

Section 4

Advanced techniques

Spinal injections

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SPINAL INJECTIONS

There is some controversy in the literature regarding spinal injections^{98,99, 127–134}. Depot steroids are not licensed for spinal use^{135,136}, but rheumatologists, pain specialists and others use these injections extensively.

Corticosteroids, often mixed with a local anaesthetic, are injected into the epidural space (via the caudal or lumbar route) and around nerve roots for the relief of back pain or sciatica, into or around facet joints for the relief of back and referred limb pain, and into muscle trigger points. Performing the injection under fluoroscopy can ensure correct placement of spinal injections^{137,139}, but many doctors perform these techniques ‘blind’ and obtain satisfactory results.

Blind caudal epidural injections are correctly placed in only two out of three attempts, even when the operator is confident of accurate placement. When the operator is less certain, the success rate is less than half. If the patient is obese the success rate reduces even further¹³⁷. In the past, large volumes have been injected into the epidural space¹³⁸, however, a total injection volume of 8 ml is sufficient for a caudal epidural injection to reach the L4/5 level¹³⁹.

The number needed to treat (NNT) with epidural corticosteroids for greater than 75% pain relief in the short term (1–60 days) is 7 (confidence interval = 5–16). The NNT for greater than 50% pain relief in the long term (3–12 months) is 13 (CI = 7–314)⁹⁹.

Selective nerve-root injections of corticosteroids (under X-ray control) are significantly more effective than those of bupivacaine alone in obviating the need for operative decompression for 13–28 months following the injections in operative candidates. This finding suggests that patients who have lumbar radicular pain at one or two levels should be considered for treatment with selective nerve-root injections of corticosteroids prior to operative intervention¹³².

Sclerosant injections are used to treat back pain with ligamentous insufficiency¹⁴⁰. They are ineffective in patients with very long-standing (e.g. 10 years) back pain and features of psychosocial distress¹⁴¹, and are not shown here.

A Cochrane systematic review recommends that because of the tendency towards positive results favouring injection therapy and the minor side-effects reported by the reviewed studies, there is at the moment no justification for abandoning injection therapy in patients with low back pain. However, because of the lack of statistically significant results, as well as the lack of well-designed trials, a solid foundation for the effectiveness of injection therapy is also lacking¹³³.

Safety precautions and strict aseptic techniques are the same as for all injections but an additional hazard is the rare possibility of an intrathecal injection of local anaesthetic. For this reason, we recommend the use of corticosteroid alone, without the addition of local anaesthetic. The benefit of the brief relief of pain and the diagnostic information thereby obtained does not outweigh the potential risks. Normal saline can be added if additional volume is required.

For physicians using this guide, there follows a description of a few spinal injections which can be safely carried out in an outpatient setting provided resuscitation facilities are available and the simple guidelines suggested are strictly followed. We strongly recommend, however, that doctors attend recognized training courses and undergo a period of supervised practice with an experienced colleague before attempting them on their own. These injections are not intended to be given by physiotherapists.

CERVICAL FACET JOINT

ACUTE OR CHRONIC CAPSULITIS

Causes

Osteoarthritis

Trauma

Findings

Pain in posterior neck, up to head, into scapular or to point of shoulder

Increased by sleeping in awkward positions and end-of-range movement

Painful and/or limited: rotation, side flexion and extension

Tender over one or more facet joints

Equipment

Syringe	Needle	Kenalog 40	Total volume
1 ml	23G 1.25–2" (0.6 × 30–50 mm)	20 mg	0.5 ml

Anatomy

The facet or zygapophyseal joints in the cervical spine are plane joints lying at angles of approximately 30–45° to the vertical. They can be palpated by identifying the spinous process and moving two fingers' width laterally. The affected levels are sensitive to pressure.

Technique

- Patient lies on unaffected side with roll under neck. The neck is held in flexion and slight side flexion away from the painful side
- Identify and mark the tender joint
- Insert needle just distal to joint parallel to the spinous processes at an angle of 45° cephalad. Pass through the thick extensors aiming towards patient's upper ear until point touches bone. Ensure needle remains parallel to spinous process at all times and does not pass medially
- Gently 'walk' along bone until needle passes into joint capsule
- Deposit solution in bolus intracapsular or pepper pericapsular

Aftercare

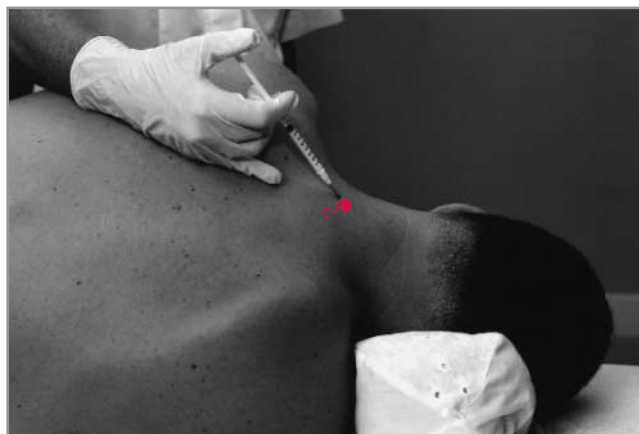
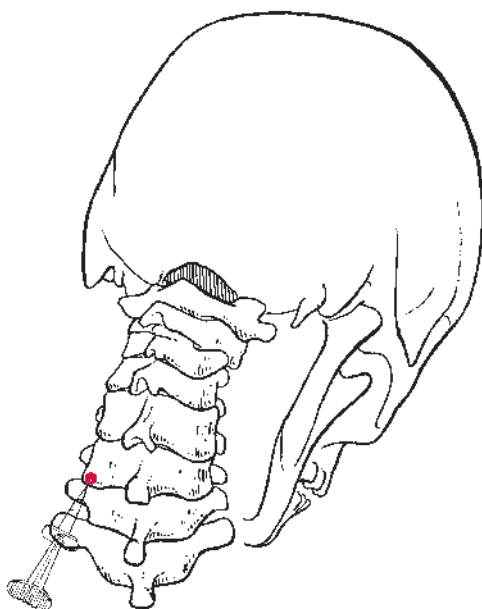
Patient maintains gentle movement, continues correct posture and is careful to sleep with the correct number of pillows to maintain the head in a neutral position.

Comments

We strongly recommend that this technique is practised first with an experienced clinician.

Although this appears to be an alarming injection, it is perfectly safe provided great care is taken that the needle always lies parallel to the spinous process and never at any time angles medially. The results in the osteoarthritic neck can be good for several months or even years, provided the patient does not strain the neck and maintains mobility and good posture.

CERVICAL FACET JOINT



LUMBAR FACET JOINT

CHRONIC CAPSULITIS

Cause

Osteoarthritis or traumatic capsulitis
 Spondylolysis/spondylolsthesis
 Ankylosing spondylitis

Findings

Unilateral low back pain, sometimes with dull vague aching down leg
 Painful and/or/limited: extension, both side flexions and less flexion of lumbar spine
 In younger patients with spondylolysis, usually most painful movement is combined extension with side flexion to the painful side

Equipment

Syringe	Needle	Kenalog 40	Total volume
1 ml	22G 3–3.5" (0.7 × 75–90 mm)	40 mg	1 ml

Anatomy

The lower lumbar facet or zygapophyseal joints lie lateral to the spinous processes – approximately one finger width at L3, one and a half at L4 and two fingers' width at L5. They cannot be palpated but are located by marking a vertical line along the centre of the spinous processes and horizontal lines across *between* each process. The posterior capsule of the joint is found by inserting the needle the correct distance for that level laterally on the horizontal line.

Technique

- Patient lies prone on small pillow to aid localization of the spinous interspace
- Identify and mark levels for infiltration
- Insert needle at first selected level vertically down to capsule. If the capsule is not found immediately, gently 'walk' needle around bone until a ligamentous end-point is reached
- Deposit solution into and around capsule
- Withdraw needle and repeat at different levels if necessary

Aftercare

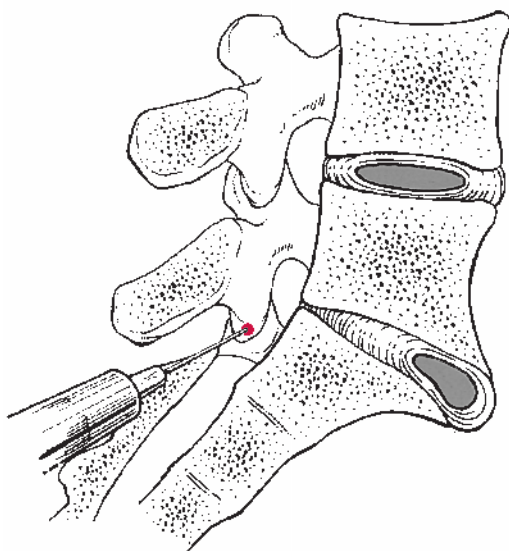
Avoidance of excessive movement while maintaining comfortable activity. Abdominal strengthening exercises should be performed regularly.

Comments

We strongly recommend that this technique is practised first with an experienced clinician.

Some practitioners recommend injection of the lumbar facets under fluoroscopy, but they can be safely reached in the above manner provided one feels for the end-point of the needle on bone.

LUMBAR FACET JOINT



LUMBAR NERVE ROOT

NERVE ROOT INFLAMMATION

Cause

Spinal stenosis
Nerve-root entrapment

Findings

Acute or chronic severe sciatica with or without root signs
Painful: flexion and side bending usually away from painful side
straight leg raise, foot dorsiflexion and neck flexion, slump test

Equipment

Syringe	Needle	Kenalog 40	Total volume
1 ml	22G 3–3.5" (0.7 × 75–90 mm)	40 mg	1 ml

Anatomy

The lumbar nerve roots emerge obliquely from the vertebral canals between the transverse processes at the level of the spinous process. Draw a vertical line along the centre of the spinous processes and horizontal lines at each spinous level. Two fingers' width laterally along the horizontal line marks entry site for the needle.

Technique

- Patient lies prone over small pillow to aid localization of spinous processes
- Identify spinous process of level required and mark spot along horizontal line
- Insert needle two fingers lateral to spinous process. Pass needle perpendicularly to depth of about 2.5–3 inches (6–7 cm)
- Aspirate to ensure needle is not intrathecal
- Deposit solution in bolus

Aftercare

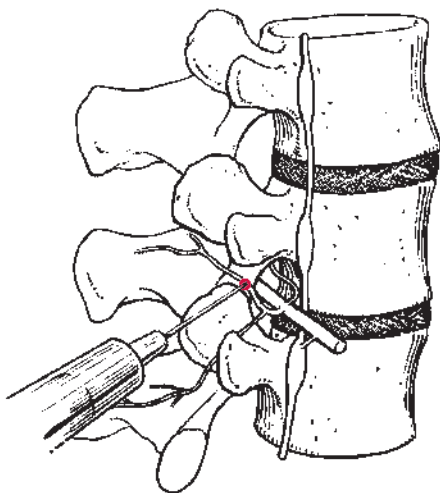
Patient keeps mobile within pain limits and is reassessed 1 week later. Repeat as necessary.

Comments

We strongly recommend that this technique is practised first with an experienced clinician.

This injection is especially effective when the patient is in severe pain and conservative manual therapy techniques are impossible. It can also be given when caudal epidural has proved unsuccessful – the caudal is technically an easier procedure. The needle must be repositioned if it encounters bone at a distance of about 2" (5 cm) (lamina or facet joint) or if the patient complains of sharp 'electric shock' (nerve root). If clear fluid is aspirated the needle is intrathecal and the procedure must be abandoned and attempted a few days later. More than one level can be infiltrated at a time.

LUMBAR NERVE ROOT



SACRO-ILIAC JOINT

ACUTE OR CHRONIC STRAIN OR CAPSULITIS

Cause

Acute sacro-iliitis

Chronic ligamentous pain after successful manipulation

Ankylosing spondylitis

Findings

Usually female – often pre- or post-partum

Trauma

Pain after rest, long periods of sitting or standing

Pain over buttock, groin or occasionally down posterior thigh to calf

Pain on stressing: posterior ligaments in hip flexion, adduction in flexion and transversely; anterior ligaments in 4 test (combined lateral rotation and abduction)

Equipment

Syringe	Needle	Kenalog 40	Lidocaine	Total volume
2 ml	21G 1.5–2" (0.8 × 40–50 mm)	20 mg	1.5 ml 20%	2 ml

Anatomy

The joint is angled obliquely postero-anteriorly with the angle being more acute in the female. The dimples at the top of the buttocks indicate the position of the posterior superior iliac spines. The easiest entry point is usually found just below and slightly medial to the spines.

Technique

- Patient lies prone over small pillow
- Identify and mark posterior superior iliac spine on affected side
- Insert needle a thumb's width medial to this bony landmark or dimple at level of second sacral spinous process and angle obliquely lateral at an angle of 45°
- Pass needle between sacrum and ilium until a ligamentous resistance is felt
- Deposit solution in bolus within joint if possible, or pepper posterior capsule

Aftercare

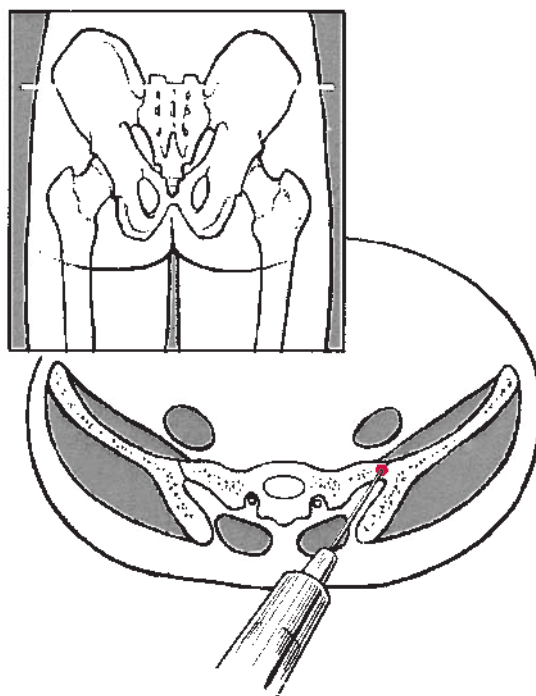
Movement within the pain-free range is encouraged – a lunging motion with the foot up on a chair can help relieve pain. A temporary belt is worn if the joint is unstable and sclerosing injections can be used to increase stability.

Comments

The needle often comes up against bone when attempting this injection and then has to be manoeuvred around to allow for the variations in bony shape before entering the joint space.

It is unusual to have to repeat this injection and the joint can often be successfully manipulated if necessary a week later.

SACRO-ILIAC JOINT



COCCYX

STRAIN OF COCCYGEAL LIGAMENTS

Cause

Trauma

Prolonged sitting on hard surfaces

Findings

Pain over coccyx

Equipment

Syringe	Needle	Kenalog 40	Lidocaine	Total volume
1 ml	23G 1" (0.6 × 25 mm)	10 mg	0.75 ml 2%	1 ml

Anatomy

The coccygeal ligaments are palpated on the dorsal and ventral surfaces. The bone may be found to be hyperflexed or even twisted.

Technique

- Patient lies prone over small pillow
- Identify and mark tender site on dorsum of coccyx
- Insert needle down to touch bone
- Pepper around into tender ligaments

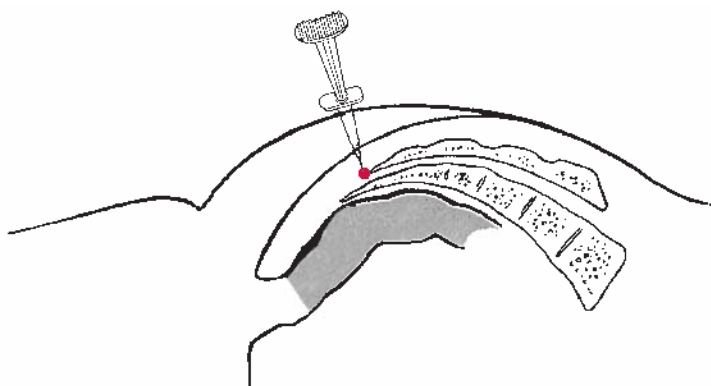
Aftercare

Advise patient to avoid sitting on hard surfaces and to use a ring cushion. At follow-up 1 week later mobilization or manipulation of the coccyx can be used.

Comments

Pain in this area can be symptomatic of psychological or psychosexual distress, in which case the appropriate referral is required. With somatic pain the protocol above appears to work either extremely well or not at all. Surgery is not usually indicated.

COCCYX



CAUDAL EPIDURAL

ACUTE OR CHRONIC LOW BACK PAIN OR SCIATICA

Cause

Disc lesion

Acute nerve entrapment

Findings

Central or bilateral pain in low back with or without sciatica or root signs

Usually painful flexion and side flexion away from painful side and nerve root tension signs

Equipment

Syringe	Needle	Kenalog 40	Total volume
1 ml	21G 1.5–2" (0.8 × 40–50 mm)	40 mg	1 ml

Anatomy

The spinal cord ends at the level of L1 and the thecal sac at S2 in most individuals. The aim of this injection is to pass a disinflaming solution through the sacral hiatus and up the canal so that it bathes the inflamed disc, dura mater and nerve roots centrally. The sacral cornua are two prominences that can be palpated at the apex of an equilateral triangle drawn from the posterior superior spines on the ileum to the coccyx. There is a thick ligament at the entrance to the canal. The angle of the curve of the canal varies widely.

Technique

- Patient lies prone over small pillow
- Identify sacral cornua with thumb
- Insert needle horizontally between cornua and pass through ligament
- Pass needle slightly up canal adjusting angle to curve of sacrum
- Aspirate to ensure needle has not penetrated thecal sac or blood vessel
- Slowly inject solution into extradural space while talking to patient
- Keep hand on sacrum to palpate for swelling caused by supra-sacral injection

Aftercare

The patient can continue to do whatever is comfortable and is seen a week later. If the injection has helped it can be repeated at 1- or 2-week intervals as long as improvement continues.

Comments

We recommend that this technique is practised first with an experienced clinician.

Caudal epidural is safe and effective provided¹³⁷:

- there is no allergy to local anaesthetic (not used in this method)
- no local sepsis
- patient is not on anticoagulant therapy.

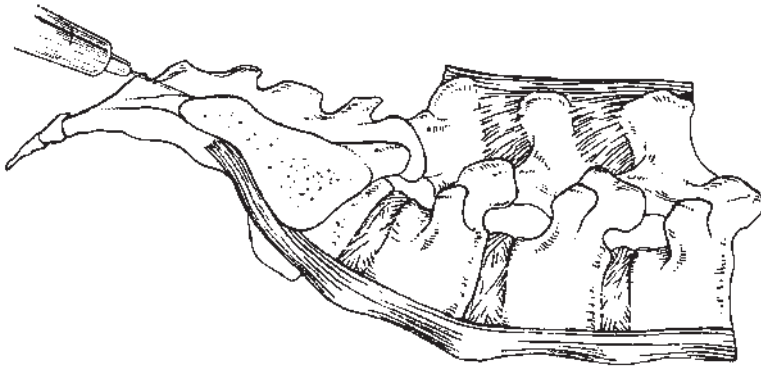
We recommend that in the outpatient setting no local anaesthetic is used.

CAUDAL EPIDURAL

Occasionally the canal is difficult to enter – this may be because of a bifid or very small canal or because the angle of the canal is very concave. Removal of the needle and re-angulation may be necessary.

If clear fluid or blood is aspirated at any point the procedure is abandoned and attempted a few days later. If the patient feels faint or dizzy during the injection, stop injecting and wait for the symptoms to go. If they do not, abandon the procedure.

Temporary reproduction of the patient's pain during the infiltration is a good sign that the treatment will be successful.



TEMPORO-MANDIBULAR JOINT

ACUTE OR CHRONIC CAPSULITIS

Cause

Trauma – often after a car accident
Osteoarthritis
Meniscal tear

Findings

Headaches
Pain over joint
Painful: on opening, deviation or protrusion of jaw with asymmetry of movement
clicking or locking

Equipment

Syringe	Needle	Kenalog 40	Lidocaine	Total volume
1 ml	25G 0.5" (0.5 × 16 mm)	10 mg	0.75 ml 2%	1 ml

Anatomy

The temporomandibular joint space can be palpated just in front of the ear while the patient opens and closes the mouth. A meniscus lies within the joint and the needle must be placed below this in order to enter the joint space. The joint can be infiltrated most easily when the jaw is held wide open.

Technique

- Patient lies on unaffected side with head supported and mouth held open
- Identify and mark joint space
- Insert needle vertically into inferior compartment of joint space below meniscus.
It may be necessary to manoeuvre needle about to avoid meniscus
- Deposit solution in bolus

Aftercare

The patient should avoid excessive movement of the jaw such as biting on a large apple or hard food. Gentle active movements and isometric exercises are carried out. A guard to prevent grinding the teeth at night and/or the advice of an orthodontist may be necessary.

Comments

If the meniscus is displaced, reduction must be attempted before giving the injection.

TEMPORO-MANDIBULAR JOINT

