



Intra-Articular Hip Injections

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Essential Concepts

- Osteoarthritis of the hip is a common problem for the elderly population and increases with age. The incidence is 1 in 4 above 85 years old.
- Prior to the diagnosis of hip OA, it is important to exclude other pathologies including lumbar spine pathology and radiculopathy, patients may also present with ipsilateral knee OA in addition to hip OA due to weight bearing problems.
- Total hip replacement provides a successful intervention in end stage hip arthritis, however this is preceded with years of pain and inability to perform activities of daily living.
- At the bedside, intraarticular injections can be performed via landmark or ultrasound techniques. Ultrasound technique is thought to have less risk of adverse events.
- Complications from use of corticosteroids include accelerated osteoarthritis, subchondral insufficiency fractures, and rapid joint destruction with bone loss.

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1 Intra-Articular Hip Joint Injections

Overview

Osteoarthritic pain is typically aggravated by mobility and daily activities and is often relieved by rest. The pain is usually confined to the hip joint itself, however in some patients pain can be referred the thigh [1, 2]. An atypical presentation may also include pain in the knee. Pain is usually intermittent in the early stages of the disease but becomes more frequent and severe as the disease progresses. There is a poor correlation between the severity of disease based on plain X-ray changes and symptoms of pain [1, 3].

The principal pathologic feature of OA is articular cartilage loss which is identified as reduction in joint space on plain X-ray films [4, 5]. Structural changes such as loss of joint cartilage, bone marrow lesions, synovial thickening (synovitis) and knee effusion all contribute to pain intensity. These findings are best visualized by magnetic resonance imaging which provides greater detail regarding hip joint pathology [6, 7].

Indications and Contraindications

Common indications for intra-articular hip injections include hip joint pain, inflammatory or degenerative osteoarthritis. The injections can be performed for diagnostic or therapeutic purposes [5] (Table 1).

Common contraindications include infection at the planned injection site, sepsis, allergy or intolerance to injectate or its components, and patient refusal. Coagulopathy, including iatrogenic, and platelet dysfunction, including iatrogenic, and not considered to be contraindications for intra-articular hip injections.

Table 1 Intraarticular hip injections indications and contraindications [5]

Indications	Techniques	Contraindications
<ol style="list-style-type: none"> 1. As a diagnostic test for hip joint pain 2. To help determine the likelihood of achieving pain relief with hip arthroplasty 3. When surgical intervention is not a viable option and pain relief is desired 4. In young patient population with hip prosthesis 	Landmark technique Ultrasound-guided	Absolute: Patient refusal Systemic infection Local infection (cellulitis) at site of injection Joint fracture Prosthetic joint Coagulopathy Relative: Anticoagulation therapy Joint instability Poorly controlled diabetes Adjacent skin abrasions

Clinical Anatomy

The hip joint is a ball and socket diarthrodial joint with point of articulation between the head of the femur and the acetabulum of the pelvis.

The hip joint acts as the dynamic support system of the upper body and trunk while facilitating force and load transmission from the axial skeleton to the lower extremities, allowing mobility.

The hip joint receives sensory innervation from the femoral, obturator, and superior gluteal nerves. Nerve fibers of the hip capsule appear to persist or proliferate in pathological states, thus can be found in the capsular complex of individuals with OA.

The profunda femoris is a branch of the femoral artery which travels posteriorly to give rise to the medial circumflex and lateral circumflex femoral arteries which supply the head of the femur. The profunda femoris is a branch of the femoral artery which travels posteriorly. There is an additional contribution from the foveal artery (artery to the head of the femur), a branch of the posterior division of the obturator artery, which travels in the ligament of the head of the femur [2, 8, 9].

Equipment and Supplies

Intra-articular hip injections can be easily at the bedside. An antiseptic solution, typically chlorhexidine, 20–22 Gauge 3.5-in. needle, 5–10 mL syringe for injectate, mask, and sterile gloves should be typically prepared for this procedure. Local anesthetic with or without corticosteroids is typically prepared for this injection as well. Other types of injectates will be discussed further in the chapter. Normal saline or local anesthetic can be utilized for ultrasound guidance during hydrolocalization. An ultrasound unit with a high-frequency linear transducer will be typically needed (Table 2).

Landmark Technique

The landmark technique aims at piercing the hip capsule at any point on the antero-lateral surface of the femoral head or neck below the acetabular rim down to the inter-trochanteric line.

Table 2 Required supplies for intraarticular hip injection

Syringe	5 or 10 mL
Needle	25 Gauge 1.5 in. needle for local anesthesia of the skin injection site 20–22 Gauge spinal needle 3.5 in.
Anesthetic	1% Lidocaine
Corticosteroid	Dexamethasone 4 mg (t1/2 life: 36–54 h) Methylprednisolone 40 mg (t1/2 life: 18–36 h)

The Lateral Approach Landmarks

The patient lies supine with the limb in neutral rotation (patella facing forward). Two points, the tip of the greater trochanter and the anterior superior iliac spine (ASIS) are marked (u shaped lines); a red line drawn between them (Fig. 1).

At the junction between the upper third and lower two-thirds of this red line lies the “soft-spot” (one can feel the anterior border of the gluteus medius); this is marked as point A (needle entry point).

The Anterior Approach Landmarks

The patient lies supine with limb in neutral position (patella facing forward). Two lines are then drawn: line 1 from the ASIS distally toward the upper pole of the patella and line 2 perpendicular to it from the tip of the greater trochanter anteriorly. The intersection point is point B which is the entry point for the anterior approach [4].

Lidocaine 1% can be used for local skin analgesia. A mixture of 6 mL is prepared in a 10 cc syringe formed of 5 mL bupivacaine 0.25% and 1 mL of 40 mg/mL of methylprednisolone if steroids are the injectate of choice or hyaluronic acid 2 mL (16 mg/2 mL) as an alternative injectate of choice.

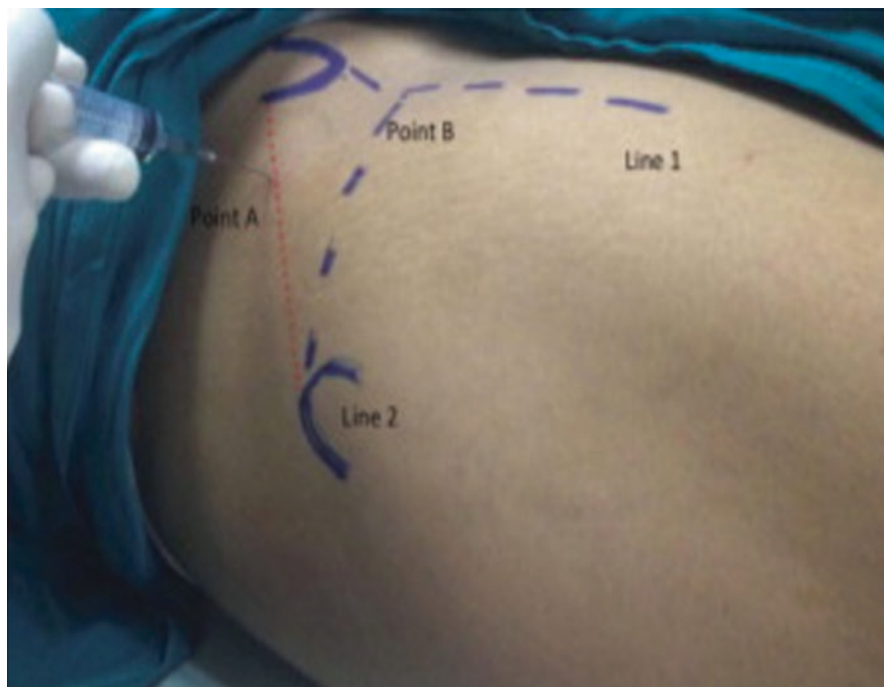


Fig. 1 Intra-articular hip injection, landmark technique. Right hip in supine position with antero-lateral view. The ASIS and the greater trochanter are palpated and demarcated. Point A is the soft-spot entry point at the junction of the upper third and lower two-thirds of the imaginary line between the ASIS and tip of the greater Trochanter, point B is the meeting of both lines and is the target point in the coronal plane. Reprinted with permission from Massed and Said [4]

The lateral approach is safer in comparison to the anterior approach. A study by Kruse et al. reported that there is greater likelihood of injury to the neurovascular bundle via an anterior as opposed to lateral technique (anterior approach the needle contacted or pierced the femoral nerve 27% of the time and was within 5 mm of the nerve 60% of the time vs no needle coming within 25 mm neurovascular structures when using the lateral approach [5]).

While not available at the bedside, in this case, fluoroscopy image was taken to confirm needle position with landmark technique (Fig. 2).



Fig. 2 Intra-articular hip injection, landmark technique. The X-ray was performed to verify the position of the needle that was advanced using landmark technique. Right hip with anterior-to-superior fluoroscopic view, showing the position of the needle under the C-arm. The needle is touching bone of the neck, which ensures that it has passed through the capsule of the hip joint. Fluoroscopic image was taken to verify the position of the needle that was originally placed using landmark technique [4]

The use of anatomic landmarks, even at the bedside, is not considered a desirable technique given the increasingly easy access to ultrasonographic guidance which can help to minimize adverse effects.

Ultrasound-Guided Technique

Ultrasound-guided technique is preferable for intra-articular hip injections. A low-frequency curvilinear probe is placed parallel to the inguinal ligament and used to identify the femoral artery and vein. The probe is then moved laterally to just above the femoral head and rotated to an oblique sagittal position so that the probe marker is aimed towards the umbilicus.

The probe position should be in line with the anterior femoral head or neck and a clear view of the redundant portion of the anterior hip capsule (anterior recess) at the junction of the femoral neck and femoral head is obtained.

The overlying neurovascular bundle containing the ascending branch of the lateral femoral circumflex artery should be visualized by color Doppler.

Needle Insertion Technique and Injection

Similar to the landmark technique, local skin analgesia is provided by injecting lidocaine 1%. A 6 mL mixture of 5 mL bupivacaine 0.25% and 1 mL of 40 mg/mL of methylprednisolone if steroids are the injectate of choice or hyaluronic acid “Synvisc” 2 mL (16 mg/2 mL) as an alternative injectate of choice is prepared in a 10 cc syringe formed. A 22-Gauge 10 mm spinal needle is used in an in-plane approach under real-time ultrasound guidance to the anterior capsular recess (Fig. 3a).

After visualizing the needle tip at the joint capsule, 1–2 mL of the solution is slowly injected under low pressure. Successful targeting of the joint space is confirmed by spread of anechoic fluid under the iliofemoral ligament within the anterior capsular recess (Fig. 3b) [6, 7].

The ultrasound-guided technique is the preferred technique for injecting hyaluronic acid to avoid extra-articular placement. The ultrasound-guided technique is likely helpful in the prevention of complications, including vascular or neural injury [8].

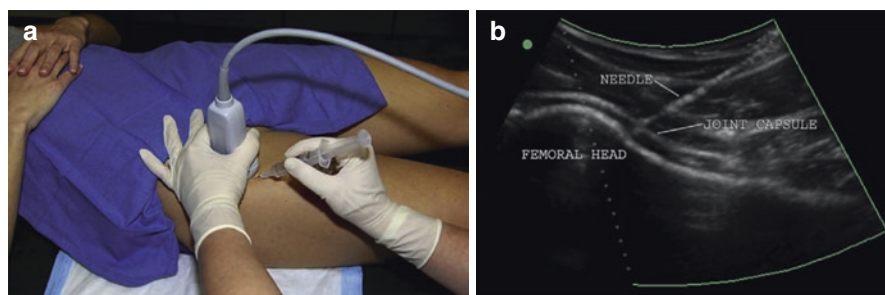


Fig. 3 Intra-articular hip injection, ultrasound-guided technique. (a) Proper probe positioning and in-plane needle insertion. (b) Depicts the needle tip entering the hip joint capsule. Reprinted with permission from Bardowski and Byrd [7]

Potential Complications and Adverse Effects

There is a significant risk for injury to the femoral nerve, femoral artery, and lateral femoral cutaneous nerve during injection of the hip joint.

There is also the potential for a high rate of extraarticular injection.

Adverse effects related to the hip joint injection include:

- Septic arthritis.
- Osteonecrosis.
- The risk of joint infection after total hip replacement.

Adverse effects related to steroid injection into the hip joint include:

- Accelerated osteoarthritis.
- Subchondral insufficiency fractures.
- Rapid joint destruction with bone loss [9].

Clinical and Technical Pearls

- A lateral approach landmark technique is considered safer than an anterior approach because it has decreased risk of injury to the femoral sheath structures.
- Ultrasound guidance is safer than landmark technique in visualizing vasculature (femoral artery, vein) and nerves (femoral nerve and lateral cutaneous nerve of the thigh) surrounding the hip joint.
- The presence of clinically suspected hip pain does not also correspond to degree of OA on radiographs.
- Avoid steroid injections 2 months prior to any planned total hip arthroplasty.
- Adequate sterile technique is essential in avoiding any joint infections post intervention.

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Further Reading

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