Orthopaedic and Sports Injuries Services "OASIS"

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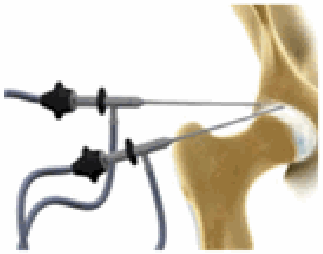
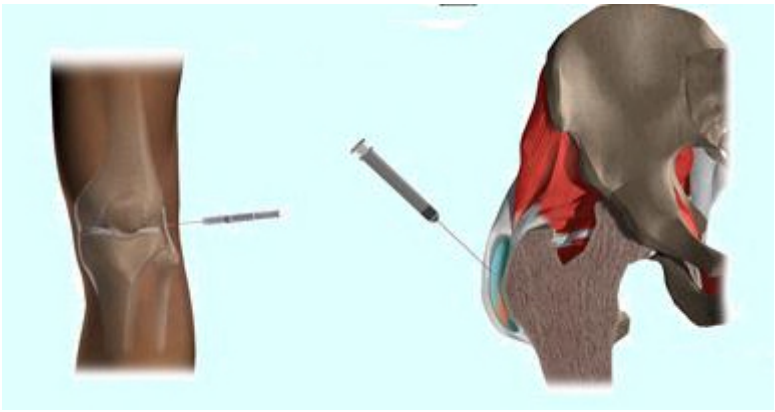


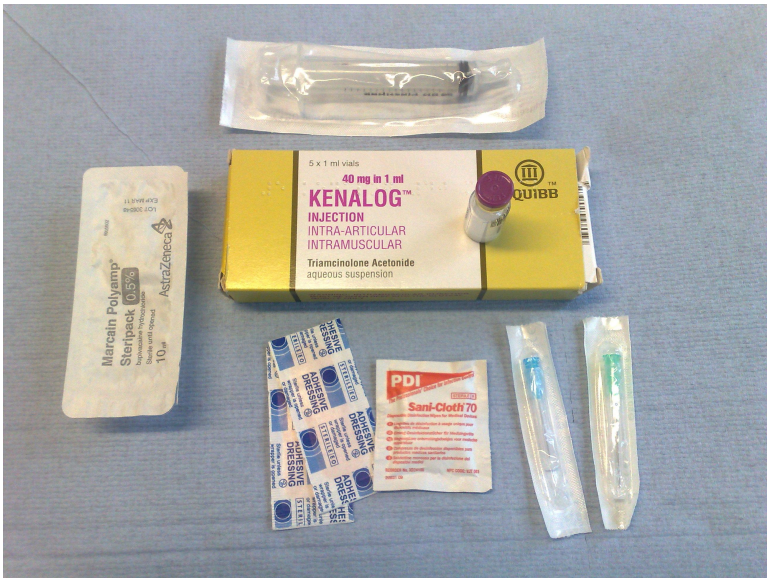
Joint injections

Injection techniques are helpful for diagnosis and therapy in a wide variety of musculoskeletal conditions. Diagnostic indications include the aspiration of fluid for analysis and the assessment of pain relief and increased range of motion as a diagnostic tool. Therapeutic indications include the delivery of local anaesthetics for pain relief and the delivery of corticosteroids for suppression of inflammation. Side effects are few, but may include tendon rupture, infection, steroid flare, hypopigmentation, and soft tissue atrophy. Injection technique requires knowledge of anatomy of the targeted area and a thorough understanding of the agents used. In this overview, the indications, contraindications, potential side effects, timing, proper technique, necessary materials, pharmaceuticals used and their actions, and post-procedure care of patients are presented.



Injection of joints, bursae, tendon sheaths, and soft tissues of the human body is a useful diagnostic and therapeutic skill for family physicians. With training, physicians can incorporate joint and soft tissue injection into daily practice, yielding many benefits. For example, a lidocaine (Xylocaine) injection into the subacromial space can help in the diagnosis of shoulder impingement syndromes, and the injection of

corticosteroids into the subacromial space can be a useful therapeutic technique for subacromial impingement syndromes and rotator cuff tendinopathies. Evidence-based reviews of joint and soft tissue injection procedures have found few studies that support or refute the efficacy of common joint interventions in medical practice. However, substantial practice-based experience supports the effectiveness of joint and soft tissue injection for many common problems.



These injections are most useful in instances of joint or tissue injury and inflammation. History of pain, local and referred, will provide important clues to the underlying pathology. Physical examination is extremely helpful in ascertaining the diagnosis. Knowledge of the anatomy of the area to be injected is essential. Intratendinous injection should be avoided because of the likelihood of weakening the tendon. Corticosteroid injections also should be avoided in cases of Achilles or patella tendinopathies.

Therapeutic responses to corticosteroid injections are variable. The patient's response to previous injection is important in deciding whether and when to proceed with reinjection. Most patients, if they are going to respond, will respond after the first injection. If the patient has achieved significant benefit after the first injection, an argument can be made to give a second injection if symptoms recur. It is important that the treating physician and patient understand that the injection is a test and is temporarily therapeutic and its effect will end and symptoms will recur and a more permanent treatment method must be advised. However, patients who have gained no symptom relief or functional improvement after two injections should probably not have any additional injections, because a subsequent positive outcome is low.

If therapeutic effect is achieved, a maximum of three injections per year is recommended. There is some concern that corticosteroid preparations, with repeated use, may accelerate normal, aging-related articular cartilage atrophy or may weaken tendons or ligaments. When symptoms are resistant, or when there is a history of trauma, a radiograph or other imaging study should be performed to help assist in the diagnosis.

TABLE 1
Indications for Diagnostic and Therapeutic Injection

Soft tissue conditions
Bursitis
Tendonitis or tendinosis
Trigger points
Ganglion cysts
Neuromas
Entrapment syndromes
Fasciitis

Joint conditions
Effusion of unknown origin or suspected infection (only diagnostic)
Crystalloid arthropathies
Synovitis
Inflammatory arthritis
Advanced osteoarthritis

TABLE 2
Absolute and Relative Contraindications to Therapeutic Joint and Soft Tissue Injection

Absolute contraindications
Local cellulitis
Septic arthritis
Acute fracture
Bacteremia
Joint prosthesis
Achilles or patella tendinopathies
History of allergy or anaphylaxis to injectable pharmaceuticals or constituents

Relative contraindications
Minimal relief after two previous corticosteroid injections
Underlying coagulopathy
Anticoagulation therapy
Evidence of surrounding joint osteoporosis
Anatomically inaccessible joints
Uncontrolled diabetes mellitus

Timing of Injections

Appropriate timing can minimize complications and allow a clear diagnosis or therapeutic response. For diagnostic injections, the procedure should be performed when acute or chronic symptoms are present, when the diagnosis is unclear or needs to be confirmed, when consideration has been given to other diagnostic modalities, and when septic arthritis has been ruled out (by aspiration and fluid analysis). For therapeutic injections, the procedure should be performed when acute or chronic symptoms are present, after the diagnosis and therapeutic plan have been made, and after consideration has been given to obtaining radiographs. Therapeutic injection should be performed only with or after the initiation of other therapeutic modalities (e.g., physical therapy). In the absence of an underlying chronic inflammatory arthritis, any joint with an effusion should be radiographed to rule out a fracture or other intra-articular pathologic process.

Corticosteroids

After intra-articular injection, corticosteroids function to suppress inflammation and decrease erythema, swelling, heat, and tenderness of the inflamed joint. These effects are believed to result from several mechanisms, including alterations in neutrophil chemotaxis and function, increases in viscosity of synovial fluid, stabilization of cellular lysosomal membranes, alterations in hyaluronic acid synthesis, transient decreases in synovial fluid complements, alterations in synovial permeability, and

changes in synovial fluid leukocyte count and activity. Whether this is exactly the same mechanism of action that occurs with orally or parenterally administered corticosteroids is uncertain.

Several precautions should be taken when using steroid injections. Care should be taken to avoid direct injection of tendons because of the danger of rupture. Avoid injection into adjacent nerves of the target area (e.g., ulnar nerve when injecting for medial epicondylitis). Allow adequate time between injections, generally a minimum of four to six weeks. Pay attention to the depth of needle insertion to avoid needle trauma to articular cartilage. Finally, avoid injecting several large joints simultaneously because of the increased risk of hypothalamic-pituitary-adrenal suppression and other adverse effects. Dosing is site dependent. As a rule, larger joints require more corticosteroid.

Before injection of a joint or soft tissue, a small quantity of 1 percent lidocaine or 0.25 to 0.5 percent bupivacaine can be injected subcutaneously with a 25- to 30-gauge needle to provide local anaesthesia. For the actual joint or soft tissue injection, most physicians mix an anaesthetic with the corticosteroid preparation. This provides temporary analgesia, confirms the delivery of medication to the appropriate target, and dilutes the crystalline suspension so that it is better diffused within the injected region. Manufacturers advise against mixing corticosteroid preparations with lidocaine because of the risk of clumping and precipitation of steroid crystals. However, I have never experienced this as a major problem.
For most injections, 1 percent lidocaine or 0.25 to 0.5 percent bupivacaine is mixed with a corticosteroid preparation. The dose of anaesthetic varies from 0.25 mls for a flexor tendon sheath (trigger finger) to 5 to 8 mls for larger joints. On rare occasions, patients exhibit signs of anaesthetic toxicity, including flushing, hives, chest or abdominal discomfort, and nausea. It can take as long as 20 to 30 minutes following the injection for these symptoms to present. For this reason, and to monitor for allergic reactions, patients should be observed in the office for at least 30 minutes following the injection.

Potential Complications

A number of potential complications can arise from use of joint and soft tissue procedures. Local infection is always possible, but it can be avoided by following the proper technique. Joint injections should always be performed using sterile procedure to prevent iatrogenic septic arthritis. Local reactions at the injection site may include swelling, tenderness, and warmth, all of which may develop a few hours after injection and can last up to two days. A post injection steroid flare, thought to be a crystal-induced synovitis caused by preservatives in the injectable suspension, may occur within the first 24 to 36 hours after injection. This is self-limited and responds to application of ice packs for no longer than 15-minute intervals.
Soft tissue (fat) atrophy and local depigmentation are possible with any steroid injection into soft tissue, particularly at superficial sites (e.g., lateral epicondyle). Peri articular calcifications are described in the literature, but they are rare. Tendon rupture can be avoided by not injecting directly into the tendon itself.
Systemic effects are possible (especially after triamcinolone acetonide injection or injection into a vein or artery), and patients should always be acutely monitored for

reactions. Alterations in taste have been reported for one to two days after steroid injection. Hyperglycaemia is possible in patients who have diabetes.
To avoid direct needle injury to articular cartilage or local nerves, attention should be paid to anatomic landmarks and depth of injection. Other rare, but possible, complications include pneumothorax (when injecting thoracic trigger points), perilymphatic depigmentation, steroid arthropathy, adrenal suppression, and abnormal uterine bleeding.

Informed Consent

Informed consent should always be obtained for any invasive procedure. Discussion with the patient should include indications, potential risks, complications and side effects, alternatives, and potential outcomes from the injection procedure. Patients should sign documentation that informed consent for the procedure was given and understood. A third party should witness the patient's signing. Documentation is kept as part of the patient's record.

Necessary Equipment
All joint and soft tissue injection or aspiration techniques should be performed wearing gloves. When injecting or aspirating a joint space, sterile technique should be used. Nonsterile gloves can be used when injecting or aspirating soft tissue regions.

Site Preparation

The entry point for injection or aspiration should be identified. The point of entry can be marked with an impression from a thumbnail, a needle cap, or an indelible ink pen. The important goal is to minimize risk of infection at the site. Prepare the area with an alcohol or povidone-iodine (Betadine) wipe. For all intra-articular injections, sterile technique should be used.

Steps for Injection and Joint Aspiration

When possible, the patient should be placed in the supine position. This will help prevent or mitigate the effects of a vasovagal or syncopal episode. Palpate the soft tissue or bony landmarks. Follow the steps for site preparation. For soft tissue injections, the following modalities may be used for short-term partial anaesthesia: applying ice to the skin for five to 10 minutes; applying topical vapo-coolant spray; or firmly pinching the skin for three to four seconds at the injecting site. Once the skin is anaesthetised, the needle should be inserted through the skin to the site of injection.
To prevent complications, adhere to sterile technique for all joint injections; know the location of the needle and underlying anatomy; avoid neuromuscular bundles; avoid injecting corticosteroids into the skin and subcutaneous fat; and always aspirate before injecting to prevent intravascular injection.
The injection should flow easily and should not be uncomfortable to the patient. Most pain is the result of tissue stretching and can be mitigated by injecting slowly. If there is strong resistance while injecting, the needle may be intramuscular, intratendinous, or up against bone or cartilage, and it should be repositioned.

Post injection Instructions and Care

An adhesive dressing should be applied to the injection site. To minimize pain and inflammation after leaving the office, the patient should be advised to apply ice to the injection site (for no longer than 15 minutes at a time, once or twice per hour), and nonsteroidal anti-inflammatory agents may be used, especially for the first 24 to 48 hours. The affected area should be rested from strenuous activity for several days after the injection because of the small possibility of local tissue tears secondary to temporarily high concentrations of steroid. This risk lessens as the steroid dissipates. Patients should be educated to look for signs of infection including erythema, warmth, or swelling at the site of injection, or systemic signs including fever and chills. The patient should keep the injection site clean and may bathe.

What to warn the patient

Pain returns after 2 hours, when the local anaesthetic wears off – may be worse than before.

If pain is severe or increasing after 48hrs, seek advice

Warn of local side effects

Advise to seek help if systemic side effects develop

Viscosupplementation.

The use of intra-articular hyaluronates for the treatment of pain in osteoarthritic joints.

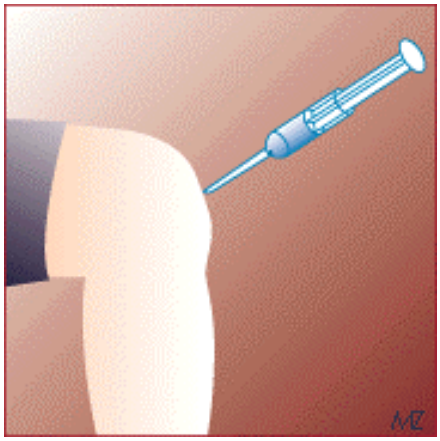
OA is the most common chronic joint disorder and is associated with pain, disability and reduced levels of hyaluronic acid in affected joints. Intra-articular injections of sodium hyaluronate (also called viscosupplementation) have been shown to be safe and effective at relieving pain in osteoarthritis of the knee. They are being used extensively in the United States and the number of randomised controlled trials on their efficacy is growing. The United Sates Food and Drugs administration (FDA) has approved several intra-articular versions of sodium hyaluronate (HA), the first having been approved in 1997 for use in the knee. They have been classified in the United States as 'medical devices' rather than drugs. There are 8 licensed versions in the United Kingdom.

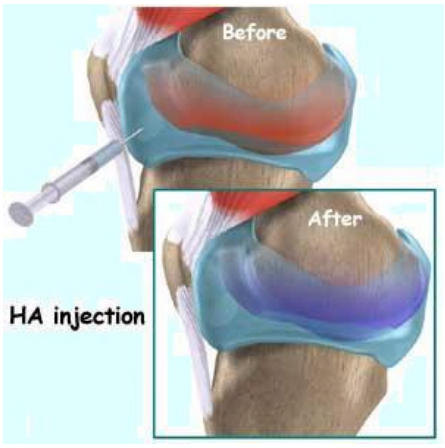
Mode of action

The mode of action is not fully understood. Although the substance persists in the joint only for days the benefits can last months.

It is postulated that there may be a biological, possibly immunological, basis for this. Possible mechanisms include:

- Increased endogenous hyaluronate
- Blocking of pain receptors
- Inhibition of pain mediators (prostaglandins, bradykinin)
- Anti-inflammatory effects
- An effect on immune cells
- Antioxidant action
- Physical effects (viscosity, lubrication and elasticity





The NICE guidance for osteoarthritis has reviewed the efficacy of hyaluronates in some detail. They conclude that the research evidence on the efficacy of hyaluronates is difficult to interpret because of:

- Different molecular weights of the hyaluronates.
- Different injection schedules (ranging from once weekly to a series of five injections).
- Poor trial design despite large numbers of studies, for example lack of intention-to-treat analyses, limitations in blinding.

On balance, the NICE guidance suggests a benefit for reducing pain up to 3 months after a series of three to five injections (although the effect size is generally small)

Indications

Osteoarthritis of the knee where:

- Current treatment not giving adequate pain relief
- Other treatments such as anti-inflammatories are contraindicated
- Surgical options not available
- Patients on multiple oral medications
- Hyaluronates are also being used in osteoarthritis of the hip, for example to delay surgery, but more studies are needed. There is even less experience of use in other joints.

Initiation and administration

The preparations are administered into the knee joint under aseptic conditions after aspiration of any effusion. Depending on the product used between 3 and 5 injections are given over several weeks. Usually no more than 3 treatments per year are recommended. It is important to emphasise to patients that:

- It does not have an immediate effect
- Local reactions after the injection are common (apply ice pack)
- Avoid jogging, standing and heavy lifting for 48 hours after the injection
- Beneficial effects may last for several months
- Viscosupplementation does not work for all patients
- It is very expensive and has not yet been demonstrated to be cost effective

Contraindications and cautions

- Allergy to products from birds (for example feathers)
- Children- Synvisc not tested in children
- Pregnancy and breast feeding

Common interactions

None listed.

Side effects

They appear to be generally well tolerated. The most common side effect is injection site pain and/or swelling. Rashes appear to be rare. A Cochrane review concluded that within the constraints of trial designs no major safety issues were detected. Septic arthritis after hyaluronate injection has been reported but infection is uncommon.

If you are interested in making an appointment to discuss a treatment, please click here to contact us, or telephone 01215807406

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