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Table 1.4 Properties of commonly used local anaesthetic agents

Local anaesthetic	Onset of action	Duration of action	Concentration (%)	Maximum dose
Lidocaine hydrochloride	Rapid (2–5 minutes)	Intermediate (80–120 minutes)	1 2	3 mg/kg
Bupivacaine hydrochloride	Slow (5–10 minutes)	Long (180–360 minutes)	0.25 0.5	2 mg/kg

Figure 1.2 Examples of commonly used local anaesthetic agents.

WHAT EQUIPMENT IS NEEDED FOR CORTICOSTEROID INJECTION?

Although many corticosteroid injections can be performed without specialist equipment, image guidance (fluoroscopy or ultrasound) is usually required for smaller joints in hands and feet, deep structure (e.g. hip joint) and most soft tissue injections (specially in proximity to tendon, nerve or vessel). Regardless of indication, all joint and soft tissue injections should be performed with an aseptic technique. It is advisable to use a sterile pack for musculoskeletal injections. Needles and syringes should be disposed into a designated sharps bin immediately after the procedure.

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Figure 1.3 displays the equipment needed and a demonstration of the no-touch technique.

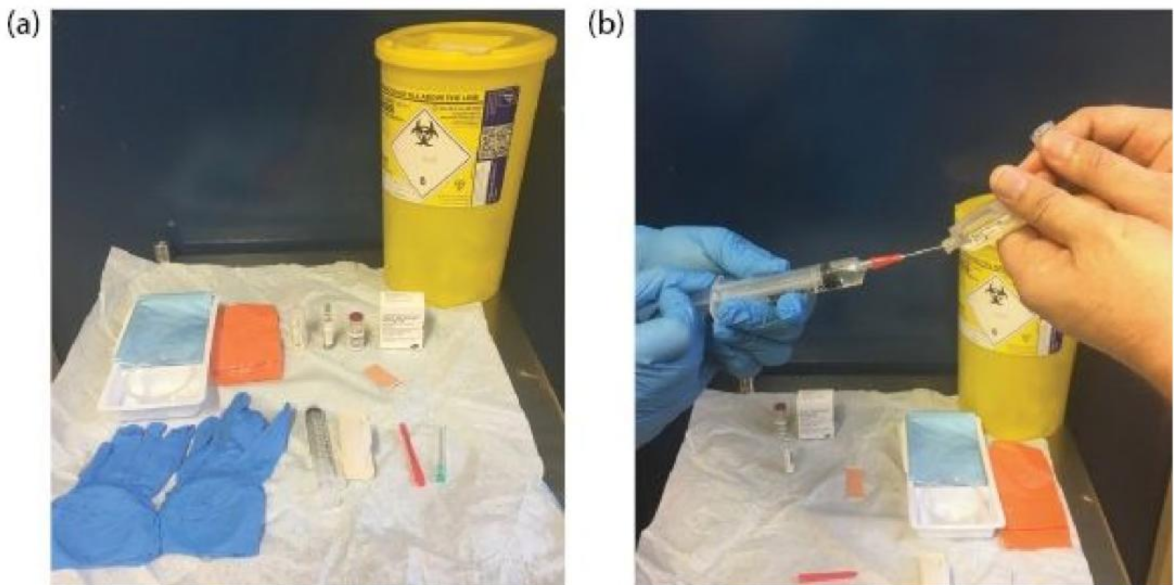

Figure 1.3 (a) Equipment required for steroid injection and (b) no-touch technique for drawing up injectate.

The size of needle and syringe used depends on the procedure being performed, with consideration also given to patient habitus. If an effusion is present, joint aspiration may be performed prior to corticosteroid injection to remove excess fluid. This can yield significant volumes, which may be cloudy or purulent in inflammatory or infective arthritis; larger syringes (20 mL or 50 mL) and larger gauge needles (18G or 21G) should therefore be used for this. Luer lock syringes can facilitate easier application and removal of the syringe, allowing multiple aspirations with the needle left in place when a large effusion is present. *If the aspirate suggests an underlying infective process, samples should be sent urgently for laboratory analysis (gram stain, culture and crystals), the planned corticosteroid injection abandoned*, and the patient referred for immediate assessment by orthopaedic or rheumatology teams according to local protocols.

Most injections can be performed using needles that are 1 to 1½ inches long. Shorter needles (½ inch) may be advantageous for injection of small joints of the hand or foot. In larger patients or where the target may be deep (e.g. trochanteric bursa), a 3-inch spinal needle can be used. Needle gauge is guided by the size of the target structure and the volume of injectate; *as a general rule 21G are appropriate for large joints, 23G or 25G for medium and small joints.* Syringe choice (2.5–10 mL) is likewise determined by the volume of injectate.

WHICH JOINTS CAN BE INJECTED WITHOUT IMAGE GUIDANCE?

The general principles and techniques of musculoskeletal injection are the same regardless of the target, i.e. to deliver corticosteroid to the affected structure and

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reduce inflammation. Some joints and soft tissues are easily identified and approached using surface landmarks, whilst others may require assistance with image guidance (x-ray or ultrasound scan) to ensure accurate administration. Table 1.5 lists examples of structures that are routinely injected 'blind' or unguided using surface landmarks only, as well as the imaging modalities commonly used in our practice for specific targets. However, it is important to note that the evidence remains unclear as to the importance of accurate intra-articular corticosteroid injection with regard to treatment response [26] (Box 1.1).

Table 1.5 Complications of corticosteroid injections

Soft tissue	
Skin atrophy	<1%
Skin depigmentation	<1%
Tendon rupture	<1%
Intra-articular	
Post-injection flare	2%–10%
Septic arthritis	<0.03%
Systemic	
Vasovagal reaction	10%–20%
Facial flushing	1%–12%
Hypersensitivity	<1%

BOX 1.1 Example structures amenable to unguided injection and those requiring image guidance

Blind[a]	X-ray guided	Ultrasound guided
Knee	Hand/wrist joints	Achilles tendon
Shoulder	Foot/ankle joints	Tibialis posterior tendon
Elbow	Hip joint	
Trochanteric bursa	Facet joint injections Epidural injections	

[a] Blind or unguided injections should only be performed by appropriately trained personnel who have knowledge of local anatomy and good clinical skills.

HOW OFTEN CAN YOU INJECT A JOINT?

Too many injections weaken the soft tissue structures including tendons and ligaments, increase the risk of infection and become ineffective over the period of time. Rheumatology studies however suggest that multiple steroid injections can be performed on the same joint [27]. *The recommended interval between intra-articular injections is at least 3 months* [28]. *A reasonable approach is to limit the frequency of injections to three to four for a single joint per year if the patient is medically unfit to have joint replacement surgery.*

Soft tissue injections should be used more sparingly as they are more likely to

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