2019

ORTHOSPORTS

Orthopaedic & Sports Medicine Service

LATEST ORTHOPAEDIC UPDATES

www.orthosports.com.au

ORTHOSPORTS

Concord	47-49 Burwood Road CONCORD NSW 2137	Tel Fax	**02 9744 2666** **02 9744 3706**	**Doctors Consulting here** Dr Todd Gothelf Dr Paul Mason Dr John Negrine Dr Rodney Pattinson Dr Doron Sher Dr Kwan Yeoh
Hurstville	Level 7 Waratah Private 29-31 Dora Street HURSTVILLE NSW 2220	Tel Fax	**02 9580 6066** **02 9580 0890**	**Doctors Consulting here** Dr Paul Annett Dr Jerome Goldberg Dr Todd Gothelf Dr Andreas Loefler Dr John Negrine Dr Rodney Pattinson Dr Ivan Popoff Dr Allen Turnbull Dr Kwan Yeoh
Penrith	Suite 5B 119-121 Lethbridge St PENRITH NSW 2750	Tel Fax	**02 4721 7799** **02 4721 7997**	**Doctors Consulting here** Dr Todd Gothelf Dr Kwan Yeoh
Randwick	160 Belmore Road RANDWICK NSW 2031	Tel Fax	**02 9399 5333** **02 9398 8673**	**Doctors Consulting here** Dr John Best Dr Jerome Goldberg Dr Todd Gothelf Dr Paul Mason Dr Andreas Loefler Dr John Negrine Dr Rodney Pattinson Dr Ivan Popoff Dr Doron Sher

www.orthosports.com.au

Time	Event	Who
07:30 – 08:00	Registration / Refreshments	
08:00	Welcome Message	Dr Doron Sher
	Wrist Ligament Trauma and Instability	Dr Kwan Yeoh
	Achilles Tendon Rupture - Best Management	Dr Todd Gothelf
	Hallux Rigidus: What's Old and What's New	Dr John Negrine
08.55	Panel Discussion	
	Femoroacetabular Impingement (FAI) Diagnosis & Treatment	Dr Paul Mason
	The Sporting Spine	Dr Paul Annett
	Disc Prolapse	Dr Andreas Loefler
	Scoliosis	Dr Samya Lakis
10.20	Panel Discussion	
10.45-11.15	**Morning Tea**	
	Physio question, education	Dr Todd Gothelf
	Updates on ACL reconstruction	Dr Doron Sher
	Interactive Shoulder Cases	Dr Ivan Popoff
	Interactive Shoulder Cases	Dr Jerome Goldberg
	Interactive Shoulder & Elbow Cases	Dr John Best
12.25	Panel Discussion	
13.00	Close	

Dr Kwan Yeoh
M.B., B.S. (Hons) (Syd), F.R.A.C.S. (Ortho)
Hand, Wrist, Upper Limb & General Orthopaedics

ORTHOSPORTS

Wrist ligament trauma and carpal instability

Anatomical Review

- Bones are inherently unstable – Flexibility vs stability
- Static stabilisers
    - Intercarpal ligaments, especially scapholunate & lunotriquetral ligaments
    - Radiocarpal & ulnocarpal ligaments
    - Radioulnar ligaments
- Dynamic stabilisers
    - Especially ECU, hypothenar, FCU
- Normal wrist motion – Complex & dependent on all the above

Carpal Instability

- Inability of wrist to maintain a normal balance between articulating surfaces of carpal bones under normal loads & movements
    - Not all ligament ruptures lead to instability
    - Not all instability is due to ligament ruptures
    - Not all wrists with malalignment are clinically unstable
    - Not all instability leads to progressive osteoarthritis
- Classifying instability helps with planning management
    - Acute vs subacute vs chronic
    - Dynamic vs static
    - Traumatic vs inflammatory vs other causes
    - Radiocarpal vs proximal row vs intercarpal vs midcarpal vs distal row vs CMC
    - VISI vs DISI vs ulnar translocation
    - Dissociative vs non-dissociative vs complex vs adaptive

Acute Trauma & Instability

Scapholunate ligament

- 3 components
    - Dorsal band is the most important, but even complete loss of all bands of SLL only causes dynamic instability. Loss of dorsal radiocarpal ligament is also required for static instability.
- Spectrum of injuries up to lunate dislocation
- MRI vs arthroscopy diagnosis, always in combination with symptoms & clinical signs
- Non operative treatment
    - For acute partial tears, chronic predynamic instability

- Operative treatment depends on stage
    - Acute predynamic instability – Repair
    - Acute or chronic dynamic instability – Repair vs reconstruction
    - Reducible static instability – Reconstruction
    - Irreducible static instability or wrist arthrosis (SLAC) – Salvage procedures
    - Post-operative treatment depends on operation performed.
        - Initial immobilisation
        - Range of motion & proprioception training

Lunotriquetral ligament

- Lunotriquetral ligament injury far less common than scapholunate ligament injury
    - Clinical suspicion, clinical tests & radiology (eg. VISI on x-ray)
    - More likely to be treated non-operatively than operatively

Chronic Instability

- Beware of possible confounding chronic instability
- Midcarpal instability
- Carpal instability adaptive

Hand Therapy Essentials

- Assess cause of instability
- Communicate with treating doctor & refer when necessary
- Activity modification
- Supplement static stabilisers with splint – Temporary or permanent
- Dynamic stabilisers
    - Strengthening
    - Proprioception

Further Reading

1. Haerle M, Bain GI, Garcia-Elias M, Wahegaonkar A, Luchetti R. IFSSH Scientific Committee Report on Carpal Instability: Parts 1 & 2. 2016.
2. Ho P-C, Tse W-L, Wong CW-Y. Palmer Midcarpal Instability: An Algorithm of Diagnosis and Surgical Management. J Wrist Surg. 2017 Nov;6(4):262–75.

NOTES:

Dr Todd Gothelf
MD (USA), FRACS, FAAOS, Dip ABOS
Foot, Ankle, Shoulder Surgery

ORTHOSPORTS

Achilles Tendon Ruptures Non-operative vs Operative Treatment

1. *K Willitis, N. Amendola, et al. Operative vs. Nonoperative Treatment of Acute Achilles Tendon Ruptures. JBJS Am, 2010;92:2767-75.*
   a) Concluded that accelerated rehab program and nonoperative be used for acute achilles ruptures, as it avoids serious wound complications and outcomes are similar.

2. *AA Suchak, GP Bostick, et al. The Influence of Early Weight-Bearing Compared with Non-weight bearing after Surgical Repair of the Achilles Tendon. JBJS 2008;90:1876-83.*
   a) This study randomised groups of surgical achilles repairs into early weight bearing at 2 weeks or to delay weight bearing until 6 weeks.
   b) They found that at 6 weeks, patients in WB group have better RAND36 scores, and fewer limitations of daily activities. At 6 months there was NO difference in outcomes. Both groups had poor endurance of calf strength, but no ruptures.

3. *A Soroceanu, F Sidhwa, et al. Surgical Versus Nonsurgical Treatment of Acute Achilles Tendon Rupture: A Meta-Analysis of Randomised Trials. JBJS Am 2012:94; 2136-43.*
   a) When functional rehab and early range of motion was employed re-rupture rates were equal for surgical and nonsurgical patients. Without early motion, the risk reduction by surgery was 8.8%. With complications other than re-rupture, surgery had an increase risk of 15.8%. No significant differences with regard to calf circumference, strength, or functional outcomes.
   b) Conclusion: non-op should be considered at centres that employ functional rehabilitation.

4. *K Nilsson-Helander, KG Silbernagel, et al. Acute Achilles Tendon Rupture: A Randomised, Controlled Study Comparing Surgical and Nonsurgical Treatment Using Validated Outcome Measures. Am J Sports Med 2010 38:2186. (Sweden)*
   a) CONCLUSION: no statistical difference between groups. Suggests that early mobilisation is beneficial for patients with acute rupture whether nonsurgical or surgical.

5. *CS Lim, D Lees, et al. Functional Outcome of Acute Achilles Tendon Rupture with and without Operative Treatment Using Identical Functional Bracing Protocol. Foot Ankle Int, 2017 vol 38(12) 1331-1336.*
   a) 62 treated operatively and 70 treated non-operatively. 132 patients available for minimum 2 year follow up.
   b) CONCLUSION: no significant difference between treatments. *** No mention of strength.

6. *DP Gwynne-Jones, M Sims, et al. Epidemiology and Outcome of Acute Achilles Tendon Rupture with Operative or Nonoperative Treatment Using an Identical Functional Bracing Protocol. Foot Ankle Int, vol 32 No 4/April 2011. (New Zealand)*
   a) 143 treated surgically, 1.4% re ruptures. 220 treated non surgically, 8.6% re ruptures. (19). There was a significantly lower re-rupture rate and reoperation rate in the surgical group.
   b) There results support surgery in patients less than 40 years; especially males.

7. *GP McComis, DA Nawoczenski, KE Dehaven. Functional Bracing for Rupture of the Achilles Tendon. J Bone Joint Surg Am, 79(A), 12, December 1997.*
   a) ****This article demonstrates non-operative early function rehab programs for achilles ruptures and explains a protocol that was effective, allowing for WB and early ROM.

8. *SW Young, A Patel, et al. Weight-Bearing in the Non-operative Treatment of Acute Achilles Tendon Ruptures. A Randomized Controlled Trial. JBJS 2014;96:1073-9. (New Zealand)*
   a) Results: no significant differences in outcomes in both groups. The WB group experienced less subjective stiffness. One rerupture in WB group and 2 in the non-weightbearing group, 3% and 5% respectively.
   b) Conclusion: WB casts offers outcomes equivalent to NWB casts. Overall rerupture was low, supporting nonoperative management.

9. *KW Barfod, JBencke, et al. Nonoperative Dynamic Treatment of Acute Achilles Tendon Rupture: The Influence of Early Weight-Bearing on Clinical Outcome: A Blinded, Randomised, Controlled Trial. J Bone Joint Surg Am, 2014;96:1497-503.*
   a) Compared full weight bearing from day one to non weight bearing for six weeks. 30 patients randomised to each group.
   b) *** showed WB is good and has no bad effects. However, their scores for total heel-rise work was quite low in both groups. Is non-op really the best treatment?

10. *KG Silbernagel, KNilsson-Helander, et al. A new measurement of heel-rise endurance with the ability to detect functional deficits in patients with achilles tendon rupture. Knee Surg Sports Traumatol Arthrosc 18(2):258-64. August 2009.*
   a) ***Here they say most people do not rerupture so the recovery of strength is a greater concern. In studies evaluating different treatment protocols there is rarely a difference between treatment groups in recovery of function, despite the fact that majority of patients have strength deficits. Strength deficit of the calf musculature after an achilles rupture is 10-30% and difficult to overcome.
   b) *** possibly the tests we use to measure function are not narrow enough to detect differences.
   c) Heel-rise work tests: combines heel-rise height measurement with number of repetitions.
   d) This study showed that when just measuring the number of repetitions at 12 months, the LSI was 95% indicated full recovery. However, when measuring the total work the LSI was 76%, indicating not full recovery.

11. *MP Jones, RJ Khan, et al. Surgical Interventions for Treating Acute Achilles Tendon Rupture: Key Findings from a Recent Cochrane Review. J Bone Joint Surg Am, 2012;94: e88 (1-6).*
   a) In Summary, they reported in favour of operative repair of achilles tendon rupture, due to lower re rupture rate. Had more infections, but reduced by using a percutaneous technique. Complex reconstruction offered no improvement in outcome for surgical treatment.

12. *NH Mortensen, O Skov, et al. Early Motion of the Ankle After Operative Treatment of a Rupture of the Achilles Tendon. A Prospective, Randomised, Clinical and Radiographic Study. J Bone Joint Surg Am, 81(A), 7, July 1999. (Denmark)*
   a) Early motion was compared to 8 weeks of rigid immobilisation in a plaster cast.
   b) Concluded that early motion resulted in shortened rehab time. There were no complications related to early motion. Early motion did not prevent muscle weakness.

Dr Todd Gothelf
MD (USA), FRACS, FAAOS, Dip ABOS
Foot, Ankle, Shoulder Surgery

ORTHOSPORTS

Early Rehabilitation Protocol for Operative or Non-operative Treatment

Time Frame	Activity
0-2 weeks	• Posterior slab/splint or Boot in PLANTAR FLEXION position, non-weight bearing with crutches
2-4 weeks	• Vacoped boot in #2 plantarflexion, or Aircast boot with 3 thick heel lifts • Protected weight-bearing with crutches • Active plantar flexion and dorsiflexion to below neutral, inversion and eversion • Modalities to control swelling • Incision mobilisation modalities • Knee/hip exercises with no ankle involvement • Non-weight bearing fitness/cardiovascular exercises i.e. bicycle with one leg • Hydrotherapy
4-6 weeks	• Weight bearing as tolerated • Continue 2-4 week protocol
6-8 weeks	• Vacoped- change position of the boot by 0.5 every 3-4 days i.e. from #2-1.5-1-0.5-0 every 3-4 days. Remain at 0 for 3-4 days then discontinue • Aircast Boot- remove a heel lift every 3-4 days to neutral for 3-4 days then discontinue • Weight-bearing as tolerated • Dorsiflexion stretching, slowly • Graduated resistance exercises (open and closed kinetic chain as well as functional activities) • Proprioceptive and gait retraining • Modalities including ice, heat, and ultrasound, as indicated • Incision mobilisation • Fitness/cardiovascular exercises to include weight bearing as tolerated e.g. bicycling, elliptical machine, walking and/or running on treadmill
8-12 weeks	• Wean off boot • Return to crutches and/or cane as necessary to gradually wean off • Continue to progress range of motion, strength, proprioception
>12 weeks	• Continue to progress range of motion, strength, proprioception • Retrain strength, power, endurance • Increase dynamic weight-bearing exercises, include phyometric training • Sport-specific retraining

NOTES:

Dr John Negrine
M.B., B.S. (Syd), F.R.A.C.S. F.A. Ortho. A.
Adult Foot & Ankle Surgery

ORTHOSPORTS

Hallux Rigidus – What's old and What's new

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

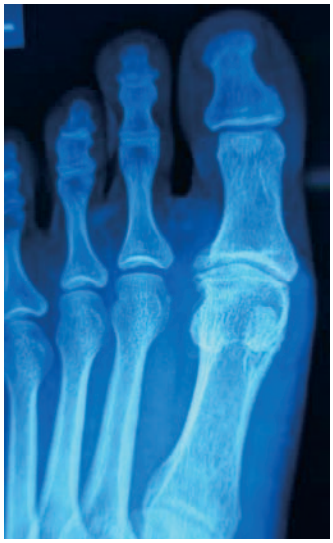
It is a condition of arthritic change in the first MTP joint. The condition is more common with advancing age and more common in men than in women. The condition can still occur in adolescence.

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.

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.



Mildly Arthritic first MTP joint

Advanced Arthritis first MTP joint

Non-surgical treatment: 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!

Dr John Negrine
M.B., B.S. (Syd), F.R.A.C.S. F.A. Ortho. A.
Adult Foot & Ankle Surgery

ORTHOSPORTS

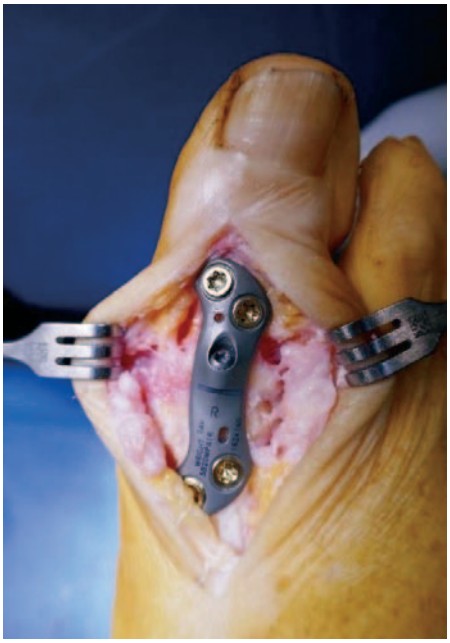
Surgical treatment: In the early and intermediate stages of the disease where the patient has no pain through the mid range of motion but pain at the extreme of dorsiflexion a cheilectomy (removal of the lip of bone i.e. the osteophyte) does afford relief in many patients. The operation is straightforward 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 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.

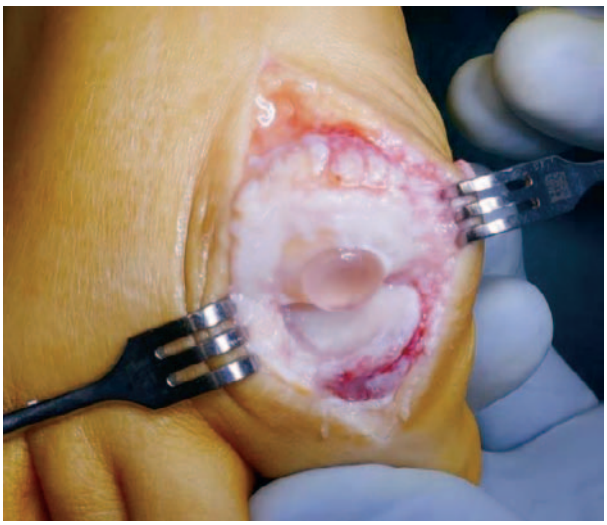
A new device has become available known as a "Cartiva". This is a synthetic material inserted into the metatarsal head as a joint spacer. A randomised controlled trial comparing fusion to Cartiva interestingly in intermediate and advanced grades of arthritis showed "a noninferiority" of the Cartiva compared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

A 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.



A first MTP fusion plate and screws



A Cartiva implant in the first metatarsal head

NOTES:

Dr Paul Mason
FACSEP, M.B.B.S.(Hons), Bachelor Physiotherapy,
Master Occupational Health

ORTHOSPORTS

Femoroacetabular Impingement (FAI)

Femoroacetabular impingement (FAI) is a relatively new diagnosis in the field of orthopaedics, first being described in the 1990's by R. Ganz. There are two major types of FAI, 'cam' and 'pincer' with a 'mixed' subtype containing features of both. A 'cam' lesion represents a loss of sphericity of the head of the femur which contributes to incongruency between it and the acetabular socket. It is named for the eccentric shape of mechanical 'cams'. 'Pincer' lesions refer to a relative deep acetabular socket limiting the range of motion available at the hip joint. Mixed FAI contains features of both cam and pincer lesions. The clinical significance of pincer lesions is less established than that for cam lesions. Importantly, the presence of morphological changes alone is insufficient for a diagnosis of FAI. Symptoms such as pain must be present, and this is reflected by the inclusion of 'impingement' in its description.

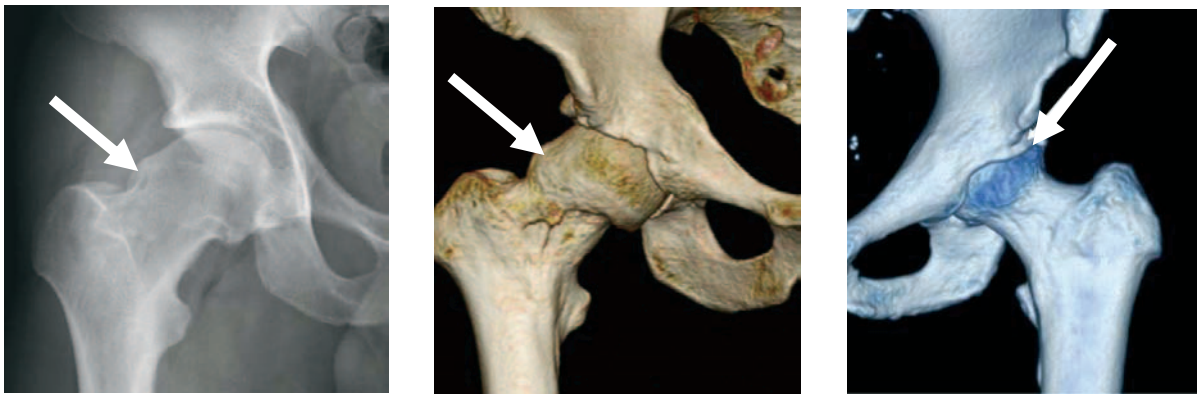


Figure 1
a) AP x-ray demonstrating pistol grip deformity due to a cam lesion

b) Anterior view of 3D CT demonstrating cam lesion

c) Anterior view of 3D CT demonstrating pincer lesion

FAI is strongly associated with the development of OA and patients with cam lesions are at approximately 10 x's the risk of developing osteoarthritis. A significant increase in the risk of OA is also seen in asymptomatic patients with FAI morphology (who technically do not have FAI due to lack of symptoms).

The morphological changes of FAI are more common in athletes, some studies suggesting cam lesions may be present in ~2/3 of all athletes. Cam deformities appear to develop prior to skeletal maturity, particularly between the ages between 10 and 15 and do not appear to progress following skeletal maturity. High impact forces and specific movement patterns seen in various sports appear to contribute to the development of FAI, possibly in the context of less resilient bone.

There is some discussion in the literature that the apparent prominence of a cam lesion is illusory, instead reflecting flattening of the adjacent bone. This may explain the association with young athletes engaged in demanding sports who may not have optimal bone health. Bone mineralisation lags behind bone growth by approximately 18 months and both nutritional and energy deficiencies may contribute to impaired bone health. FAI must be differentiated from Perthes' disease and slipped capital femoral epiphysis, the delayed diagnosis of either potentially leading to catastrophic consequences.

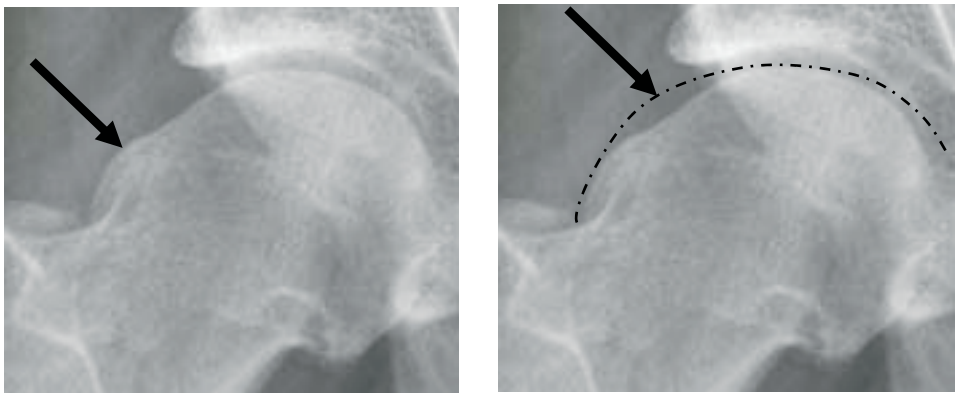


Figure 2. Is a cam lesion a prominence (a) or a flattening adjacent to the apparent cam (b)?

Pain from FAI can arise from different sources. The acetabular labrum, attached to the periphery of the acetabular socket is pain sensitive and a common source of pain in FAI. While the protective articular cartilage lining the bones within the joint has no nerve supply, its degradation, otherwise known as osteoarthritis, can contribute to pain in several ways. Loss of protection of the underlying (subchondral) bone, combined with altered joint mechanics secondary to loss of joint congruency can lead to bone stress characterised by micro-trabecular injury. Pain from bone stress is commonly exacerbated both during and after exercise and can be present at night. Degradation and fragmentation of articular cartilage can also contribute to 'synovitis', or inflammation of the joint lining. This pain is often worse following periods of relative immobility.

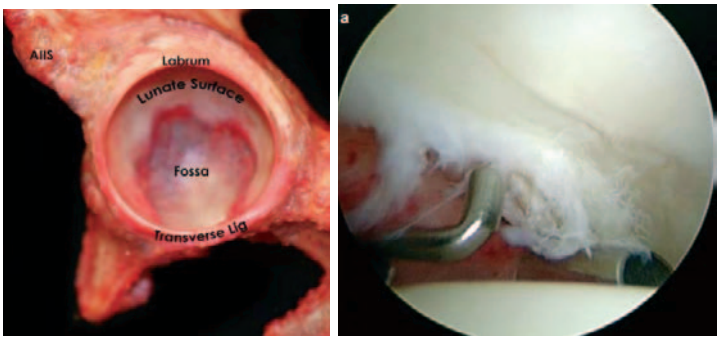


Figure 3: a) acetabular labrum b) fragmented labral tear seen on arthroscopy

3-dimensional imaging is increasingly being studied as a means of more accurately identifying relevant morphological changes with early findings promising. Currently clinical practice however continues to utilise x-ray as a mainstay of assessing for both cam and pincer morphology. X-rays in two planes are required for a full assessment to ensure 3-dimensional coverage. An AP pelvic view (x-rays from front to back) and Dunn lateral view (x-ray from side to side) are recommended.

The alpha angle is used to identify the presence of a cam deformity. While an angle greater than 60 degrees is commonly considered a positive finding, an angle greater than 78 degrees is considered by some authorities to be more diagnostic of significant pathology. Despite the absence of clear consensus, it is apparent that larger alpha angles are significantly associated with increased risk of developing hip osteoarthritis. A pincer deformity is identified by the lateral centre edge angle, with larger angles (>40 degrees) reflecting a deeper acetabulum.

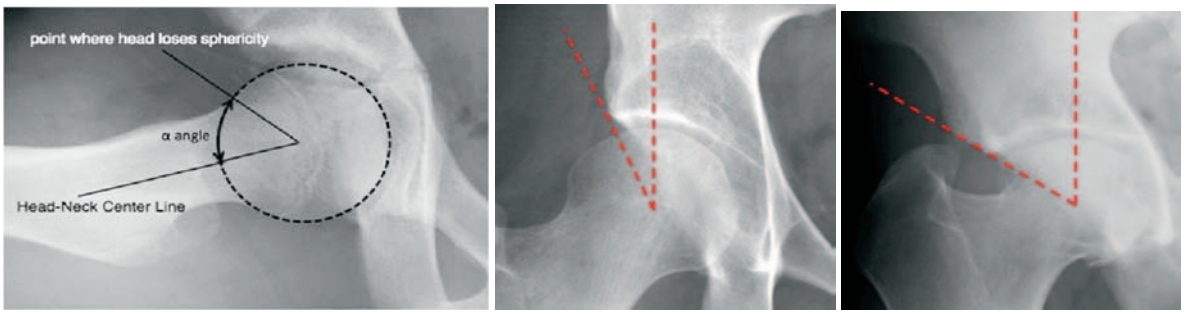


Figure 4: a) alpha angle is measurement b) centre edge angle(shallow socket) c) centre edge angle (deep socket)

The FADIR test, combining end range hip flexion, adduction and internal rotation is highly sensitive for FAI and reliably excludes its presence when negative. Conservative management is unable to correct the morphological changes seen in FAI. Consequently, therapy has traditionally focussed on addressing impairments, usually of range or strength. While some individuals appear to benefit from this approach, evidence of the long-term efficacy of impairment focused therapy is not yet clear.

Education and training regarding the avoidance of provocative postures and movements appears effective for symptom management. An understanding of the anatomical basis of impingement will allow for careful selection or modification of activities. For example, some patients may tolerate slow running, requiring minimal hip flexion, while road cycling may provoke symptoms. Tolerance to squat based activities, if unable to be avoided, may be improved by increasing hip abduction and external rotation and limiting the degree of hip flexion. These changes can reduce the contact between cam lesions, typically located antero-superiorly and the acetabular rim. Likewise, repetition of provocative movements should be discouraged. Many patients will become symptom free through the avoidance of provocative manoeuvres, however it is unclear as to what degree, if any, this may reduce the risk of osteoarthritis.

Figure 5: a) the 'sumo' squat is performed with the feet externally rotated to 45° and feet wider than shoulder width. b) While cycling is often recommended for those with joint pain, the range of hip flexion required can be provocative in FAI, especially road cycling.

The role of surgery in managing FAI is poorly defined. While about 70% of patients may improve in the short term, long term results are lacking, and it is not clear whether surgery has the capacity to reduce progression to OA. Some authorities even feel arthroscopic surgery may even accelerate joint degeneration. Given that approximately 30% of patients who undergo surgery have unsatisfactory results, any decision to proceed with surgery should be well considered.

NOTES:

DJO® POWERING MOTION™

PUT US TO THE TEST AND WE'LL DO THE REST

We are confident that you will love the quality and price of our practice consumables.
Try them firsthand for FREE!

COMPLIMENTARY ISAVE PACK

Visit the DJO Stand to book an inservice for your clinic and receive your complimentary iSave pack.

P: 1300 66 77 30 | E: customerservice.au@djoglobal.com | W: www.djostore.com.au

Dr Paul Annett
M.B.,B.S,(Hons I) FACSP,
Sport & Exercise Medicine Physician

ORTHOSPORTS

Lumbar Stress Fractures

Introduction: Lumbar stress fractures are a common cause of lower back pain in adolescence. Up to 30% of athletes between 11-17 may have lower back pain, and a high index of suspicion for stress fracture should be maintained in this age group.

Aetiology: Lumbar stress fractures occur due to an overload of the pars interarticularis region. The L5 level is most commonly involved. Symptoms occur commonly in adolescence, and generally relate to exercise that involves extension and/or rotation. Classic sports affected include cricket fast bowling or gymnastics, but they may occur in any running or pivoting sport.

Stress fractures may occur in structurally normal bone. There are also chronic bony lesions in this area known as 'pars defects'. A pars defect is not congenital, but develops early in life. It is present in around 5% of the population and is often asymptomatic. It may be aggravated with similar activities that cause acute stress fractures. When the pars defects are bilateral there may be a slippage of one vertebra on another, which is known as a spondylolisthesis.

Diagnosis: Historically the patient will complain of a gradually evolving lower back pain, usually unilateral, which is worsened by their chosen sport and improves with rest. At its worst the pain may be present in daily activities or even at night. Often it will grumble on for many months before a diagnosis is made.

Clinical examination will reveal pain that is worsened by positions of spinal extension. More specifically extension/rotation or single leg hyperextension to the affected side may also reproduce pain. Tenderness may be palpated at the lumbosacral level, 1cm lateral to the midline.

Fig1: The single-leg hyper-extension test

Investigation: A plain X-ray is the simplest method to investigate the adolescent with back pain. It may show a pars defect or even a spondylolisthesis. Oblique views are more sensitive for pars defects, but increase the radiation dose. Further investigation may be needed to make the diagnosis. This may initially involve a bone scan, which is very sensitive for diagnosing stress fractures and confirms bony activity, and a limited CT scan to stage the lesion as acute or chronic. MRI scanning may be a viable alternative as it avoids radiation, but is not as sensitive as the combined bone scan/CT. Newer T1 VIBE sequences have improved MRI sensitivity.

Treatment: The prognosis for lumbar stress fractures is generally favourable. The treatment will involve complete rest from all sport for anywhere up to 3 months. Bracing has been used historically, but had not been shown to improve outcomes and is reserved only for recalcitrant pain.

The period of rest required will be guided by the stage of the lesion on the CT scan. A Japanese study demonstrated that with rest, union of the fractures occurred in 75% of early lesions, 40% of progressive lesions and 0% of terminal lesions. As such, terminal lesions only require rest until symptoms resolve as healing is unlikely, as opposed to early lesions where healing is the goal and more prolonged rest is needed. Radiological signs of a terminal lesions include sclerosis and widening of the pars defect, bilateral defects and associated spondylolisthesis.

Physiotherapy is required to improve lumbar mobility and flexibility. Home exercises to stretch the hamstrings, hip flexors and gluteals, as well as to strengthen core stabilizing muscles should be performed daily. Technique correction is important, especially in cricket bowlers where a 'mixed action' of shoulder and hip counter-rotation is a predisposing factor.

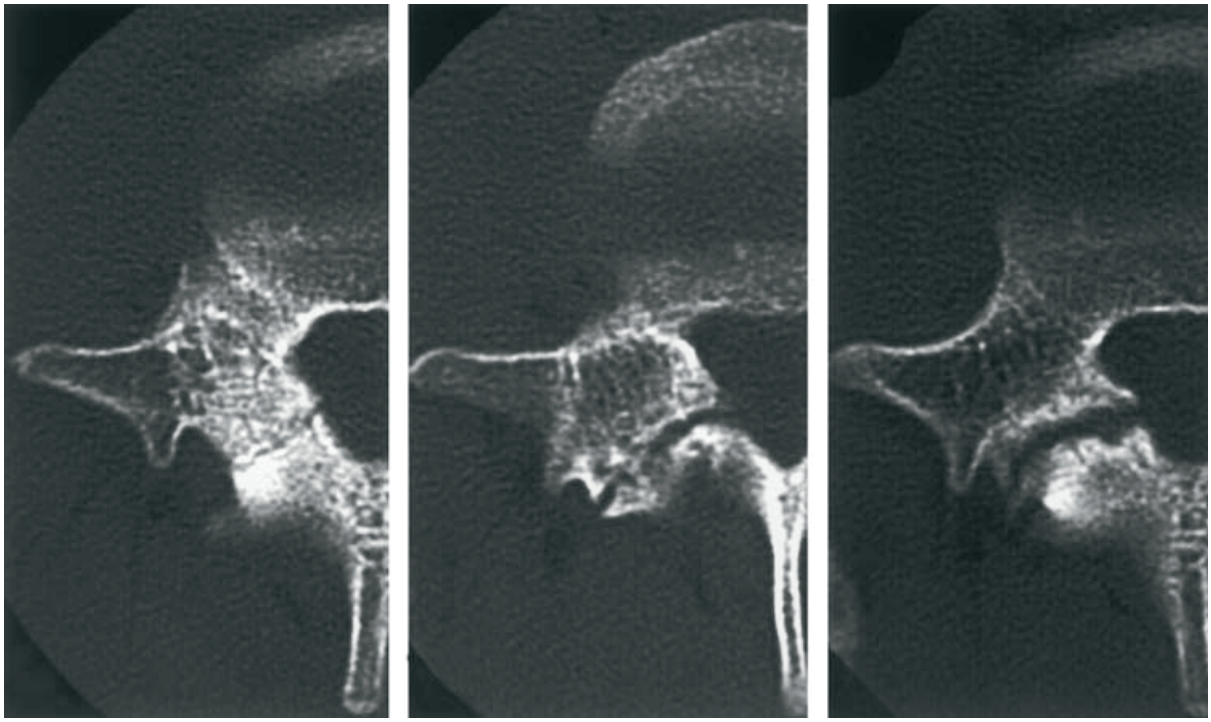


Fig 2. Representative CT images of stress fractures in: a) the early stage, b) the progressive stage and c) the terminal stage.

Key Points:

- Lumbar stress fracture is an important cause of lower back pain in adolescents and requires a high index of suspicion for diagnosis
- Stress fractures are caused by activities that cause extension and rotation of the spine
- The pain is usually insidious and persistent over a period of time
- Diagnosis requires imaging in the form of an X-ray, bone/CT scan or MRI
- Treatment involves a period of complete rest from sport but invariably leads to a favorable outcome
- Technique assessment in cricket fast bowlers is essential

NOTES:

Dr Andreas Loefler
B.S.C., M.B., B.S., F.R.A.C.S. (Ortho.)
Joint Replacement & Spine Surgery

ORTHOSPORTS

Disc Prolapse – a summary of a common condition

Epidemiology: Disc prolapse, rupture, protrusion, and herniation all describe the colloquial 'slipped disc'. The prevalence of symptomatic disc prolapse is between 1-3% and highest in people 30-50 years old. The male to female ratio is 2:1. Any disc in the cervical, thoracic or lumbar spine may prolapse and each will have a typical presentation.

Pathology: The intervertebral disc is a robust cushion and universal joint, which acts like a shock absorber and allows movements in all directions. Excess forces or inherent defects can lead to a rupture of the annulus fibrosus and an extrusion of part of the nucleus pulposus, a bit like squeezing toothpaste out of the tube. This causes compression and chemical irritation of adjacent nerves. Pain is usually experienced distally in the myotome and dermatome of the affected nerve. There may be associated numbness and weakness.

Presentation: Typically there is an event, a fall or a lifting incident, which causes neck or back pain. There is often a delay of a day or two before the patient experiences progressive arm or leg pain. The pain will be exacerbated by posture and activities. Some patients prefer sitting and others standing to alleviate symptoms. Pain is often quite severe and prevents patients from working. Progressive neurological impairment is not common. In rare situations a large disc prolapse may cause bladder and bowel dysfunction. This is called the Cauda Equina Syndrome and is considered a surgical emergency.

Apart from **pain** and the inability to work, patients often experience **fear** of sinister pathology or of permanent loss of function. We need to explain the cause and the natural history of their condition. Patients need our reassurance and guidance, as well over 80% will make a full recovery within three months. While surgery may offer a quicker resolution of symptoms, the long term outcome of surgical and of non-operative treatments are similar and surgery should be delayed in most cases.

History: The story alone will establish the diagnosis in most, but not all patients. There may be a history of previous episodes of similar pain. Questions about general health and specifically about work or sporting activities will help in confirming the diagnosis. The physical examination should be targeted to the affected limb, testing for power, reflexes and sensation.

Lumbar disc prolapse is 15 times more common than cervical herniation. Most pathology is seen at L4/5 and at L5/S1. The shape and position of the prolapse determines which nerve root will be affected. A lateral disc lesion affects the traversing root, whilst a foraminal or far lateral disc affects the exiting root. A patient, who prefers sitting is more likely to have a foraminal disc prolapse, as sitting or flexion opens the foramen, whilst a patient with a more central prolapse will prefer standing. The sciatic stretch test is positive for L5 and S1 roots, and the femoral nerve stretch test is more specific for the L4 root.

The most common **cervical** levels involved are C5/6 and C6/7. C5/6 affects the C6 nerve root and a prolapse at C6/7 will compress the C7 root. The biceps jerk is mediated mainly by C6 and the triceps jerk by C7. Almost all muscle in the upper limb have some degree of dual innervation, which is protective, but may confuse the examination. There is also some overlap of neck and shoulder pathology.

MRI: Provided there are no red flags in the history and practitioners have reasonable confidence in their working diagnosis, there is no need for urgent investigations. If the history, or symptoms and signs are unusual, or if the patient deteriorates or fails to improve a scan or an urgent referral may be indicated. If in doubt consult the GP or the surgeon you know. The MRI is the preferred scan, but most patients do not need urgent imaging.

Evidence base: Although disc prolapse is a common condition, there is a paucity of studies to guide patients and therapists regarding best treatments. The Spine Patient Outcomes Research Trial, or SPORT study is still the biggest and most recent prospective randomized multicentre trial comparing surgical versus non-surgical treatments. 501 patients with lumbar disc prolapse were enrolled and followed for 5 years. There was a large number of patients, who crossed over in either direction, that is patients, who were randomized to surgery chose not to have an operation and vice versa. The results were analysed for 'intention to treat' and for 'as treated'. In the 'as treated' group surgery provided quicker relief of symptoms and the improved outcomes were maintained at 1 year and 5 years.

In a meta-analysis of **athletes** with lumbar disc prolapse the outcomes were favourable. 75-100% returned to sport, although the recovery period was 3-9 months. The career length and performance was calculated to be at 60-100% of pre-injury baseline statistics. Such figures are difficult to interpret, when trying to predict for an individual athlete, but do give patients some hope, as the majority did return to their sport.

The **Cauda Equina Syndrome** is the only absolute indication for surgery and requires urgent referral. Progressive weakness is usually treated with some urgency, but the main indication for surgery is intractable pain and a failure to improve. There are also relative indications to operate, such as financial pressures, as many patients are not able to afford a prolonged period off work. This applies especially to those, who are unable to perform physical work. Most patients will make the decision as to whether and when to operate, and it us usually on the basis of persistent pain, which has failed to improve.

Non-operative treatment is the mainstay of care. This includes a short time off work, reassurance, analgesia and anti-inflammatory drugs. Physical therapy provides comfort and reassurance, relief of muscle spasms, help with posture and advice about daily activities. Patients need maintain strength in the affected muscles groups. As pain improves, patients should be advised to increase exercises and to strengthen paraspinal and abdominal muscles or neck and shoulder muscles, depending on the area involved. Patients need to understand that there will be some discomfort when exercising in the recovery period.

Referral: Patients who have an unusual presentation and those who have failed to improve by 4-6 weeks should be referred for a surgical opinion. Occasionally a steroid injection may be helpful to reduce severe radicular symptoms. An intra-foraminal injection under CTguidance can be repeated once or twice. Temporary relief of pain after an injection may also help to confirm the diagnosis.

Differential diagnosis: Cervical and shoulder pathology has some overlap, as the pain from acute cuff tears or impingement may radiate down the arm. Brachial neuritis can present with severe pain and proximal weakness. In the lower limb acute hamstring injuries and trochanteric bursitis should be considered as differential diagnoses, as well as hip pathology. Typically, radicular symptoms due to a lumbar disc prolapse should be felt below the knee, with calf pain and numbness in the foot.

Surgery is usually the last resort, although the outcome of surgery in well selected cases is excellent, with almost instant resolution of radicular pain. Numbness and weakness usually take several weeks to improve. Although many techniques have been tried, a simple open discectomy is the gold standard. The prolapsed part of the disc is removed, relieving pressure and chemical irritation of the nerve. This is usually done through a 4cm incision. The term 'micro-discectomy' applies more to the use of an operating microscope than to the length of the incision. In the cervical spine a small lateral disc prolapse can be removed through a posterior foraminotomy, but a larger or central disc fragment requires a complete excision of the disc through an anterior approach, followed by a fusion or a disc replacement. Even if successful, 5-10% of disc herniations car recur.

NOTES:

Dr Samya Lakis
M.B.B.S., F.R.A.C.S. (Ortho.)
Spinal & Paediatric Orthopaedic Surgery

ORTHOSPORTS

Scoliosis

Scoliosis is a three dimensional deformity of the spine. Classic coronal patterns include the S or C-shaped spine, but the key to a significant curve is the element of segmental rotation, most manifest on a forward bend. Spinal deformity can be predominantly sagittal, most commonly kyphosis (an increase in the forward bend of the spine). Scoliosis results in asymmetry of shoulders, chest wall/ ribs, and waist. It can result in pelvic obliquity and an apparent limb length discrepancy. It can also result in an imbalance in global spinal alignment, both in coronal and sagittal planes.

Scoliosis is present in 4% of the population. Most patients are successfully managed long term with non-operative treatment. Scoliosis can be degenerative, or exacerbated by degenerative disc disease, however I'll be focusing on the under 25yo age group. Paediatric scoliosis can be broadly classified into age at presentation/ onset, and/or likely cause, but the reality is most are unknown/ idiopathic. Early onset scoliosis (EOS) is that which is diagnosed in those less than 10 years of age, whereas Adolescent onset is those 10 years and older. Identifiable causes include congenital, syndromal or neuromuscular, with the remaining all bundled together under the idiopathic umbrella.

EOS: is a potentially aggressive and life threatening form of scoliosis. The real concern is the effect of a significant curve upon chest wall anatomy, with the resultant effect of a severe restrictive lung disease and potential cor pulmonale. In the early stages a combination of casting and/ or long-term bracing is utilised. Some of the infantile idiopathic forms may even regress with this treatment. The aim is to defer any surgery as long as possible, because of the technical and implant issues with operating on these small patients. Hence, surgery is growth friendly with either traditional growing rods (TGR) or the more novel magnetically driven growing rods (MAGEC). The aim is to defer definitive surgery until growth is maximised, with a T1-T12 height of 22cm ideally. Long-term studies demonstrate that this seems to be protective of significant cardiorespiratory decline from. 'Graduation surgery' is conversion from growing rods to definitive posterior instrumented spinal fusion.

Congenital scoliosis: implies scoliosis associated with a congenital vertebral anomaly. The spinal elements are formed early in utero, and mature over a period of weeks. Spinal development starts by day 16, and progresses with neural folding and segmentation (weeks 4-8) and further maturation. Broadly speaking, there are failures of formation or segmentation/ mixed, although up to 11% can be unclassifiable. There can be absence of anterior or posterior elements (spina bifida); or presence of hemivertebrae/ block vertebrae; or multiple congenital anomalies associated with a known genetic defect/ syndrome. The most significant impact on a child's quality of life can be the associated pathology, as any midline structure may also have been affected at the same time. Neurological abnormalities are present in 18-40%, which is why an MRI of the entire spinal column is mandated at some time point. The acronym VACTERL is useful for remembering associated organ anomalies; Vertebral, Anal, Cardiac, Tracheo Esophageal, Renal and Limb. Renal and genitourinary anomalies are present in 40%, and early screening with USS is recommended. Deformity can be predominantly coronal or sagittal/ mixed, and decision making about intervention depends upon the observed rate of progression. Certain patterns of anomalies have high annual rates of progression i.e. 6 degrees pa for those hemivertebrae with two active growth plates above and a contralateral tether. Treatment depends on spinal balance overall, and is as per EOS, however consideration for early limited excision and surgery in isolated congenital anomalies may be of benefit.

Syndromal scoliosis: occurs in association with any known syndrome or dysplasia. Often there is ligamentous laxity as a component, for example with Ehlers-Danlos or Marfan's Syndromes. There may be a predisposition to certain patterns, for example kyphoscoliosis in Marfan's. Neurofibromatosis may present with a short, sharp, dystrophic curve, or the pattern more commonly seen in Adolescent idiopathic scoliosis (AIS). The difficulty for these connective tissue disorders is the associated dural ectasia, which can make operative correction fraught with technical difficulties. The lysosomal storage disorders, including muccopolysaccharidoses, may present very early with a thoracolumbar gibbus (acute forward bend) that may be refractory to casting and bracing. Additionally, these dystrophic or kyphotic curves have higher rates of neurological compromise both preoperatively and perioperatively.

Neuromuscular scoliosis: occurs because of poor voluntary muscle control, muscle weakness, and tone issues in centrally mediated pathology. Spinal muscular atrophy (SMA) is a common cause of progressive infantile scoliosis, whereas cerebral palsy (CP) is the commonest cause in adolescence and early adulthood. Other potential pathologies include Duchenne's Muscular Dystrophy, Friederich's ataxia, and other neuraxial associations including syrinx formation. The principles of treatment are as per EOS in the young. A neuromuscular curve tends to be a long C-shaped curve, often in thoracolumbar region, with involvement of the pelvis. It can drive pelvic obliquity and lead to progressive hip subluxation (20%) and vice versa, however most of the time there is rapid progression of the scoliosis with hip dislocation concurrently (>40%). Treatment is aimed at maintaining seating balance, with asymmetric wheelchair supports of benefit whilst the curve is flexible. Surgery is indicated with large curves, inability to maintain seating balance, and presence of painful costopelvic impingement. Surgery is high risk in these fragile patients, and each patient requires comprehensive multi-disciplinary evaluation to maximise nutrition/ gastric emptying, min aspiration/ max lung function, and minimise other potential infectious contaminants. The traditional approach was an extensive multi-level fusion from the upper thoracic spine to the pelvis, with prolonged operative time and bleeding risk. SCH are currently evaluating a promising French technology that spans these spinal segments, looking at an internal instrumented construct without fusion. The benefits include shorter operative time, decreased perioperative complications and bleeding, and the potential to perform further procedures 6-12 months later to progressively correct the spine.

AIS: is the common curve occurring in the population, usually just prior to the onset of their adolescent growth spurt. Whilst a significant component is likely genetic, there is variability in penetrance and phenotype. Classic patterns include the R-thoracic, the L-lumbar and the balanced S-shaped curves, but others do exist. Most occur in females. Red flags include abnormal curve patterns, kyphosis, males, significant pain, neurological signs, large curves at presentation or curves that are rapidly progressing. 95% of these patients will be managed non-operatively, and observed with growth. Weinstein performed the original natural history data that determined the surgical cohort, in addition to the recent BrAIST trial that confirmed the efficacy of bracing through growth. These are the only two treatment options with evidence that demonstrate efficacy. Exercise and core strengthening are important to help with the postural component, and ensure the patient is able to care for their spine long-term, but won't change the progressive bony deformity that continues with growth. Whilst the aims of surgery are corrective and cosmetic, the rationale for surgery is to prevent significant progression as an adult. The benefits of operating in a fit adolescent with a flexible curve are self-evident; and include a better outcome, fusion of fewer levels, and more rapid recovery. The cost is stiffening/ fusing those levels operated on. Vertebral body tethering (VBT) is fashionable currently, and is promising, but remains experimental and unpredictable. The real benefit may be that of growth modulation and correction of the curve, in those adolescents whose curves are too large to brace.

NOTES:

CASTLEREAGH IMAGING

EOS Weight Bearing Spinal and Lower Extremity Imaging Now Available at Castlereagh Imaging Westmead and St Leonards

THE FIRST 3D FULL BODY IMAGING TECHNOLOGY WITH LOW RADIATION

+ EOS provides high quality images with either a **low radiation dose** – Up to 9 times less than conventional CR systems or **micro dose technique** – up to 45 times less the conventional CR.
+ EOS can image the entire spine and lower extremities in less than 20 seconds, reducing the total procedure time to less than 4 minutes, without compromising image quality.
+ The Micro Dose feature can be used to monitor spine and lower limb disease progression in paediatric patients, particularly for pathologies which require frequent monitoring such as scoliosis.

At Castlereagh Imaging the benefits speak for themselves.

+ Friendly and caring multilingual staff
+ Open 7 days a week
+ Short waiting times
+ Urgent fit-ins accommodated
+ Free onsite parking
+ Same day reporting
+ Comfortable and contemporary setting
+ State-of-the-art technology and equipment
+ 3T MRI with full Medicare eligibility

Client services
1300 669 727

Find a location close to you: **www.casimaging.com.au**
clientservices@casimaging.com.au

Dr Doron Sher
M.B., B.S. (NSW), M.Biomed.E., F.R.A.C.S. (Ortho.)
Knee, Elbow, Shoulder Surgery

ORTHOSPORTS

Updates on ACL reconstruction

The Anterior Cruciate Ligament has a poor capacity to heal and therefore the treatment for an ACL injury in an athletic patient is an ACL reconstruction with autograft tissue. While this started off being the patella tendon it then moved to the hamstring tendons and other tissue such as the quadriceps tendon and allografts are also routinely used these days.

Primary Repair
There has been a recent resurgence in interest in primarily repairing the ACL. Improvements in imaging now allow for identification of tear location, with femoral-sided injuries, being more suitable for repair. Primary repair, if successful, could theoretically lead to a significant improvement in the treatment of ACL injuries in the athlete. There may be retention of proprioception and perhaps the native kinematics of the graft. We don't know if the graft stretches or is damaged in some way before it is avulsed from the femur so these theoretical advantages may not actually be present in a real life scenario. Even the most recent studies have shown much higher re-rupture rates in these patients. Historically these have not been very successful.

Biologically Enhanced Repair
Engineered collagens combined with platelets can work in very specific circumstances but are never going to be suitable for all types of tears.
PRP without a collagen scaffold offers no benefit.
Bone marrow derived stem cells (not what we have in Australia) when combined with other factors have shown some promise in animal models (but not yet in humans). There is no evidence for the use of fat derived stem cells that I am aware of.

Graft Choice

Quadriceps tendon
In recent times there has been great enthusiasm to use the quadriceps tendon for ACL reconstruction. Donor site morbidity seems less than both hamstring tendon harvest and middle third patella tendon harvest. The graft size and shape mimic the native ACL and the equipment to facilitate graft harvest has improved where the graft can be reliably harvested. Fixation can be achieved using either bone or soft tissue methods. The new kid on the block was looking very promising and is good to use from the perspective of the surgeon.

Unfortunately, the results from the Danish ACL registry show a significantly higher (more than double) re-rupture rate of Quadriceps grafts compared to other autografts. This tells us that we need to be very cautious switching away from traditional grafts and at this stage the quadriceps tendon should be studied more closely and not used universally for ACL reconstruction.

Allograft
As allograft tissue has become more available use of it has increased. Recovery is certainly faster when the knee is left intact. If an allograft is to be used it should be non irradiated but again the re-rupture rates are unacceptably high in young patients. This is a graft that should be reserved for older patients with lower functional demands or those with multi ligament injuries.

Synthetic
Synthetic grafts are being used in some countries like China but the rest of the world has gone away from using them inside the joint. They are a reasonable option in some circumstances when used extra-articularly but if they break down inside the joint they create synovitis and arthritis and I would never allow one to be used in my knee.

Dr Doron Sher
M.B., B.S. (NSW), M.Biomed.E., F.R.A.C.S. (Ortho.)
Knee, Elbow, Shoulder Surgery

ORTHOSPORTS

Hamstring and Patella Tendon
For most patients hamstring autografts remain the graft of choice with relatively low harvest site morbidity and good functional results. The morbidity from bone harvest using the middle third patella tendon can be massively reduced by bone grafting to the donor sites. This is something I have been doing for many years with great success and patients tend not to have anterior knee pain or trouble kneeling once the harvested bone is replaced.

Extra-capsular procedures
If there is damage to the meniscus or stretching of other secondary restraints such as the capsule then a stiffer graft such as the middle third patella tendon is probably the best choice. This will occasionally need to be combined with an extra articular procedure such as an anterolateral ligament reconstruction or tenodesis.
Certainly in revision cases this combination is probably the most reliable.

Rehabilitation
No universal timeline to return to running exists. It is unclear whether time-based and assessment-based criteria relate to safe RTR. These include range of motion, pain, dynamic knee control and hop tests.

Hamstring and quadriceps weakness continue up to 2 years and beyond surgery. It may in fact not be individual muscle strength that is a factor as much as a decreased hamstring to quadriceps ratio.

ACL reinjury rate has been shown to reduce by half for each month return to sport was delayed until 9 months after surgery, after which no further risk reduction was observed. Those less than 20 years old have a 6.3 times increased risk of re-rupture and 1/3 have a second injury, usually soon after their return to play.

Asymmetrical quadriceps strength at the time of RTS is associated with asymmetrical knee biomechanics during hopping, which in turn has been found to predict a second ACL injury.

Bracing
In some circumstances bracing may help protect the graft in the early post-operative period but there is no convincing data that it reduces the rate of re-injury with return to sport. There are studies showing increased thigh atrophy in the short term and long term weakness with long term use. On the other hand non-braced skiers were 2.7 times more likely to sustain knee injury than braced skiers.

Conclusion
Multiple factors combine to allow patients to successfully return to sport after an ACL reconstruction. This starts with pre-habilitation to prepare for the surgery and then appropriate graft choice and fixation method for that particular patient. Having completed the surgery they must then undergo a rigorous rehabilitation programme and just as importantly be psychologically ready to return to sport and risk re-injuring themselves. These are all areas currently undergoing active research to improve outcomes for our patients.

NOTES:

Dr Ivan Popoff
BPhEd (1986), MBChB (1991), F.R.A.C.S. (Ortho.)
Shoulder, Knee and Elbow Surgery

ORTHOSPORTS

A series of interactive shoulder cases

Case 1:

- 20 year old elite rugby player
- First time dislocation
- Reduced on field

- Immediately post reduction
  Poor elevation, weak rotator cuff

- At 6 weeks examination normal except for positive apprehension and relocation tests

Case 2:

- 75 year old woman
- Falls and dislocates shoulder
- Reduced in A & E
- X-Rays OK post reduction
- Reassured and referred back to LMO

- On examination (2/52 post fall)
- Poor active elevation
- Passive ROM intact but painful
- External rotation 3/5

NOTES:

Dr Ivan Popoff
BPhEd (1986), MBChB (1991), F.R.A.C.S. (Ortho.)
Shoulder, Knee and Elbow Surgery

ORTHOSPORTS

Case Three:

- 75 year old woman
- Falls and dislocates shoulder
- Reduced in A & E
- X-Rays OK post reduction
- Reassured and referred back to LMO

- On examination (8/12 post fall)
- Poor active elevation
- Passive ROM intact but painful
- External rotation 3/5

NOTES:

Dr Jerome Goldberg
M.B., B.S., F.R.A.C.S., F.A. Ortho. A.
Shoulder Surgery

ORTHOSPORTS

A series of interactive shoulder cases

Case 1:

History:

- 50 yr old female
- Dominant arm
- 3 month history of
  – Pain with movement
  – Discomfort at night
  – Progressive loss of ROM
- No trauma
- No significant medical history

Examination:

- Tender shoulder
- 90/90/10/S
- Normal power
- + impingement
- Normal neck

NOTES:

Case 2:

History:

- 45 yr old male
- Dominant arm
- Fall onto outstetched arm 2 weeks ago
- Significant pain with elevation
- Severe night pain

Examination:

- Tender shoulder
- Mild bruising
- Ruptured lhb
- 90/160/45/S
- Positive Impingement sign
- Negative apprehension sign
- Loss of ER power

NOTES:

Dr John P Best
B Med, Dip Sports Med (London), FACSP, FFSEM
Sport & Exercise Medicine Physician

ORTHOSPORTS

A Series of Interactive Shoulder & Elbow cases

Case 1: Primary Multi-Directional Shoulder Instability in the Adolescent

Case History: 15-year-old State level swimmer presents with 3 months of bilateral shoulder pain. She competes in freestyle, butterfly and breaststroke. Breaststroke is comfortable. The pain worsened following an intensive training camp and she has suffered night pain for the last 6 weeks. Her ability to train has reduced.

No improvement after one week of rest but over the counter oral anti-inflammatory medications have helped. She has seen two physiotherapists and has been non-compliant with her exercises. The National titles are in 6 weeks and she is hoping a 'cortisone injection' could be arranged as it helped one of her friends.

There is a family history of joint instability (her mother suffered a non-contact patellar dislocation). She, her family and coach are all unhappy with this situation which is evident in the consultation.

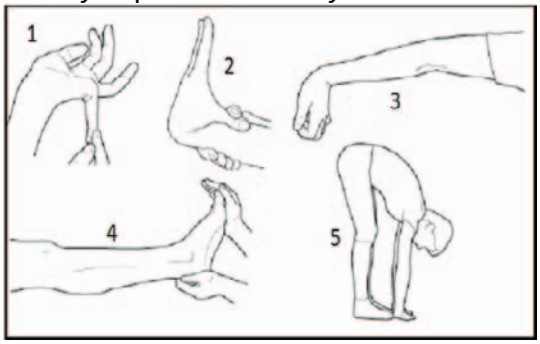
The examination features include poor posture with cervical protraction, anterior humeral head translation and scapular dyskinesis. You calculate a Beighton score of 4/9. There are bilaterally positive sulcus signs with equivocal right anterior glenohumeral instability signs. There are mildly positive impingement signs. Her rotator cuff power is normal as is her neurological examination.

Presentation overview: Multidirectional shoulder instability (MDI) in the adolescent is frequently under diagnosed. Shoulder instability often develops post injury (traumatic) or may be present as a primary condition (atraumatic). The prevalence of generalised hyperlaxity is 5 to 15%. It is more prevalent in females and more frequent in certain sports (swimming, gymnastics, dance). Hyperlaxity and true hypermobility (see below) may exist without instability. MDI of the shoulder is defined as symptomatic instability in two or more directions.

MDI of the shoulder may present in a variety of ways – shoulder impingement with repeated use (eg swimming, overhead sports); instability episodes with little or no external trauma; a lack of power particularly in overhead positions; persistent pain after heavy lifting; a feeling that the shoulder is 'unreliable' and episodic paraesthesia due to brachial plexus irritation.

Hypermobility of the shoulder is associated with an increased risk of injury. Shoulder examination should include active and passive ROM, rotator strength through range, and tests for laxity and instability. These include the 'sulcus sign' where the inferior humeral head translation of greater than 2cm suggests the presence of laxity. Apprehension, relocation and labral tests are all essential. Neurological examination is required.

The finding of laxity and subsequent MDI may be an associated feature of a more complex hypermobility disorder affecting connective (collagen) tissue (e.g. Marfan's syndrome, Ehler's Danlos and benign hypermobility syndrome). This is very important to clarify as there are potentially serious associated conditions with these including cardiac disorders (aortic root or aortic valve disease), eye disorders (lens dysplasia) or other musculoskeletal disorders associated with joint instability and tendinopathy. On this basis a Beighton score should be completed. A maximum score of 9 is possible. A score of 4 out of 9 suggests hypermobility. Referral for further assessment may be required.



In patients with pain an x-ray series is required. Other imaging to assess anatomical pathology or anatomical variations (MRI, CT scan) may be added, particularly when surgery is considered.

Non-operative treatment is invariably the first line of management. 90% of patients who follow a 6 month supervised program enjoy pain relief and improved function. If unsuccessful, surgical results and techniques are available but results vary. Overall, 80% of patients achieve a good outcome for a minimum 5-10 years with revision surgery frequently required.

The rehabilitation is long and tedious with little subjective change noted for several weeks. Careful supervision to maximize GHJt control and scapular positioning is foundational. The management of sports interests is critical with a need to avoid collision sports and activities with repeated overhead movements especially in the ABER position.

References:
1. For a good technical demonstration of theThe Beighton Score go to https://youtu.be/ZwWts_P-Xws
2. American College of Rheumatology www.ACRPatientInfo.org
3. Generalized joint laxity and multidirectional instability of the shoulder. Saccomanno et al., *Joints. 2013 Oct-Dec:1(4);171-179*

NOTES:

Case 2: Lateral Epicondylar Pain of the Elbow

Case history: 55-year-old right arm dominant male, presents left lateral elbow pain. It developed insidiously over 3 months. A keen golfer and enjoyed more regular weights training. These both increased in the 2 months prior to his pain commencing. There has been occasional night pain and consistent elbow stiffness when waking. Golf is now painful as are gripping movements.

He is an ex-smoker and is treated for hypertension. He has a golf holiday booked in 6 months, which involves playing a full week, one round per day.

On examination he lacks 3 degrees of active left elbow extension with full but uncomfortable passive range (Mills test). He is exquisitely tender over the lateral epicondyle with vague tenderness over the extensor muscle compartment. Mid and outer range resistance testing reprocess his pain, particularly with middle finger extension (Maudley's test) and wrist extension.

You note weakness of left shoulder external rotation compared with the right with positive left upper limb neural tension tests. Cervical motion and neurological examination is otherwise normal.

Dr John P Best
B Med, Dip Sports Med (London), FACSP, FFSEM
Sport & Exercise Medicine Physician

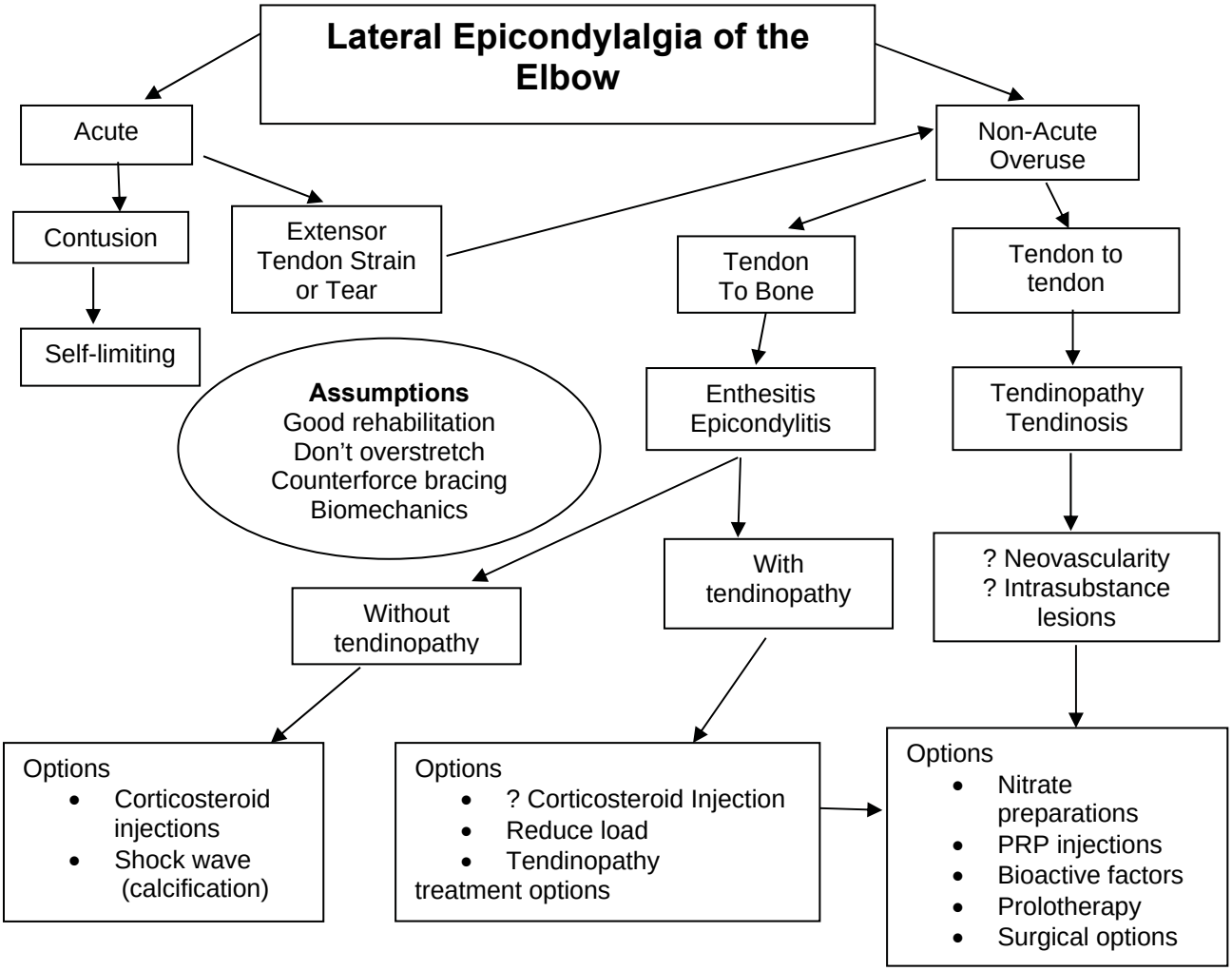
ORTHOSPORTS

Presentation overview: The results of non-operative and operative treatments for lateral epicondylalgia are inconsistent.

Deciding on the appropriate treatment pathway is dependent on both the causation and nature of the pathology. Epicondylosis / tendinopathy usually requires months to fully recover invariably with non-operative treatment.

The differential diagnosis includes: postero-lateral elbow impingement; osteoarthritis; posterior interosseous nerve entrapment and referred / neural pain.

The paradigm below will be outlined during the presentation.



Recommended reading:

1. Non-surgical treatment of lateral epicondylitis: a systematic review of RCTs. Sims et al; *Hand 2014; 9; 419-446*
2. Tennis Elbow. Keijsers et al; *Shoulder and Elbow September 18,1-9,2018*

NOTES:

ORTHOSPORTS

THANK YOU FOR JOINING US TODAY

Remember - We would love your feedback
Tell us what you liked about the day and what you think we could improve for next year.

Please go directly to the link address below to complete a **5 minute survey**

https://www.surveymonkey.com/r/2019OrthoUpdate

www.orthosports.com.au

CERTIFICATE OF ATTENDANCE

Should you wish to receive a **certificate of attendance** please complete the survey first.
You will then be given a unique code to email to education@orthosports.com.au

Thank you,
The Team at Orthosports

ORTHOSPORTS

Thank you to our 2019 Sponsors

DJO®

POWERING MOTION™

CASTLEREAGH IMAGING

ORTHOSPORTS

Concord	47-49 Burwood Road CONCORD NSW 2137	Tel Fax	**02 9744 2666** **02 9744 3706**	**Doctors Consulting here** Dr Todd Gothelf Dr Paul Mason Dr John Negrine Dr Rodney Pattinson Dr Doron Sher Dr Kwan Yeoh
Hurstville	Level 7 Waratah Private 29-31 Dora Street HURSTVILLE NSW 2220	Tel Fax	**02 9580 6066** **02 9580 0890**	**Doctors Consulting here** Dr Paul Annett Dr Jerome Goldberg Dr Todd Gothelf Dr Andreas Loefler Dr John Negrine Dr Rodney Pattinson Dr Ivan Popoff Dr Allen Turnbull Dr Kwan Yeoh
Penrith	Suite 5B 119-121 Lethbridge St PENRITH NSW 2750	Tel Fax	**4721 7799** **4721 7997**	**Doctors Consulting here** Dr Todd Gothelf Dr Kwan Yeoh
Randwick	160 Belmore Road RANDWICK NSW 2031	Tel Fax	**02 9399 5333** **02 9398 8673**	**Doctors Consulting here** Dr John Best Dr Jerome Goldberg Dr Todd Gothelf Dr Andreas Loefler Dr Paul Mason Dr John Negrine Dr Rodney Pattinson Dr Ivan Popoff Dr Doron Sher

www.orthosports.com.au

47-49 Burwood Rd
CONCORD NSW 2137
Tel: 02 9744 2666
Fax: 02 9744 3706

Lvl 7, 29-31 Dora Street
HURSTVILLE NSW 2220
Tel: 02 9580 6066
Fax: 02 9580 0890

119-121 Lethbridge St
PENRITH NSW 2750
Tel: 02 4721 7799
Fax: 02 4721 7997

160 Belmore Rd
RANDWICK NSW 2031
Tel: 02 9399 5333
Fax: 02 9398 8673