**Subcutaneous injection technique**


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**Summary**

This article outlines the procedure for administering subcutaneous injections, including site selection and prevention of complications.

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THE ADMINISTRATION OF subcutaneous (SC) injections is an important part of drug administration and a common nursing intervention in clinical practice. A skilled injection technique can make the patient’s experience less painful and avoid unnecessary complications.

Standards for medicines management from the Nursing and Midwifery Council (NMC) (2007) state: ‘The administration of medicines... is not solely a mechanistic task to be performed in strict compliance with the written prescription of a medical practitioner (now independent/supplementary prescriber). It requires thought and the exercise of professional judgement.’ The administration of SC injections requires the healthcare practitioner to understand the guiding principles that underpin this clinical skill. All aspects of these techniques (anatomy, physiology, patient assessment, preparation and technique) should be evidence-based to ensure the nurse provides safe and accountable practice (Shepherd 2002, NMC 2007).

This article aims to update the nurse’s knowledge and skills of SC injection techniques. A practical step-by-step approach for administering SC injections, accompanied by the underpinning rationale, is described to enable the nurse to perform this skill safely and competently.

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**General principles**

A nurse’s action can influence the patient’s physical and emotional experience and the intended outcome. To provide a safe standard of practice, nurses should continuously update their knowledge and skills, and be aware of and adhere to their organisation’s local policies, procedures and guidelines. The NMC’s (2007) *Standards for Medicines Management* provides standards by which the administration of medications must be performed. As a benchmark, these standards enable nurses to apply their knowledge, skills and professional judgement in the best interests of the patient and to measure their performance in clinical practice.

Nursing practice is also guided by local policies and procedures and nurses should adhere to the specific guidance issued by their organisation. This will include whether one or two nurses are required to check the medication. Only registered nurses may administer medications unsupervised. Nursing students must be supervised by a registered nurse to enable them to develop mastery and competence. A registered nurse is required to countersign any documentation signed by a nursing student (NMC 2007).

**Subcutaneous injections**

For all SC injections it is important to maintain aseptic procedures. Nurses must wash their hands before commencing the procedure and following the administration of the medication. Gloves must be worn for all invasive procedures (Pratt et al 2007), including SC injections. Gloves do not, however, protect the nurse from needlestick injury: sharps should be carefully and immediately disposed of at the point of administration (Workman 1999).

Injection via the SC route is chosen when slow, continuous absorption of the drug is required, for example, insulin and low molecular weight heparin. The medication is injected beneath the epidermis into the fat and connective tissue underlying the dermis, where there is less blood flow and therefore a slower absorption rate. The SC route is relatively pain free. Fluids can also be infused in this way: it is a safe, reliable and less
invasive route for the hydration of some patients. It is used when patients are having difficulty taking oral fluids, for example, older patients or those with dysphagia. However, this method is not recommended for rehydration in an acute emergency (Donnelly 1999).

It is essential to recognise and understand potential complications with SC injections. The administration of any medication can present a risk and, therefore, the nurse should be able to recognise the signs of an anaphylactic (allergic) reaction. Poor injection technique can cause adverse outcomes for the patient. Importantly, site pain and bruising can occur from local tissue trauma during administration. Therefore, it is important to consider the volume of solution to be administered, usually 0.5-2ml, and the speed at which the medication is given to prevent harm and discomfort for the patient (Chan 2001). Further, a poor understanding of the technique could lead to the accidental administration of a SC injection into the muscle (intramuscular (IM) injection), which will affect the rate of absorption and cause harm to the patient.

Sites for subcutaneous injection

The sites suitable for administering SC injections are the lateral aspects of the upper arm and thighs and the umbilical region of the abdomen (Figure 1). The back and lower loins can also be used. The upper arms are a favourable choice as the arms have fewer large blood vessels and less painful sensations, reducing the level of discomfort for the patient (Lister and Sarpal 2004). The abdomen is probably the most common site of choice for heparin as the skin here has thicker subcutaneous tissue (Chan 2001).

When choosing an appropriate site for administration, nurses need to consider whether the patient is receiving regular SC injections as these should be rotated to avoid irritation, scarring, hardening of the tissue and pain. Choice will also be influenced by the amount of SC tissue available at a particular site; any areas where there is evidence of inflammation, scarring or abrasions/lesions should be avoided (Workman 1999, Jamieson et al 2002). The procedure should be explained so that the patient fully understands and is able to give his or her informed consent and co-operation. The discussion should include the choice of site for the injection and information about the medication, action and side effects. This allows for any concerns or anxieties about the procedure to be addressed and the patient’s knowledge to be evaluated.

Equipment

You will need the following equipment:

- A prescription chart.
- The prescribed drug to be administered. This may be a pre-filled syringe where the medication has already been prepared and is ready for administration.
- A clean tray or receiver in which to place all equipment.
- A syringe of appropriate size (0.5-2ml).
- A 25 gauge needle.
- Gloves.
- A sterile, clinical wipe or tissue.
- A sharps container.

Preparation of equipment

The following outlines the procedure to follow when preparing the equipment:

- Collect all the equipment and make sure all packaging is intact to retain sterility. Check the expiry date on all packaging. Discard the equipment if any packaging is damaged or has expired.
- Wash and dry hands thoroughly with bactericidal soap and water, or use bactericidal hand rub to prevent any contamination of the equipment or medication. Put on gloves to prevent cross-infection from the hands of staff to patients and to protect staff against injectable substances.
- Check the patient’s prescription chart and determine the following: check the patient’s
identity; which drug is to be administered; the required dose; the route of administration; the date and time of administration and whether the prescription is legible and signed by an authorised prescriber. These actions ensure that any risk to the patient is minimised and that the patient is given the right dose of medication at the correct time by the prescribed route (Lister and Sarpal 2004).

- Check the drug against the prescription chart. Check the expiry date as all medications deteriorate over time. The expiry date shows when a drug can no longer be guaranteed to be effective.
- If using a pre-filled syringe the following steps will not be necessary.
- To prepare the syringe for medication: open the packaging at the plunger end and remove the syringe. Ensure that the plunger moves freely inside the barrel. Take care not to touch the nozzle end to prevent contamination. Open the needle packaging at the hilt (coloured) end. Hold the syringe in one hand and then attach the needle firmly onto the nozzle of the syringe. Loosen the sheath but do not remove it. Place the syringe and covered needle on the tray to prevent contamination or potential injuries.
- Examine the solution in the ampoule: cloudiness or sedimentation may indicate that the drug is unstable or contaminated. Make sure that the contents are in the bottom of the ampoule by tapping the neck gently. To prevent injury, splashing or contact with the medication, use a clinical wipe or tissue to cover the neck of the ampoule and break it open. Look at the solution in the ampoule for any glass fragments as these pose a risk to the patient if injected. Discard the ampoule and contents if any foreign matter is visible.
- Pick up the syringe and allow the sheath to fall off the needle into the tray. Insert the needle into the solution of the ampoule. Avoid scraping the needle on the bottom of the ampoule, as this will blunt the needle.
- Taking care not to contaminate the needle, pull back the top of the plunger with one finger on the flange to draw up the required dose into the syringe. It might be necessary to tilt or hold the ampoule upside down to make sure the needle remains in the solution to prevent drawing in air (Figure 2).
- Carefully replace the sheath on the needle to maintain sterility. This can be achieved by using the aseptic non-touch technique (Figure 3).
- To expel the air, hold the syringe upright at eye level and let any air rise to the top of the syringe. If necessary, lightly tap the barrel of the syringe to encourage the bubbles to rise to the top. Carefully, push the plunger to expel the air until the solution is seen at the top of the needle.
- For pre-filled syringes, you should not expel the air from the syringe. The air bubble is designed to remain next to the plunger. When the medication is given the air fills the needle of the syringe to ensure that the whole dose is administered. Refer to the manufacturer’s instructions for more information when preparing this type of medication.

**Injection technique**

The following outlines the procedure to follow when performing the injection:

- Take the tray, syringe, ampoule, tissue, prescription and sharps container to the patient’s bedside. Check the prescription, medication and the patient’s name band according to local policy.
- Ensure that the curtains are drawn around the bed to provide privacy and dignity. If necessary assist the patient into a comfortable position and remove any clothing to expose the injection site. However, do not leave the patient exposed.
- It is not necessary to clean the skin before giving the injection. Cleaning with alcohol would:

![Figure 2](image1)

**FIGURE 2**

*Drawing up an injection*

![Figure 3](image2)

**FIGURE 3**

*Non-touch technique*
wipes is not needed to reduce local infections at the injection site (Workman 1999) and, with repeated use of alcohol, the skin may harden. However, if the skin is visibly dirty then washing the area is required to decontaminate the skin (Nicol et al 2004).

- With one hand, pinch the skin using the thumb and forefinger to lift the adipose tissue from the underlying muscle to prevent the solution from being injected into the muscle (Workman 1999, King 2003) (Figure 4). Insert the needle smoothly into the SC skin at an angle of 90° (Nicol et al 2004). The angle depends on the amount of SC tissue available.

- It is not necessary to draw back on the plunger to ensure the needle is not in the vein as it is unlikely that a blood vessel will be pierced (Nicol et al 2004, McAskill and Goodhand 2007).

- Inject the solution by pushing carefully and slowly on the plunger. Wait briefly before withdrawing the needle to help prevent backtracking.

- Use the tissue to wipe any fine capillary blood that might be leaking away. It is not necessary to massage the area.

- Do not resheathe the needle as this may cause a needlestick injury. Discard the syringe and needle immediately into the sharps container to prevent any injury.

- Record the administration of the medication on the prescription chart to show that the drug has been given. Report any abnormalities or complications.

- Place any equipment safely away, for example, insulin is stored in the refrigerator.

- Ensure that the patient is comfortable.

**Angle of injection** Traditionally, SC injections have been given using a 45° angle. However, with the introduction of shorter needles for insulin syringes and pre-filled syringes, the 45° angle has been challenged and it is now recommended that SC injections, in particular insulin, should be administered at a 90° angle to ensure that the medication is deposited into the SC layer (King 2003). Special consideration of the best injection site and angle of injection is required when the patient is obese or cachectic. The crucial factor is to ensure that the injection is given into the SC adipose (fatty) tissue rather than intradermally (just under the epidermis) or into the muscle.

**Conclusion**

This article has outlined the principles of best practice for administering SC injections. It is not just a mechanistic task; it is a valuable and necessary skill for nurses to acquire. To provide safe practice, the nurse should use clinical judgement when choosing the injection site, understand the anatomy, relevant landmarks and the principles for administering a SC injection, and be able to perform this technique competently in practice NS.

**References**


