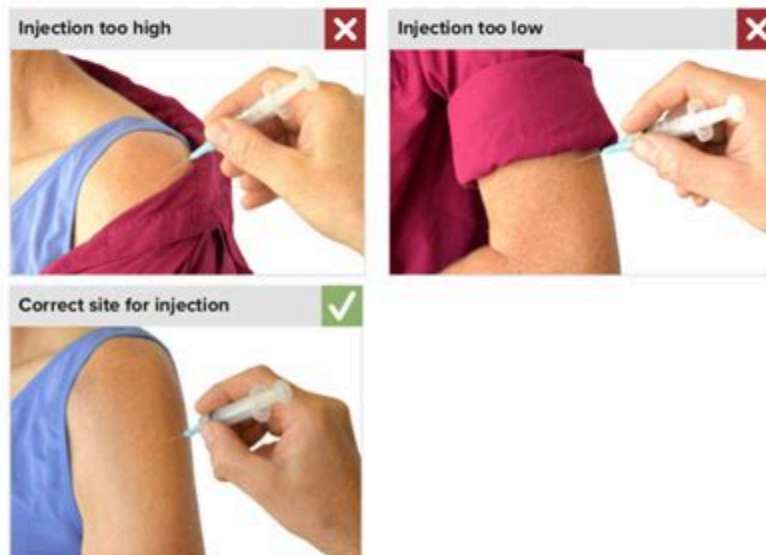
Correct injection technique and positioning will avoid SIRVA.

1 Choose the correct size needle

Use an appropriate needle length to improve vaccine delivery and reduce pain.

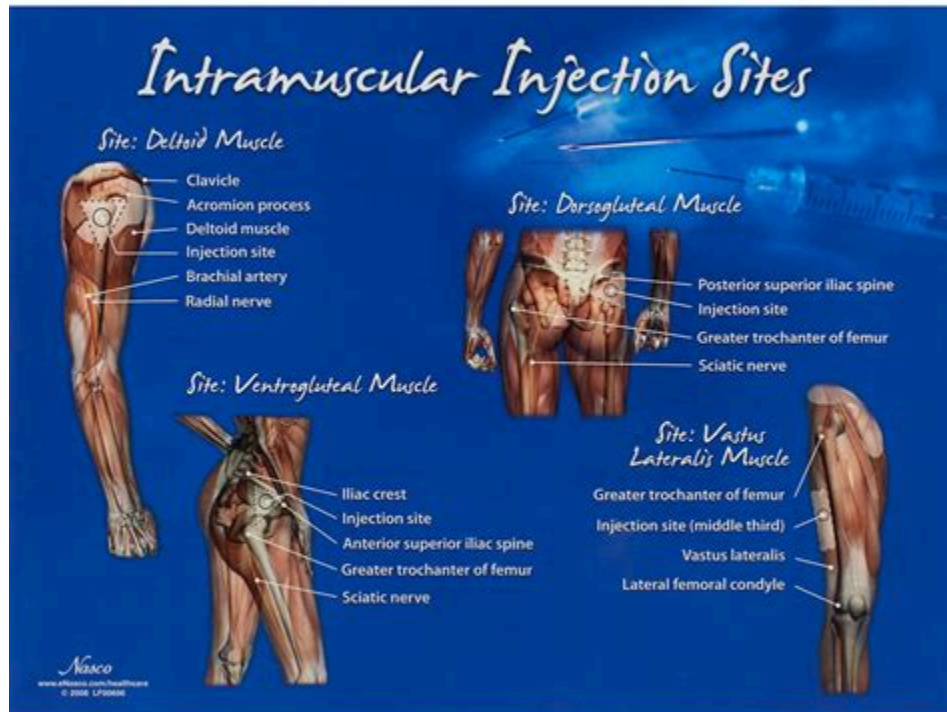
Age or size of person	Needle type
Child or adult – note that the deltoid muscle is not recommended for vaccination of infants less than 12 months of age	22–25 gauge, 25 mm long
Very large or obese person	22–25 gauge, 38 mm long

2 Expose the entire upper arm



In the case of IM injections, you should be particularly aware of the patient's preference for an injection site and administration process . are preferred for the administration of larger volumes of medications, while small volumes can be given to the arm, in the deltoid muscle. The deltoid site is mostly commonly used for immunizations .

Intramuscular Injections - Acute care | Elsevier - Clinical Skills



Sep 17, 2010 I'm with them. I've always been told 1ml max in the detoid. healthstar, BSN, RN 1 Article; 944 Posts Sep 17, 2010 I was told 0.5 ML max chansen

Rules about intramuscular injection in children: - Armada Hospital JLT .



Locations of six examined sites in young adults. A: In the deltoid muscle, three finger breadths below the mid-acromion (MA) was defined as (a), and the point on the anteroposterior axillary line (b) was defined as that located at the intersection of the perpendicular line from MA and the horizontal line between the upper end of the anterior axillary line (AAL) and upper end of the posterior .

How and where is a deltoid IM injection given? - Drugs



small dose (< 2 mL) injection length The deltoid is the preferred site when administering a volume of these sites? Assessing BMI to select the appropriate site and needle

7. 4: Intramuscular Injections - Medicine LibreTexts



Pull or push the skin 2 to 3 cm away from the injection site with the nondominant hand

A deltoid IM injection is given into a specific area of the deltoid muscle located in your upper arm. Many vaccinations are given by this route. There are several different ways to find the deltoid muscle injection site, which is the central and thickest portion of the deltoid muscle, for example:

18. 6 Administering Intramuscular Medications - Nursing Skills - 2e

ACTIVE LEARNING TEMPLATE

Nursing Skill



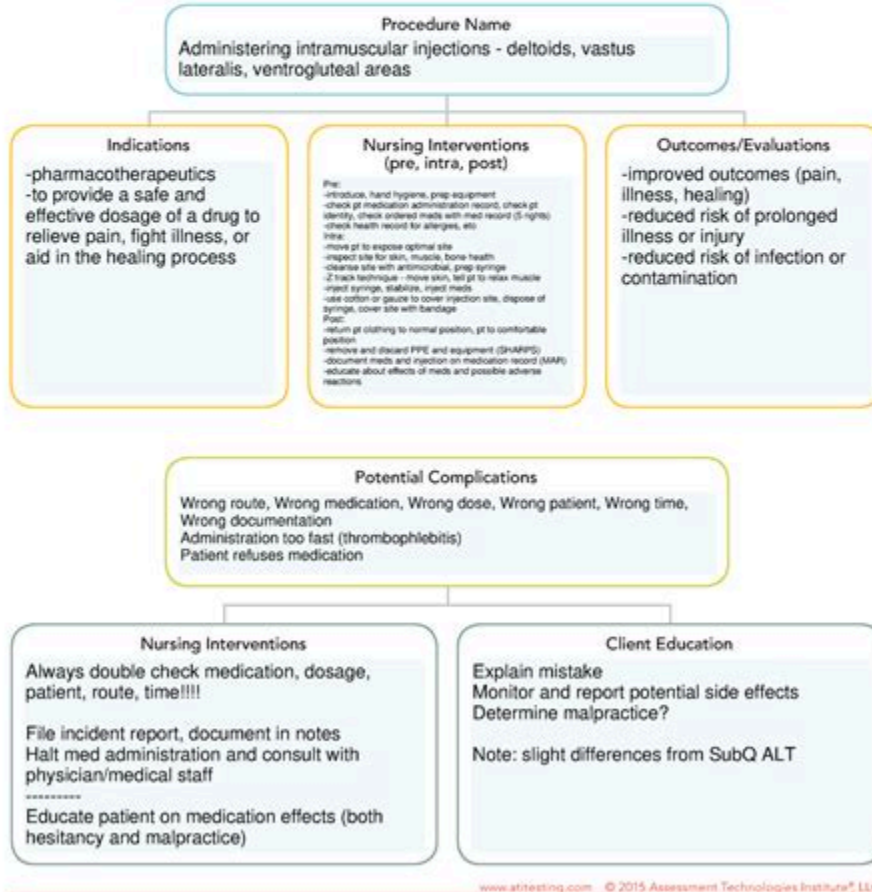
NAME _____

CONTENT Injectable medication administration

REVIEW MODULE CHAPTER Taylor CH 29

TOPIC DESCRIPTOR Intramuscular medication administration

DESCRIPTION OF SKILL: Preparing and administering medications by injection safely and correctly are important components of nursing practice. When preparing and administering medications by injection, keep distractions to a minimum, double check all calculations, avoid shortcuts, and follow the 10 rights of medication administration.



Dispose of both the syringe and the medicine. Get more medicine in a new syringe. When you give the second injection, give it on the other side. Inject the medicine: Push down on the plunger to inject the medicine. Do not force the medicine by pushing hard. Some medicines hurt. You can inject the medicine slowly to reduce the pain.

The Best Intramuscular (IM) Injection Sites - Verywell Health



The deltoid muscle is preferred for children aged 3-10 years ; the needle length for deltoid site injections can range from $\frac{5}{8}$ to 1 inch on the basis of technique. The anterolateral thigh can also be used . In this case the needle length should be 1 inch to 1.25 inches.

Deltoid Intramuscular Injections: A Systematic Review of Underlying .

Cureus

Open Access Review
Article

DOI: 10.7759/cureus.24172

Deltoid Intramuscular Injections: A Systematic Review of Underlying Neurovascular Structures to the Muscle and Proposing a Relatively Safer Site

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Abstract

The deltoid is the preferred site for intramuscular injection (IMI) because of its easy accessibility for drug and vaccine administration. Government immunization advisories, standard anatomy textbooks, and researchers have proposed various injection techniques and sites, but specific guidelines are lacking for the administration of IMIs in the increasingly used deltoid site. This study analyzes the procedures of administering IMIs in the deltoid related to the neurovascular network underlying the muscle and proposes a preferred site with the least chance of injury. The review protocol was submitted with PROSPERO (ID: 519251). PubMed, Google Scholar, and Websites of National Public Health Agencies were searched from 1950 up to 2022 for articles, advisories, and National Immunization Guidelines using Medical Subject Headings (MeSH) terms, including IMIs, deltoid muscle, safe injection sites, to identify recommendations for safer sites and techniques of administering deltoid IMIs. All the authors strictly adhered to a well-developed registered review protocol throughout the study and followed the risk of bias in systematic reviews (ROBIS) guidance tool. The proposed sites and landmark data were tabulated, and each site was analyzed based on the underlying neurovascular structures. Data were depicted by self-generated images.

The initial search identified 174 articles. After applying the inclusion and exclusion criteria, 57 articles were shortlisted. Out of the 39 selected articles, 18 focused on the administration of deltoid IMIs, whereas seven focused on the variations in the underlying neurovascular structures in proximity to the deltoid muscle. The remaining 14 articles were the immunization guides issued by the National Public Health Agencies of the Government of India and abroad, whose data was used for comparison. Twelve deltoid IMI sites and techniques were identified. A site 1-3 fingerbreadths/5 cm below the mid-acromion point (7 studies); mid-deltoid site (densest part of the deltoid) (1 study); a site at the middle third of the deltoid muscle (1 study); triangular injection site (1 study). Limitations included the unavailability of free access to complete text in many articles resulting in exclusion. The area around the shoulder joint and up to the lower level of the intertubercular sulcus is highly vascularized by the presence of many anomalous arterial patterns. To avoid injury, a safer site is proposed of 5 fingerbreadths/10 cm below the midpoint of the lateral border of the acromion. The authors received no specific funding for this study except for the journal publication charges.

Categories: Family General Practice, Epidemiology, Public Health, Anatomy

Keywords: needle depth, axillary nerve, safe site for injection, deltoid muscle, intramuscular injections

Introduction And Background

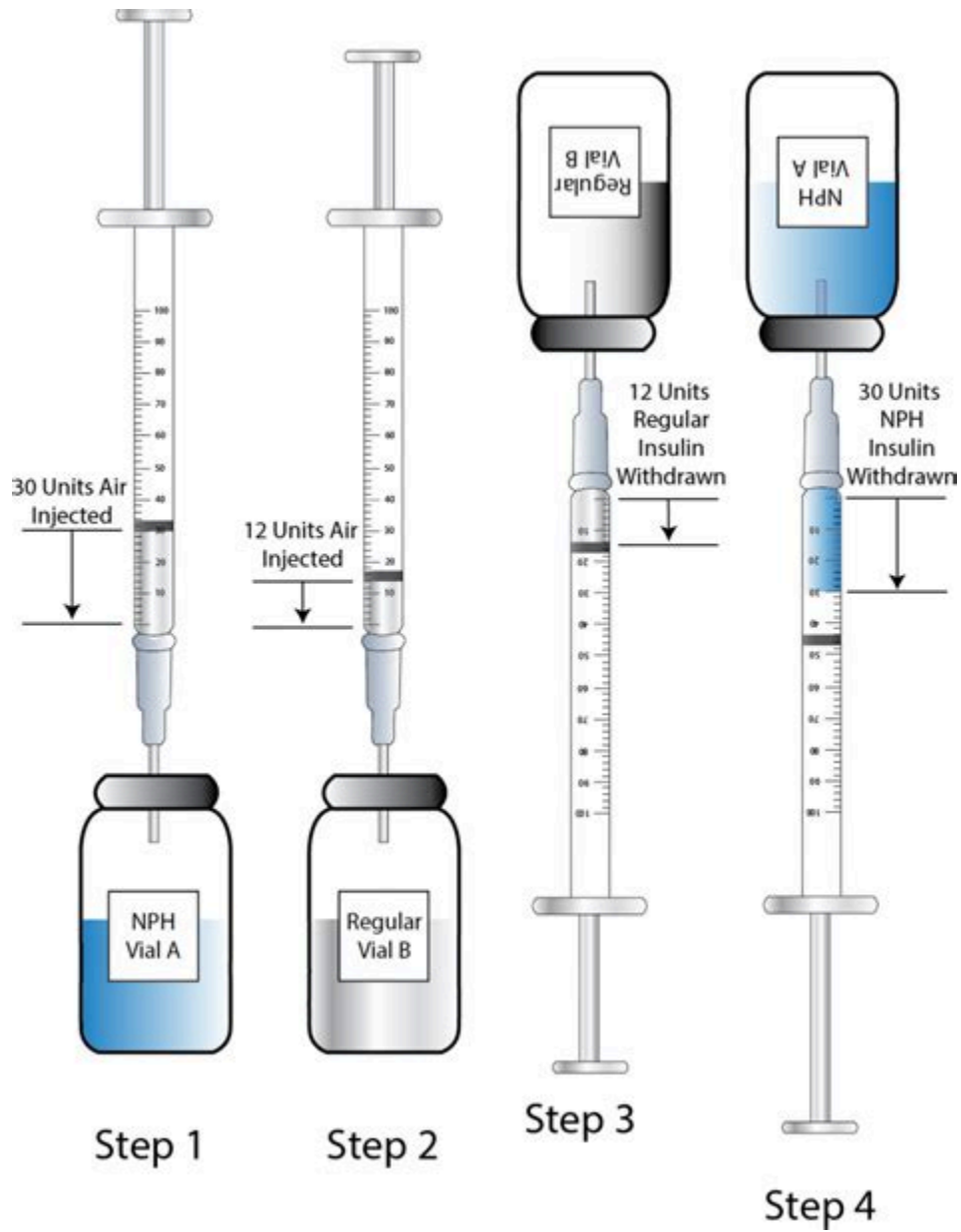
Intramuscular injections (IMIs) are among the most common medical procedures performed in any healthcare center [1]. Globally, the deltoid is the preferred IMI site in clinical practice [1]. Many other IMI sites have been considered over the deltoid based on the risk of injury to the underlying vessels and nerves. However, a paucity of uniform guidelines and algorithms persists for IMI administration by healthcare professionals [2]. This study analyzes the procedures of IMI administration in the deltoid in relation to the arterial network underlying the muscle. Our study proposes a site preferred to the deltoid for IMIs with the least chance of injury to neurovascular structures. Figure 1 and Table 1 present the structures underlying the deltoid muscle.

How to cite this article

Chaudhary S, Sharma S, Kushwaha S, et al. (April 15, 2022) Deltoid Intramuscular Injections: A Systematic Review of Underlying Neurovascular Structures to the Muscle and Proposing a Relatively Safer Site. *Cureus* 14(4): e24172. DOI: 10.7759/cureus.24172

The deltoid is the preferred site for intramuscular injection (IMI) because of its easy accessibility for drug and vaccine administration. Government immunization advisories, standard anatomy textbooks, and researchers have proposed various injection techniques and sites, but specific guidelines are lacking for the administration of IMIs in the increasingly used deltoid site.

18. 6: Administering Intramuscular Medications - Medicine LibreTexts



IM injections are administered in five potential sites: deltoid (commonly used for adult vaccinations), dorsogluteal, ventrogluteal, rectus femoris, and vastus lateralis 3,10,11 (Figure 1). .

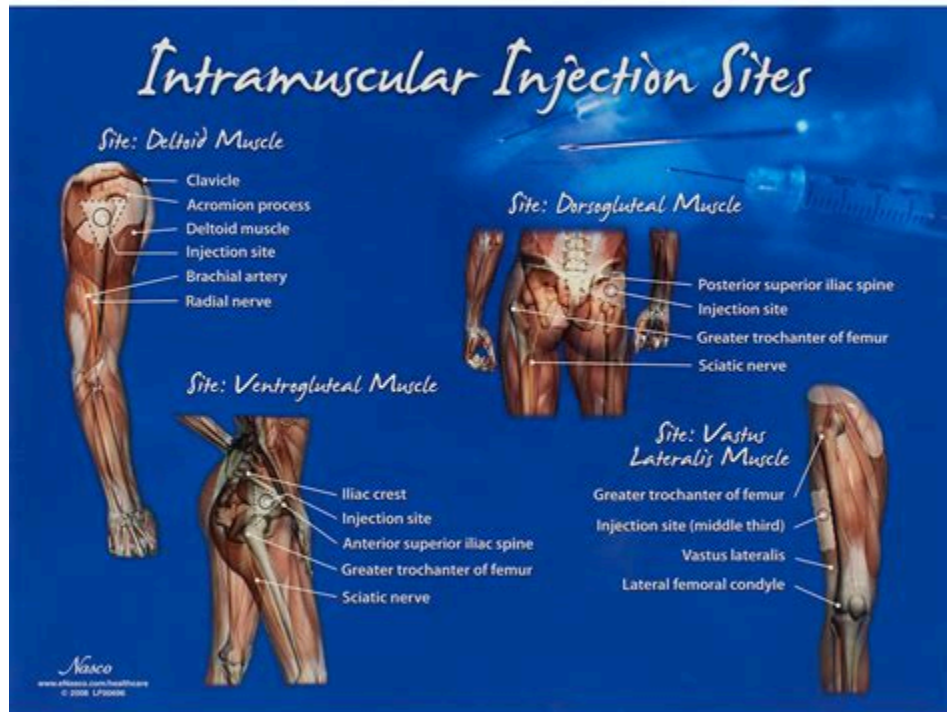
Large-volume IM injections: A review of best practices

TABLE. Overview of injection-site reactions in clinical studies of fulvestrant

Study	Phase	Treatments	Incidence of ISRs
First-line therapy			
FIRST ¹⁶	2	Fulvestrant 500 mg/month ^a vs anastrozole 1 mg/day	Fulvestrant: 1.3% (14) of all administrations (two 250-mg injections) and 5.9% (6) of patients
Study 25 ¹⁷	3	Fulvestrant 250 mg/month ^b vs tamoxifen 20 mg/day, orally	Fulvestrant: 2.9% (9 of 310 patients) Tamoxifen (placebo injection): 1.1% (3 of 271 patients)
Second-line therapy			
CONFIRM ¹⁸	3	Fulvestrant 250 mg/month ^b + placebo (5-mL injections of each) vs fulvestrant 500 mg/month ^a	250 mg/month: 13.4% (50 of 374 patients) 500 mg/month: 13.6% (49 of 361 patients)
FINDER 1 ¹⁹	2	Fulvestrant 250 mg/month ^b vs Fulvestrant LD ^c vs Fulvestrant 500 mg/month ^a	250 mg/month: 31.1% ^d (14 of 45 patients) LD: 21.6% ^d (11 of 51 patients) 500 mg/month: 30.4% ^d (14 of 46 patients)
FINDER 2 ¹⁹	2	Fulvestrant 250 mg/month ^b vs Fulvestrant LD ^c vs Fulvestrant 500 mg/month ^a	250 mg/month: 10.6% ^d (5 of 47 patients) LD: 10.0% ^d (5 of 50 patients) 500 mg/month: 6.5% ^d (3 of 46 patients)
Trial 0020 ²⁰	3	Fulvestrant 250 mg/month ^b (single 5-mL injection) vs Anastrozole 1 mg/day	Fulvestrant: 1.1% of courses
Trial 0021 ²¹	3	Fulvestrant 250 mg/month ^b (two 2.5-mL injections) + placebo vs anastrozole 1 mg/day + placebo	Fulvestrant: 4.6% of courses Placebo: 4.4% of courses
^a Fulvestrant 500 mg/month: 500 mg on days 0, 14, and 28 of month 1, then every 28 days thereafter ^b Fulvestrant 250 mg/month: 250 mg every 28 days ^c Fulvestrant LD: 500 mg on day 0, 250 mg on days 14 and 28 of month 1, then 250 mg every 28 days thereafter ^d Injection site pain			
Key: CONFIRM, Comparison of Faslodex In Recurrent or Metastatic Breast Cancer; FINDER 1, Faslodex Investigation of Dose Evaluation in Estrogen Receptor-Positive Advanced Breast Cancer; FINDER 2, Faslodex Investigation of Dose Evaluation in Estrogen Receptor-Positive Advanced Breast Cancer 2; FIRST, Fulvestrant First-Line Study Comparing Endocrine Treatments; ISRs, injection site reactions; LD, loading dose.			

Deltoid . The deltoid muscle is the preferred injection site in children aged 3-18 years when muscle mass is more developed. It is suitable for small volume injections. The recommended volume is 1ml; however, up to 2mls can be administered. The deltoid muscle is a rounded triangle shape.

PDF How to Administer Intramuscular and Subcutaneous Vaccine Injections to .



Two ml dosages should go deep IM in the gluteal muscle. Not knowing what medication you are talking about, I would DEFINITELY double check the dosage that you are giving and the order, check it with the pharmacist if necessary.

Anatomically safe sites for intramuscular injections: a cross-sectional .



Observing the large numbers of recently published media images of persons receiving their vaccine, the authors noted that in many cases the injection technique involved "bunching" of the skin over the injection site i. e. folding the skin overlaying the deltoid muscle between two fingers and inserting the hypodermic needle into the fold (Fig .

Can 2 ml of fluid be administered in deltoid muscle?

Table 1. Injectable volumes per site in adults	
Site	Maximum volume
Ventrogluteal (recommended)	2.5ml
Vastus lateralis (recommended)	5ml
Deltoid	1ml
Rectus femoris	5ml
Dorsogluteal (not recommended)	4ml

Source: Adapted from Dougherty and Lister (2015)

Intramuscular route offer a faster rate of absorption than subcutaneous injection, it can hold a volume of fluid in children which is 0.5-2ml depending on the child size. 2. In children age less than 2 years the recommended site of injection is the leg muscle vastus lateralis, middle part and the lateral aspect of the muscle; shown in the figure.

Optimal Intramuscular Injection Site and Maximum Volume in Adult Population

IM Injections: Other Ages



Sites:

Deltoid:

- Toddler (1-2 years)
- Child/adolescents (3-18 years)
- Adults (19 years and older)

Anterolateral thigh:

- Toddlers
- Children/adolescents
- Adults

Needle Size:

- | | |
|-----------------------|--------------------------------------|
| Toddlers | 5/8"-1" deltoid * |
| Children /Adolescents | 1"-1 ¼" thigh
22-25 gauge |
| Adults | 1"-1 ½" deltoid/thigh*
22-25gauge |

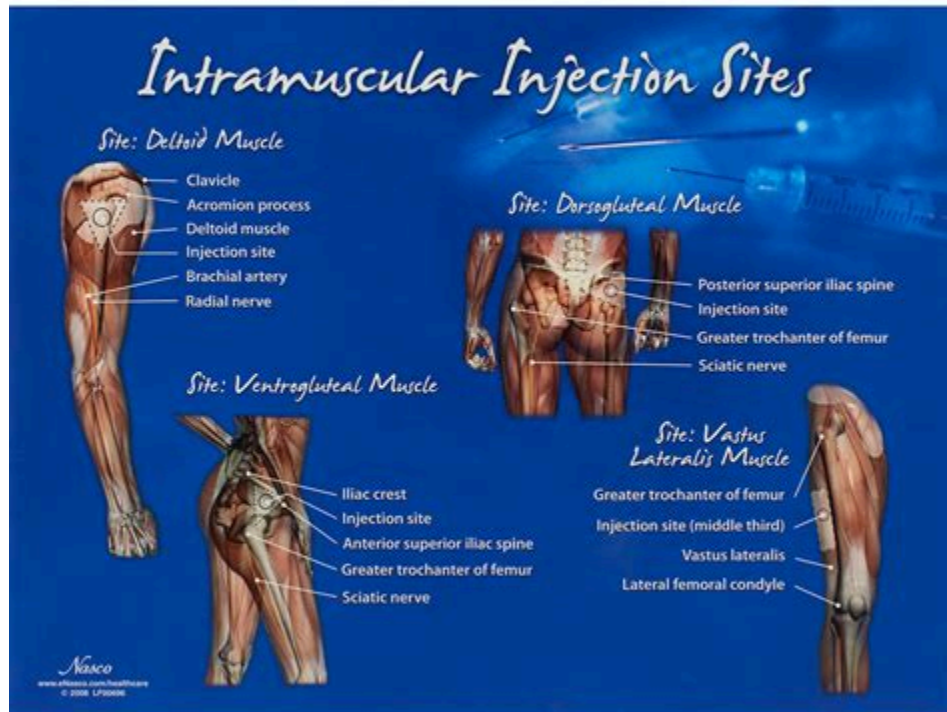
*Indicates alternate locations if deemed necessary after assessment



We Protect Lives.

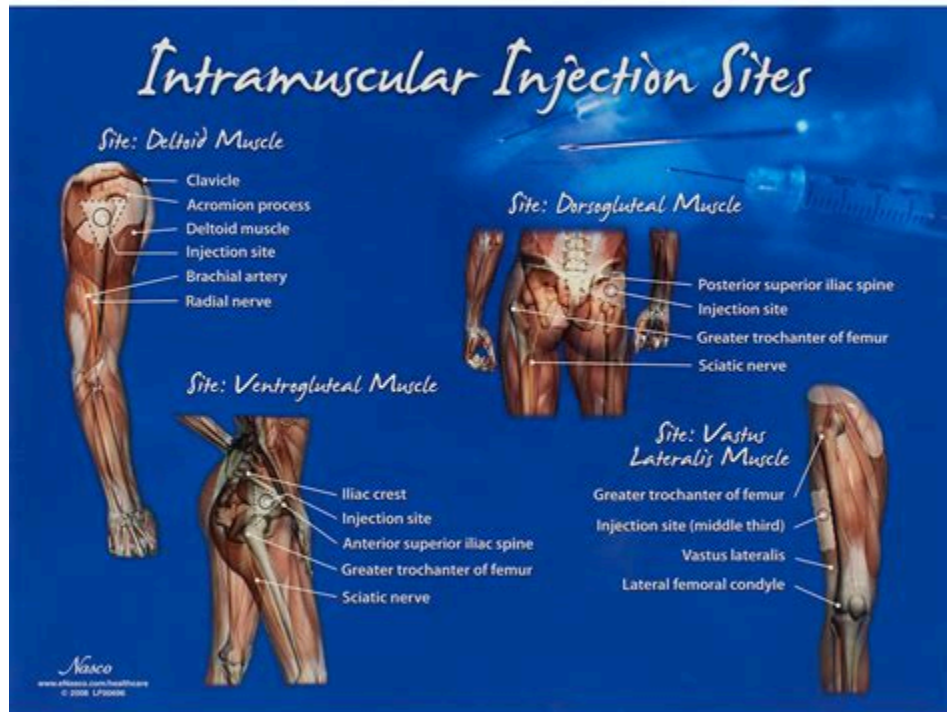
1. Use the correct syringe and needle. Administer vaccine using either a 1-mL or 3-mL syringe. Use a 22- to 25-gauge needle. Use the correct needle length based on the patient's gender and weight. For adults, use a 1- to 1.5-inch needle. 1.5 in (38 mm) OR 1 in (25 mm) in (25 mm) Men and women, less than 60 kg* (130 lbs) Men and women,

Intramuscular injection: Locations and administration - Medical News Today



Intramuscular (IM) injections have been associated with adverse effects and pain, and this route of medication injection should be used as a last resort. Consider contacting the practitioner for an alternative, preferred route of medication administration. Take steps to eliminate interruptions and distractions during medication preparation.

PDF Immunization Technique for Intramuscular (IM) Injections Deltoid Muscle



Use a needle long enough to reach deep into the muscle. Insert the needle at a 90° angle to the skin with a quick thrust. Separate two injections given in the same deltoid muscle (or anterolateral thigh muscle, if using) by a minimum of 1". acromion process. • (bony prominence above deltoid)

- <https://collectednotes.com/aas2024reviwer/stanabol-50-alchemy>
- <https://publiclab.org/notes/print/41712>
- <https://publiclab.org/notes/print/43167>