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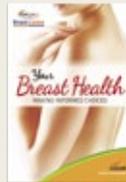
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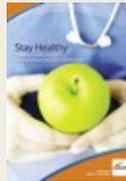
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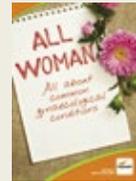
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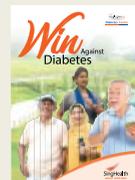
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Supported by a faculty of 3,700 doctors and well-equipped with medical diagnostic and treatment technology to provide quality care for our patients, the group has earned a

strong reputation for setting standards in healthcare.

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Sport & Exercise Medicine Centre

The **SingHealth Duke-NUS Sport & Exercise Medicine Centre (SDSC)** provides integrated, multidisciplinary and seamless Sport and Exercise Medicine (SEM) care while pushing the frontiers of clinical services, research and education in SEM.

SEM benefits not only the elite and competitive athletes, but also sedentary individuals looking to start an active and healthy lifestyle, the very young to the very old, and those looking to use exercise as an effective intervention to manage chronic diseases.

The SDSC has 12 full-time physicians specialising in Sport and Exercise Medicine and a large number of

accredited supervisors and training positions for Advanced Specialist Training in Sport and Exercise Medicine.

The SDSC was formed in 2018 to leverage on Changi General Hospital's (CGH) leadership in SEM to better serve patients and respond to evolving healthcare needs.

It has since established clinical sites at Singapore General Hospital (SGH), Sengkang General Hospital (SKH), and KK Women's and Children's Hospital (KKH), in addition to existing sites at Changi General Hospital (CGH), SSMC@SSI (Singapore Sport Institute) and SSMC@Novena. This has significantly enhanced patients' accessibility to a comprehensive range of SEM services.

Our Services

The extensive range of integrated Sport & Exercise Medicine services includes:

Sports Injury Treatment
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Athlete Pre-participation
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Modalities

Exercise Prescription for
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Sport & Exercise Medicine Centre

Find out more about the SingHealth Duke-NUS Sport & Exercise Medicine Centre at
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Foreword

The SingHealth Duke-NUS Sport & Exercise Medicine Centre (SDSC) serves to provide an integrated, multidisciplinary and seamless Sport and Exercise Medicine (SEM) service across the SingHealth cluster.

Sport and exercise are integral to our society. In 2014, a Sport Singapore survey showed a twofold increase in sport participation compared to 2001. With increased physical activity, sport- and exercise-related injuries will increase in tandem. However, the benefits of physical activity, be it a reduced chronic disease burden, enhanced well-being, social integration or resilience, far outweigh the risks. This is especially so if the risk of injuries is well-managed.

The following chapters are by no means comprehensive, but they highlight the more common sports injuries, looking into the causes, presentation, treatment options, and services available at SingHealth Duke-NUS Sport & Exercise Medicine clinical sites. We believe that patient education is a key pillar in preventing and better managing sports injuries, thereby enabling individuals to reap the full benefits of engaging in sport and exercise.

With a multidisciplinary team of SEM physicians, sports orthopaedic surgeons, sports cardiologists, sports physiotherapists, clinical exercise physiologists, sports podiatrists, sports dietitians, and sports psychologists, we at SingHealth strive to keep you physically active!

Adj Assoc Prof Benedict Tan

Head & Senior Consultant,

SingHealth Duke-NUS Sport & Exercise Medicine Centre;

Chief & Senior Consultant,

Department of Sport & Exercise Medicine,

Changi General Hospital

Introduction

The field of sport and exercise medicine is continually evolving, as new science and research push the discipline forward. With increased sport and exercise participation, we have seen an increased recognition of the importance of injury prevention and treatment.

‘Sharing knowledge’ is the focus of this edition of the Sport and Exercise Medicine booklet. This booklet brings together some common problems and diagnoses in sport and exercise medicine. The chapters are written to provide reliable sport and exercise medicine information for patients who are curious about their medical condition, and we have divided the text into five convenient sections: common musculoskeletal conditions of the athlete; concussion in sports; weight management; exercise prescription; and other treatment modalities including extracorporeal shockwave therapy, viscosupplementation and autologous platelet-rich plasma injection.

For this booklet, we recruited clinicians from the sport and exercise medicine fraternity who are actively engaged in the care of the active individual. We sincerely hope you enjoy this booklet and that this reference assists in your better understanding of sports medicine.

Dr Mandy Zhang

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SingHealth Duke-NUS Sport & Exercise Medicine Centre;
Department of Sport & Exercise Medicine,
Changi General Hospital

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Disclaimer: All information provided within this publication is intended for general information and is provided on the understanding that no surgical and medical advice or recommendation is being rendered. Please do not disregard the professional advice of your physician.

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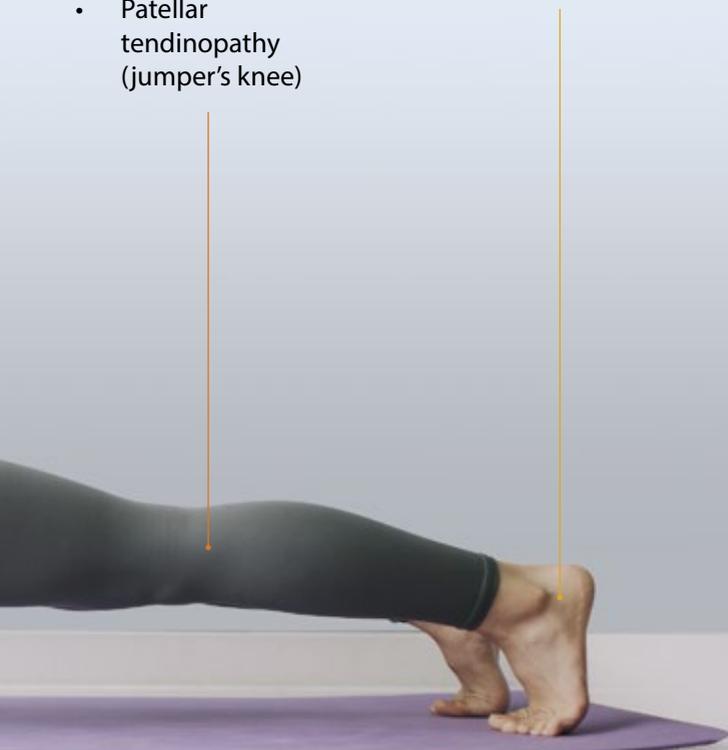
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1

Spine

Back pain is a common symptom, with most adults experiencing at least one episode during their lifetime.

The spine is made up of bones (vertebrae) that are stacked on top of each other, separated by the intervertebral discs and held together

by strong ligaments. Small joints (facets) between the vertebral bones enable movement. The bones protect the spinal canal, through which the spinal cord and nerves travel. Damage or wear and tear (degeneration) to these structures can give rise to pain.

Information contributed by:

Spondylosis

Spondylosis is the wear and tear of the discs and bones (vertebrae) of the spine. It is used to describe osteoarthritis (OA) of the spine but is also commonly used to describe any manner of spinal degeneration.

Causes and risk factors

Intervertebral discs are like cushions between the individual vertebrae. They have a soft centre (nucleus pulposus) surrounded by a tough outer ring of fibrocartilage (annulus fibrosus).

With **age and injuries**, the gel-like discs lose their water content and shrink, thus reducing their shock-absorbing and stabilising properties. This increases the stress on the joints and ligaments.



Over time, the cartilage in the joints becomes thinner, and overgrowth of bone occurs leading to the formation of spurs (osteophytes). The ligaments also become less elastic and thicken with age, leading to stiffness and loss of stability.

Spondylosis usually occurs after the age of 40 years, although it may occur earlier due to factors such as:

- 1 Poor posture that puts a strain on the spine
- 2 Injuries involving the spine
- 3 A sedentary lifestyle
- 4 Being obese
- 5 Genetic predispositions
- 6 An occupation that involves repetitive heavy lifting involving the spine



Signs and symptoms

People with spondylosis often have no symptoms.

If symptoms occur, they may include:

- 1 **Pain and stiffness in the neck**
- 2 **Restriction of movement**, which presents after a period of prolonged activity such as sitting, walking or staying in the same position for a long duration

If there is pressure on, or irritation of, the surrounding nerves of the degenerated discs, osteophytes or thickened joints, you may also experience weakness and/or numbness/tingling in the:

- 1 **Arms** – in cases of spondylosis affecting the neck or cervical spondylosis
- 2 **Legs** – in cases of spondylosis affecting the lower back or lumbar spondylosis

Diagnosis

Spondylosis is usually diagnosed clinically based on history taking, physical examination and imaging tests. X-rays can measure the extent of degeneration. Magnetic resonance imaging (MRI) can examine for soft tissue problems such as disc degeneration and nerve impingement.

Treatment

Initial treatment includes activity restriction, painkillers such as nonsteroidal anti-inflammatory drugs (NSAIDs) and a course of physiotherapy.

Over time, most patients with back pain can resume their occupational or recreational activities, starting with low impact aerobic exercises. Those who are unable to obtain relief via these measures, or patients with severe pressure on the nerves, may require surgical intervention.

Slipped Disc or Prolapsed Intervertebral Disc

A slipped disc is when a piece of the soft centre of the disc (nucleus pulposus) bulges or protrudes out through a weakness in the outer part of the disc. This often causes sudden, severe lower back pain.

Causes and risk factors

The most common age to develop a slipped disc is between 30 and 50 years. Factors that may increase the risk include:

- 1 Jobs involving a lot of lifting
- 2 Jobs involving a lot of sitting (e.g., driving)
- 3 Weight-bearing sports (e.g., weightlifting)
- 4 Smoking
- 5 Obesity
- 6 Increasing age



Signs and symptoms

Signs and symptoms of a slipped disc include:

- 1 Lower back pain with numbness or tingling in the buttocks, legs or feet
- 2 Difficulty bending or straightening the back
- 3 Muscle weakness in the legs
- 4 Pain that may be worsened on coughing or sneezing

Diagnosis

Diagnosis is usually made clinically. In most cases, symptoms often settle within a few weeks. Magnetic resonance imaging (MRI) may be advised if symptoms persist or worsen.

When do you need to see a doctor?

Seek early medical attention if pain is not relieved with rest, over-the-counter (OTC) medication, warm/cold packs and activity modification, or if it becomes worse with progressive loss of function including limb weakness, numbness or tingling.

Occasionally, the nerves to the bladder and bowel may be damaged by pressure from a disc or bone spur. This can lead to bowel or bladder incontinence, as well as saddle anaesthesia (numbness over the anal region and inner thigh and calf).

This is an emergency and immediate medical attention should be sought without delay in the event that this occurs.

How can you ease the pain from a slipped disc?



Keep active as much as possible.

This may not be possible at first if the pain is very bad, but patients should start gentle exercise as soon as they can as this will help with faster recovery.



Painkillers such as nonsteroidal anti-inflammatory drugs (NSAIDs) can be used, particularly when the pain is bad.



Most patients can be treated with a combination of **medication, activity modification and physical rehabilitation.**

Occasionally, some may require **injection in the spine, or ablation of the nerves** around the joints for symptom management. Over time, most patients with back pain can resume their occupational or recreational activities.

Spinal Stenosis

Spinal stenosis is the narrowing of the spinal canal which contains the nerve roots and spinal cord. This may increase pressure on the neural structures.

Causes and risk factors

This is usually due to structural changes from spondylosis, but may also be due to herniated discs, thickened ligaments, injuries, tumours and congenital disorders. It usually affects those above the age of 50 years.

Diagnosis

Tests like x-rays, magnetic resonance imaging (MRI) and/or computed tomography (CT) scans can help to diagnose the condition and check for the presence of spondylosis or bone spurs, nerve damage or other changes.

Signs and symptoms

Symptoms include the following:

- 1 Back pain
- 2 Muscle weakness and/or numbness/tingling, if pressure on the nerves is significant
- 3 Balance and continence may be affected in severe cases
- 4 There may also be a dull ache or cramp-like sensation in one or both legs during prolonged walking and/or standing.

Symptoms usually improve once there is a change in position such as sitting down or bending forward.

Treatment

Non-surgical management includes nonsteroidal anti-inflammatory drugs (NSAIDs), physiotherapy and epidural steroid injections.

People with spinal stenosis should try and maintain activity as much as they can. Surgical intervention is occasionally indicated for patients not responding to conservative measures.

What is the prognosis?

The outcome is variable. The natural history of lumbar spinal stenosis due to degenerative spondylosis is relatively benign.

Frequently Asked Question



Can Back Pain Be Prevented?

Paying attention to posture at work and during physical activities will help to reduce the stress on the spine. The muscles around the spine, pelvis and lower limbs will also need to be strengthened so that they are better able to protect the spine.

Some tips include



Stop Smoking



Avoid prolonged sitting/working in a fixed position



Avoid excessive flexion (bending forward), **extension** (bending backward), or **twisting/rotation**



Strengthen the core muscles in the abdomen and pelvis



Improve cardiovascular (aerobic) fitness



Lose weight (if overweight or obese) through lifestyle modifications such as exercise and diet



Improve flexibility of the long muscles of the back and the lower limbs (especially the hamstrings)



Warm up with light exercises and stretches before any strenuous activity (e.g., weightlifting, golf, tennis) affecting the lower back



Learn proper technique when training in the gym, especially for exercises such as the squat and deadlift



Be careful of how you lift; avoid bending over from the waist to lift heavy objects – bend your knees and squat, and hold the object close to your body as you stand up



2

Shoulder

The shoulder is a ball and socket joint made up of three bones. The upper arm bone (humerus) sits in a shallow socket (similar to a golf ball resting on a tee) at the end of the shoulder blade (scapula), and the collar bone (clavicle) links this to the chest wall.

Its physical structure gives the shoulder a high degree of freedom to move, enabling us to reach overhead for objects, scratch our backs, comb our hair and throw a ball.

Unfortunately, this also predisposes the shoulder to injuries, which usually affects those whose daily or occupational activities involve a large amount of upper limb movement.

Athletes participating in racket sports (e.g., badminton, tennis), swimming, weightlifting or throwing also have a higher risk.

Information contributed by:

Shoulder Impingement

Shoulder impingement is a common problem, and subacromial impingement is the most common type. This occurs when the tendons of the muscles surrounding the shoulder (rotator cuff) rub under the surface of the acromion bone.

Repetitive arm movements, especially above 90 degrees, can irritate the subacromial bursa, a fluid-filled sac, causing it to become inflamed and swollen (bursitis). Thickened ligaments and bone spurs may also narrow the space for the tendons to move, thus increasing the risk of impingement and bursitis, especially in those with prior injuries or above the age of 40 years.

Causes and risk factors

There are various reasons that can lead to the development of this condition. Subacromial impingement could be due to:

- 1 Muscle imbalance.** This refers to the tone or strength of the muscle around a joint and may be caused by unbalanced training regimes or poor technique.
- 2 Mechanical reasons.** Bone spur formation on the surface of the acromion, reducing the subacromial space and increasing the risk of impingement.
- 3 Direct injury to the tendon.**

Signs and symptoms

Symptoms include generalised pain in the region of the shoulder worsened by movement, especially with lifting of the arm above the shoulder or with the arm behind the back.

People with subacromial impingement may have difficulties with the following activities:

- 1 Driving**
- 2 Putting on clothes**
- 3 Combing their hair**
- 4 Lying on the affected shoulder**

Diagnosis

Besides a thorough history and physical examination to establish the cause, extent and severity of the problem, investigations such as x-rays, ultrasound scans, magnetic resonance imaging (MRI), or computed tomography (CT) scans may be done to assess its severity and/or exclude injuries to the surrounding structures. This will also help with selecting the appropriate course of treatment.

Treatment

Patients with subacromial impingement often respond to non-operative measures and only a small proportion of patients will require surgery.

- 1 **Rest and painkillers.** Initial treatment includes rest and modification of activities, and painkillers such as paracetamol or nonsteroidal anti-inflammatory drugs (NSAIDs).
- 2 **Physiotherapy.** A physiotherapy programme aimed at improving strength and coordination of the rotator cuff may be useful.
- 3 **Corticosteroid injection.** Sometimes, an injection of corticosteroid into the subacromial bursa may reduce inflammation.

Most people recover with rest and physiotherapy. If non-operative options fail, surgery may be considered.



Activities to avoid

Patients with subacromial impingement should avoid activities that make the injury worse. These activities may include overhead throwing like tennis or basketball. It is also a good idea to avoid certain weightlifting exercises that involve overhead movements.

Increase your training gradually and be mindful of the alignment of your shoulders and arms and exercise technique.

Rotator Cuff Tendinopathy

The rotator cuff is a group of four small muscles that surround the shoulder. They work as a unit to help stabilise the shoulder joint and help with shoulder joint movement.

They may be injured through wear and tear (from repetitive movements), improper lifting of a load or a fall. Injuries range in severity from tendon strains to partial and complete tears.

Causes and risk factors

Rotator cuff tendinopathy is caused by irritation and inflammation of the tendons of the rotator cuff muscles.

Often, it is of an acute onset with a preceding injury.

Sometimes, it occurs due to overuse of the shoulder, especially in athletes who participate in throwing sports. In non-athletes, there may be a history of recent heavy lifting.

Signs and symptoms

The main symptoms are an acute onset of pain and painful movement of the shoulder, worse with overhead activities.

If a tear is present, there may also be weakness. The symptoms may be severe enough to affect sleep and daily activities such as dressing or bathing.



Diagnosis

The diagnosis is often obtained through a thorough history and physical examination.

Investigations such as x-rays, ultrasound scans, magnetic resonance imaging (MRI), or computed tomography (CT) scans may be done to assess its severity and/or exclude injuries to the surrounding structures. This will also help with selecting the appropriate course of treatment.



Treatment

- 1 **Rest.** Active rest is the main treatment for rotator cuff tendinopathy.
- 2 **Medication.** Paracetamol and nonsteroidal anti-inflammatory drugs (NSAIDs) can also reduce pain and inflammation.
- 3 **Physiotherapy.** Physiotherapy to regain strength and motion is also a modality of treatment.
- 4 **Steroids.** Occasionally steroid injections may be performed to reduce the inflammation in the rotator cuff tendons if rest, medication or physiotherapy does not help.
- 5 **Shockwave therapy.** In calcific tendinopathy, extracorporeal shockwave therapy (ESWT) may be delivered to the affected tendon to help with the pain.
- 6 **Surgery.** Surgery is sometimes needed in large or complete rotator cuff tendon tears, and may involve enlarging the space underneath the acromion and repair of the rotator cuff tendon.

Shoulder Instability

The shoulder is an inherently unstable joint and depends on the surrounding muscles, capsule and ligaments for support and stability. These structures may be congenitally loose or damaged as a result of injury.

This can lead to excessive movement of the end of the arm bone in the socket, or if due to a high-energy injury (e.g., fall or tackle during sports), a dislocation of the joint. The latter injury may be associated with damage to the nerves and blood vessels of the upper limb, and require urgent medical attention.

Causes and risk factors

Significant trauma to a previously normal joint, causing partial dislocation (subluxation) or dislocation of the shoulder joint, can lead to joint instability.

Repetitive overhead motions can cause wear and tear of the joint and stretch the capsule that surrounds the shoulder joint, inherently making the joint loose and unstable.

Congenital factors such as hyperlaxity syndrome can also cause a general looseness in the joint and the surrounding ligaments, tendons and muscles.

Signs and symptoms

In an acute injury, the following symptoms may be present:

- 1 Swelling
- 2 Numbness
- 3 Weakness
- 4 Bruising

Some people may feel instability of the shoulder joint and the sensation of the shoulder 'popping out', occurring with specific activities or positions of the arm, such as throwing a ball or reaching behind the body.



Diagnosis

Besides a thorough history and physical examination to establish the cause, extent and severity of the problem, investigations such as x-rays, ultrasound scans, magnetic resonance imaging (MRI), or computed tomography (CT) scans may be done to assess its severity and/or exclude injuries to the surrounding structures. This will also help with selecting the appropriate course of treatment.



Treatment

- 1 **Rest.** After an acute episode of dislocation, it is important to rest the shoulder in a sling and avoid aggravating activities for the first few days.
- 2 **Ice and Medicine.** Applying ice before and after exercise, as well as nonsteroidal anti-inflammatory drugs (NSAIDs) can help reduce the pain and swelling.
- 3 **Physiotherapy.** Once the pain and swelling have subsided, physiotherapy for range of motion exercises and gentle strengthening can be started.

The goal of therapy is to achieve shoulder motion and stability and increase rotator cuff muscle strength. If the shoulder remains unstable despite a course of strengthening physical therapy and activity modification, surgery to stabilise the shoulder joint may be needed.

“The goal of therapy is to achieve shoulder motion and stability and increase rotator cuff muscle strength.”

Frozen Shoulder

Frozen shoulder, also known as adhesive capsulitis, involves inflammation of the shoulder joint capsule, resulting in thickening and stiffness. It can occur spontaneously, or occur following a rotator cuff injury or in conditions causing immobility (e.g., cerebrovascular accident or cast immobilisation).

Causes and risk factors

The causes are not fully understood, although certain factors may put you at higher risk:

- 1 Gender and age.** Women between 40 and 60 years old are at higher risk.
- 2 Endocrine disorders.** If you have diabetes mellitus or thyroid disorders, you are at higher risk.
- 3 Existing injury.** Inflammation of the muscles or tendons from previous shoulder injury can lead to frozen shoulder.
- 4 Prolonged immobilisation after injury/surgery.** Your risk increases if you remain still for long periods while recovering from an illness or surgery, or if surgery prevents you from moving your arm.

Signs and symptoms

Symptoms begin with a gradual onset and progress through three stages, each lasting on average 3 to 9 months.

- 1 Freezing.** Pain is the dominant symptom and increases in severity over weeks, and may affect sleep and movement.
- 2 Frozen.** Movement is progressively limited and the shoulder becomes increasingly stiff, eventually affecting daily activities. Pain gradually lessens as stiffness increases.
- 3 Thawing.** The range of motion improves gradually during this phase, which can take up to 24 months.

Complications

Complications include long-term pain and shoulder stiffness.

Prevention

Avoid prolonged immobilisation (e.g., slings and plaster casts).

Frequently Asked Question



Can Shoulder Injuries Be Prevented?

While it may not always be possible to avoid injury arising from accidents, the following tips will help to reduce the risk of developing an overuse injury.



Avoid jerky movements when lifting loads



Avoid repetitive overhead movements



Use appropriately-sized equipment



Increase training load gradually over weeks and months



Pay attention to proper technique during recreational and sports activities (e.g., swimming, tennis, golf)



Engage the large muscles of the trunk to generate force during sports, instead of relying on the smaller shoulder and arm muscles

Diagnosis

A thorough history and physical examination is usually sufficient to establish the diagnosis.

X-rays are usually normal. Magnetic resonance imaging (MRI) or blood tests may be ordered if other factors are suspected to have caused the frozen shoulder. This will help with selecting the appropriate course of treatment.

Treatment

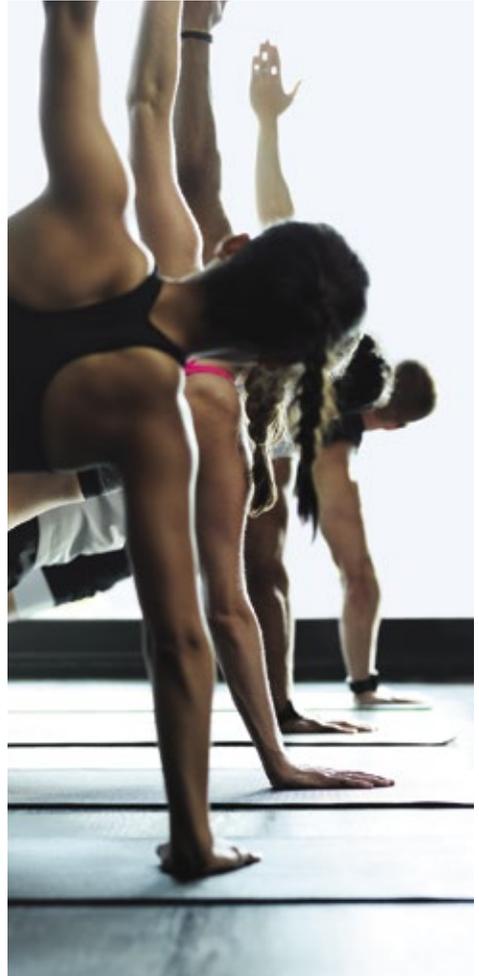
Treatment can be challenging and requires a considered approach and patient compliance to improve outcomes.

- 1 **Rest.** Early treatment includes rest, ice and painkillers.
- 2 **Physiotherapy.** Early activity and referral to a physiotherapist for joint mobilisation to increase range of motion in the affected shoulder is encouraged.
- 3 **Corticosteroids.** Injection with corticosteroids can reduce pain and duration of symptoms in the early phases of the disease.

If symptoms persist despite non-surgical management, manipulation under anaesthesia (MUA) may be carried out. If MUA fails, surgical capsular release is done.

Prognosis

Symptoms can persist from 18 months to more than three years. However, more than 90% of patients with spontaneous frozen shoulder have shown to recover to normal levels of function and movement within two years without any treatment.



3

Hip

The hip joint is where the femur (thigh bone) meets the pelvis. This joint is very stable. Hip injuries are usually caused by chronic overuse of the joint and its associated muscles rather than a direct traumatic injury.

Hip pain is a common and disabling condition that affects people of all ages. There are many causes of hip pain, and hip injuries may present as pain in the buttock, groin, thigh, back or knee.



Information contributed by:

Iliotibial Band Friction Syndrome

Iliotibial band (ITB) friction syndrome (ITBFS) is a common cause of pain on the outer aspect of the knee particularly among runners, military personnel, and cyclists. It is an overuse injury and is often treated successfully with a conservative approach.

Causes and risk factors

The exact cause of the condition remains elusive, although biomechanical and training factors have been identified to play a large role in the development of ITBFS.

- 1 **Errors in training**
ITBFS is usually caused by overuse, which is mainly due to errors in training. Factors such as inadequate warm-up and ramping up the speed, distance and frequency of the training too fast – especially when you are not accustomed to the activity – may predispose you to injury.
- 2 **Worn out or improper footwear**
Wearing worn out or improper footwear that does not provide adequate support can affect not just the joints of the foot and ankle, but also the knee, hip and the muscles and other soft tissues that support these joints.
- 3 **Changes in training surface**
Sudden changes in training surface such as from soft to hard or from flat to uneven surfaces or running downhill.
- 4 **Certain physical conditions**
Other risk factors include:
 - Differences in the length of both lower limbs
 - Tight ITB
 - Weak hip muscles
 - Excessive rolling in of the foot (overpronation)

Signs and symptoms

The pain is often localised close to the outer side of the knee where the ITB attaches to the shinbone (tibia), but may also be experienced at the outer part of the hip.

Many people experience pain only during rigorous activities; however, some may experience persistent pain with walking as the syndrome progresses.

It is worse with downhill running or squatting and becomes worse with activity after a pain-free start as it is mechanical in nature. The pain may also spread from the knee upwards or downwards.

A swelling or thickening of the tissue may also be felt at the point where the iliotibial band moves over the lower end of the femur. At the hip, the pain is sometimes reproduced if the affected leg is crossed.

Diagnosis

The diagnosis is often obtained clinically through a **history and physical examination**.

X-rays are usually unremarkable in ITBFS, but may be ordered to rule out fractures, bone spurs or other bony lesions. Alignment and soft tissue swelling may also be evaluated.

Ultrasound examination is useful in imaging soft tissue swellings, inflammation of fluid-filled pockets (bursitis) and tears.

Magnetic resonance imaging (MRI) is seldom performed but is effective in excluding other conditions which may present with symptoms similar to ITBFS.

Prevention is key to avoid recurrence of ITBFS

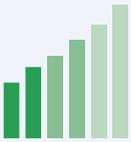


Check your shoes

Consider replacing your running shoes between every 500 to 750 km, which equates to approximately 4 to 6 months for someone who runs 30 to 35 km per week.

However, you may start looking for your next pair of shoes if your current shoes are showing signs of excessive wear, such as the outer sole wearing through to the white midsole, the midsole becoming too soft and collapsing easily under pressure, or the toes wearing through the shoe box and the tearing of the shoe upper.

Worn out shoes absorb less shock, which may lead to an increased risk of ITBFS. Another useful strategy is to alternate between two pairs of running shoes to allow each pair's shock-absorbing cushion to return to its optimal form before you wear them again.



Ramp up the training intensity gradually

Avoid being too ambitious and doing too much too soon. Both novice and professional athletes are recommended to use the 10 percent rule as a guide when increasing weekly training.

This guideline simply states that you should increase your activity no more than 10 percent per week. This includes the distance, speed, intensity, and duration of your exercise session.



Strengthen the hip and lower limb muscles

Have a regular exercise routine that aims to strengthen the gluteal muscles (backside muscles) and the quadriceps, to take the stress and load off the ITB. These simple exercises may include step-downs, clamshells, side planks, and squats.

They may be performed on the days of the week that you are not running or cycling.



Stretch your muscles and ITB

Stretch after your workout to keep the ITB, the gluteal muscles and hamstrings (posterior thigh muscles) flexible and prevent them from tightening. You may also use a foam roller to stretch them after exercise, especially when the muscles are warm and supple.



Warm up adequately

It is recommended to perform 5 to 10 minutes of a low-to-moderate intensity activity, such as brisk walking, before engaging in the more strenuous phase of your exercise routine.



Avoid uneven training surfaces and running downhill excessively

Running downhill increases friction on the ITB and adds more stress to the quadriceps (anterior thigh muscles). As the quadriceps fatigue, they lose the ability to stabilise and control the kneecap tracking position and alignment, therefore increasing the stress on the ITB.

Treatment

Most people do not see a doctor for ITBFS unless the pain interferes with normal activities.

1 Rest

Initial treatment typically involves a period of rest and modification of activities.

Recommendations include:

- Reducing the frequency, intensity and duration of physical activity
- Modifying activities to avoid repetitive movement of the hip and the lower limbs
- Stretching out tight structures (piriformis, hip abductor and hip flexor muscles, ITB)

If symptoms persist or if there are associated symptoms such as leg weakness, numbness, or shooting pain down the leg, medical attention for a thorough evaluation should be sought.

2 Medication

Painkillers such as paracetamol or nonsteroidal anti-inflammatory drugs (NSAIDs) may be used to reduce the discomfort.

Injection of a corticosteroid into the fluid-filled pocket (bursa) may reduce painful inflammation.



3 Physiotherapy

Physiotherapy for stretching and strengthening of the musculature surrounding the hip and lower limbs may be part of the treatment.

A podiatry referral for orthotics may be useful if it is determined that abnormal foot biomechanics is contributing to the condition.

Snapping Hip Syndrome

Snapping hip syndrome is characterised by an audible or visible snap or click in or around the hip joint when walking, getting up from a chair, or swinging the leg around. Athletes appear to have an increased risk of snapping hip syndrome due to repetitive and physically demanding movements of the hips and lower limbs.

Causes

Snapping hip syndrome has multiple causes and is classified based on the anatomic structure that is the cause or the source of the snapping sensation. Three main snapping hip categories have been recognised:

- 1 The most common cause involves the **snapping of the iliotibial band (ITB) that runs over the outside of the hip joint (extra-articular)**.

This is commonly associated with differences in lower limb length (usually the longer side is symptomatic) and predisposed by:

- Tight or thickened ITB on the involved side
- Weakness in the hip abductor and external rotator muscles
- Poor stability in the lower back and pelvic region
- Abnormal foot mechanics such as excessive rolling in of the foot (overpronation)

- 2 The second cause for snapping hip is due to **the iliopsoas tendon catching on the prominence of the pelvis when the hip is flexed**.
- 3 The third and least likely cause involves **snapping within the joint (intra-articular)**, and can be due to loose bodies, wear and tear of the joint cartilage, or tears of the soft tissue covering the hip socket (labrum).

Risk factors

There is no data available on the prevalence or incidence of snapping hip syndrome in our local population.

In the United States, the syndrome is most often found in individuals aged 15-40 years and affects females slightly more than males. The most common athletes to be affected are ballet dancers, runners and soccer players.

Signs and symptoms

- 1 The symptoms of snapping hip syndrome include snapping in and around the hip joint with moving the leg forward (flexion) or backward (extension) at the hip.
- 2 The sensation of hip popping may sometimes be felt (palpable) at the front or side of the hip and may be accompanied by pain.
- 3 These symptoms are usually present for several months or years rather than days or weeks before treatment is sought.

Diagnosis

The diagnosis is often obtained clinically through a **history and physical examination**.

Imaging tests may also be ordered to confirm the clinical diagnosis. Although x-rays of people with snapping hip do not typically show anything abnormal, x-rays or other tests may be ordered to exclude any other problems with the bones or joints.

Ultrasound examination examines the soft tissues, and when performed dynamically during hip motion, may visualise the tendon snapping and any accompanying inflammation of fluid-filled pockets (bursitis).

Magnetic resonance imaging (MRI) can sometimes identify intra-articular causes of snapping hip syndrome.

Prevention

Snapping hip syndrome can be prevented by stretching the tight lower limb and hip muscles regularly, as well as strengthening the weak core muscles that help to stabilise your hip and maintain your posture.



Strengthen the hip and lower limb muscles

An ideal exercise programme should also include exercises that strengthen the lower back muscles, the gluteal muscles and the hip flexor muscles. These muscles are important as they help to stabilise your hips and maintain your posture during activities.

These exercises may include step-downs, clamshells, front and side planks, bridges, lunges as well as squats.





Stretch your muscles and ITB

Stretch after your workout to keep the ITB, hip flexor muscles (anterior hip and thigh muscles), the gluteal muscles (backside muscles) and the hamstrings (posterior thigh muscles) flexible and prevent them from tightening.

You may also use a foam roller to stretch them after exercise, especially when the muscles are still warm and supple.



Warm up adequately

It is recommended to perform 5 to 10 minutes of a low-to-moderate intensity activity, such as brisk walking, before engaging in the more strenuous phase of your exercise routine to ensure that these muscles are warmed up prior to the activity.



Treatment

Seek medical attention if there is pain or if the injury interferes with normal activities.

1 Rest

Start by avoiding repetitive movement of the hip and lower limbs. Apply ice to the affected area to reduce pain or inflammation. Nonsteroidal anti-inflammatory drugs (NSAIDs) may be used.

2 Corticosteroid

Injection of a corticosteroid into an inflamed fluid-filled pocket (bursitis) may be useful to reduce painful inflammation.

3 Physiotherapy

Physiotherapy for stretching and strengthening of the musculature surrounding the hip, as well as manual release of certain tight structures, may be part of the treatment.

4 Surgery

In the rare instance that snapping hip does not respond to conservative treatment or when an intra-articular pathology is present, surgery may be recommended.

The type of surgery (keyhole arthroscopy or an open procedure) will depend on the cause of the snapping hip, and should be decided in consultation with an orthopaedic surgeon.

Hip Osteoarthritis

Hip osteoarthritis (OA) is a degenerative disease affecting the hip joint. It occurs most often in people 50 years of age and older, though it may occur in younger people too.

A healthy hip has linings of cartilage and lubricating joint fluid (synovial fluid) to protect and cushion between the pelvic and thigh bones, allowing pain-free hip movements. In OA, the cartilage lining gradually wears out, becomes frayed and rough, and the protective joint space between the bones decreases.

All these can result in bone rubbing on bone thus causing joint stiffness and pain. To make up for the lost cartilage, the damaged bones may start to grow outward and form bone spurs (osteophytes).



Causes and risk factors

OA has no single specific cause, but there are certain factors that may increase the risk of developing the disease, including:

- 1 Previous trauma or injury to the hip joint
- 2 Obesity
- 3 Increased age
- 4 Congenital malformation of the hip



Symptoms

Pain and stiffness may be worse in the morning, or after sitting or resting for a while. Over time, painful symptoms may occur more frequently, including during rest or at night.

Additional symptoms may include locking, a grating or crunching sensation that may be felt or heard (crepitus) during movement, and loss of range of motion.

Pain may flare up after vigorous activities.

Diagnosis

Doctors grade the severity of OA by evaluating x-rays of the hip, together with a combination of symptoms including pain, stiffness or loss of range of motion.

Occasionally magnetic resonance imaging (MRI) of the hip may be performed to check on the soft tissue component of the hip.

Prevention

Making certain lifestyle changes can help you improve your joint health and prevent hip OA.



Modify your activities

Activities that involve a lot of repetitive motion of the hips and excessive loading of the lower limbs can be hard on the hip joint.

Talk to your doctor about ways to reduce this risk if you have been performing activities that involve a lot of climbing, walking, running, jumping, twisting, squatting or lifting.



Maintain a healthy weight

Excess weight is one of the biggest risk factors of hip OA, as it puts extra stress not just on the hips but also on the other weight-bearing joints of the lower limbs, such as the knees and ankles. This can speed up the deterioration of the joint cartilage.

Overweight and obese individuals are at high risk of developing OA. Losing weight through a healthy diet and regular exercise can also help to reduce pain and improve OA symptoms.



Exercise regularly

Low-impact exercises such as walking are safe for the hip joint and can even improve joint health. An ideal exercise programme must include strength training and stretching exercises in addition to aerobic exercise. Regular exercise can help slow down, or even prevent hip OA.

Exercise helps by:

- Maintaining healthy joints
- Relieving joint stiffness and muscle tightness
- Reducing pain
- Improving muscle endurance and reducing fatigue
- Increasing muscle and bone strength
- Improving balance and stability to prevent falls

Treatment

1 Home treatment

Initial home treatment options include avoiding aggravating activities, and taking medications such as nonsteroidal anti-inflammatory drugs (NSAIDs) to reduce pain. Modification of sport to avoid repetitive movement of the hip and switching from high impact activities to lower impact exercises are recommended.

2 Physiotherapy

If the pain does not subside after trying these conservative methods, medical attention should be sought. Physiotherapy is a useful modality of treatment which includes specific exercises that can help increase range of motion and flexibility, as well as strengthen the muscles in the hip and lower limbs.

3 Surgery

Surgery may be recommended if the pain from hip OA causes disability and is not relieved with conservative treatment. Surgical treatment is individualised and should be decided in consultation with an orthopaedic surgeon.



4

Knee

Knee pain is a common complaint that affects people of all ages. Knee pain may be the result of an acute injury, such as a ruptured ligament or torn meniscus or chronic, repetitive overuse injuries. Pain, instability, swelling and stiffness are some of the common symptoms in the knee.



Information contributed by:

Knee Osteoarthritis

A healthy knee has linings of cartilage and lubricating joint fluid (synovial fluid) to protect and cushion between the main leg bones, allowing pain-free knee movements. However, in osteoarthritis (OA), the cartilage lining gradually wears out, producing the symptoms of OA.

Causes and risk factors

Previous knee injury, especially with ligament or meniscus damage, poses the largest risk of knee OA. Age is a contributing cause, together with obesity.

Signs and symptoms

Common symptoms of knee OA are:

- 1 Pain
- 2 Stiffness
- 3 Swelling
- 4 Loss of range of motion
- 5 Symptoms can be worse in the mornings or after a period of inactivity, especially stiffness
- 6 Pain may also increase after weight-bearing activities

Complications

This is an irreversible condition and the symptoms may worsen with time. Knee OA flare which presents as increased pain and swelling of the knee can be expected, and may become more frequent as the condition worsens.

Prevention



Preventing traumatic injury to the knee will be of definite help. Keeping physically active and body weight within the healthy body mass index (BMI) range can help to maintain the health of the knee joint.

Diagnosis

Doctors grade the severity of OA by evaluating the x-rays of the knee, together with a combination of symptoms including pain, stiffness, swelling or loss of range of motion.

Occasionally magnetic resonance imaging (MRI) of the knee might be performed to check on the soft tissue component of the knee.



Treatment

If the knee is swollen, icing, compression, and elevation can be helpful. During an initial OA flare, rest, activity modifications and pain management with nonsteroidal anti-inflammatory drugs (NSAIDs) are advised.

Once the pain is more settled, lifestyle modifications such as weight loss and physiotherapy are recommended.

Occasionally, supplements like glucosamine and chondroitin sulphate may be prescribed. Corticosteroid or viscosupplementation injections may be recommended in some cases.

Should the knee symptoms not respond to these conservative treatments and the joint degeneration be severe, knee replacement surgery may be advised. Surgical treatment is individualised and the patient should make an informed decision after consultation with an orthopaedic surgeon.

“Surgical treatment is individualised and you should make an informed decision after consultation with an orthopaedic surgeon.”

Meniscus Tear of the Knee

The menisci (singular: meniscus) are two C-shaped fibrocartilaginous structures located on the inside of your knee that act as a cushion inside the knee joint. They can get damaged in various ways as described below.

Causes and risk factors

Meniscus tears may occur during a trauma or fall, or if there is a sudden twisting or rotational force on the knee during sports such as soccer, basketball or rugby. In older patients, degenerative meniscus tears associated with knee osteoarthritis can occur.

Signs and symptoms

Symptoms of a meniscus tear depend on the size and location of the tear and whether other knee injuries occurred along with it.

Symptoms can include:

- 1 Pain, especially when the knee is rotated or twisted
- 2 Swelling of the knee joint
- 3 Locking of the knee when you try to move it
- 4 Clicking sound within the knee
- 5 Catching when the knee is flexed
- 6 Giving way of the knee

How does it occur?

A meniscus tear can occur when the knee is forcefully twisted, or with minimal trauma such as squatting.



Complications

Complications include locking – a mechanical blockage to the knee range of motion; recurrent knee swelling with impact or pivoting actions of the knee; and accelerated knee osteoarthritis.

Diagnosis

Diagnosis begins with a thorough history of the mechanism of injury as well as the presenting symptoms, followed by a careful physical examination.

The physician may order imaging studies to confirm and determine the extent of the injury, especially if other injuries in addition to the meniscal tear are suspected. X-rays may be ordered if there is concern for bony injury. Magnetic resonance imaging (MRI) can help to determine injuries to the menisci and ligaments.

Treatment

Initial treatment for a meniscus injury focuses on decreasing pain and swelling in the knee. Rest and pain medications can help to decrease these symptoms.

Physiotherapy may be indicated to decrease pain; restore normal range of motion, balance and control of the lower limb; and to gradually strengthen muscles around the knee.

A brace may also be prescribed to protect the injured knee, and for extra stability during walking. Crutches may be used temporarily if it is painful to put weight on the affected leg.

If symptoms are persistent and severe despite the initial period of rehabilitation, surgery may be required to either remove or repair the torn portion of the meniscus. Surgical treatment is individualised and the patient should make an informed decision after consultation with a sports orthopaedic surgeon.



Patellofemoral Pain Syndrome (Runner's Knee)

Patellofemoral pain syndrome (PFPS) describes pain on and around the kneecap (patella). It is also sometimes called "anterior knee pain syndrome" or "runner's knee" because it is common in runners and active individuals.

Causes and risk factors

In general, PFPS occurs when the patella does not move or track smoothly and with proper alignment on the femur (thigh bone) when the knee is bent.

There are several risk factors for PFPS including:

- 1 Repetitive deep knee bending
- 2 Flat feet
- 3 Technical errors in running or in sports
- 4 Tight iliotibial band
- 5 Muscle imbalances
- 6 Weak thigh and gluteal muscles

Signs and symptoms

Symptoms of PFPS include aching or sharp pain at the front of the knee that may be provoked by bending the knee, using the stairs, or sitting for long periods of time with the knee bent.

Prevention



Manage physical activity

To prevent PFPS, excessive training or sudden increases in physical activity level should be avoided.



Strengthen the muscles

Muscles that are involved in running and other lower limb sports should be adequately strengthened, so that they can meet the demands of sporting and daily activities.



Have the right footwear

Shoes should be changed regularly, as excessively worn-out shoes may not provide adequate support or shock absorption. Shoes should be suitable for the foot type and should be of correct fit and size.

Diagnosis

The diagnosis is often obtained through a thorough history and physical examination. Investigations such as x-rays, ultrasound scans, magnetic resonance imaging (MRI), or computed tomography (CT) scans may be done to exclude other related injuries or conditions. Assessment of gait while running on a treadmill may be performed.



Treatment

Physiotherapy can help regain the range of motion in the knee and correct muscle imbalances that affect patella movement. Other treatments include sports taping of the knee to help facilitate exercise without pain.

Activity modification forms part of the treatment of PFPS, by reducing activities that involve repetitive, high impact on the knees or deep knee bending, such as running, stairs or step aerobics. Activities should be adjusted to a level that can be comfortably tolerated. High impact activities may be replaced with low impact exercises such as cycling, swimming, deep water running, rowing or using the elliptical trainer.

A podiatry consult for further assessment and orthotics (insoles) fitting may be scheduled, if necessary.

Surgery is seldom required in the treatment of PFPS.

Patellar Tendinopathy (Jumper's Knee)

The patellar tendon is the attachment between the bottom of the knee cap (patella) and the top of the shinbone (tibia). It attaches the thigh muscle (quadriceps) to the tibia to allow you to straighten the lower leg.

Patellar tendinopathy is an overuse injury in athletes that do a lot of jumping in their sports (such as basketball, high jump or volleyball). Hence, it is also sometimes called “jumper’s knee”.

Causes and risk factors

Repetitive jumping as well as significant increase in training load or intensity in impact sports are causes of this condition.

There are several risk factors for patellar tendinopathy including:

- 1 Repetitive jumping
- 2 Flat feet
- 3 Technical errors in sports
- 4 Tight hamstrings
- 5 Muscle imbalances
- 6 Weak thigh and gluteal muscles



Signs and symptoms

Pain over the patellar tendon is initially felt during jumping, but the pain may also occur during other knee movements. Occasionally you might experience swelling over the tendon after physical activities.

Complications

Persistent pain leading to loss of function and restriction of physical activities are some complications of patellar tendinopathy.

“Other treatments include extracorporeal shockwave therapy (ESWT) to stimulate healing at the patellar tendon.”

Prevention



Manage training programme

To prevent patellar tendinopathy, avoid excessive training or sudden increases in physical activity level, as that may cause symptoms.



Strengthen the muscles

Muscles that are involved in jumping and landing should be adequately strengthened, so that they can meet the demands of sporting and daily activities.



Have the right footwear

Shoes should be changed regularly, as excessively worn-out shoes may not provide adequate support or shock absorption. Shoes should be suitable for the foot type and should be of correct fit and size.

Diagnosis

The diagnosis is often obtained through a thorough history and physical examination.

Bedside ultrasound could be performed to look at the tendon structure. Imaging tests such as x-rays, ultrasound scans, magnetic resonance imaging (MRI), or computed tomography (CT) scans may be done to exclude other injuries or conditions.

Treatment

Initial rest, ice and pain medications such as nonsteroidal anti-inflammatory drugs (NSAIDs) can be helpful. Physiotherapy may be prescribed to decrease the stress on the patellar tendon, alter jumping and running biomechanics, teach taping techniques, and stretch and strengthen the muscles surrounding the knee.

Other treatments include extracorporeal shockwave therapy (ESWT) to stimulate healing at the patellar tendon.

Surgery is seldom required in the treatment of patellar tendinopathy.



5

Foot and Ankle

The foot and ankle are complex mechanical structures joined together by an extensive network of ligaments, muscles and tendons that function to provide stable support to the body. Foot and ankle injuries are among the most frequent musculoskeletal injuries.



Information contributed by:

Ankle Sprain – Lateral Ligament Injury

A lateral ligament injury usually refers to a sprain or tear of one or more of the ligaments on the outer (lateral) aspect of the ankle. The lateral ligaments consist of three ligament bands which provide stability to the lateral aspect of the ankle joint.

These ligaments as a group are referred to as the lateral ligament complex.

Causes and risk factors

The lateral ligaments are injured when they are overstretched (sprained). This commonly occurs when the foot and ankle are forcibly rolled inwards. This injury is often referred to as a “rolled ankle”.

The ankle may sprain during rapid changes in direction, on uneven surfaces, landing awkwardly on the foot after jumping or pivoting, treading on a ball or opponent’s foot, or another person landing or stepping on your foot during sports activity.

Factors that increase the risk of a sprained ankle include:

- 1 Sports participation**
Ankle sprains are a common sports injury, particularly in sports that require jumping, cutting action, or rolling or twisting of the foot such as basketball, tennis, football, soccer and trail running.
- 2 Uneven surfaces**
Walking or running on uneven surfaces or poor field conditions may increase the risk of an ankle sprain.
- 3 Prior ankle injury**
Previous sprains or other injuries to the ankle increase the risk of spraining the same ankle again.
- 4 Poor physical condition**
Poor strength, balance or flexibility in the ankles may increase the risk of a sprain when participating in sports.
- 5 Improper shoes**
Shoes that do not fit properly or are not appropriate for an activity, as well as high-heeled shoes in general, make ankles more vulnerable to injury.

Signs and symptoms

The first symptom after a lateral ligament sprain is pain on the outside and front of the ankle. There may also be an audible snap, crack or tear.

Depending on the severity of the injury, the outside and front of the ankle may swell and there may be difficulty walking due to pain. Swelling may be immediate or occur over a period of hours. The ankle may also feel weak.

Over the coming days, bruising may develop which may extend up the leg and down to the toes.

Diagnosis

The diagnosis is often obtained through a thorough history and physical examination. If the injury is severe:

- 1 **X-rays** may be ordered to exclude bone fractures.
- 2 **Bedside ultrasound** examination could be performed to look at the ligament or tendon structures in the ankle.
- 3 **Magnetic resonance imaging (MRI) or computed tomography (CT) scans** may be done to evaluate the bones and/or soft tissues of the ankle and exclude other injuries or conditions.

Complications

Most lateral ligament injuries heal without complication within a matter of weeks. However, a proportion of injuries can result in longer-term effects depending on the severity of the injury and extent of damage.

When the ankle is sprained, a number of structures in the vicinity of the lateral ligaments may also be injured. These include bone, cartilage and muscle tendons. Injuries to these structures can produce persistent pain and swelling which can slow recovery.

Following injury, there may be reduced range of movement, weakness and an increased chance of re-injuring the ankle. Failing to treat a sprained ankle properly, engaging in activities too soon after an ankle sprain, or repeated sprains to the ankle might lead to chronic ankle pain, chronic ankle joint instability, and arthritis in the ankle joint.

Treatment

To limit the severity of this injury, it is advisable to stop activity immediately and start initial treatment. To control the amount of swelling and limit the degree of damage to the lateral ligament complex, the RICE regime should be commenced (Rest, Ice, Compression, Elevation). This will help to reduce blood flow to the injured area, thereby reducing the extent of swelling and tissue damage.

- 1 **Rest** involves ceasing activity or sport and limiting the amount of weight put on the ankle. Crutches may be required if there is difficulty walking.
- 2 **Ice** should be applied to the injured site for 15 to 20 minutes every 1 to 2 hours. Ideally, it should be applied using crushed ice wrapped in a moist cloth or towel.

- 3 **Compression** involves the application of an elastic bandage around the injured ankle. It should be firm but not tight enough to cause pain.
- 4 **Elevation** involves lying with the injured ankle resting comfortably on a chair or pillows so that it is above the level of the heart.

After the initial RICE treatment, the aim of subsequent treatment is to restore the ankle to full function. This involves restoration of full range of motion, strengthening the muscles around the ankle, improving the proprioception (balance) with specific exercises and graduated return to full activity.

Strapping, taping and bracing the ankle and other preventive measures may be prescribed in certain cases.



Achilles Tendinopathy

Achilles tendinopathy is an overuse injury of the Achilles tendon, the band of tissue that connects calf muscles at the back of the lower leg to the heel bone. It most commonly occurs in runners who have suddenly increased the intensity or duration of their runs. It is also common in middle-aged people who play sports, such as tennis or basketball.

Causes and risk factors

Achilles tendinopathy is a common injury in sports involving running and jumping, and results from overuse of the tendon. The function of the Achilles tendon is to transmit forces produced by the calf muscles to the heel bone.

Repetitive use of the calf muscles and therefore the Achilles tendon can lead to microscopic tears within the substance of the tendon. However, due to the relatively lower blood supply due to its thickness, the healing of the tears may be sub-optimal and this may result in degeneration of the tendon.

A number of factors may increase the risk of developing Achilles tendinopathy, including:

- 1 **Gender.** Achilles tendinopathy occurs more commonly in men.
- 2 **Age.** Achilles tendinopathy is more common with increasing age.
- 3 **Obesity.** Excess body weight can increase tendon strain.
- 4 **Exercise-related training choices.**
 - A recent change in training frequency, duration or intensity
 - Running on hilly terrain
 - Reduced rest times
 - Poor footwear or running in worn-out shoes
 - Poor flexibility – decreased muscle flexibility and joint range of motion, especially of the lower limbs
- 5 **Medications.** Certain types of antibiotics, called fluoroquinolones, have been associated with higher rates of Achilles tendinopathy.



Signs and symptoms

Achilles tendinopathy results in pain within the tendon just above where it attaches to the heel bone. This pain typically develops gradually. Initially, the tendon may only be painful, and tight following exercise.

However, with continued participation in the aggravating sport or activity, the tendinopathy may progress and the pain within the tendon becomes more intense and more frequent.

Complications

Achilles tendinopathy can weaken the tendon, making it more vulnerable to a tear (rupture) – a painful injury that usually requires surgical repair.

Diagnosis

The diagnosis is often obtained through a thorough history and physical examination. X-rays may be ordered to exclude bone fractures. Ultrasound examination or magnetic resonance imaging (MRI) can assist in diagnosing the problem and establishing its severity.

Treatment

Achilles tendinopathy generally does not settle without assessment and medical care.

Prior to seeking medical attention, initial treatment can be commenced. This should consist of icing the Achilles tendon following participation in the aggravating sport or activity, and regular calf stretching. Icing may consist of crushed ice wrapped in a moist towel applied for 15 to 20 minutes over the Achilles region.

Treatment of the condition includes nonsteroidal anti-inflammatory drugs (NSAIDs) and activity modification to avoid the aggravating sport or activity.

Physiotherapy for soft tissue treatment, such as release and stretching, and strengthening exercises may be useful in the treatment of Achilles tendinopathy.

Other treatments include extracorporeal shockwave therapy (ESWT) to stimulate healing of the Achilles tendon.

Plantar Fasciitis

Plantar fasciitis is pain on the inside aspect of the heel. It involves inflammation of a thick band of tissue that runs across the bottom of the foot and connects the heel bone to the toes (plantar fascia).

Causes and risk factors

It is usually an overuse injury that causes degeneration of the plantar fascia at its attachment site on the heel bone. The plantar fascia is in the shape of a bowstring, supporting the arch of the foot and absorbing shock during walking. If tension and stress on this bowstring become too great, small tears can occur in the fascia.

Repeated stretching and tearing can irritate or cause degeneration of the fascia, although the cause remains unclear in many cases of plantar fasciitis.

Although plantar fasciitis can develop without an obvious cause, some factors can increase the risk of developing this condition. They include:



- 1 **Age.** Plantar fasciitis is most common between the ages of 40 and 60 years.
- 2 **Certain types of exercise.** Activities that place a lot of stress on the heel and attached tissue, such as long-distance running, ballet dancing and aerobic dancing, can contribute to the onset of plantar fasciitis.
- 3 **Foot mechanics.** Flat feet, a high arch or even an abnormal pattern of walking can affect the way weight is distributed during standing and can put added stress on the plantar fascia.
- 4 **Obesity.** Excess body weight puts extra stress on the plantar fascia.
- 5 **Occupation.** Occupations involving long hours of walking or standing on hard surfaces, such as factory workers and teachers, increase the load on the plantar fascia.

Signs and symptoms

The pain is typically worse in the morning, with the first steps being very tender until the area warms up. Pain is worse with high-impact weight-bearing activities.

The site of tenderness is localised to the inside aspect of the heel and is usually described as a dull ache.

Over time, combined with the repetitive nature of running or walking, the degeneration can get worse and the intensity of the pain increases.

Diagnosis

The diagnosis is often obtained through a thorough history and physical examination. Imaging tests, such as x-rays, ultrasound examination and/or magnetic resonance imaging (MRI) can assist in diagnosing the problem, establishing its severity, and excluding other conditions.

Treatment

Although the pain in plantar fasciitis improves with warming up, it does not usually go away on its own, and tends to progress over time with continued loading of the area. Medical attention is often required to treat this condition definitively.

Treatment involves a combination of ice, massage, taping, stretching, as well as assessment and correction of biomechanical anomalies which may have caused the injury.

Footwear assessment is also important in the successful treatment of plantar fasciitis.

A sports medicine professional will also be able to provide assistance in the return to activity programme to prevent recurrence of the injury.

If the condition does not resolve after treatment with the above measures for several months, other treatment modalities include:

- 1 **Injection of corticosteroid.** Injecting corticosteroid medication into the tender area can provide temporary pain relief. Multiple injections are not recommended as they can weaken the plantar fascia and possibly cause it to rupture.
- 2 **Extracorporeal shockwave therapy.** In this procedure, sound waves are directed at the area of heel pain to stimulate healing.
- 3 **Surgery.** Few people need surgery to detach the plantar fascia from the heel bone. It is generally an option only when the pain is severe and other treatments have failed. It can be done as an open procedure or through a small incision with local anaesthesia.

6

Concussion in Sports



Information contributed by:



Concussion

A concussion is a traumatic brain injury resulting in a disturbance of brain function. Concussions can vary in severity.

Common symptoms of concussion include headaches, dizziness, balance issues, and visual and memory disturbances.

Causes

Sports-related concussion can happen when an athlete receives a direct blow to the head during sports. It can also occur when impact to other parts of the body results in rapid movements of the head.

Risk factors and complications

Athletes that participate in **contact sports with high risk of collision** such as rugby, boxing, martial arts and motorsports are at higher risk of concussion.

Children and adolescent athletes are more vulnerable to concussion and require a longer duration to recover. They are also more susceptible to rare and dangerous neurological complications, including death caused by a single or second impact.

Repeated episodes of concussion in an athlete may result in **long-term effects on brain function**. These include memory loss, difficulty sleeping and concentrating, and mood and behaviour changes such as depression and anxiety.



How to recognise concussion or suspected concussion

The first important step in concussion management is to “**recognise and remove**”. It is essential that those involved in the sport (including pitch-side medical staff, licenced healthcare providers, coaches, players, parents and teachers) can promptly recognise the symptoms and signs of concussion.

Any athlete who displays one or more of the following signs and symptoms after a direct or indirect blow to the head should be immediately removed from play and assessed for concussion.

Red flag indicators of concussion

- | | | |
|---|---|------------------------------------|
| 1
Double vision | 2
Vomiting | 3
Neck pain or tenderness |
| 4
Seizure or convulsion | 5
Severe or increasing headache | 6
Deteriorating conscious state |
| 7
Weakness or tingling/
burning in arms or legs | 8
Increasing restlessness,
agitation or combativeness | |

Source: Concussion Recognition Tool 5 (CRT5)



The presence of any red flag indicators will require **urgent medical assessment** by a trained healthcare professional. If a healthcare professional is not available at pitch-side, **calling an ambulance** will be necessary.

Should the athlete not display any red flags, he/she should be assessed for the following signs and symptoms.

Observable signs of concussion/suspected concussion

- | | |
|---|---|
| 1
Blank or vacant look | 2
Grabbing or clutching of head |
| 3
Lying motionless on the playing surface | 4
Facial injury after head trauma |
| 5
Slow to get up after a direct or indirect hit to the head | 6
Injury event that could possibly cause concussion |
| 7
Disorientation or confusion, or an inability to respond appropriately to questions | 8
Balance, gait difficulties, motor incoordination, stumbling, slow laboured movements |

Symptoms that may suggest concussion/suspected concussion

- | | | | |
|---------------------------|----------------------------|-------------------------------|--------------------------------|
| 1
Headache | 2
Drowsiness | 3
Dizziness | 4
Sadness |
| 5
Blurred vision | 6
Neck pain | 7
More irritable | 8
More emotional |
| 9
"Don't feel right" | 10
"Pressure in head" | 11
Feeling like "in a fog" | 12
Sensitivity to light |
| 13
Feeling slowed down | 14
Nervous or anxious | 15
Balance problems | 16
Fatigue or low energy |
| 17
Nausea or vomiting | 18
Sensitivity to noise | 19
Difficulty remembering | 20
Difficulty concentrating |



“ For the first 24 to 48 hours, they should not be left alone, consume alcohol or drive a motor vehicle until cleared by a healthcare provider. ”



Concussion management

All athletes with concussion or suspected concussion should be referred to a healthcare provider for further medical management and clearance for return to play, even if the symptoms resolve.

For the first 24 to 48 hours, they should not be left alone, consume alcohol or drive a motor vehicle until cleared by a healthcare provider. They should be advised to go to the nearest hospital if any red flag signs and symptoms develop.

Summary

Concussion is a traumatic brain injury that results in a disturbance of brain function. Sports-related concussion can have serious negative long-term effects on the athlete's cognitive function, and physical and mental well-being.

The main steps of sports-related concussion management are "recognise and remove", referral to a trained healthcare provider, rest, rehabilitation, recovery and a graduated return to play.

7

Managing Your Weight



Information contributed by:

Overweight and obesity is a leading concern in the world, increasing the risk of a wide range of diseases and illnesses including coronary artery disease, type 2 diabetes mellitus, high blood pressure and certain cancers.

The average life expectancy is reduced by up to nine years for an individual who is obese.

A weight loss of 5-10% in obese people can achieve significant health benefits.

Therefore, successful implementation of a weight management programme can have significant and positive impacts on resources and health.

Our Weight Management Programme is a comprehensive, multidisciplinary, coordinated, and closely-supervised programme.

The programme comprises consultations with an assigned sport and exercise medicine (SEM) physician and a dietitian, and supervised gym sessions with an exercise physiologist. Your SEM physician will screen you for medical and musculoskeletal conditions, mutually agree on goals, and customise a dietary plan and exercise programme for you.



Who should be referred?

Definition of obesity in adults

- 1 Body mass index $> 27.5 \text{ kg/m}^2$ for Asians or $> 30 \text{ kg/m}^2$ for Caucasians
- 2 Waist circumference $> 90 \text{ cm}$ (male) or $> 80 \text{ cm}$ (female) for Asians or $> 102 \text{ cm}$ (male) or 90 cm (female) for Caucasians

Comorbidities that can be improved with weight loss / diet / exercise

- 1 Diabetes mellitus (DM)
- 2 Obstructive sleep apnoea (OSA)
- 3 Fatty liver disease
- 4 Polycystic ovarian syndrome (PCOS), male hypogonadism
- 5 Hyperlipidaemia, hypertension
- 6 Osteoarthritis (OA)

Sports Medicine Clinic (Weight Management Programme)

BMI > 23 (overweight and obese) without comorbidities

OR

With comorbidities other than those listed for referral to the Metabolic Clinic

Sports Physician-led Weight Management Programme

Metabolic Clinic

Has one or more of the conditions below:

- 1 DM on insulin or with HbA1c > 9%
- 2 Fatty liver
- 3 PCOS
- 4 Hypogonadism
- 5 Ischaemic heart disease
- 6 Endocrine conditions needing management (e.g., newly diagnosed thyroid disease)

Endocrinologist-led Weight Management Programme

Obesity Surgery Clinic

Considering surgery and meets the following criteria:

- 1 **BMI** > 37.5 or > 32.5 with DM / high blood pressure / OSA / fatty liver / hyperlipidaemia / OA knee requiring total knee replacement
- AND**
- 2 **Weight loss failure**
Lost < 5% weight in 3 months **or** regained weight **or** unable to exercise

Bariatric Surgery

“Our patients are expected to exercise 5-7 days a week, up to an hour a session.”

Do I need this Weight Management Programme?

The Weight Management Programme is a closely-supervised programme over six months. Not everyone needs close supervision, and some individuals can lose weight on their own without outside support. If you have attempted to lose weight but found the results unsatisfactory, or do not know where to start in making the change, then joining this programme may be a good next step.



What can I learn from this weight loss programme?

- 1 Safe and sustainable weight loss strategies
- 2 How to make healthier food choices
- 3 Exercise plans to keep fit and lose weight
- 4 Skills to prevent weight regain

How much weight can I expect to lose when I enrol in the Weight Management Programme?

Your SEM physician will discuss with you your weight loss targets and determine a mutually agreed target. In most cases, the weight loss target is 5-10% of your starting weight.

On average, our patients lose 7.3 kg and shed 8.3 cm off their waistline by the end of our six-month programme.

Note that we report our average results – this gives you a more accurate picture, rather than selectively highlighting the results of only our star performers, which can be deceiving. The rate of weight loss is planned at 0.5 kg to 1.0 kg per week. Most importantly, we equip you with effective weight management tools so that you continue to lose weight and **effectively maintain your weight loss** after the programme.

What is the difference between our programme and a slimming centre?

We run a hospital-based weight management programme that is medical evidence-based and designed to achieve fat loss safely and effectively. Being a mainstream healthcare institution, we audit and publish our results, and report them accurately, rather than cite anecdotal results.

I have serious medical conditions and pre-existing injuries. Is it safe for me to enrol in the Weight Management Programme?

Being a medically-based institutional programme, the Weight Management Programme is designed to handle difficult and complex cases which commercial gyms may not be equipped to manage. The programme starts with a medical screening performed by our SEM physicians, to identify existing diseases or injuries.

Our SEM physicians will ensure that your medical conditions will be taken into consideration when diet and exercise are prescribed. Exercises prescribed will be individualised to minimise injury risk and impact to the injured part of the body.

Will the Weight Management Programme take up a lot of my time?

Our programme requires a commitment on your part. This includes a time commitment, especially for the exercise sessions.

Your exercise prescription will be individually-tailored but typically, our patients are expected to exercise 5-7 days a week, up to an hour per session, although this can be divided throughout a day. You will exercise at our gym during supervised sessions with the exercise physiologist. In between these sessions, you are expected to exercise at your own home, gym or neighbourhood.

Will I be taking weight loss drugs?

Generally, we do not use weight loss drugs as a first-line treatment for obesity. Our focus is on the three pillars of weight loss, namely diet, exercise, and increased incidental daily activities.

For patients who lose weight but hit a plateau after some months, we may selectively introduce weight loss drugs after discussion with patients as an adjunct to our three pillars. The majority (80-90%) of our patients go through the whole programme successfully without having to take any weight loss drugs.



What are 5 tips that I can try on my own before I decide on a weight management programme?

1 Balance food choices

- Exercise portion control by using a smaller serving plate

2 Get active

- Choose a suitable workout programme
- Achieve at least 300 minutes of moderate exercise a week to lose weight

3 Build strength

- Resistance training can help increase your resting metabolism, and improve balance, coordination and posture

4 Be mindful of what you eat

- Focus on a diet comprising 'real food' – rich in vitamins and minerals, with no chemical additives and mostly unprocessed (e.g., tomatoes, apples, broccoli, whole eggs, salmon, unprocessed meat)
- Avoid refined grains and go for wholegrain foods
- Choose food and beverages with no or less sugar

5 Have regular meals

- Skipping meals will not help you lose weight; you could end up snacking more throughout the day because you feel hungry
- Eat breakfast to fill your stomach first thing in the morning

“Our focus is on the three pillars of weight loss, namely diet, exercise, and increased incidental daily activities.”

8

Exercise Prescription



Information contributed by:

What should I do and how much is enough?

Physical activity is a key component to achieving a healthy lifestyle and disease prevention. A variety of physical activities to improve the components of physical fitness is recommended for all adults.

Type of physical activity	Effect on physical fitness	Exercise prescription
Aerobic activity	Improves cardiorespiratory fitness and body composition	3-5 times per week, 30-60 minutes each time, moderate intensity, to achieve 150 minutes per week. For weight loss, ~300 minutes of moderate intensity exercise is recommended.
Resistance activity	Improves muscular fitness such as muscular strength and endurance	2 times per week. Start with < 50% one-repetition maximum (1RM) involving large muscle groups. 8-12 repetitions, 3 sets with rest intervals of 2-3 minutes between each repetition for each exercise. Aim to complete 30-60 minutes per session.
Stretching activity	Improves flexibility	2-3 times per week. Stretch to the point of tightness. Hold static stretch for 20-30 seconds, repeat for 3 sets.
Neuromuscular activity	Improves neuromuscular fitness such as balance, agility and proprioception	2-3 times per week, 30 minutes each time. Focus on motor skills, balance, agility, and coordination. May include yoga and Tai Chi.

The World Health Organization (WHO) recommends 150-300 minutes of moderate intensity physical activity per week, and muscle strengthening involving major muscle groups two or more days in a week.

Every active minute counts! Staying active is important for both our physical and mental well-being.

AEROBIC EXERCISE

Indoor Activities



Circuit training (no equipment needed) with push-ups, squats, lunges, calf raises, jumping jacks, crunches and planks

Weight training

Brisk walk around the house or use the stairs

Treadmill, elliptical or stationary bike

Jump rope

Do aerobics or dance to workout videos

STRENGTH TRAINING

Simple Home Exercises



Download a workout app

Follow a strength training video

Exercise using your own body weight e.g., burpees, squats, push-ups, planks (no equipment necessary)

Sit to stand using sturdy chair

Wall squats

Push-up against wall

Strength training recommendations: 8-12 repetitions of each exercise and repeat 3 times

Outdoor Activities



Yoga and mat pilates



Do gardening or lawn work

Walk, jog or cycle around your neighbourhood

Hike in nature parks

Breaking Up Sitting Time



Walking up the stairs (single leg optional)



Enabling notifications on your phone to remind yourself if you have been sitting for long periods of time



Setting up your computer at a standing desk to allow engagement of more muscles

Remember to take time for yourself every day. Even if it is only for 30 minutes, it is a great way to keep your body and mind moving!



9

Other Treatment Modalities

Information contributed by:



Extracorporeal Shockwave Therapy

Extracorporeal shockwave therapy (ESWT) is a non-invasive procedure for treating a number of painful musculoskeletal conditions. ESWT uses shockwaves to stimulate healing of the problematic tissue.

What are some common indications for ESWT?

- 1 Plantar fasciitis
- 2 Tennis or golfer's elbow
- 3 Calcific tendinopathy of the shoulder
- 4 Patellar tendinopathy
- 5 Achilles tendinopathy

How does ESWT heal an injury?

The mechanism of ESWT on musculoskeletal disorders is not fully understood, however it is thought that the shockwaves initiate a pro-inflammatory response in the affected tissue. The body responds by increasing the blood circulation and metabolism in the affected area which accelerates the body's own healing process.

It can provide short-term reduction in pain and sensitivity to the area targeted. Over time, ESWT triggers the body's repair mechanism through the local release of various growth factors.



Why and when should I have ESWT?

ESWT is offered to patients who have not responded to treatments such as rest, ice, pain relief medications and physiotherapy.

Are there any adverse effects?

ESWT is safe and effective. The shockwaves may be uncomfortable or painful, but most patients tolerate it well. Minor bruising may develop, but that is temporary and rare.

What should I do after the treatment?

You will be able to return to your usual activities right after the procedure and return to work immediately.

However, it is advised not to undertake any strenuous pain-provoking activity 48 hours following the procedure. Aggravating activities (e.g., running in the case of plantar fasciitis) should be avoided until two weeks after the completion of the course of ESWT.

Concurrent therapy (e.g., physiotherapy or orthotics) may be prescribed to address the underlying biomechanical causes of the injury.

How can I access ESWT treatment?

You will need to see a doctor first to confirm the diagnosis and decide if ESWT is medically indicated.



Viscosupplementation

Viscosupplementation is a procedure where a hyaluronic acid-based product is injected into an arthritic joint to improve pain, swelling and stiffness associated with arthritis.

What is hyaluronic acid?

Inside a healthy joint, there is a small amount of lubricating fluid called synovial fluid. The primary composition of synovial fluid is hyaluronic acid. Hyaluronic acid provides lubrication in the joint movements. It also absorbs shock which goes through the joint when it is loaded (e.g., when a person hops or jumps).

In osteoarthritis (OA), the cartilage in the joint wears out and the synovial fluid also becomes diseased and loses its lubricating and shock-absorbing abilities. The joint loses its protective mechanism and pain, stiffness and loss of function occur in the joint.

Hyaluronans are substances similar to hyaluronic acid in synovial fluid, in terms of lubricating and shock-absorbing abilities. Hyaluronans are injected into the joint affected by OA and they replace the diseased synovial fluid, protecting the already damaged cartilage lining from further damage caused by friction.

When is viscosupplementation considered for treatment?

Viscosupplementation is not regarded as a first-line treatment for joint OA. Therefore, it is usually considered when conventional and evidence-based treatments, such as exercise, weight loss and physical therapy have been tried but have not resulted in the desired outcomes.

How is the injection performed?

The doctor will clean the joint with antiseptic solutions. He or she may inject a local anaesthetic to the joint and withdraw some of the diseased synovial fluid from the joint before injecting the hyaluronan preparation into it. Occasionally the procedure will be guided with the use of ultrasound.



What should I do after viscosupplementation?

- 1 Rest the affected joint for the first 24 to 48 hours from moderate-to-vigorous activity. Daily activities are okay.

Ideally, you should avoid intensive activities (e.g., running) for the first two weeks to prevent joint fluid build-up.
- 2 If there is pain during this period, ice the area and/or take pain medications.
- 3 Any bandage placed over the injected site can be removed after 1-2 hours, if there is no bleeding.

How long does the pain relief last?

The onset of pain relief varies among individuals. Most patients experience pain relief six weeks post-injection, but there are patients who experience pain relief as soon as one week post-injection.

Viscosupplementation is not a cure for OA, and hence there may not be permanent symptom relief. A single viscosupplementation injection can provide up to an average of six months of pain relief. Hence, some patients may opt for repeat injections.



What are the possible risks or side effects?

Viscosupplementation is a safe procedure. There may be pain or bleeding to the injection site. Some patients might also develop a rash. These are usually mild and do not last more than 3-5 days.

There is also a small risk of joint fluid build-up, infection, or acute swelling (flare reaction). If you have symptoms such as a fever, or find that movement is painful or the joint feels warm, see your family doctor immediately, or go to the Accident and Emergency (A&E) Department if you suspect that you have developed a joint infection or flare reaction.

Autologous Platelet-Rich Plasma (PRP) Injection

Autologous platelet-rich plasma (PRP) injection is an emerging treatment under a group of therapeutic agents known as 'orthobiologics'. PRP therapy offers a promising solution to accelerate healing of tendon injuries without subjecting the patient to significant risk.

A small amount of venous blood is drawn from your arm using a specially designed needle and syringe. The syringe is then placed into a centrifuge and spun. This separates the plasma, which contains platelets and other growth factors, from the rest of the blood. The PRP is then injected directly into your injured or diseased body tissue.

What is plasma and what are platelets?

Blood is made up of red blood cells, white blood cells, plasma and platelets. Plasma is the liquid portion of whole blood, composed largely of water and proteins. It provides a medium for red blood cells, white blood cells and platelets to circulate around the body. Platelets are blood cells that cause blood clots and other growth healing functions.

Concentrated platelets found in PRP contain huge reservoirs of bioactive proteins and growth factors that initiate and accelerate tissue repair and regeneration.

How do PRP injections work?

PRP has been found to enhance the healing process of soft tissue injury. However, PRP does not offer a 100% reduction in pain for all patients. Rather, PRP therapy should be used as part of a larger treatment plan to reduce pain and improve function.



PRP as part of a comprehensive treatment plan

Most doctors do not consider PRP injections a stand-alone or first-line treatment for injuries. The injections are one element in a multi-faceted rehabilitation treatment plan that may include activity modification, cold or heat therapy, anti-inflammatory medication and physiotherapy.

What are the possible risks or side effects?

PRP injection is a safe procedure. There may be temporary pain, bleeding or bruising at the injection site. There is also a small risk of infection at the injection site, which typically presents with increased pain and redness 2-4 days after the injection, associated with fever.

Please see your family doctor immediately, or go to the A&E Department, if you suspect that you have developed an infection after an injection.

What should I do after the treatment?

Patients are advised to take it easy for 48 hours after the injection and avoid putting strain on the affected joint. If there is pain during this period, ice and pain medication may be taken. Patients can usually resume normal activities of daily living right after the injection.



“PRP injection is a safe procedure. There may be temporary pain, bleeding or bruising at the injection site.”

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