



Welcome to the Spring Edition of Orthosports News:

In our final newsletter for 2019, Dr Doron Sher presents a detailed article on Imaging for ACL injuries from a simple orthopaedic perspective.

Dr John Negrine presents an interesting article on What's New with Hallux Rigidus on page 3.

A reminder that we will be running the Latest Orthopaedic Updates Lectures at UNSW and via webinar on Saturday, 9th November. Please see more details on page 4.

– The Team at Orthosports



WHO ARE WE?

Orthosports is a professional association of Orthopaedic Surgeons based in Sydney.

ORTHOSPORTS LOCATIONS

- > Concord 02 9744 2666
- > Hurstville 02 9580 6066
- > Penrith 02 4721 7799
- > Randwick 02 9399 5333
- > Bella Vista 02 9744 2666

Or visit our website
www.orthosports.com.au

Imaging for acute ACL injuries (A simple orthopaedic perspective)



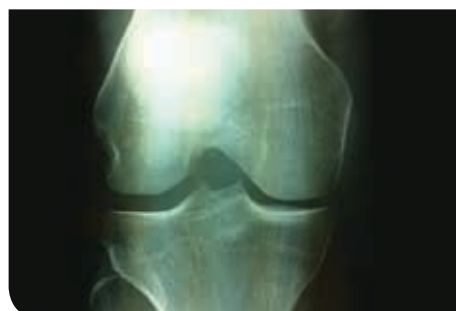
As with all injuries of the knee, a careful clinical examination is required after taking a detailed history. The history and clinical examination will allow you to make an accurate diagnosis over 90% of the time.

PLAIN RADIOGRAPHS

Imaging is then performed to confirm your diagnosis and a standard set of x-rays is obtained. These are:

- Weight bearing AP (looking at alignment and for arthritis),
- Lateral (looking at patella height and tibial translation)
- Notch view (looking at the flexion portion of the condyles) and
- Skyline view (looking at the patella).

In most instances the plain x-rays will be normal but there are some changes worth looking for:



Notch view



Segond Fracture

1. A Segond fracture (described by Dr Paul Segond in about 1879¹) where a fleck of bone is seen adjacent to the tibia. This almost certainly indicates an avulsion near the area of insertion of the anterolateral ligament and in most studies is pathognomonic of an ACL rupture.

The x-rays will also show arthritic changes or something unexpected like a tumour.

MRI SCANNING

Magnetic resonance imaging (MRI) is a scan which uses a magnetic field to take pictures of the inside the body. It is especially helpful to collect pictures of soft tissue such as organs and muscles that don't show up on x-rays.

One way to think of an MRI scan is that of a water imaging device. Normal x-rays image calcium, so they are good to see bones but not good for imaging soft tissues.

At a simplistic level, the magnet lines up all the water molecules and then lets them go. As they go back to their more natural state they release energy which is read by a sensor and then a mathematical equation (Fourier Transformation) is used to convert this to shades of grey to be seen as images. An example of this is a bone bruise. There should be a very limited amount of water within bone. When the ACL tears and the knee dislocates the 2 bones hit against each other and create damage to the bone with some bleeding internally. This 'micro-fracture' of the bone indicates an increased severity of injury.

The investigation of choice is, of course, an MRI scan, with most of the pathology being seen on T2 weighted images. The primary role of the MRI is to confirm the diagnosis or exclude a tear in patients with equivocal physical examination findings. Be aware that not all MRI scans are the same with quality and the reporting of the images varying

significantly. That is why it is useful to be able to interpret the images yourself.

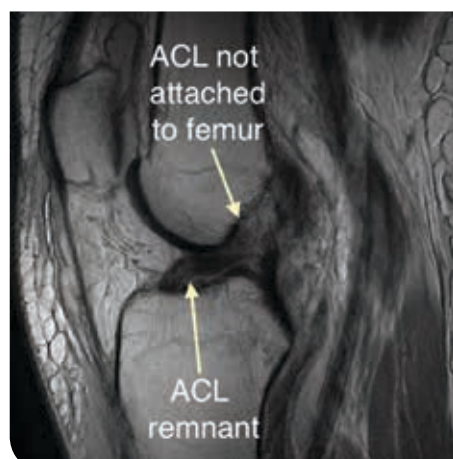
The MRI cannot replace careful clinical examination looking for tears of the lateral collateral ligament (LCL), posterior cruciate ligament (PCL), and the menisci. Patients with combined LCL/ACL or PCL/ACL injuries usually need surgery within 3 weeks because an unoperated LCL tear makes early graft failure more likely.

The majority of ACL tears are mid-substance with only 10% being femoral or tibial avulsions. On most MRI scans the tibial ACL insertion will be better visualised than the femoral side so if the rest of the ligament looks normal and the clinical examination does not suggest instability then the ligament is probably not damaged even if the femoral insertion is not perfectly visualised. While inspecting the ACL itself is important, you also need to look for secondary signs which correlate well the presence of an ACL injury.

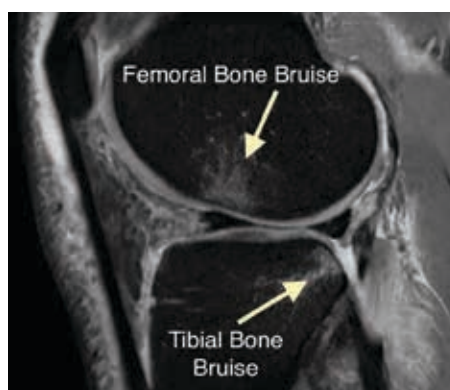
It is ideal to follow the same sequence each time when looking at a knee MRI scan.

SAGITTAL VIEW

Start laterally in the knee and move medially on the T2 weighted images. The first thing we usually see is bone bruising on the femoral condyle (although this may not be present in all injuries and on recurrent instability episodes - about 70% of people with



Femoral ACL avulsion sagittal view



Bone bruise ACL tear MRI

an acute ACL injury have a bone bruise). This bruising is due to the joint subluxation that happens and is seen (1) in the lateral femoral condyle overlying the anterior horn of the lateral meniscus and (2) on the posterior aspect of the tibial plateau. The femoral condyle bone bruise is seen at the anterior aspect of the lateral femoral condyle between the femoral condyle and the trochlear (where an impaction fracture can take place).

A lateral meniscal tear is seen in up to 85% of patients with an ACL injury but few of these need treatment clinically.

As you move through the notch you will see the ACL first and then the PCL but if the MRI slices are too thick or the axis is not altered to 10-20 degrees of internal rotation the ACL might not be seen on an MRI scan. These days this is rarely the case but this is another reason that clinical correlation with the imaging findings is essential.

Normally, the ACL is a dark structure in the center of the knee. It can be seen starting on the tibia and heading upwards and backwards towards the femur. It is usually a straight line with no sag (the 'hammock sign' showing sagging of the ACL usually means the ligament is functionally deficient even if it seems to be attached to both the tibia and femur).

As we move more medial we start to see fluid in the joint, which is consistent with bleeding from an ACL tear. It is also common for there to be a tear to the posterior horn of the medial meniscus with an ACL injury.

CORONAL VIEW

We then move to the coronal images. The normal ACL will be traced from the postero-superior and lateral origin to its antero-inferior and medial insertion. As we start to move more posterior we look for bone bruising and we start to see a stump of a torn ACL. Instead of seeing normal contour of the dark ACL substance, we start to see more a balled-up appearance. In this view we can also see the injury to the posterior horn of the medial meniscus.



Coronal view missing the ACL

AXIAL VIEWS

Finally, we look at the axial views, although these are not as useful when looking at ACL tears. The ACL is an oval low intensity structure which becomes elliptical in the midsubstance. This is much harder to appreciate if the cuts are not in exactly the right plane. You can see if there is fluid present within the joint and you may be able to see the Segond fracture at the tibia on these images (depending on the slice thickness used).

SUMMARY

This is clearly not an overview to read all parts of the MRI, but ACL injuries are common and it is worth knowing some of the common and important imaging signs to look for. In a young active person with these imaging signs early referral for a surgical opinion is appropriate. Not all ACL injuries require surgery but unfortunately many do to return the person to their desired level of sport.

[1] Segond P. Recherches cliniques et expérimentales sur les épanchements sanguins du genou par entorse. *Progres Med* 1879

Dr Doron Sher

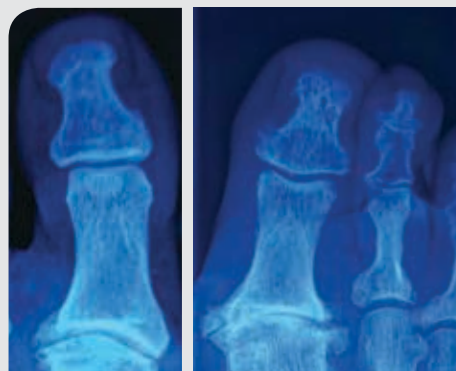
HALLUX RIGIDUS: WHAT'S OLD AND WHAT'S NEW

Hallux rigidus literally translated from the Latin means “stiff big toe”.

It is a condition of arthritic change in the first MTP joint. The condition is more common with advancing age and more common in men than in women, though it can also occur in adolescence.

The condition can be associated with arthropathy such as gout or rheumatoid arthritis but most frequently is associated with osteoarthritis.

Patients complain of pain when pushing off on the great toe. Swelling and stiffness of the great toe are often accompaniments. As with many forms of arthritis, pain is often activity related initially but in the later stages of the disease the pain can occur day and night.



From left: Mildly arthritic first MTP joint, and Advanced arthritis first MTP joint

The condition has been classified by Michael Coughlin and it is a useful classification in that it does help with treatment decisions.

In the initial stages of the disease, the patient has normal x-rays and some stiffness in the joint. In the intermediate stages of the disease the patient has no particular pain through the mid range of motion but pain at the extremes of motion with some changes on x-ray involving less than 50% of the joint. The final stage involves pain through the mid range of motion with no articular cartilage left on plain x-rays and frequently an element of deformity.

Nonsurgically, the condition can be managed with anti-inflammatory medications, stiffening of the shoe or an insole with an extension beneath the first MTP joint to decrease dorsiflexion. Cortisone injections will give the patients transient relief. The evidence for PRP and stem cells in my opinion does not warrant their use in treatment.

Obviously activity modification is an important part of management, these patients are frequently runners in their 50s and 60s and I often tell them to go and purchase a bicycle!

Surgical treatment: In the early and intermediate stages of the disease where the patient has no pain through the mid range of motion but pain at the extreme of dorsiflexion a cheilectomy (removal of the lip of bone i.e. the osteophyte) does afford relief in many patients. The operation is straightforward requiring one day in hospital and approximately 7 to 10 days of recovery. Patients report less pain at the extremes of dorsiflexion and in the right patient where the disease is not too advanced the results of surgery are excellent. I explain to patients however that this operation will “buy time” and not be curative in the long-term.

The traditional answer for grade 4 or advanced arthritis was a first



A first MTP fusion plate and screws

MTP joint fusion. A fusion is a good operation in that it does relieve pain. Patients are able to walk, cycle, swim and play tennis. Women are however limited to a 3 cm heel and activities such as yoga which involve bending the great toe are compromised.

A new device has become available known as a “Cartiva”. This is a synthetic material inserted into the metatarsal head as a joint spacer. A randomised controlled trial comparing fusion to Cartiva interestingly in intermediate and advanced grades of arthritis showed “a noninferiority” of the Cartiva compared to fusion at two years. Enthusiasm was therefore great that this was a solution to the patient who wanted to keep their movement.



A Cartiva implant in the first metatarsal head

A recent review however of 64 patients published in the June 2019 edition of Foot and Ankle International showed 38/64 patients were either unsatisfied or very unsatisfied because of ongoing pain and stiffness in the joint. 20 of these patients had subsequent surgery.

The device is still in use but the results may not be as good as we were first led to believe.

In summary, patients with Hallux rigidus can be offered successful treatment at any stage of the disease, usually with excellent results in terms of pain relief and restoration of activity.

Dr John Negrine

Orthopaedic Surgeons and their Interests

CONCORD

47-49 Burwood Road Concord NSW 2137
Tel: 02 9744 2666

Dr Todd Gothelf	Foot & Ankle, Shoulder
Dr David Lieu	Knee, Shoulder and Elbow
Dr John Negrine	Foot & Ankle (Adult)
Dr Rodney Pattinson	Paediatrics and General Orthopaedics
Dr Doron Sher	Knee, Shoulder and Elbow
Dr Kwan Yeoh	Hand, Upper Limb and General Orthopaedics

HURSTVILLE

Waratah Private 29-31 Dora Street Hurstville NSW 2220
Tel: 02 9580 6066

Dr Jerome Goldberg	Shoulder
Dr Todd Gothelf	Foot & Ankle, Shoulder
Dr Andreas Loeffler	Spine, Trauma, Hip and Knee
Dr John Negrine	Foot & Ankle (Adult)
Dr Rodney Pattinson	Paediatrics and General Orthopaedics
Dr Ivan Popoff	Shoulder, Knee and Elbow
Dr Allen Turnbull	Hip and Knee
Dr Kwan Yeoh	Hand, Upper Limb and General Orthopaedics

PENRITH

Suite 5B, 119-121 Lethbridge Street Penrith NSW 2750
Tel: 02 4721 7799

Dr Todd Gothelf	Foot & Ankle, Shoulder
Dr Kwan Yeoh	Hand, Upper Limb and General Orthopaedics

RANDWICK

160 Belmore Road Randwick NSW 2031
Tel: 02 9399 5333

Dr Jerome Goldberg	Shoulder
Dr Todd Gothelf	Foot & Ankle, Shoulder
Dr Andreas Loeffler	Spine, Trauma, Hip and Knee
Dr John Negrine	Foot & Ankle (Adult)
Dr Rodney Pattinson	Paediatrics and General Orthopaedics
Dr Ivan Popoff	Shoulder, Knee and Elbow
Dr Doron Sher	Knee, Shoulder and Elbow

BELLA VISTA

Suite 116, Building B, 20 Lexington Drive
Bella Vista NSW 2153 Tel: 9744 2666

Dr Kwan Yeoh	Hand, Upper Limb and General Orthopaedics
--------------	---

Sport & Exercise Medicine Physicians

Dr Paul Annett	Hurstville
Dr John Best	Randwick
Dr Paul Mason	Concord Randwick

LATEST ORTHOPAEDIC UPDATES 2019

Saturday, 9th November, 2019
University of NSW – 8am to 12.30pm
or via Webinar

For more information visit our website or
email education@orthosports.com.au

Should you wish to unsubscribe please email
education@orthosports.com.au or contact one of our offices directly.

www.orthosports.com.au



**ORTHOSPORTS IS AN RACGP
ACCREDITED ACTIVITY PROVIDER**
CATEGORY 1 MODULES (40 CPD POINTS)

Foot & Ankle – Injuries & Conditions
Management of Knee Arthritis
Shoulder Pain & Injury Management
**Knee Sports Injuries, Imaging
& the Swollen Knee**

To register your interest or for more information
please email education@orthosports.com.au