



SPORT INJURY MANAGEMENT

Volume I

**BACK
SPORTS**
SPORTS INJURY MANAGEMENT

Table of Contents

Osgood-Schlatter Disease (OSD).....	5
Patellar Tendinitis	9
Is Your Game Hamstrung?	17
Iliotibial Band Friction Syndrome	25
The Buckling Knee.....	29
Snapping Ankle	35

Sports Injury Management: Volume I is a collection of articles written by Back2Sports' specialist physiotherapists. The benefits of sports is tremendous and should not be hampered by injuries that could have been prevented. If not prevented then better managed to enable a quick return to sports.

Education plays an important role in managing this potential injuries. We hope that this collection of articles will be able to contribute in some small way in furthering our better understanding our sports injuries and how to prevent and manage them better.

Back2Sports Team

Sports Injury Management Volume I

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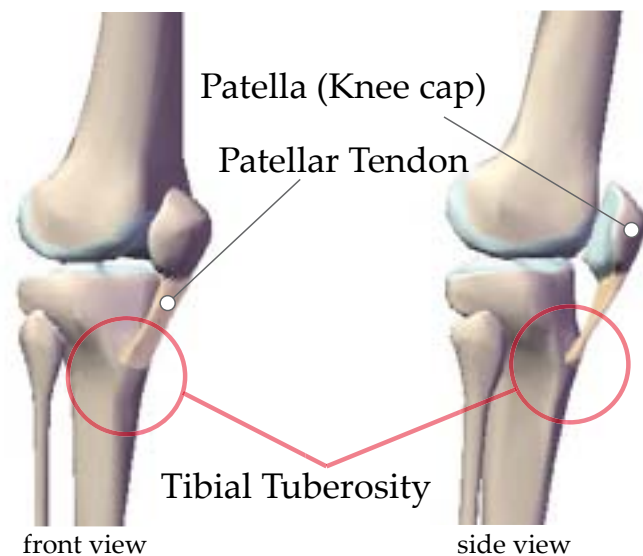
Osgood-Schlatter Disease (OSD)

Osgood-Schlatter Disease is most commonly characterized by the big tibial tubercle and pain on activities like kneeling or repeated jumping. OSD arises from a strong pull of the quadriceps muscle on the tibial tubercle during a child's growth spurt. This normally occurs around the ages of 9 – 16 years old. This strong pull occurs in sports that require a quick, strong contraction of the quadriceps, like in soccer, martial arts, and basketball.

The quick, strong pull on the tibial tubercle has an avulsion-fracture like effect (when a small bone fragment breaks away from the main bone mass) that would cause an inflammation of the periosteum. However, with the child being actively involved with the sport, this effect is magnified as the action is repeated. The frequency and repetitive nature of

Tibial Tuberosity

Tuberosity refers to round elevation (bump) from the bone



source: visiblebody & core concepts

the sport doesn't allow the periosteum to recover and thus causes a chronic inflammation on the prominence of the tubercle (see image). This leads to a constant, persistent pain, especially on impact. This pain will not only limit the child's performance in the sport, preventing them from excelling,

it would also cause a lot of inconveniences later on in their growing years.

Management

- RICER regime (Rest, Ice, Compression, Elevation, and Referral).
- Oral NSAIDs or injection of NSAIDs directly over the painful area
- Ultrasound guided Extracorporeal Shock Wave Therapy (ESWT) by a sports physician to break down scarred tissues and allow for the tubercle to heal
- Stretches and improving muscle control through physiotherapy
- Assessing for biomechanical factors that may cause OSD by sports physiotherapists to prevent recurrence of pain and to maximise the child's performance in their sport

Prevention

The best way to prevent the onset of OSD is to ensure adequate stretching and good control of the quadriceps. Adequate prehab should thus be a key before starting any form of sport.

Patellar Tendinitis

Patellar tendinitis or ‘jumpers knee’ is a condition that results from an inflammation of the patellar tendon. The patellar tendon is the structure that connects the patella (knee cap) to the tibia (shin bone). Taking a closer look at anatomy, the knee cap is a small floating bone (sesamoid) which attaches the quadriceps to the tibia through the patellar tendon. Hence the patellar tendon being a continuation of the bulky quadriceps muscle is pivotal in the way you move your leg. It helps the quadriceps muscle extend the lower leg so that you can kick a ball, jump in air or push the pedals on your bike.

The symptoms of patellar tendinitis are pain and occasionally a swelling over the patellar tendon. Pain is usually sharp during the sporting activities such as jumping or running and persists as a dull

ache after the activity. Initially the pain might be present only during the start or after completing the sport or work out which then worsens to becoming more constant in nature. Everyday activities such as climbing up and down stairs might be painful too. Pain on pressing directly over the patellar tendon is a characteristic feature in examination. An X-ray might provide additional information of a bone spur and an MRI is needed in more chronic cases to rule out tendon degeneration.

The commonest cause of patellar tendinitis is overuse. This occurs frequently in jumping sports such as basketball and volleyball and hence it is often referred to as 'jumpers knee.' However it can occur with sports such as running and soccer too. A less common cause is due to direct injury to the tendon.

The inflammation can be a result of numerous factors. Here are some of the causes which lead to patellar tendinitis:

Factors	Causes
Training Errors	<ul style="list-style-type: none">• Rapid increase in the frequency of training• Sudden increase in the intensity of training• Transition from one sport to another without proper conditioning• Repeated training on a rigid surface, leading to high impact• Lack of flexibility exercises• A poor base strength of the quadriceps muscle

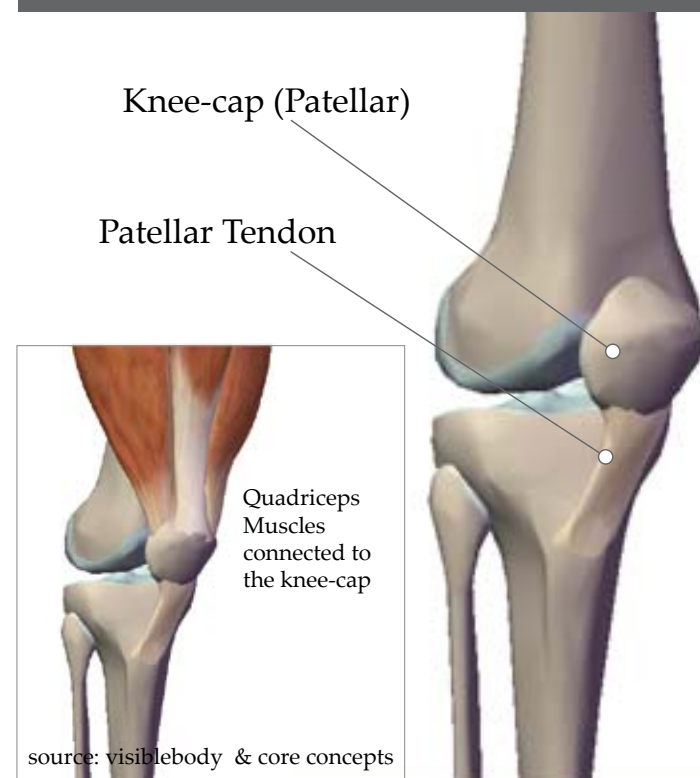
Factors	Causes
Biomechanical Factors	<ul style="list-style-type: none"> • Reduced flexibility of the thigh muscles namely the quadriceps and the hamstring muscles • Muscle imbalance, if some muscles in your leg are much stronger than others • Patella alta, a condition in which the knee cap is structurally much higher than the knee joint • Overweight • Foot conditions, either a flat foot or a raised arch can impose high strain on the patellar tendon

Treatment of patellar tendinitis is usually conservative, and is briefly discussed below:

Treatment Options	Details
Rest	<ul style="list-style-type: none"> • Not necessarily meaning to stop all activities but only those that involve straining the patellar tendon i.e. Jumping and running
Correcting Body Mechanics	<ul style="list-style-type: none"> • Stretching tight thigh muscles to equalize force distribution in the leg muscles • Strengthening the quadriceps muscle, particularly in an eccentric fashion • Proper form in take off and landing techniques in sport
Patellar Tendon Strap	<ul style="list-style-type: none"> • Strapping or taping techniques might help take off pressure from the patellar tendon and help in further aggravation as well as pain relief

Treatment Options	Details
Orthotics	<ul style="list-style-type: none"> • Foot orthotics to support the arch for better shock absorption in jumping and other impact sport
Additional Approaches	<ul style="list-style-type: none"> • other physiotherapy treatments such as ultrasound and, laser might help in pain relief during the acute phase of healing • extracorporeal shock wave therapy using sound waves to heal the tendon • medications such as NSAIDS and corticosteroids are used to settle the initial acute healing phase

Patellar Tendon



If the symptoms persists beyond 6 months after attempting conservative treatment then surgery can be discussed. There is little research available on the best surgical options for patellar tendinitis so the procedure depends largely on the surgeons discretion.

Is Your Game Hamstrung?

Basketball players tend to focus a lot on the quadriceps (muscles in front of the thigh) when doing strength training often neglecting the hamstrings. This severe muscle strength imbalance often leads to hamstring pulls or tears. And just as importantly, players with weak hamstrings also simply don't play as well as shown in a study of national basketball teams.

Why focus on the hamstring?

In a study amongst national basketball team divisions, division I players have significantly higher peak torque (explosive power) than the lower divisions in both the quads and hamstrings. Running fast is not simply a result of the legs pushing off the floor with the quads; but also the result of the hamstring and the glutes pulling back the hips. Explosive power from both the quads and the hamstrings are crucial to high performance plays.

Hamstrings

The hamstring is a group of large, powerful muscles that covers the back of the thigh, from the lower pelvis to the back of the shin bone. The hamstring functions to extend the hip joint and flex the knee joint. If the quadriceps is far stronger than the hamstrings, it can easily overpower the hamstrings, tearing or straining them during vigorous game play. Sadly, hamstring pulls rank high amongst the most common injuries to bench a player. Just recently in April, Forward Luke Walton missed the Lakers' game at Sacramento with a strained right hamstring.

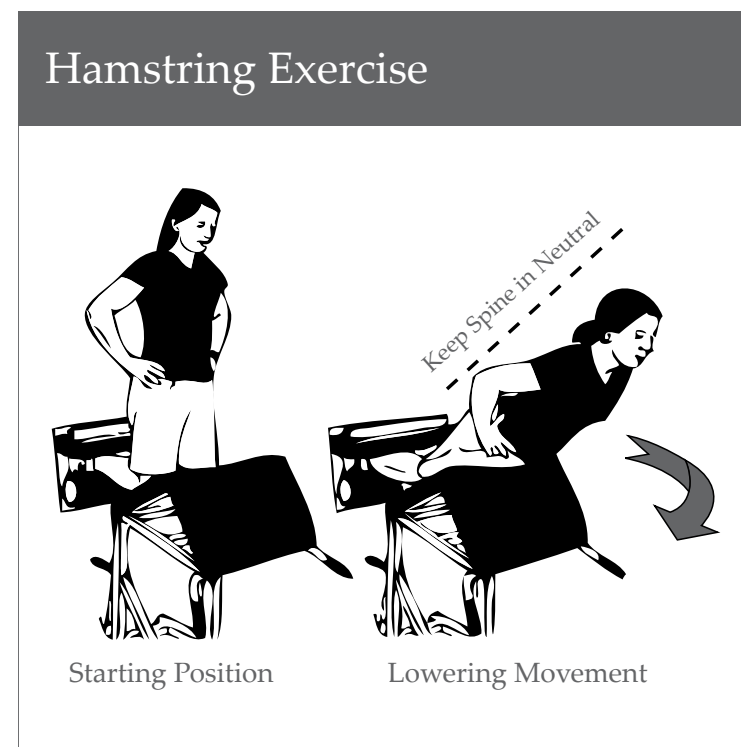
Are you hamstrung?

Common symptoms of a pulled hamstring include :

1. Bruising from small muscle tear and bleeding,
2. Swelling,
3. Muscle spasm and,

4. Difficulty in contracting the muscle or flexing the knee.
5. Pain on walking especially upslope and sprinting.

Some immediate steps to take include applying R.I.C.E.R. (Rest Ice Compression Elevation and Referral). Seek a doctor or physiotherapist's attention if you have difficulty walking or the pain is quite significant.



Sports Injury Management

The first 72 hours - what to do

Rest the injured area for 48-72 hours. Movement of the injured part will increase blood flow and bleeding to the injury site, may cause the blood clot to dislodge, and begin bleeding again and may cause more tissue damage.

Ice. Apply ice or cold therapy to injured area for 15-20 minutes every two hours. Avoid direct ice contact to the skin to prevent cold burns. Ice decreases swelling and pain.

Compression. Apply firm, elastic, non-adhesive bandage to the area. May be done in conjunction as an ice compress. Reduces swelling and bleeding at the injury site.

Elevate the injured area above the heart level. For example for an ankle injury, when lying down, raise the ankle slightly above the body with pillow. Elevation decreases bleeding, swelling and pain.

Refer to see a doctor or physiotherapist for an accurate definitive diagnosis. You may need continued management (including anti-inflammatory medication) and prescription of a rehabilitation programme.

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Hamstring of Steel

This exercise is great to build up really strong hamstrings.

Start position

- Place your knees on the glute-ham bench with your ankles firmly supported and assume an upright position, with hips and shoulders in line with knees. If you don't a bench, work with a partner to hold your feet down.
- Tighten your buttocks and tuck your tummy in so your pelvis is in the neutral position.

Lowering movement

- Slowly lower your whole body forward until you feel a pull in your hamstrings.
- Squeezing your buttocks throughout the movement to keep your hips extended.
- Stop when you feel a little strain in the hamstrings.

Return movement

- Pause for moment and raise your body back to the start position. Your hamstrings will work

very hard to get you back up. Watch for excessive movements from the back. If you feel your back muscles tightening up much and starts to ache, you could be using your back extensor muscles to compensate.

To make it easier to start with, bend at the hips a little or use your hands to help you back up at first. As you get stronger, you will be able to complete the movement up and down smoothly. If at first you cannot lean very far forward, this will also improve with practice. Aim to get as far forward as possible to work the hamstrings through a full range of motion.

Perform two sets of five reps at first, building up the range of motion. Once you can complete a full range all the way down and up, keeping your body straight, increase to three sets of 8-10 reps. Don't forget to do sprint work to build up the explosive strength of your hamstring. And lastly stretch them out. Longer hamstrings produce more explosive power.

Reference:

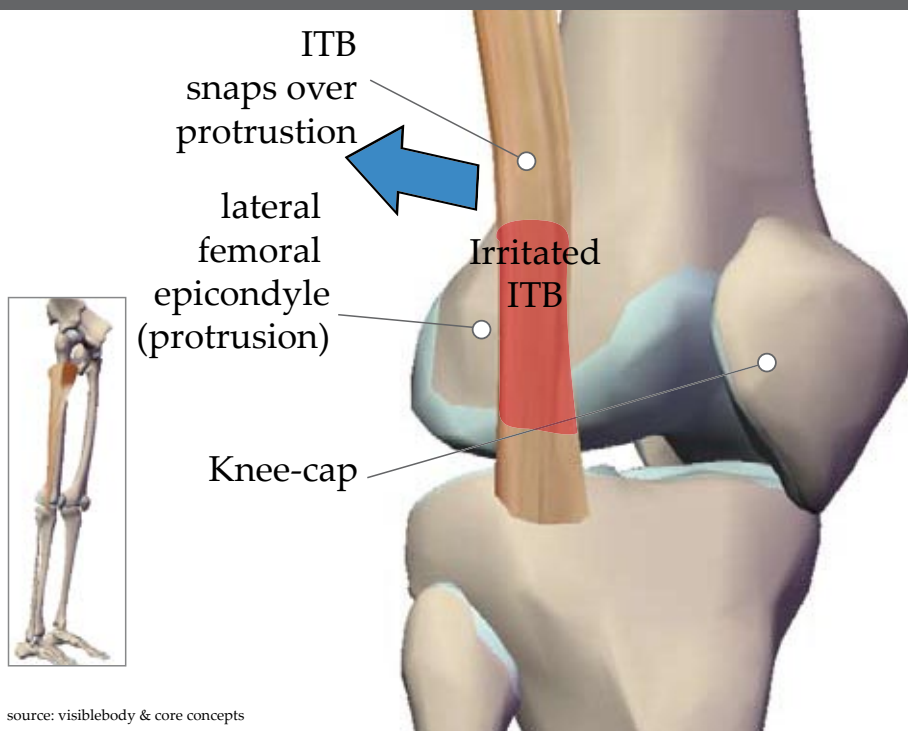
1. Peak torque of quadriceps and hamstring muscles in basketball and soccer players of different divisions, Journal of Sports Medicine and Physical Fitness, 1995

Iliotibial Band Friction Syndrome

Tell any long-distance runner or cyclist about your stinging pain at the side of the knee or hip, and you will get a knowing sympathetic look. ITB (Iliotibial band) friction syndrome is one of the commonest complaints amongst runners, cyclists and intense court sports.

ITB friction syndrome gets its name from the Iliotibial Band rubbing against a bony protrusion just at the side your knee. The ITB is a continuation of one the largest hip muscles and spans as a thick band of tissue on the outside of the thigh. Starting from the pelvis, it runs over side of the hip and ending just below the knee. Just before it crosses the knee, it runs over a protrusion in the thigh bone (lateral femoral epicondyle). The frequent rubbing of the band over this bony protrusion from bending and straightening of the knee irritates the band, causing an inflammation. The tighter the ITB, the harder it

ITB: Bony Protrusion



rubs over the protrusion.

What tightens the ITB?

Three basic things tighten the ITB.

1. Training Methods

Running on banked surfaces, inadequate warm up or cool down, increases in distance too fast or excessive downhill running are faults associated with running which strains the ITB. In cycling having the feet toed inwards commonly causes the band to get tight.

2. Bio-mechanical Gait

Problems with foot structures such as high or low arches and uneven leg length typically tighten the ITB on one side. A complete biomechanical assessment helps determine the faults. Where appropriate, foot orthotics can correct these problems.

3. Weak outer hip muscles

Weak outer hip muscles forces the ITB to work harder to compensate and becomes tight as a result. Exercise to strengthen the outer hip muscles helps to lighten the load on the ITB.

Despite avoiding all the three issues mentioned, athletes with a high training volume often still experience painful ITBs. In such cases, deep tissue massage will help release the tight band.

Don't forget to stretch the ITB. Ignoring ITB tightness can lead to groin pain and low back pains.

The Buckling Knee

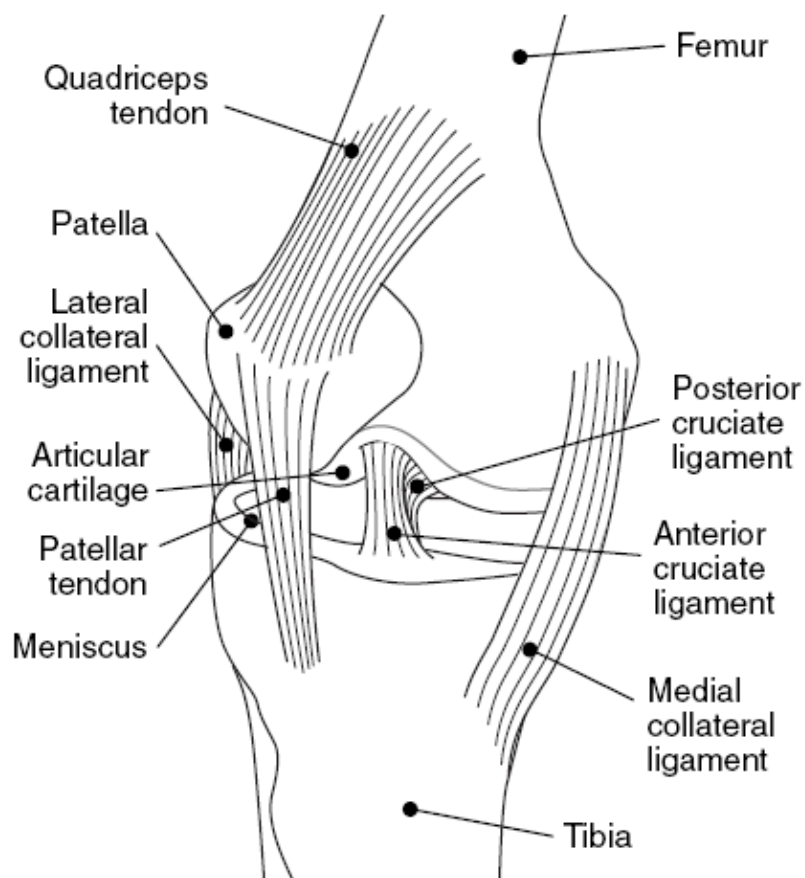
Having a sense of the knee ‘giving way’ or ‘locking’ is a fairly common complaint by athletes who have twisted their knees in sports like basketball, netball, soccer or badminton. The sensation of ‘giving way’ is an indication that you might have torn your Anterior Cruciate Ligament (ACL) while the ‘locking’ sensation is an indication of a possible meniscus tear.

ACL Injury

The ACL is a fairly strong ligament found between the knee-joint. Its main role is to limit the forward movement (anterior translation) of the leg bone (tibia) on the thigh bone (femur).



Lateral View of the Knee



source: US GSA & core concepts

When athletes change direction quickly during their games, they twist their knee inwards. This increases the strain on the ACL and places the ligament at risk of tearing. The ACL tears when the knee is force downwards and inwards beyond the ligament's ability to hold. Athletes who tear their ACL often report hearing a 'pop' on injury.

Unfortunately, the ACL is very rarely the only ligament involved in this kind of injury. It is normally accompanied with a slight tear in the Medial Collateral Ligament (MCL) and either a medial or lateral meniscus (cartilage) tear. These three tears are commonly known as the 'Unhappy Triad' or 'Terrible Triad'.

Meniscal Injury

The meniscus, which is a crescent shaped cartilage between the knee, acts as a cushion to absorb the impact between the leg and thigh bone. The meniscus is better at the handling stress from an up and down motion. It doesn't do as well under a twisting motion especially when compressed. This motion can cause a tear in the meniscus. The knee feels 'locked' when the torn part of the meniscus blocks the movement of the knee.

Immediate swelling and severe pain in the knee are common signs of this Triad injury. However, there are occasions where there will be a delay in the onset of swelling or even no swelling at all. Remember how you injured the knee. It helps your Doctor or Physiotherapist in diagnosing this problem.

Solving the Problem

Sadly, the ACL doesn't heal on its own due to the poor blood supply to the ligament. It would need to be reconstructed surgically by using either your hamstring tendon or patella tendon. Rehabilitation after surgery normally takes about 6-9 months before the athlete is able to go back to full training.

Nevertheless, there are about 20% of people with ACL tears who are able to go about their day-to-day activities without having their ACL reconstructed. To cope without surgery, the following muscles need to have good strength and control:

- Hamstrings
- Quadriceps (thigh)

- Gluteus Medius
- Gastrocnemius (calf)

Besides doing strengthening exercises, slowly getting back into sports specific training is essential. This is so that your muscles can develop an anticipatory reaction (feed-forward mechanism) to prevent injury.

Sports taping of the knee to support the ACL and MCL can also be done as a temporary measure for the athlete to cope with the injury until the end of the season.

Snapping Ankle

In people who recurrently sprain their ankle, it is not uncommon to hear clicking coming from the outside of their ankle. This phenomenon is commonly known as “snapping” ankle or slipping peroneal tendon. As the name suggests, the clicking sound arises from the peroneal tendons slipping in and out of the groove behind the bone sticking out on the outside of the ankle. Medically, it’s known as peroneal subluxation.

Anatomy

The peroneal muscles are made of 2 muscles and lie on the outside of the ankle. They assist in pointing the foot downwards and outwards. These two muscles run through a groove behind the lateral malleolus and are kept within the groove by a sheath. This complex is then re-enforced by a ligament-like structure known as a rectinaculum, preventing the

tendon from slipping out of the groove.

Why do I get this problem?

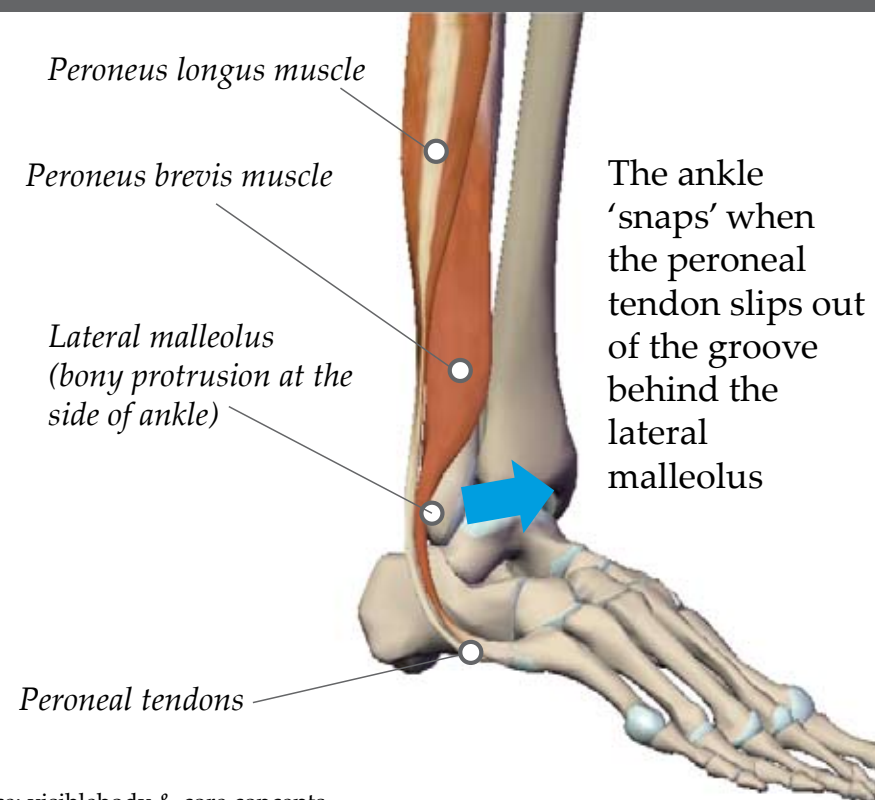
When you roll your ankle outwards, it may put the peroneal tendons on a forceful stretch. This forceful stretch may cause tears in the retinaculum. Frequent sprains would thus increase the strain on the retinaculum, which ultimately might cause the retinaculum to tear. This tear in the retinaculum compromises the integrity of complex, allowing the tendon to slip in and out of groove.

However, in some cases, there is a structural defect that causes the slipping. There are some people born with a shallow groove and thus gives rise to the slipping

Diagnosis and Management

Diagnosing a peroneal subluxation is normally overlooked as this problem is commonly superseded with other more acute pain of an ankle sprain, like swelling arising from an ATFL strain. Diagnosing this problem requires a close examination of the ankle. An experienced Sports Physician, Orthopedic Surgeon or Sports Physiotherapist would normally

SNAPPING ANKLE



source: visiblebody & core concepts

assess the ankle in all ranges to check whether the tendon would slip out. Another common test would be a resisted up pointing and out turning of the ankle. This could cause the tendon to thicken and slip out of the groove and can be felt at the back of the

lateral malleolus. Pain, tenderness and swelling may also be seen over the tendon behind the rectinaculum.

The first choice of management for a peroneal subluxation is a referral to physiotherapy for rehabilitation. In acute stages, the aim is to prevent further aggravation to the strain on the rectinaculum and a cast might be used for the first 4-6 weeks. During that period, gentle stretching of the tendon and range of movement is advised to prevent stiffening of the ankle. Ultrasound and cryotherapy may also be used to help manage the pain and swelling if present.

Following the protective phase, proprioceptive training and eccentric strengthening exercises of the peroneal tendons are essential in prevention of a recurrence.

However, 50% of acute subluxation tends to recur in active athletes. This would normally result in either surgery or a retirement from the sport.

There are 3 common surgical techniques:

- Rectinaculum Repair

- Groove Reconstruction
- Construction of a bony block

Following surgery, physiotherapy will be essential to get you back to sport.

Post-surgical Management

An immobilization period varying from 3-6 weeks will follow after surgery. Upon removal of the cast, achieving a full range of movement of your ankle will be the main goal of rehabilitation in the first 4 weeks. Pain controlling modalities like ultrasound and TENS may be used if pain is present. Building up the strength and proprioception of the ankle with exercises like calf raises and single leg stand (eyes open/ eyes closed) would normally start about the same time. Progressing proprioceptive training from standing on stable ground to a rocker board, followed by a wobble board is a normal progression before proceeding to agility drills.

Only when one achieves full range of movement, good strength and ability to complete sports specific agility drills will one be allowed to return to sports.

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