

2024

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Orthopaedic & Sports Medicine Service



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Time	Event	Who
07:30 – 08:00	Arrival / Refreshments	
08:00	Welcome Message	Dr Doron Sher
	Management of hip arthritis in young people	Dr Chris Spelman
	Back pain, leg pain, surgery and psychology	Dr Andreas Loeffler
	Bilateral total knee replacement	Dr Ivan Popoff
09:10	Panel Discussion	
	Hypermobility in young adults: Clinical and Management Considerations	Dr John Best
	Cortisone injections; how, when and why	Dr Paul Mason
	Capsulitis	Dr Paul Annett
10.25	Panel Discussion	
10.40-11.15	Morning Tea	
	Physio question and sponsor	
	Ligament injuries of the thumb and fingers	Dr Kwan Yeoh
	Update on ACL reconstruction	Dr Doron Sher
	Shoulder Instability – the remplissage	Dr Todd Gothelf
	Meniscal Pathology	Dr Michael Goldberg
12.45	Panel Discussion & Close	

Management of Hip Arthritis in Young People

Hip arthritis in young individuals is less common than in older populations, but when present, it poses unique challenges. Patients have high expectations from both non-surgical and surgical management and these need to be managed from the first consultation. The management of hip arthritis in young people includes both non-surgical and surgical approaches, which are often dictated by the severity of the condition, patient activity level, and lifestyle goals.

Non-Surgical Management

Physiotherapy and exercise programs

- Focus strength training to improve core and hip muscle strength
- Range of motion exercises should be limited to maintaining rather than extended range, as pushing an arthritic joint beyond its end range will result in pain and inflammation
- Low impact activities (cycling, swimming, rowing) are preferable to running and HIIT style programs
- Systematic reviews have shown that exercise programs tailored to hip arthritis can improve functional outcomes (Moseng et al., 2020).

Weight Management

- Reducing body weight can significantly decrease load on the hip joint, reducing symptoms of arthritis.
- Strong evidence supports the correlation between weight reduction and symptomatic improvement (Blagojevic et al., 2010).

Surgical Management

When conservative management fails, surgical options may be considered. The choice of procedure depends on factors such as the degree of joint damage, the patient's age, and their activity level.

Hip arthroscopy

- Minimally invasive technique for debridement of CAM lesions, focal cartilage defects, labral repair, or rarely for synovectomy (for specific indications).
- Often used for patients with mechanical symptoms or focal labral tears.
- Systematic reviews show good outcomes in early-stage arthritis, but effectiveness declines in advanced stages (Sing et al., 2021).

Osteotomies

- Periacetabular Osteotomy (PAO): Realigns the acetabulum to improve joint congruity, commonly used in patients with dysplasia or impingement due to acetabular retroversion.
 - o Can delay the need for hip replacement in young adults by 20-30 years.
 - o **Only effective in early stage arthritis and in patients under 35**
- Femoral Osteotomy: Reorients the femoral head to improve joint biomechanics, used in cases of femoral head deformities or to offload focal chondral lesions.

Dr Christopher Spelman

M.B.B.S., MSpMd, F.R.A.C.S. (Ortho.)

Hip, Knee and Paediatric Orthopaedic Surgery



Hip Resurfacing Arthroplasty

- Typically used in younger, more active patients who want to continue running and impact sports.
- Systematic reviews suggest lower dislocation rates compared to THA but note higher rates of femoral neck fractures and metal ion release (Treacy et al., 2018).
- According to the Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR), hip resurfacing is less common but shows lower revision rates in carefully selected patients under 55 years old.
- Metal on metal bearing surface necessitates life long metal ion testing and serial ultrasounds.
- New ceramic on ceramic resurfacing may solve this issue and reduce the revision rate long term

Total Hip Replacement

- Indicated in end-stage arthritis with failure of conservative treatments.
- Excellent results even in young people with improvement in pain and function.
- Cannot run on a THR or participate in high impact sports
- Improved prosthetic designs and materials (ceramic-on-ceramic, ceramic-on-polyethylene) have reduced wear and improved longevity, especially in young patients. Current cumulative revision rate is 8.1% at 20 years
- Systematic reviews indicate that cementless fixation is preferred in younger patients due to lower revision rates (Huo et al., 2021).

Total Hip Replacement Surgical Approaches

- As long as the surgery is done by an experienced surgeon using tried and tested implants the functional outcomes at 6 months are identical for all approaches.
- Direct Anterior Approach (DAA) - Now accounting for up to 30% of all THR
 - o Long learning curve for new surgeons
 - o Not suitable for cases of severe deformity, extremes of body habitus, (most) revision surgeries
 - o Reduced dislocation rate, increased periprosthetic fracture rate
 - o Lowest revision rate based on 8 years data from AOANJRR, but higher rate of major revision surgery
- Posterior approach and Lateral approach
 - o Posterior is the most commonly used approach for THR
 - o Both be used for all cases including complex revisions, severely abnormal anatomy
 - o Slower early recovery than DAA
 - o Increased dislocation rate in posterior approach
 - o Lateral approach rehab more challenging with higher instance of abductor dysfunction

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NOTES:

Back pain, Leg pain, Psychology & Surgery

Worldwide back pain is a leading cause of disability and of presentation to doctors and physiotherapists. The social and economic impact is enormous in terms of lost productivity, cost of medical care, investigations, medications, and as a cause for anxiety and depression. Risk factors for back pain include obesity, smoking, age, and activities including repetitive movements and lifting heavy loads.

Some back pain precedes and results in leg pain or sciatica, with a lifetime incidence of between 13-40%. Most cases of sciatica resolve, but some become intractable and chronic with major socioeconomic implications. Sciatica also gives rise to fear and occasional catastrophising.

The most common cause of sciatic neuralgia or radicular symptoms is a prolapsed lumbar disc. Pain is perceived as arising in a limb caused by ectopic activation of nociceptive fibres in a nerve root or ganglion. Sciatica as a condition was already known to the ancient Greeks, a condition which usually improved within 40 days, but it was as late as 1934 when Mixter and Barr first described that pain was caused by a prolapsed disc.

The pathophysiology of radicular pain is complex. Pressure itself causes numbness and weakness, but inflammation causes pain. After an acute incident causing back pain, there is often a delay of several days before patients experience leg pain and that in turn may become much more severe than their back pain.

Risk factors for radicular symptoms are age, probably some genetic predisposition, perhaps smoking, and occupations involving bending, lifting and twisting, as well as working with hands above the shoulders. Interestingly body mass is not a risk factor for radiculopathies. Apart for the mechanical causes of inflammation there are irritants within the disc, such as Phospholipase A2, which are particularly irritating to the nerve root. There are also immune modulators or cytokines, especially TNF Alpha, which can promote inflammation.

Most patients with acute radicular symptoms respond to a short period of rest, simple analgesia, and gradual mobilisation. Anti-inflammatory medications and steroid injections help with pain. Most disc lesions shrink and some completely disappear within several months. Only a small number have persistent pain which is severe enough to warrant surgery. Occasionally there is progressive weakness, which may also necessitate an operation.

Spinal claudication also causes leg pains, usually when walking and standing. It is positional as the volume of each segment in the spinal canal decreases with expansion. Tough structures, such as hypertrophied facet joints and thickened ligamentum flavum squeeze the dural sack and the nerve roots within, causing numbness and fatigue in the legs, prompting the patient to bend forward or to sit. In this case direct pressure on the nerve roots interrupts the microvascular blood supply resulting in dysfunction.

When assessing patients, we must be aware of other more serious conditions causing back or leg pain. We must remember to check for Red Flags, which include a history of cancer, unexplained weight loss, fevers or recent infection, immunosuppression, severe night pain, dysfunction of bladder and bowel, or more generalised neurological deficits.

Dr Andreas Loeffler

B.S.C., M.B., B.S., F.R.A.C.S. (Ortho.)

Joint Replacement & Spine Surgery



When assessing patients, we must also remember their psychological state. Whilst physiotherapists and doctors have a good understanding of anatomy and of the relevant nerves involved, most patients are under the impression that their spinal chord extends to the sacrum and there is often fear of paraplegia. Equally so the inability to function or work has serious implications for many, who are already struggling with life. A simple explanation and reassurance can work wonders.

As physiotherapists you are healers and also hypnotherapists. Hypnosis in general terms is a method of inducing relaxation to treat mainly psychological and emotional states, which can of course result from trauma and pain. By simply reassuring a patient and saying You Will Be Alright, we can break down fear and start or accelerate recovery. Reassurance means a lot to our patients, especially to those prone to catastrophising.

Who needs investigations? Most patients with acute radiculopathies will improve. Most patients do not need urgent investigations. At the same time many patients demand to have scans to prove a diagnosis. Dr Google does not help either and we have to balance the costs with the potential reassuring power of scans. X-rays are good for deformity, fracture and dynamic instability, but have a poor yield for back or leg pain. CT scans are good for bony pathology, like fractures or calcified discs. They can show a disc prolapse or canal stenosis, but the gold standard is the MRI. An MRI has several sequences, T1, T2, fat suppression, Gadolinium enhanced, and several others. MRI is particularly good at identifying soft tissue lesions and is the preferred investigation for lumbar pathology, but it is expensive.

Cauda equina is one of the rare surgical emergencies. Cauda equina is due to severe compression of nerve roots in the lumbar spine resulting in pain, perineal numbness, loss of bladder and bowel function, as well as variable weakness in the legs. Cauda equina can be caused by a large disc prolapse, by spinal tumours or infection, by fractures and bleeds, and by complications from surgery. Cauda equina needs urgent referral for investigations and treatment. Patients with so called Red Flags need to be referred for investigations. Patients with intractable pain, progressive neurological symptoms, such as progressive weakness, also warrant speedy investigations. On the other hand many patients who improve may not need scans at all.

Who needs surgery? One of the few surgical emergencies is Cauda equina syndrome. Whilst surgeons argue whether immediate surgery or surgery within say 24 hours is required, there is no room for delays. For most other patients with acute sciatica one should wait 4 to 6 weeks before considering surgery. Some patients will benefit from corticosteroids, either orally or injected under CT guidance, but the success of steroids is variable. It may be a temporising method. When pain and disability persist, surgery should be explored as an option. Economic factors, such as the inability to work are also relative indications for surgery.

Patients with spinal claudication usually have a gradual deterioration. As their symptoms are usually associated with standing and walking, the walking distance can act like reasonable measure of severity. When the so called claudication distance becomes too short, patients often decide to have surgery. The indications will have to be weighed up against co-morbidities, which are common in the elderly.

Dr Andreas Loeffler

B.S.C., M.B., B.S., F.R.A.C.S. (Ortho.)

Joint Replacement & Spine Surgery



What evidence do we have for surgery? Although sciatica is very common, we have very few randomised prospective studies to guide us as to who benefits from surgery. The first large trial came from Sweden and won the Volvo Award in 1981. In that study 281 patients with leg pain of more than 6 weeks duration were randomised to have surgery or non-operative treatments. At one year the surgical group did somewhat better, but the difference was not so marked at 4 years. In a more recent study, the SPORT or Spine Patient Outcome Research Trial, 501 patients were randomised to have open discectomy or non-operative treatment. Measured outcomes were pain and function, severity of pain and return to work. At 2 years both groups reported substantial improvements. The problem with both trials is that there was a significant number of patients who crossed over. In the SPORT study only 50% of patients who were assigned to surgery actually had their operation within 3 months, whilst 30% of those assigned to the non-operative arm of the study opted to have surgery. In an as-treated analysis those who had surgery did better and also recovered quicker. Obese patients had less benefits from either operative or non-operative treatments.

What type of operation should be offered? Whilst a small open discectomy is still the gold standard, endoscopic discectomy and endoscopic decompression of the spinal canal is becoming more popular. However, to date there are only few studies comparing the outcomes, costs and complications of open versus endoscopic surgery. Most published papers have poor numbers. One retrospective study tries to compare 38,000 open with 175 endoscopic surgeries. Another study for Sydney talks about the learning curve, as the first 10 cases took an average of 3 hours, compared to less than 1 hour for an open case. Very few studies compare the costs of equipment, theatre time, hospitalisation, or return to work.

The Australian Spine Registry is a new initiative by the Spine Society of Australia. The registry is still new, but we hope to capture demographic data, treatments and outcomes of spinal conditions and treatments. Approximately 45,000 patients have spinal surgery per year. In 2002 the registry reported data on the first 3,733 participant patients. Whilst this number is only a small fraction of all patients having surgery, the number is considerably bigger than most trials have achieved. The registry report is publicly available and may well become of interest to you.

What do I do? I have done well over 2500 open discectomies and will continue to offer patients a small, safe and relatively quick operation with predictable outcomes. Equally so I believe that a thorough decompression of spinal stenosis is best done open, as that is the only way to clear the lateral recesses where the lumbar roots pass into their exit foramina. There are some cases, such as far lateral disc lesions, where endoscopic procedures may have an advantage, but endoscopic devices and techniques need to be shown to be better, safer, and cost effective before we can recommend them to our patients.

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NOTES:

Dr Ivan Popoff

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



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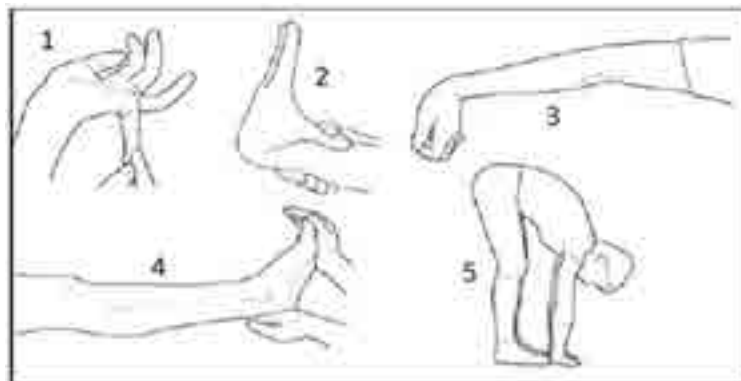
Hypermobility in Young Adults: Clinical and Management Considerations

1. What is hypermobility?

Hypermobility is a syndrome of varied severity, where an individual's soft tissues, due to the patient's genetic profile of their collagen fibres, are excessively lax. This should be differentiated from isolated joint laxity although most patients with hypermobility display laxity of their major joints and some smaller joints. They may present with episodes of joint instability (subluxation or dislocation).

The prevalence of generalised hyperlaxity is 5 to 15%. It is more prevalent in females, certain ethnic groups and more frequent in certain sports (swimming, gymnastics, dance). Hyperlaxity and true hypermobility may exist without instability.

The Beighton score remains key in our clinical assessment. This is a physical examination with a total possible score out of nine (9) points. A positive Beighton score is any score greater than or equal to 5/9 points in adults, 6/9 points in children (pre-pubertal), and 4/9 points in adults over age 50.



Early detection allows us to give patients good clinical advice regarding further assessment, physical activity and allows them to be healthy and avoid injury risk.

2. What other features are important to identify?

The finding of hypermobility and subsequent instability may be an associated feature of a more complex disorder affecting connective (collagen) tissue (e.g. Marfan syndrome, Ehlers Danlos Syndrome - EDS). This is important to clarify as potentially serious associated conditions may co-exist. This includes cardiac disorders (aortic root or aortic valve disease), eye disorders (lens dysplasia) or other musculoskeletal disorders associated with joint instability and tendinopathy. The autonomic nervous system may be affected with symptoms of fatigue, tachycardia (which may include POTS – postural orthostatic tachycardia syndrome), blood pressure variations and heat intolerance. Referral to appropriate specialists for diagnostic clarification and medical screening is essential.

Dr John P Best

*B Med, Dip Sports Med (London), FACSP, FFSEM
Sport & Exercise Medicine Physician*



With these factors in mind we should extend our history taking and ask patients:

- Do you have family members who have dislocated joints?
- Do you have family members who have been told that they are 'double-jointed'?
- Are there hypermobility conditions in your family with names such as Marfan syndrome or Ehlers-Danlos syndrome?

Over the last decade studies have also identified that hypermobility may be associated with some neurodivergent syndromes. Attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) have been studied with reports that the prevalence of hypermobility is around 50%, almost five times the general population. In addition mental health conditions, such as anxiety or depression, may coexist as a secondary phenomenon. Considering all of these factors will allow us to understand our patients and tailor our treatments for them compliance, learning and concentration may vary, as well as suitability for sport and exercise.

3. What are some management considerations with sport and exercise?

Young adults who display large joint hypermobility, such as the glenohumeral joint, the elbow joint, the patellofemoral joint or extreme range of motion in the hip joint, are not suitable for collision sports. The risk of dislocation of these joints is high, ongoing instability is common and surgical results are less successful. In this clinical setting there is an increased risk of joint degeneration and secondary failure of soft tissues. For example, repeated glenohumeral instability may also lead to rotator cuff failure separate to any glenohumeral joint degeneration. Recurrent patellofemoral joint instability may also lead to chronic patella tendon pathology, generally upper patella tendinopathy, which is often difficult to manage.

When recommending sports and exercise regimes isometric training programs with low impact and excellent technique are far more suitable for these patients. During the Covid period, many patients commenced home-based exercise programs, such as HIIT, forms of yoga and circuit training. These often included repetition end-of-range weight-bearing positions, causing repeated trauma and pathology. Isolating joints and loading them in positions of end range will tend to cause pain, and tendon failure. Examples include wide push ups, 'dips' and the "preacher curl". The latter may lead to distal, biceps, tendinopathy, and posterior elbow joint impingement. Once a patient develops this, it is far more difficult to manage them - injury prevention is a better option in this setting.

As we look at muscle development and strength gains, combined functional movements using isometric techniques are more desirable. This may include Pilates type programs (commencing at low entry levels). As the patient graduates and improves they may use the Reformer. Resistance equipment, such as TRX training is a helpful tool as they progress.

References:

1. Note: there are actually 28 different types of collagen. Type I is the most common found in skin, bone, teeth, tendons, ligaments and organs.
2. For a good technical demonstration of the The Beighton Score go to https://youtu.be/ZwWts_P-Xws
3. American College of Rheumatology www.ACRPatientInfo.org
4. Go to *The Ehlers Danlos Society* website <https://www.ehlers-danlos.com/what-is-eds/>
5. *Association between adult attention-deficit hyperactivity disorder and generalised joint hypermobility: A cross-sectional case control comparison*". Glans M., et al, *Jnl Psych Res.*, Vol 143, Nov 2021, pp334-340

Dr Paul Mason

*FACSEP, M.B.B.S.(Hons), Bachelor Physiotherapy,
Master Occupational Health*



NOTES:

Adhesive Capsulitis

Introduction: Adhesive capsulitis or ‘frozen shoulder’ is a common and often disabling ailment. It is a condition of uncertain aetiology that is characterized by clinically significant restriction of active and passive shoulder motion that occurs in the absence of a known intrinsic shoulder disorder. It affects 2-5% of the population and is more common in women than men. The incidence peaks in the 5th and 6th decades. It may be bilateral in 10-20% of cases, but usually occurs sequentially.

Aetiology: As previously mentioned the cause of adhesive capsulitis is unknown. It is generally considered to be a self-limiting condition, with signs and symptoms resolving in 90% of patients over a 12-24 month period. Whilst autoimmune causes have been considered, there is a lack of aspects of these diseases, including systemic symptoms and positive serological markers. There is a clear association between adhesive capsulitis and diabetes, dyslipidaemia and thyroid disorders. Blood tests should always be organized to exclude these conditions. Likewise, Parkinson’s disease needs to be considered. Capsulitis may also occur after trauma and surgery, especially if there is upper limb immobilization.

Diagnosis: Historically adhesive capsulitis runs through 3 overlapping phases. The initial phase is the pain phase, which may last from 2-9 months. It generally has an insidious onset and is typically worse at night. As it progresses the pain may become constant and can be quite severe. As range of motion is maintained it may be difficult to distinguish from other painful conditions of the shoulder, such as impingement. The pain is worse with sudden and end of range movements and will often refer down the arm. The second phase is the freezing phase, which may last from 4-12 months. Pain may persist into this phase, although it may diminish. The loss on movement is capsular in nature, thus affecting all planes of motion, although rotation is generally more affected. The final phase is the thawing or resolution phase, which may last from between 5-24 months. In this phase pain slowly resolves and range of motion returns. Whilst most patients have a resolution of the stiffness, 40% may have some mild ongoing loss of motion and less than 10% have more clinically significant restriction.

Examination: Physical examination is essential to exclude other common causes of shoulder pain including impingement, instability or AC joint arthrosis. Clinically the loss of motion is capsular, and thus affecting all planes of motion. The most readily identifiable of these is loss of passive external rotation range. In capsulitis the loss of motion actively and passively is equivalent, whereas in impingement passive motion will be maintained even if active motion is restricted by pain. It may be difficult to distinguish the two conditions in phase one where there is pain but not yet loss of motion.

Investigation: The diagnosis of a frozen shoulder is typically a clinical one. All patients presenting with adhesive capsulitis require a plain X-Ray. This may identify glenohumeral osteoarthritis, an important mimic of a frozen shoulder, or AVN. It will also exclude nasty pathology such as a tumor. An ultrasound is unhelpful, and potentially confounds the diagnosis when it shows fluid in the sub-acromial bursa, which is a common incidental finding. MRI scanning is generally reserved for cases where the diagnosis is unclear or there has been a lack of response to appropriate treatment. The addition of intra-articular contrast may show capsular restriction.

Dr Paul Annett

M.B.,B.S,(Hons I) FACSP,

Sport & Exercise Medicine Physician



Treatment: The treatment of adhesive capsulitis is expectant as the majority of patients with this condition will improve. It is rarely a surgical condition unless the patient is unhappy to see out the natural history of the condition or there is persistent stiffness over an 18-month period. The cornerstones of treatment are pain relief and improving range of motion.

Pain relief may be achieved using paracetamol based medications regularly, possibly with the addition of codeine. Long acting opioids should be used sparingly. Anti-inflammatory preparations may also be helpful, after taking their side-effect profile into account. Oral corticosteroids may be used, and have been shown to have positive effects within the first 6 weeks. Their side-effect profile needs to be considered carefully.

Physiotherapy with a home exercise program will help to improve function in patients with capsulitis. Both range of motion and scapular and rotator cuff strengthening are essential.

Interventional treatment may involve performing an intra-articular cortisone injection alone or with the addition of normal saline, to create a hydrodistension effect. Cortisone provides a potent anti-inflammatory effect inside the joint whilst the addition of normal saline will theoretically stretch the restricted joint capsule. The literature suggests that cortisone injection plus hydrodistension will improve pain in the short term (6 weeks) and disability in the short to medium term (12 weeks). Similar effects may be obtained with an intra-articular cortisone injection on its own. Range of motion will be improved with the combination of intra-articular cortisone and post-injection physiotherapy.

Surgery is generally only required for prolonged stiffness and may include a manipulation under anaesthesia followed by an arthroscopic capsuloraphy.

Key Points:

- Frozen shoulder is an idiopathic condition
- It is generally considered to be self-limiting, although time frames may be prolonged
- There are 3 phases of the condition – ‘Freezing, frozen and thawing’
- Treatment is generally non-operative and aimed at analgesia and improving range of motion
- Interventional treatment may include intra-articular cortisone injections with or without the addition of a normal saline hydrodistension
- Surgery is only considered in recalcitrant cases

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Dr Kwan Yeoh

M.B., B.S. (Hons) (Syd), F.R.A.C.S. (Ortho)

Hand, Wrist, Upper Limb & General Orthopaedics



Ligament injuries of the thumb & fingers

THUMB MCP JOINT

ULNAR COLLATERAL LIGAMENT (SKIERS' THUMB)

- Abduction/radial deviation force
- Clinical examination with care
 - Beware of worsening the situation
 - Pay attention to proximal end tenderness & swelling
 - Degree of laxity
- Stener lesion
- Investigations:
 - X-ray
 - Ultrasound or MRI
- Treatments:
 - Immobilisation
 - Surgery:
 - Acute → repair
 - Chronic → reconstruction
 - (Arthrodesis)

RADIAL COLLATERAL LIGAMENT

- Ulnar deviation force
- Clinical examination
- Investigations:
 - X-ray
 - MRI
- Treatment:
 - Immobilisation
 - Surgery:
 - Almost all acute complete tears → repair
 - Chronic → reconstruction
 - (Arthrodesis)

THUMB CMC JOINT

- Usually following dislocation
 - More often discovered less acutely
- Investigations:
 - X-ray
 - MRI
 - CT – sometimes
- Treatments:
 - Immobilisation & mobilisation

Dr Kwan Yeoh

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Hand, Wrist, Upper Limb & General Orthopaedics



- Surgery:
 - Ligament reconstruction
 - Arthrodesis

FINGER (NON-THUMB) PIP JOINT

COLLATERAL LIGAMENTS

- Clinical examination
 - Degree of laxity
- Investigations:
 - X-ray – is usually all that is required
 - Watch for subtle signs of subluxation
 - (Ultrasound)
 - (MRI)
- Treatment:
 - Immobilisation & mobilisation
 - (Surgery – ligament reconstruction)

VOLAR PLATE

- Hyperextension or longitudinal compression force, or with dislocation
- Check for joint instability (ability to dislocate)
- Investigation:
 - X-ray – watch for subtle signs of subluxation
- Treatment:
 - Immobilisation, slight flexion
 - Surgery:
 - Indicated for acute irreducible dislocation
 - Indicated for chronic hyperextension (swan neck deformity)

FINGER (NON-THUMB) MCP JOINT

COLLATERAL LIGAMENTS

- Usually radial collateral ligament
- Clinical examination
 - Degree of laxity
- Investigations:
 - X-ray
 - MRI
- Treatments:
 - Immobilisation & mobilisation
 - Surgery:
 - Acute & unstable joint → repair
 - Chronic → reconstruction

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NOTES:

Dr Doron Sher

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



Update on ACL Reconstruction

ACL injuries and surgery are very common in Australia. There are new advances taking place all the time.

Graft Selection

In Australia we transitioned away from patella tendon grafts about 25 years ago. I was involved in this when I did my masters degree in Biomedical Engineering where my research thesis was on ACL reconstruction. What we showed at the time was that the hamstring tendons were a viable alternative to patella tendon graft. When tested on an Instron machine the hamstring grafts stretched out and became non functional before they failed completely. This meant that if you had an early incident involving the knee it was likely that the graft would not work well in the long term. The patella tendon graft did not stretch out before it failed so it was obvious if any injury had happened. It was possible to get more tendon bulk using a hamstring than you could get with a relatively thin strip of patella tendon and the operation was faster and easier. Despite this the re-injury rate remained lower with patella tendon grafts than it did with hamstring grafts. In many parts of the world the patella tendon graft remains the 'gold standard' and most commonly performed operation.

Many of the problems traditionally associated with patella and tibial bone block harvest were solved when allograft bone became commonly available because we could fill the defect with bone and prevent the problems with kneeling and of anterior knee pain for the most part. I have been doing this for more than 15 years now.

The re-injury rate was generally higher with isolated hamstring tendon surgery in higher level athletes but the addition of a lateral extra-articular tenodesis has brought this back into line with the results of patella tendon surgery (see below).

There are also potential issues with hamstring harvest such as saphenous neuritis during harvest, decreased maximum knee flexion strength and perhaps increased rotational and anterior knee laxity compared to that seen after patella tendon surgery.

Allografts, if used, should be non-irradiated but also do have a well-documented higher rate of re-rupture in younger patients compared to autografts.

The quadriceps tendon graft is now 'the next best thing' because it has greater intra-articular graft volume and greater residual native tendon volume compared to that seen in the patella tendon. There are many potential problems harvesting this graft and results are a little mixed in terms of re-rupture rates but this certainly is now a good third option to consider. Most studies have shown a slower recovery of quadriceps strength when recovering from quadriceps harvest but it seems that the levels do get back to normal eventually.

The quadriceps tendon can be harvested with or without bone but without bone there is a risk that graft will be short and only have minimal tissue contact to the bone. More data are needed to look at the mid- and longer-term outcomes of quadriceps tendon compared to other graft choices and to look at the results in young athletes over time.

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Knee, Elbow, Shoulder Surgery



Lateral Extra-articular Tenodesis (LET)

We know that despite 'anatomic tunnel' placement in ACL surgery, rotational laxity can still persist (we are replacing a complex ribbon like structure with a single band of tissue).

The STABILITY trial was a multicentre, prospective randomized clinical trial that compared hamstring ACL surgery with or without LET in patients 25 years or younger who met two of three criteria: high-grade pivot shift [2 or 3], goal to return to pivoting sports, or generalized ligamentous laxity. Patients who underwent LET augmentation during ACL surgery had a 0.67 relative risk reduction of graft rupture over the two-year follow-up period.

There are biomechanical concerns of over constraint with the LET or anterolateral ligament procedures but clinically so far no differences have been found in terms of increased risk of joint degeneration. There are multiple different surgical options for this surgery and so far none have been proven to be superior.

ACL Repair

Historically, primary repair of ACL tears was abandoned because of high failure rates. There are now lots of techniques which make the surgery more reliable and the results in very carefully selected sub-groups of patients are less bad than they were previously. The bridge-enhanced ACL repair (BEAR) has demonstrated non-inferiority in terms of IKDC scores and side-to-side AP laxity at 2-year follow-up but there was a higher rate of retear in the study, 14% BEAR vs 6% ACL surgery, but this was not statistically significant. Watch this space.....

Non-Operative treatment

In Australia more so than any other country we are well aware of the Cross bracing protocol. Historically there has always been a role for non-operative treatment. A certain number of patients who are ACL deficient are still able to function at a high level without the knee giving way. The trick is to predict who these people will be without allowing them to injure the knee further if the knee was to give way again. While it is very early days there is some hope that studying this population more carefully will help us work out who these patients are. Currently this is very interesting but not yet backed up by enough solid science. Watch this space....

Rehabilitation

Prehabilitation: has been shown to be beneficial for patient-reported knee outcomes, improved physical exam findings and allowed faster return to sport. Unfortunately, there are no clear endpoints of exactly what goals need to be met in this group in terms of muscle bulk, strength or range of motion.

Rehabilitation: it would appear that not all protocols are alike. Early weight bearing and mobilisation is certainly the standard here in Australia but not necessarily elsewhere in the world. Neuromuscular electrical stimulation (NMES), blood flow restriction, psychosocial support, early contralateral lower extremity conditioning and Kinesio taping are relatively new and potentially helpful modalities after ACL surgery and while they are certainly very popular it once again falls into the area of 'watch this space'. There is currently no evidence of superiority of closed over open kinetic chain exercises in terms of return to sport, ligament laxity, functional questionnaires or reported physical function, regardless of the graft or surgical techniques.

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Knee, Elbow, Shoulder Surgery



Psychosocial Approach to Return to Sport

While there is a widely accepted view that patients should not return to sport before 9 months post surgery, these days we do not use purely time-based return to sport protocols. The patient must progress through a multidisciplinary, criterion-based progression focused on meeting specific clinical and objective milestones. These include return to sport testing of functional assessment as well as psychological readiness. The level of testing applied will vary widely on the level of sport the patient is hoping to achieve. Most test batteries include functional questionnaires, kinesiophobia questionnaires, limb strength and symmetry tests, arthrometry ligament laxity tests, different unipodal jump tests and agility tests. Unfortunately, recent systematic reviews and meta-analyses give conflicting results, as only 23% of patients can pass all test batteries and yet many more than this successfully return to sport.

Dr Todd Gothelf

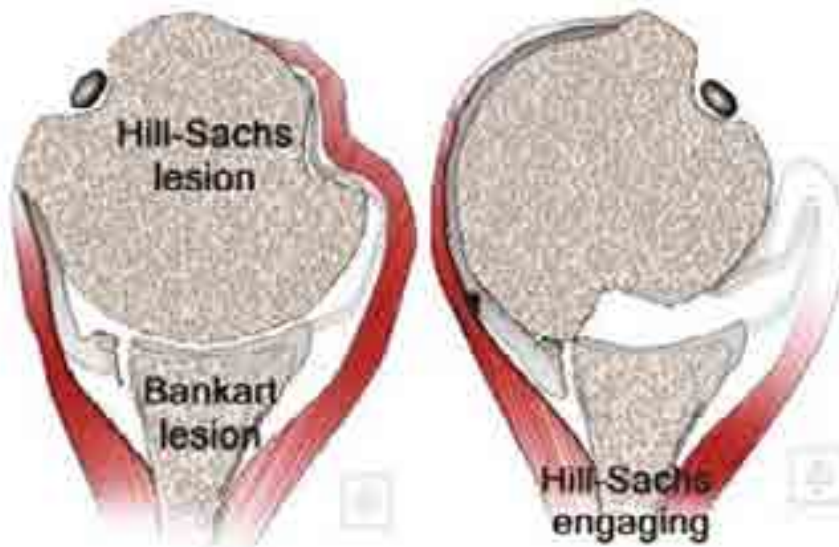
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Shoulder Instability: The Remplissage

Anterior glenohumeral instability is the most common form of shoulder instability, occurring after a traumatic shoulder dislocation. The dislocation occurs with the arm in the abducted, externally rotated position.

With even first-time dislocations of the shoulder, especially in individuals under forty years old, the risk of re-dislocation is above 60%-90%, mostly due to the permanent damage caused by the dislocation. The main damage from a dislocation involves a bankart lesion (bone and/or capsular rupture of the glenoid anteriorly), and a hill-sachs lesion, or bony indentation of the posterior humeral head. The combination of these two lesions allows the joint to shift during physical activities, and the hill-sachs lesion can engage with the anterior defect resulting in a recurrent dislocation.

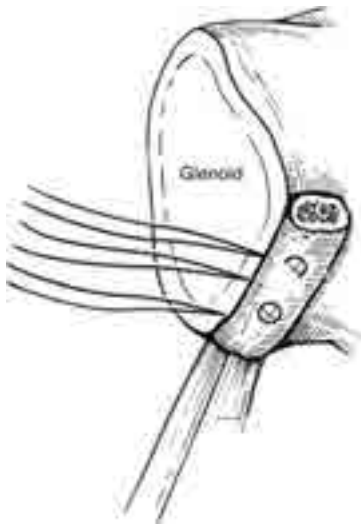


The image on the left demonstrates the bankart lesion and hill-sachs lesion. With external rotation, these can engage resulting in recurrent dislocations.

Arthroscopic bankart repair has been the standard treatment for shoulder instability and has a general success rate of 85%. However, it has been shown that when the bone defect of the bankart lesion is large (greater than 15% of the diameter of the glenoid), or when the hill-sachs defect is too large, an unacceptably high failure rate (67%) occurs. In the presence of large amounts of bone loss on the glenoid side and a hill-sachs defect (or bipolar defect), a Latarjet procedure, or coracoid bone transfer, is often an acceptable choice. The Latarjet is performed often open, and is thought to have a higher complication rate of 15%.

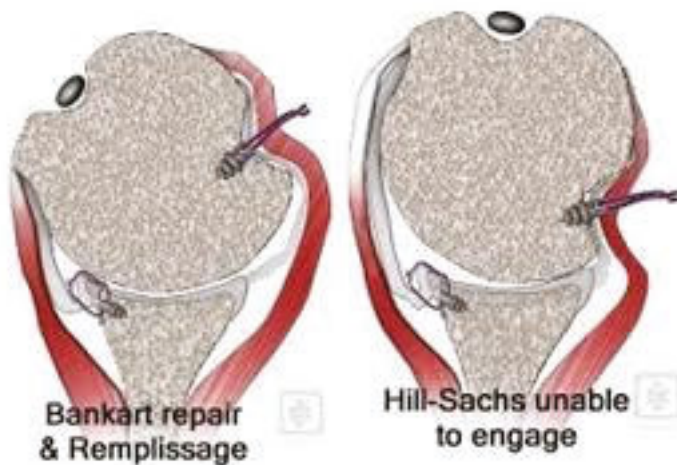
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The Latarjet procedure involves a transfer of the coracoid bone along with the attached conjoint tendon to fill the anterior bankart bony defect. The placement of the graft increases the arc of rotation to help prevent engagement of a hill-sachs defect. The complication rates for this procedure are higher than the arthroscopic procedure and include a higher risk of nerve injury.

With large defects on the humerus, or hill-sachs lesion, the “remplissage” has been proposed. “Remplissage” is French for “filling” or “stuffing”, and describes the procedure of filling the humeral head defect with the infraspinatus tendon. By filling the defect, the defect becomes extra-articular and can no longer engage with the bankart lesion. This procedure is also done arthroscopically, avoiding the need for open surgery.



With a “remplissage”, the defect is filled with the infraspinatus tendon, making the defect extra-articular and therefore prevents engagement of the defect with the anterior bankart lesion.

Studies comparing arthroscopic bankart repair alone to arthroscopic bankart repair with remplissage show a decreased re-dislocation rate when a remplissage is included in the repair. In fact, adding a remplissage to the procedure has shown similar outcomes to the open Latarjet procedure. Treating bipolar defects (anterior bone loss and hill-sachs lesions) with arthroscopic bankart repair and remplissage have been shown to result in similar or superior outcomes to the open Latarjet, with a higher return to sport for overhead or contact athletes, fewer complications. The remplissage may result in a loss of external rotation of the shoulder.

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NOTES:

Meniscus tears: When to rehab? When to refer?

Anatomy

- Medial is C-shaped. Lateral is circular.
- Attached to bone at anterior and posterior roots. Attached via ligaments to surrounding capsule.
- Triangular in cross-section.
- Vascular supply comes from the periphery, dividing to the menisci into the more vascular peripheral third (red-red zone), and avascular inner third (white-white zone).

Function

- Load transmission. 60-70% of load transmission in full extension.
- Joint stability (secondary stabilisers).
- Proprioception

History

- Acute injury vs chronic/gradual onset.
- Location of pain.
- Exacerbating activities: typically uneven surfaces, twisting, squatting.
- Night pain.
- Mechanical symptoms: locking, clicking, giving way/insecurity.

Examination

- Effusion
- Site of tenderness – does this correlate to imaging findings?
- McMurray's test – non-specific.

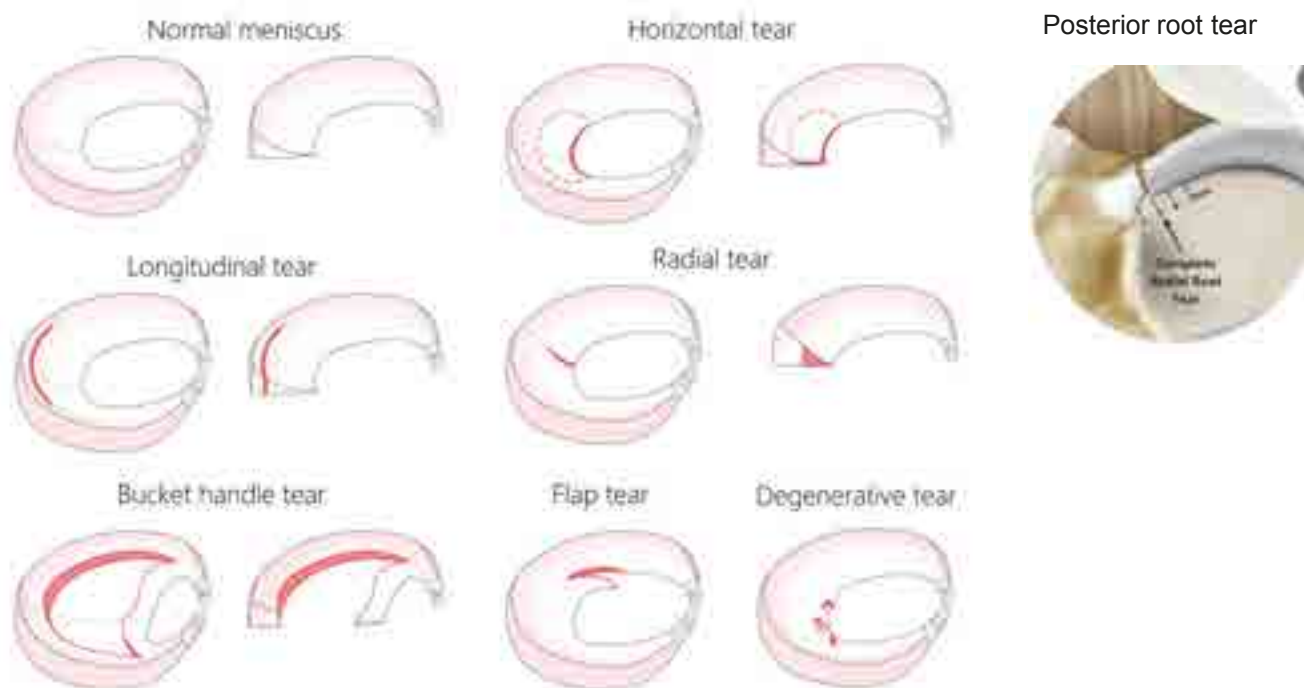
Investigations

- Weight-bearing xrays – to assess presence/extent of osteoarthritis.
- MRI – gold standard.
 - BUT 34% incidence of meniscus tears in asymptomatic individuals > 40yrs.
- US – No role in assessment of meniscus tears.

Tips for MRI image interpretation

- T2 weighted images (bone dark, meniscus/ligaments black, fluid white).
- Look on all views (coronal, sagittal, axial).
- Meniscus should appear triangular
- Look at meniscus volume. If reduced volume be suspicious of tear/previous surgery.
- **White is tear**
- Try to determine tear morphology by looking at sequential imaging (easiest on computer).
- A good resource: <https://radsources.us/meniscal-tear-patterns/>

Common tear patterns



Summary – Refer vs Rehab

Refer	Rehabilitate
Bucket-handles tears – <i>Urgent. Ring the surgeon.</i>	Degenerative/”complex” tears
Root avulsion	Partial radial/oblique tears without mechanical symptoms.
Full-thickness radial tears	
Displaced flap tears with fragment in meniscotibial recess.	
All paediatric tears	
Associated ligament injuries (usually ACL).	
Degenerative tears that fail to improve after 3-6 months of non-operative treatment.	

An evidence-based rehabilitation protocol

Noorduyn JCA, van de Graaf VA, Willigenburg NW, et al; ESCAPE Research Group. Effect of physical therapy vs arthroscopic partial meniscectomy in people with degenerative meniscal tears: five-year follow-up of the ESCAPE randomized clinical trial. *JAMA Netw Open.* 2022;5(7):e2220394. doi:10.1001/jamanetworkopen.2022.20394 eAppendix. Physical Therapy Protocol

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