Hughston Health Alert

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Inside...

Ankle Sprains

Almost everyone knows that sudden, painful moment: you misstep off a curb, land awkwardly playing backyard basketball, or catch an uneven patch of grass, and your ankle completely gives way. Ankle sprains are among the most common musculoskeletal injuries in the world, and they affect people of all ages. But what exactly happens when you twist your ankle, and how do you ensure a full and proper recovery?

Ankle anatomy

To understand ankle sprains, it helps to review ankle anatomy. Three bones make up the ankle joint: the tibia (shin bone), the fibula (smaller bone of the lower leg), and the talus (small ankle bone). Ligaments are strong, dense, rubber-band-like tissues that connect bones and stabilize your joints. The lateral (outside) ankle has 5 ligaments—the anterior talofibular (ATFL), anterior inferior tibiofibular (AITFL), calcaneofibular (CFL), posterior talofibular (PTFL), and the posterior inferior tibiofibular (PITFL) (**Fig. 1**). The medial (inside) ankle has the deltoid ligament complex, which is composed of 4 ligaments (**Fig. 2**). A sprain occurs when you stretch a ligament beyond its limits.

Common injuries

The most common ankle sprain, an inversion sprain, occurs when the foot rolls inward, forcing your body weight onto the outside of the foot. Another type of sprain is an eversion, which occurs when the foot rolls outward, forcing your body weight onto the inside of the foot. If stretched too far or with enough force, the ligaments can tear, resulting in a more serious injury.

A high-ankle sprain involves injury to the ligaments

Fig. 1. Lateral (outside) ankle anatomy and inversion sprain.

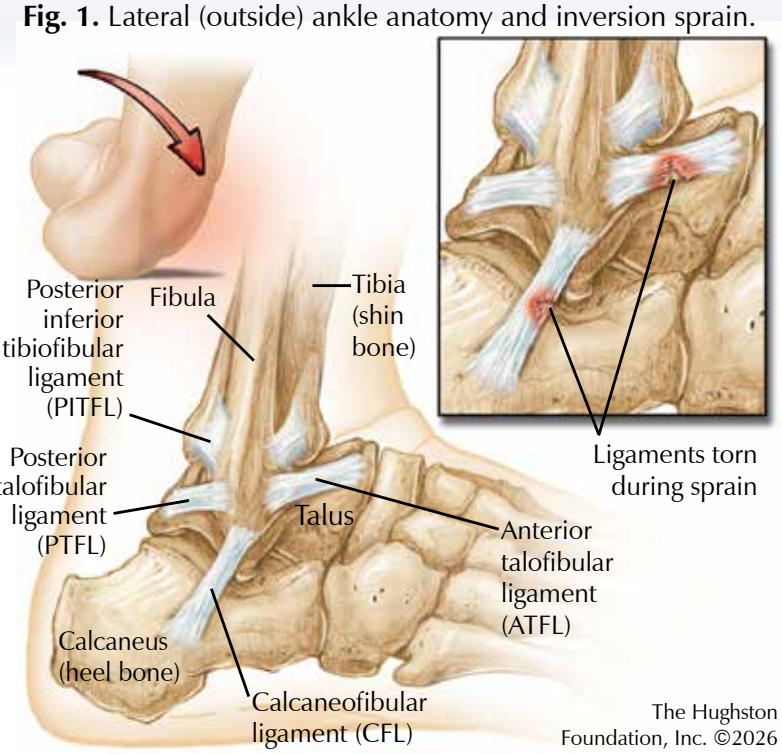


Fig. 2. Medial (inside) ankle anatomy and eversion sprain.

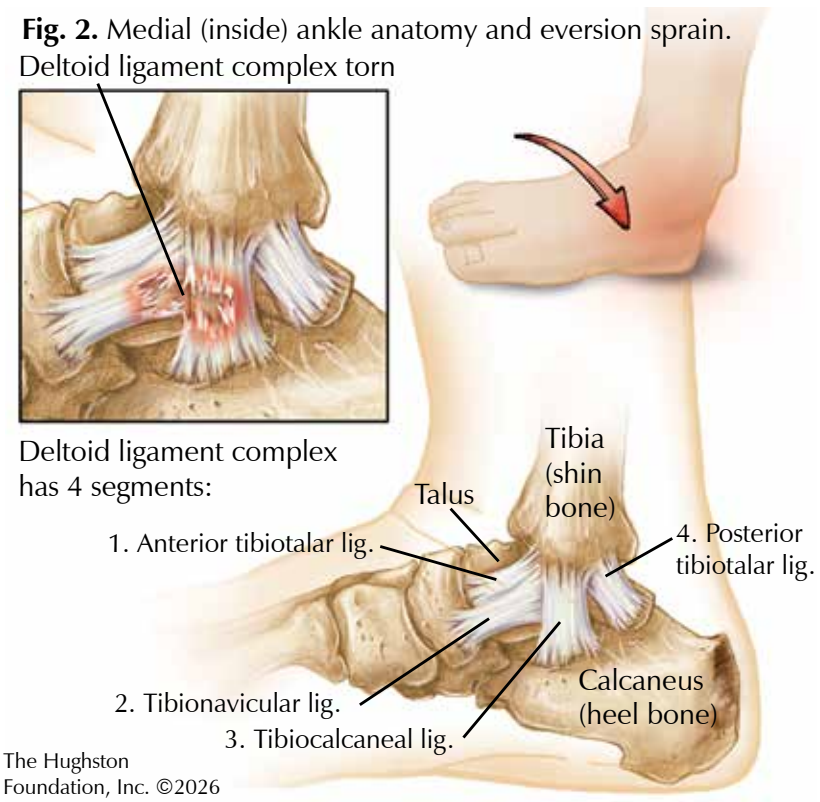
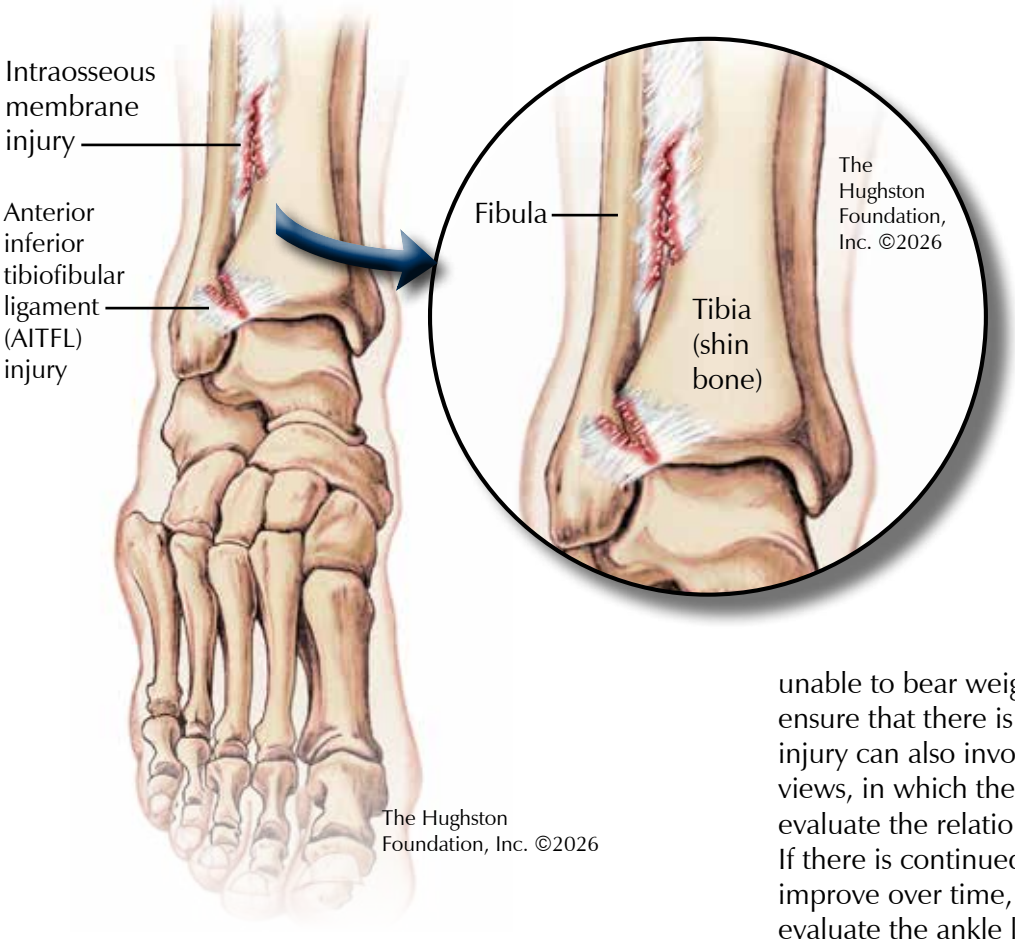


Fig. 3. Front view of ankle anatomy and high sprain.



that connect the tibia and fibula, just above the ankle. Together, the ligaments—the AITFL, the PITFL, and the intraosseous membrane are called the syndesmosis. These ligaments maintain the special relationship between the tibia and fibula, creating stability for the talus. High-ankle injuries often occur during a forceful twisting motion when the foot flexes upward.

Who is at risk?

Ankle sprains do not discriminate, but they often affect athletes after a twisting, inversion injury. Ankle sprains account for an estimated 15% of all sports injuries.[1] Sports most commonly associated with ankle sprains involve frequent jumping or rapid changes in direction, such as football, soccer, basketball, and volleyball. Despite news headlines, though, half of the 2 million annual sprains do not occur during sports or physical activity.[2] Regardless of sport participation, ankle sprains tend to occur more often in females than in males.[3]

Figuring it out

Range of motion, ability to bear weight and walk, and pain with palpation (pressing) of the ankle ligaments are the most common indicators of a sprain. Most patients injure their ligaments in a stepwise manner rather than all at once. Typically, the ATFL, the weakest of the ligaments, is injured first, followed by the CFL, and finally the PTFL. Orthopaedists grade ligament injuries from minor, Grade 1, to severe, Grade 3 injuries (**Box 1**).

Physicians diagnose an ankle sprain by carefully reviewing the patient's account of the injury and performing a physical exam of the lower leg, foot, and ankle. Physical exam findings useful in diagnosing a high-ankle sprain include limited ability to ambulate due to pain, as well as pain when squeezing the tibia and fibula together. If a patient has pain with palpation of the medial or lateral malleolus (inside or outside of the ankle bony prominences) or is unable to bear weight on the ankle, an x-ray is needed to ensure that there is no fracture. Diagnosis of a syndesmosis injury can also involve additional standing x-rays or stress views, in which the foot is manipulated dynamically to evaluate the relationship of the tibia, fibula, and talus. If there is continued concern, or your symptoms do not improve over time, your doctor may order an MRI to evaluate the ankle ligaments and other soft tissues in more detail.

Getting back on your feet

Box 1. Ligament injuries grading system

Grade 1 (Mild):
The ligaments are stretched, but not torn, causing minor swelling and tenderness.

Grade 2 (Moderate):
A partial tear. This comes with moderate pain, swelling, bruising, and a slightly loose feeling in the joint.

Grade 3 (Severe):
A complete ligament tear. You may hear or feel a "pop," followed by severe swelling, intense bruising, and an inability to walk.

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For most mild to moderate sprains, treatment begins with the simple, time-tested **PRICE** protocol during the first few days after injury **(Box 2)**.

Over-the-counter anti-inflammatories, such as ibuprofen, can help manage the initial pain. As swelling improves over the coming days, early rehabilitation is crucial. Simple exercises, like tracing the alphabet with your toes, standing on one foot, balance balls, and eventually progressing to single-leg hops, help restore balance, strength, and proprioception (the ability to sense your foot's positioning in space).

Doctors often treat high-ankle sprains conservatively; however, the injury typically requires a longer period of immobilization and nonweightbearing than low ankle sprains, generally 2 to 3 weeks. You should avoid weightbearing until you can apply weight without pain.

Box 2. PRICE protocol

Protect: Safeguard the joint with a brace, boot, or supportive wrap.

Rest: Avoid stressing the injured ankle or pushing through pain. If it hurts, stop.

Ice: Apply cold packs wrapped in a towel for 15 to 20 minutes at a time to reduce swelling.

Compress: Lightly wrap the ankle with an elastic bandage to reduce swelling.

Elevate: Prop your ankle above your heart level whenever you are resting to reduce swelling.

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Surgical treatment

Your doctor may recommend surgery if your ankle sprain does not improve with conservative care. For athletes, surgery does not guarantee a quicker return to play.[4] Some studies show that platelet-rich plasma injections can shorten an athlete's return to play, but it is important to discuss all treatment options with a sports medicine doctor or an orthopaedic surgeon before making a decision about your care. Surgical treatment could involve using sutures to brace/augment ligaments while they heal or using tissue graft to reconstruct the ligaments.

Avoiding Injury

In everyday life, avoiding ankle sprains can be as simple as carefully watching foot placement while walking on uneven surfaces or during daily activities. Ensuring solid footing and wearing supportive footwear are also simple measures that can prevent an ankle sprain. Additionally, proprioception and balance training can decrease the incidence of ankle sprains, especially in athletes.[5]

What to watch out for

Treating an ankle sprain as "just a twisted ankle", pushing through pain, and skipping rehabilitation can lead to long-term issues. The most common complication is chronic ankle instability, where stretched, weakened ligaments leave the ankle loose and prone to repeated injuries. Each subsequent sprain further destabilizes the joint, significantly increasing the risk of osteoarthritis (wear-and-tear arthritis) and chronic ankle pain later in life. After an injury, taking time to rest and rebuild your ankle stability is the best way to protect your long-term mobility.

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Stepping Strong: Rehab after an Ankle Sprain

An ankle sprain is one of the most common injuries treated in orthopedic care. Most people call it a "twisted ankle," which can happen during sports, on uneven ground, or even from a simple misstep. While it may seem minor at first, if you do not fully rehabilitate your ankle sprain, you can develop long-term issues. Many patients feel better within a short time; however, recovery is not complete until strength, balance, and stability have been restored.

A sprain occurs when you stretch or tear the ligaments that support your ankle. These ligaments help keep the joint stable, especially during movement. Most injuries occur when the foot rolls inward, placing stress on the ligaments along the outside of the ankle and resulting in pain, swelling, bruising, and difficulty walking. You may also notice that your ankle feels weak or unsteady, especially when you try to return to normal activity.

One of the most important things to understand about an ankle sprain is that feeling better does not necessarily mean the ankle has fully healed. Pain and swelling often improve before the body regains normal strength and control. This is where rehabilitation becomes especially important. Without it, the ankle may remain vulnerable, increasing the risk of another sprain.

Early treatment

Historically, treatment for ankle sprains often centered on the well-known "RICE" method: rest, ice, compression, and elevation. While these strategies can still play a role in managing early symptoms, current rehabilitation approaches place a greater emphasis on active recovery. A more modern framework, known as "PEACE and LOVE," highlights the importance of both early protection and a gradual return to movement.

The "**PEACE**" method focuses on the first few days after injury. This includes **protecting** the ankle from further harm, **elevating** it to reduce swelling, **avoiding** anti-inflammatory medications, and using **compression** as needed. It also emphasizes **education** by helping you understand your injury and by discouraging over-treatment. Notably, the approach recommends limiting the routine use of anti-inflammatory medications early on, as inflammation is a natural part of the body's healing process.

Rehabilitation

The "**LOVE**" approach marks the next phase of recovery and focuses on active rehabilitation. This includes gradually **loading** the ankle through movement and weight-bearing activities, maintaining a positive **outlook** during recovery, increasing **vascularization** (blood flow) through light activity, and performing targeted **exercises**. Shifting away from prolonged rest encourages patients to begin moving sooner, which can promote healing and prevent stiffness and weakness.

Fig. 1. Dorsiflexion and plantarflexion resistance band exercise to strengthen ankle.

A. Pull toes up against the band (Dorsiflexion)

B. Push toes down against the band (Plantarflexion)

Rehabilitation focuses on helping the ankle move well, feel strong, and respond appropriately to changes in movement. Early in the recovery process, the goal is to restore motion. Gentle exercises, such as slowly moving the foot up and down or tracing the alphabet in the air, can help reduce stiffness and improve circulation. The small movements may seem simple, but they play an important role in the healing process.

As motion improves, the physical therapist will gradually introduce strengthening exercises. The muscles surrounding the ankle provide important support, and rebuilding strength helps protect the joint. Exercises like heel raises (you slowly lift up onto your toes and lower back down) are a good starting point. Resistance bands can also gently work the ankle in different directions, improving control and coordination (**Figs 1 & 2**).

Fig. 2. Medial and lateral resistance band exercise to strengthen ankle.

A. Starting position

B. Medial - toes towards the inside

C. Lateral - toes towards the outside

Another key part of recovery, balance training is often overlooked. After an ankle sprain, the body's ability to sense position and movement can make the ankle feel less stable, especially during quick or uneven movements. Standing on one leg is a simple but effective way to retrain balance. Over time, you can progress by reducing hand support or adding more challenging surfaces.

As strength and balance improve, rehabilitation begins to look more like everyday movement. This stage often includes activities such as stepping, reaching, and changing direction. For athletes, you may eventually progress to running or sport-specific drills. The goal is to prepare the ankle for the demands of daily life or activity, while reducing the risk of another injury. Progression should be gradual, allowing the body time to adapt.

Working with a physical therapist

While many people start exercises on their own, working with a physical therapist can provide additional support and guidance. A therapist can identify areas of weakness, monitor progress, and adjust the program as needed. A physical therapist can be especially helpful for patients who have had repeated ankle sprains or for those trying to return to a higher level of activity.

Without proper rehabilitation, some individuals develop ongoing issues such as chronic ankle instability. The ankle can feel like it "gives way," even during simple movements, and over time, this can lead to lower confidence during activity and a higher risk of further injury. Addressing these concerns early can help prevent long-term problems.

Recovery from an ankle sprain takes time and often requires patience. There may be times when you need to modify your activity, but staying consistent with rehabilitation can make a meaningful difference in the overall outcome. Even after returning to normal activity, continuing a few strengthening and balance exercises can help maintain progress and protect the joint.

Simple steps

There are also simple steps that can help reduce the risk of future ankle sprains. Wearing supportive footwear, taking time to warm up before activity, and being mindful of uneven surfaces are all helpful habits. For those with a history of ankle injuries, wearing a brace during higher-risk activities can provide additional support.

An ankle sprain may seem like a small setback, but it can have a lasting impact if not fully addressed. With the right approach to rehabilitation, most patients can return to their normal activities, safely and confidently. Focusing on full recovery—not just symptom relief—can help ensure the ankle is ready for whatever comes next.

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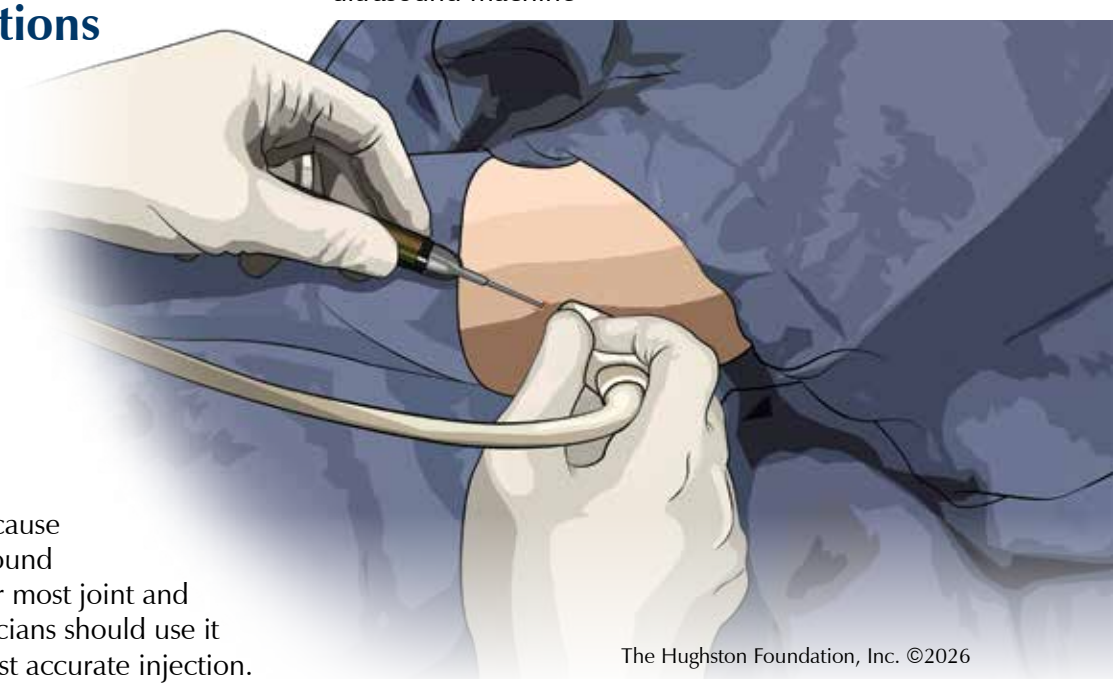
Ultrasound Guidance for Musculoskeletal Injections

Fig. Elbow procedure using a needle and an ultrasound machine



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Ultrasound provides a quick, safe, cost-effective technique for image-guided musculoskeletal injections. Physicians can perform injections in clinic with little to no additional cost to the patient and can significantly improve accuracy and precision compared with landmark-based (blind) injections. Studies also show higher patient satisfaction with ultrasound-guided joint injections because they cause less pain than blind injections. Ultrasound guidance is now the gold standard for most joint and soft tissue injections; therefore, physicians should use it whenever possible to provide the most accurate injection.

History

Although considered common practice today, physicians have performed musculoskeletal injections for only a little over 75 years, with the first documented joint injection performed in 1950 by a physician at the Mayo Clinic for knee arthritis. Since then, orthopaedists have increasingly used injections to treat or diagnose joint and soft tissue pain and injuries.

Physicians have historically performed injections using their knowledge of anatomy, skills learned from those who came before them, and by identifying the location of maximal tenderness. With this knowledge and skill, doctors have successfully used a technique known as a "blind" injection, and physicians continue to use this treatment protocol today. However, technological advances in the 20th and 21st centuries now allow physicians to use imaging to assist with musculoskeletal injections with much higher accuracy than blind injections. These imaging modalities include options such as x-ray guided fluoroscopy, computerized tomography (CT), magnetic resonance imaging (MRI), and ultrasound (US). Each imaging-guided technique has its own pros and cons, including required training or specialization, availability, cost, radiation, and exposure.[1]

Ultrasound availability has steadily increased over the past few decades, following the development of large point-of-care ultrasound (POCUS) systems in the mid-1990s that doctors used primarily in emergency room and obstetric settings. Today, we use small handheld systems. Advancements in ultrasound equipment, coupled with availability, patient convenience, and lower costs, have led to patient preference for ultrasound over other imaging-guided modalities, such as x-ray-guided fluoroscopic procedures. Introduced in 1998, a portable POCUS system, running on battery power alone, weighed about 25 pounds. The first pocket-sized ultrasound was developed in 2007. Today, small wireless ultrasound probes weigh less than a pound, connect to phones and tablets, and can be used anywhere on the planet.

Uses

Musculoskeletal injections are among the primary tools physicians use to diagnose and treat orthopaedic conditions (**Fig**). Doctors use injections for different reasons, such as a steroid injection to control inflammation, a PRP injection to support regeneration and healing, or a hyaluronic acid injection to manage arthritis. Injections play a vital role in managing both acute and chronic conditions and can also serve diagnostic purposes. For example, physicians use numbing agents with medications to serve as a diluting agent as well as to provide some anesthetic pain relief. While the injection provides crucial diagnostic information that confirms the source and location of the pain, any significant pain relief noted in the first 30 to 90 minutes is almost certainly from the anesthetic agent.

Using imaging guidance for musculoskeletal injections can greatly increase accuracy and effectiveness. Of the currently available imaging-guided injection options, ultrasound is the quickest, safest, most cost-effective option, and it requires little to no additional training to use. With these advantages, ultrasound guidance has become the gold standard for many musculoskeletal injection treatments.

Procedure

A licensed health professional often performs ultrasound-guided injections in clinic during the scheduled office visit. The doctor will explain the procedure and obtain consent; the staff will prep and drape the treatment area the same way they would a blind injection. During an ultrasound-guided injection, however, an ultrasound machine will be set up next to the bed to allow visualization of anatomic structures during the procedure. An ultrasound probe and gel provide a medium for radiation-free sound waves to travel through the tissues. The waves bounce off anatomic structures and provide feedback through the ultrasound probe, which the machine interprets to produce a real-time image of the structures beneath the probe. This allows visualization of structures that are both static (still) and dynamic (live), as well as the needle during the procedure, leaving little to no doubt that the injection is in the desired structure or space. During the procedure, the doctor saves the images to the ultrasound machine and uploads them to an imaging database for future review, if necessary. Once the procedure is complete, the doctor cleans off the ultrasound gel and applies a sterile bandage.

Outcomes

Studies have repeatedly shown increased accuracy of ultrasound-guided injections compared to blind injections, especially for small joints such as fingers and toes and medium-sized ankle and wrist joints. Some studies have shown similar accuracy for large joints such as the shoulders and knees between blind and ultrasound-guided injections, while others clearly show ultrasound-guidance superiority for all joint injections. Hip joints specifically have demonstrated low accuracy with blind injections (approximately 70%) compared to ultrasound-guided injections (approximately 97%). There are few, if any, studies that demonstrate superiority of landmark-based (blind) injection techniques when compared to ultrasound-guided techniques (**Table**).

Conclusion

Ultrasound usage for injections is a relatively new technique that can provide increased accuracy while potentially allowing for decreased pain. Patients often prefer it over fluoroscopically guided injections because of its convenience and lower cost. When available, ultrasound-guided musculoskeletal injections provide a clear advantage in accuracy compared with non-imaging injections.

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Table. Pros and cons of imaging used during musculoskeletal injections

Imaging Modality	Pros	Cons
Landmark-guided (blind)	Quick setup Inexpensive Fast to perform	Lower accuracy Difficult for larger body types Difficult for deep structures Difficult for small joints Difficult to confirm if medication goes inside the joint
X-ray-guided fluoroscopy	Effective for deep, complex injections Less training than ultrasound Allows contrast material Identifies extravasation Confirms needle placement Offers real-time diagnosis	Risks soft tissue structures Radiation exposure Not always available May require a radiologist Longer procedure times More expensive
Ultrasound-guided	Inexpensive Noninvasive No radiation or contrast material Easily visualize joint space Immediate post-assessment	Operator dependent Equipment required Longer procedure times Other body structures can obstruct view

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