

NEXCERPTS FROMursing PROCEDURES

Intramuscular Injection Technique



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I.M. INJECTION

I.M. injections deposit medication deep into muscle tissue. This route of administration provides rapid systemic action and absorption of relatively large doses (up to 5 ml in appropriate sites). I.M. injections are recommended for patients who are uncooperative or can't take medication orally and for drugs that are altered by digestive juices. Because muscle tissue has few sensory nerves, I.M. injection allows less painful administration of irritating drugs.

The site for an I.M. injection must be chosen carefully, taking into account the patient's general physical status and the purpose of the injection. I.M. injections shouldn't be administered at inflamed, edematous, or irritated sites or at sites that contain moles, birthmarks, scar tissue, or other lesions. I.M. injections may also be contraindicated in patients with impaired coagulation mechanisms, occlusive peripheral vascular disease, edema, and shock; after thrombolytic therapy; and during an acute myocardial infarction because these conditions impair peripheral absorption. I.M. injections require sterile technique to maintain the integrity of muscle tissue.

Oral or I.V. routes are preferred for administration of drugs that are poorly absorbed by muscle tissue, such as phenytoin, digoxin, chlorthalidone, and diazepam.

Equipment

Patient's medication record and chart ■ prescribed medication ■ diluent or filter needle, if needed ■ 3- or 5-ml syringe ■ 20G to 25G 1" to 3" needle ■ gloves ■ alcohol sponges.

The prescribed medication must be sterile. The needle may be packaged separately or already attached to the syringe. Needles used for I.M. injections are longer than subcutaneous needles *because they must reach deep into the muscle*. Needle length also depends on the injection site, patient's size, and amount of subcutaneous fat covering the muscle. The needle gauge for I.M. injections should be large to accommodate viscous solutions and suspensions.

Preparation of equipment

Verify the order on the patient's medication record by checking it against the doctor's order. Also note whether the patient has any allergies, especially before the first dose.

Check the prescribed medication for color and clarity. Also note the expiration date. Never use medication that is cloudy or discolored or contains a precipitate unless the manufacturer's instructions allow it. Remember that for some drugs (such as suspensions), the presence of drug particles is normal. Observe for abnormal changes. If in doubt, check with the pharmacist.

Choose equipment appropriate to the prescribed medication and injection site, and make sure it works properly. The needle should be straight, smooth, and free of burrs.

For single-dose ampules: Wrap an alcohol sponge around the ampule's neck and snap off the top, directing the force away from your body. Attach a filter needle to the needle and withdraw the medication, keeping the needle's bevel tip below the level of the solution. Tap the syringe *to clear air from it*. Cover the needle with the needle sheath.

Before discarding the ampule, check the medication label against the patient's medication record. Discard the filter needle and the ampule. Attach the appropriate needle to the syringe.

For single-dose or multidose vials: Reconstitute powdered drugs according to instructions. Make sure all crystals have dissolved in the solution. Warm the vial by rolling it between your palms *to help the drug dissolve faster*.

Wipe the stopper of the medication vial with an alcohol sponge, and then draw up the prescribed amount of medication. Read the medication label as you select the medication, as you draw it up, and after you've drawn it up *to verify the correct dosage*.

Don't use an air bubble in the syringe. *A holdover from the days of reusable syringes, air bubbles can affect the medication dosage by 5% to 100%*. Modern disposable syringes are calibrated to administer the correct dose without an air bubble.

Gather all necessary equipment and proceed to the patient's room.

Implementation

- Confirm the patient's identity by asking his name and checking his wristband for name, room number, and bed number.
- Provide privacy, explain the procedure to the patient, and wash your hands.
- Select an appropriate injection site. The gluteal muscles (gluteus medius and minimus and the upper outer corner of the gluteus maximus) are used most commonly for healthy adults, although the deltoid muscle may be used for a small-volume injection (2 ml or less). Remember to rotate injection sites for patients who require repeated injections.

■ **PEDIATRIC ALERT** For infants and children, the vastus lateralis muscle of the thigh is used most often *because it's usually the best developed and contains no large nerves or blood vessels, minimizing the risk of serious injury*. The rectus femoris muscle may also be used in infants but is usually contraindicated in adults. ■

- Position and drape the patient appropriately, making sure the site is well exposed and that lighting is adequate.
- Loosen the protective needle sheath, but don't remove it.

- After selecting the injection site, gently tap it *to stimulate the nerve endings and minimize pain when the needle is inserted.* (See *Locating I.M. injection sites.*) Clean the skin at the site with an alcohol sponge. Move the sponge outward in a circular motion to a circumference of about 2" (5 cm) from the injection site, and allow the skin to dry. Keep the alcohol sponge for later use.
- Put on gloves. With the thumb and index finger of your nondominant hand, gently stretch the skin of the injection site taut.
- While you hold the syringe in your dominant hand, remove the needle sheath by slipping it between the free fingers of your nondominant hand and then drawing back the syringe.
- Position the syringe at a 90-degree angle to the skin surface, with the needle a couple of inches from the skin. Tell the patient that he'll feel a prick as you insert the needle. Then quickly and firmly thrust the needle through the skin and subcutaneous tissue, deep into the muscle.
- Support the syringe with your nondominant hand, if desired. Pull back slightly on the plunger with your dominant hand to aspirate for blood. If no blood appears, *slowly* inject the medication into the muscle. *A slow, steady injection rate allows the muscle to distend gradually and accept the medication under minimal pressure.* You should feel little or no resistance against the force of the injection.
- **NURSING ALERT** If blood appears in the syringe on aspiration, the needle is in a blood vessel. If this occurs, stop the injection, withdraw the needle, prepare another injection with new equipment, and inject another site. Don't inject the bloody solution. ■
- After the injection, gently but quickly remove the needle at a 90-degree angle.
- Using a gloved hand, cover the injection site immediately with the used alcohol sponge, apply gentle pressure, and unless contraindicated, massage the relaxed muscle *to help distribute the drug.*
- Remove the alcohol sponge, and inspect the injection site for signs of active bleeding or bruising. If bleeding continues, apply pressure to the site; if bruising occurs, you may apply ice.
- Watch for adverse reactions at the site for 10 to 30 minutes after the injection.
- **ELDER ALERT** An older patient will probably bleed or ooze from the site after the injection because of decreased tissue elasticity. Applying a small pressure bandage may be helpful. ■
- Discard all equipment according to standard precautions and your facility's policy. Don't recap needles; dispose of them in an appropriate sharps container *to avoid needle-stick injuries.*

Special considerations

- To slow their absorption, some drugs for I.M. administration are dissolved in oil or other special solutions. Mix these preparations well before drawing them into the syringe.
- **PEDIATRIC ALERT** The gluteal muscles can be used as the injection site only after a toddler has been walking for about 1 year. ■
- Never inject into sensitive muscles, especially those that twitch or tremble when you assess site landmarks and tissue depth. *Injections into these trigger areas may cause sharp or referred pain, such as the pain caused by nerve trauma.*
- Keep a rotation record that lists all available injection sites, divided into various body areas, for patients who require repeated injections. Rotate from a site in the first area to a site in each of the other areas. Then return to a site in the first area that is at least 1" (2.5 cm) away from the previous injection site in that area.
- If the patient has experienced pain or emotional trauma from repeated injections, consider numbing the area before cleaning it by holding ice on it for several seconds. If you must inject more than 5 ml of solution, divide the solution and inject it at two separate sites.
- Always encourage the patient to relax the muscle you'll be injecting *because injections into tense muscles are more painful than usual and may bleed more readily.*
- I.M. injections can damage local muscle cells, causing elevations in serum enzyme levels (creatinase [CK]) that can be confused with elevations resulting from cardiac muscle damage, as in myocardial infarction. *To distinguish between skeletal and cardiac muscle damage,* diagnostic tests for suspected myocardial infarction must identify the isoenzyme of CK specific to cardiac muscle (CK-MB) and include tests to determine lactate dehydrogenase and aspartate aminotransferase levels. If it's important to measure these enzyme levels, suggest that the doctor switch to I.V. administration and adjust dosages accordingly.
- Dosage adjustments are usually necessary when changing from the I.M. route to the oral route.

Complications

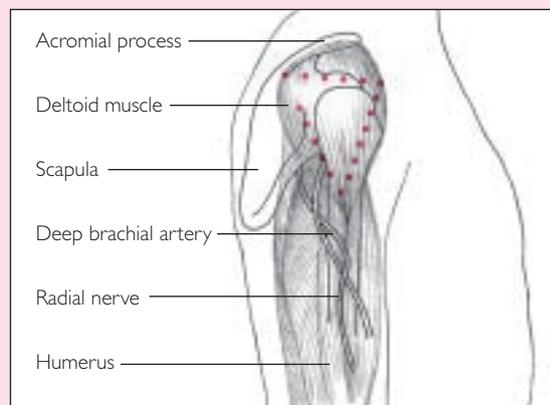
Accidental injection of concentrated or irritating medications into subcutaneous tissue or other areas where they can't be fully absorbed can cause sterile abscesses to develop. Such abscesses result from the body's natural immune response in which phagocytes attempt to remove the foreign matter.

Failure to rotate sites in patients who require repeated injections can lead to deposits of unabsorbed medications. Such deposits can reduce the desired pharmacologic effect and may lead to abscess formation or tissue fibrosis.

Locating I.M. injection sites

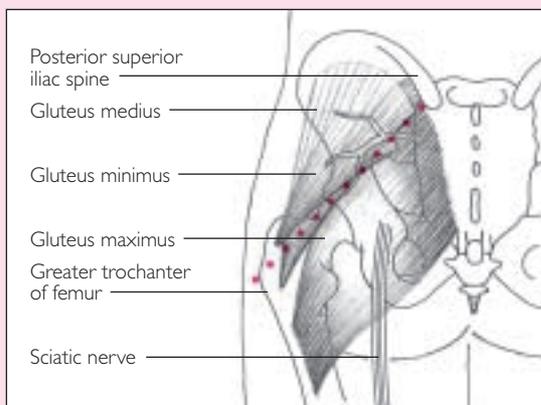
Deltoid

Find the lower edge of the acromial process and the point on the lateral arm in line with the axilla. Insert the needle 1" to 2" (2.5 to 5 cm) below the acromial process, usually two or three fingerbreadths, at a 90-degree angle or angled slightly toward the process. Typical injection: 0.5 ml (range: 0.5 to 2.0 ml).



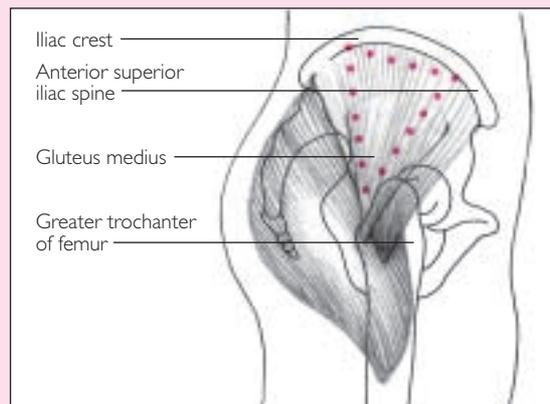
Dorsogluteal

Inject above and outside a line drawn from the posterior superior iliac spine to the greater trochanter of the femur. Or; divide the buttock into quadrants and inject in the upper outer quadrant, about 2" to 3" (5 to 7.6 cm) below the iliac crest. Insert the needle at a 90-degree angle. Typical injection: 1 to 4 ml (range: 1 to 5 ml).



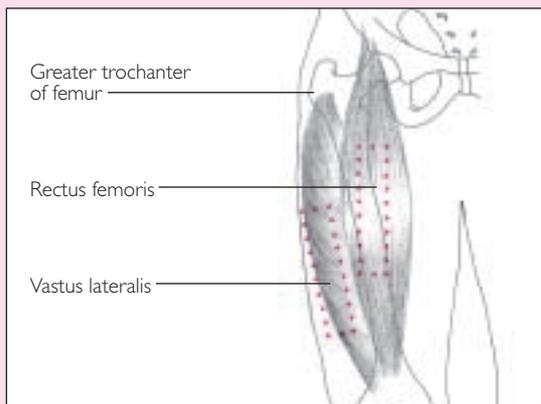
Ventrogluteal

Locate the greater trochanter of the femur with the heel of your hand. Then, spread your index and middle fingers from the anterior superior iliac spine to as far along the iliac crest as you can reach. Insert the needle between the two fingers at a 90-degree angle to the muscle. (Remove your fingers before inserting the needle.) Typical injection: 1 to 4 ml (range: 1 to 5 ml).



Vastus lateralis

Use the lateral muscle of the quadriceps group, from a handbreadth below the greater trochanter to a handbreadth above the knee. Insert the needle into the middle third of the muscle parallel to the surface on which the patient is lying. You may have to bunch the muscle before insertion. Typical injection: 1 to 4 ml (range: 1 to 5 ml; 1 to 3 ml for infants).



■ **ELDER ALERT** Because older patients have decreased muscle mass, I.M. medications can be absorbed more quickly than expected. ■

Documentation

Chart the drug administered, dose, date, time, route of administration, and injection site. Also, note the patient's tolerance of the injection and the injection's effects, including any adverse effects.

Z-TRACK INJECTION

The Z-track method of I.M. injection prevents leakage, or tracking, into the subcutaneous tissue. It's typically used to administer drugs that irritate and discolor subcutaneous tissue, primarily iron preparations such as iron dextran. It may also be used in elderly patients who have decreased muscle mass. Lateral displacement of the skin during the injection helps to seal the drug in the muscle.

This procedure requires careful attention to technique because leakage into subcutaneous tissue can cause patient discomfort and may permanently stain some tissues.

Equipment

Patient's medication record and chart ■ two 20G 1¼" to 2" needles ■ prescribed medication ■ gloves ■ 3- or 5-ml syringe ■ two alcohol sponges.

Preparation of equipment

Verify the order on the patient's medication record by checking it against the doctor's order. Wash your hands.

Make sure the needle you're using is long enough to reach the muscle. As a rule of thumb, a 200-lb (90-kg) patient requires a 2" needle; a 100-lb (45-kg) patient, a 1¼" to 1½" needle.

Attach one needle to the syringe, and draw up the prescribed medication. Then draw 0.2 to 0.5 cc of air (depending on your facility's policy) into the syringe. Remove the first needle and attach the second *to prevent tracking the medication through the subcutaneous tissue as the needle is inserted.*

Implementation

- Confirm the patient's identity, explain the procedure, and provide privacy.
- Place the patient in the lateral position, exposing the gluteal muscle to be used as the injection site. The patient may also be placed in the prone position.
- Clean an area on the upper outer quadrant of the patient's buttock with an alcohol sponge.

- Put on gloves. Then displace the skin laterally by pulling it away from the injection site. (See *Displacing the skin for Z-track injection*, page 247.)
- Insert the needle into the muscle at a 90-degree angle.
- Aspirate for blood return; if none appears, inject the drug slowly, followed by the air. *Injecting air after the drug helps clear the needle and prevents tracking the medication through subcutaneous tissues as the needle is withdrawn.*
- Wait 10 seconds before withdrawing the needle *to ensure dispersion of the medication.*
- Withdraw the needle slowly. Then release the displaced skin and subcutaneous tissue *to seal the needle track.* Don't massage the injection site or allow the patient to wear a tight-fitting garment over the site *because it could force the medication into subcutaneous tissue.*
- Encourage the patient to walk or move about in bed *to facilitate absorption of the drug from the injection site.*
- Discard the needles and syringe in an appropriate sharps container. Don't recap needles *to avoid needle-stick injuries.*
- Remove and discard your gloves.

Special considerations

- Never inject more than 5 ml of solution into a single site using the Z-track method. Alternate gluteal sites for repeat injections.
- Always encourage the patient to relax the muscle you'll be injecting *because injections into tense muscle are more painful than usual and may bleed more readily.*
- If the patient is on bed rest, encourage active range-of-motion (ROM) exercises or perform passive ROM exercises *to facilitate absorption from the injection site.*
- I.M. injections can damage local muscle cells, causing elevated serum enzyme levels (for example, of creatine kinase) that can be confused with the elevated enzyme levels resulting from damage to cardiac muscle, as in myocardial infarction. If measuring enzyme levels is important, suggest that the doctor switch to I.V. administration and adjust dosages accordingly.

Complications

Discomfort and tissue irritation may result from drug leakage into subcutaneous tissue. Failure to rotate sites in patients who require repeated injections can interfere with the absorption of medication. Unabsorbed medications may build up in deposits. Such deposits can reduce the desired pharmacologic effect and may lead to abscess formation or tissue fibrosis.

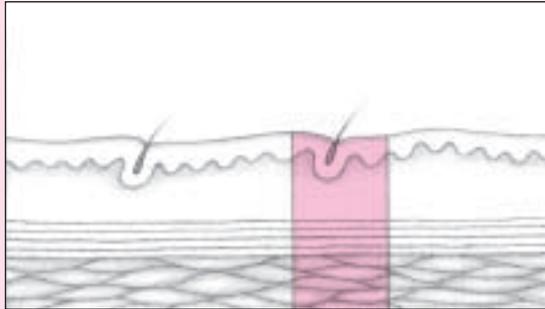
Documentation

Record the medication, dosage, date, time, and site of injection on the patient's medication record. Include the patient's response to the injected drug.

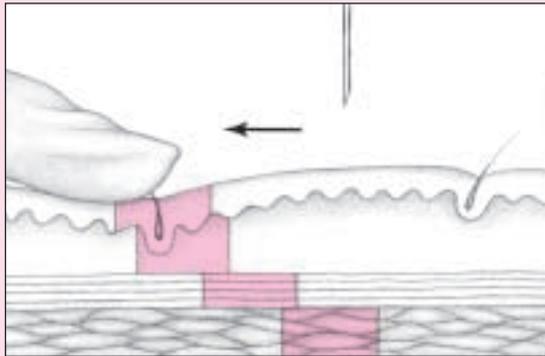
Displacing the skin for Z-track injection

By blocking the needle pathway after an injection, the Z-track technique allows I.M. injection while minimizing the risk of subcutaneous irritation and staining from such drugs as iron dextran. The illustrations below show how to perform a Z-track injection.

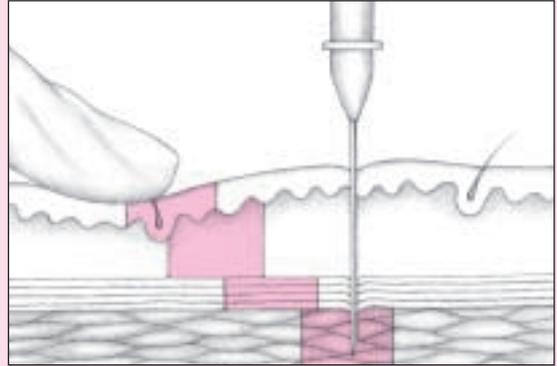
Before the procedure begins, the skin, subcutaneous fat, and muscle lie in their normal positions.



To begin, place your finger on the skin surface, and pull the skin and subcutaneous layers out of alignment with the underlying muscle. You should move the skin about $\frac{1}{2}$ " (1 cm).



Insert the needle at a 90-degree angle at the site where you initially placed your finger. Inject the drug and withdraw the needle.



Finally, remove your finger from the skin surface, allowing the layers to return to their normal positions. The needle track (shown by the dotted line) is now broken at the junction of each tissue layer, trapping the drug in the muscle.

