



Hughston Health Alert

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Small Incisions, Big Results - Part 1

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Inside...

- Morton's Neuroma - In the Training Room
- Carpal Tunnel Release
- Mini-Open Rotator Cuff Repair
- Michael (Matt) Tucker, MD

Morton's Neuroma

GETTING ON MY NERVES

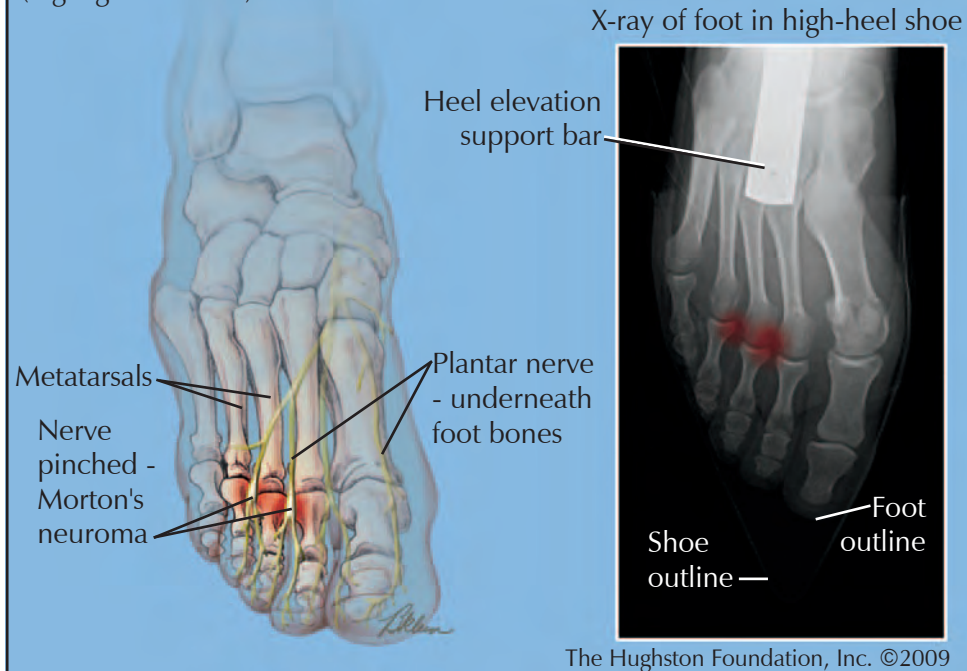
Morton's neuroma is the swelling of the nerve in the intermetatarsal space in the foot. With Morton's neuroma, some patients describe the feeling as walking on a marble, while others complain of burning and aching pain in the forefoot or numbness in the forefoot and toes. The pain often occurs during or after strenuous activity, such as running a long distance, because the nerve becomes irritated and swollen after activity. However, if your shoe fits tight or the neuroma is large, you can feel pain and numbness with very little activity.¹

What causes Morton's neuroma?

Morton's neuroma is a painful condition in the foot that occurs when the sheath of the intermetatarsal nerve becomes enlarged after excessive squeezing or rubbing the toes together. The pain usually results from the 3rd intermetatarsal space (the space between the 3rd and 4th toes and metatarsals). At this location, the intermetatarsal nerve is at its thickest because it is where 2 different nerves join together (Fig.1). Another common location for the swelling is at the 2nd interspace of the foot.¹

Women suffer from Morton's neuroma more than men because women often choose fashion over comfort. Shoes with pointy toe boxes and high heels are a major cause of Morton's neuroma. Morton's neuroma can occur when your toes are squeezed together in a tight toe box. The foot's position in the shoe can cause the metatarsal bones to move slightly and pinch the nerve between the bones. Chronic pinching can also cause the sheath to enlarge

Fig. 1. Morton's neuroma shown in the 2nd and 3rd intermetatarsal spaces. (highlighted in red)



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from the irritation and swelling. As it swells, it becomes squeezed even more so, increasing the problem.

When should you see a doctor?

Before you contact your doctor, check your shoes and give your feet a rest for a few days. You may have worn-out shoes or shoes that are not wide enough for your forefoot. After a rest from tight shoes, the pain may very well subside. If changing shoes or buying supportive shoes that do not squeeze your forefoot does not relieve the pain and numbness, contact your doctor. If the pain persists it's important to seek medical attention to avoid nerve damage or suffering needlessly with the pain.

When you see your doctor, take your shoes with you so your physician can examine them. Your doctor may ask you to put on the shoes and then examine your foot and your gait. The physician will examine the size, shape, and area of tenderness. X-rays may be performed to rule out stress fractures (tiny bone fractures) or other medical conditions.

Once your doctor knows you suffer from Morton's neuroma, he or she can prescribe orthotics and anti-inflammatory medicines first and can recommend you

change to a different style or type of shoe. If you do not have any relief after a week to 10 days, then your physician can inject Cortizone to help reduce the inflammation. After all non-surgical techniques have been tried, your physician may recommend surgery.

Small incision surgery

There are 2 methods for removing a neuroma. Your surgeon can choose a plantar (bottom of the foot) or dorsal (top of the foot) approach in removing the neuroma. With the plantar approach the full length of the affected intermetatarsal nerve can be exposed. However, with this approach the healing time can be longer due to the location and size of the incision.³ Another disadvantage is that a scar from the incision can result and with it on the bottom of the foot, the scar can make it uncomfortable to walk (Fig 2).

The dorsal approach provides a more limited exposure, but the small incision heals faster and often results in a quicker return to full activity. With the dorsal approach, the toes are separated and an incision of 2 to 3 cm in length in the web space between the toes is made. Then the deep transverse

metatarsal ligament is cut to expose the neurovascular bundle (Fig 3). Often, the neuroma will be apparent because it will bulge into the wound. Or it can be seen by applying slight pressure to the space between the metatarsal head.³ After removing a neuroma the pain subsides but the weightbearing surface of the affected toes can, at least partially, become anesthetic or numb.

For most of us, Morton's neuroma can be avoided by giving your forefoot plenty of room. However, for some, there is no known reason for the nerve irritation or swelling. In the treatment of Morton's neuroma, the most favorable factor is time. Early diagnosis of treatment often results in relief of pain with minor adjustments of the shoe. Even if you do require surgery, the surgery is usually done as an outpatient and with successful outcomes.

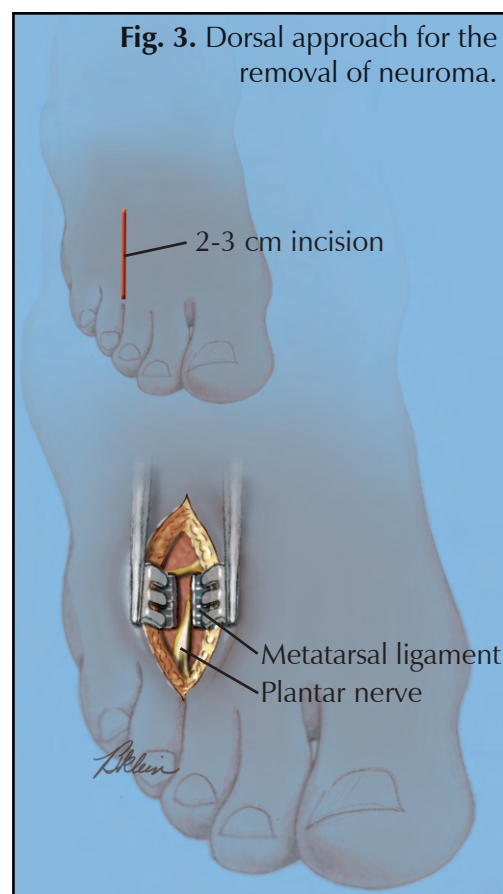


Fig. 3. Dorsal approach for the removal of neuroma.

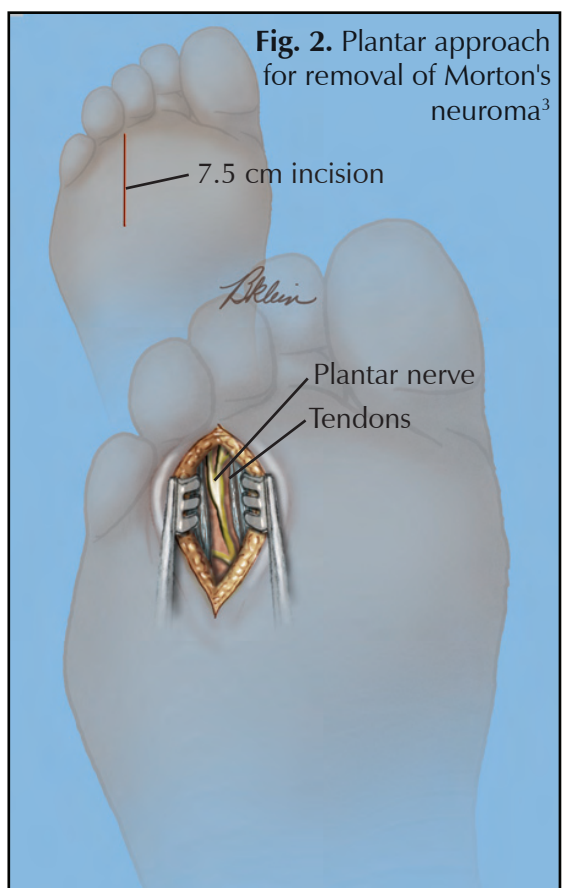


Fig. 2. Plantar approach for removal of Morton's neuroma³

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THOMAS GEORGE MORTON, MD (1835 TO 1903)

Dr. Morton was born in Philadelphia and he earned his medical degree from the University of Pennsylvania. Much of Dr. Morton's research and publications covered blood transfusions, but his most important contribution to orthopaedics was the first rational description of metatarsalgia which became known as Morton's disease. Dr. Morton described the symptoms as neurologic and caused by bone applying pressure on the digital nerves as they passed between the metatarsal heads between one or more toes.

Morton's Neuroma

IN THE TRAINING ROOM

Morton's neuroma is a condition of the forefoot that is quite frequently seen in athletes, conditioning walkers, and in soldiers who perform road marches. The origin of the condition is a thickening of a nerve in the foot where the nerve branches join and then divide to pass to their own toes. The thickening increases when the nerve is trapped between the metatarsal heads. Often, lax splaying, or turning outward, of the forefoot places more pressure on the nerve and fibrous tissue forms.

Examination

On examination in the athletic training room, the athlete or soldier often complains of a sprain of the front arch. The athlete complains that the onset appeared to be spontaneous, further adding to the false idea of a sprain. However, the foot appears to be normal with no external sign of swelling.

The indication that separates plantar neuroma from a sprain is the intermittent, severe pain in the outside bottom of the forefoot. The pain is prominent in close proximity to the third and fourth toes and occasionally on top of the lateral foot. One tell-tale sign of Morton's Neuroma is the feeling of an electric shock running up the third and fourth metatarsals and third and fourth toes. Numbness can be noticeable, but is not as common as the tingling or electric sensation.

Upon examination, there is tenderness between the third and fourth metatarsal heads, and it worsens when localized pressure is applied. Tenderness is noticed in the mid-to-lateral dorsum (back) of the foot. The distinction is best obtained by applying pressure using the rubber end of a pencil sandwiched between the third and fourth distal metatarsals. This almost pinpoint pressure directs the force on the interdigital nerve.

Another method to solicit this tingling is for the trainer or therapist to wrap his or her hands around the athlete's metatarsal heads and squeeze. This compression solicits a "clicking" feeling in the athlete.

Nonsurgical treatment

Often, the most effective nonsurgical treatment of Morton's Neuroma is the placement of a longitudinal arch fitted just behind the metatarsal heads. This pad placement permits the metatarsal heads to spread out over the pad, thus separating them a bit and relieving stress between the third and fourth metatarsals and their respective toes. Another nonsurgical treatment can involve placing a "metatarsal bar" on the bottom

of the shoes, just behind the metatarsal heads. As the gait reaches mid-stance, the body weight spreads over the metatarsal bar, further decreasing the irritation. If non-surgical techniques fail, a physician can recommend surgery. The surgery usually involves a small incision on an out-patient basis. After surgery rehabilitation is often recommended.

Post-surgical rehabilitation

Rehabilitation exercises are performed slowly and forcibly with maximum effort maintained for 3 to 5 seconds, beginning with 10 repetitions. Begin with 10 repetitions and then add one more repetition each day. (See photographs of exercises.) Do not begin any rehabilitation exercises without the recommendation of your physician or physical therapist.

Exercise 1.

Place foot on a 1 to 1.5 inch board or over the edge of a stair. Lift or extend the toes to the sky keeping the metatarsal heads in contact with the platform.

Fig. Rehabilitation Exercises

Exercise 1



Exercise 2



Exercise 3



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Fig. Rehabilitation exercises cont.

Exercise 4



Exercise 5



Exercise 6



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Exercise 2.

Slide the foot forward until the metatarsal heads extend beyond the edge of the stair. Proceed to flex the toes slowly and forcibly with maximum effort maintained for 3 to 5 seconds and 10 repetitions.

Exercise 3.

Spread the toes and wiggle them up and down, slowly and forcibly with maximum effort maintained for 3 to 5 seconds with 10 repetitions.

Exercise 4.

Roll the foot upon the fifth metatarsal, curl the toes downward and backward in an effort "to make a fist" with maximum effort

maintained for 3 to 5 seconds with 10 repetitions.

Exercise 5. Again, roll the foot upon the fifth metatarsal, curl the toes downward and backward and attempt to grab pre-positioned pencils or marbles. Upon retrieval, move the marbles or pencils to another location and slowly place the object down. Do not drop them.

Exercise 6. Finally, lift the foot off the floor while retaining contact between the heel and floor. Using your big toe as your artist's brush, draw all the letters of the alphabet. If you get bored, try the Greek alphabet.

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Carpal Tunnel Release

SMALL INCISION, BIG RELIEF

In the wrist, the median nerve passes through a firm tunnel, called the carpal tunnel, which is made up of the wrist bones and a tough ligament that forms across the top of the carpal tunnel. After the nerve exits the tunnel, it goes into the hand and fingers (Fig. 1). Several tendons (the structures that connect muscle to bone) also pass through the carpal tunnel. Carpal tunnel syndrome is a progressive condition that occurs when pressure is put on the median nerve in the wrist, causing numbness in the hand and fingers¹. When pressure inside the tunnel increases the median nerve can become pinched, causing pain and numbness and if left untreated, can cause nerve damage.

Carpal tunnel syndrome causes pain, burning, or numbness in the thumb, index, middle, and ring fingers of the affected hand. Especially at night, your hand or fingers can feel swollen. As the condition worsens, you can lose fine hand control or grip strength and begin to drop things more easily. If your condition is advanced, you can completely lose the feeling in your hand or fingers.

To relieve your symptoms, your physician can suggest that you wear a splint on the wrist, take anti-inflammatory medicines, or he or she can prescribe an injection of anti-inflammatory medicine into the carpal tunnel. Except for the most severe or advanced cases, nonsurgical treatment

Fig 1. Structures of the carpal tunnel and affected area

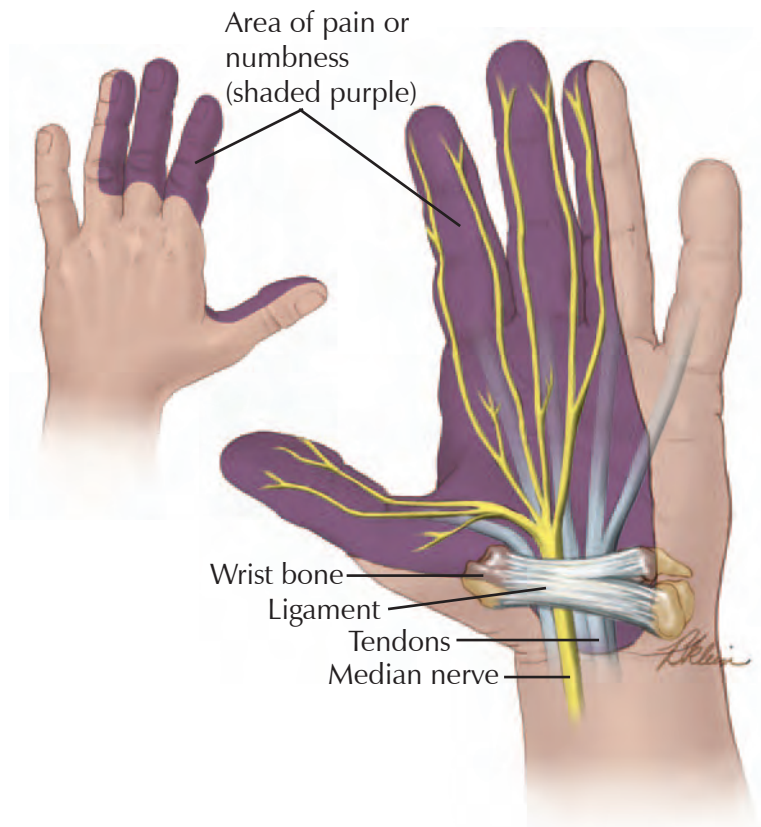
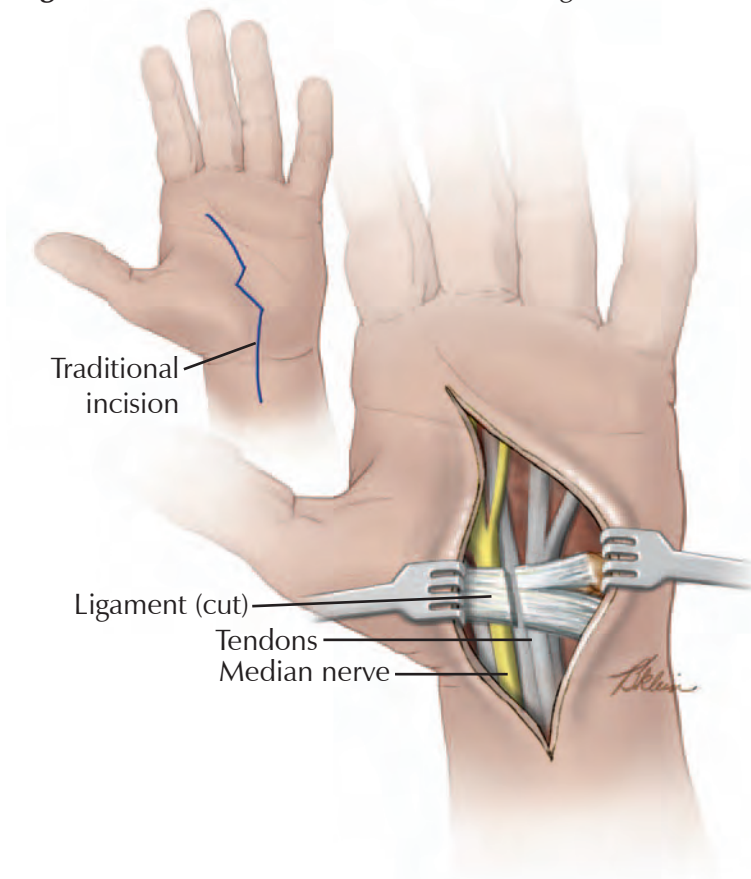


Fig 2. Traditional incision (several inches long).



for carpal tunnel syndrome is usually tried first. However, sometimes these treatments will not relieve your symptoms and surgery is needed to correct the problem.

Early diagnosis is important

Early diagnosis for carpal tunnel syndrome is important to avoid permanent damage to your median nerve. Often, your doctor will ask you to describe your symptoms and explain when they occur while he or she is examining your hand, wrist, and arm. X-rays and electrodiagnostic studies, including nerve conduction study (NCS) and electromyogram (EMG), are often used to establish the severity and help determine treatment. With these tests, your doctor can find out if your median nerve is being pinched or determine if your nerve is being affected at another location, for example in the neck. The tests can also determine the severity of your injury and can show if any of your other nerves are involved. However, even if your nerve studies are normal, you can have carpal tunnel syndrome. It's important for you to be examined soon after your symptoms begin because how well you recover from carpal tunnel syndrome often depends upon the length of time you have had symptoms and the severity of any nerve damage.

Many conditions can cause pressure to build up in the carpal tunnel and pinch the median nerve. For example, the nerve can be pinched when tendons in the carpal tunnel become inflamed and swollen. Medical conditions

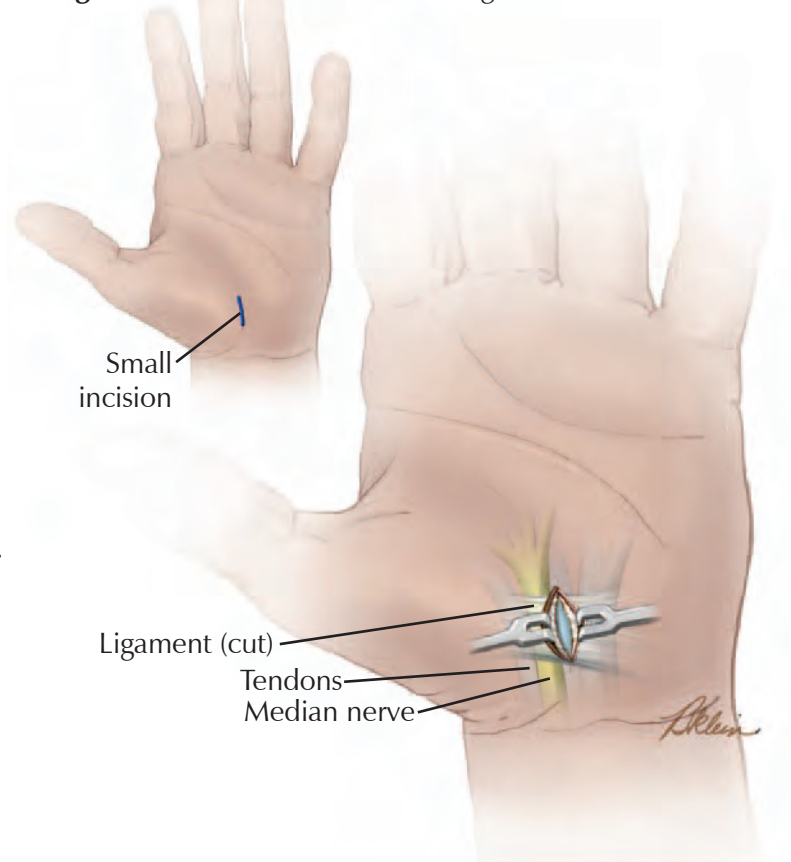
such as hypothyroidism, rheumatoid arthritis, gout, and diabetes also can play a role. Fluid that builds up in the wrists during pregnancy can cause carpal tunnel syndrome as well.² Often, the ligament is simply too tight, and the cause may be unknown.

What happens during and after surgery?

During surgery, the ligament on top of the carpal tunnel is released to relieve pressure on the median nerve. Traditionally, an incision several inches in length was made. The incision could extend from the mid palm to the wrist or even further up the forearm (Fig. 2). One problem that can occur after carpal tunnel release is pain and sensitivity at the incision site, particularly the area around the wrist. The discomfort can last up to 4 months or longer after surgery. More recently, a new technique using a smaller incision to release the ligament has become available (Fig. 3). A smaller incision, often only 2 cm (1 inch) in length, encourages rapid recovery and less postoperative pain.

Often, the surgery can be done with local anesthesia on an outpatient basis, which means you do not have to spend the night in the hospital. After surgery, you may wear a splint on the operated wrist for 1 to 2 weeks. The time needed for the symptoms of carpal tunnel syndrome to go away and the hand and wrist to return to normal differs for each person. Surgery is usually successful at relieving symptoms of numbness and tingling as well as nighttime pain.³

Fig 3. Small incision (1 to 2 cm long).



People often relate carpal tunnel syndrome to computer-usage; however, any repetitive movement in the hand and wrist can cause carpal tunnel syndrome and it can be caused by other medical conditions. Therefore, the risk for developing carpal tunnel syndrome is not confined to any one type of industry or job. Women are 3 times more likely than men to develop carpal tunnel syndrome, perhaps because the carpal tunnel itself may be smaller in women than in men and it usually occurs in adults.² People with diabetes who experience neurological symptoms are at a higher risk as well.

Carpal tunnel syndrome can become disabling if left untreated. It can cause permanent damage to the median nerve, which can cause you problems with picking up objects and holding on to them. See your physician before the symptoms become unbearable and nerve damage occurs. The small incision used to release the pressure on the median nerve can be as tiny as an inch in length, but it can give you big relief.

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Mini-Open Rotator Cuff Repair

In orthopaedics, it seems as if the most technological advances these days come in the smallest of devices and techniques. Repairing a tear in the rotator cuff is no exception.

What is a rotator cuff tear?

The rotator cuff is a group of muscles (the infraspinatus, subscapularis, supraspinatus, and, teres minor muscles) and tendons (tissue connecting muscle to bone) that surrounds the shoulder joint (Fig. 1). The rotator cuff holds the joint in place and helps stabilize your shoulder while you lift your arm over your head and during movement such as swinging your arms from side to side. You can injure your rotator cuff by falling on an outstretched arm or develop an injury over time doing repetitive activities at work or while playing a sport. Muscle and tendon degeneration due to aging can also be a factor in a rotator cuff tear, especially if you are over 40 years of age.^{1,2} Additionally, the acromion process (the bone above the rotator cuff) can develop bone spurs that can rub on the rotator cuff tendons, causing impingement, or weakening and tearing at the tendons.³ A rotator cuff tear can range from small to large in size, it can be a partial tear in one of the muscles or it can be a partial or complete tear in the tendon. Tear sizes can be described as small (less than 1 cm), moderate (1 to 3 cm), or a large tear (3 to 5 cm).⁴

What are the symptoms of a rotator cuff tear?

People who have a rotator cuff tear often complain of pain and weakness in the shoulder. With a rotator cuff tear, you can experience intense pain during activity or at rest and you may have difficulty sleeping at night.^{1,2} You can experience trouble lifting your arm or moving it because of the pain and weakness in the affected muscle or tendon. The size, shape, and location of the tear often determine

the extent of the discomfort you experience. You can also hear a crackling noise or have a crackling sensation in your shoulder while moving your arm.^{1,2}

How is a rotator cuff tear diagnosed?

Your physician will examine your shoulder to see

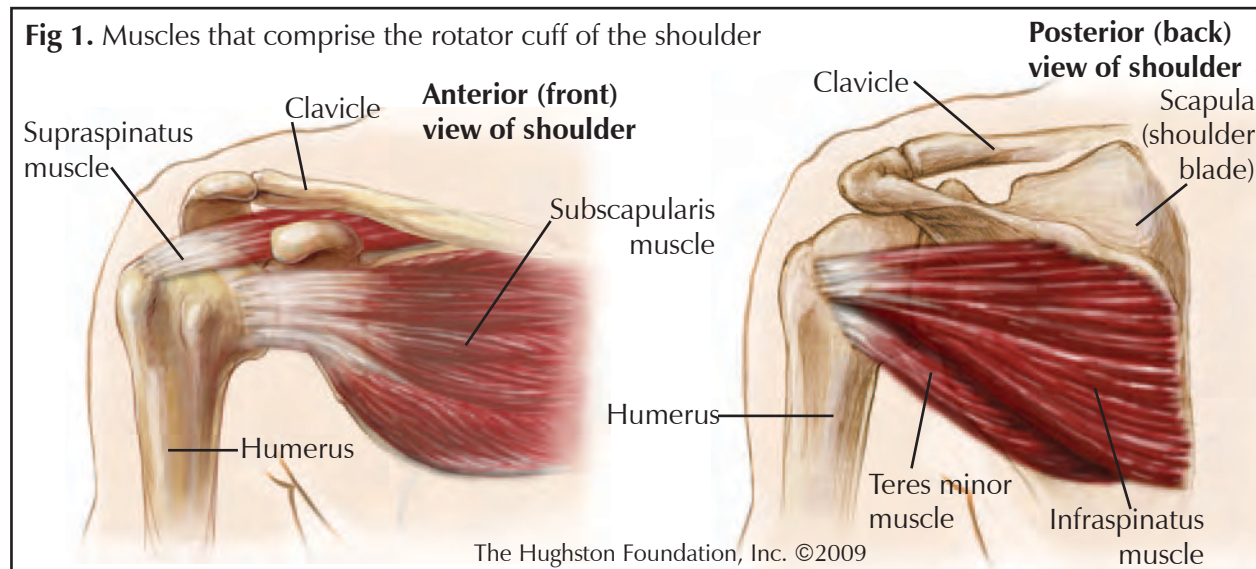
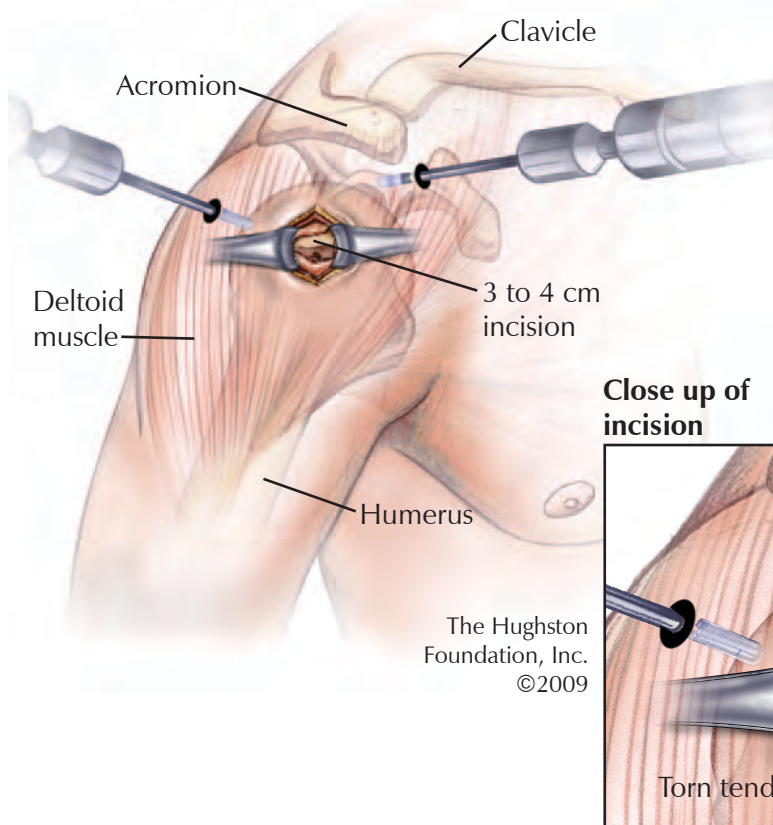


Fig 2. Mini-open rotator cuff repair



if it is tender to touch or if there is any sign of deformity caused by a tear. The doctor will ask you if a traumatic event occurred, such as a fall, or if the pain you feel has progressed over time in severity. Your physician can order an x-ray or magnetic resonance imaging (MRI, a scan that shows the bones, muscles, tendons, and ligaments) to help diagnose the source of your pain. X-rays are often taken first to eliminate other possible injuries causing the pain, such as a fracture. The MRI is often used because it will show the tear and its size. The details a MRI provides are usually excellent; however, sometimes arthroscopy (surgery through small incisions in the skin) of the shoulder is necessary to make a definitive diagnosis.^{1,2,3,5,6}

Treatment options

Nonsurgical treatment can be effective in reducing pain and improving function of the shoulder.^{2,3} Rest, using a sling, and taking anti-inflammatory medications can be effective; but, if you continue to experience pain and weakness in the shoulder your physician can prescribe physical therapy or cortisone injections.² Often, rehabilitation is prescribed to strengthen the shoulder and non-steroidal medications are prescribed for pain. Cortisone injections can also be used to control inflammation and alleviate the pain and weakness.^{1,2}

There are a number of treatment options for rotator cuff tears. Depending upon the size, shape, and location of the tear, your physician can start with nonsurgical treatments, which are often successful for many patients.

However, for some tears, surgery is the first option and the best one to relieve your pain and shoulder weakness. Again, depending on your type of tear, your physician will determine whether an open, mini-open, or arthroscopic technique is best for you.^{1,2,3,6}

Mini-open rotator cuff repair

If nonsurgical treatments are not successful in relieving the pain, then the doctor can recommend surgery. During the mini-open repair, the deltoid muscle is split to allow access to the torn tendon. By not fully detaching the deltoid (which is done in an open repair) the patient avoids possible complications with the deltoid muscle. The mini-open repair is often done in conjunction with an arthroscopic component so additional pathology, such as bone spurs, can be quickly assessed and remedied. During rotator cuff tear surgery the torn tendon is reattached back down to the bone (for a complete tear) or the tear in the tendon (for a partial tear) is sutured back together. Often, during the surgery, the acromion bone

is filed down smoothly (acromioplasty) to prevent future tears.^{4,5}

Conclusion

After surgery, you will use a sling for about 6 weeks and will begin a rehabilitation program. The physical therapist will start with safe, easy shoulder exercises and will progress them depending on your response to treatment.³ Rehabilitation will take some time; however, with the less invasive mini-open technique, patients can begin rehabilitation sooner and they often experience a faster return to normal daily activities.⁴

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Michael (Matt) Tucker, Jr., MD, who is originally from Columbus, Georgia, graduated from Hardaway High School. He graduated summa cum laude from the University of Georgia with an undergraduate degree in Biology. He earned his medical degree from the Medical College of Georgia and completed his internship at Methodist Memorial Hospital in Memphis, Tennessee. He completed his training in orthopaedic surgery at the Campbell Clinic in Memphis, Tennessee.



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Dr. Tucker is a candidate member of the American Orthopaedic Society for Sports Medicine. He practices general orthopaedics with an interest in sports medicine and continues academic research in sports medicine at The Hughston Foundation, Inc. and The Hughston Clinic, PC.

Dr. Tucker enjoys spending time with his wife Christy and his two children; daughter, Mallory and son, Jackson. He fills his leisure time with activities such as golf, snow skiing, football, fitness, and traveling.

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