Tibialis Posterior Tendinopathy

Speciality Information

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This important tendon runs just behind the medial side of the ankle into the foot and attaches into the underside of the midfoot bones providing essential arch support. Tibialis Posterior Tendinopathy can occur in previously healthy tendons when there is a sudden physical overload (eg overtraining). It also occurs in aged and degenerate tendons without such physical overload especially in overweight individuals or those with poor foot mechanics. Complete rupture of the tendon is rare except in the more elderly. Dysfunction of the tendon causes pain and flatfoot due to loss of support for the arch. Most patients can be treated without surgery often with physio, orthotics and braces.

Anatomy and Function

The tibialis posterior muscle starts on the back surface of the tibia (shin bone) near your knee and travels down the inner aspect of your leg. The muscle integrates with its tendon behind the medial malleolus (bony bulge on the inside of your ankle) which attaches to the navicular bone (in the foot).

The most important function of the tibialis posterior is to control the position of your foot when it hits the ground. It also plays a major role in maintaining the medial arch (inner arch) of your foot.

Types of Tendinopathy

Tendon injuries can be either classified as:

1. **Acute (reactive)**

A reactive tendinopathy is usually caused by new physical activity that your tendon is not used to doing e.g. suddenly starting to run 5 times a week to train for a marathon.

2. **Chronic (degenerative)**

Degenerative tendinopathy occurs to tendons that have been worn out with age or repetitive loading and are struggling to heal.

Causes

The cause of a tibialis posterior tendinopathy can be multi-factorial and can be a combination of a sudden increase in activity, an over-pronated foot (flat foot) and tendon degeneration due to repetitive loading.

Symptoms

Symptoms of tibialis posterior tendinopathy can include:

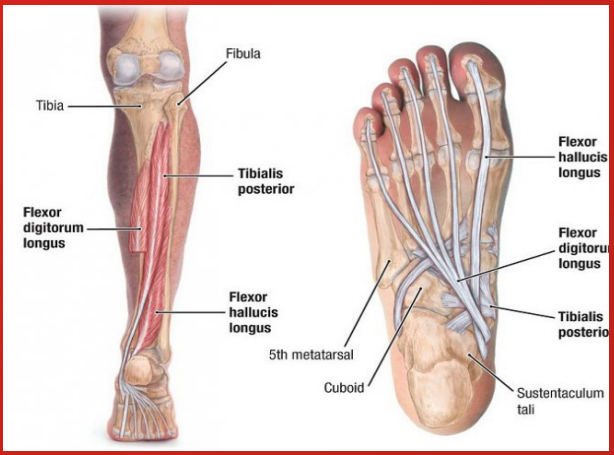
Pain along the inside of the foot and ankle, where the tendon lies. This may or may not be associated with swelling in the area.

Pain that is worse with activity. High-intensity or high-impact activities, such as running, can be very difficult. Some patients can have trouble walking or standing for a long time.

Weakness and pain when trying to stand on tip-toes

Pain on the outside of the ankle. When the foot collapses, the heel bone may shift to a new position outwards. This can put pressure on the outside ankle bone. The same type of pain is found in arthritis in the back of the foot.

Tibialis Posterior Tendinopathy



Examination Findings

Clinical examination is the key to diagnosing a tibialis posterior tendinopathy.

This includes observing the posture of the foot, assessing the range of movement available at the ankle and watching how your ankle moves whilst you try and stand on your tip toes

Investigations

Often a good patient history and examination is all that is needed to diagnose tibialis posterior tendinopathy. Weight-bearing X-rays of the foot and ankle can be used to exclude other causes of medial ankle pain. If the diagnosis is not clear or further information is required an MRI scan may be ordered.

Treatment

If a tibialis posterior tendinopathy is diagnosed and treated in the early stages of the disease it can be successfully treated non-operatively.

Several types of treatment are used together and can include:

- Resting and avoiding running or high-impact sports for a short period of time
- Medial Arch supports and an ankle brace pulled into inversion
- Strengthening the tibialis posterior muscle
- Strengthening all the muscles around the ankle joint
- Stretching of the calf muscles
- Paracetamol and occasional Non-steroidal anti-inflammatory medications (NSAIDs)
- Corticosteroid injection around the tibialis posterior tendon. Multiple injections should be avoided as they can weaken the tendon and increase the likelihood of a complete rupture
- Combining several of the above non-surgical treatments has been shown to help 85% of people but it can take an average of four months for people to function normally again.

Surgical Treatment

Options for failed non-operative treatment include:

- Repair and / or reconstruction of the tendon
- Bony fusion to stabilise the foot is a last resort

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Shoulder Tendonitis & Impingement

Speciality Information

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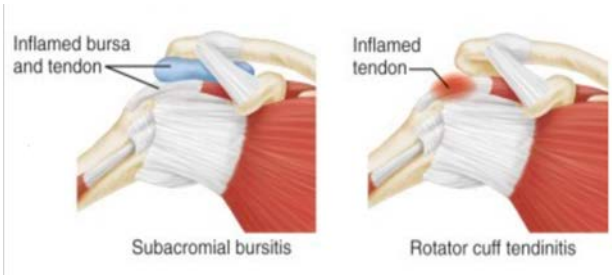

Figure 1

Shoulder tendonitis and impingement are common conditions that usually resolve with time, simple exercises and avoidance of aggravating activities. Some people are more prone to developing these problems due to the type of activities they do, the shape of the bones in the shoulder, or muscle imbalance. The rubbing of the rotator cuff on the undersurface of the acromion can cause pain that runs down the arm to below the elbow and is often worse at night or with certain activities. These activities - such as overhead work and forward reaching - can produce symptoms which interfere with daily activities and duties. Most patients can be treated without surgery; usually with physio.

Anatomy / Pathology

The rotator cuff is a group of 4 tendons that attach around the head of the humerus. The rotator cuff plays an integral role in the stability of the shoulder as well as helping to elevate the arm and rotate the shoulder.

Types of Rotator Cuff Problem

- Tendonitis / Bursitis: Inflammation of the tendon and bursa that sits between the tendons and the top of the shoulder.
- Acute Tears: Mostly from a fall or lifting something too heavy.
- Chronic / degenerative tear: wearing over time due to age, or repetitive overhead activities. This type of tear progresses through stages from tendinopathy or fraying of the tendon to minor partial tears or larger rotator cuff tears.

Causes

Lack of rotator cuff muscle strength or control due to:

- Partial tear / strain causing pain and weakness.
- Complete tear
- Muscle imbalance due to incorrect technique / training.

Loss of shoulder flexibility (especially the capsule at the back of the shoulder) causing the shoulder to hinge forward and jam on movement.

Lack of space between the humeral head and the acromion due to:

- Inflammation in the rotator cuff tendons (tendonitis)
- Uneven rotator cuff surface due to a partial tear
- Bone spurs that can dig into and tear the tendon
- Thickening of the coraco-acromial ligament
- Calcium deposits in the tendon

Symptoms

Pain – especially with raising or lowering the arm above shoulder height, often known as impingement and pain lying on the affected shoulder at night.

Weakness – lifting and rotating the shoulder.

Examination

Crepitus – felt under the shoulder blade with elevation or rotation of the arm.

An acute rotator cuff tear will cause immediate acute pain and weakness. Pain and disability from a degenerative rotator cuff tendon comes on over time – months to years.

Imaging

X ray: most important investigation. Shows spurs , arthritis and fractures.

MRI: may be indicated if the shoulder fails to improve with an appropriate rehabilitation programme or if surgery is being considered.

Ultrasound; can show jamming of the tendon and bursa (usually evident with shoulder examination)

Non-Operative Treatment

Non-surgical treatment of these problems incorporates the following principles:

- avoidance of repeated aggravating activities
- restoration of normal flexibility
- restoration of normal strength
- aerobic exercises
- modification of work, home duties and sport
- use of anti-inflammatory medication
- injections of local anaesthetic and cortisone to reduce inflammation and oedema of tendons

If surgery is required, people who have undergone a rehabilitation programme recover quicker post operatively.

For acute partial rotator cuff tears 4-6 weeks of physiotherapy and relative rest is appropriate as many partial acute rotator cuff tendon injuries will settle in that frame time.

In chronic degenerative rotator cuff pathology a 3-6 month home based rehabilitation programme under the guidance of a physiotherapist specialising in shoulder rehabilitation is appropriate. 50% of people with a degenerative rotator cuff can be managed with physiotherapy.

The use of cortisone to the 'bursa' should be used with caution. It can give short term relief – up to 6 weeks. It may help to settle pain so the rehabilitation programme can progress. Repeated cortisone injections should be avoided as they increase the likelihood of tearing the rotator cuff as they weaken the tendon.

Operative Treatment

If the non-surgical treatment does not correct the problem an operation may be required to:

- repair a tear in the rotator cuff
- remove a large spur that is digging into the rotator cuff
- remove the coraco-acromial ligament to make more space for the rotator cuff tendons
- remove the outer end of the clavicle (collar bone) due to arthritis
- combination of the above procedures

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Patella Instability

Speciality Information

WAKEFIELD
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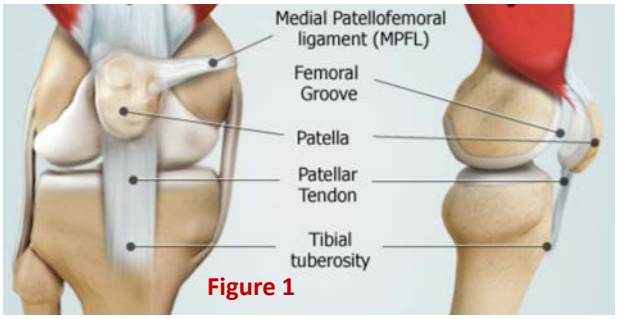


Figure 1

Patella instability is when the kneecap comes out of its groove completely (dislocation) or partially (subluxation). In over 90% of cases this occurs when knee anatomy is poor. The pull of the quadriceps may be too angulated (the high Q angle), the femoral groove (Fig. 1) may be too shallow or the patella may be too high. If the patella does dislocate it will stretch or break the ligament that helps hold the patella in place (the medial patellofemoral ligament - MPFL). Rehabilitation, taping and bracing may help to correct this but sometimes surgery is ultimately required.

Abnormal Anatomy

1. Lateralised Tibial Tuberosity ; The tibial tubercle is the attachment point for the patella tendon and it determines the line of pull of the driving muscles *(Fig 1 - 2))*. If the tibial tubercle is situated too far to the side *(Fig 2)* then the result is a large quadriceps angle (or Q angle) and this means the line of pull of the quadriceps is abnormal and the patella will tend to be pulled off to the lateral side.

2. Patella Alta (high patella) *(see figure 3)* **.** This means that the patella sits too high and is therefore higher than the femoral groove. When the patella is sitting high and above the groove it can easily slip off to the side. We can assess the patella height on x-rays taking some simple measurements as shown in *figure 2.*

3. Shallow Femoral Groove (trochlea) *(see figure 4)*This means that the groove on the femur is too shallow and therefore does not hold the patella in place.

4. Abnormal Patellofemoral Ligament. The medial patellofemoral ligament (*see figure 1 and 3)*, is a very important ligament whose function is to stop the patella dislocating to the side. If the medial patellofemoral ligament is torn or stretched this allows the patella to slip to the side.

Causes

- The instability episodes occur with activity, particularly twisting movements
- Sports, dancing
- Intoxication

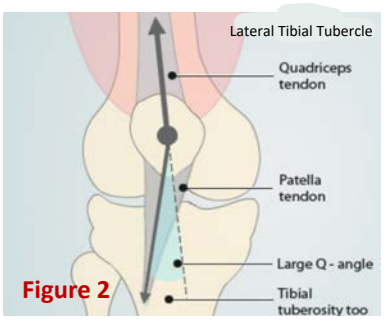


Figure 2

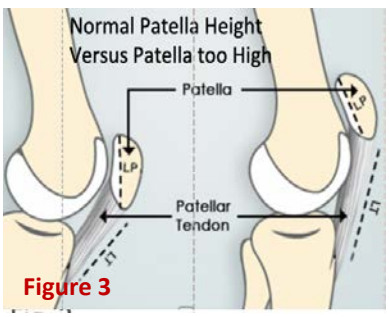


Figure 3

Symptoms

- Knee Instability is the major symptom
- With patella subluxation (kneecap partly come out) the knee feels like it is going slip and the person may almost fall.
- With complete patella dislocation the knee buckles and the person's knee collapses usually resulting in a fall.
- The knee will look severely deformed if the kneecap stays dislocated. The kneecap invariably dislocates to the lateral side (the outside)

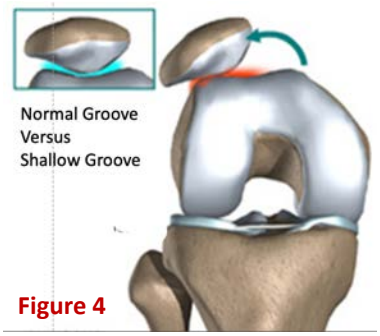


Figure 4

Patella Instability

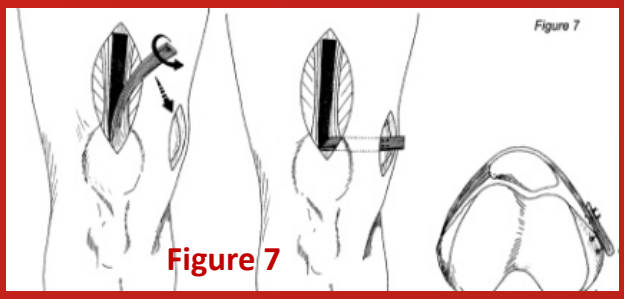
Rehabilitation after a Patella Dislocation

Frequently surgery is not required after a first dislocation. Rest, ice, compression and elevation (RICE) is needed for the first few days and then physio and rehabilitation. Taping the patella or using a patella brace helps to stabilise joint during the first few weeks. (pictured above)

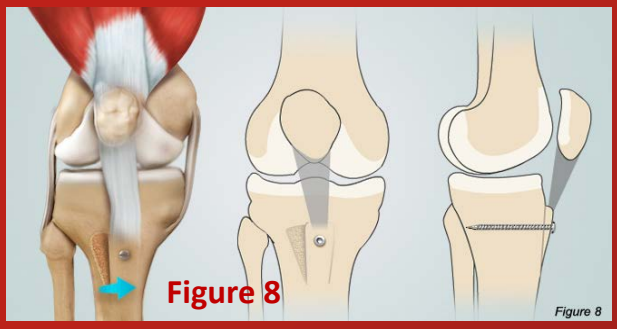
Surgery for recurring Patella Dislocation or Subluxation

Once the patella has dislocated, there is a higher chance it will happen frequently and this may require surgical intervention to stabilise the patella. Surgery may involve one or more of the following procedures.

1. **Medial patellofemoral ligament reconstruction.** After repeated patella dislocation, the medial patellofemoral ligament becomes too weakened and is replaced by a graft. *Figure 7* shows how a small strip of quadriceps tendon can be used to replace the torn medial patellofemoral ligament.



2. Tibial tuberosity transfer (medial).
Figure 8 shows a tibial tuberosity transfer where the attachment of the patella tendon is shifted across to be more inline with the femoral groove above it. This gives a straighter line of pull to help stop patella instability.



3. Tibial tuberosity transfer

Figure 9 shows the tibial tuberosity being more distally (down toward the foot). This brings the patella down so it can better engage into the femoral groove. This places the patella in the groove much earlier as the knee flexes.

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Patella Tendinopathy

Speciality Information

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Patellar tendinopathy is a common cause of pain at the front of the knee. It is most frequently in males aged 15-30. It may be caused by increasing activity too quickly, which then overloads the tendon. It especially occurs with repetitive jumping and explosive running sports where the load on the tendon is very high. This is why it is often called "jumpers knee" and is seen in sports such as volleyball, basketball and netball. With a good exercise program most cases can be managed without needing injections or surgery.

Anatomy (Fig 1)

The quadricep muscles at the front of the thigh attach to the patella via the quadriceps tendon.

The patellar tendon attaches the patella to the shin bone (tibia) at the tibial tubercle. These structures form the "quadriceps mechanism" which powers the knee into a straight position (knee extension). This is clearly vital for most activities including walking, running, squatting, climbing stairs and jumping. Patellar tendinopathy is inflammation of the patellar tendon.

What's the Tendon Problem?

Inflammation is NOT usually present - so the term "tendinitis" (meaning tendon inflammation) is best avoided.

Most tendon pathology is really tendinosis which is a non-inflammatory degenerative wear and tear process.

The cause of tendinosis is repetitive stress overload of the tendon leading to a reactive or degenerative tendinopathy

Reactive tendinopathy is due to repetitive overload of a normal tendon as occurs in a sudden change in activity

Degenerative tendinopathy occurs when there is repetitive loading of an already worn, aged or damaged tendon.

Phases of Tendinopathy

In normal circumstances the tendon will adapt to stress .

If the load increase is too rapidly a **reactive tendinopathy** may occur leading to symptoms. With correct treatment adaptation and recovery will occur .

If the repetitive injury rate exceeds the tendon repair rate a state of **tendon disrepair** will occur.

Treatment needs to allow repair processes to prevail or a **degenerative tendinopathy** will develop where tendon cell death then occurs.

Unchecked this can lead to **tendon tears or ruptures**

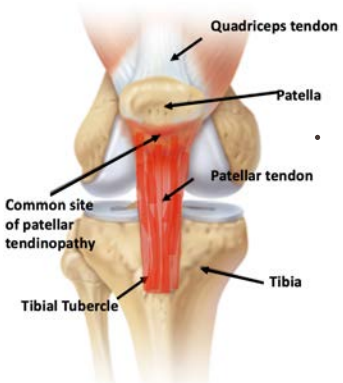


Figure 1

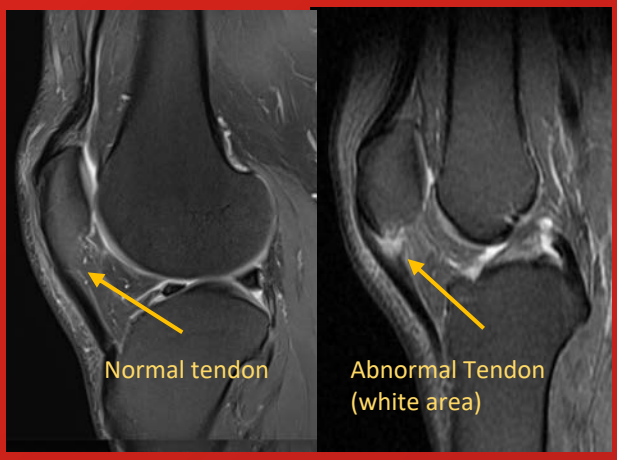
Contributing Factors

- Repetitive stress overload of the tendon – this is commonly doing 'too much too quickly'. Activities which involve repetitive jumping are common culprits such as basketball or volleyball.
- Tightness or muscle imbalances in the quadriceps, hamstring, and gluteal muscles
- Ankle stiffness and abnormal foot biomechanics
- Previous surgery involving the patellar tendon (e.g ACL reconstruction)
- More common in males than females

Signs and Symptoms

- Anterior knee pain: usually just at the bottom of the patella
- Pain worse with jumping, landing, running, stairs and steps.
- Pain of gradual onset made worse with intense activity
- Pain well localized to the top of the patella tendon
- Pain and stiffness in the region first thing in the morning after getting up from bed
- Less common is swelling or thickening of the tendon region

Patella Tendinopathy



MRI of normal patella tendon on left and patella tendinopathy on right

Investigation

Xray: usually normal, but help exclude other diagnoses

Ultrasound: can demonstrate tendon tears and tendon degeneration

MRI: most accurate investigation that will also show the area of tendon affected AND help exclude other causes of knee pain (see MRI example above)

Physiotherapy Treatment

Good physical therapy is usually the key to treatment and involves stretching and strengthening, particularly eccentric quadricep loading.

Other Treatments

Rest and Activity Modification: to avoid the repetitive overload

Iontophoresis: a specialized technique to administer cortisone to the region without injection (cortisone injections are not recommended as may weaken the tendon and promote a rupture)

Platelet Rich Plasma Injections: a special type of injection using a fractioned part of the patients own blood products

Surgery

Only used in difficult cases where the other treatments have been tried and failed over a period of many months.

Using arthroscopic techniques ("keyhole surgery") the degenerated tendon area can be removed. Usually a very small area of bone is removed from the patella to aid in the healing process

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Clavicle Fractures

Speciality Information

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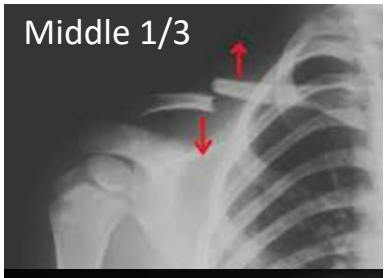
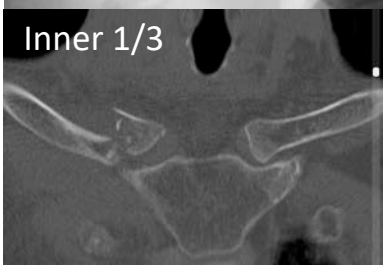
Clavicle (or collarbone) fractures are a common traumatic injury, often seen in young adults after a fall onto the shoulder or an outstretched arm. 80% of these fractures occur in the middle third of the bone. About 15% occur near the outer end of the bone near where it joins to the shoulder (near the AC joint). The remaining 5% occur near the inner end of the bone where it forms a joint with the sternum (breastbone). The vast majority of clavicle fractures heal spontaneously in a few weeks requiring just a sling or support for comfort. A small number are more problematic where the broken pieces are significantly separated or the fragments have injured the skin, nerves, blood vessels or even the lung. For these more complicated fractures surgery is needed to realign and fix the collarbone into place to ensure it heals correctly.





Types

Middle 1/3 (85%)

The vast majority of fractures occur in the middle part of the bone.

Most can be managed without surgery.

Outer 1/3 (15%)

15% occur in the outer part near the shoulder.

Displaced fractures have a high chance of being displaced and not healing without surgical intervention

Inner 1/3 (rare)

<5 % occur at the inner end near the sternum.

Quite a rare injury.

Difficult to diagnose and hard to see with standard Xrays .

May need a CT scan to clearly identify

Symptoms

Pain

Swelling and bruising

Deformity or bump at the fracture site

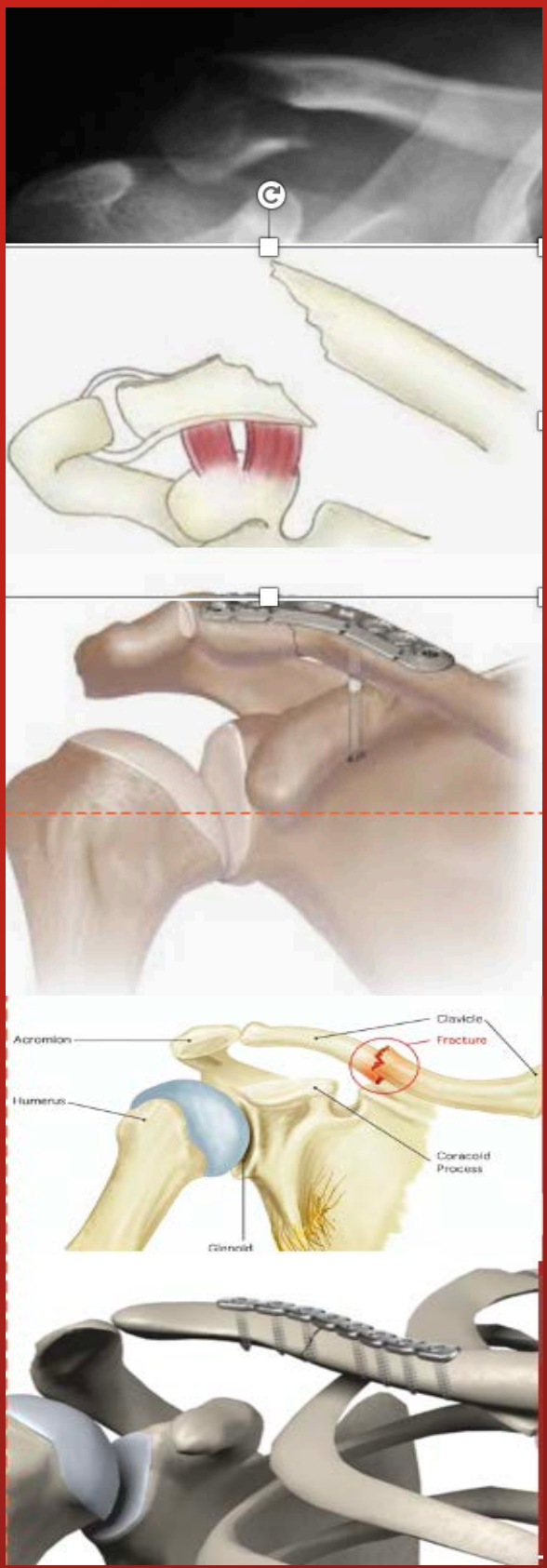
Inability to lift the arm due to pain

Investigations

Xray :
Will usually show the fracture position and displacement

CT Scan :
Required when normal Xray doesn't give enough detail. Usually required for medial 1/3 fractures which are hard to visualise with xrays alone.

Clavicle Fractures



Surgery is not usually required

After appropriate medical and radiological assessment a treatment plan can be recommended.

Most clavicle fractures heal well and can be treated non-operatively. This is especially true for the common middle 1/3 fractures

Most clavicle fractures in children heal rapidly and do not need surgery

Nonsurgical Treatment

Ice helps initially to reduce swelling

Pain Medication to help with discomfort especially in the first week

A sling or arm support for comfort is usually needed for 4 to 6 weeks

Physiotherapy is required almost immediately to keep movement in the hand, wrist and elbow. Later the shoulder needs movement and strengthening as the clavicle healing allows

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AC Joint Injury

Speciality Information

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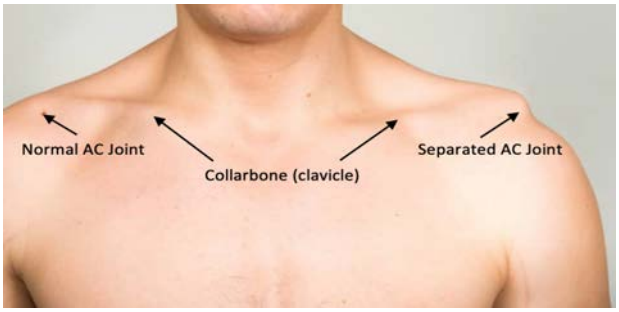


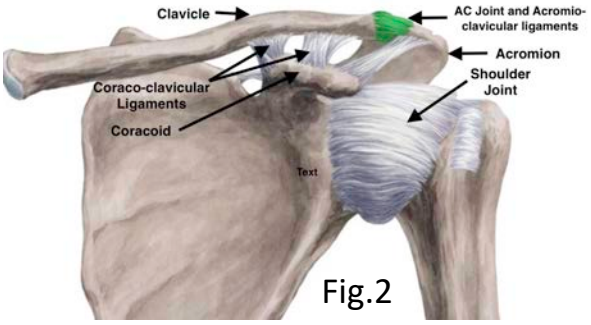


Fig.2

The AC Joint is the small joint at the top of the shoulder where the clavicle (collarbone) meets the scapular (shoulder blade). The joint capsule including the acromioclavicular ligaments gives some stability to the joint, but the main ligaments that keep the clavicle stable are the coraco-clavicular ligaments (figure 2). AC Joint injury and separation (see left shoulder figure 1) is caused by sports and traumatic episodes. The amount of separation and disruption of the AC Joint will determine if the injury can be treated with a sling OR if surgical stabilisation may be recommended.

Anatomy (Fig. 2)

The AC Joint is the small joint at the top of the shoulder where the clavicle (collarbone) meets the scapular (shoulder blade). The Joint is surround by the acromioclavicular ligaments which gives some stability but the main ligaments that keep the clavicle stable are the coraco- clavicular ligaments.

AC Injury - Grades

Grade I - Mild
The joint is strained but the ligaments are not ruptured
X-rays look normal

Grade II - Moderate
Rupture of Acromioclavicular Ligaments

Grade III - Severe
Rupture of Acromioclavicular Ligaments and Coracoclavicular Ligaments
clavicle 100% displaced

Causes

Falls onto the tip of the shoulder as can occur going over the handlebars of a bike.

Fall onto the outstretched hand

A direct blow to the shoulder as occurs frequently in contact sports

Symptoms

Pain at the top of the shoulder

Swelling and deformity

Limited movement

Making a diagnosis

Examination shows tenderness and sometimes swelling directly over the AC Joint.

Higher grades show an abnormal step at the AC Joint where the clavicle has moved upward

X-rays will show the degree of separation to grade the injury into Grade I, II or III

AC Joint Injury

Management

Initial management includes resting the arm in a sling for comfort and ice.

Seek medical advice and Xrays to obtain an accurate diagnosis and grading of the injury.

Xrays also help to rule out other injuries including frcatures

Grade I

Rest for 1-2 weeks in a sling .

Avoid lifting , overhead work and sports for 2-4 weeks

Grade II

Rest for 4 - 6 weeks in a sling then rehabilitate when relatively pain free

Avoid lifting , overhead work and sports for 6– 8 weeks

Grade III

Seek advice if surgery advisable

Physiotherapy

Aims to:

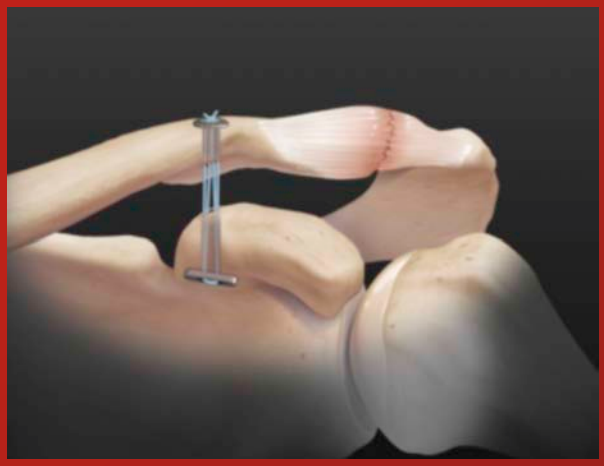
Reduce pain and swelling

Improve range of motion and strength

Improve the scapular stability

Surgery

May be needed in more severe cases where the outer end of the clavicle is very displaced and unstable.



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Hamstring Injuries

Speciality Information

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Hamstring injuries can occur at upper tendon portion, middle muscular portion or lower tendon end. At the upper end the tendons can pull off the bone. These injuries occur especially in waterskiing, rugby, sports and after falls. They can be very severe with retraction of the tendons and may require surgical repair. By far the most common hamstring injuries however occur in the middle muscular part of the thigh. These occur in all sports particularly those that involve running, jumping, hurdling and kicking. Whilst resulting in significant disability and time away from sport they do not commonly require surgical treatment but rather extensive rehabilitation. The least common tears occur at the lower end of the thigh around the knee joint where the tendon can pull away from the bone.

Anatomy

Three muscles form the hamstring compartment at the back of the thigh: (Fig1)

- Semitendinosis
- Semimembranosus
- Biceps Femoris

All three begin together as tendons from the ischial tuberosity (from the pelvis bone just next to the sit bone). As the tendons move lower down the leg they separate and gradually blend into the large muscle bellies that make up the thigh.

Different Types of Tears

Upper End Tendon Tears (Proximal Tendon Avulsions): Severe Injuries to the tendons which pull off the pelvis bone (Fig.2 number 1)

Mid Thigh Muscle Tears (The common "Hamstring Tear") ; Injuries in the mid to upper thigh involving muscle fibre tearing. (Fig.2 number 2)

Lower End Tendon Tears (Distal Tendon Avulsions): Very rare tendon injuries around the knee. (Fig.2 number 3)

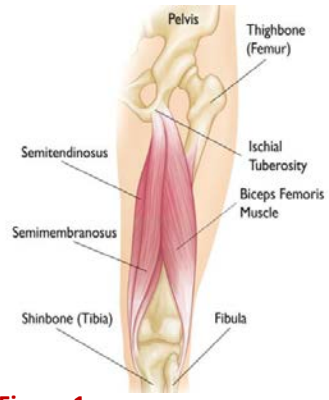


Figure 1

Figure 2

Grade of Tear

Grade 1

A mild strain which is characterised by stretching of the musculotendinous unit and tearing of few muscle or tendon fibres (less than 5% disruption of structural integrity of the unit). An athlete may not even be aware of injury until after cooling down.

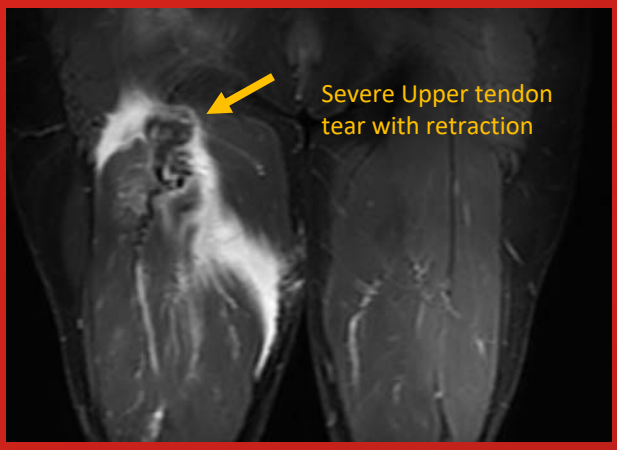
Grade II

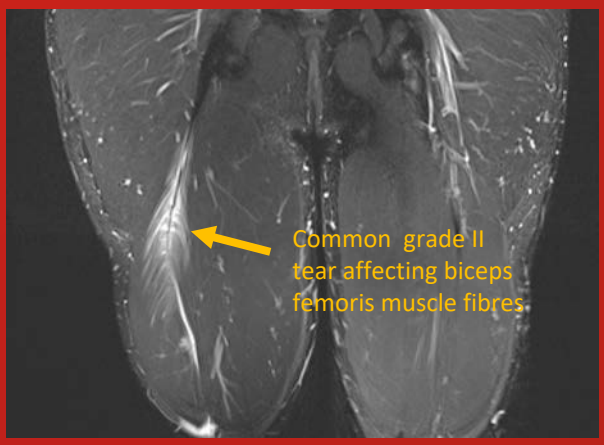
A moderate strain with partial tearing of the musculotendinous unit but without compete disruption.

Grade III

Severe or complete rupture of the musculotendinous unit which results in a "rag mop" appearance macroscopically. These injuries are relatively rare.

Hamstring Injuries





Risk Factors

Previous hamstring injury.

Increasing age.

Poor flexibility.

Poor strength.

Hamstring muscle fatigue.

Muscle strength imbalance between the quadriceps and hamstrings.

Inappropriate, inadequate or no warm up.

Non-Operative Treatment

Grade I-II (minor to moderate) hamstring injuries usually heal on their own. For the first 48-72 hours think of:

RICE - Rest, Ice, Compression, Elevation;

Do no HARM - No Heat, Alcohol, Running or Massage.

Recovering from a hamstring injury:

Most hamstring injuries, even grade III injuries, heal without surgery. In severe cases, crutches may be necessary.

Lack of use results in muscle shrinkage and the formation of scar tissue where the tear is healing. Excessive scar tissue prevents healthy muscle function, as it doesn't stretch and move as normal muscle does.

To avoid these complications rehabilitation need to begin early (except grade III injuries):

After a few days, once the pain has subsided, you should start to do regular gentle hamstring stretches followed by a programme of gentle exercise, such as walking and cycling.

Operative Treatment

Severe upper end and lower end tendon injuries with significant retraction of the tendon away from the bone may do poorly without surgical repair . A specialist opinion should be sought.

Grade III tears in the thigh at the junction between muscle and tendon usually are usually treated non-operatively but a specialist surgical opinion may be needed.

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