Hughston Health Alert

6262 Veterans Parkway, PO Box 9517, Columbus, GA 31908-9517 • www.hughston.com/hha

VOLUME 33, NUMBER 4 - FALL 2021

Inside...

Fig 1. Bench press emphasizing a strained pectoralis major muscle

Adobe Stock reference - The Hughston Foundation, Inc. ©2021

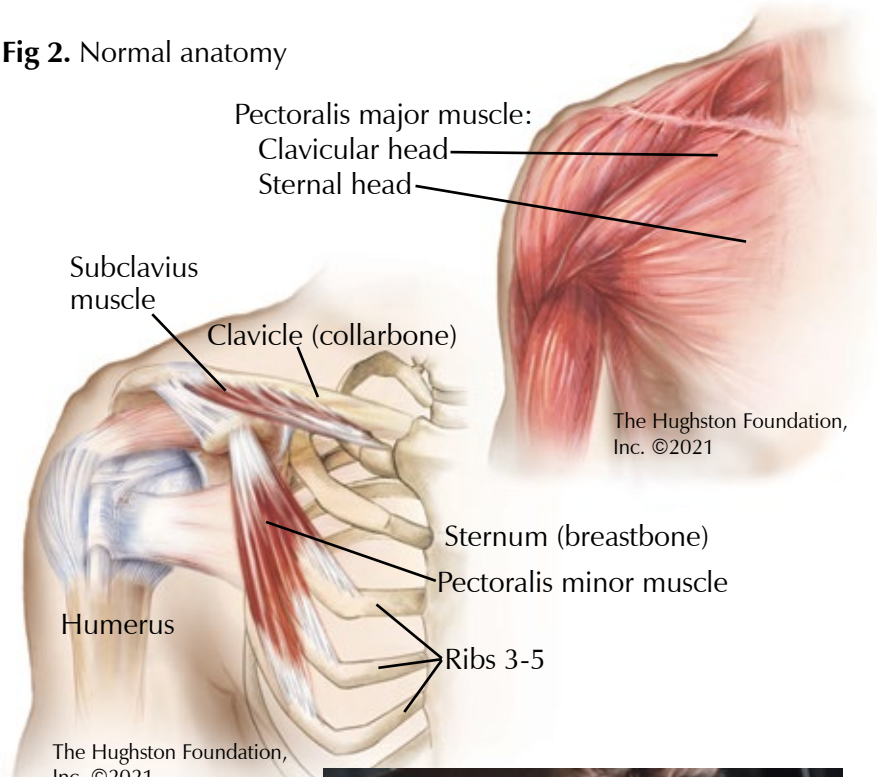
Pectoralis Major Muscle Injuries

Reported injuries involving the pectoralis major muscle have significantly increased in the last 25 years. These injuries can range from contusions (bruising) and inflammation (swelling) to complete tears resulting in significant loss of function. They often cause pain, weakness, deformity to the chest wall, and can lead to noticeable changes in overall shoulder function. Military personnel, laborers, even older adults injure their pectoralis major muscle when excessive weight is lifted or moved beyond what the muscle can handle (**Fig. 1**). After pectoralis major injuries occur, they can be disabling, especially to athletes such as weightlifters. Several factors including recognition of the injury and timely care can help prevent delay in necessary treatment and improve functional outcomes. Treatment is dependent upon the severity of the injury, your activity level and demand, and your ability to perform activities of daily living.

Anatomy

The 2 pectoralis muscles, pectoralis major and pectoralis minor (the larger and smaller muscles of the chest), connect the front of the chest wall with the humerus (upper arm bone) and shoulder joint (**Fig. 2**). The pectoralis major is a thick, fan-shaped muscle consisting of 2 heads, the clavicular and sternal. The clavicular head originates from front of the clavicle (collarbone) while the sternal head arises from the sternum (breastbone) and the first through sixth ribs.

Fig 2. Normal anatomy



The Hughston Foundation, Inc. ©2021

The Hughston Foundation, Inc. ©2021

Fig 3. A Torn pectoralis major muscle

Adobe Stock reference - The Hughston Foundation, Inc. ©2021

The 2 portions of the muscle then converge on the outer side of the chest with the subclavius muscle (the small, triangular muscle between the clavicle and first rib) to form the axilla or armpit. The multiple origins and insertions of the pectoralis major muscle allow it to initiate a wide range of actions of the arm, enabling it to adduct (draw toward the body), flex (bend), and internally rotate (turn toward the body).

Causes of injury

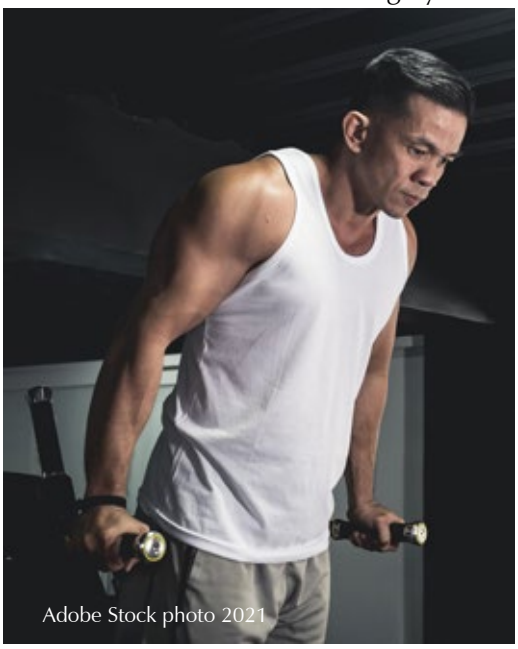
Repetitive or prolonged activity can cause the tendons of the pectoralis major muscle to degenerate, resulting in a weakened tendon that is more susceptible to injury. Chronic muscle imbalances, weaknesses, tightness, and abnormal biomechanics, especially when combined with excessive training without appropriate rest, can contribute to the development of significant injury. By contrast, acute strains or tears to the pectoralis muscle occur when you place excessive tension across the muscle or tendon while it is maximally stretched or eccentrically (not central) loaded. This can occur during weight training, especially while performing a bench press (**Fig. 1**), chest press, or pectoral fly, and is more likely to happen when using free weights than a machine. For example, if you apply too great of an external force while the muscle is at its maximal stretch point, as during the downward movement of a bench press, it will rupture at the junction of the tendon and muscle belly. When this occurs, patients typically report hearing or feeling a pop with immediate pain.

Tears to the pectoralis major muscle can affect only a portion of the tendon or may result in a complete rupture (**Fig. 3**). Tears are classified as 1 of 3 grades, based on the number of muscle fibers torn and how much function has been lost, with grade 3 representing the most extensive damage. The majority of tears are grade 2.

Diagnosing the injury

During a physical examination, your doctor will look for swelling and bruising on the front of the chest that may extend to the armpit and upper arm. There may be noticeable asymmetry along the chest, and palpation (touch) can elicit pain near the armpit and the provider may even be able to palpate the tear over the chest. In addition, many patients report pain and loss of strength while pushing with the extremity. You can experience pain to the chest and front of the shoulder or armpit, but it can radiate into the upper arm or neck and may increase from an ache to a sharper pain with activity.

Fig 4. Example of full-resistance exercises 3-4 months after surgery.



In the acute phase of injury, a physical exam may be difficult to perform because swelling from the injury can distort the shoulder, and pain can limit testing your strength and motion. Once the swelling has resolved, your physician can test the muscle strength while having you attempt to move your arm toward your body while he or she attempts to hold it in place. Your physician can compare the results with the opposite arm to determine the degree of limitation.

Your doctor can also use imaging to differentiate a pectoralis injury from other types of injury and to determine its extent. X-rays are often taken to look for a possible bone fragment on the tendon or other associated fractures or dislocation. Your physician may order a CT scan (computed tomography) to evaluate fractures identified on x-rays for surgical fixation or an ultrasound test that can help to assess the presence of a tear or retraction of the tendon. A MRI (magnetic resonance imaging that shows the bones, muscles, ligaments, and tendons) is often the test of choice to determine the site and extent of injury as well as giving a more advanced look at the injury to allow for possible surgical planning.

Treating the injury

The treatment for a pectoralis major injury is dependent upon the severity of injury, the extent of muscle function, and your health and general activity

level. Physicians typically consider nonsurgical treatment for patients who are low demand, elderly, or have either partial tears or tears within the muscle belly. Initial management with immobilization, rest, and cold therapy followed by strengthening and stretching can offer a satisfactory to excellent functional result. Once the shoulder motion returns without pain, patients can resume daily activities. In those patients who either need to return to full strength and function or are concerned with cosmetic appearance, the physician will recommend surgical repair. Often, patients are highly satisfied with surgical repair of the pectoralis major, reporting a return of strength, structure, and overall function. Additionally, operative management can result in better function, including peak torque and overall work performance. The need for rehabilitation after surgery varies depending on how the surgeon repaired your muscle. In general, patients begin range of motion activities at 2 weeks, progressive-resistance exercises at 6 to 8 weeks with full-resistance exercises beginning at 3 to 4 months (**Fig. 4**). You can expect to return to your pre-injury level of function at roughly 6 months.

Returning to activity

The management of pectoralis major injuries is patient specific. In sedentary or low-demand individuals with partial or complete tears, nonsurgical management can provide acceptable to excellent results. In those who demand function and form, surgical treatment can be the best option. Although complications such as repair failure, infection, and stiffness can occur, they are relatively rare. Generally, you can return to activity and improved appearance following surgical repair with appropriate postoperative rehabilitation.

Benjamin J. Catoe, DO
Columbus, Georgia

Total Hip Replacement

Total hip replacement, also known as total hip arthroplasty, is one of the most common orthopedic surgeries performed today. Since 2007, according to the Agency for Healthcare Research and Quality, orthopaedists have performed more than 400,000 hip replacements each year in the United States alone. Back in 2007, a Lancet article title labeled the procedure as "the operation of the century," which has proven true especially since the number of total hip replacements performed continue to grow exponentially. There are multiple reasons why patients choose to have a hip replacement. Although the procedure appears to be complex, the key is to understand the anatomy of the hip joint and the goals of the procedure.

Hip anatomy

Most people have heard the hip described as a ball and socket joint. The head of the femur (the ball) and the acetabulum (the socket) form the joint (**Fig. 1**). The acetabulum is shaped by the combination of 3 bones within the pelvis: the ilium, the ischium, and the pubis. A thick layer of cartilage covers both the femoral head and the acetabulum so that the joint can handle the enormous amount of force that transfers across it during movement. Cartilage is the smooth tissue that covers the bones in a joint and allows the bones to move against each other with minimal friction. A ring of cartilage called the labrum also surrounds the joint and contributes to its stability. The hip is also surrounded by some of the strongest ligaments (tissues connecting bones), tendons (tissues connecting muscle to bone), and muscles in the entire body. These structures attach to the pelvis and to the top of the femur allowing hip movement.

Why have a hip replacement?

The most common reason patients have a hip replacement is osteoarthritis (degenerative joint disease), which causes a breakdown of the joint surface. Osteoarthritis usually causes wear and tear on the joint and leads to destruction of cartilage. As the cartilage wears out, it exposes the bone underneath and causes pain as the 2 bony surfaces move against each other. This is what doctors mean when they say "bone-on-bone" arthritis. There are several other indications for a hip replacement including damage to the femoral head blood supply causing collapse, malformation of either the acetabulum or the femoral

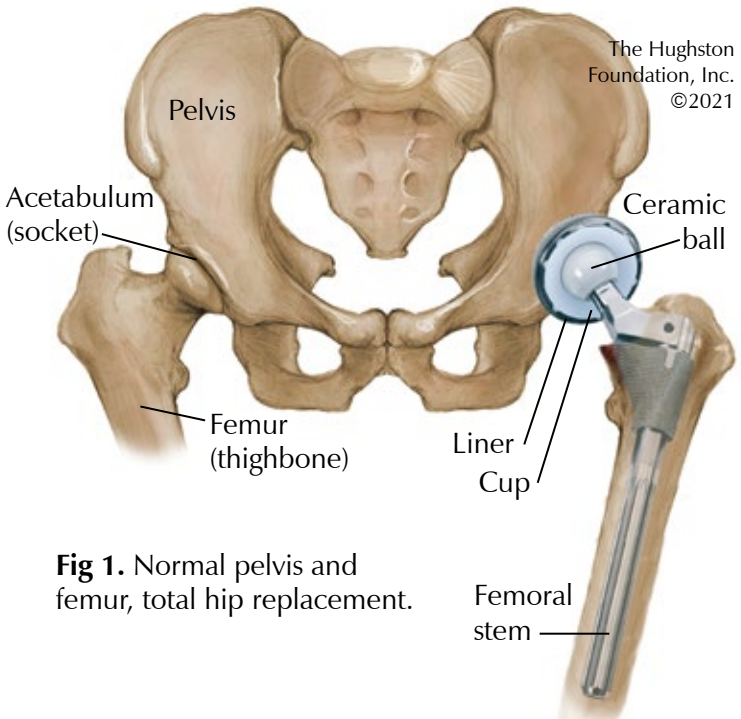
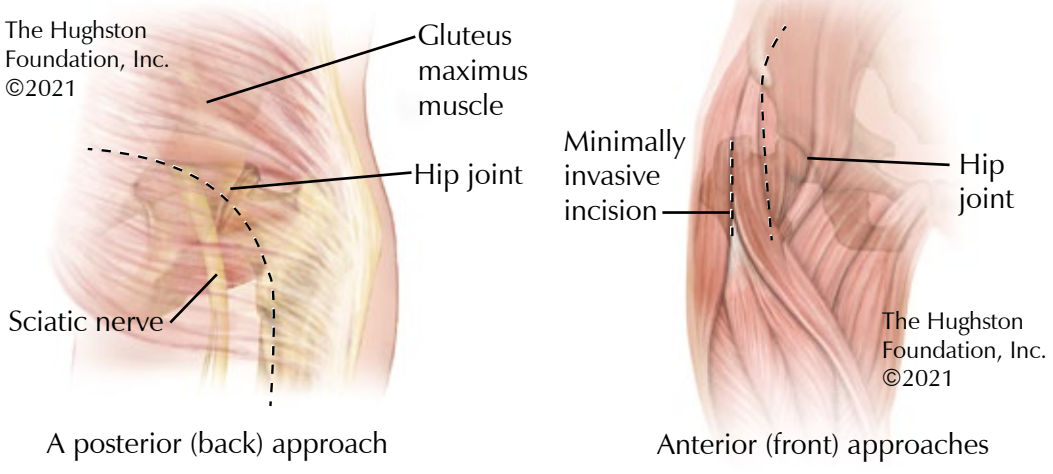


Fig 1. Normal pelvis and femur, total hip replacement.

Fig. 2. Surgical approaches to the hip. Dotted line shows incisions on the right hip.



head, and fractures of the acetabulum, femoral head, or femoral neck. In the setting of osteoarthritis, physicians often recommend a total hip replacement for patients who have severe pain in their hip that affects how they perform their daily activities or the pain limits their ability to get around.

The best approach for you

Hip replacement can take place in both an inpatient or outpatient setting, and many patients are able to go home the same day as the surgery. The procedure requires access to the hip joint, and a surgeon can do so through many different approaches, or ways through the muscles and surrounding structures. Two of the most common are the posterior (back) and the anterior (front) approaches (**Fig. 2**). Each approach has its pros and cons; therefore, your surgeon will carefully consider your anatomy, their surgical training, and their own preference when planning the procedure. A discussion with your surgeon prior to surgery is a great opportunity to understand each approach and which he or she feels is best for you.

Hip replacement surgery

Following access to the hip joint, the surgeon removes the femoral head and labrum and prepares the acetabulum for the implant. Surgeons often use a trial acetabulum implant, which is shaped like a cup to find the appropriate size before placing the formal implant. Although most implants have a surface that encourages bone growth, sometimes surgeons add a screw through the implant or cement to stabilize the cup further. After placing the plastic liner inside the cup, the surgeon's attention turns to the femur.

Just as in the case of the acetabulum, broaches of increasing size are tested within the femur. These broaches allow for widening of the femoral canal (inside of the bone) until the surgeons finds the appropriate size and fit. After a trial implant is in place with a ball on top and the hip joint is reduced (put back into place), the surgeon can assess the stability of the joint with the goal of having the new prosthetic hip being as close to a natural hip as possible. A femoral implant then replaces the trial, and a ball replaces the femoral head. Like the acetabular component, the femoral implants have a coating that allows the bone to grow naturally onto the implant. Additionally, the surgeon may use cement to help stabilize the femur. The acetabulum and femur implants are usually made of titanium, with the femoral head commonly made of ceramic that sits inside the plastic liner of the acetabular component. The surgeon then repairs the surrounding muscle and skin with suture.

Postoperative care

Most patients can walk on the replacement immediately after surgery. Often, your doctor will prescribe physical therapy to further aid in recovery. Additionally, surgeons prescribe patients with a blood thinner, such as aspirin, to prevent blood clots following the surgery and pain medication to help with discomfort. After you return home, you should gradually wean yourself from your prescription medication as your discomfort lessens. You should change your sitting position every 60 minutes throughout the day and you can use ice on your surgery site for 10 to 30 minutes a day after exercising or as needed. Be sure to place a towel between the skin and ice to prevent skin irritation. The plastic surgical dressing is waterproof, so you may shower if you keep the dressing intact, but do not submerge the incision in water until it has completely healed. Notify your surgeon immediately if you have an increase in pain, a fever higher than 101 degrees, increased swelling, or redness at the incision site, or if you notice a change in the color or odor of drainage, as these are all signs of a possible infection.

Easing your pain

Patient-satisfaction rates usually exceed 90% or better for those who undergo hip replacement. The procedure is one of the most effective surgeries an orthopedic surgeon can offer his or her patient. The surgeon removes the diseased bones that were painfully moving against one another and replaces them with metal and plastic components. For most patients, their pain level improves within a few months. If you have hip pain that is keeping you from the activities you would like to do, ask your orthopaedist about hip replacement.

Jacob Taunton, DO
Columbus, Georgia

Understanding Proximal Humeral Fractures

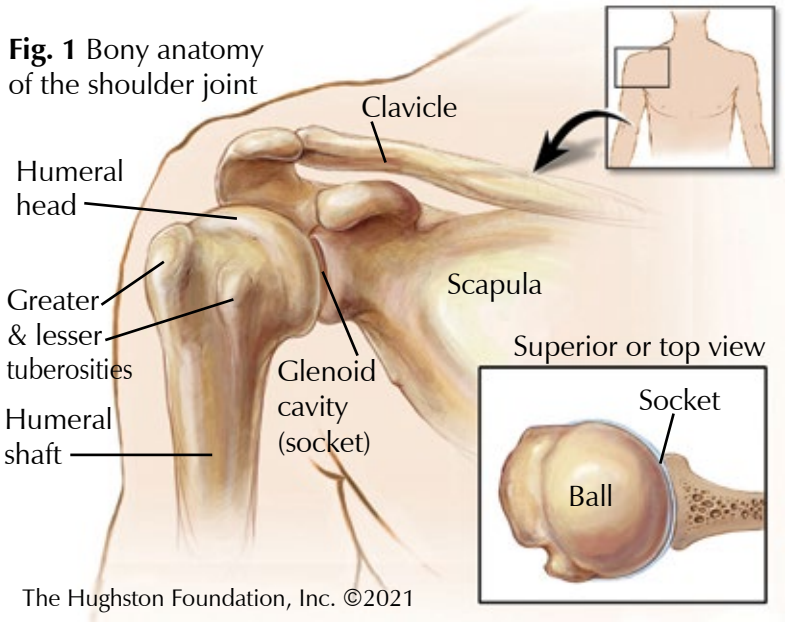
In the elderly population, the proximal humerus (upper arm bone near the shoulder) ranks third as the most frequent fracture. Our working population is aging; as a result, researchers believe the incidence of proximal humeral fractures will increase, making it important for us to understand more about these potentially life-changing injuries and their treatments.

Symptoms

Symptoms of a humerus fracture can include pain, swelling, bruising, and an inability to move the shoulder joint. You may experience a grinding sensation when you move your shoulder and you may notice some deformity or that your shoulder may not look right.

Unlike many chronic conditions associated with overuse or age, fractures are a result of a specific injury. The most common mechanism is a fall from a standing position. The proximal humerus anatomic structures include the humeral head, the humeral shaft, and the lesser and greater tuberosities (**Fig. 1**). Radiographs (x-rays) are the first imaging study to characterize these fractures with a computed tomography (CT) scan able to provide additional information if surgical intervention is considered.

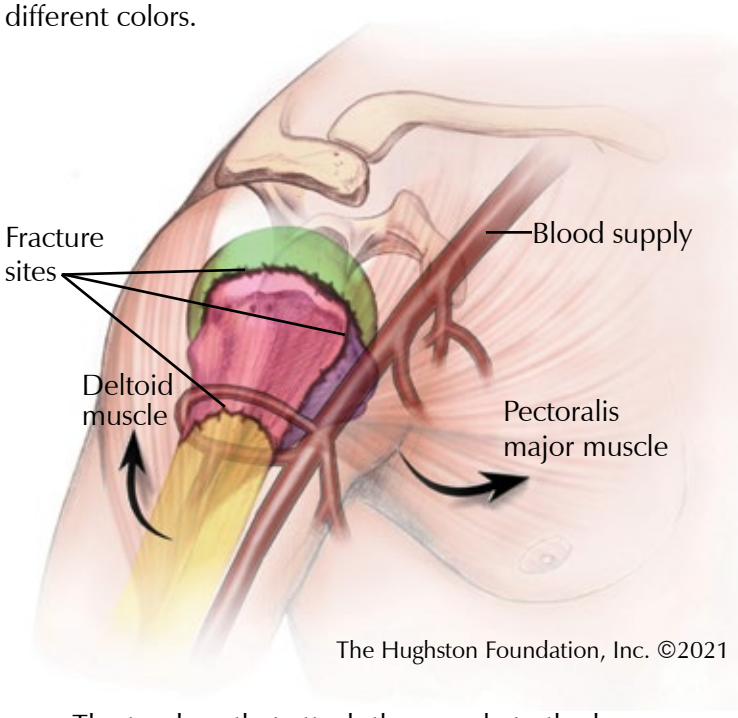
Fig. 1 Bony anatomy of the shoulder joint



Treatment

Several factors can influence treatment, including the patient's lifestyle, the surgeon's experience, and, of course, the fracture itself. Often, with complex fractures, the most disconcerting factor is the disruption of the blood supply to the humeral head. This is frequent in cases with displacement and multiple fracture pieces. The greater the risk of blood supply disruption, the more likely the potential need for shoulder replacement.

Fig. 2 Potential humeral fractures, highlighted in different colors.



The tendons that attach the muscle to the bone can displace other pieces, as well. For example, the humeral shaft is often rotated and angulated by the pull of the pectoralis major muscle. The greater tuberosity is the location where 3 of the 4 rotator cuff tendons attach (the supraspinatus, infraspinatus, and teres minor) and in unstable fractures this bony piece can migrate away from the shoulder joint as the pull of the cuff is not resisted. The lesser tuberosity is the attachment site for the largest rotator cuff tendon, the subscapularis. Depending on where the fracture occurs, there will be 2, 3, or 4 independent large fracture pieces.

The majority of fractures do not require surgery. Clinicians often prescribe pain medication and sling immobilization with early physical therapy to restore function. With displaced fractures in healthy individuals seeking to maximize shoulder function, a physician may recommend surgery. The most common surgical options include intramedullary nailing—i.e., for 2-part fractures to put the "ice cream scoop back on the cone"—plate and screw fixation—i.e., for 3- and 4-part fractures able to be fixed (**Fig. 2**)—and replacement, if the blood supply to the humeral head is disrupted or the head is split into more than 1 fragment.

If the decision is to replace the joint, the most common option is a reverse total shoulder as the healing of fractured tuberosities is unpredictable and a reverse procedure does not depend upon rotator cuff function to restore function.

Brent A. Ponce, MD
Columbus, Georgia

Wide-Awake Local Anesthesia with No Tourniquet:

IS WALANT RIGHT FOR YOU?

Wide-awake local anesthesia with no tourniquet, or WALANT, is an anesthetic technique used by surgeons to achieve pain control at the operative site through a local injection. Most surgeons use WALANT in the upper extremity for cases such as trigger finger release, carpal tunnel release, flexor tendon repairs, and fracture care; however, the technique is gaining popularity for other areas, including trauma and foot and ankle surgery (**Table 1**).

Table 1. Some procedures surgeons perform using WALANT

- Carpal tunnel release
- Collateral ligament tears of the MCP joint
- Dupuytren contractures
- Flexor tendon repairs
- Fracture fixation
- Ligament repairs
- Metacarpal fractures
- Thumb MCP fusions
- PIP fusions
- Soft-tissue finger lesions
- Finger sensory block
- Mass removal
- Nerve compressions

Dr. Donald H. Lalonde first described using wide-awake local anesthesia with no tourniquet in treating operative hand cases. Since its introduction, WALANT has continued to gain popularity among surgeons with high patient satisfaction and clinical outcomes. This anesthetic technique allows patients to be awake during their surgical procedure without pain from a tourniquet (**Table 2**). Another added benefit, is the ability for the patient to participate by moving their extremity as indicated by the surgeon depending on the surgical procedure. In addition, no intravenous, or IV (within a vein) is required and the patient does not have to undergo formal sedation. The use of WALANT also provides a potential cost saving benefit to the healthcare system by decreased operative times, avoiding pre-operative clearances for general anesthesia, and decreased use of hospital resources.

Table 2. The benefits of using WALANT during hand surgery

- Less pre-operative appointments and clearances needed
- Patients may continue their normal medication regimen
- No fasting before surgery
- Shorter surgical time
- Less expensive surgery
- Shorter time in the hospital or surgery center
- Less time in recovery room setting

Steps for an effective WALANT procedure

The surgeon sees the patient in the pre-operative waiting area, marks their surgical site, and explains the procedure in detail. Typical injections include a mixture of room temperature lidocaine, which blocks pain, and epinephrine, which stops bleeding, and sodium bicarbonate, which buffers the solution to make it less painful. The size of the needle used is typically a 27 or 30-gauge needle. The physician presses firmly on the injection site to help decrease the initial needle stick the patient will feel. The surgeon stabilizes the syringe with the injection using both hands and slowly injects a small amount under the skin. The doctor then asks the patient to say when the pain has stopped from the initial needle stick. At that time, the physician slowly injects the local anesthetic. Ideally, the patient will only feel the first needle stick. The surgeon continues to inject the operative site with the anesthetic mixture to ensure you gain the full anesthesia effect.

Can I feel anything during a WALANT procedure?

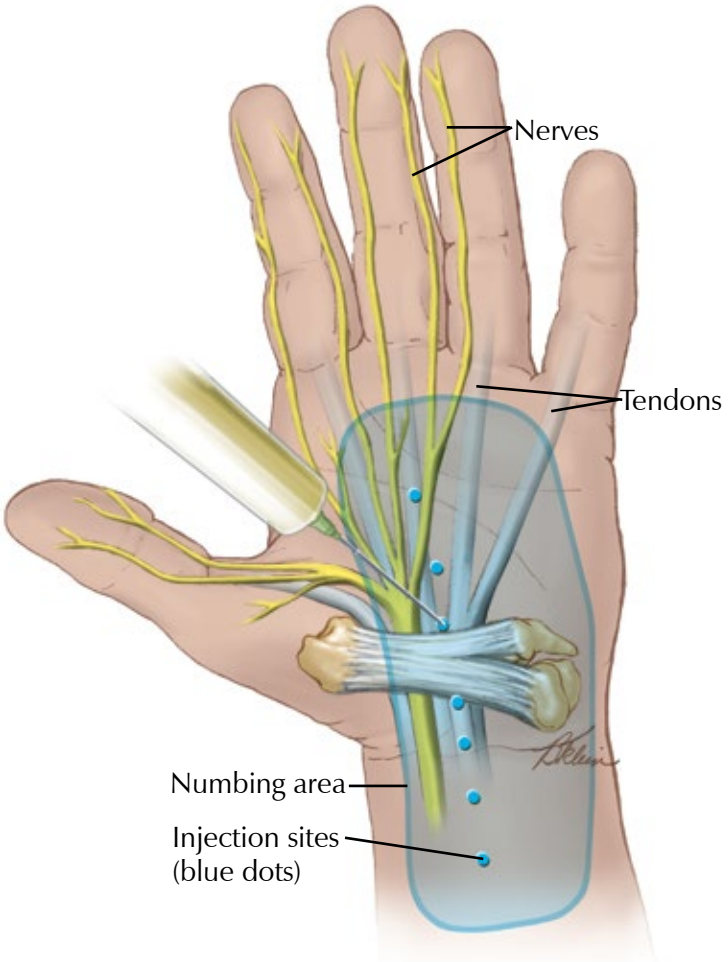
You will feel the initial needle poke that is no worse than an IV stick, which is what you would otherwise feel if you have surgery under an anesthetic. You may be able to feel that the surgeon is doing something, but you do not feel anything painful. What you can do is move your hand, if instructed to do so by your surgeon, or you can listen as the surgeon tells you what he or she is doing. You can bring headphones to listen to music or watch a video to distract yourself if you believe this awareness may bother you.

Are there any complications or side effects during surgery?

There are 2 common problems that can occur after lidocaine and epinephrine injections, but both of these can be overcome. The first is nervous jitters or trembling that can occur after an epinephrine injection. You may feel a little jittery or shaky after the injection, which is similar to the feeling after consuming too much coffee. Physicians consider this a normal reaction to the adrenaline in the numbing medication that will go away after approximately 20 to 30 minutes.

The second common problem is a vasovagal syncope episode that can make you feel dizzy, nauseated, or sweaty. After the injection, some patients may begin to feel faint because their body overreacts to certain triggers, such as the sight of blood or extreme emotional

Fig 1. Wrist anatomy, injection sites and numbing area.



distress. The vasovagal syncope trigger causes your heart rate and blood pressure to drop, but this is typically not a severe health condition. Some people have a similar reaction when they donate blood. A vasovagal response can be limited by having the patient lying down instead of sitting up. However, even if lying down, some patients may complain that they are not feeling well or that they are going to be sick. They may also get pale or show signs of imminent fainting. If you begin to feel faint, the nurse may reposition your bed to where your head is lower than your feet. Often, with these measures, most patients usually begin to feel better within minutes. While both of these side effects result after the injection, they are not an allergic reaction to the medicine.

What happens after my surgery with WALANT?

After surgery using WALANT, your nursing staff will take you to the postanesthesia care unit (PACU) where the surgeon can talk to you about the procedure and your postoperative care. Your surgeon will discuss your surgery and give you follow-up instructions. At that time, you can go home because you do not have to wait for the effects of general anesthesia or sedation to wear off. Your surgeon's staff will schedule you to come back for your first follow-up appointment at postoperative day 10 to 14 depending on the surgical procedure.

What are the potential complications?

With the use of epinephrine, constriction of the blood vessels may occur leading to damage of the tissues, but many studies have shown this risk to be minimal. In the event of constriction, there are medications available to reverse these effects. Additionally, the use of epinephrine can cause an elevated heart rate in patients with cardiac conditions, but these risks are also minimal. Overall, the risk of complications from WALANT remains small, and with the benefits to the patient and healthcare system the usage continues to grow.

Am I a candidate for WALANT?

The use of WALANT provides many benefits; however, before making your decision, you should discuss the pros and cons of the technique with your surgeon. Patients with poor peripheral circulation, vascular conditions, or previous vascular injury should avoid WALANT. Patients with extensive heart or lung conditions should discuss further with their provider if they are a candidate for WALANT.

Your physician will take into account your desire for WALANT; however, some patients are better served having sedation. For example, patients with psychological disorders such as high anxiety or severe post-traumatic stress disorder may not tolerate a wide-awake procedure and may prefer to undergo other forms of anesthesia. Further, patients with allergies to the local mixture should also avoid WALANT.

You can flex for better outcomes

Active patient participation offers many advantages for the surgeon to evaluate the strength and function of the repair. Patients have the ability to perform the active range of motion, enabling surgeons to identify possible impingement or problems with implants. For example, by asking the patient to actively flex and extend the flexor tendon during a repair, the surgeon has the opportunity to vent pulleys, which may be prohibiting full range of motion in the finger. Your surgeon may find gaps in a repair before final closure that can prevent another rupture or injury. Additionally, visualizing the integrity of the repair in full active flexion and extension enables the surgeon to permit full or half flexion days after your procedure.

Over the past decade, the WALANT technique has proven to be valuable to both patients and surgeons by optimizing patient satisfaction and providing substantial healthcare savings. The advantages of WALANT offer patients the convenience of fewer office visits while avoiding the need to obtain pre-operative clearances and pre-surgery fasting. Some surgeons perform the procedures in an office setting while others use smaller surgical centers, with result in sizeable cost savings.

Devin W. Collins, DO
Columbus, Georgia

Hughston Health Alert

The Hughston Foundation, Inc.
6262 Veterans Parkway P.O. Box 9517
Columbus, Georgia 31908-9517

WINNER 2020 APEX AWARDS FOR PUBLICATION EXCELLENCE 2002-2020

NONPROFIT ORG
US POSTAGE
PAID
COLUMBUS GA
PERMIT NO 99

Did you benefit from this
Free Hughston Health Alert?

Your gift makes a difference to support this Award-Winning Patient Education Newsletter

Please send in your tax-deductible donation to
The Hughston Foundation, P.O. Box 9517, Columbus, GA 31908
or visit: https://hughston.com/hughston-foundation/

YOUR CONTRIBUTION SUPPORTS

- Hughston Foundation's mission of providing reliable medical information in digital and print versions of The *Hughston Health Alert*.
- Strengthening our community by supplying issues to the YMCA, fitness centers, the Girls Club, and Girls Inc.
- Providing training materials at meetings for healthcare professionals, such as occupational health nurses, and future healthcare providers.
- Materials distributed at sporting events, such as the Georgia High School Soccer Association Championship, and Safe Kids programs to educate the public about safety concerns for our youth.

Send inquiries to Medical Writing, The Hughston Foundation, Inc., P.O. Box 9517, 6262 Veterans Parkway, Columbus GA 31908-9517 USA.

ISSN# 1070-7778

JACK HUGHSTON MEMORIAL HOSPITAL
4401 River Chase Drive
Phenix City, AL 36867
Phone: 334-732-3000
Fax: 334-732-3020

HUGHSTON CLINIC
6262 Veterans Parkway
P.O. Box 9517
Columbus GA 31908-9517
Appointments:
706-324-6661
1-800-331-2910

HughstonOrtho
HughstonClinic
HughstonClinic