# THE BODY

VOLUME 2 OF *THE HUMAN GARAGE* TRILOGY

## SNAPPING HIP

Snapping hip syndrome is more common in athletes due to repeated strenuous movements of the hip, and it is mainly caused by a tendon catching on a bony prominence and then releasing, much like when you pluck a guitar string.

There are three main causes of snapping hip syndrome:

- The greater trochanter is the bony protrusion you can feel on the side at the top of your leg near the hip joint. The iliotibial band (ITB) is a strong and broad tendon that passes over this area and down to the knee on the outside of the leg. The snapping of the ITB across the greater trochanter is the primary cause of snapping hip.
- The most important muscle for bringing the thigh forward (hip flexor) is the iliopsoas major muscle, which runs from the lower spine inside the torso and then across the front of the hip joint. It can snap across the pelvis, and this condition is also known as 'dancer's hip'.
- Although not so common, the cartilage in the hip joint can sometimes tear, causing noise as the hip moves.

Diagnosis is by physiotherapy assessment, ultrasound scan, MRI, or biomechanical assessment, and treatment can include: physiotherapy, strengthening and stretching rehab, shockwave, corticosteroid injection, and if non-resolving, surgery.

Do you get brief, sudden pain down the front of your thigh, or sudden twinges with your leg giving way, meaning you are unable to walk for a while?

It can just be increasing knee stiffness and pain, but you may have the following:

## LOOSE BODY

The top of the shin bone (tibia) has a coating of cartilage, as well as two meniscal cups for the long thigh bone (femur) to move in. The menisci have a number of important roles in the function on the knee, such as spreading the load across the top of the shin bone (tibia), plus helping to both absorb shocks and stabilise the knee.

The lateral meniscus is less prone to tearing than the medial meniscus, and this tends to occur with twisting while weight bearing, which is common in many sports. Aggravating factors include aging, as much of the body's connective tissue becomes more rigid and less elastic with age, and typical symptoms include significant pain if the knee is rotated or if a sudden load increase occurs, as in jumping.

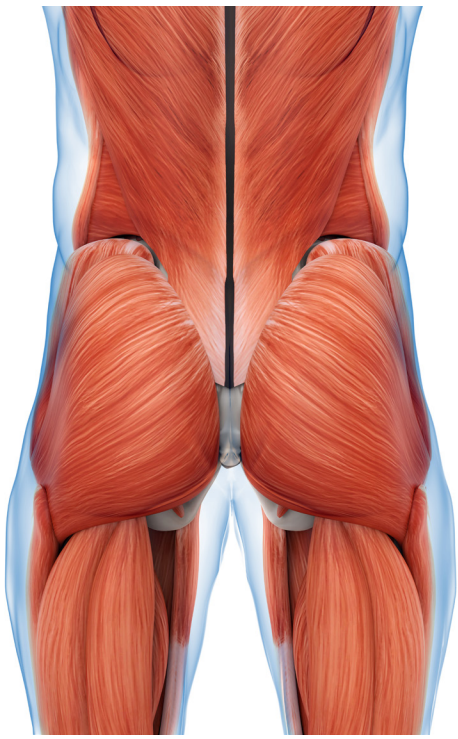
The menisci have poor blood supply and often will not heal. In cases where conservative treatment does not work, surgery is indicated with either repair or removal of the torn tissue. Recovery times will vary widely depending on the grade of the injury, and could be up to several months.

Diagnosis is by physiotherapy assessment and MRI, and treatment can include: RICE, physiotherapy, gentle specific rehab, knee brace, TENS, laser, ultrasound, sports massage, mobilisations, and if deemed necessary, a surgeon referral.

Do you get pain in the buttocks, for no apparent reason? Does walking make it worse?

*If so, you may have one of the following conditions:*

## GLUTEAL BURSITIS



Gluteal bursitis causes pain on the side of the hip, making it uncomfortable to cross your legs or walk up the stairs. Pain from gluteal bursitis can be worse in the morning, and sitting a lot can irritate the condition further.

Diagnosis is by physiotherapy assessment, X-rays to rule out osteoarthritis, and MRI, and treatment can include: ultrasound, pulsed shortwave, massage, ice, physiotherapy, and corticosteroid injection.

The vertebrae in the spine are connected to each other via the disc and two facet joints, one on each side, and the facet joints have cartilage and synovial fluid to lubricate them, allowing for low friction movement. Osteoarthritis in the facet joints can lead to cartilage loss, inflammation in the synovial fluid, bone on bone contact, and bony spurs, all of which can contribute to the pain and stiffness typically felt. Symptoms tend to be worse after inactivity and then improve as activity is underway, as the movement helps lubricate the joint. Activity throughout the day tends to bring the pain back.

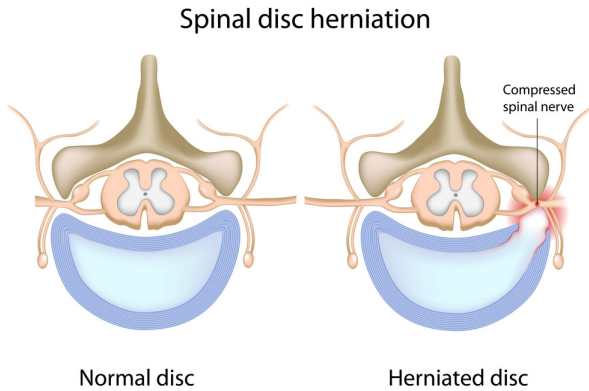
## OSTEOARTHRITIS

Osteoarthritis (OA), the most common type of arthritis, is wear and tear in the smooth cartilage that protects the bones in joints, eventually leading to bone erosion, bone spurs, and unsightly bony end thickening. The joint juice – the synovial fluid – swells and becomes inflamed and sticky, and the attacked bone

haemorrhages precious calcium. By the time we are 50 years old, 8 out of 10 of us have OA, and by 60, 9 out of 10. Left untreated, OA can have a massive negative impact on quality of life and will eventually need surgery.

Diagnosis is by physiotherapy assessment and X-ray, and treatment options include: physiotherapy, MBST, rehab, and shockwave.

## RADICULOPATHY




This describes a nerve problem, but one where the problem lies at the root, close to the spine. Neuropathy is also a nerve problem in which the nerves are not functioning correctly, with typical symptoms including pain, pins and needles, numbness, and muscle weakness. Neuropathic problems can occur as a result of interference with the nerves not at the nerve root, whereas radiculopathy is specifically caused at the nerve root. Thus radiculopathy is one type of neuropathy.

## HIP PROBLEMS AND SACRAL ILIAC

Do you get pain slowly developing in the front of your upper thigh for no apparent reason, which has maybe been going on for years? Is it painful if someone tries to push your legs together or twist your leg outwards?

*If so, you may have iliopsoas bursitis.*

## ILIOPSOAS BURSITIS

The Iliopsoas consists of three muscles that lie deep in the body, connecting the lower spine and pelvis to the thigh bone (femur). The Iliopsoas act to flex the hip. The Iliopsoas bursa is the largest in the body and eases friction of the soft tissue over the top of the hip capsule. Iliopsoas bursitis usually occurs with tendinitis of the psoas tendon, and symptoms can include pain that spreads deep into the groin, the front of the hip, down the front of the thigh to the knee, and into the lower back and buttock. These symptoms can sometimes be confused with hip osteoarthritis or rheumatoid arthritis, and the condition can link with snapping hip, trochanteric bursitis, torn hip labrum, lumbar spine and lumbosacral problems, groin injuries, and more.

Diagnosis is by physiotherapy assessment, X-ray, and MRI, and treatment can include: specialised sports physiotherapy, pulsed shortwave, deep tissue massage, Acupuncture, specific rehab strengthening of the hip, pelvis, abdominal muscles and back, stretching out the opposing muscles to take the load off the iliopsoas and stabilise the pelvis, NSAIDs, and corticosteroid injection.

The iliopsoas muscles attach between the lower back and pelvis and into the femur. They move the knee towards the chest and are very active in kicking, hurdling, and running. When the iliopsoas muscles are put under stretch, the fibres are in tension – too much and they fail. The level of iliopsoas strain is graded, and most tend to be grade II:

- Grade I: Small number of fibres torn, some pain, full function.
- Grade II: Significant fibres torn, major loss of function.
- Grade III: All muscle fibres torn/ruptured with major function.

## RHEUMATOID ARTHRITIS OF THE HIP

Hip RA can cause symptoms such as severe pain, stiffness, and swelling, and with RA's hip pain, you may have discomfort and stiffness in the thigh and groin very similar to osteoarthritis. However, other symptoms of RA include fatigue, loss of appetite, pain, swelling, and stiffness in other joints, and these can come on gradually or suddenly. Inflammatory, seronegative

arthritis occurs when the body's immune system becomes overactive and attacks healthy tissues. It can affect several joints throughout the body at the same time, as well as many organs, such as the skin, eyes, and heart.

There are three types of inflammatory arthritis that most often cause symptoms in the hip joint:

- Rheumatoid arthritis.
- Ankylosing spondylitis.
- Systemic lupus erythematosus.

Although there is no cure for inflammatory arthritis, there have been many advances in treatments to ease the symptoms, particularly with new medications. Early diagnosis and treatment can help patients maintain mobility and function by preventing severe damage to the joint.

## RHEUMATOID ARTHRITIS

In rheumatoid arthritis, the synovium thickens, swells, and produces chemical substances that attack and destroy the articular cartilage covering the bone. Rheumatoid arthritis often involves the same joint on both sides of the body, so both hips may be affected.

## ANKYLOSING SPONDYLITIS

Ankylosing spondylitis is a chronic inflammation of the spine that most often causes lower back pain and stiffness. It may also affect other joints, including the hips.

## SYSTEMIC LUPUS ERYTHEMATOSUS

Systemic lupus erythematosus can cause inflammation in any part of the body, and most often affects the joints, skin, and the nervous system. The disease is most prevalent in young adult women, who have a higher incidence of osteonecrosis (death) of the hip, a disease that causes bone cells to die, weakens the bone structure, and leads to disabling arthritis.

Blood tests may reveal whether a rheumatoid factor – or any other antibody indicative of inflammatory arthritis – is present.

## NON-SURGICAL TREATMENT

Most people find that some combination of the following treatment methods works best.

## NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS)

Drugs such as Naproxen and Ibuprofen may relieve pain and help reduce inflammation. NSAIDs are available in both over-the-counter and prescription forms.

## CORTICOSTEROIDS

Medications such as Prednisone are potent anti-inflammatories. They can be taken by mouth, by injection, or as creams.

## DISEASE-MODIFYING ANTIRHEUMATIC DRUGS (DMARDS)

These drugs act on the immune system to help slow down the progression of disease. Methotrexate and Sulfasalazine are commonly prescribed DMARDs.

## PHYSICAL THERAPY

Specific exercises help increase the range of motion in your hip and strengthen the muscles that support the joint. Acupuncture, laser, and massage can ease the pain, and in addition, regular, moderate exercise may decrease stiffness and improve endurance. Swimming is a preferred exercise for people with ankylosing spondylitis because spinal motion may be limited.

## ASSISTIVE DEVICES

This can include using a cane, a walker, a long-handled shoehorn, or a reacher.

## SURGICAL TREATMENT FOR RA HIP

If non-surgical treatments do not sufficiently relieve your pain, your doctor may recommend surgery, and the type of surgery performed depends on several factors, including: your age, the hip damage, disease, and severity. The most common surgical procedures performed for inflammatory arthritis of the hip include total hip replacement and synovectomy (the removal of the synovium/lining).

## TOTAL HIP REPLACEMENT

The surgeon will remove the damaged cartilage and bone, and then position new metal or plastic joint surfaces in order to restore the function of your hip. Total hip replacement is often recommended for patients with rheumatoid arthritis or ankylosing spondylitis to relieve the pain and improve their range of motion.

Do you have a severe stabbing pain in your hip, upper buttock, front of the thigh, your knee, and sometimes down to your ankle?

If so, you may have radiculopathy (see the spine section).

*Do you have a dull pain in your lower back, one or both buttocks, and possibly your groin, radiating sometimes to your feet? Is it uncomfortable to put one cheek on a chair?*

*If so, you may have sacroiliac joint dysfunction.*

## SACROILIAC JOINT DYSFUNCTION

The sacroiliac joint is a very strong joint that lies at the junction between the sacrum of the spine and the pelvis – it is almost immobile and is key to load transference. Sacroiliac joint dysfunction can be due to leg length discrepancy, injury, or pregnancy.

Finding out if the sacroiliac joint is inflamed is not easy, as it can hardly move, and it is difficult to palpate or manipulate. X-rays and MRI scans can read as normal, and both the hip and lower back can refer pain here.

Diagnosis is by physiotherapy assessment or biomechanical assessment, and treatment can include: mobilisations, physiotherapy, exercises, Acupuncture, orthotics, and corticosteroid injection.

*Do you have groin pain? Does lifting a straight leg, doing sit-ups, or coughing make it worse?*

*If so, you may have a hernia.*

## HERNIA

A hernia is a protrusion through a weakened wall, and there are many types of hernia affecting the stomach, abdominal organs and tissue, and groin. The most common are abdominal hernias, where adipose tissue or abdominal organs can push through, whereas hiatal are when the stomach protrudes, and inguinal hernias can be found in the groin. Men may experience a dragging feeling, or pain and swelling in the testicles. Spinal discs can also become herniated.

Hernia symptoms can include a vague pain with a palpable lump, and strangulated hernias can cause vomiting, fever, and severe pain. There

are numerous causes of hernias, some of which require surgery, though this varies greatly according to the size and location of the hernia, and the techniques involved. If the procedure is done with keyhole surgery, the recovery time is much faster. Muscle reinforcement techniques used with synthetic mesh are called tension free repairs, and results from the use of synthetic mesh show a lower reoccurrence of herniation and a faster recovery, though there are higher recorded levels of chronic pain, infection, and rejection. Conservative recovery can sometimes be successful with weight loss, gentle muscle toning, and avoiding strenuous activities.

Diagnosis is by your GP or sports physiotherapy exam and a CT scan, and the treatment can include weight loss, gentle rehab and exercises, and surgery.

*Do you have hip pain and a reduced range of movement, plus clicking on movement? Is it difficult to flex or rotate the joint?*

*Do you have a locking, clicking, or catching sensation in your hip joint, plus pain in your hip/groin with stiffness in your hip joint?*

*If so, you may have a hip labral tear.*

## HIP LABRAL TEAR

A hip labral tear can happen without any symptoms, and only MRI – ideally using a dye – can diagnose this. It basically involves the ring of cartilage (called the labrum) that follows the outside rim of the socket of your hip joint. The labrum acts like a rubber seal or gasket to help hold the ball at the top of your thighbone securely within your hip socket. Athletes who participate in such sports as ice hockey, soccer, football, golf, and ballet are at a higher risk of developing a hip labral tear. Structural abnormalities of the hip can also lead to a hip labral tear, such as Perthes' hip – a misshapen head of femur that you are born with.

## LABRAL TEAR

The hip labrum is a cartilage ring that deepens the hip socket by adding a rim, allowing flexibility and motion. A labral tear has two main causes:

- Degenerative, due to overuse. This can be seen in early osteoarthritis.
- Acute trauma in association with dislocation, and common with sudden twisting actions.

Labral tears are difficult to diagnose as they are similar to hernias, snapping hip syndrome, and bursitis, and although a labrum is torn, this does not necessarily mean that it is the cause of the symptoms. Typical symptoms include groin pain, clicking in the hip, and limited movement of the hip joint.

Arthroscopic techniques – which were developed for hips in the 1990's – awakened an interest in labral tears, and reattachment of labral tears through surgery is now showing good results with athletes.

Provisional diagnosis is by physiotherapy assessment, then MRI with dye to distinguish pathology. If a labral tear is suspected, treatment can include an orthopaedic assessment, rehabilitation, physiotherapy, MRT, and possibly (in rare instances) surgery with a scope. With orthopaedic surgery and post-op physiotherapy rehab, recovery is typically six to 12 weeks.

Do you ha*ve hip pain on walking or running? Does your hip feel tender and warm over the bony bump on the side of your hip? Is it sore to lie on?*

*If so, you* may have trochanteric bursitis.

## TROCHANTERIC BURSITIS

The bursa sits over the outer side of the hip, located where you have a palpable bony prominence, the greater trochanter. Because the bursa lies between fascia and muscles, a **trochanteric bursitis** diagnosis can be unclear, especially as there is no obvious cause for it. Local trauma, osteoarthritis, and

hip replacement, however, are candidates. In rare cases the bursa is surgically removed, followed by a six-week recovery period with physiotherapy.

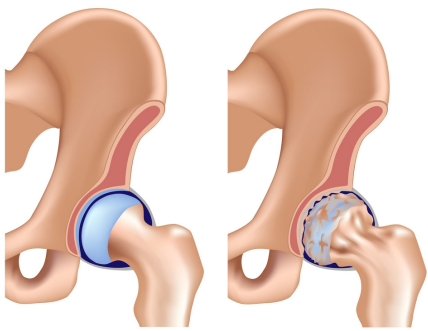
Provisional diagnosis is by physiotherapy assessment, X-ray to rule out bony pathology, and ultrasound to diagnose. Treatment can include: RICE, pulsed shortwave, Acupuncture, physiotherapy, graded exercises, and corticosteroid injection.

*Do you have hip pain, which increases on movement or loading? It is difficult to walk and are you stiff after rest or sleep?*

*Do you experience joint stiffness that occurs as you are getting out of bed, or joint stiffness after you sit for a long time? Do you have any pain, swelling, or tenderness in the hip joint, or a sound or feeling ('crunching') of bone rubbing against bone?*

*If so, you may have hip osteoarthritis.*

## HIP OSTEOARTHRITIS



Healthy hip joint Osteoarthritis

This occurs when inflammation and injury to a joint cause a breaking down of cartilage tissue. In turn, that breakdown causes pain, swelling, and deformity. Cartilage is a firm, elastic coating that covers the ends of bones in healthy joints, made up of water and proteins. The function of cartilage is to reduce friction in the joint and serve as a 'shock absorber', and the shock-absorbing quality of normal cartilage comes from its ability to change shape when compressed. It can do this because of its high water content. Although cartilage may undergo some repair when damaged, the body does not grow new cartilage after it is injured, and its ability to do this declines with age as well.

You're most likely to feel pain deep at the front of your groin, but also at the side and front of your thigh, in your buttock, or down to your knee (this is called radiated pain). If you have severe hip osteoarthritis, you may find that your affected leg seems a little shorter than the other because of the bone on either side of your joint being crunched up due to muscle spasms. Men and women are equally likely to develop hip osteoarthritis, and it can start from your late 40's onwards. You may be at greater risk if you had hip problems at birth (congenital dislocation), or abnormal hip development in childhood, such as Perthes' disease. Physical work and obesity may also increase the risk, but there's often no clear cause.

Your doctor may arrange X-rays or other tests – including blood tests and examination of the fluid in the joints – usually to eliminate other types of arthritis. He or she may also recommend a special type of X-ray where dye is injected into the hip joint (known as an arthrogram), or an MRI or CT scan. Treatment can involve: losing excess weight, exercise prescription, physiotherapy with mobilisation techniques, MRT to help repair the joint, pulsed shortwave, Acupuncture, Gunn IMS assessment for spinal involvement, gait analysis to check footwear, and possibly a stick or Nordic poles to walk with.

Medicines prescribed may include Paracetamol, a non-steroidal anti-inflammatory medicine such as Ibuprofen, or a prescription pain medication. These treatments mostly control pain and inflammation. Surgery may be needed for a resurfacing or total hip replacement if Grade 4. For complementary and alternative therapies, see www.arthritisresearchuk.org.

## AVASCULAR NECROSIS OF THE FEMORAL HEAD

Avascular necrosis is a disease in which a lack or interruption of blood supply leads to cellular death within hours (necrosis). One of the more common sites for avascular necrosis is at the head of the thigh bone (femur), resulting from the death of the bone cells which are responsible for breaking down and rebuilding all bones. Avascular necrosis of the femoral head affects the

hip joint and will not only damage the bone, but also the articular surfaces of the joint (osteochondritis dissecans).

Avascular necrosis is most common in the middle aged – typically 30 to 50 years old – and the preferred treatment for the hip is resurfacing, as hip replacements do not have sufficient longevity for anyone other than older patients. An alternative is drug therapy to promote bone building. Many proposed causes for avascular necrosis are being investigated, though rheumatoid arthritis and lupus are known ones. Sports trauma can also upset the blood supply and create this problem, for example, in water-skiing. Trauma is caused by extreme dislocation of the hip, where the ball of the hip joint is dislodged from the socket (subluxation).

Symptoms of avascular necrosis of the femoral head include pain in the lateral hip, groin, buttock, or knee, which is made worse by weight bearing. Hip movements are especially sore when the leg is rotated inwards (medial rotation).

Provisional diagnosis is by physiotherapy assessment, MRI, bone scan, and scope, and treatment includes: surgeon opinion, physiotherapy, MBST, nutrition, and hip replacement.

*Do you have hip stiffness? Is it worse after rest or sleep?*

*If so, you may have:*

## TROCHANTERIC BURSITIS

The bursa sits over the outer side of the hip, located where you have a palpable bony prominence, the greater trochanter. Because the bursa lies between fascia and muscle tendons, a trochanteric bursitis diagnosis can be unclear, especially as there is no obvious cause for trochanteric bursitis. Local trauma, osteoarthritis, and hip replacement, however, are candidates.

In rare cases the bursa is surgically removed, followed by a six-week recovery period with physiotherapy.

Provisional diagnosis is by physiotherapy assessment, X-ray to rule out bony pathology, and ultrasound to diagnose. Treatment can include: RICE, pulsed shortwave, Acupuncture, physiotherapy, graded exercises, and corticosteroid injection.

*Do you have pain down one or both legs to the foot? Is sitting painful? Do you find it helps to roll one buttock off the seat?*

*If so, you may have piriformis syndrome.*

## PIRIFORMIS SYNDROME

The piriformis muscle sits below the gluteus muscles in the bottom and runs across the sciatic nerve. In about 10% of the population, the sciatic nerve runs through the piriformis, and if the piriformis goes into spasm, it is prone to irritate the sciatic nerve and give typical sciatica symptoms in the affected leg of pain, pins and needles, and tenderness. The piriformis muscle tends to go into spasm due to nerve irritation in the lumbar spine, or problems in the hip joint.

Provisional diagnosis is by physiotherapy assessment, and treatment can include: Gunn IMS, electro-acupuncture, shockwave, and physiotherapy.

*Do you have an ache in the front of your thigh and groin, which gets worse with activity? (This is most likely in athletes).*

*If so, you may have iliopsoas strain.*

## ILIOPSOAS STRAIN

The iliopsoas (IP) muscles attach between the lower back and the pelvis and into the femur. They move the knee towards the chest and are very active in kicking, hurdling, and running. When the iliopsoas muscles are put under stretch, the fibres are in tension – too much and they fail. The level of iliopsoas strain is graded and most tend to be grade II:

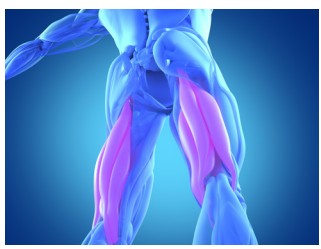
- Grade I: Small number of fibres torn, some pain, full function.
- Grade II: Significant fibres torn, major loss of function.
- Grade III: All muscle fibres torn/ruptured with major function loss.

Diagnosis is by sports physiotherapy assessment, and treatment can include: physiotherapy, specific sports massage and stretching, then rehab to work towards a neutral pelvis.

*Do you have pain at the base of your buttocks, which gets worse on sprinting and stretching?*

*If so, you may have a hamstring strain.*

## HAMSTRING STRAIN



Hamstring strains are common amongst sprinters, long jumpers, and hurdlers, as well as in sports where hard sprinting is required, such as football or hockey, and aging increases the risk. Most of the injuries occur in the biceps femoris muscle, especially during sprinting. Injuries occur just before foot strike. Hamstring tendinitis can occur at either end of the three muscles where the hamstring tendons attach to the bone.

The hamstrings are comprised of three posterior thigh muscles: semimembranosus, semitendinosus, and biceps femoris, and they span the thigh from the ischial tuberosity at the bottom of the pelvis, to attach below the knee. They connect by tendon to the tibia and fibula below the knee

and ischial tuberosity. At the top (proximal), the hamstrings attach to the bottom of the pelvis at the ischial tuberosity. The odd man out is the biceps femoris, where only one head attaches to the ischial tuberosity and the other head attaches to the femur. For this reason, the rectus femoris tends to be injured the most frequently. The hamstrings extend the hip and flex the knee, and while they are not active in normal walking or standing, they come into their own in running, jumping, and climbing. Athletes depend on healthy, well-conditioned hamstrings.

There are three grades of strain:

- Grade I: Minor strain with some pain, though the individual may be able to continue sport. Use ice, compression bandage, and massage, and get assessed by a sports physio – you may need to rest from sport for up to three weeks. With grade I, gentle jogging at seven days is fine, and fast sprinting by three weeks.
- Grade II: There is immediate pain which is more severe than the pain of a grade I injury, and it is confirmed by pain upon the stretch and contraction of the muscle. It can be also felt with a 'ping' feeling, like elastic in the muscle. You may be out of your sport from four to six weeks depending on the treatment you receive.
- Grade III: Hamstring strain is a severe injury. There is an immediate burning or stabbing pain and the athlete is unable to walk without pain. The muscle is completely torn and there may be a large lump of muscle tissue above a depression where the tear is. You will need crutches or sticks to walk initially, then when walking any distance, and you may need to take up to three months off the aggravating activity. Three months of sports rehab, massage, and treatment will be needed, and surgery if severe.

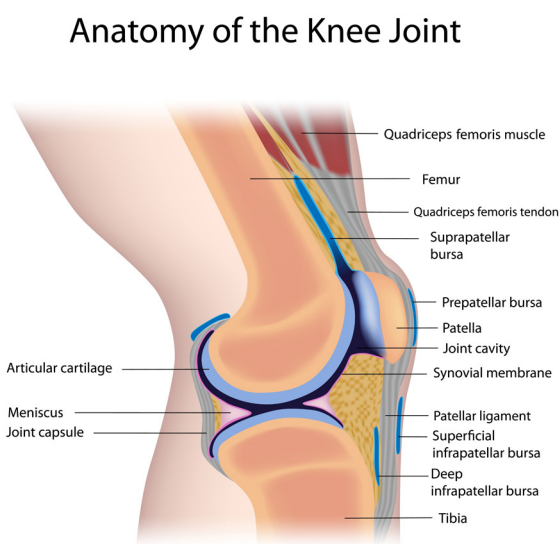
After a few days with grade II and III injuries, a large bruise may appear below the injury site, caused by the bleeding within the tissues. Grade III will need intensive icing every two hours for twenty minutes, elevate, rest, and a compression bandage. After about five days, you can start active rehab.

With all grades, as soon as pain permits, it is important to begin a prescribed program of stretching and range-of-motion exercises. Your sports therapist/physiotherapist will help you avoid prolonged inactivity resulting in muscle shrinkage (atrophy) and scar tissue (fibrosis). Excessive scar tissue is incompatible with healthy muscle function, and atrophy and scarring (fibrosis) are best avoided or reduced by prescribed exercise and stretching early in the rehabilitation process. This can be followed by massage and shockwave, then a graded rehab program return to sport encourages the tissue to stay pliable.

Rehab needs to include sprinting, as the hamstrings work hard to decelerate the lower leg as it swings out. It is in this phase – just before the foot hits the floor – that the hamstrings have to remain injury free, as they are maximally activated at maximum length.

*As strength returns, resistance exercise is increased and Therabands can be useful. This is closely followed by core work. Fit ball work is great for stability, as both the trunk and pelvis get more stable, and sporting drills can follow the core stability training.*

## HAMSTRING TENDINITIS




Hamstring tendinitis can occur at either end of the three muscles where the hamstring tendons attach to bone. The hamstrings are comprised of three posterior thigh muscles: semimembranosus, semitendinosus, and biceps femoris, and they span the thigh from the ischial tuberosity at the bottom of the pelvis,

to attach below the knee. They connect by tendon to the tibia and fibula below the knee and ischial tuberosity. At the top (proximal), the hamstrings attach to the bottom of the pelvis at the ischial tuberosity. The odd man out is the biceps femoris, where only one head attaches to the ischial tuberosity and the other head attaches to the femur. For this reason, the rectus femoris tends to be injured the most frequently. The hamstrings extend the hip and flex the knee, and while they are not active in normal walking or standing, they come into their own in running, jumping, and climbing. Athletes depend on healthy, well-conditioned hamstrings.

It will hurt to stretch, pull, and sprint, and it can follow an unhealed tear or repetitive overuse. Your sports therapist will advise on RICE, stretching, and strengthening, and advice on a full rehab program is important. Massage and shockwave will also help to reduce scar tissue. Occasionally, hamstring syndrome occurs, where fibrous adhesions irritate the sciatic nerve as it passes above the ischial tuberosity. If shockwave cannot help, surgery may be needed.

Diagnosis is by physiotherapy assessment and ultrasound scan, and treatment can include: RICE, shockwave, and strengthening and stretching with massage.

*Do you have pain inside your hip or pelvis, or up to your back? When lifting your knee or stretching your hip, does it gets worse?*

*If so, you may have ischiogluteal bursitis.*

## ISCHIOGLUTEAL BURSITIS

The ischiogluteal bursa sits between the ischial tuberosity, at the base of the pelvis, and the hamstring muscles. It mimics hamstring problems – similar to hamstring tendonitis – and may come on after a lot of sprinting. Once a bursa becomes swollen and inflamed, it can make it difficult to move the joint, and a tell tale sign of bursitis is worsening symptoms after massage,

and improvement with cooling. A common cause is a fall, and occasionally crystal deposits due to gout or infection.

Provisional diagnosis is by physiotherapy assessment, and for conformation, MRI, and treatment can include: rest from the aggravating activity, physiotherapy, and pulsed shortwave.

*Have you had an injury to your upper anterior thigh that hasn't got better?*

*If so, it could be a quads strain at the attachment onto the pelvis.*

## QUADS STRAIN (NEAR HIP)

The rectus femoris central tendon inserts at the pelvis in two locations, the direct and the indirect head. The indirect head is deeper, and flattens and rotates before it blends into the rectus femoris muscle at the central tendon. Injuries in this area are thought to occur due to the two parts acting independently, resulting in a shearing at the central tendon. Symptoms can eventually become apparent months after the injury, and recovery time with a comprehensive rehab program can be three to six times longer than a normal quads muscle strain.

Diagnosis is by physiotherapy assessment, with MRI to confirm, and treatment can include: RICE, massage, physiotherapy, shockwave, and prescribed exercise and stretching.

*Has the belly of your quads felt tender and weak for a long time, and has it been painful to run and kick?*

*If so, you may have quadriceps strain.*

## QUADRICEPS STRAIN

The quads comprise of four muscles: rectus femoris, vastus lateralis, vastus intermedius, and vastus medialis. These muscles cause hip flexion and knee extension, and they arise from the pelvis and femur (thigh bone) and insert via the patella tendon on the tibia (shin bone). Only the rectus femoris attaches above the hip joint into the pelvis, and as a result, is far more vulnerable to injury.

Strains are graded in the usual way: mild, moderate, and complete tear. The usual symptom is immediate pain, and depending on the severity of the strain, swelling and bruising can also occur. The location of the injury can sometimes be felt – a complete tear may feel like a hole.

It is important not to stress the area and to control swelling as quickly as possible. The injury will heal in time – typically in two to six weeks, depending on the severity of the injury. Management of the scar tissue formation is important to regain full capability. In some cases, a strain can occur deep in the rectus femoris muscle, which will require significantly longer rehab.

Diagnosis is by sports physiotherapy assessment, and MRI if severe, and treatment can include: RICE, maintaining exercise by cycling (if not painful), sports massage, ultrasound, laser, and sports specific rehab.

*Have you felt a sudden onset of pain – possibly a swelling in your thigh – most likely after a sprint start, rapid change of direction, jumping, or martial arts kick? Have you had traumatic pain to your inner thigh, and if you try to close your legs against resistance, is it too sore?*

*If so, you may have adductor longus strain, or rider's strain.*

## ADDUCTOR LONGUS STRAIN

The adductors are located on the inside of the thigh and act to close the legs together. Adductor longus strain is common in football, hockey, tennis, horse riding, and karate, and it tends to happen when the athlete needs to quickly change direction and the adductors are subjected to high forces, such as in a football tackle where an adducting foot is about to kick the ball and meets an opponent's leg. This type of strain is responsible for 62% of groin injuries.

Diagnosis is by physiotherapy assessment and treatment can include: physiotherapy, shockwave, massage, and if acute, ultrasound and pulsed shortwave. Recovery can be lengthy – up to five months.

*Have you had a bruising injury some months ago? Do you now feel a bony lump there?*

*If so, you may have myositis ossificans.*

## MYOSITIS OSSIFICANS

This is an uncommon condition in which bone is formed inside an injured muscle. Many sports are prone to muscle injury – such as football, rugby, martial arts, and hockey – and these injuries can lead to heavy internal bleeding, evident as bruising and swelling, and can also result in a blood clot, which is an ideal breeding ground for calcification. Left untreated, the calcification can continue to develop and may take over much of the injured site over several months.

The key to prevent myositis ossificans – or the growth of bone by calcification within the injured muscle – is to seek treatment as early as possible after the injury. Once formed, the bone can only be removed surgically and the current guidelines advise waiting up to 12 months to minimise the risk of further bone growth post-surgery. The cause of myositis ossificans is not understood, and there *is* a risk of further bone growth post-surgery.

Diagnosis is by physiotherapy assessment, X-ray to confirm the diagnosis, and checks to confirm it is non-malignant. Treatment can include: drugs to relieve the symptoms, and surgery.

*Have you suffered a blow to the front mid high (quads)? Are the muscles swollen and sore?*

*If so, you may have quadriceps contusion, or 'dead leg'.*

## DEAD LEG

There are three grades of contusion, and grades I and II are commonly known as 'dead leg':

- Grade I: The thigh will feel tight and mildly uncomfortable on walking or extending the knee.
- Grade II: You will be unable to run or walk quickly, and unable to bend the knee fully.
- Grade III: A muscle tear with severe pain, you will be unable to walk without crutches or contract muscles. You will be out of competition for six to 12 weeks.

The quads comprise of four muscles: rectus femoris, vastus lateralis, vastus intermedius, and vastus medialis. These muscles cause hip flexion and knee extension, and they arise from the pelvis and femur (thigh bone) and insert via the patella tendon on the tibia (shin bone). The quads are easily kicked in contact sports, sometimes leading to a severe bruise or tear (grouped as contusion) that can take weeks or months to heal. A quads contusion can be swollen, sore, and bruised.

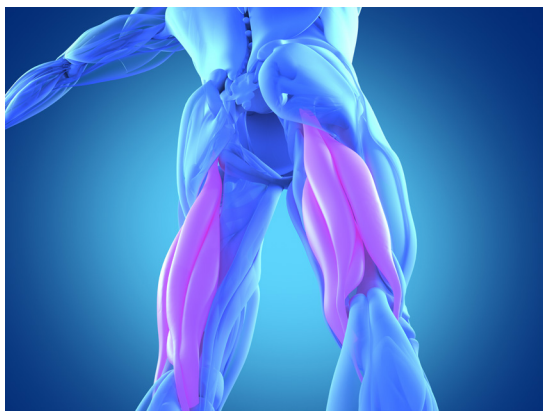
A contusion injury results in a crushing force on your muscle tissue, and the body's protective response is to wall-off the area of damage from the unaffected muscle in order to prevent damaging chemicals – released due to the injury – from further damaging more muscle. This results in an overall decrease in the oxygen to the surrounding tissue. This walling-off causes stiffness, creating an internal splint to prevent further injury and slowing down

healing. Repeated overuse causes microscopic soft tissue failure, inflammation, and rupture. Healing involves inflammatory cells, macrophages clearing necrotic cells, and muscle cells regeneration.

Treatment can include: physiotherapy, ultrasound, pulsed shortwave, light massage, and gentle prescribed rehab.

*Do you have localised pain at the back of your thigh?*
*Does it hurt to bend your knee against resistance, and does it feel weak?*
*Do your hamstrings feel tight when you stretch them?*
*If so, you may have hamstring strain.*

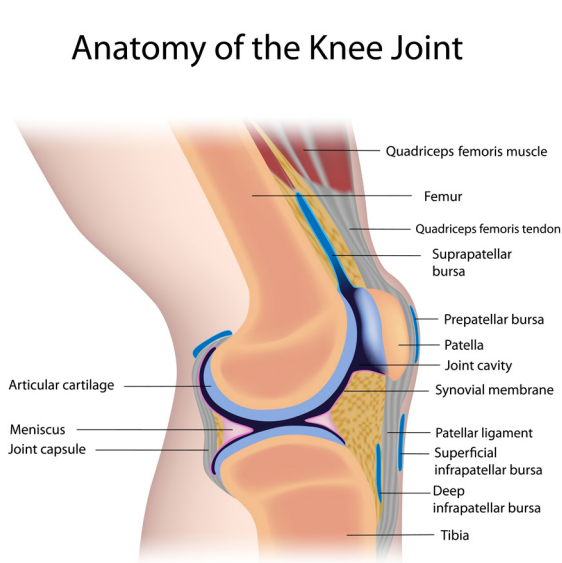
## HAMSTRING STRAIN



Tight hamstrings, SI joint dysfunction, and lumbar spine radiculopathy all have to be assessed in order to confirm hamstring strain; just because the hamstrings may feel tight, they may not be short and therefore stretching does not always help. The brain feels tightness as a signal that something is wrong; it cannot perceive shortness in length. Therefore, overstretched muscles can feel tight, and the problem could be coming from the lower back, from the pelvis, or from the sciatic nerve. Back problems can cause short hamstrings and vice versa – lots of sitting or driving without core stability can cause this. You need to have a rehab stretching program specific to you and your sporting needs.

Diagnosis is by sports therapist/physiotherapy assessment.

The hamstring muscles run down the back of the thigh, and there are three of them:




- Semitendinosus
- Semimembranosus
- Biceps femoris

They start at the bottom of the pelvis at a place called the ischial tuberosity, crossing at the knee joint and ending at the lower leg. Hamstring muscle fibres join with the tough, connective fascia of the hamstring tendons attaching to bones. The hamstring muscle group helps you extend your leg straight back, as well as bending your knee.

During a hamstring strain, one or more of these muscles gets overloaded, and the muscles might even start to tear. You're likely to get a hamstring strain during activities that involve a lot of running and jumping, or sudden stopping and starting. The three grades of hamstring injury are:

- Grade I: A mild muscle strain.
- Grade II: A partial muscle tear.
- Grade III: A complete muscle tear.

The length of time it takes to recover from a hamstring strain or tear will depend on how severe the injury is. A minor muscle pull (grade I) may take a few days to heal, whereas it could take weeks or even months to recover from a muscle tear (grade II or III).

Getting a hamstring strain is also more likely if:

- You don't warm up before exercising.
- The muscles in the front of your thigh (the quadriceps) are tight as they pull your pelvis forward and tighten the hamstrings.
- You have weak glutes (bottom muscles). Glutes and hamstrings work

together; if the glutes are weak, the hamstrings can be overloaded and become strained.

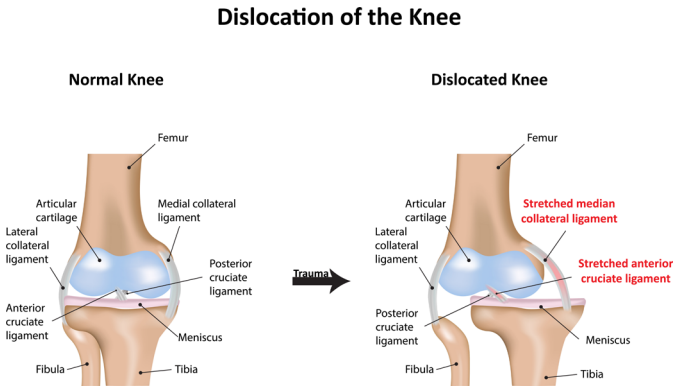
Treatment can include the following:

- Avoid putting weight on the leg as best you can. If the pain is severe, you may need crutches until it goes away – ask your doctor or physio if they're needed.
- ICE: Ice your leg to reduce pain and swelling. Do it for 20 minutes every four hours for two to three days, or until the pain is gone. Compress your leg. Use an elastic bandage around the leg to keep down swelling. Elevate your leg on a pillow when you're sitting or lying down.
- Take anti-inflammatory painkillers and painkillers from your pharmacist or GP. Non-steroidal anti-inflammatory drugs (NSAIDs) – like Ibuprofen or Naproxen – will help with pain and swelling. However, these drugs may have side effects, such as an increased risk of bleeding and ulcers. They should only be used short-term, unless your doctor specifically says otherwise.
- Practice stretching and strengthening exercises if your doctor/physical therapist recommends them. Strengthening your hamstrings is one way to protect against hamstring strain.
- Sports massage, shockwave, stretching, and rehab will all help to speed up recovery.

*Are you unable to move your knee after a sudden trauma? Is the joint deformed, swollen, and cannot bear weight?*

*If so, you may have a dislocated knee.*

## DISLOCATED KNEE




This is a serious injury, and it describes the situation when the thigh bone (femur) loses all contact with the lower leg bones (the tibia and fibula). For this to happen there is usually substantial damage to the tissues around the knee, often including complete tearing of the cruciate ligaments (ACL & PCL), plus damage to the collateral ligaments and menisci, so it has the potential to cause significant damage to important vascular (blood) vessels and nerves. Immediate attention is required as this injury can lead to the loss of the leg.

After repositioning the knee, ongoing surveillance of the nerves and blood vessels may be needed, and due to the level of damage, surgical reconstruction is usually required.

Diagnosis is by physiotherapy assessment, X-ray, and MRI, with urgent medical attention needed. Treatment can include: having the joint repositioned by a medical practitioner, gentle progressive physiotherapy, having your blood vessels and nerves monitored, thorough rehab for mobility, balance, and strength, and possible surgery.

*Did you have a blow to the outside of your knee? Is your foot weak when you lift it to walk?*

*Do you have a tingling/numbness on the outside of your leg?*

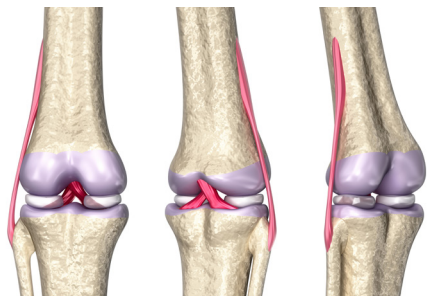
*If so, you may have peroneal nerve injury or radiculopathy (see spinal section).*

## PERONEAL NERVE INJURY

The peroneal nerve branches off from the sciatic nerve and is responsible for innervating the muscles that raise the foot and toes. Damage to the nerve can thus lead to spontaneous foot drop or weakness in lifting the foot. Other symptoms include a tingling or numbness on the outside of the lower leg, and pain down the shin or the top of the foot.

Diagnosis is by EMG tests, orthopaedic surgeon, or a back specialist.

Peroneal nerve injuries have a poor chance of recovery, worsening with time, so it is cimportant to be assessed quickly by a specialist who can determine whether to proceed with surgery or go down a more conservative route – typical conservative options include physiotherapy and orthotics.



*Did you have a sudden onset of localised acute pain on the inner side of your knee, which is painful after a twisting injury and is still mildly painful when touched?*

*If so, you may have a medial coronary ligament.*

## MEDIAL CORONARY LIGAMENT

The top of the shin bone (tibia) has a coating of cartilage, with two meniscal cups for the long thigh bone (femur) to move in. The medial meniscus is attached at the medial, lower edge to the tibia by the medial coronary ligament, and the lateral meniscus is attached at the lateral, lower edge to the tibia by the lateral coronary ligament. These ligaments act to stabilise the menisci and help limit knee rotation injury to the coronary ligaments.

Injury is most likely to occur with sudden, sharp direction changes, especially when the foot is planted securely, forcing a rotation of the lower leg (tibia)

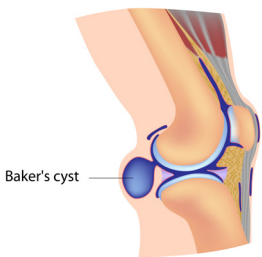
relative to the thigh (femur). Such injuries are common in football, rugby, tennis, squash, dancing, and martial arts, and aggravating factors include poor biomechanics and laxity in the four major stabilising knee ligaments (ACL, PCL, MCL, and LCL). Injury can be from acute trauma – which normally causes immediate, sharp pain – or chronic overuse, such as from long distance running.

Diagnosis is by physiotherapy assessment and possibly scope, and the medial coronary ligament usually heals conservatively.

*Do you have a golf ball-shaped swelling at the back of your knee?*

*If so, you may have a popliteal cyst.*

## POPLITEAL CYST




This is also known as a baker's cyst. Irritation to the knee can be caused by a number of factors, such as osteoarthritis and rheumatoid arthritis, biomechanical problems, and meniscal tears. Any form of irritation can lead to swelling due to excess synovial fluid production, and if this causes sufficient pressure, it can lead to a cyst forming at the back of the knee. The cyst may or may not cause pain and/or restricted range of knee motion.

Assessment is important in order to differentiate from a tumour or deep vein thrombosis. Diagnosis is by physiotherapy assessment to find the cause – possibly osteoarthritis or a cartilage leak – and treatment can include: RICE (depending on the cause) and occasionally surgery.

*Do you have a gradual onset of knee pain on the inner side, plus limited range of movement, especially when it comes to bending? Is the knee stiff on rest?*

*If so, you may have osteoarthritis, and you are more likely to suffer from this if:*

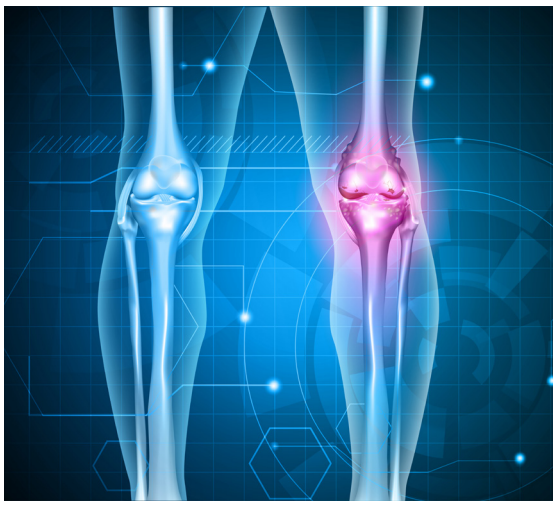
- **You're in your late 40s or older** – your muscles have become weaker, your body is less able to heal itself, and your knee joints have gradually worn out over time.
- **You're a woman** – osteoarthritis is more common and more severe in women.
- **You're overweight** – this increases the chances of osteoarthritis and of it becoming gradually worse.
- **Your parents or siblings have had osteoarthritis**.
- **You've had a knee injury** – for example, a torn meniscus.
- **You've had an operation on your knee** – for example, a meniscectomy (to remove damaged cartilage) or repairs to your cruciate ligaments.
- **You do a repetitive activity or have a hard, physically demanding job**, like a physio.
- **You have another type of joint disease** that has damaged your joints – for example, rheumatoid arthritis or gout.
- See more at: http://www.arthritisresearchuk.org/arthritis.

Main symptoms can include pain (in the knee, or at the end of the day – this usually gets better when you rest), stiffness (especially after rest – this eases as you get moving), crepitus (a creaking, crunching, grinding sensation when you move the joint), hard swellings (caused by osteophytes, calcified bony growths), and soft swellings (caused by extra fluid in the joint). Other symptoms can include: your knee giving way because your muscles have become weak or the joint structure is less stable, your knee not moving as freely or as far as normal, your knees becoming bent and bowed, the muscles around your joint looking thin or wasted, and the joint looking thickened.

It's unusual, but some people have pain in their knee that wakes them up at night. This generally only happens with severe osteoarthritis – Grade III or IV. You'll probably find that your pain will vary, with good days and bad days. This can be due to how active you've been, but sometimes it will just happen for no clear reason.

Some people find that changes in the weather (especially damp weather and low barometric pressure) make their pain and stiffness worse, and this may be because nerve fibres in the capsule of their knee are sensitive to changes in atmospheric pressure.

## RHEUMATOID ARTHRITIS



Rheumatoid arthritis is an inflammatory disease that can strike at any age. When arthritis develops following an injury to the knee, it is called post-traumatic arthritis, and this can occur years after a torn meniscus, injury to ligament, or fracture of the knee. Some types of arthritis can also cause fatigue.

Rheumatoid arthritis (RA) is a systemic disease of the immune system, affecting multiple joints in the upper as well as the lower limbs. Knees are one of the most common joints affected by RA, which can occur at any age and which can affect both knees. When RA affects the knee joint, the synovium that lines the ends of the bones thickens and produces an excess of joint juice – it is said to feel like a crisp packet. The immune system supplies inflammatory juices, leading to swelling and damage to the cartilage that normally acts as a cushion within the joint. This then leads to pain and joint erosion.

Symptoms of RA mostly include pain and stiffness of the affected joints, and the pain is more often than not worse in the mornings, a time that is associated with severe stiffness. The joint may become stiff and swollen, making it difficult to bend or straighten the knee, and pain and stiffness is also at its worst after a period of inactivity. The knee may feel weak, it may feel 'locked', or it may 'buckle' as a result of this disease. Due to inflammation,

blood tests such as C-reactive protein and erythrocyte sedimentation rate (ESR) may be raised. These are, however, non-specific markers of inflammation as it is not straight forward to diagnose. Rheumatoid factor is a relatively specific test, and there is presence of this indicative factor in nearly 80% of all rheumatoid arthritis sufferers. Presence of rheumatoid factor may NOT be detected in early stages of the disease. In addition, just to really f*** up the diagnosis, around 1 in 20 healthy persons may test positive for rheumatoid factor (RF), hence RF is not absolutely indicative of rheumatoid arthritis.

Several imaging studies such as X-rays, MRI scans, and CT scans may be ordered to look at the extent of joint damage caused by the disease; X-rays typically show a loss of joint space in the affected knee. To ease the symptoms, pain relievers and non-steroidal anti-inflammatory drugs (NSAIDs) are used widely to control the symptoms of rheumatoid arthritis. They are, however, notorious for their side effects due to which they may be used for a short-term basis only. A healthy diet and supplements can also help.

To prevent progression of joint damage, disease-modifying anti-rheumatic drugs (DMARDs) are used. They act by reducing joint swelling and pain, decreasing markers of acute inflammation in the blood, and halting the progressive joint damage. DMARDs include Methotrexate, Sulfasalazine, Leflunomide, Hydroxychloroquine, Gold salts and Cyclosporine. However, everything comes with a price and these are also associated with a varying degree of side effects.

## CORTICOSTEROIDS

Corticosteroids are anti-inflammatory agents that may be given as medications or as injections directly into the joint spaces in order to reduce the joint inflammation. I have given these jabs in the past.

## BIOLOGICAL AGENTS

A newer approach is to use biological agents such as TNF (tumour necrosis factor), cytokines that kill cells you do not want.

## SUPPORTIVE TREATMENT

Supportive treatment includes exercise prescription, physiotherapy, joint protection nutrition, psychological support, and a multitude of alternative medicines.

## LIFESTYLE MODIFICATIONS

Lifestyle modifications include losing weight, and changing exercises from running or jumping to swimming or cycling – things that don't carry the risk of damaging the knees. Weight loss can reduce stress on weight bearing joints, such as the knee.

## PHYSIOTHERAPY

Physiotherapy is an important part of the treatment of debilitating arthritis, as it helps maintain optimum joint flexibility and strength. Assistive devices – such as a cane, walker, long shoehorn etc. – may help cope with disabilities associated with knee rheumatoid arthritis.

## SURGERY

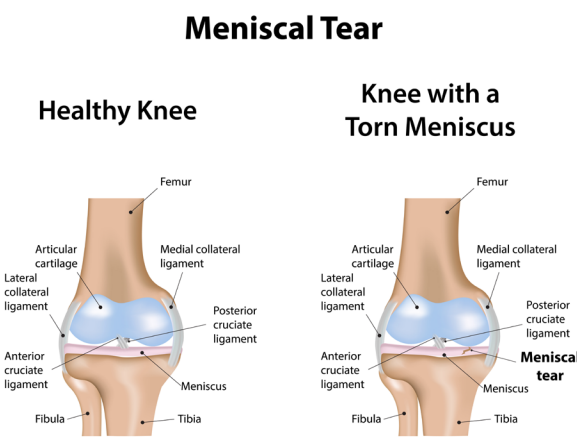
Surgery may be performed to retain joint function or prevent the loss of joint function. Joint replacement therapy may also be chosen, which is vital

when joints fail. There are different types of surgery to correct different joint problems, and total or partial knee replacement is often recommended for patients with rheumatoid arthritis.

*Do you have inner knee pain after a 'twisting with knee bent' injury, typically with your foot fixed to the ground? Did you feel 'something go' with immediate pain and swelling afterwards?*

*If so, you may have a medial menisci tear.*

## MEDIAL MENISCI TEAR




The top of the shin bone (tibia) has a coating of cartilage and then two meniscal cups for the long thigh bone (femur) to move in. The menisci have a number of important roles in the function of the knee, such as spreading the load across the top of the shin bone (tibia), plus helping to both absorb shocks and stabilise the knee.

The menisci are often torn in knee injuries, particularly those involving twisting while the knee is bent, which is common in many sports. Aggravating factors can include aging, as much of the body's connective tissue becomes more rigid and less elastic with age.

The menisci have a poor blood supply and often will not heal. Therefore, in cases where conservative treatment does not work, surgery is indicated with either repair or removal of the torn tissue. The top of the shin bone (tibia) has a coating of cartilage and then two meniscal cups for the long thigh bone

(femur) to move in. The menisci have a number of important roles in the function of the knee, such as spreading the load across the top of the shin bone (tibia), plus helping to both absorb shocks and stabilise the knee.

The lateral meniscus is less prone to tearing than the medial meniscus and tends to occur with twisting while weight bearing, which is common in many sports. Aggravating factors can include aging, as much of the body's connective tissue becomes more rigid and less elastic with age. Typical symptoms are significant pain if the knee is rotated, or if a sudden load increase occurs – as in jumping.

Diagnosis is by physiotherapy assessment and MRI, and treatment can include: RICE, physiotherapy, MBST, gentle specific rehab, knee brace, TENS, laser, ultrasound, sports massage, mobilisations, and surgeon referral. Recovery times will vary widely depending on the grade of injury, and may be several months.

## SYNOVIAL PLICA

The knee is encased in synovial tissue, and sometimes a fold (**synovial plica**) will remain in the tissue from birth. If the plica is sufficiently large it can become irritated during activity and is then more susceptible to injury from direct trauma or overuse. This type of injury is most common on the medial side of the knee and its symptoms can sometimes be confused with a medial meniscal tear or patellar tendonitis.

In most cases, a **plica** can be treated conservatively, including the use of corticosteroid injections. If the symptoms do not respond, then arthroscopic surgery may be needed.

Diagnosis is by physiotherapy assessment and treatment can include: RICE, physiotherapy, MBST, rehab and exercises, support, sports massage, and TENS. If there is no improvement, MRI and surgeon referral may be needed.

*Have you had a blow to the inside of your knee? Is your knee tender and painful on the outer side, most noticeably on the bone just below the knee?*

*If so, you may have a problem with your collateral ligaments.*

## COLLATERAL LIGAMENTS

These are found on the sides of your knee. The medial/inner collateral ligament (MCL) connects the femur to the tibia, while the lateral/'outside' collateral ligament (LCL) connects the femur to the thin bone in the lower leg (fibula). The collateral ligaments control the sideways motion of your knee and protect it against sudden movements – the knee joint relies just on these ligaments and the surrounding muscles for stability. Any direct contact to the knee or hard muscle contraction – such as changing direction rapidly while running – can injure a knee ligament. Injuries to the collateral ligaments are usually caused by a force that pushes the knee sideways, and while these are often contact injuries, they're not always.

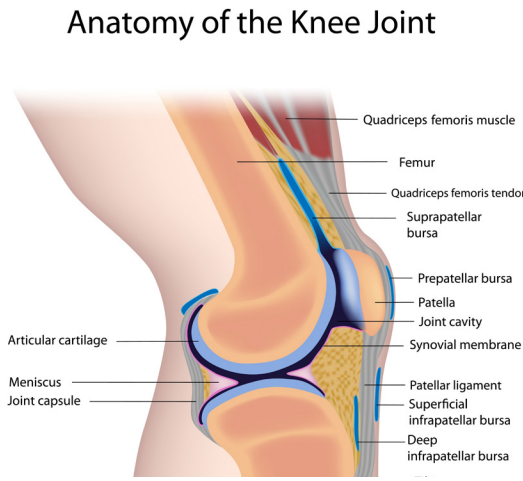
Medial collateral ligament tears often occur as a result of a direct blow to the outside of the knee, and this pushes the knee inwards (toward the other knee). If there is an MCL injury, the pain is on the inside of the knee; an LCL injury pain is on the outside of the knee. A blow to the outside of the knee does the latter, and you get swelling over the site of the injury. Injury causes instability, and this is when the knee gives way. Injured ligaments are considered 'sprains' and are graded on a severity scale.

- Grade I sprains: The ligament is mildly damaged. It has been slightly stretched, and is still able to keep the knee joint stable.
- Grade II sprains: This stretches the ligament to the point where it becomes loose. It is referred to as a partial tear of the ligament.
- Grade III sprains: This type of sprain is a complete tear of the ligament. The ligament has been split into two pieces, and the knee joint is unstable.

*Do you have pain just below the knee? Is it painful to extend the knee, and worse after exercise?*

*If so, you may have Osgood-Schlatter disease.*

## OSGOOD-SCHLATTER DISEASE




Osgood-Schlatter disease (OSD) – also known as apophysitis of the tibial tubercle, or Lannelongue's disease – is an inflammation of the patellar ligament at the tibial tuberosity. It is characterised by a painful lump just below the knee and is most often seen in young adolescents.

Osgood-Schlatter disease describes the local pain in the tendon under the kneecap (patella), which links the kneecap to the top of the shin bone (tibia). The tendon becomes inflamed and swollen due to repeated tension whilst exercising, and is most common in early teenage boys, particularly those undergoing a strong growth phase. In some cases the tendon becomes calcified.

Osgood-Schlatter disease occurs most often in children who participate in sports that involve running, jumping, and swift changes of direction – such as soccer, basketball, figure skating, and ballet. While Osgood-Schlatter disease is more common in boys, the gender gap is narrowing as more girls become involved with sports. Age ranges differ by sex because girls experience puberty earlier than boys, so the Osgood-Schlatter disease typically occurs in boys aged 13 to 14 and girls aged 11 to 12. The condition usually resolves on its own, once the child's bones stop growing; the discomfort can last from weeks to months and may recur until your child has stopped growing.

Provisional diagnosis is by physiotherapy assessment and X-Ray, and treatment can include: RICE, massage, and a specific rehab program. If severe, casts, patella tendon straps, or braces may be needed.

*Do you have pain in the knee on movement? Does the movement feel boggy, and is there swelling?*

*If so, you may have knee bursitis.*

## KNEE BURSITIS

A bursa is a sac of synovial fluid that is positioned to cushion joints and help tendons move more freely and with less friction. The overuse of joints and tendons can cause tendinitis and inflammation of the bursa, which is called bursitis. The primary action of the quads is to straighten the leg at the knee, and these four strong muscles all connect to the upper kneecap (patella) through the suprapatellar tendon. Overuse of this tendon – or local trauma – can cause tendinitis and also bursitis of the underlying suprapatellar bursa, plus nearby infrapatellar and prepatellar bursae.

The infrapatellar bursa is located under the tendon connecting the bottom of the kneecap to the shin bone, the infrapatellar tendon. This area is prone to injury from any biomechanical misalignment. Inflammation of the infrapatellar bursa is also known as 'clergyman's knee', as historically, clergymen were prone to this condition due to frequent kneeling. A similar condition occurs with the bursa in front of the kneecap – the prepatellar bursa – known as 'housemaid's knee'. Infrapatellar bursitis can often coincide with infrapatellar tendinitis, or jumper's knee.

Diagnosis is by physiotherapy assessment, and treatment can include: gentle progressive physiotherapy, training of correct lifting techniques, laser, electrotherapy, MBST, and biomechanical assessment. If non-responding, corticosteroid injections may be used.

*Do you have pain in the knee with swelling, creaking, and pain on running? Does your knee feel as if it catches and is unstable?*

*If so, you may have osteochondritis dissecans.*

## OSTEOCHONDRITIS DISSECANS

In most cases this affects the knee joint, but it can also occur in other body joints. Osteochondritis dissecans describes the separation of a piece of cartilage, plus a small piece of bone from one of the bones in the joint. This is caused by a local weakening in the bone due to insufficient blood supply and mainly occurs following a trauma to the joint. In some cases surgery may be needed to repair the bone, but in many cases the problem will self heal.

Diagnosis is by physiotherapy assessment with orthopaedic opinion, X-ray, and MRI, and treatment can include: RICE, MBST, and physiotherapy. If not healing, surgery may be needed.

*Are you tender just above the kneecap, possibly with swelling? Do you get the same pain if someone else bends your knee or if you try to straighten your knee against resistance?*

## SUPRAPATELLAR TENDON

Overuse of the suprapatellar tendon – or local trauma – can cause tendinitis and also bursitis of the underlying suprapatellar bursa, plus the nearby infrapatellar and prepatellar bursae. This area is prone to injury from any biomechanical misalignment.

Diagnosis is by physiotherapy assessment, and to confirm, MRI, and treatment can include: gentle progressive physiotherapy, MBST, laser, ultrasound, biomechanical assessment, and training of the correct lifting technique.

## CHONDROMALACIA PATELLA

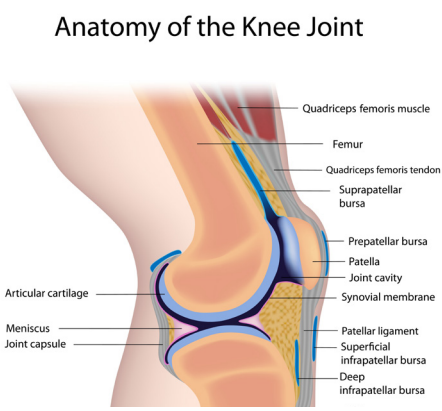
This describes the condition where the back of the kneecap (patella) – which is normally covered in cartilage to provide a smooth, low friction contact with the thigh bone (femur) – is damaged, leading to a painful and sometimes noisy contact. It is more common in women and tends to be more prevalent in under 30's.

Chondromalacia patella could be caused by a number of factors:

- Individual knee misalignment problems.
- Overuse.
- Poor tracking due to muscle imbalance or hypermobility.
- Trauma.
- Normal wear and tear from aging.

Diagnosis is by physiotherapy assessment, X-ray, scope, and biomechanical assessment, and treatments can include: physiotherapy, MBST, shockwave, sports massage, muscle strengthening, stretching and balancing, orthotics, possible knee support, or taping. If unresponsive, try scope for plica or surgery.

## HYPERMOBILITY




This is commonly referred to as being 'double jointed', and it is a condition where joints are allowed to move further than in a normal joint. People who have hypermobility tend to be more prone to sprains and strains, and are generally more accident-prone. The implications of hypermobility include:

- More rapid muscle fatigue as muscles have to compensate for joint laxity.
- More muscle pain than normal.

- Greater prevalence to childhood growing pains.
- Increased joint wear and tear and hence early onset osteoarthritis.
- More easily dislocated joints, especially in the shoulder.
- Prone to lower limb joint pain.
- Increased risk of spinal disc bulge and spondylolisthesis.

Diagnosis is by physiotherapy assessment and/or a rheumatologist, and treatment can include: orthotics, which can help assist lower limb joint pain.

*Is it tender just below your kneecap? Is it painful to contract your quads, or after exertion?*

*If so, you may have infrapatellar tendinitis.*

## INFRAPATELLAR TENDINITIS

This condition is also known as jumper's knee. The straightening of the knee is achieved primarily through the quads and their attachment to the top of the kneecap (patella) with a very strong tendon. This force is transferred through the kneecap down to the lower leg by the infrapatellar tendon, which connects the lower part of the kneecap to the shin bone (tibia). Tendinitis is a condition where the tendon becomes irritated and inflammed. Infrapatellar tendinitis is most often caused by overuse and is particularly common in sports involving repeated jumping, such as football and netball. This condition can often occur with infrapatellar bursitis.

Diagnosis is by physiotherapy assessment, grading by the severity of pain and swelling, and MRI, and treatment can include: RICE, rest from aggravating activities, gentle progressive physiotherapy, sports rehab, laser, ultrasound, and MBST. If severe, a sports surgeon referral may be needed.

*Is there tenderness and possible swelling on the outer side of your knee? Is knee movement restricted, and does it hurt to squat?*

*Is your knee tender on the inner side around the joint line?*

As covered earlier, the inner side of your knee could be tender for a number of reasons, but most likely, it is a sprain to the medial collateral ligament (MCL). This is a common injury in skiing and contact sports, and comes in grades I to III.

- Grade I: Mild sprain.
- Grade II: Partial tear.
- Grade III: Complete rupture and the knee feels unstable.

## COLLATERAL AND CRUCIATE LIGAMENT COMBINED INJURY AND MEDIAL MENISCI TEARS

*Was there an audible crack at injury? Does the knee feel unstable, and does the pain feel deep in the knee? Is it warm and swollen?*

*Is swelling pronounced within 24 hours, and does it feel thick rather than fluid? Is it painful at the end range of movement of your knee?*

*If so, you may have a combined injury.*

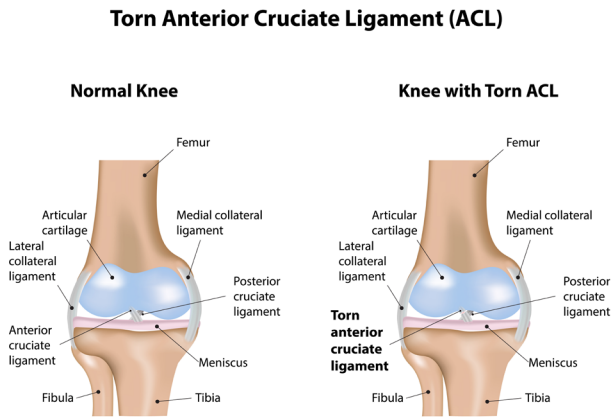
The knee is stabilised by four major ligaments: not just the collaterals, but also the anterior cruciate ligament (ACL) and posterior cruciate ligaments (PCL). The medial collateral ligament (MCL) connects to the femur (the long thigh bone) and the tibia (the shin bone), its task being to stabilise the inside of the knee (medial) and prevent it from opening up. However, it can be damaged in conjunction with the ACL. The MCL is most often injured when the outside of the knee is struck from the side, and depending on the amount of force, this will overload the MCL to cause anything from a mild sprain to complete rupture. This is a common injury in skiing and contact sports. Often, an MCL injury coincides with an anterior cruciate ligament (ACL) injury or a meniscal tear, and can injure both the medial and lateral coronary ligaments. This type of injury is common to football.

Grade I and II injuries will be painful over the ligament and will result in swelling within one or two days. With a full thickness tear – grade III – the knee will feel unstable and it will be difficult to bend it. Grades I and II will

require ceasing the sport for one to four weeks, whereas a grade III tear will need bracing for at least six weeks. Surgery is not often needed.

Diagnosis is by physiotherapy assessment, specific test for grading I to III, MRI if a suspected grade III, and sports surgeon consultation. Treatment can include: RICE, physiotherapy, rest from training, knee brace if grades II or III, sports massage, ultrasound, pulsed shortwave, laser, MBST, and rehab that includes proprioception work for rough ground. Full recovery only comes with rehab.

## CRUCIATE LIGAMENTS ACL AND/OR PCL SPRAIN




To reiterate, the knee is stabilised by four major ligaments, the medial (MCL) and lateral (LCL) collateral ligaments, and the anterior (ACL) and posterior (PCL) cruciate ligaments. The ACL and PCL lie deep within the knee joint, and of these, the ACL is much more prone to injury in sport, typically with a non-contact rapid deceleration whilst running or a twisting fall. This may also coincide with a MCL and medial meniscal injury. If the pain is behind the knee, it is more likely PCL.

PCL injuries are most common when the knee is bent and the shin is forced backwards – this is common in car accidents or in sports when a player lands hard on the knees with the knees fully flexed.

Diagnosis is by physiotherapy assessment, MRI, endoscope, and X-ray, and treatment can include: RICE, stopping the sport, physiotherapy, MBST,

brace, rehab and exercises, and possible surgeon referral and prescribed pre-surgery rehab.

## LOWER LEG

*Did you get a sudden severe pain at mid-calf, with pain on walking ever since?*

*If so, you may have gastrocnemius and soleus strain.*

## GASTROCNEMIUS AND SOLEUS STRAIN

The calf is made up of two well-known muscles, the gastrocnemius and soleus, and a little known muscle, the plantaris. These muscles all join at the achilles tendon.

The largest muscle – the gastrocnemius – lies above the soleus and attaches above the knee joint, helping to bend the knee, whereas the soleus attaches below the knee and has no effect on the knee. Both muscles act to flex the foot down (plantarflex) through the achilles tendon. Gastrocnemius is the stronger plantar flexor when the knee is straight, with the soleus becoming stronger when the knee is bent. The gastrocnemius is more at risk of straining due to crossing two joints, and most often it is the medial head that is strained. The muscle has a high density of two fast twitch muscles, and in sport its action has been described as being like a whip.

Soleus is considered low risk to injury – mostly slow twitch fibres – and injury tends to be slower and less traumatic than with gastrocnemius, with mild calf tightness. Walking and running can provoke discomfort that can

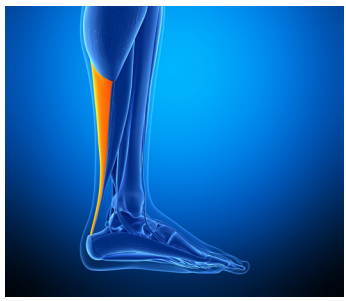
rumble on for weeks. The plantaris also crosses the knee and ankle, it is considered vestigial, and isolated strains are difficult to identify.

A calf strain usually happens at the place where the gastrocnemius muscle joins the tendon, and starts with a sudden sharp pain. The injury is graded 1 to 3. It is possible to strain a combination of muscles, or in isolation. Physical tests – and ultimately, ultrasound scanning or MRI – give diagnostic information.

- Grade I: Twinge pain in lower leg, some aching up to five days, and you can still play sport. Initially, therapists will be careful of strong massage, and your sports injury therapist will give technology and massage as the tissue heals at appropriate stages, before progressing on to rehab in order to strengthen and stretch, helping elongate the scar tissue. Shockwave also aids with scar tissue treatment. Strengthening starts with unloaded isometric, then isotonic and dynamic. It often takes 10 days for the tensile strength to allow this to be pain free, then you will need to do sport specific skill drills, and finally, plyometrics, i.e. hopping and jumping. Complete recovery is the goal before returning to sport. Rare complications do occur, such as myositis ossificans and compartment syndrome. Diagnosis is by physiotherapy assessment to grade and specify muscle rehab.
- Grade II: Pain on walking and initially a sharp pain in the back of the calf, bruising and some swelling, aching for a week, and pain on resisted plantar flexion (pointing toes). Treatment can include massage, electrotherapy, and specific sport physio rehab.
- Grade III: Severe pain, and you are unable to contract the muscle. There is obvious swelling and bruising. If full rupture muscle, the tear is palpable and Sever's test positive. I have seen a handful of these.

Orthopaedic opinion and an ultrasound scan are both needed to confirm diagnosis before treatment, which can include: RICE, heel raises to ease stress on the tendon and bilateral to avoid back issues, and physiotherapy followed by shockwave, rehab massage, and stretches for grades I and II. Sport specific rehab for strengthening and balance work can also help, as

well as a biomechanics check. For grade III, an orthopaedic surgical referral is always needed in case of surgery.



*Did you get sudden pain on the outside of the lower leg with or without a blow? Also, does pulling your toes and foot up feel weak?*

*If so, you may have anterior compartment syndrome.*

## ANTERIOR COMPARTMENT SYNDROME

The (front) anterior compartment space has a fascial enclosure and osseous enclosure of muscles. Anterior compartment syndrome can affect tibialis anterior, extensor hallucis longus, extensor digitorum longus, and peroneus tertius, and it is potentially much more serious than shin splints. Increased pressure in the compartment can stop venous (blood) flow, which causes more swelling and pressure that can cause tissue death. The process may start with muscle swelling, then you'll start to feel the pain. The skin may look taut and red, and the common fibular nerve may give more pain and numbness.

For a test guideline, remember the 5 P's: Pain, Pallor, Paraesthesia, Pulselessness, Paralysis.

This condition requires urgent medical attention, then later on, physiotherapy and a biomechanical assessment. Treatment can include: RICE, medical attention, biomechanical assessment, ultrasound, pulsed shortwave, massage, and a rehab program including exercising the upper body or cycling.

*Do you get foot pain on stopping or starting from running? Do you have swelling and pain on the big toe joint? Does it hurt to pull your big toe up?*

*If so, you may have a metatarsophalangeal joint injury.*

## METATARSOPHALANGEAL JOINT INJURY

The big toe joint at the base of the big toe can be damaged when the foot is jammed into the ground – such as when pushing off for running – resulting in forced over straightening (hyperextension) of the joint. Typical symptoms include pain at the base of the toe.

There are 3 grades:

- Grade I: Minor tearing of capsuloligamentous complex.
- Grade II: Partial tear of capsuloligamentous complex.
- Grade III: Complete tear of capsuloligamentous complex and plantar plate torn from the toe bone, the proximal phalanx of the metatarsal head.
- Diagnosis is by physical exam by physio or GP and then X-ray, and treatment can include: physiotherapy, laser, MBST/MRT, pulsed shortwave, Acupuncture, brace, and firm shoes to prevent bending. Non-weight bearing activity for two days, using a stick or crutches. Buddy tape for shoes. Then, strengthening rehab over three to four weeks, allowing the injury to heal before returning to normal sport.

*Do you get localised pain on the bone on the outer side of the lower leg (fibula)? Is it worse when weight bearing, especially if you have flat feet?*

*If so, you may have a fibula stress fracture.*

## FIBULA STRESS FRACTURE

This happens when either the compressive forces due to repetitive weight bearing, or the stress caused by the contraction of muscles that attach to the fibula, get too much and cause bony damage. Pain will be felt in the outer lower leg, often after running on hard ground or excessively, and in more severe cases, there may be night pain. MBST/MRT and laser can help the repair process, and rehab needs to be graded from non-weight bearing to full impact. Progression goes from cycling and swimming to water running and dynamic proprioceptive work, and finally, plyometrics.

Provisional diagnosis is by physiotherapy assessment, X-ray, biomechanical assessment, CT, and bone scan, and treatment can include: MBST, laser, orthotics, complete rest until the bone is healed, support, massage, and a gradual return to sport.

*Do you get pain in an infected area? Is it sore and difficult to move the limb?*

*If so, you may have osteomyelitis.*

## OSTEOMYELITIS

This is a bone infection, and you will feel ill in addition to having a local bump over a bone with tenderness. Bacteria (staphylococcus aureus) is the most common cause of osteomyelitis, and increased risk factors include:

- Poor immune system.
- Following hip prosthesis surgery.
- Fracture.
- Alcoholic or drug abuse.

Diagnosis is by GP for scans and bloods, and treatment options include: seeing a medic, drugs, and nutrition.

*Do you get pain in the lower third of your shin bone (tibia) after running long distances, and if you press there?*

*If so, you may have a tibia stress fracture.*

## TIBIA STRESS FRACTURE

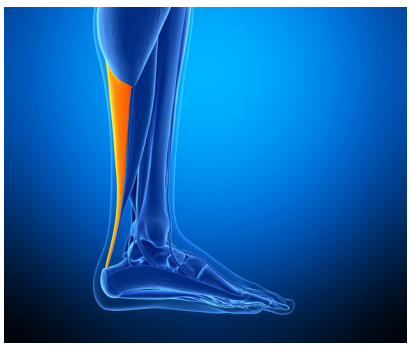
This is an incomplete crack in the shin bone. Several muscles attach to the tibia and when they contract they pull on the bone. If the loading is too excessive or repetitive, this can lead to stress fractures. A tibia stress fracture causes tenderness and pain, which tends to mostly be on the inner shin bone.

Various factors can play a role in the development of a **tibia stress fracture**:

- Training on too hard a surface.
- Poor foot biomechanics.
- Stiff ankle.
- Weak muscles.
- Diet lacking in minerals.
- Too obese to run.

Treatment involves soft tissue work, laser and MBST to fracture sites, Gunn IMS dry needling, guided rehab, and ankle mobs, with a biomechanics overview – especially looking for pronation – and possible orthotics with arch support.

Diagnosis is by physiotherapy assessment, and an X-ray after four weeks to show the bone is healing. Treatment can include: rest, MBST, laser, Gunn IMS, biomechanical assessment, and lower limb non-weight bearing rehab. In most cases, the individual can return to sport in eight to twelve weeks, but if more severe, this could turn into six months.



*Do you get pain on the back of your heel? Does standing on your tiptoes hurt?*

*If so, you may have achilles tenosynovitis.*

## ACHILLES TENOSYNOVITIS

Achilles tenosynovitis and achilles tendinitis usually occur together. Tendons are fibrous structures that attach muscle to bone, covered by sheaths that are lubricated by synovial fluid. Achilles tenosynovitis is also called paratenonitis, which describes the degeneration of the outer sheaf. As the tendon heals, scar tissue forms in the sheaf, attaching itself to the inner part of the tendon and causing tightness, pain, and swelling. The

smooth gliding of the tendon is prevented, leading to secondary tearing. Beyond swelling and tightness, it may be possible to feel a lump at the back of the tendon.

There are multiple causes for inflammation:

- Sports activities.
- Competing triathletes.
- Systemic diseases.
- Repetitive movements.
- Poor footwear.
- Inadequate stretching.
- Hard, uneven terrain.
- Previous scar tissue.
- Sudden increase in distance.

Relative rest, cooling, and gels can help, as well as a biomechanical analysis to see if the positioning of the foot or footwear is an issue, local electrotherapy, and sport specific rehab with graded strengthening and balance work. Shockwave will soften the scar tissue, promoting healthy collagen and also promoting blood flow.

Provisional diagnosis is by physiotherapy assessment, ultrasound scan or MRI, and biomechanical assessment, and treatment can include: RICE, massage, physiotherapy, heel raises, orthotics, changing your footwear, shockwave, Gunn IMS, pulsed shortwave, ultrasound, rehab and exercises, and reduced hill running.

*Do you get persistent ankle pain with swelling and locking after an ankle sprain or injury?*

*If so, you may have an osteochondral fracture.*

## OSTEOCHONDRAL FRACTURE

This is damage to the joint cartilage and underlying bone, and in the ankle this is often caused by trauma, typically from a sports injury where the shin bone is struck on the outside. Persistent ankle sprains can also lead to osteochondral fractures on the inside of the ankle.

Fragments of cartilage and bone are torn from the bone under the shin bone in the ankle (talus). If a fragment of cartilage is still attached to the bone, then conservative treatment of putting the ankle in a cast, plus MBST/MRT will suffice until the fracture is healed. Where fragments are only marginally attached or totally detached, then these are best removed with arthroscopic surgery.

Symptoms of osteochondral fracture include the swelling of the joint, possibly some instability, and a feeling of the joint catching with some grating.

Provisional diagnosis is by physiotherapy assessment and X-ray, and treatment can include: for grades I and II – cycling/swimming, ankle non-weight bearing exercises, laser, MBST/MRT, and a full rehab program for balance and strength. For grades III and IV – scope and surgery to remove the fragment.

Do you get a tingling or numbness in the extremities, stiff muscles or cramps, and a red rash?

*If so, you may have hypocalcaemia.*

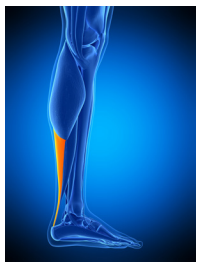
## HYPOCALCAEMIA

Calcium regulation is necessary for cell function – including cell membrane integrity – and ionised calcium is needed for nerve conduction, muscle relaxation, contraction, bone mineralisation, and hormones.

Diagnosis is by GP physical exam, and treatment can include: seeing a medic, and then, with their agreement, a nutritionist.

*Do you have an ache at the back of the ankle, which is painful on exercise, and worse on stairs or an incline? Is the achilles tender, thickened, and red?*

*If so, you may have achilles tendinitis.*



## ACHILLES TENDINITIS

Achilles tendinitis is the irritation/inflammation of the large tendon at the back of the ankle. This is an acute condition, rather than the chronic condition called tendinosis. Causes of achilles tendinitis include a lack of flexibility and overpronation, increasing running mileage, more uphill work, poor footwear, and poor biomechanics.

Typically the back of the ankle is very sore after rest, about 4 cm above tendon insertion on the heel bone (calcaneus). Pushing off through the foot will also be difficult. Rehab must allow for adequate rest to stop the tendon getting inflamed. Initially, cycling and swimming is progressed to weight bearing and balance exercises, and then plyometrics.

Diagnosis is by physiotherapy assessment, biomechanical assessment, and MRI scan, and treatment can include: sports rehab exercises, stretches, a training program, MBST, orthotics, physiotherapy, massage, and laser. For the chronic cases, Gunn IMS and shockwave will be needed.

## ACHILLES BURSITIS

An increase in running mileage, more uphill work, poor footwear, and poor biomechanics can cause this. Like with achilles tendinitis, the back of the ankle is very sore after rest, about 4 cm above tendon insertion on the heel bone (calcaneus). Pushing off through the foot will also be difficult.

Rehab must allow for adequate rest to stop the tendon getting inflamed. Initially, cycling and swimming is progressed to weight bearing and balance exercises, and then plyometrics.

Diagnosis is by physiotherapy assessment, biomechanical assessment, and MRI scan, and treatment can include: sports rehab exercises, stretches, a training program, MBST, orthotics, physiotherapy, massage, and laser, and for chronic cases, Gunn IMS and shockwave.

*Do you have leg pain, but no amount of working your leg muscles or prodding specific places gives a pain?*

*If so, you may have radiculopathy (see the spinal section).*

*Do you have pain and swelling over the outside of the ankle, which gets worse with activity?*

*If so, you may have peroneal tendinitis or a peroneal nerve injury (weakness of foot raise).*

## PERONEAL TENDINITIS

The two peroneal tendons – the brevis and longus – run outside the lower leg and then behind and underneath the bony prominence on the outside of the ankle (lateral malleolus). A high arch tends to increase the stress through the tendons and thus aggravate the condition.

Peroneal tendinitis tends to be a chronic wear and tear problem resulting from repetitive loading, and in some cases the tendons can become torn. Symptoms of peroneal tendinitis include pain and inflammation on the outside rear of the ankle. This inflammation will cause stiffness, especially after periods of inactivity such as first thing in the morning.

The tendons are activated in direction changes and therefore sports involving rapid changes of direction will aggravate the tendinitis and should be

avoided while healing. Biomechanically, a high arch with an inverted ankle (the foot being rotated as if you are trying to look at the bottom of your foot) will predispose you to peroneal problems. A complete tear would be evident with you not being able to move the foot to the side. Occasionally, nearby nerves (sural) are affected and this will cause nerve supersensitivity.

Diagnosis is by physiotherapy assessment, pressing on the peroneal, and a biomechanical assessment for overpronation and excessive eversion. Treatment can include: biomechanical assessment, orthotics with a view to looking at the high arch being a problem, foot plate analysis for pressure around the big toe, rehab with strengthening and stretching the peroneal and calf muscles, and sports.

## PERONEAL NERVE INJURY

The peroneal nerve branches off the sciatic nerve and is responsible for innervating the muscles that raise the foot and toes. Damage to the nerve can thus lead to spontaneous foot drop or weakness in lifting the foot. Other symptoms include a tingling or numbness on the outside of the lower leg, and pain down the shin or the top of the foot.

Peroneal nerve injuries have a poor chance of recovery, worsening with time, so it is important to be assessed quickly by a specialist who can determine whether to proceed with surgery or go down a more conservative route – typical conservative options include physiotherapy and orthotics.

Diagnosis is by EMG tests, orthopaedic surgeon, or a back specialist, and treatment can include: Gunn IMS for assessment, physiotherapy, and biomechanical assessment.

Do you have pain over the inside of your lower part of your shin, which gets worse if you bend your foot down? Is there initial pain on training that can be worse the next morning?

If so, you may have shin splints.

## SHIN SPLINTS

These are caused by exercise, and the pain comes on after long distance running, or sports that involve sudden turns and stops. The dull pain – which can be felt along the shin bone (tibia) – gets worse without rest. Take the pain as a warning to do activities that put less force through the tibia, then try ice, relative rest, and swimming or cycling while healing – over a couple of weeks. Once the pain is gone, make sure to run on softer ground.

It is not clear what causes microtrauma to the membrane between the bones or small fractures to the periosteum, but to reduce risk, wear good running shoes and orthotics if needed, especially if flat-footed. Run on softer ground, watch your weight, and stretch the achilles tendon before activity. A sports physio will advise you on warming up correctly, and rehab will be needed with a progressive return to your sport.

Provisional diagnosis is by physiotherapy assessment, X-ray, and biomechanical assessment, and treatment can include: orthotics, better trainers, changing your training program and using a softer surface, laser, MBST, mobilising the ankle, nutrition, and weight control. A sports therapist will take you through a graded rehab program.

Do you have unpleasant sensations in your legs, which cease on movement, and worsen in evenings?

*If so, you may have restless legs syndrome.*

## RESTLESS LEGS SYNDROME

This affects the nervous system, and you can experience an overwhelming need to move your legs, as well as a creeping, crawling feeling in the legs. Low dopamine levels can affect this. Restless legs syndrome is occasionally linked to anaemia, kidney failure, or Parkinson's, and it affects around one in ten people.

Diagnosis is by nutritionist, and a Gunn IMS specialist to check for lumbar spondylosis link. Treatment can include: massage, stretching, Gunn IMS, Acupuncture, reducing caffeine and alcohol, increasing your iron intake, increasing your exercise, and dopamine aiding your nutrition.

*Have you had a bruising injury some months ago and do you now feel a bony lump there?*

*If so, you may have myositis ossificans.*

## MYOSITIS OSSIFICANS

This is an uncommon condition in which bone is formed inside an injured muscle. Many sports are prone to muscle injury – such as football, rugby, martial arts, and hockey – and these injuries can lead to heavy internal bleeding, evident as bruising and swelling, and can also result in a blood clot, which is an ideal breeding ground for calcification. Left untreated, the calcification can continue to develop and may take over much of the injured site over several months.

The key to prevent myositis ossificans – or the growth of bone by calcification within the injured muscle – is to seek treatment as early as possible after the injury. Once formed, the bone can only be removed surgically and the current guidelines advise waiting up to 12 months to minimise the risk of further bone growth post-surgery. The cause of myositis ossificans is not understood, and there *is* a risk of further bone growth post-surgery.

Diagnosis is by physiotherapy assessment, X-ray to confirm the diagnosis, and checks to confirm it is non-malignant. Treatment can include: drugs to relieve the symptoms, and surgery.

*If you try to flex your foot up against resistance, does it hurt?*

*If so, you may have a tibialis anterior strain.*

## TIBIALIS ANTERIOR STRAIN

The tibialis anterior muscle runs down the outside of the shin, and when it gets sore, you feel pain at the front of the ankle. Its purpose is to lift your foot up and out. With tibialis anterior strain, the tendon can feel creaky and sore and the toes hurt to move up and down. This strain occurs when running on hard ground and is especially vulnerable with racket sports.

Provisional diagnosis is by physiotherapy assessment, and treatment can include: RICE, orthotics, shockwave, ultrasound, laser, physiotherapy, sports strengthening rehab, and proprioceptive exercise.

*If you try to rotate your foot in – as if looking at the sole of your foot – against resistance, does it cause pain on the inside of your foot, but does flexing your foot up against resistance not hurt?*

*If so, you may have tibialis posterior tendinopathy.*

## TIBIALIS POSTERIOR TENDINOPATHY

The tibialis posterior originates from the back of both calf bones – the tibia and fibula – then travels down the inner side of the leg, with the tendon running behind the inner bony prominence of the ankle (medial malleolus) to attach into the foot bones. It acts to flex the foot down and rotate inwards, as when you're trying to look at the bottom of your foot. It is also an important muscle for maintaining the arch of the foot.

A problem with tibialis posterior tendinopathy can occur either with a sudden force or repeated overuse, the latter being the more common. Symptoms of tibialis posterior tendinopathy include pain in the inner lower leg and ankle, which is made worse when running over uneven ground. Sore to touch, it can be stiff in the morning, and this can go on for weeks.

Degeneration of the tendon causes pain on the inside of the foot, and the pain is made worse if someone else tries to lift the outside of the foot

(passive eversion) or if you try to press the inside of your foot down against resistance (resisted inversion). Some noise may be apparent when the tendon is activated (crepitus). In severe cases of tibialis posterior tendinopathy, the tendon can become detached and pull some of the underlying bone away (partial avulsion).

Sports prone to tibialis posterior tendinopathy include:

- Speed skaters, as they have prolonged stretching and eversion of the feet.
- Runners who develop by training around bends.

If you have flat feet or you are not fit with good balance reactions, you will be more at risk of experiencing this injury.

Diagnosis is by physiotherapy assessment, MRI or ultrasound scan to confirm, and biomechanical assessment, and treatment can include: looking at your posture, orthotics to correct overpronation, physiotherapy, shockwave, laser, prescriptive proprioceptive strengthening, and rehab sports therapy to change your running program to avoid running around bends. It can take months to achieve full recovery, depending on how chronic the condition is.

## FEET

*Are you a dancer? Is it tender on the sole of your foot? (Dancers tend to repeatedly impact load the sole of the foot, making this area tender.)*

*If so, you may have metatarsalgia.*

## METATARSALGIA

The metatarsals are the five long bones in the midfoot which connect the toes to the group of bones at the ankle. The metatarsals meet the toe bone (phalanges) at the ball of the foot, and metatarsalgia is pain in this area. Symptoms may also include pins and needles, numbness in the toes, and a burning or sharp pain.

There are many potential causes of metatarsalgia including being overweight, wearing tight and/or high heeled shoes, any sport which causes high impact loading, and thinning of the fat pad on the bottom of the foot, which is typical with aging and the foot structure itself. Both flat and excessively arched feet can aggravate the condition, and related conditions which could contribute include osteoarthritis, gout, Morton's neuroma, and diabetes.

Provisional diagnosis is by physiotherapy assessment, X-ray, ultrasound scan, bloods, and biomechanical assessment, and treatment options include: physiotherapy and exercises, orthotics, Acupuncture, toe mobilisations, stretches and graded exercises, and wearing padded, spacious shoes.

*Are your toes stiff? Can you only pull your toes up by 45 degrees or less? Do you get pain on walking?*

*If so, you may have osteoarthritis of the toes.*

## OSTEOARTHRITIS OF THE TOES

Osteoarthritis is a condition where the cartilage that coats the end of the bones at joints to provide a smooth motion is worn away, eventually leaving bone on bone contact. The symptoms of osteoarthritis include pain and stiffness, worsening as the condition develops.

Treatment options are MBST plus physiotherapy and exercise.

Does your ankle click or have loss of movement? Is one ankle stiffer, has less movement than the other, and is noisy? Comparing the two ankles, is one joint stiffer with more loss of movement when you flex your foot down? Does it clunk and creak when moving? Does it feel blocked with a 'hard end' feel?

*If so, you may have osteoarthritic changes.*

## OSTEOARTHRITIC CHANGES

The ankle joint is subject to considerable loading from normal daily activities, something that is much higher with impact loading such as with running or jumping. The ankle area has a lot of bones and joints, and this combined with the loading makes it vulnerable to both wear and tear and injury. It is no surprise that the ankle is the most injured joint in the body and therefore vulnerable to osteoarthritis. Additional contributing factors include poor foot mechanics such as flat feet (overpronated) or high arched feet (supinated).

Provisional diagnosis of this condition is by physiotherapy assessment plus X-ray, and treatment options include: MBST/MRT plus physiotherapy, rehab, and Acupuncture.

*Do you get severe pain under the heel when you first stand? If you have been sitting or lying – especially first thing in the morning – do you get severe pain under the heel, but if you wiggle your ankle it is not painful?*

*If so, you may have plantar fasciitis.*

## PLANTAR FASCIITIS

This condition is also known as 'policeman's foot'. The fascia is a strong tendon that connects the heel bone (calcaneus) to the toes and acts as a shock absorber, supporting the arch in the underside of the foot. Pain is most often felt where the fascia connects to the underside of the heel bone, and this can be due to being overweight from inactivity, excessive heel strike loading as in running, or having excessively tight calf muscles. The pain and tightness will most likely be felt first thing in the morning or after periods of inactivity.

Plantar fasciitis responds well to shockwave therapy on the fascia combined with calf stretching if necessary. For chronic tendon problems, MBST can

help calm the condition. If the feet are incorrectly aligned, then orthotics will help resolve the underlying cause.

Provisional diagnosis is by physiotherapy assessment plus biomechanical assessment, and treatment options include: ice, stretching, night splint, taping, massage, orthotics, shockwave, and physiotherapy. Then you can consider MBST/MRT.

*Do you have a blood blister, bruising, and possible tenderness?*

*If so, you may have a haematoma.*

## HAEMATOMA

A haematoma is swelling caused by the accumulation of clotted blood, and if the haematoma compresses a local nerve it can cause pain. These are quite common in contact sports, and such injuries can occur either inside or outside a muscle. Muscle strains will typically restrict the range of movement, but those outside of muscles can be more persistent and more restrictive.

Treatment options include: RICE, physiotherapy, and electrotherapy, and if resolved, you may need aspiration.

*Have you had a recent trauma to a toe by kicking something hard or dropping something heavy on it? Do you now get foot and/or toe pain, which is worse on standing? Are you unable to move your foot in the full range of motion?*

*If so, you may have broken toes.*

## BROKEN TOES

Broken toes are fairly common injuries, but in most cases do not require treatment and will self heal in around four to six weeks. If the toe is misaligned it may need to be reset, which your GP can do under anaesthetic.

If the big toe is broken, it may need to be put in a cast. If you have walked a lot or play a lot of contact sport, you can get a stress fracture in your toes.

Laser or MRT accelerates the healing process and you have to ease up on the aggravating activities. Treatment can include: stiff shoes, laser, and strapping.

*Does it hurt if someone else flexes your ankle by pulling your foot down, but you can stand on your toes and it does not hurt? Is the back of your heel tender?*

*If so, you may have posterior impingement syndrome.*

## POSTERIOR IMPINGEMENT SYNDROME

This condition is also known as 'dancer's heel', as it is very common with ballet dancers. Pain is felt at the back of the ankle – at the base of the thin bone running down the outside of the calf (fibula) – and is aggravated if the foot is pointed downwards (plantar flexion). The pain is due to tissue inflammation in this area, caused by the trapping, or impingement, of tissue as the foot is flexed. Usually standing on tiptoe will elicit the pain.

Rest and ice are advisable to reduce any swelling, and it's possible that a cast may be needed for four weeks. In some cases, a corticosteroid injection is advised to control inflammation.

Provisional diagnosis is by physiotherapy assessment plus biomechanical assessment with dancing shoes, and treatment can include: rest, ice, physiotherapy, orthotics, cast, and corticosteroid injection.

*Do you have swelling over the outside of your ankle and does it hurt when you do a combination of flexing your foot down and turning the sole inwards, as if to look at the sole of your foot?*

*If so, you may have ligament strain or tear.*

## LIGAMENT STRAIN OR TEAR

The ankle is a hinge joint between the leg and the foot, allowing up and down movement. The bones of the leg (tibia and fibula) form a slot, and the talus bone of the foot fits between them. The talus connects to the tibia and fibula by strong bands of tissue called ligaments, and each ligament is made of many fibres of collagen, which is extremely strong.

The ligament on the inside of the ankle (the deltoid ligament) has two layers; the deepest one is the most important. This ligament is mainly torn in association with severe fractures of the ankle bones, and sporting injuries of this ligament are rare. The ligament on the outside of the ankle (lateral ligament) is made up of three separate bands: one at the front (anterior talo-fibular ligament), one in the middle (calcaneo-fibular ligament) and one at the back (posterior talo-fibular ligament). The front and middle bands are the ligaments that are injured in a sprain.

The tibia and fibula form a joint between themselves just above the ankle, and this also has strong ligaments, one at the front and one at the back (tibio-fibular ligaments). The ligament at the front is involved in 10-20% of ankle sprains, and this injury is important, as it takes a long time to heal, although it usually heals without the need for surgical treatment.

How do the ankle ligaments get injured?

Most ankle ligament injuries are caused when the foot twists inwards. All of the body's weight is then placed on the lateral ankle ligaments. The anterior and middle fibres of the ankle tear/sprain the ankle. Occasionally small pieces of bone may be torn off with the ligaments.

In a few cases I have seen a twisting force on the ankle cause other damage: the bones around the ankle may have fractured, a piece of the cartilage lining the ankle may be chipped off, ligaments connecting other bones in the foot may be torn, or the tendons around the ankle may be damaged. X-rays (conducted later on) show these bony injuries.

Although a couple of days' rest is useful – as well as a stick – it is best to start taking some weight on the injured ankle reasonably soon after injury, usually within 2-3 days. Also, start to exercise and stretch the injured ankle as soon as possible after the injury, taking advice from experts.

Normally a sprained ankle will recover within 6-8 weeks, although it may tend to swell for a few months longer. Treatment can include: physiotherapy, strapping, a gradual return to activities with rehab prescription, and electrotherapy.

*Do you get pain on walking at the big toe? Can you not lift the big toe beyond 45 degrees? (The big toe – or hallux – should normally lift well beyond 45)*

*If so, you may have osteoarthritis of the first MTP joint.*

## OSTEOARTHRITIS OF FIRST MTP JOINT

This is osteoarthritis in the joint at the base of the big toe. The metatarsals are the long bones in the midfoot that join the ankle bones to the toe bones – the phalangeals at the MTP joint. The big toe is the first toe.

The restriction of the toe joint is carried out when not weight bearing. A similar test when weight bearing is called the Windlass test, which looks at the ease of the toe to be lifted up and also tests for flat feet. Bunions (hallux valgus) deformity at the base of the big toe may be associated with OA, but not necessarily.

Provisional diagnosis is by physiotherapy assessment and X-ray, and treatment can include: physiotherapy with MBST/MRT, and shockwave.

So, this concludes our whistle stop tour through the notebook of a physio – hopefully you've learnt something about muscle and nerve problems, and hopefully you can use this guide in the future if you start experiencing any pain or discomfort.

# Appendix 2

"Do not deprive me of my age. I have earned it."

– *May Sarton*


# Your Greatest Wealth Is Your Health

*Cromwell House, Wolseley Bridge Clinic*

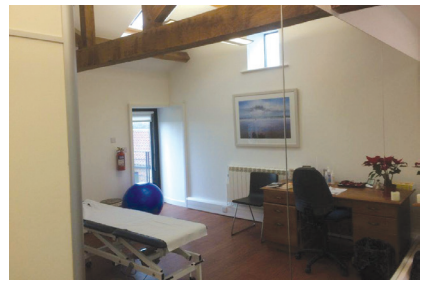
The midlands holistic physiotherapy clinic is in a refurbished Grade II listed building, called Cromwell House, as it is thought that Oliver Cromwell stayed here before the battle at Hopton Heath, near Stafford.

*Clinic waiting room*

Upon arrival, it feels like stepping into your home rather than a clinic. The energy is conducive to healing as it is surrounded by an Area of Outstanding Natural Beauty, on the edge of Cannock Chase in Staffordshire.

*MRT WILLEY BARN Wolseley Bridge*

*Harrogate, Spa Bottom Farm*



My new venture, Spa Bottom Farm, is near to my darling little nephews, who are both under five at the time of writing this book. Strangely enough, Cromwell was busy around here too, destroying the place and burning witches. There will be more about this in my Soul volume.

The midlands clinic was set up to educate and help patients and practitioners in many aspects of musculoskeletal health, aimed not just at fire-fighting their symptoms but informing people of them too.

I want for you all to see your body as your temple – not just a vehicle – and one that is built on pillars of health. Each pillar represents a different aspect and each needs to be strong for you to have a long and healthy life. Your temple is only as strong as the weakest pillar. This is what inspired me to present and write *The 4 Keys to Health*, as by the time I got around to pub-

lishing my book, everyone was talking about 'pillars' of everything, so keys it was.

So, when you come to our clinics and we look at you – that's myself and my team – we want every aspect of you to be as robust as it can be, whether it be mindset, diet and nutrition, exercise and fitness, or lifestyle and stress. Your ability to heal from an injury and your speed of recovery depends on all of these factors. This project has been ongoing, and it originally evolved in my home practice. It is the foundation for my presentations on pain around the world, my Z factor shows, and my book on the 4 keys to health.

We believe that a long, healthy, pain free life is your greatest wealth, and we will strive to help you achieve this. More than 10,000 patients have gone through this kind of therapy approach with me, and are now no longer immobile and needing pain meds; they are testament to this approach of preventative medicine.

Instead of just treating your injury or pain, we would like to prevent your problem from reoccurring, and to achieve this we need you to embrace the preventative approach of optimum health, which can:

- Move you towards a pain free life.
- Regain your physical fitness.
- Help you live a longer and healthier life.
- Reignite your passion for life.
- Make you feel more energetic and vital.
- Give you more resistance to illness and disease.

## WHAT IS OPTIMUM HEALTH?

The achievement of optimum health can be likened to the Parthenon; for the building to have optimum strength, each of the stone pillars must be strong and well built, otherwise the building will crumble and fall.

*Optimum Health Parthenon*


Picture optimum health as that building; every one of your health pillars needs to be strong or your health will come crashing down. For optimum health you need to learn the power of your own mind to control and drive your subconscious thoughts, and you also need to understand that your body is a complex biological machine made up of billions of cells. These tiny cells crave good nutrition and oxygen to grow and flourish. Therefore, adding regular exercise is vital to maintain good blood flow, muscle tone, and strong bones, as well as helping to keep you trim and combat the stress that goes with our modern lifestyle.

## HOW DO WE GET YOU THERE?

*Jon Hobbs, Chair AACP, teaching acupuncture in November 2015.*

Once we fully understand the severity of your problem and your starting point, we will make a specific treatment plan to get you to your goals, using the appropriate skills and technologies. Whether or not you come to one of my holistic physiotherapy clinics or similar clinics, or one of my presentations, you will soon have my life's work at your fingertips with my Human Garage series of books.

## CHINESE MEDICINE

Chinese Medicine and Acupuncture offers a gentle approach to putting your body back in balance. As a holistic approach, it is particularly good at treating conditions where there is an internal imbalance, such as period pain, pregnancy, menopause, IBS, and worry and anxiety.

Chinese Medicine and Acupuncture has been proven to:

- Rebalance your body.
- Reduce pain.
- Increase flexibility.

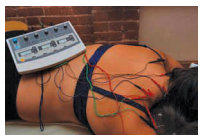
Chinese Medicine is a complete medical system with a history going back thousands of years. The basis of the treatment starts with questioning, observation, and pulse and tongue diagnosis, to work out in which way your body is out of balance – something that is called Syndrome Differentiation. It also treats local pain problems with 'Ah shi' (which literally translates as 'that's it') point needling. Treatment is a combination of herbal medicine, Acupuncture, diet, massage, and exercise. The effect of generating chi or 'vital energy' can be experienced through Tai Chi or Qigong.

Most people have heard of Acupuncture, though this is normally western Acupuncture, which combines needling to local areas of pain or spasm, 'Ah shi' points – sometimes called trigger points – plus some use of Chinese Acupuncture points, but without reference to the principles and theory of Syndrome Differentiation.

Acupuncture is a treatment that has been and continues to be debated heavily by western medical practitioners. The views are widespread – some GP Practices and NHS hospitals openly use Acupuncture while others don't. One year, NICE (government guidelines) gives Acupuncture a gold standard for treating, for example, back pain, while another year it vanishes again.

Perhaps a broader and more logical perspective can be seen in China, the birthplace of Acupuncture. China is rapidly developing, and as a result, it is reforming its approach to medical care. The approach that China is taking is to evaluate the effectiveness of traditional Chinese medicine in comparison to western techniques, selecting the most effective in clinical trials. China teaches both western and eastern medical courses, though in many cases China continues to use traditional Chinese medicine as the preferred treatment option.

## ELECTROACUPUNCTURE



*Electroacupuncture*

- Chronic spinal neuropathic pain relief.
- Acute and post-operative pain relief.
- Acute back pain relief.
- Osteoarthritic pain and sports injuries.

Electro acupuncture is often likened to TENS, but it is more effective in the treatment of chronic pain, and therefore it is often used by physiotherapists for the treatment of chronic pain. Also, benefits continue after treatment and improve with repeated treatments. TENS, on the other hand, is only effective while the treatment is active, but is beneficial for acute and post-op pain relief. It is also helpful for reducing pain during a course of IMS treatment.

## TENS

Transcutaneous electrical nerve stimulation (TENS) is a method of pain relief involving the use of a mild electrical current produced by the device to stimulate the nerves for therapeutic purposes. TENS, by definition, covers the complete range of transcutaneously applied currents used for nerve excitation.

A TENS machine is a small, battery-operated device that has leads connected to 4 sticky pads called electrodes. TENS is applied at high frequency (>50 Hz), with an intensity below motor contraction (sensory intensity), or low frequency (<10 Hz), with an intensity that produces motor contraction. The physiotherapist will demonstrate how to use all the settings and where to place the pads.

The development of the modern TENS unit is generally credited to C. Norman Shealy, and a few studies have shown objective evidence that TENS

may modulate or suppress pain signals. One showed that electric stimulation of A-beta sensory fibers reliably suppressed the A-delta fiber (touch). Two other studies used functional magnetic resonance imaging (fMRI) to look at brain activity: one showed that high-frequency TENS decreased pain with carpal tunnel syndrome, the other showed that low-frequency TENS decreased shoulder impingement pain and modulated pain-induced activation in the brain. A head-mounted TENS device called Cefaly was approved in 2014, for the prevention of migraines. The Cefaly device was found effective in preventing migraine attacks in a randomised sham-controlled trial. This was the first TENS device which the FDA approved for pain prevention, as opposed to pain suppression.

## LASER ACUPUNCTURE

*Laser Acupuncture*

- Reduce pain and swelling.
- Promote tissue healing.
- Promote bone healing.

Therapeutic laser – sometimes called cold lasers – use pure light to speed cell repair. A physiotherapist will often use a therapeutic laser as part of their treatment as it is effective in reducing pain and swelling. Different wavelengths can be used to treat skin conditions, muscle and tendinopathy, and bone healing.

It is unclear how LLLT (low level laser therapy) might work. However, photochemical reactions are well known in biological research; it may be that the light applied in low level laser therapy might react with the respiratory enzyme cytochrome c oxidase, which is involved in the electron transport chain in mitochondria.

The research is not terribly positive – while anecdotal evidence is strong, Cochrane reviews, sadly, are not. I was trained how to use laser by Prof Gunn and Omega Lasers, and I find it very useful in combination with needling.

A 2008 Cochrane Library review concluded that LLLT has insufficient evidence for treatment of nonspecific low back pain, a finding echoed in a 2010 review of chronic low back pain. A 2015 review found benefits in nonspecific chronic low back pain. Another 2015 review found benefits in shoulder tendinopathy. A 2014 Cochrane review found tentative evidence that it may help in frozen shoulders.

## MANUAL MANIPULATION

Joint manipulation is a passive movement made to a patient's joint by a therapist, and it is aimed at producing a therapeutic effect at a synovial joint (a fibrous joint capsule filled with synovial fluid). The degree of force and the angle of application to free up a joint is taught by different professional bodies. Physiotherapy has Cyriax, Maitland, McKenzie, and Nags and Snags schools of training. Chiropractors and Osteopaths have their own too.

## THERAFLEX ROBOTIC SPINAL MANIPULATION

At least 60% of the UK population suffer from back problems. There are many causes for back pain, and one of those causes is a spine which becomes inflexible. In simple terms, there are 17 vertebral bones from the bottom of the neck to the base of the spine, and if we imagine that each of these should allow an element of rotation and flexibility, then if any of these joints become seized, it begins to cause problems in overall flexibility, resulting in pain.

Physiotherapy is an effective treatment for improving spinal flexibility, however, a physiotherapist's ability to manipulate spinal vertebrae is limited by the force they can apply with their hands. Theraflex robotic spinal manipulation provides the physiotherapist with a powerful technology to manipulate the whole spine with ease.

## HOW DOES THERAFLEX SPINAL MANIPULATION WORK?

Theraflex has three modes of operation, each of which can be minutely adjusted for force and speed, thus matching the patient requirements exactly.

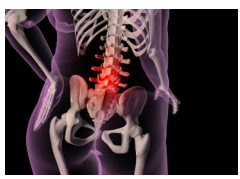
## MUSCLE RELAXATION

On this setting, the device rapidly taps on the muscles either side of the spine. By running this up and down the spine, the physiotherapist is able to stimulate muscle relaxation along the whole length of the spine, quickly and effectively. Most patients find this setting extremely comfortable and relaxing.

## REFLEX STIMULATION

The second stage of treatment involves stimulation of the spinal reflexes. This is achieved by a gentle tapping over the full length of the spine, triggering the spinal reflexes to create further relaxation in preparation for spinal manipulation.

## VERTEBRAL MANIPULATION



In the final stage of Theraflex treatment, the physiotherapist is able to manipulate each neighbouring vertebrae to move independently of each other, reducing the friction between them. In practice, the treatment mobilises the facet joints between each pair of neighbouring vertebrae. The net result of this treatment is to regain the flexibility in the full length of the spine, as originally intended. To achieve this, several treatments may be required, as each treatment progressively improves flexibility.

## WHAT DOES THERAFLEX TREAT?

Theraflex is able to treat a number of conditions, the most common being general stiffness of the spine, but we have also successfully treated:

- Mild Scoliosis, a mild side flexion in the spine.
- Mild Kyphosis, hump back posture.

It also helps with the symptoms of:

- Osteoarthritis.
- Sciatica.
- Spinal Disc Pain.

## THERAFLEX AS PREVENTATIVE TREATMENT

As a maintenance treatment, Theraflex helps keep the spine supple and prevents many of the pain problems associated with a stiff spine. This treatment has helped golfers improve their handicap by enhancing the smoothness of their golf swing thanks to increased spinal flexibility.

## PULSED SHORTWAVE

*Pulsed Shortwave Close Up*

- Increase range of movement of joints.
- Reduction of pain and inflammation for acute and chronic conditions.
- Increase blood flow.

Pulsed shortwave uses high frequency electromagnetic waves to produce thermal and non-thermal effects in deeps tissues. An advantage of pulsed shortwave over ultrasound is that a much larger, deeper area can be treated and the heating effect will last longer (if necessary), giving the practitioner more time to work on the treated area.
A damaged cell that is inflamed has a reduced cell membrane potential, meaning that the cell can't function correctly. This causes an ionic imbalance, and cellular osmotic pressures go awry. PSWD (pulsed shortwave diathermy) is said to restore normal cell membrane transport and ionic

balance. The theory is not fully understood, but it is believed that it's to do with ionic transport and sodium/potassium pumped by the pulsed energy (Sanseverion, 1980). Energy is absorbed in the membrane (Luben and Cleary, 1996), and via signal transduction, it stimulates intracellular effects.

## RADIAL SHOCKWAVE

*Shockwave treatment of Achilles Tendinitis*

Radial shockwave has been extensively used in mainland Europe for many years, but as it has only recently been introduced to the UK, it is not commonly available here. It has, however, recently gained NICE approval. Extensive research around the world is pushing the boundaries of radial shockwave forward at a rapid pace and many new applications are being developed all the time.

The hubby and I have travelled to Europe for education on shockwave use, and have had training from an orthopaedic consultant who runs a major shockwave clinic in Luxembourg.

Shockwave is particularly effective in the treatment of:

- Plantar fasciitis/policeman's foot.
- Tendon calcification.
- Adhesive capsulitis/frozen shoulder.
- Achilles tendonitis.
- Reducing lumbar spasm.
- Piriformis syndrome.
- Tennis elbow.
- Iliotibial band syndrome.
- Improving osteoarthritic joint mobility.

## SHOCKWAVE TREATMENT OF EPICONDYLITIS / TENNIS ELBOW

Many patients who have come to us with osteoarthritic joints have felt immediate improvement in joint flexibility. For those who choose not to undergo joint replacement surgery, shockwave offers a maintenance alternative, and ultimate relief from the condition of osteoarthritis; preliminary treatment with shockwave (to loosen the joint), followed by MBST (to regrow the cartilage), is the best solution in preventative care to slow down osteoarthritis.

There is so much supporting research out there. We attended a shockwave seminar in Southern France a few years back and listened to three days of research presentations from around the world, often at seven minutes a presentation. There was so much information to share!

For example, Ogden et al. (Shockwave Therapy for Chronic Proximal Plantar Fasciitis: A Meta-Analysis, 2014) presented at the 4th annual meeting of the International Society for Musculoskeletal shockwave Therapy, Berlin, Germany, in May 2001.

Pleiner et al., 2004, states that in a randomised controlled trial, extracorporeal shockwave treatment is effective in treating calcific tendonitis of the shoulder.

## ULTRASOUND THERAPY

*Ultrasound*

- Reduces fibrous scar tissue.
- Speeds soft tissue injury healing.
- Increases local blood flow.
- Increases collagen production in tendons and ligaments.

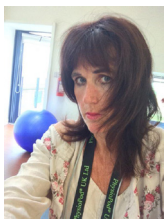
Ultrasound in physiotherapy uses high frequency sound waves to accelerate the treatment of an inflammatory condition. The depth of penetration is controlled through the frequency.

## INTERFERENTIAL THERAPY

- Reduce Swelling.
- Reduce muscle spasm.
- Treat acute joint pain.

Interferential therapy is most often used to treat conditions where there is muscle spasm, swelling, or joint pain, resulting from an acute injury. It works on the same pain gate theory as TENS and, like TENS, involves the use of stick-on pads around the area to be treated.

## DEEP OSCILLATION-ELECTROSTATIC



I love this – the technology can be used through your hands. It's so much fun.

## DEEP OSCILLATION

I was introduced to this again recently at an AACP conference in 2016. Just after this event, bronchitis hit me again and I was amazed at the effect of this technology on my lungs; I could breathe afterwards and slept much better.

It is easy to use and cost effective, the results including pain relief, anti-inflammatory effects, the reduction of oedema, the acceleration of wound healing, and it is anti-fibrotic and can be used straight after an injury.

I came across three good pieces of research on this, though there are a lot more out there: Jahr et al., 2008, Aliyev, 2009, and Aliyev, 2012.

# TREATING SPORTS INJURIES AND BACK PAIN WITH DEEP OSCILLATION

**Press Release**

**Nicky Snazell, Consultant Physiotherapist, adds DEEP OSCILLATION® to her high-tech Pain Relief Clinics**

Julie Soroczyn, M.D. of PhysioPod® UK Ltd. Consultant Physio and health celebrity Nicky Snazell

"DEEP OSCILLATION® was initially implemented in the UK for the management and treatment of Lymphoedema and Lipoedema but it is now used increasingly within the elite sporting world and in private physiotherapy clinics. It was at the AACP Conference in May 2016 that Nicky Snazell first learned of DEEP OSCILLATION® therapy.

**So what is DEEP OSCILLATION®?**

DEEP OSCILLATION® is an internationally patented, proven technology based on the effects of creating an electrostatic field in the tissue of the patient. Easy application is from clinician to patient/client via vinyl gloved hands; utilizing all normal massage movements or via circular movements over the tissue with a handheld applicator but without pressure, protecting the clinician's hands. The special structure of DEEP OSCILLATION® allows the creation of biologically effective oscillations in the treated tissue using electrostatic attraction and friction. In contrast to other therapies, these pleasant oscillations have a gentle and deep-acting effect on all tissue components to an 8 cm depth (through skin, connective tissue, subcutaneous fat, muscles, blood, and lymph vessels).

Because of the non-invasive, non-traumatic, gentle nature of this therapy, very early possibilities of application are possible following injury and from Day One post-operatively. Chronic conditions can also be worked upon with effective results.

It is clinically proven to significantly reduce pain, anti-inflammatory, swelling and bruising, resulting in a dynamic wound healing with less resultant scar tissue. Stubborn fibrosis and scar tissue are also effectively broken down. Sensitivity, range of motion, and function are regained with a quicker return to normal activities than with conventional therapies alone.

It is also FDA Approved. Normal massage contraindications apply plus pregnancy and pacemaker."

## DYNAMIC SCANNING

As you walk across the GaitScan plate, 4096 sensors are set to scan the plantar surface of the foot in motion. The GaitScan system records timing sequences during gait, and captures the relative pressure for each of ten distinct anatomical landmarks. The result is the detection of imbalances and other indicators of common lower limb pathologies.

## PRESSURE MAPPING

GaitScan gives you the ability to view a patient's foot (plantar) pressure distribution in both 2D and 3D. The synchronised mode allows for a direct right and left foot comparison, and displays the centre of pressure – or 'gait line' of the foot – throughout the gait cycle. Detailed images allow for the easy identification of high-pressure areas and existing biomechanical inefficiencies. It can be an early predictor of osteoarthritis in the lower limb, and can help to avoid injuries by prescribing orthotics where clearly a biomechanical abnormality needs addressing.

## DIETARY PAIN RELIEF

When presented with a medical issue, it is easy to overlook diet and nutrition as a potential cause of the problem. It is a sad fact that our health in the UK is not as good as it could be – you only have to look at

the rapidly increasing obesity evident on our streets every day. Through simple changes to your diet, however, it is possible to:

- Minimise your risk of heart disease, diabetes, and arthritis.
- Live a longer and healthier life.
- Maximise your life every day.

Cases of heart disease, stroke, and diabetes are all increasing, and there is a very clear relationship between this and the proliferation of sugar-loaded and highly processed food that is becoming ever more popular. Such a rapid change in health cannot have occurred by evolution. After all, we have been on this planet for hundreds of thousands of years, and we are seeing rapid change over the last 30 to 40 years.

No food manufacturer is going to tell you that their products are bad for your health, even if they know they are. Ultimately, you are what you eat, and only you are responsible for that.

The facts are that many of the UK's health problems are preventable; the proof is that other countries with healthier diets have fewer health problems than we do. For example, recent data shows that the UK is the 6th WORST country for breast cancer and that women are 50% more likely to die than in Spain. So, we could be 50% better if we do and eat what they do and eat.

How many older people do you know who are having a really hard time with poor health or pain, with it getting worse every day? A common phrase to describe this is we 'live short and die long'. Do you want that to be you? It doesn't have to be that way. It's your choice. You just need to get your mind-set focused on prevention – why wait until it's happened and then hope that surgery or drugs will save you? We can help guide you towards better diet and health.

*Exercise class*

## REHABILITATION CLINIC

## EXERCISE CLASS

At the clinic we will ensure that you are safe and ready to start exercising, and then we will tailor a program to your needs. This program must contain specific stretches and exercises – prescribed only to you. Never, ever use someone else's prescription, as it may make you worse. You need both a balanced body, and good core strength to minimise damaging, abnormal stress. Studies have shown a 67% improvement when the rehab program has been prescribed by a physiotherapist.

We can help you develop a highly effective exercise strategy to keep you active and improve your quality of life, putting you in control of your physical health. Effective exercise can also help you to:

- Prevent Injury.
- Live longer.
- Live more healthily.
- Minimise pain.
- Be happier.

## WHY EXERCISE?

Most people have a negative picture of exercise – picturing heavy exertion in a gym – and they often only link this with weight loss. However, numerous studies have shown that even minor effort, such as walking 30 minutes a day, can drastically reduce your risk to disease and premature death.

The statistics are overwhelming. Many of today's diseases are preventable – cancer, heart disease, diabetes, and osteoporosis just to name a few – and

exercise is a key component of prevention. Similar studies have recorded there being just as much benefit for mindset.

Exercise stimulates the release of endorphins – our body's natural painkiller – and it is many times stronger than morphine. Endorphins also give a natural 'feel good' response. Regular exercise has been shown to reduce stress, anxiety, and depression. A huge fear amongst many is Alzheimer's or dementia in later life, and one study on over 65's recorded a 50% decrease in Alzheimer's amongst those who exercised regularly. Exercise has also been shown to improve memory and reduce dementia.

Lastly, exercise will help reduce weight. This in itself has huge beneficial implications to physical health and mindset.

## RESOURCES

My clinic now has specialist software that enables us to directly email exercise programs to you after your treatment. Through a partnership with Physio Tec, we are able to offer you the ability to review your exercise program in detail as many times as you like from the comfort of your own home. The Physio Tec software enables a physiotherapist to select specific exercises from an extensive library and prescribe them to the patient.

## MEDICATION FOR PAIN RELIEF

*Various medications*

With some conditions it is often not possible to effectively treat them with medication. Whilst my clinic provides this information for general purposes, it is always important to consult with the prescribing doctor before taking any medication. When prescribing medication, there are often a number of routes that it is possible to take.

## ANALGESICS

More commonly known as 'painkillers', this group of medication works by interrupting the pain signals in the nervous system, which has the effect of blocking the pain and therefore reducing its effects. Some of the most common analgesics used include:

- Paracetamol.
- Co-Codamol.
- Tramadol.
- Dihydrocodeine.
- Morphine.

Whilst morphine is occasionally prescribed for extreme cases, Paracetamol at full strength is often sufficient for most problems. Some antidepressants – such as Amitriptyline, which can sometimes be used at low doses – have been found to help relieve certain types of pain. For example, taken at night, Amitriptyline is used to treat chronic (persistent) pain.

Specific nerve pain symptoms are sometimes treated with Pregabalin.

## NON-STEROIDAL ANTI-INFLAMMATORIES

This group of medication works to reduce pain by reducing the inflammation that is causing it. Often, the pain is caused by the inflammation process itself. Some example of anti-inflammatories are:

- Ibuprofen.
- Diclofenac.
- Naproxen.

Anti-inflammatories are often highly effective when used in combination with analgesics, such as a combination of Paracetamol and Ibuprofen.

## MUSCLE RELAXANTS

Some muscle relaxants – such as Diazepam – can be used to help relax muscles which are in spasm. In more severe cases, muscle relaxants such as Botulinum Toxin (Botox) can be injected directly into the muscle to release the spasm.

## INTRAMUSCULAR STIMULATION

*Nicky Snazell IMS*

Many people suffer from chronic pain and are unable to find an effective long-term treatment to relieve it. Intramuscular stimulation provides an alternative, effective treatment for the relief of chronic pain. It has been proven to effectively:

- Make chronic pain history.
- Help you play sport at your best.
- Help you stop taking drugs.
- Prevent surgery.

The fact is that many of these problems can be symptoms – with the cause being in the spine – the trouble being that you can go on treating symptoms forever and still be in pain or restricted in movement.

Think of your car: if your headlight bulb keeps blowing because of a faulty wire in the fuse box, then you need to fix the fuse box, not keep replacing the headlight bulb.

The way that human anatomy is formed in the womb means that the limbs can be considered an extension of the spine. So, specific parts of the body are controlled by specific nerves, their roots emerging at the spine. Just as in the car analogy, you could have pain in your foot because of a nerve

problem in your back, or an elbow problem because of a nerve problem in the neck.

Many spinal problems can be linked to muscular problems and the facts are that neither MRI nor X-ray can see such problems. IMS will find and treat muscular-related nerve (neuropathic) problems, and is used as part of a wider treatment by a physiotherapist. For neuropathic problems, IMS is unsurpassed.

## WHAT IS GUNN IMS?

*Professor Chan Gunn*

Many people who suffer from chronic pain become frustrated and depressed when their doctor cannot help. Some try medications and physical therapies – such as massage, physiotherapy, manipulations, and even surgery – and do not find lasting relief.

Chronic pain is a form of pain that lasts for a prolonged period. This timescale can range from several weeks to many years, and the pain worsens over time. Chronic pain can significantly affect quality of life, and can lead to many secondary conditions, including depression. This cycle can be difficult to break out of.

*Nicky Snazell*

Have you suffered months, or even years, of pain and have you tried everything, but nothing seems to help? Are you on a cocktail of drugs to control your pain, are concerned about the possible side effects of the drugs, and do not want to be on the drugs forever? Have you suffered years of pain but nobody seems to know what it is?

If this is you, then it could be that you have a neuropathic problem, which conventional scans such as X-ray and MRI simply cannot see. This is

where Gunn IMS excels, as it is unsurpassed in diagnosing and then treating such problems. That's why so many people come to this clinic from all over the UK, from Europe, the Middle and Far East, and the Caribbean. Gunn IMS succeeds where other treatments fail, and is used as part of a wider physiotherapy treatment.

## GUNN IMS FOR SPORTS INJURIES

*Sports injury*

Complex sports injuries are often not resolved by conventional physiotherapy techniques. In part this is because many sports injuries have a neuropathic origin. Gunn IMS works by treating the root cause of the problem.

Athletes have been shown to recover far more quickly from their injuries when Gunn IMS has been used in their treatment, and some national teams and Olympic squads require IMS practitioners to be part of their core therapy team.

*Pictured here in Vancouver, with Prof Gunn and Prof Aung, Nicky as an 'Honorary Fellow' speaking about pain advances and IMS in the UK.*

*IMS Pain Article: NICKY SNAZELL AUTHOR listed in 'Neurological', originally published in issue 111 - May 2005.*

**"Which Animal Are We Chasing?**

Would you like to learn about an effective drug and surgery free treatment for pain relief? If the answer is a sceptical 'yes', then please read on.

This article will hopefully whet your appetite and get you to embark on a journey of discovery into the jungle of human pain. In this jungle, metaphorically speaking, there are many different animals. Pain can disguise

itself in many forms. The secret of killing pain is in knowing which animal you are dealing with before choosing your weapon.

My background is in human and animal physiology, physiotherapy, and musculoskeletal Acupuncture. I have collected rows of certificates in my search, and until I studied Intramuscular Stimulation (IMS), none of them allowed me to catch this elusive animal that I now come to realise is 'neuropathic pain'.

There are, broadly speaking, three types of animals in the jungle, but we are concerned here with only one. The animals we are not concerned with are:

1. Those described as pain due to acute injury or inflammation.
2. Those related to psychogenic disorders, including severe depression.

We are going to take a closer look at the more puzzling third group, exhibited by conditions such as tennis elbow, back pain, repetitive strain, frozen shoulder, whiplash, and fibromyalgia. These are all the result of the same type of pathology called neuropathy. You cannot kill this pain by cutting it out with surgery and it cannot be hidden by drugs. The only way to deal with this animal is by desensitising it by relieving the irritation at its source. Invariably this is at the nerve root.

Significantly, every one of us will see this animal at some time in our lives. But the camouflage is so effective it takes a special kind of hunter to find its cause. Professor Gunn, a world guru and Clinical Professor in pain relief, spent years mapping out muscle activity using EMG (Electromyography). He related this to physical signs, muscle shortening being the most important to the understanding of this third type of painful condition.

In 1996, Prof Gunn founded iSTOP (Institute for The Study and Treatment of Pain) in Vancouver, Canada, to promote IMS across the world and ensure its development. After many exciting trips to this clinic, and then to the rapidly evolving centre of excellence in Seoul, South Korea, my ability to hunt and kill this elusive animal improved immeasurably.

## NEUROPATHIC PAIN

The treatment of chronic pain has always been a bone of contention, and I do not wish to debate as to which aspect is truly a new invention and which aspect is thousands of years old. My concern is to convey the truly amazing results that I have both witnessed and achieved through IMS, the latter being a fusion of oriental acupuncture with western concepts of neurophysiology.

Prof Gunn theorises that many patients with chronic pain have tender shortened muscles, because of neuropathy of the segmental nerves that supply them. His theory embraces the sound physiological principles of super sensitivity by Cannon and Rosenblueth. Their research explained the problems of super sensitivity when nerves themselves were sick, and this can be likened to a house alarm whose sensing system is too sensitive and hence normally innocent activities cause the alarm to go off – in the same way that a supersensitive nerve reacts abnormally to innocuous signals.

Aging, accidents, and poor posture all injure the nerves. Normal electrical signals are interrupted and the muscles become over-reactive to very small traces of a chemical called acetylcholine. Prof Gunn states, "It's like driving a car with the brakes on." Tight muscles lead to neuropathy in which poor blood circulation will make the area feel cold. This neuropathy also changes the skin surface, appearing pitted with reduced hair growth in the affected dermatome. Joint range is often restricted.

The disaster continues. Shortened muscles pull on tendons, creating conditions like Achilles tendonitis or Golfer's elbow. They compress spinal discs and hence the nerves, leading to sciatica and facet joint osteoarthritis. It accelerates the osteoarthritic changes in major joints. Lengthy problems can lead to permanent scarring, and this is why it is imperative that both GPs and physiotherapists recognise this type of animal and intervene early.

## IMS TREATMENT

The programme of treatment can include gentle acupuncture, laser, and stretching prior to IMS. IMS is a dry needling technique using needles varying between 0.25 and 0.35mm gauge. The technique is most effective when the needle is placed within a plunger, a device that both enables extremely accurate control of the needle and significantly increases the amount of needling attainable within any amount of time. Ultimately the plunger, a device developed by Prof Gunn, allows the needle to be used as a micro surgical tool, preventing the need for surgery. Having equipped yourself with this formidable weapon, you can hunt down this neuropathic problem and kill the pain.
The insertion of the needle into the shortened muscle causes an instantaneous shock to that muscle, measurable with EMG, facilitating release. Locally it causes bleeding, attracting blood clotting platelets and growth factors to promote healing.

The implication of the muscle release is that it restores transmission along dormant nerve pathways, ultimately curing the condition. This can be seen objectively with changes to neuropathic signs and subjectively with the absence of pain.

## ASSESSMENT OF NEUROPATHIC SIGNS

Evidence needs to be found, not only with questioning, but most importantly by carrying out many physical tests, to hunt out which animal we are dealing with and where is it hiding. This must include questions relating to internal organs, as well as musculoskeletal issues. The presence of neuropathic pain has to be confirmed before moving on to IMS treatment. Visible signs of a dysfunctional nerve and its corresponding spinal levels can be pieced together like a jigsaw puzzle. The visible neuropathic signs can be grouped into sensory, motor, autonomic, and trophic.

**Sensory changes:**

- Muscle tenderness.

- Exaggerated sensitivity.
- Numbness.

**Motor changes:**

- Shortened muscles and restricted joints.
- Thickened palpable muscle bands.

**Autonomic features:**

- Coldness.
- Excessive perspiration.
- Goosebumps.
- Excessive fluid in the subcutaneous tissue called trophoedema (skin rolling and matchstick tests).

**Trophic Changes:**

- Localised hair loss.
- Brittle nails.
- Abnormal skin, i.e. psoriasis.

Some of these signs might at first appear insignificant, but I cannot emphasise enough the benefits of learning to understand easily recognisable signs, which clearly indicate a problem and its location. To help illustrate, here are two case studies.

## CASE STUDY 1 – DRUGS ELIMINATION

This patient worked in a physically demanding job when his 'back went'. He staggered into the clinic like a drunk, as a result of being prescribed a huge cocktail of pain killers from his GP, who could offer no help other than 'take drugs and wait for the pain to go away'. His speech was incoherent and the pain was so severe that assessment had to rely on neuropathic signs.

On flexing the patient forward and palpating the spinous processes, the tip of L4 (Lumbar 4) was thickened and prominent, indicating a problem in the disc below. This assessment was further supported by a damp strip at L4

and orange peel effect, indicating trophoedema. Sliding my hand down the legs, the L4 dermatome was cold on both legs and there was visible hair loss.

I found thickened superficial shortened muscles between L4 and L5. On deep needling with the plunger, both multifidus and rotators were gripping the left L4/5 disc and left sciatic nerve with a vengeance. He returned three days later and declared he was 50% better and had already cut back on the drugs, to the extent that he was coherent. Following the second session he said he felt 100% better and had stopped taking all the drugs. On the third visit he was doing well, although some calf pain had reappeared. The needle still grabbed at L4/5 indicating that the problem had not been fully resolved. One week later he still had an ache in his calf, although not bad enough to need even mild painkillers. Another week on and he was pain free with no needle grab. He was discharged after five treatments.

## CASE STUDY 2 – SURGERY AVOIDANCE

This lady was referred to the clinic by an insurance company who indicated that she needed immediate help prior to a knee operation. She had severe pain in the knee and was unable to walk. All the tests for the knee ligaments and menisci were negative. The knee appeared normal but the erector spinae muscles in her back were in spasm. On palpation there was a thickened nodule on the right of L3, which related to the pain in the knee area. My hand skidded on damp skin at L3, which also exhibited the orange peel effect. The dermatome L3 over the lower aspect of her thigh had hair loss and was cold.

I commenced treatment by desensitising the area with laser and Acupuncture, covering the area between L2 and L5. Two days later the patient still struggled to walk. I laid her on her side, used laser as preparation and then needled once, with the help of the plunger, at L4 level, releasing tight muscle fibres. She yelped and said, "that's my knee pain". Four days later the pain had centralised to her buttock, which was an excellent improvement, and with further IMS I released the remaining tight multifidus fibres. A review

eight days later showed full pain free movement and she was discharged with no further problems and no need for a knee operation.

## FREQUENTLY ASKED QUESTIONS

**What conditions respond well to IMS?**

Sciatica responds brilliantly. In days we have got people back to work and sports. With the pressure taken off sensitive structures within the spine – such as nerve roots, prolapsed discs, and facet joints – they all have the best possible chance to heal without surgical involvement. It is then important to restore the stability with exercise.

In the cervical area, carpal tunnel nerve entrapment can be relieved by this method if treated early enough. RSI (Repetitive Strain Injury) can be helped greatly with IMS and changes to the workstation.

For the sports-oriented, chronic muscle shortening in the forearm causes conditions such as tennis and Golfer's elbow. These can be cured by needling the lower cervical and specific arm muscles.

Frozen shoulder, for those of us in our 40s, can be extremely debilitating. Current treatment options are long-term physical therapy and corticosteroid injections, with pain usually not resolved for up to 18 months. IMS can resolve this in many cases in days or weeks by needling the cervical and rotator cuff muscles.

Hamstring injuries are a major problem within football. IMS has demonstrably resolved these problems with lumbar needling and is now being used within the premier league.

Achilles tendonitis can cause major layoffs for runners. With IMS treatment, gentle training can continue and the problem can be resolved within days.

The knee is always vulnerable to overexertion and twisting. Sports injuries to the knee can respond quickly and chronic anterior knee pain can be a thing of the past. Numerous Olympic athletes are now being treated with IMS.

**Is IMS the same as Acupuncture?**

Acupuncture is an amazing ancient philosophy, its diagnosis and practice being based on oriental medicine originating many thousands of years ago. IMS is based on western medical knowledge and is aimed at treating neuropathic pain. IMS can only be administered by chartered physiotherapists or MDs who have a background in Acupuncture and who have been trained by an authorised IMS instructor.

**I hate needles. Will it hurt?**

When the muscle is normal, you should not feel anything at all, other than possibly a mild prick as the needle enters the skin. The needle is much thinner than the hollow needles used for injections or taking blood. However, if the muscle is supersensitive and in spasm, there is a very short but unpleasant cramping pain. This is due to the needle being grabbed by the muscle.

**Why don't I feel the same unpleasant sensations with Acupuncture?**

Acupuncture does not seek out the centre of muscles in spasm that elicits the grab at the heart of the super sensitivity. Acupuncture is based on inserting needles according to meridian points that form a map based on traditional Chinese medicine. This can often help a lot, especially if the problem is not severe. With mild cases, up to 70% of the problem can be treated with Acupuncture and laser alone. If the problem is neuropathic, traditional Acupuncture will not cure it.

**What is the Plunger?**

The Plunger developed by Prof Gunn turns dry needling into microsurgery. It transforms the use of the needle into a precision instrument, enabling

many tiny incisions and literally cutting away the problem with a 0.25mm cutting edge.

**Why does IMS feel more comfortable after using a laser?**

The benefit of the laser is that it has an analgesic effect on the area and starts the healing process before the needle is inserted.

**I am pain free, do I need to keep coming?**

Once treated there is no need for top-ups.

**I have severe osteoarthritis with bone erosion. Can IMS help?**

IMS cannot change structural defects.

**Could early IMS treatment have helped to arrest osteoarthritis development?**

Yes. Unwell nerves equals shortened muscles, equals tight tendons, equals accelerated bone erosion.

**How many treatments do I need and how often?**

The number of treatments depends on many factors: age, stress, nutrition, general health, the severity and duration of the condition, and the degree of fibrosis. Furthermore, any previous surgery complicates the picture.

Typically my clinic aims to see an improvement within two treatments, or we would question why. Normally, five to six treatments will resolve it, though complex cases require more. The frequency of treatment depends on the individual's ability to heal. Treatments can be as often as weekly or as infrequent as monthly. IMS cures cumulatively, rather than offering temporary help, therefore leaving longer gaps between treatments is not an issue.

**Can IMS cure me?**

IMS is unequalled in the treatment of pain of a neuropathic origin. However, it is just one tool in the box to be used in combination with the many other tools available to fight pain.

**How do I find IMS practitioners who are correctly trained?**

The best source is the iSTOP website, www.istop.org. It lists all approved IMS practitioners and their level. At the moment IMS is still in the pioneering phase and there are not many practitioners available.

It is best to ask questions as to the amount of training any practitioner has had and if they have passed the exams. They should have also attended several days of internships with a recognised IMS instructor, which is imperative to assess practical skills in the use of a plunger.

## SUMMARY

I have been fortunate enough to be taught how to identify the signs associated with neuropathy. The results that I have achieved by correct diagnosis and the use of IMS have been amazing. Surgery and drugs are not the answer with neuropathic pain.

Read the signs, identify the animal, and use the Gunn."

## REFERENCES

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## MASSAGE FOR INJURIES

Massage in this country tends to be thought of as a luxury indulgence, whereas in many countries it is perceived as a fundamental part of treatment, and may even be the prescribed first line of treatment. The difference perhaps lies in the more common UK leaning towards gentle massage, which has little, if any, therapeutic benefit.

*Back massage*

## SPORTS MASSAGE

Sports massage is applied with more pressure, and to be effective, the masseur must have a good understanding of anatomy. Massage is widely used with athletes and in the treatment of sports injuries. It is an essential part of sports rehab, assisting the speed of recovery.

If you have a sports injury – or an injury from an accident or just from normal daily living – a sports massage can help. Your normal pliable body tissue may have been replaced by scar tissue, which can bind other tissues together, causing loss of pliability and strength. Adhesions can occur in joints and ultimately become part of joint tissue. In such cases, ongoing stress or overuse will more likely cause you repeated injury.

## CALF MASSAGE

Sports massage can help you by breaking down scar tissue and helping its re-absorption, encouraging normal tissue to be laid down.

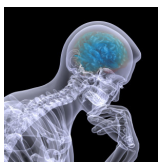
Deep tissue massage – which is more common in the east – is based on understanding the links in the body, as developed by Brandon Raynor, so that the cause of the pain can be treated rather than where it hurts. For

some, there may be deep-seated causes, which will need excavation. This in turn may lead to emotional release.

## AROMATHERAPY

This is a very relaxing, soft, gentle treatment. Aromatherapy uses plant materials and aromatic plant oils – including essential oils, and other aroma compounds – for the purpose of altering one's mood or physical well-being. It can be offered as a complementary therapy.

## MINDSET THERAPY



*Mindset*

- Healthy body.
- More happiness.
- Deeper meaning of life.

At my clinics, we encourage you to take control of your destiny in a more fulfilling and positive way, and this mindset change starts by developing a healthy body.

The mind has a powerful control of how we feel, both mentally and physically. Our behaviour is a result of our history of emotional experiences, which formed our learnt belief system. Provoking memories can yield to an instant response to past emotions, causing either pleasurable feelings, or irrational behaviour and physical pain.

It is no surprise, then, that a physical pain linked to a painful emotional experience can go on for years. In some cases treatment of the physical manifestation brings on a huge emotional response, with deeply buried memories flooding to the forefront.

Only by dealing with these past memories can a person move on and let go of their physical pain.

## NLP

*The Sports Sandwich, Stafford FM, Nicky talking about the mind.*

Neuro-linguistic programming (NLP) is an approach to communication, personal development, and psychotherapy created by Richard Bandler and John Grinder in the United States in the 1970s. I thoroughly enjoyed a two-week course with Richard Bandler, and it did wonders for any nerves I feel before public speaking. We spent a lot of time in trance where learning is accelerated.

NLP's creators cleverly work on the connection between the neurological processes (*neuro-*), language (*linguistic*), and behavioural patterns learned through experience (*programming*). Changing these connections can enable you to lessen your fear and achieve your specific goals in life.

## ORTHOPAEDIC SURGEON CONSULTATION

*Vinod Kathuria*

- Rapid access means you don't have to wait months.
- Highly skilled diagnosis gives peace of mind.
- Decision on need for surgery clarifies your plans.
- Diagnostic testing prescription.
- Qualified reading of scans within 48 hours of having scan.
- Rapid access to MRI within 48 hours of consultation.

Orthopaedic Surgeons use surgical and non-surgical means to diagnose and treat musculoskeletal trauma, sports injuries, arthritis, wear and tear,

infections, and tumours. They can authorise MRI, ultrasound, X-ray, and bloods, then can interpret the results to fine-tune the diagnosis.

## PHYSIOTHERAPISTS

*Physiotherapy*

- Re-ignite your motivation for life.
- Feel more attractive and confident.
- Move towards a pain free life.
- Give yourself a slimmer, more flexible and active body.
- Recover more quickly and more fully following surgery.

## WHAT IS PHYSIOTHERAPY? A BRIEF HISTORY

Physiotherapy's origins date back to 1813 in Sweden, when massage manipulation and exercise were used to treat gymnasts. As a profession, however, physiotherapy wasn't founded until 1894, by four nurses through the Society of Trained Masseuses. By 1900 it was recognised as a professional organisation and later, in 1920, it was awarded a royal charter, forming the Chartered Society of Massage and Medical Gymnastics. By 1944 the society became the Chartered Society of Physiotherapy (CSP).

"Physiotherapy is a science-based healthcare profession concerned with human function, movement and maximizing potential," (CSP). As a professional body it is regulated by the Chartered Society of Physiotherapy, and the Health and Carers' Profession Council (HCPC).

As each case is unique, a physiotherapist clinical diagnosis is based upon an assessment of previous medical history, work, and lifestyle, and it also takes into account psychological, cultural, and social factors. Physiotherapy training is comprehensive and physiotherapists' skills are endorsed by

GPs. This means you can trust that you will receive a skilled and informed diagnosis of your problem.

## HOW DOES PHYSIOTHERAPY TREAT MY CONDITION?

At my clinic, we focus on a holistic approach, providing information on healthy lifestyle, weight targets, and diet and nutrition.

We have very senior, experienced Grade 7 neuromusculoskeletal physiotherapists with a keen interest in sports injuries, and our ultimate goal is to establish your maximum functional independence. Our physiotherapists develop a personalised program to move you towards optimum musculoskeletal health. To achieve this, we combine our diagnostic listening skills with hands on treatment, supported by our broad range of technology. Physiotherapists prescribe and monitor a lifestyle and exercise program with realistic and attainable goals.

## RICE THERAPY

This is now more often called MICE movement, and we offer advice on this home treatment.

**RICE** is an acronym for **R**est, **I**ce, **C**ompression, and **E**levation, and is an important first aid treatment for immediate post-injury use, to help reduce swelling and pain and prevent further complications. Soft tissue injuries to muscles, tendons, and ligaments often occur in sports, and can also occur in normal daily life from a trip or fall. In many cases the injured area will swell and bruise from internal bleeding and become tender. Early first aid treatment with RICE can reduce the swelling and make the injury heal faster.

Although not part of the official RICE acronym, it is important to protect the injured area as quickly as possible from further injury, by using:

**Rest**: Stop all aggravating activity and make sure the injury is not weight bearing.

**Ice**: Apply ice (a frozen pack of peas works well) to the area for 15 to 20 minutes, but always with a towel or similar between the skin and ice, to prevent frostbite – never leave on for more than 20 minutes to avoid frostbite. Also, allow sufficient time between applications for the skin to warm up, typically 45 to 60 minutes. Ice is used to lower the blood supply to the injury and thus restrict swelling. It also helps reduce the pain level.

**Compression**: This aids the ice in reducing the swelling and can also help with pain relief. Compression can be achieved with a simple bandage wrap, or an elasticated wrap. It is important not to wrap too tightly, however, as this can promote swelling and pain. If this occurs, just reapply the wrap a little looser.

**Elevation**: Try to elevate the injured area above heart level to help reduce swelling.

## SPORTS INJURY REHABILITATION

Recent research has shown that around 30% (that's a staggering 22 million people) of the population of the UK suffer a sporting injury every year. So, the chances are high that most sports people will suffer multiple injuries over their sporting careers. On average, a person participating in sport will:

- Pick up 1-2 injuries per year.
- Take up to 5 days off work every year.

Even worse, of all the people injured, 25% will not be able to carry on playing sport as a direct result of the sporting injury.

If you love your sport, want to keep playing, and can't afford the risk of time off work, then you need to be proactive and make sure you know how to be as well prepared as you can be. You should also know where to get the best

treatment, so that if you are injured, you can get yourself back to full fitness as quickly as possible.

Chartered physiotherapists will make an enjoyable exercise programme for self-analysis. This will enable you to recover from an operation, return to sport, or simply improve everyday life.

Benefits of one of our rehab programmes include:

- Resolution of neck or back pain.
- Reduction in joint pain.
- Greater strength and tone.
- Less stress and fewer headaches.
- Improved looking, firmer, more supple body.
- Better posture and gait.
- Increased bone density.
- A return to sport with fewer injuries.
- Improved circulation and immune system.

Your road to recovery following an injury will be a lot more effective and enjoyable when guided by specialists.

## ENERGY MEDICINE

### REIKI

*June, my beloved Reiki Master, who passed over last March.*

Reiki was developed in 1922 by a Japanese Buddhist called Mikao Usui. Universal energy or Chi is said to be channelled through the hands of the healer to the patient. The name means 'mysterious atmosphere' or 'miraculous sign', and was first recorded in AD 1001.

## MAGNETIC RESONANCE TREATMENT

All of our information regarding Magnetic Resonance Treatment and MBST has now been transferred to our specialist website, which also provides details of our specialist magnetic resonance treatment centre, if you'd like to find out more about this: WWW.MRTCENTRE.CO.UK

## WHAT IS MRT (MBST)?

Magnetic Resonance Treatment (MRT) is provided on MBST technology made by MedTec in Germany. In that respect, MRT and MBST are equivalent in terms of meaning.

MRT is a cellular regeneration treatment for osteoarthritis, osteoporosis, bone fractures, spinal discs, and sports injuries to ligaments and tendons. Traditional treatment is either a cocktail of drugs or surgery, but now we can offer you a third and more attractive option.

- Increase your physical activities capability.
- Improve your joint flexibility.
- Enhance your sleep quality.
- Reduce your reliance on drugs.
- Delay or eliminate your need for surgery.
- Minimise your risk of bone fracture.
- Significantly speed bone fracture healing.
- Increase rate of recovery from sports injuries to tendons and ligaments.

Osteoarthritis is mainly caused by a loss of cartilage, leading to painful bone-on-bone contact. MRT can stimulate the growth of new cartilage. So, for example, for those suffering knee arthritis, a treatment would be given to target the cartilage in the knee. This stimulates the thickening of the cartilage and typically, a reduction in pain would be felt within days. Cell regeneration starts with treatment, but then continues afterwards, with further improvements felt for up to six months after treatment. The latest research from Germany indicates that patients feel significant benefits more than four years later.

Most joints in the body can be treated, including:

- Shoulder, elbow, wrist, and hand.
- Hip, knee, ankle, and foot.
- Spinal facet joints.

Spinal discs, particularly in the lumbar region, are prone to damage from normal daily activities and can become frayed, weakened, or torn. MRT can help treat these conditions by stimulating spinal disc regeneration.

Osteoporosis is a silent disease that many people suffer from with no awareness until the bones start breaking or crumbling. The pain associated with this condition can be severe and can effectively destroy any quality of life. One in three women and one in twelve men over 50 suffer from osteoporosis.

MRT can be used to stimulate the growth of new bone, causing the bones to regenerate and become both thicker and stronger. In the same way, bone fractures can be stimulated to heal more quickly.

Soft tissue injuries to ligaments and tendons – typical in sports injuries – can linger longer than bone fractures. MRT can be used to speed the recovery of damaged tissue.

## PREVENTATIVE TREATMENT

The careers of professional sports athletes are reliant on joint quality. In football, for example, wear and tear on knee joints alone has led to significant injury time and has cut many careers short; many retired football players end up needing new knees. MRT offers a risk free, painless option to preventatively treat such conditions, potentially extending careers and avoiding the need for later surgery.

MRT was developed directly from Magnetic Resonance Imaging (MRI) by German scientists in the 1990s. MRI was the state of the art diagnostic image producing procedure, which used very expensive, highly complex technology to produce clear internal body scans. Prompted by the fact that

some patients claimed a therapeutic benefit from the MRI scan, it was clear that a new state-of-the-art therapeutic treatment was feasible.

The key to MRT success was in the understanding of the therapeutic mechanism of MRI, and enhancing this in a cost effective solution. MRT uses a complex triple independent energy field to deliver energy to the targeted human tissue, whether it is bone or cartilage.

In simple terms, MRT is able to target specific body tissue and saturate that tissue with energy, stimulating cell growth. In practical terms, this means we can heal bone and soft tissue injuries considerably quicker.

## FOR THOSE WHO WANT A MORE SCIENTIFIC UNDERSTANDING

Hydrogen nuclei behave like small magnets, which spin around their own polar axes. The positions of these spin axes in space are usually random, so that molecules containing hydrogen do not exhibit external magnetic characteristics.

However, when such molecules – for example, cartilage tissue in the human body – are subjected to a nearly homogenous static magnetic field, the spin axes of the hydrogen nuclei (protons) align parallel to the magnetic field and precess at a frequency (known as the Larmor frequency), which depends on the strength of the external magnetic field.

If the hydrogen atom is subjected to an electromagnetic field that oscillates at the Larmor frequency, the field can transfer energy to the proton by inverting its spin direction. When the field is turned off, the proton spin decays back to its original direction and gives off the acquired energy to the surrounding tissue, resulting in the following recurrent action: the electromagnetic energy of the therapeutic appliance raises the energy of the hydrogen protons. These pass energy on to their environment as the energy falls back to the initial (ground state) value.

In this way, information for renewed synthetic activity can be transferred from the MBST appliance to the cartilage tissue. It is the resonance between the proton spin precession frequency and the electromagnetic field frequency in the MBST device that allows the highest possible quantity of therapeutic energy to be transferred accurately into human tissue.

MBST technology – which provides MRT – was developed in the 1990s in Germany and has had substantial interest and use, initially in Germany and Austria, and more latterly around the world. This has stimulated a lot of academic interest and various studies have been completed on the subject. Perhaps of most significance is the 10 year study of over 4,500 patients, published in early 2013, as this gives the most comprehensive real world data on the efficacy of MBST.

## WHAT IS MRT?

MRT uses the same magnetic resonance technology principles as MRI, but uses it for therapy instead of imaging.

## WHAT HAPPENS IN TREATMENT?

MRT works by applying a stimulating and regenerative magnetic field directly to the affected area.

## IS MRT THE SAME AS MAGNETIC FIELD THERAPY?

No. MRT differs fundamentally from magnetic field therapy due to its unique use of magnetic resonance technology.

## IS MRT EFFECTIVE?

Its effectiveness in stimulating cells to regenerate has been proven in a number of scientific studies and by more than 180,000 successfully treated patients.

## HOW CAN YOU BE CONFIDENT IN MRT?

MRT is currently used in over 290 centres around the world. In Germany and Austria alone – countries with very high medical standards – there are over 150 orthopaedic consultants trusting and using MRT.

## WHY HASN'T MY GP HEARD OF MRT?

MRT is still fairly new to the UK, with only four sites offering this technology. To be fair to your GP, there is little chance they would have any knowledge of something so new to the UK. However, the fact that over 150 orthopaedic consultants trust in this technology in countries with very high medical standards should give you confidence. We will happily send your GP an information pack if requested.

## HOW LONG DOES MRT TAKE?

MRT requires seven hours for osteoarthritis (nine for osteoporosis) in one-hour sessions each day, except weekends. Patients who travel, or who would prefer treatment completed in five days, can have two treatments per day, provided there are eight hours or more between the sessions.

## HOW LONG IS MRT EFFECTIVE FOR?

Controlled clinical studies have found MRT to be effective over 12 months, though latest research indicates significant benefits with some patients for more than four years. An annual top up of three sessions is recommended to maintain the benefits. For those who would prefer to wait until symptoms return, a full seven-hour treatment would be required.

## WHAT DOES IT MEAN FOR YOU?

You will be receiving treatment specifically designed for the joints and tissues causing you pain. The treatment device is programmed specifically for you using controlled software, targeting the underlying cause of pain.

## WILL MRT BE EFFECTIVE FOR YOU?

Most probably. MRT's success rate is around 80% for reducing pain, improving function, and increasing cartilage thickness. MRT nearly always works, alleviates pain, improves mobility, and makes a significant improvement to quality of life.

## DOES MRT HURT?

No. MRT is not painful, and in some cases there is a pleasant feeling of warmth in the joint treated. In rare cases, pain may briefly increase before rapidly declining. However, this is a sure sign that the treatment is working for you.

## ARE THERE ANY SIDE EFFECTS?

No. MRT has never produced any side effects in over 180,000 treatments or any clinical trials.

## WHAT ARE THE CONTRAINDICATIONS FOR MBST?

All types of electrical implants located in the area to be treated. Pregnancy, bacterial inflammations within the area to be treated, tumours, leukaemia, or HIV. Patients who have had cancer must have been clear for a minimum of five years.

## CAN MRT BE USED WITH METAL IMPLANTS?

Yes. Metal implants are of no concern at all. This is because the energy pulses used in MRT are tiny, i.e. only 1/30,000 of those used in MRI.

## WHAT DO YOU NEED TO DO?

Make sure you drink at least 1.5 to 2 litres of water a day, starting at least one week before and during treatment. Avoid excessive exercise. Eat healthily, ensuring good nutrition.

## HOW DO YOU BOOK MRT?

You cannot self-refer for MRT. It is most important to be first assessed by a qualified physiotherapist to determine your condition and make sure MRT is right for you. The physiotherapist will evaluate your condition, your physical and mental health, lifestyle, fitness, and diet. The features and benefits of MRT will be reviewed and your questions answered.

## WHAT HAPPENS DURING MRT?

MRT treatment will require you to lie on the bed for one hour for each session. We can prop you up a bit, but not into a sitting position. You will be assisted getting on and off the bed, but otherwise left alone throughout the treatment. Some patients like to book additional sessions with their therapist for associated treatment and to answer further questions.

You can read, listen to music, just relax, or sleep. You can move during the treatment, provided you keep the joint being treated within the coil, and should you need assistance during the treatment, there is an intercom directly to reception. Please be aware that your therapist may be treating other patients during your treatment and may not be available to answer your questions.

## WHAT HAPPENS AFTER TREATMENT?

MRT stimulates the growth of the targeted tissues, and for most patients there will be a noticeable difference at the end of the treatment. The stimulation process continues after treatment, with further improvements being noticeable after two months. Growth stimulation continues, but at a reducing rate up to six months after treatment.

## IS THERE POST-TREATMENT FOLLOW UP?

Yes. You will be called to see how you are progressing in the first three months after treatment.

## ESSENTIAL LUMBAR STABILITY DRILL AND CORE EXERCISES

These show you how to isolate and engage the deep stabilising muscles of the pelvis and spine, the transversus abdominis, the pelvic floor, and the multifidus muscles. To get the best stability, either brace your core, dig your fingers into your ribs and push the muscles of your trunk up against them, or contract the pelvic floor at the same time as pulling the tummy button in to the spine (called hollowing) in order to engage the transversus abdominis. It is important to practice spinal stability drills if engaging in Pilates or Yoga classes.

Please see chapter six in this book for yoga and McGill exercises, and also my first book, *The 4 Keys To Health*.

# Glossary

"I grow old … I grow old …
I shall wear the bottoms of my trousers rolled."

*–T.S. Eliot*

*Some of the following information has been gathered from various places on the internet, from sites such as Wikipedia.*

**ACUPUNCTURE:** A key part of Chinese Medicine that treats using needles and herbs. It involves inserting thin needles into Acupuncture points and it now has a big part to play in western physical therapy.

**ALCOHOLISM:** A broad term for addictive drinking that is over the safe limits and can result in social, personality, and health issues.

**ALLODYNIA:** I used this term when discussing IMS dry needling. It refers to central pain amplification of innocuous stimuli. Just massaging or the touching of clothes on the skin can elicit pain.

**ALZHEIMER'S:** A chronic neurodegenerative disease, a deterioration in cognition, memory, and general thinking. It accounts for 70% of dementia cases.

**AORTIC VALVE:** This sits between the left ventricle and the aorta heart chambers. The other semilunar valve is the pulmonary valve. The other two valves are the mitral and tricuspid.

**ATRIA:** One of two blood collection chambers in the heart, the plural being atrium.

**ATRIOVENTRICULAR NODE:** This is part of the heart's electrical conduction system. It electrically connects atrial and ventricular chambers.

**ARTERIOLE:** A small, thin blood vessel in the microcirculation going from the arteries to the capillaries.

**ARTHRITIS:** A joint disorder involving inflammation and pain. There are many different types.

**ATP [Adenosine Triphosphate]:** A coenzyme used as an energy carrier in the cells.

**AUTONOMIC NERVOUS SYSTEM (ANS):** A division of the peripheral nervous system that affects the internal organs unconsciously in order to control sex drives, digestion, heart rate, eye dilation, and urination. It is also known for its key role in fight or flight.

**CENTRAL NERVOUS SYSTEM (CNS):** The part of the nervous system that is the brain and the spinal cord. It integrates information it receives and then centrally coordinates and influences the outcome of everything.

**CANCER:** An abnormal cell growth that can invade or spread to other parts of the body. Not all tumors are cancerous; benign tumors do not spread to other parts of the body.

**CERVICAL GANGLIONS, INFERIOR AND SUPERIOR:** Nerves of the cervical/neck and part of the sympathetic nervous system. Nerves from the thoracic spinal cord enter into the cervical ganglions and synapse (join) with its postganglionic fibers. The cervical ganglion has three paravertebral (spinal) ganglia:

- Superior cervical ganglion – adjacent to Cervical 2 & Cervical 3, targets the heart, head, and neck via the carotid arteries.
- Middle cervical ganglion – adjacent to Cervical 6, looks to the heart and neck.
- Inferior cervical ganglion (fused with the stellate ganglion) – adjacent to Cervical 7 at the base of neck, and transmits to the heart, lower neck, arm, and posterior cranial arteries.

Nerves emerging from cervical sympathetic ganglia contribute to the cardiac plexus, among other things.

**CELIAC PLEXUS AND GANGLION:** The celiac/coeliac/solar plexus is a complex network of nerves (a nerve plexus) located in the abdomen. It is

behind the stomach and in front of the diaphragm, on the level of the first lumbar vertebra.

**CHIROPRACTOR:** Specialising in the diagnosis, treatment, and prevention of disorders of the neuromusculoskeletal system, and the effects of these disorders on general health. They predominately manipulate the spine in order to improve general health as well as reducing spinal subluxations.

**CHROMOSOME:** This contains most of the DNA of a living organism – the hard drive. It is a structure wrapped around protein complexes called nucleosomes, which consist of histones. The DNA in chromosomes is also associated with the transcription (copying) of genetic sequences factors. During most of the duration of the cell cycle, a chromosome consists of one long double-stranded DNA molecule. The chromosome gets replicated, like a photocopy resulting in an 'X'-shaped structure called a metaphase chromosome. Both the original and the newly copied DNA are now called chromatids. The two 'sister' chromatids join together at a protein junction called a centromere. During a sequence of mitosis known as metaphase, they are attached to the mitotic spindle and prepare to divide.

**CROHNS DISEASE:** A type of inflammatory bowel disease (IBD) that may affect any part of the gastrointestinal tract from mouth to bottom.

**CYTOPLASM:** This comprises of cytosol (the gel-like substance within the cell membrane) and the organelles – the cell's sub-structures.

**DERMATOME:** An area of skin that is supplied by a single pair of dorsal spinal nerve roots.

**DIABETES:** A metabolic disease in which there are high blood sugar levels over a prolonged period of time.

**DISC:** Each intervertebral disc forms a fibrocartilaginous joint to allow movement, and ligaments hold the spine together. Their role as shock absorbers in the spine is crucial.

**DISC HERNIATION:** Another name for this is a 'slipped disc' and it happens when the outer fibrous ring of the disc allows the soft central bit to bulge out of the fibrous rings. The annulus fibrosus gets more fragile with impacts and age, and the tears are nearly always posterolateral (back and to the side). The tear can result in a leak of chemicals that cause pain, and also the disc tear can cause nerve root compression.

**DISC PROTUBERANCE:** When the outermost fibers are intact and the central bit does not escape but the disc bulges under pressure. This is less serious than a herniation.

**DEOXYRIBONUCLEIC ACID (DNA):** Nucleic acid carrying our genetic blueprint for function and reproduction. The two DNA strands are made of nucleotides – cytosine, guanine, adenine, or thymine – as well as a sugar, deoxyribose, and a phosphate group. They pair up, A with T and C with G.

**ECHOCARDIOGRAM:** Often referred to as a 'cardio echo', this is a sonogram of the heart.

**ENDOPLASMIC RETICULUM (ER):** This is a type of organelle in cells that forms an interconnected network of membrane-enclosed tube-like structures, continuous with the outer nuclear membrane, rough and smooth. The outer face of the rough endoplasmic reticulum is studded with ribosomes that are the sites of protein synthesis.

**SMOOTH ENDOPLASMIC RETICULUM:** This lacks ribosomes and functions in lipid metabolism, as well as the production of steroid hormones and detoxification.

**ENERGY MEDICINE:** Also 'spiritual healing', these are branches of alternative medicine. The healers can channel healing energy into a patient, and there are several methods: hands-on, hands-off, and distant, where the patient and healer are in different locations.

**GENES:** This is a region of DNA that encodes a functional RNA or protein, and is the unit of heredity. The transmission of genes to an organism's offspring is the basis of the inheritance.

**GLUTEUS MUSCLES:** These are a group of three muscles which make up the buttocks: the gluteus maximus, gluteus medius, and gluteus minimus. The three muscles originate from the ilium (pelvic bone) and sacrum (pelvic central posterior triangular bone) and insert on the femur. The functions of the muscles include extension, abduction (outward movement of hip), external rotation, and internal rotation of the hip joint.

**GUNN IMS:** A dry needling technique taught by Professor Gunn after a qualification in understanding and treating neuropathic pain.

**EXTENSOR DIGITORUM BREVIS AND LONGUS (EDB):** A muscle on the upper surface of the foot that helps extend digits 2 through 4.

**FACET JOINTS (or Z joints, zygapophyseal, or apophyseal):** These are a set of synovial plane joints between the articular processes of two adjacent vertebrae. There are two facet joints in each spinal motion segment and each facet joint is innervated by the recurrent meningeal nerves.

**FASCIA:** A sheet of connective tissue – collagen – under the skin that attaches, encloses, and separates muscles and other internal organs.

**HISTAMINE:** A nitrogenous compound involved in immune responses and physiological control in the gut, it also acts as a neurotransmitter.

**HORMONE:** A signalling juice produced by glands, and carried by the circulatory system to target distant organs in order to regulate physiology.

**HYPERALGESIA:** A temporary increased sensitivity to pain, which may be caused by damage to nociceptors or peripheral nerves.

**INFLAMMATION:** A biological response of body tissues to harmful stimuli – such as pathogens, damaged cells, or irritants – this is a protective response involving immune cells, blood vessels, and specific juices. Inflammation clears out dead cells damaged from the trauma, ready to initiate tissue repair.

**INFERIOR MESENTERIC GANGLION:** Located near to where the inferior mesenteric artery branches off from the abdominal aorta.

**IRRITABLE BOWEL SYNDROME:** Abdominal pain and changes in the pattern of bowel movements, these symptoms occur over a long time, often years.

**KYPHOSIS:** Convex (bent over) curvature of the spine as it occurs in the thoracic and sacral regions.

**LEVATOR SCAPULA:** A muscle situated at the back and side of the neck, its main function is to lift the scapula.

**LORDOSIS:** This refers to the normal healthy inward curvature of the lumbar and cervical regions of the spine. Excessive curvature of the lower back is known as lumbar hyper lordosis, commonly called sway back.

**MAGNETIC RESONANCE TREATMENT:** This is based on the physical principle of magnetic resonance imaging, and it aims to activate repair and regeneration processes in specific cells and tissues such as bone and cartilage.

**MAST CELL:** A type of white blood cell. It is a type of granulocyte that is a part of the neuroimmune system and contains many granules rich in histamine and heparin. As well as their role in allergic reactions, mast cells play an important protective role in wound healing, defense against pathogens, and blood–brain barrier function.

**MERIDIANS:** These are channels of life-energy known as 'Qi'.

**MECHANICAL BACK/NECK PAIN:** This is classified by the underlying cause of pain as either mechanical, non-mechanical, or referred pain. The symptoms of mechanical low back pain usually improve within a few weeks. It refers to the pain being to do with the structures of the spine, not involving nerve root compression or any more serious/sinister cause.

**MITOCHONDRIA:** These organelles (structures inside the cell) are described as 'the powerhouse of the cell' because they generate most of the cell's chemical energy called adenosine triphosphate (ATP). Other roles include: signalling, cellular differentiation (cells changing to different cells), and cell death for cancerous and old cells, as well as controlling cell division and cell growth.

**MOTOR NEURONE DISEASE:** This can refer to any of five neurological disorders that selectively affect the motor neurons (brain to muscle/gland), the cells that control voluntary (conscious) muscles. There are five conditions, all neurodegenerative in nature and that all cause muscle wasting, increasing disability, and eventually, death. The names of the five conditions are: amyotrophic lateral sclerosis (Lou Gehrig's Disease**),** primary lateral sclerosis, progressive muscular atrophy, progressive bulbar palsy, and pseudobulbar palsy.

**MRI (magnetic resonance imaging):** A medical non-invasive imaging technique used in radiology to image the anatomy in order to look for damage and disease. MRI scanners use strong magnetic fields, radio waves, and field gradients to form images of the body.

**MUSCLE:** This contains protein filaments of actin and myosin that slide past one another in healthy muscle, producing a contraction that changes both the length and the shape of the cell. Muscle contractures are fixed and sore and are targeted by dry needling. The muscle's role is to produce force and movement, and they are primarily responsible for maintaining and changing posture, running, walking, writing, and eating, as well as the contraction of the heart and the movement of food through the digestive system.

**MUSCULOSKELETAL:** Involving both muscles and bones, hence the musculoskeletal system.

**NERVE:** This is an enclosed, cable-like bundle of axons (nerve fibers, the long thin projections of neurons/nerve cells) in the peripheral nervous system. A nerve provides a roadway for electrochemical nerve impulses/messages that are transmitted along each of the axons/nerve fibers to the peripheral organs.

**NEUROPATHIC:** This is damage to or a disease affecting nerves, which may impair sensation, movement, and gland or organ function. It may lead to unpleasant pain. Learning to read the physical signs of its presence can lead to treatment.

**NEUROENDOCRINE:** Cells receive messages from neurotransmitters released by nerve cells or neurosecretory cells, and in return, they release message molecules (hormones) to the blood. In this way they bring about a conversation or integration between the nervous system and the endocrine (hormones) system, through a process known as neuroendocrine integration.

**NEURITIS:** This is a general term for the inflammation of a nerve in part of or all of the peripheral nervous system. Physical signs depend on the severity and the nerves involved, but they may include pain, paresthesia (pins-and-needles), paresis (weakness), hypo aesthesia (numbness), anaesthesia (no feeling), paralysis (no movement), muscle wasting, and reflex (automatic response to stimuli) being absent on testing.

**NOCICEPTOR:** This is a sensory neuron (nerve cell) that responds to touch/pressure on the body in response to potentially damaging stimuli by sending signals to the spinal cord and brain. A kick or slap fires off these receptors/nerve endings, and this process, called nociception, causes the perception of pain in the brain.

**NUCLEUS:** This is a membrane-enclosed organelle (inside the cell). Human cells have a single nucleus, but a few cell types have no nuclei, and others many. It houses the 'blueprint', or the map of life – the genetic material in the form of DNA. Proteins called histones make up the chromosomes, and these paired snake-like structures carry the genome – which is the encoded genetic material – while the nucleus provides a safe house for these precious jewels. The cell membrane allows material into the cellular cytoplasm that could affect the gene expression of these guys. Therefore, there is a nuclear envelope, a double membrane that encloses the nucleus and isolates its contents from the cellular cytoplasm, and the nucleoskeleton (cell structure).

**ORTHOPAEDIC:** This word derives from 'ortho', which is the Greek for 'straight', and 'pais' for 'child'. Years ago, orthopaedists used braces to make a child 'straight', and bone setters worked on joints. Today, orthopaedic medicine means the treatment of musculoskeletal trauma, spinal discs, the wear and tear of the spine, osteoarthritic joints, sports injuries, and bone or muscle tumors. Treatments are carried out by orthopaedic surgeons and chartered physiotherapists.

**OSTEOARTHRITIS:** This is a wear and tear problem, a joint disease, also called 'osteoarthrosis'. Aging and use wears down the cartilage and underlying bone, leading to stiffness and then pain in the joints. This is initially due to overexertion, then being at rest at night.

**OSTEOPAENIA:** A condition in which bone mineral density is lower than normal, a precursor to osteoporosis (brittle bones). However, not everyone with osteopaenia will develop osteoporosis, and physiotherapy will help prevent the next stage. Osteopaenia is defined as having a bone mineral density T-score between -1.0 and -2.5.

**OSTEOPOROSIS:** A disease where bone weakness increases the risk of a broken bone, it is more common in post-menopausal women. Bones may weaken to such a degree that a break may occur with minor stress, a mild fall, or just a sneeze. The bones become painful and tender to the touch,

made worse by microfractures and full blown fractures. Diet, supplementation, and weight bearing exercise helps.

**OSTEOPATHY:** A type of treatment that involves hands-on soft tissue massage and manipulation for musculoskeletal problems.

**PELVIC PLEXUS/INFERIOR HYPOGASTRIC PLEXUS:** A plexus of nerves that supplies the organs of the pelvic cavity. It is a paired structure on the side of the rectum in the male, and at the sides of the rectum and vagina in the female.

**PERIPHERAL NERVOUS SYSTEM (PNS):** This is outside of the brain and spine, and communicates with the central nervous system back and forth to the extremities.

**PEPTIDES:** These are short chains of amino acid monomers linked by peptide bonds.

**PIEZOELECTRIC:** A static electric charge that accumulates in certain materials like a crystal: bone, DNA, and proteins. It is electricity from pressure.

**PILOMOTOR:** Goosebumps are the bumps that appear (unconsciously/involuntarily) on a person's skin at the base of their body hairs when a person is cold or experiences strong emotions such as excitement, fear, euphoria, or sexual arousal. It is also present in a dermatome affected by a neuropathic nerve.

**PHYSIOTHERAPY:** A physical medicine and rehabilitation specialty that diagnoses and treats physical disability, pain, sports injuries, neurological conditions (like strokes), and respiratory illness. This career is all about promoting preventative health and physical activities such as mobility, function, and quality of life, through examination, diagnosis, prognosis (outcome), and physical intervention, using specific medical technology,hands-on treatment, and exercise and lifestyle prescription.

**PLANTAR FASCITIS:** Sole pain, especially under the heel, the pain being most severe with the first steps of the day or following a period of rest.

**PIRIFORMIS:** a muscle in the gluteal region (bottom), it is one of six muscles that turns the hip out and can cause sciatica.

**POSTURE:** Correct body alignment with a neutral spine.

**POSTURAL DYSFUNCTION:** biomechanical malalignment.

**PROSTRATE:** An exocrine gland of the male reproductive system

**RADICULOPATHY:** Nerve root entrapment at the spinal cord, which, according to the level, can cause pain and weakness down a limb, be it the arm or the leg.

**REIKI:** A form of alternative medicine developed in 1922 In Japan, by Japanese Buddhist Mikao Usui. Reiki has been taught in different ways across varying cultural traditions, and it uses hands-on-healing. Through the use of this technique, practitioners believe that they are transferring 'universal energy' through the palms of the practitioner, which they believe encourages healing.

**RHEUMATOID ARTHRITIS (RA):** A long-lasting autoimmune disorder (where the body attacks itself) that most significantly affects joints – you get swollen, stiff, and painful joints, and pain and stiffness often worsen after rest. Most commonly, it firstly affects the wrist and hands, with typically the same joints being involved on both sides of the body. The back can also ache without being diagnosed as RA, and the disease may affect other parts of the body too. This may result in low red blood cells, and inflammation around the lungs and heart. Fever and low energy also comes with flare ups. Rheumatologists run repeated specific tests in order to diagnose.

**RIBOSOME:** This serves as the site of biological protein synthesis (translation) inside cells. Ribosomes link amino acids ( the building blocks of pro-

teins) together in the order specified by messenger RNA (mRNA) molecules. Ribosomes consist of a reader of the RNA, and a joiner together of amino acids in order to form a polypeptide chain.

**RIBONUCLEIC ACID (RNA):** This is involved in coding, decoding, regulation, and the expression of genes, which is essential for all known forms of life. Like DNA, RNA is assembled as a chain of nucleotides, but unlike DNA, it is a single-strand folded onto itself, rather than a paired double-strand. Messenger RNA (mRNA) convey genetic information (using the letters G, U, A, and C to denote the bases guanine, uracil, adenine, and cytosine) that directs synthesis of specific proteins.

**SCIATICA:** Also known as lumbar radiculopathy, this is when pain is felt going down the back, outside, or front of the leg. Typically, symptoms are only on one side of the body, but occasionally on both sides. Lower back pain is sometimes present, and a weakness, numbness, or tingling may occur in parts of the leg and foot.

**SCHEUERMANN'S DISEASE:** A disorder of a child's spine where the vertebral endplates and discs are believed to have an autoimmune problem, causing damage. This results in an idiopathic juvenile kyphosis of the spine (a hunchback shape, and this uneven growth results in the signature 'wedging' shape of the vertebrae, causing this posture.

**SHIATSU:** A physical therapy that supports and strengthens the body's natural ability to heal and balance itself. It works on the whole person; the physical, psychological, emotional, and spiritual aspects of being. Shiatsu originated in Japan from traditional Chinese medicine, with influences from more recent western therapies. It means 'finger pressure' in Japanese. As well as fingers, hands and elbows give comfortable pressure, and manipulative techniques adjust the body's physical structure and balance its energy flow. It is a deeply relaxing experience, and regular treatments can alleviate stress and illness and maintain health and well-being.

**SENSORY NEURONS:** Nerve cells that transmit sensory info like sound or touch.

**SPONDYLOSIS DEFORMANS:** A disease of the spine. Some think it is osteoarthritis of the spine but since spondylosis deformans does not involve active arthritis in joints, it is a degenerative disease of the discs of the spine that in turn causes wear on the bones. It comes from the annulus fibrosus of the disc bulging against connective tissue and causing traction on the bony attachment of the vertebrae causing osteophyte (bony spurs) on the front and side of the vertebral body. The traction causes osteophytes to rise several millimetres from the end-plates that may bridge the disc spaces, then at times, may cause nerve problems.

**SPONDYLOLISTHESIS:** The forward displacement of a vertebra, most often the fifth lumbar vertebra, and often after a fracture. Backward displacement is referred to as a retrolisthesis, a posterior displacement of one vertebral body with respect to the adjacent vertebrae to a degree less than a luxation (dislocation).

**STEM CELL:** Undifferentiated (undecided on what they will be) biological cells that can differentiate into specialised cells and can divide (through mitosis) to produce more stem cells. There are two broad types of stem cells: embryonic stem cells, which are isolated from the inner cell mass of blastocysts, and adult stem cells, which are found in various tissues.

**STROKE/CEREBROVASCULAR ACCIDENT (CVA):** When poor blood flow to the brain results in cell death. There are two main types of stroke: ischaemic, due to a lack of blood flow because of a clot, and a bleed. They both result in part of the brain not functioning properly.

**SUBLUXATION:** This may have different meanings, depending on the medical specialty involved, but it basically implies the presence of a partial dislocation of a joint. The World Health Organization (WHO) defines both the medical subluxation and the chiropractic subluxation, contrasting the two and stating in a footnote that a medical subluxation "is a significant

structural displacement, and therefore visible on static imaging studies. In chiropractic, vertebral subluxation is a set of signs and symptoms of the spinal column." Those chiropractors who assert this concept also add a visceral component to the definition; chiropractors maintain that a vertebral subluxation complex is a dysfunctional biomechanical spinal segment which is fixated.

**SUDOMOTOR:** The cholinergic innervation of the sympathetic nervous system prominent in sweat glands, which causes perspiration to occur via activation of muscarinic acetylcholine receptors.

**TRAPEZIUS:** One of two large superficial muscles that extend from the occipital bone (skull) to the lower thoracic vertebrae and to the shoulder blade. Its functions are to move the scapulae and support the arm, and it is usually tense, both emotionally and physically.

**TENDINITIS:** The inflammation of a tendon.

**TENOSYNOVITIS:** The inflammation of the fluid-filled synovium that surrounds a tendon. Symptoms include pain, swelling, and difficulty moving the joint.

**TROPHEDEMA:** A pitting appearance in skin above the neuropathic nerve.

**VACUOLE:** A membrane-bound organelle.

**VESICLE:** A small fluid-filled structure within a cell, enclosed by a lipid bilayer. Vesicles form during secretion (exocytosis), uptake of garbage (phagocytosis and endocytosis), and the transport of materials within the cytoplasm.

**VASOMOTOR:** This refers to actions upon a blood vessel that alter its diameter. More specifically, it can refer to vasodilator action and vasoconstrictor action.

**VASOCONSTRICTION:** The narrowing of the blood vessels resulting from the contraction of the muscular wall of the vessels. The process is the opposite of the widening (dilating) of the blood vessels. On a larger level, vasoconstriction and dilation is one mechanism by which the body regulates and maintains arterial pressure.

**VENTRICLE:** The pumping chambers of the heart.

**X-RAY:** Composed of radiation, this is a form of electromagnetic radiation. Most X-rays have a wavelength ranging from 0.01 to 10 nanometers.

# Bibliography

"Spring passes and one remembers one's innocence.
Summer passes and one remembers one's exuberance.
Autumn passes and one remembers one's reverence.
Winter passes and one remembers one's perseverance."

*– Yoko Ono*

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CHAPTER SIX

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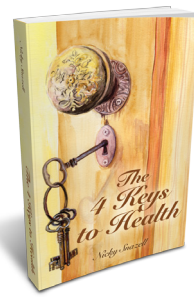


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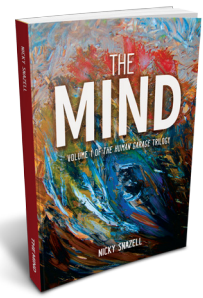


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