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Small Incisions, Big Results - Part 2

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Arthroscopy of the Elbow

When surgery is needed to treat athletic injuries of the shoulder or knee, it can often be done arthroscopically. A small, lighted camera is first used to look inside the joint and diagnose the injury. If necessary, small operating instruments are then used to correct the injury.

Although it was first used in the knee and shoulder, arthroscopy is being used with increasing frequency to treat injuries of the elbow, wrist, ankle, and hip. Elbow arthroscopy is now commonly used to diagnose and treat problems related to locking of the elbow, for example, when a loose body, such as a bone chip or piece of cartilage is catching in the joint. It can also be used to treat tendon problems, scar tissue, or bone spurs related to arthritis. Although frequently used in sports medicine and the treatment of injured athletes who want to return to their sport quickly, arthroscopic elbow surgery has become increasingly common in the treatment of all orthopaedic patients (Fig 1).

Who is a candidate for the surgery?

The typical patient who is a candidate for elbow arthroscopy comes to the orthopaedist complaining of catching in the joint or pain when he or she flexes or bends the elbow. There may or may not have been an injury to the elbow. Other common symptoms of elbow

Fig. 1. Arthroscopic elbow surgery.



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A typical surgical set-up for elbow arthroscopic surgery with the patient in prone position. Markings are often drawn on the skin by the surgeon as guides to identify landmarks and structures. The arthroscopic camera is placed on one side of the elbow to view the surgical instruments placed in other portals. The **small inset images** are examples of what is viewed from the arthroscopic camera, inside the elbow joint, with two types of instruments being used.

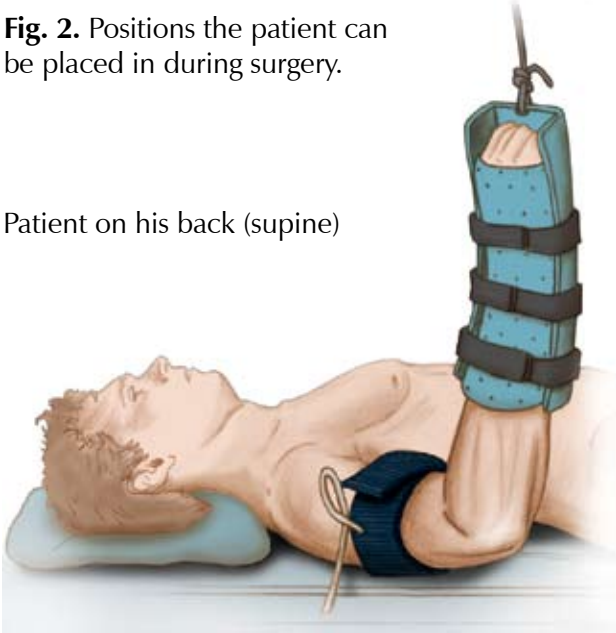
problems are pain on the outside of the elbow and pain when extending the elbow while reaching for something or shaking hands. When these symptoms continue after physical therapy or steroid injections, these patients often benefit from surgery. This group includes patients with loose bodies in the joint; tendinitis of the medial or lateral epicondyle (bony prominence) of the elbow; and bone spurs that are related to either arthritis or to overuse, as occurs in throwing athletes.

What happens during surgery?

Surgical procedures to treat these elbow problems are done in the hospital with the patient under anesthesia. The patient is placed in 1 of 3 positions: 1) on his or her back with the elbow bent at a right angle under traction,

Fig. 2. Positions the patient can be placed in during surgery.

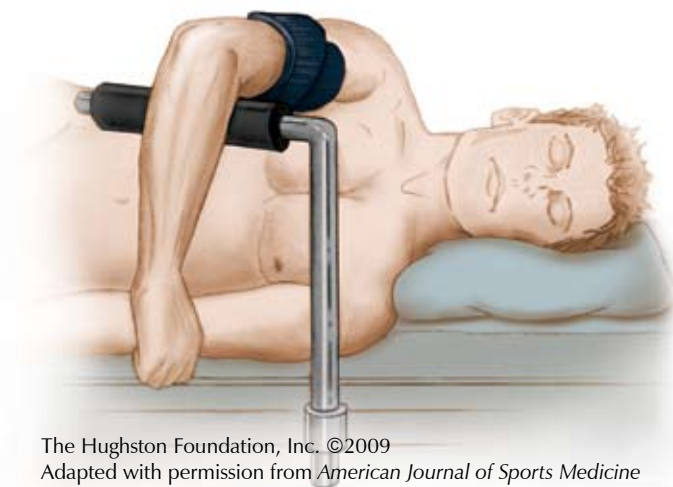
Patient on his back (supine)



Patient on his stomach (prone)



Patient on his side (lateral decubitus)



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2) on his or her stomach with the elbow hanging down at a right angle, or 3) on his or her side in the lateral decubitus position (Fig. 2). With the patient on the operating table, a tourniquet is applied to the patient's arm in preparation for the procedure. Small incisions are made in the elbow to create portals in which to insert the arthroscope and the instruments needed for surgery. The most common portals are created on the medial (inside) and lateral (outside) sides of the elbow (Fig. 3). If they are needed, other portals on the posterior (back) may be created to access other areas of the elbow. The surgeon must be well aware of the location of the nerves and vessels in the area to prevent damage while inserting the arthroscope or other instruments. Fluid is put into the joint to distend the capsule surrounding the elbow joint, making it easier to see the anatomy inside when the arthroscope is inserted.

Loose bodies, which can be related to early arthritis or a condition known as osteochondritis dissecans, are often found in the anterior, or front, part of the joint. They can be grasped with an instrument and pulled out through the incision (Fig. 4). If there is swelling or scarring of the tissue, a shaver is used to remove the damaged tissue. If problems are suspected in the posterior compartment, or rear, of the elbow, the arthroscope is inserted there with the elbow extended (straight). We often see the olecranon tip hitting against the humerus as the elbow is straightened. Loose bodies and spurs are sometimes found in this area in throwing athletes (Fig. 5). If damage is seen, a small osteotome, or chisel, is used to remove the loose body, and for more severe problems related to arthritis, a burr may be used to remove the spurs.

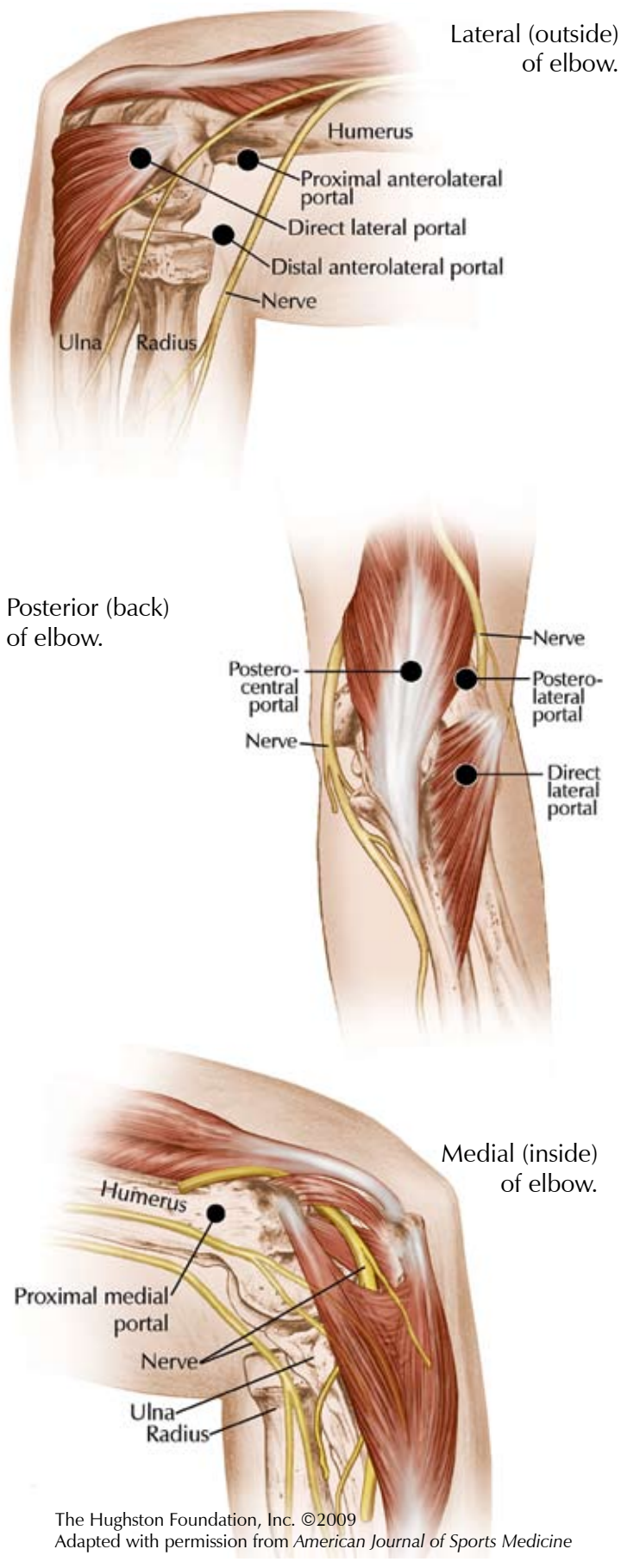
If the problem is tendinitis that will not resolve, the tendon can be examined arthroscopically. A shaver or a laser-type instrument called a radiofrequency probe is used to trim away the diseased tissue.

What to expect after surgery

Once the surgery is completed, the small incisions are closed with a stitch and covered with a dressing. Arthroscopic elbow surgery is not considered a painful operation because of the small incisions needed, and patients usually need little or no pain medication. Patients usually go home the same day and most are able to move the elbow within a few days. Exercises to regain motion are done with a therapist. Depending on the nature of the procedure, patients can usually expect to be back to their normal activities in 4 to 6 weeks.

The doctors at The Hughston Clinic have been using elbow arthroscopy to treat elbow disorders surgically for many years. A scientific study done at The Hughston Foundation on the long-term results of arthroscopic treatment of patients with tennis elbow was recently published in the *American Journal of Sports Medicine*.¹ No patient interviewed had required another operation for

Fig. 3. Portal locations for the arthroscope and surgical instruments.



the condition; they had no pain at rest and very minimal pain with increased activities; and all had returned to their sporting activities.

Because it is often used to treat well-known athletes, arthroscopic elbow surgery has received much attention, but it is a valuable tool for all orthopaedic patients. Patients recover more quickly and easily than is possible with open surgery. Today, elbow arthroscopy is considered an excellent way of treating patients with elbow problems of catching, locking, loss of motion, or pain related to tendinitis.

Fig. 4. An arthroscopic image of a loose body being removed from the elbow joint.

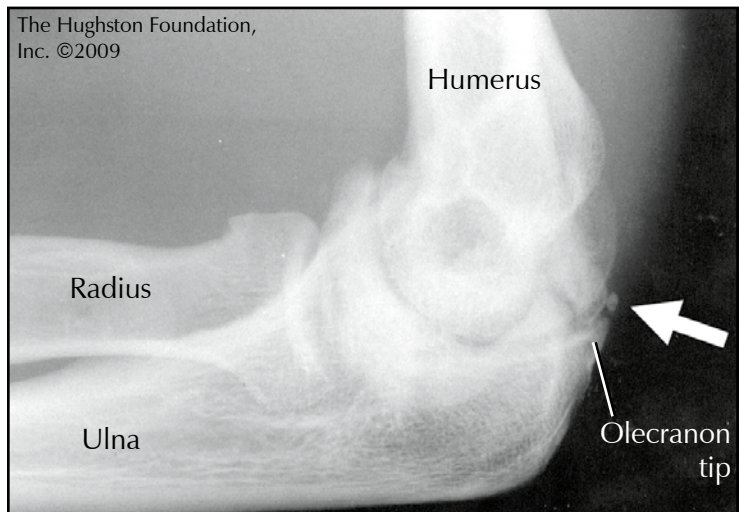
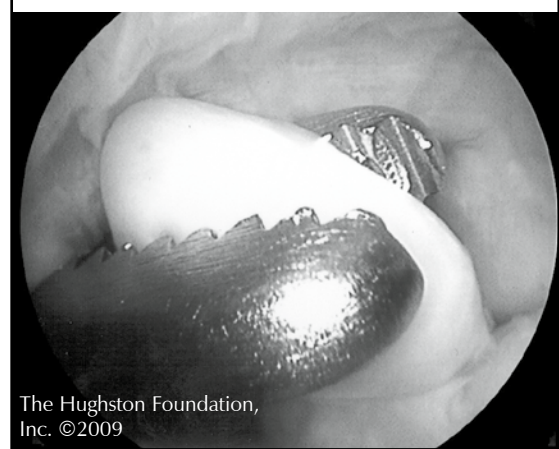


Fig. 5. An x-ray showing a loose body (indicated by arrow) in the posterior (rear) of the elbow joint.

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Small Incision Techniques in Hand Surgery

Many common hand surgical procedures can now be performed through a small incision, or in some cases, no incision at all. Procedures that are done through small incisions are of great interest to both physicians and patients because the incisions tend to heal faster and patients often experience less pain.

Endoscopy and arthroscopy are typically performed through 1 or more very small incisions. Endoscopy is used for examination and surgery of an internal part of the body using a special instrument called an endoscope, and arthroscopy is used for endoscopic examination and surgery of the interior of a joint. An endoscope is an instrument that uses special lenses, fiber optics, cameras, and monitors. Additionally, limited-open, or mini-open, procedures are used to perform routine surgical procedures through much smaller incisions. The smaller incisions require fewer stitches or sometimes no stitches, such as when a percutaneous technique is done by using a sharp needle through the skin.

Peripheral nerve entrapment syndromes

Surgical procedures that use small incisions are especially useful for treating peripheral nerve entrapment syndromes. For example, carpal tunnel syndrome (occurs when pressure is put on the median nerve in the wrist) (Fig. 1) and cubital tunnel syndrome (a condition that is caused by a pinched or pressed nerve at the elbow) (Fig. 2) can be treated by mini-open and endoscopic techniques.

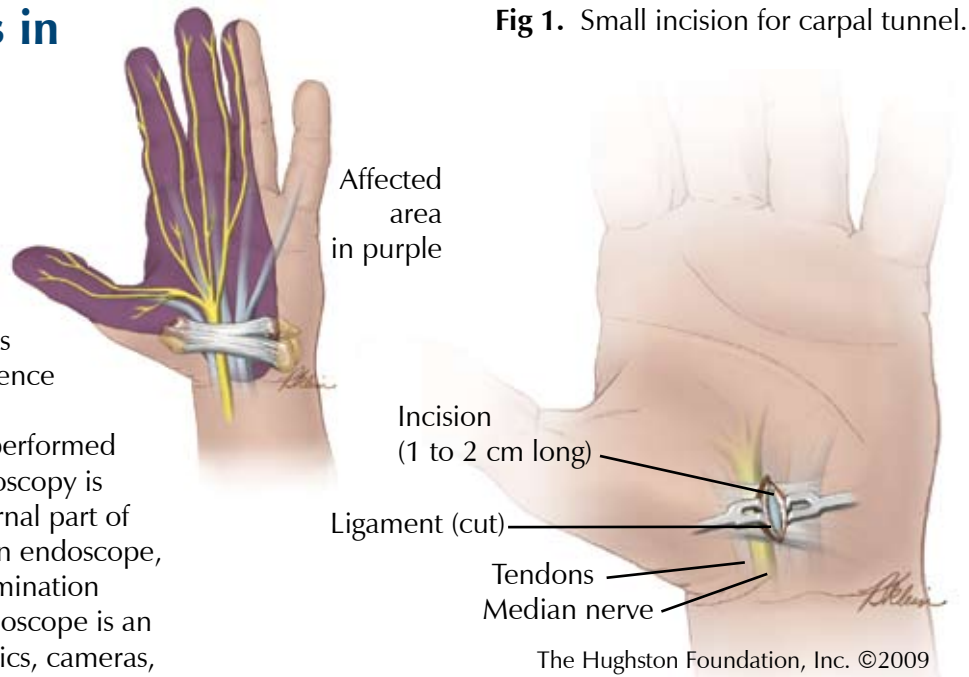


Fig 1. Small incision for carpal tunnel.

The major differences between the techniques are the location and number of incisions. Both techniques produce excellent results and a smaller scar than more traditional open techniques.¹

Trigger finger

Trigger finger release can sometimes be performed using a percutaneous technique. Trigger finger, or stenosing tenosynovitis, is a condition that causes the tendons in your hand to click when you bend your finger or thumb. In severe cases, the tendon can become trapped, locking the finger in place. Activity modification, splinting, nonsteroidal anti-inflammatory drugs, and steroid injections are usually tried first. If the treatments do not relieve the symptoms, surgery is often recommended.

The percutaneous technique is performed using local anesthesia. The needle is inserted into the tendon sheath and then withdrawn slowly until it is positioned properly. The incision in the tendon sheath is made by moving the needle while advancing it in line with the tendon sheath. Once the release is complete, the needle is withdrawn, and the patient is asked to flex and extend the finger to show relief from triggering.² The percutaneous technique eliminates the need for an incision and the possibility of a painful scar; however, not all trigger fingers can be treated with the percutaneous technique.

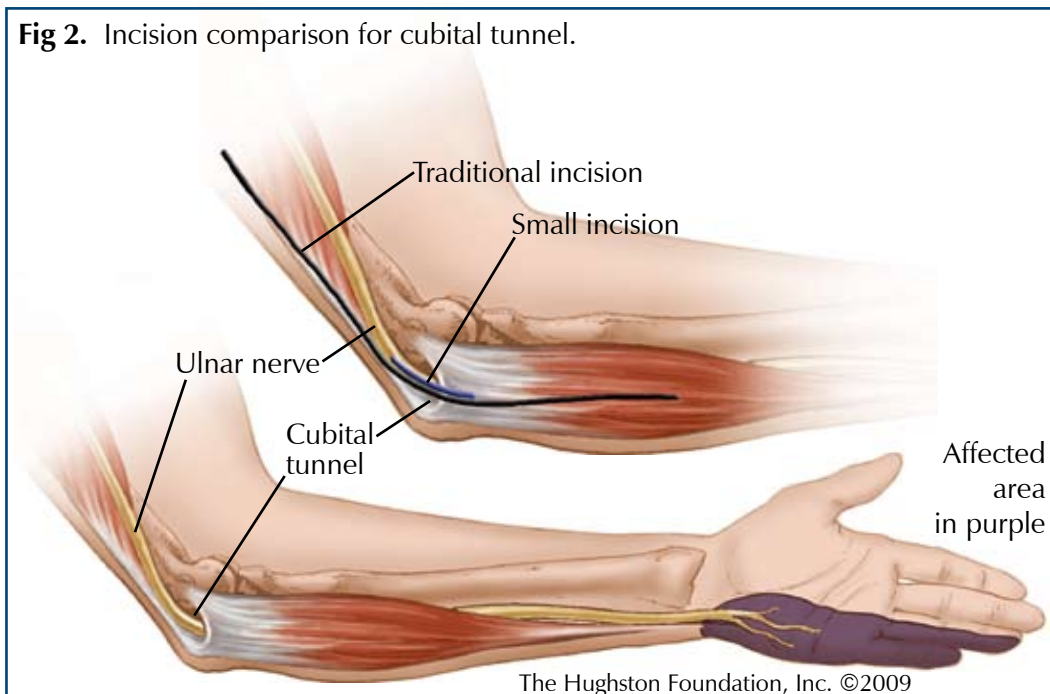
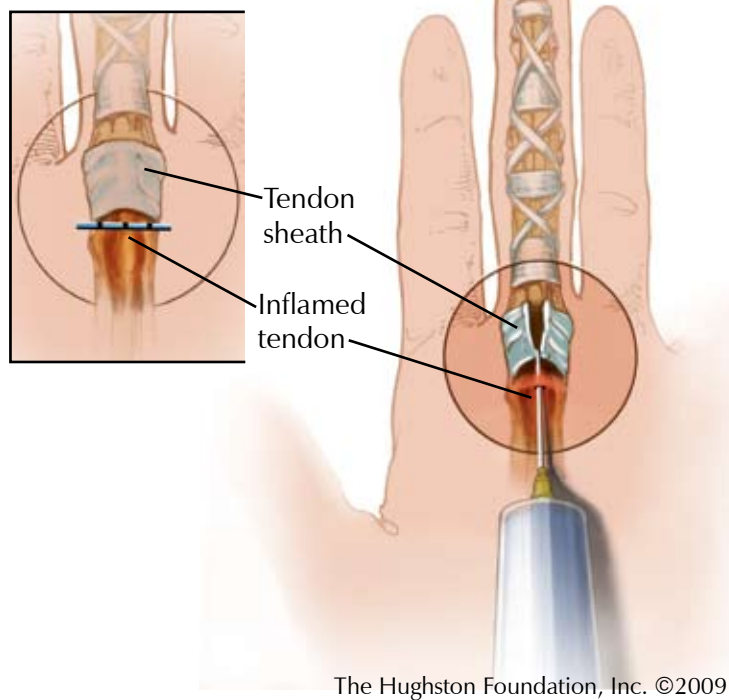


Fig 2. Incision comparison for cubital tunnel.

Fig 3. Location of the traditional incision and percutaneous technique for trigger finger.



Dupuytren contracture

Dupuytren contracture (a condition where abnormal tissue growth in the palm of the hand prevents the fingers from being fully extended) can also be treated using percutaneous techniques, which also decrease the need for a large incision in the palm that can take a long time to heal and is often painful.

Newer techniques using small incisions have produced tremendous results for hand surgery patients. However, the techniques cannot be used for all conditions and for all patients. Smaller incisions eliminate some problems and complications; however, they can also produce other complications for some patients. Only a careful and detailed discussion with your physician can help to determine if one of these procedures is right for you.

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Extreme Lateral Interbody Fusion

AN INNOVATIVE APPROACH TO LUMBAR SPINE SURGERY

Minimally invasive surgery is popular with surgeons and patients, because it often results in less tissue trauma, less postoperative pain, shorter hospital stays, and faster recovery times than open surgery. A new procedure called Extreme Lateral Interbody Fusion, or XLIF (NuVasive, Inc., San Diego, CA), uses a minimally invasive technique to gain access to the lumbar spine for lower back surgery. The technique is unique in that it is used to gain access to the lumbar spine through a lateral, or side, approach rather than through the back or abdomen.¹

Anatomy of the lumbar spine

The lumbar vertebral column consists of 5 separate vertebrae, which are named for their location, L1, at the top of the lumbar spine, through L5, at the bottom (Fig 1). Between the vertebrae, small nerves or nerve roots enter and emerge from the spinal cord through spaces called the intervertebral foramen. Spongy pads of cartilage (intervertebral discs)

in the spaces between the vertebrae allow for flexibility and act like shock absorbers during body movement. The intervertebral disc has a jelly-like center called the nucleus pulposus, which is composed of 80% to 90% water, and has a solid portion made up of a special type of connective tissue.² As you age, the inner nucleus of the disc can dry out, causing the disc space to narrow and the annular ligaments to bulge.

If the disc becomes damaged due to disease or injury, the space between the two vertebrae decreases and can cause the two bony vertebrae to rub together. Often, damage from bone-on-bone rubbing causes pain and inflammation



Fig 1. Illustration and x-ray of the lumbar spine. **Left:** healthy discs and a degenerative vertebral disc. **Below:** a fusion device is shown in place after removal of the degenerative disc.

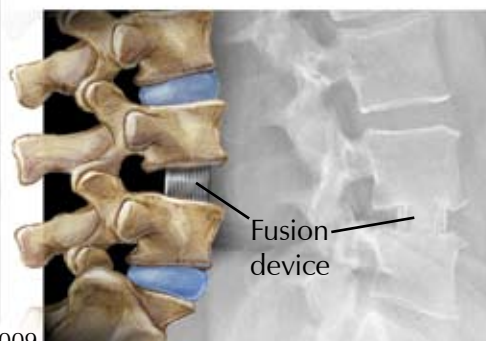
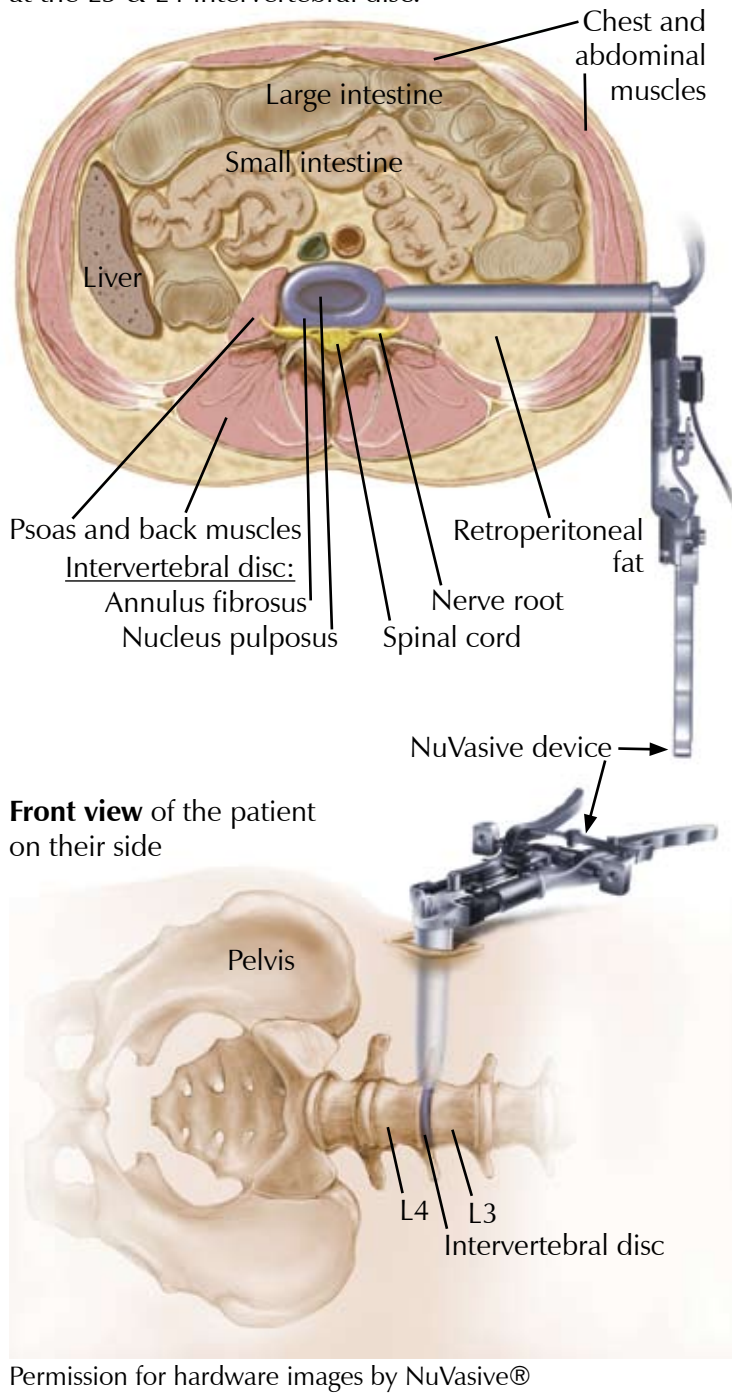


Fig 2. Two views of the access made with the NuVasive device in preparation to remove the intervertebral disc.

Cross section (bird's eye view) of abdomen at the L3 & L4 intervertebral disc.



Permission for hardware images by NuVasive®

and can reduce the range of motion in the lower back. Furthermore, if the space is decreased, it could affect the size of the intervertebral foramen (the opening in the disc the nerve must pass through) and cause the nerves to become compressed or pinched.

Why surgery?

The goal of the surgery is to restore disc space height. Often, spinal fusion is used to treat the pain caused by two vertebrae rubbing against each other. The surgical

treatment often involves eliminating the motion between affected vertebrae by removing all or most of the disc and replacing it with bone graft, or another fusion device.

How is the surgery performed?

Before surgery, you are positioned on your side and a fluoroscope is used to verify the location of the affected disc space. Fluoroscopy verifies the location of hard tissue, such as bones, surgical instruments, and implants, and soft tissues, such as organs and muscle. During surgery, a small incision is made through your side for your surgeon to use as a guide for placement of the surgical instruments (Fig 2). As the tubes are advanced through the muscle, fluoroscopic images and NeuroVision® nerve monitoring help to guide them away from nerves and other structures toward the operative disc space.^{1,3}

Once the disc is accessed, most of the nucleus of the disc is removed. During this process, fluoroscopic images are examined to confirm adequate removal and preparation for the fusion device. The surgeon then places the device into the empty space to restore the proper disc space height. Once the implant is in position, final placement of the device and spinal alignment is confirmed using fluoroscopic images. The two small incisions are closed with a few stitches and a bandage is applied.^{1,3}

What happens after surgery?

After surgery, you may experience some back stiffness and pain, which is often intermittent and worse in the morning after waking up. If you experience leg pain or numbness, which is often due to nerve root irritation, it will gradually improve. Increasing activity a little at a time and not overdoing it will help the healing process.

A regular walking plan is strongly recommended, because walking helps to strengthen the back muscles. You should try to increase the walking distance a little each day and carefully follow your physical therapy instructions. It is important for your recovery to follow proper body mechanics.

XLIF is not appropriate for everyone. Medical care is tailored to fit each individual patient; therefore, seek the advice of an orthopaedic surgeon to determine the treatment best suited for you. Your surgeon can discuss this procedure and other options with you.

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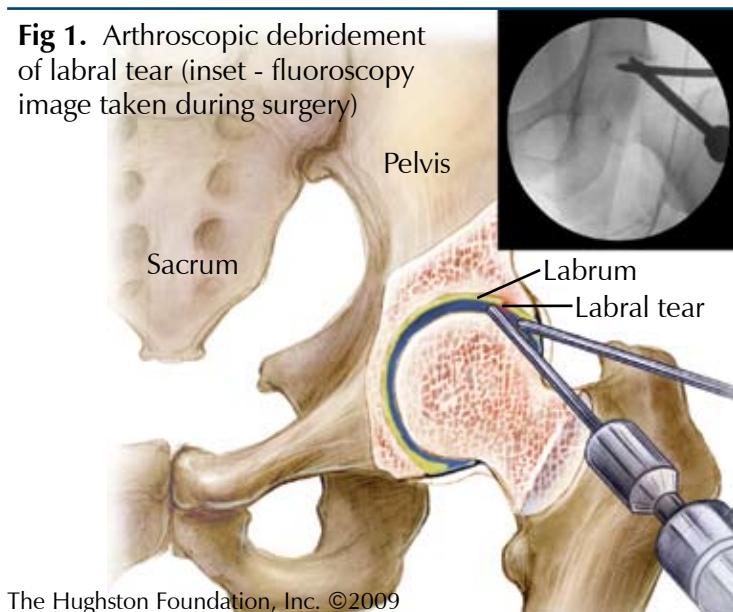
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Hip Arthroscopy

Arthroscopic procedures for knees and shoulders have proven to be successful for treating complex problems with minimal trauma to the patient. For this reason, arthroscopic techniques to treat other joints, such as the hip, have become more and more popular. Although it is not a new technique (the first hip arthroscopy was performed in 1939¹), recent advances in technology have dramatically widened the spectrum of hip conditions responsive to arthroscopic treatment.

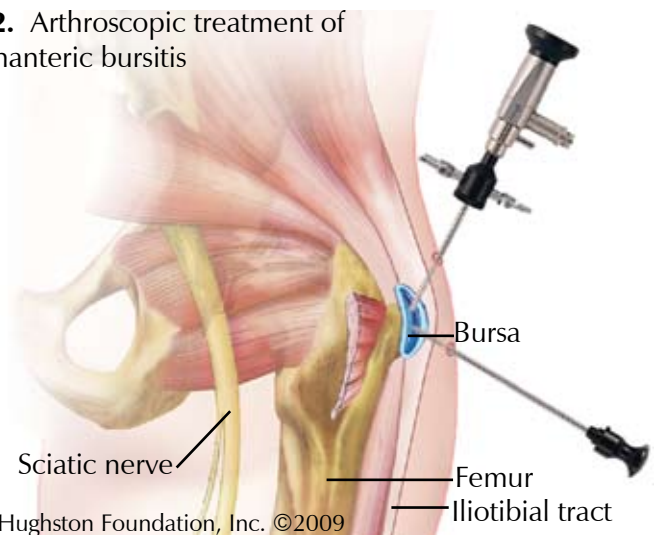
The 3 most common areas a patient identifies as “hip” pain are the groin, the side, and the back portion of the hip. A problem arising from the actual ball-and-socket hip joint typically causes pain in the groin. Pain on the outside, or lateral, portion of the hip is most often an irritation of soft tissue, such as trochanteric bursitis. Often, pain felt in the back of the hip or buttocks can stem from pressure on the sciatic nerve exiting the lower back, or from problems in the joint between the sacrum and pelvis. Although there are exceptions to these generalities, identifying the cause is important because the first two may be responsive to arthroscopic treatment of the hip.

The most common problem within the hip joint is a tear in the labrum, or the cup of flexible cartilaginous tissue that surrounds the bony socket. Arthroscopic debridement of labral tears has a success rate approaching 80%.² Loose fragments in the joint are also ideally treated by arthroscopic removal. Furthermore, bony impingement of the ball and socket (femoroacetabular impingement) has recently been treated by removing the bone spurs arthroscopically with very promising results.³ Although it is rare, the joint lining of the hip can become inflamed, especially in patients with rheumatoid arthritis, and often the inflamed lining can be removed arthroscopically. Some patients experience a painful



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Fig 2. Arthroscopic treatment of trochanteric bursitis



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snapping of the hip joint, which can be caused by the iliopsoas tendon rubbing over the joint during motion. If nonoperative management has failed to relieve the problem, this tendon can be released, or cut, arthroscopically with results better than open procedures.⁴ Arthroscopic procedures for rare conditions within the hip joint are also being performed with encouraging early results.

Another category of hip pain, lateral pain, can also be caused by conditions amenable to arthroscopic procedures. In 2007, Baker and associates found excellent results from arthroscopic treatment of trochanteric bursitis.⁵ Patients had to have had 6 months of nonoperative treatment to be candidates for surgery. Women tended to have better results than men in this study. Furthermore, by treating this condition arthroscopically, partial tears of muscle tendons can be visualized and treated if found. Another cause of lateral hip pain can be from a band of tissue, the iliotibial tract, which runs from the pelvis to below the knee. Sometimes its snapping over the hip bone causes pain. This condition is easily treated with arthroscopic release.

The indications for hip arthroscopy are continuing to expand, and as our diagnostic ability increases, so do our treatment options. Arthroscopy is an exciting method used to treat many previously enigmatic conditions of the hip in a minimally invasive way, resulting in faster recovery times and decreasing pain for our patients.

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