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Topic	Presenter	Notes
My approach to the patient with Impingement	Jerome Goldberg	Notes below
Shoulder Instability	Dr Doron Sher	Notes below
COVID Injury Patterns – Lockdown, HIIT Training & Plyometrics	Dr John Best	Notes below
Pros and Cons of Spinal Fusion. What are the indications to fuse.	Dr Andreas Loefler	Notes below
Periacetabular Osteotomy	Dr Christopher Spelman	
Have you got the right diagnosis? Common misdiagnosis in musculoskeletal medicine	Dr Paul Mason	
Groin Pain Revised	Dr Paul Annett	Notes Below
Management of the Cavovarus Foot	Dr Todd Gothelf	Notes below
The Unhappy Total Hip Replacement	Michael Goldberg	Notes below
Achilles Tendon Ruptures & Hallux Rigidus	Dr John Negrine	Notes below

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My Approach to the Patient with Impingement

History

- Age
- Hand dominance
- Occupation
- Sports/hobbies
- Medical history (esp DM)
- Previous shoulder problems/ops
- Mechanism of injury
    1. Fall onto outstretched arm
    2. Was arm forced into abd/ER
    3. Was arm forced into add/IR
- Pain location
    1. Night pain
    2. What precipitates pain
- Weakness
- Loss of motion
- Clicking
- Instability/dead arm

Beware of

- Rest pain
- Constant pain
- Neck/scapula pain
- Paraesthesia

START THINKING OF DIAGNOSIS

Under 30 years

- Impingement
- Instability

30 to 50 years

- Impingement
- Biceps tendonitis
- Arthritis AC joint
- Calcific tendonitis

Over 50 years

- Rotator cuff tears
- Adheseive capsulitis
- Arthritis

PRINCIPLE OF EXAMINATION - LOOK – FEEL -MOVE

LOOK: observe from front & back



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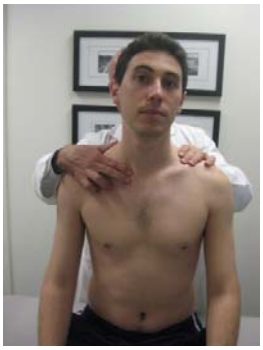
FEEL:

- SClav joint
- Clavicle
- AC joint
- Coracoid process
- Biceps
- Greater tuberosity
- Rotator cuff
- Joint lines
- Acromion/scap
- Cervical spine



MOVE

- Rhythm - anterior
- Rhythm - posterior
- Active Forward elevation
- Passive forward elevation
- Passive E.R.
- Passive I.R.
- Abduction


POWER

- E.R
- I.R.

SPECIAL TESTS:

- Impingement
- adduction
- Speed's test
- O'Brien's test
- Biceps lift
- Anterior apprehension
- Posterior apprehension
- Anterior relocation
- Posterior relocation
- Sulcus sign
- Belly press/lift off
- Dynamic SLAP
- Generalised lig laxity
- Adson's test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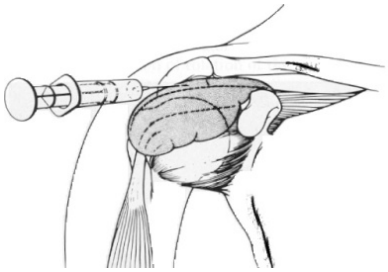
INJECTION TESTS:

- Subacromial space
- AC joint
- Biceps sheath
- GH joint



INVESTIGATIONS:

- Plain xrays
- Ultrasounds
- CT scans
- MR arthrogram

CASE STUDY

HISTORY

- 45 yr old male
- R dominant arm
- Painter
- Gym – 3 times a week
- Tennis – weekly
- NIDDM

SYMPTOMS

- 3/12 symptoms
- Lateral arm pain with movement
- Night pain
- Mild loss of motion
- No weakness
- No instability
- Paraesthesia hand
- No trauma

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CLINICAL SIGNS

LOOK

- No wasting

FEEL

- Tender RC & BT
- Non tender AC & C. Spine

MOVE

- Range of motion
  - 150 degrees active elevation
  - 175 degrees passive elevation
  - 45 degrees external rotation
  - T12 internal rotation
  - 165 degrees abduction
- **Normal power**
- + impingement
- + speeds
- - adduction
- - apprehension
- - tinels

Full ROM C Spine

XRAYS

- Normal
- Acromial spur (type 3)

NOTES:

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Surgical treatment of the unstable shoulder – How do you decide which patient gets what operation?

We know that younger patients and those doing sport that dislocate their shoulder are likely to do so again. Having more than 2 dislocations leads to a higher likelihood of arthritis developing in the shoulder. While it is generally clear that a patient requires surgical stabilisation of the shoulder it can be less clear which operation is best for them.

In broad terms the procedure can be performed **arthroscopically** or **open**. There are advantages and disadvantages to both approaches.

Arthroscopically you can achieve a labral repair, capsular plication, Remplissage (suturing the infraspinatus into the Hill Sachs lesion) or a combination of these. **Open** surgery can take the form of a labral repair, capsular shift or a bone transfer procedure (whether it be locally like a Laterjet or remotely like an Iliac crest bone transfer).

Arthroscopic stabilisation of the shoulder has a very low complication rate with a very high level of return to sport (close to 90%). *It is the operation of choice for most people who dislocate their shoulder.*

The results of arthroscopic surgery are much worse in contact athletes so my treatment paradigm is broadly divided into patients who participate in contact sports (Rugby, AFL, Boxing, Basketball, Ice Hockey etc) and those who do not. The exception to this is a very high level contact athlete in the early part of their season. It is also important to understand if the patient has any bone damage to the glenoid or humeral head.

Re-dislocation rates after arthroscopic surgery are as low as 4% and as high as 25% depending on the individual patient. The re-dislocation rate of an arthroscopic stabilisation depends a great deal on which sport the person returns to, with a higher percentage of re-dislocation in collision athletes and younger patients (under the age of 18). The failure rates are also higher in the presence of a Bony Bankart lesion, ALPSA lesion and significant Hill Sachs lesion. Certain operations are not safely performed arthroscopically, such as a HAGL repair.

Open Surgery
If the patient is likely to re-dislocate with an arthroscopic operation we then change to performing open surgery for them. The next decision is whether to perform an open capsular shift or a bone transfer operation.

Laterjet
The Laterjet procedure (coracoid bone transfer) was designed to treat patients with significant glenoid bone loss and shoulder instability.
Recently there has been a considerable shift towards doing a Laterjet procedure as the patient's first operation, even without bone loss. While this operation will certainly stop the shoulder from physically dislocating it does not necessarily cure the patients sensation of the shoulder moving excessively because it does not address the issue of capsular laxity that caused the problem in the first place. In many cases this operation is being used for contact athletes, despite them not having any significant bone loss (which is not what the operation was originally designed for).

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The complication rate for a Laterjet procedure has been documented to be far higher than an open capsular shift. Complication rates of 6-30% (and higher) are often quoted, varying from permanent nerve injury, through failure to heal of the bone and hardware complications such as damage to the humeral head from the screws. If this operation fails there are not many options left to salvage the shoulder.

Over the last few years, it has become clear that if a Laterjet is performed where the patient does not have any bone loss then the bone graft will reabsorb and disappear because it is not being loaded. This can leave the screws used to hold it in place very prominent and likely to create damage to the humeral head.

Open Stabilisation
An open stabilisation and capsular shift does have the disadvantage of taking down and then repairing the subscapularis muscle. It is possible to create some fatty degeneration in the subscapularis muscle belly but this does not seem to create much in the way of functional limitation for the patient.

The advantage of this operation is that allows the labrum to be repaired and the stretched out capsule to be tightened. The success rate of this operation is very high with a very low re-dislocation rate, even in contact athletes *and very low complication rates*. It does not create any issues when performing a joint replacement in the future (we know that most of these patients will end up with arthritis in the long term)

Decision Making
The factors to consider are:

- Age
- Contact athlete
- Labral Tear
- SLAP lesion alone
- Capsular stretch without labral tear
- Mild damage
- Significant bone damage (GTIMS Score)
- Significant damage to the humeral head as well (On Track vs Off Track)

My approach:

1) *Non contact athlete with a labral tear*
    1) Arthroscopic stabilisation + posterior capsule plication +/- Remplissage
        i. HAGL lesion – Open repair

2) *Contact Athlete with a labral tear*
    1) Open stabilisation
        i. If Posterior labral tear only – Arthroscopic Repair
        ii. In season professional wanting to play again early but accepting a slightly higher re-injury rate – Arthroscopic stabilisation with posterior capsular plication and rotator interval closure– May need formal open repair later

3) *SLAP lesion* – Arthroscopic Repair

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4) *Instability without labral tear*
    1) MDI / Non contact – *Arthroscopic capsular plication*
    2) Contact / Very Active Sports or Work / HAGL – *Open Capsular Shift*

5) Mild Bone Damage ('On Track')
    1) Non Contact – Arthroscopic repair with Remplissage
    2) Contact / Very Active Sports or Work / HAGL – *Open Capsular Shift*

6) Significant Bone Damage
    1) Laterjet Procedure

7) Younger Patient
    1) Usually male and often contact sports – Open Stabilisation

Rehabilitation

The patient spends the first 6 weeks immobilised in a sling performing elbow range of motion only. At 6 weeks they work to restore shoulder range of motion focusing on scapula retraction exercises. At 3 months strengthening is added but the avoid ABER strengthening until 6 months post surgery. Once they complete a proprioceptive retraining programme they usually return to sport at 6 months but must wear a brace for contact sport for the first 2 years. During this time their weights programme should be modified to avoid stretching the capsular repair.

Summary

Recurrent shoulder instability is very common. These days we are operating earlier to try to prevent arthritis developing in the shoulder caused by multiple dislocations. It is important to assess the individual and their imaging before deciding which operation is appropriate for them.

Remember that there is more than one type of open surgery available to the patient. An open stabilisation has a very high success rate and far fewer potential complications than a Laterjet procedure. Arthroscopic surgery will still be used the majority of the time.

NOTES:

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COVID Injury Patterns – lockdowns, HIIT training and plyometrics

This handout complements the presentation given on the above topic. For brevity "COVID" refers to infection from SARS-CoV-2, also known as the coronavirus. It is the virus that causes COVID-19 and is responsible for the ongoing COVID-19 pandemic.

Observations during COVID

In 2020-2021, working from home as a result of being in lockdown, particularly in the Australian cities of Sydney and Melbourne, has led to ill health for many people. Lockdowns have led to Australians gaining weight and increasing their smoking and alcohol use[i]. Our political and health leaders have given us great reminders to maintain our health and fitness, including reinforcing the connection between physical and mental health.

Home-based work environments are generally associated with an ergonomically poor physical setup, contributing to postural deficiencies. Gym closures have led to reduced access to fitness equipment. To create alternate exercise opportunities, many people have engaged in online and outdoor small group fitness training. Much of this training has included high intensity interval training (HIIT) in a circuit class environment, which often requires plyometric movements.

This combination of isolation, poor posture, and risk of overwork due to lack of work/home boundaries all contribute to a higher injury risk with certain movements. This is a particular risk for individuals with generalised joint hypermobility – which may not have been previously recognised.

Physical Activity and COVID

Research data shows that patients who are physically active (PA) are less likely to suffer from COVID, are less likely to have severe COVID infection, are less likely to be hospitalised with COVID and are less likely to suffer fatal COVID disease[ii]. Indeed, physical inactivity is the second most prominent risk factor for COVID infection after organ donation.

Comorbidities such as diabetes, obesity, and immune suppression from various health treatments and conditions follow this. PA also reduces anxiety associated with living in this "COVID era"[iii]. It is critical to accept that COVID infection is minimised if you are active.

HIIT Training and Plyometrics

There are many forms of exercise and training routines. The categorisations vary depending on the metabolic pathways utilised and the way muscles are used. The American College of Sports Medicine defines high intensity interval training as "repeated bouts of high intensity effort followed by varied recovery times". These comprise efforts that vary in length from for five seconds up to 8 minutes usually training at a level of 85-90% of your heart rate maximum. The high intensity efforts alternate with recovery where your recovery heart rate reduces to approximately 40-50% maximum. This may be a ratio of 1:2 or sometimes 1:1, depending on levels of fitness. Most high intensity interval training sessions would run for 20-60 minutes and this could be performed 3-5 times per week[iv]. Some people would perform this type of training most days depending once again on one's level of fitness and training experience.

Plyometric training is the exertion of a maximal force in short intervals of time and often involves jumping and hopping. It combines both eccentric and concentric movements. Combining high intensity interval training and plyometrics has been common during COVID with the creation of circuit classes with many of these combined movements.

Circuit classes have many benefits including: one can participate at home; little or no equipment is needed; they may be performed in a small group (as little as two people or with socially-distanced groups of up to 10); and they can be conducted outdoors. The social benefits of this are powerful and important. People feel good after doing high intensity circuit training due to the known neurochemical changes. HIIT training is time-efficient.

Common Movements with HIIT Training and Injury Risk

Studies have shown that during the resumption of physical activity after lockdown, soft tissue injuries increase[v]. The classic movements that are involved with high intensity interval training will involve both the upper and lower body.

Isolated lower body movements would include squatting, lunging, jumping and hopping. Upper body movements would involve various push-ups, pullups and dips. Combined movements would include positions such as 'mountain climbers, burpees and jumping jacks/ star jumps'. In some forms of yoga and pilates movements weight-bearing through the shoulders could be performed with a range of push-up position such as planks, salutations ('downward dog, greet the sun, mountain'), or more dynamic movements in yoga such as the 'chaturanga'.

In patients that are untrained in these movements, have joint hypermobility or previous injury, there is a high risk of injury. The postural imbalances which are seen as a result of 'work at home' during COVID create underlying weakness of important muscle groups such as the lumbo-pelvic core and the scapula retractors with poor scapular positioning. This creates pathologies to the shoulder (impingement, labral tears and rotator cuff failure) and hip (impingement, gluteal tendinopathy, labral tears).

A case presentation during the talk highlights the scenario above.

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[i] www.aihw.gov.au/reports/burden-of-disease/the-first-year-of-covid-19-in-australia/summary

[ii] Sallis R, et al. Physical Inactivity is associated with a higher risk for severe COVID-19 outcomes: a study in 48,440 adult patients. Br J Sp Med, 0:1-8; 2021

[iii] Ming-Qiang Xiang, et al. Relationship of Physical Activity with Anxiety and Depression Symptoms in Chinese College Students During the COVID-19 Outbreak. Front Psychol 20 November 2020

[iv] American College of Sports Medicine definition 2014

[v] Seshadri R, et al. Return to Sport and Injury Rates Following COVID-19 in German Bundesliga. Fr Sports Act Living, 2021; 3:604226

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The Pros and Cons of Spinal Fusion: What are the indications to fuse?

Chronic back pain is common, affecting one in eight Australians. It is more common in the second part of life. It may be related to work, sport, injury, or disease. It is worsened by age, lack of fitness, extra weight and smoking. It is characterized by episodes of exacerbations and remissions and can be severe at times. It has a negative effect on quality of life and prevents patients from working and socializing.

Chronic back pain may be associated by leg pain. It may be referred from abdominal organs, such as an aortic aneurism or from renal stones. Rarely it is caused by tumours or infection. Beware of so called Red Flags, which are constitutional symptoms such as night sweats or weight loss and may indicate sinister pathology.

Patients may need investigations with MRI, CT scan, bone scan, dynamic x-rays, and blood tests. Whilst the MRI is very sensitive, it does not show pain and may overread some changes. It is estimated that at least 20% or asymptomatic people have a black disc on MRI.

Most patients with chronic back pain improve with physical therapy and reassurance. Some require lifestyle changes. Some need medications or injections. Surgery is only rarely needed.

Spinal fusion is an un-physiological treatment, as we stiffen one or more motion segments. We get bones to grow together, with or without implants. The principles are the same in the cervical, the thoracic and the lumbar spine. The incidence of spinal fusions has continued to grow exponentially, being most common in the elderly.

The indications for spinal fusion are controversial. Some patients with severe or with progressive deformity require corrective surgery. Some patients with instability, such as a fracture or a spondylolisthesis require stabilization. Some patients with nerve compression or with mechanical back pain benefit from fusion surgery. Sometimes one has to operate because of previous surgery. Contraindications may be co-morbidities, osteoporosis, psychological issues or smoking, which inhibits wound healing and bony fusion.

There are techniques to achieve a fusion, with or without implants. Most common are constructs with pedicle screws and interbody cages to give anterior column support. Surgery takes between 2 to 4 hours and requires a general anaesthetic. X-ray guidance or computer navigation is necessary. Either autologous bone graft, allograft, or synthetic graft can be used to achieve a fusion.

Rehabilitation progresses gradually. Early mobilization is followed ROM and non-impact exercises. Hydrotherapy is useful and is core strengthening and strengthening of the legs to get the patients up and about.

Spinal fusion surgery is complex and there are several complications intra-operatively, early and late. These include damage to neural structures, dural tears, bleeding and blood clots, infection, failure to fuse and failure of implants.

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The outcomes of spinal fusions are variable. There are many studies, but there is no high-level evidence to support fusions for simple back pain. It is difficult to define success and there is a high rate of potential complications. There is evidence of the benefits of spinal fusion for patients with fractures, tumours, instability and deformity, but much less so for patients with chronic back pain.

Ideally patients should be offered a multi-disciplinary approach, involving the GP, the physiotherapist, perhaps a psychologist, work and lifestyle changes. Weight loss should be considered. If surgery is considered, the patient needs to understand the pros and cons and the potential complications of an operation.

With careful selection, good preparation, careful surgery, and good rehabilitation, many patients can be helped with spinal fusion.

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Groin Pain Revised

Introduction:

Groin pain is viewed as a difficult entity. There are multiple diagnostic terms, which can lead to confusion. Groin pain makes up 5% of all athletic injuries. It is common in direction change sports such as soccer and AFL, making up 25% of injuries in soccer. Groin pain should be considered in 2 main diagnostic groups, described as 'pubalgic' (extra-articular) and 'non-pubalgic'. The pubalgic group includes the entities of adductor tendinopathy, osteitis pubis, posterior inguinal wall weakness (or 'sports hernia') and illiopsoas tendinopathy. In 30-40% of cases there may be more than one of these entities causing pain concurrently. Non-pubalgic pain (intra-articular) is dominated by the hip joint where diagnoses such as osteoarthritis, stress fracture, avascular necrosis and femoroacetabular impingement need to be considered.

Aetiology:

The aetiology of 'pubalgic' groin pain is multifactorial. It may come as a consequence of acute injury, or more commonly as an overload of the soft tissue or bony structures around the pelvis. A combination of restricted hip motion and weakness or inflexibility of the adductor and lower abdominal muscles causes increased shear forces through the pelvis with direction change activity. Subsequent overload may lead to pain from the adductor, illiopsoas or conjoint tendons, or the pubic symphysis. Pain then causes further soft tissue dysfunction, causing a further deterioration of symptoms.

Diagnosis:

Historically the pubalgic causes of groin pain will tend to be worsened by running with direction change, and are more common in young men. As the problem in osteitis pubis is bony, the patient usually complains of a deep aching pain during and after activity. Lower abdominal problems may be aggravated by coughing or sneezing. Older patients are more likely to have degenerative hip disease.

In adductor tendinopathy the patient will have tenderness over the bone/tendon interface or pain on resisted hip adduction. Osteitis pubis may be diagnosed by a positive 'squeeze test', causing either pain or adduction weakness. Lower abdominal problems may be provoked by abdominal testing, such as resisted sit-ups. Hip joint problems may be reflected by loss of hip motion, especially in rotation, flexion and abduction. The 'hip quadrant' or FADIR test is sensitive for early osteoarthritis or an acetabular labral tear.

Investigation

A plain x-ray is essential to demonstrate hip arthritis or other pathology such as a stress fracture. It will also show erosions around the pubic symphysis in osteitis pubis. MRI is helpful to assess the spectrum of pathology, including adductor or illiopsoas tendinopathy and may demonstrate bone marrow oedema or degenerative changes in osteitis pubis, or hip joint pathology such as early osteoarthritis or acetabular labral tears. Sports hernias are diagnosed most accurately by ultrasound performed by an experienced radiologist.

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Treatment:

The treatment for all causes of pubalgic groin pain is similar and is initially non-surgical. Generally, it is favourable, although may run a protracted time course. It involves unloading the groin from impact and direction change sports. Physiotherapy is essential to release the soft tissues of the adductors, hip flexors and gluteals and to improve hip joint mobility. A program of strengthening for core musculature, gluteals and adductors is also required. In one trial for adductor tendinopathy an 80% improvement occurred in patients treated with an exercise program compared to 15% of those treated with passive therapy alone (1). Injections of either corticosteroids or other agents such as PRP may be an adjunct to the physical program in adductor tendinopathy. A return to training program is guided by improvement in clinical symptoms, but may take many months, especially in osteitis pubis. If symptoms are not settling then surgery in the form of an adductor tendon release or a hernia repair may be indicated.

Key Points

- Groin pain usually occurs in sports that require running and direction change, such as soccer and AFL
- A key differentiation is between ‘pubalgic’ and ‘non-pubalgic’ pain.
- Common causes of pubalgic pain are adductor tendinopathy, osteitis pubis or ‘sports hernia’
- The most common source of non-pubalgic pain, and of groin pain in general, is the hip joint
- Pubalgic groin pain requires a comprehensive rehabilitation program. The time course may be lengthy, and surgery is occasionally required.

References

1. *Hölmich P, Uhrskov P, Ulniths L, et al. Effectiveness of active physical training as a treatment for long-standing adductor-related groin pain in athletes: randomised trial. Lancet 1999; 353: 439-443.*

NOTES:

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Management of Cavovarus Foot

The cavovarus foot deformity is defined by a hindfoot varus and a plantar flexed first ray. The deformity can a range of mild to severe. Here are examples of more severe cavovarus and features:

The image on the left, note the high midfoot arch, plantarflexed first ray, great toe clawing, lesser toe clawing, tight plantar fascia. The image on the right demonstrates and hindfoot varus deformity caused by the plantar flexed first metatarsal.

In your clinical practice, the subtle cavovarus or cavus foot is far more common and can be underappreciated if it is not recognized. Patients usually come in for other injuries which tend to be associated with a subtle cavovarus deformity. These include:

- Recurrent Ankle Sprains
- 5th metatarsal fractures or stress fractures
- Peroneal Tendinopathy or tears
- Lateral column stress and pain

When treating these conditions, it is important to recognize the subtle cavus foot as not addressing the overall foot deformity may result in persistent pain, nonunion, or failure of treatment.

Physical Examination:
When assessing for a cavovarus foot, the feet should be observed from the front and from the back. Observing the feet facing forward is important to assess alignment. A common sign to look for is called the “Peek-a-boo” sign. The medial heel can be seen in a cavovarus foot deformity, while it is absent in a normal foot. Note the two images. The left “normal” foot has no “Peek-a-boo” sign and the right has a “Peek-a-boo” sign with visibility of the medial heel.

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Investigations:

STANDING x-rays of the foot (AP, L, Oblique) are important to assess alignment of the foot. Parameters to note are Meary's Line seen in blue, which is a line drawn through the body of the talus and through the first metatarsal. These are parallel in a normally aligned foot, and are slightly angled in plantar flexion in a cavovarus foot. The second parameter (seen in yellow) is the vertical distance from the base of the 5th metatarsal to the base of the 1st metatarsal. This distance is usually increased in a cavovarus foot.

Treatment: Treatment of the presenting pathology is primarily important. Thus, for recurrent ankle sprains a trial of physiotherapy may be required or a surgical reconstruction may be necessary. However, the underlying cavovarus deformity must be addressed to optimize the success of treatment.

Orthotics are a reasonable first line approach. A referral to a podiatrist for custom orthotics is made for a recessed first metatarsal head for the plantar flexed first ray, a low medial arch, and a lateral hindfoot wedge to push the heel to valgus. Corrective orthotics with hopefully reduce stress of the lateral column and assist with healing of the primary pathology.

In more severe deformities, surgical correction may be warranted. Surgical treatment involves osteotomies of the calcaneus to correct the heel varus, and osteotomy of the first metatarsal to dorsiflex the first metatarsal. Concomitant procedures include a peroneus longus to brevis transfer to remove the powerful plantarflexor of the first ray, and a release of the plantar fascia to relax the high midfoot arch.

Summary: An awareness of the subtle cavovarus foot is essential to ensure successful treatment of various common pathologies of the foot and ankle. When treating a patient with recurrent ankle sprains, 5th metatarsal fracture, peroneal tendinopathy or tears, or lateral column stress, it is important to assess the foot for a subtle cavovarus deformity and to address and treat the deformity at the same time. Addressing the deformity appropriately will enhance healing and improve outcomes of the primary pathology.

Resources

1. SE Deben, GC Pomeroy. Subtle Cavus Foot: Diagnosis and Management. J Am Acad Orthop Surg 2014:22:512-520.
2. MP Makill, JD Maskill, GC Pomeroy. Surgical Management and Treatment Algorithm for the Subtle Cavovarus Foot. Foot Ankle Int, Vol 31, No 12: December 2010.

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The Unhappy Total Hip Replacement

The unhappy Total Hip Replacement

Two causes of post-operative hip discomfort a physio may encounter

Dr Michael Goldberg

1

Outline

- Brief discussion on some technical aspects of THR, to enable better understanding of the conditions we will discuss.
- Discuss two relatively common causes of post-operative hip discomfort which may present first to a physio.
- Discuss clinical and radiographic assessment of these conditions.
- Discuss treatment options.

2

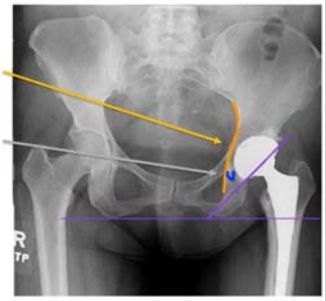
THR 101

- Extremely successful treatment for arthritis.
- The goal is a pain-free, functional and **stable** hip.
- Surgical goals to achieve this:
  1. **Cup position**: restore the normal centre of rotation, optimise position for a stable hip, optimise implant coverage in bone.
  2. Restore **equal leg lengths**
  3. Restore **offset**

3

THR 101 – Cup Position

- **Depth** – cup should sit against ilioischial line.
- **Height** – inferior aspect of cup should sit along tear drop.
- This allows restoration of **centre of rotation**



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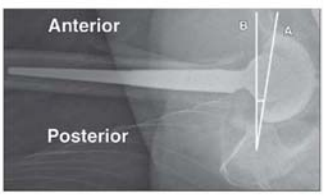
THR 101 – Cup Position

- **Inclination** – orientation of the cup in the coronal plane. Angle between horizontal and line across rim of cup.
- Aim ~ 40°

5

THR 101 – Cup Position

- **Version** – cup orientation in the sagittal plane.
- Assess on lateral xray.
- Aim slight anteversion ~20°



6

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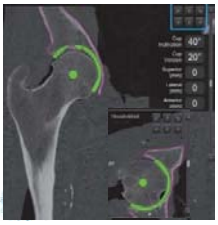
THR 101 – Cup Position

- Aiming for these parameters → match patient anatomy and **maximise bony coverage** of cup.



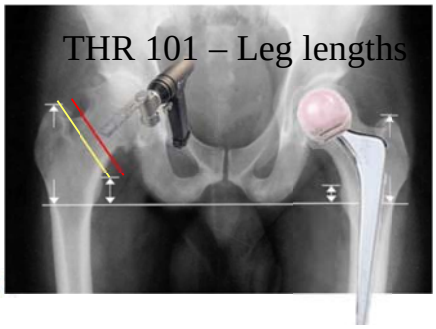
7

THR 101 – Leg length

- Based on femoral stem and cup position.
- Aim to restore patient's normal leg length or match contralateral side.
- Arthritic leg often slightly shorter pre-op.
- Up to 90% of population have LLD. Mean 5.2mm. 20% have LLD > 9mm.
- Slightly increasing leg length tends to increase hip stability.

8

THR 101 – Leg lengths



9

Case 1

- 70yo female is 2 months post elective left THR for osteoarthritis.
- PMH: lower back pain
- Pre-op L leg 1cm shorter than R.
- Complains that operated leg now feels longer than normal left leg.

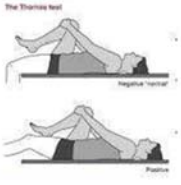
10

Leg length discrepancy

- **Anatomical LLD** = structural bony shortening of one limb vs the other.
  - Surgeon may deliberately "lengthen" a patient's limb to achieve a stable hip.
- **Functional LLD** = bony anatomy equal. But patient perceives LLD.
  - Not well understood.
  - Related to joint contracture (tight anterolateral capsule), abductor weakness, altered limb mechanics.
  - More common in patients with pre-op LLD, degenerative spine conditions.

11

Clinical assessment of leg lengths



- Assess the patient standing
  - Pelvic obliquity
  - Compensation eg bending knee on "longer" side.
- Block test
  - Block under leg that feels shorter.
  - Does pelvic obliquity change?
- Assess the patient lying
  - Assess for fixed flexion (Thomas test), abduction contractures AND CORRECT FOR THESE.
  - Measure from ASIS to Medial malleolus.

12

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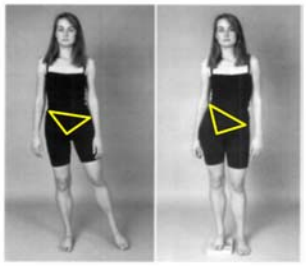
Clinical assessment of Functional LLD

- Soft tissue contractures influence perception of leg length.
- In post-op FLLD – usually have tight capsule and ABDuction contracture.
  - Pelvic obliquity: lower on "longer" side. Obliquity worsens with block test.
- In anatomical LLD, pelvic obliquity should improve with block test.



13

Radiographic assessment

- Full length films and CT may be more accurate measures of leg length.

14

Treatment

- **Time:**
  - Allow 3-6 months to allow abductors to relax and strengthen.
  - Functional LLD in 14% at 1 month. 0% at 6 months. (Ranawat, 1997).
- **Shoe-raise:**
  - Delay ~ 6 months.
  - May be effective for < 2cm LLD.

15

Treatment

- **Physiotherapy**
  - May help with functional LLD, less for anatomical LLD.
  - Abductor stretching and strengthening – no good evidence.
  - "A positive attitude toward the outcome of therapy by the therapist may make a difference in the patient's accommodation of a different sensation." (Clark et al, 2006 JAAOS).

16

Treatment

- **Revision surgery**
  - Last resort
  - Shortening femoral component tends to reduce hip stability.

17

Key messages – Functional leg length discrepancy

- Accurate clinical, radiographic assessment to determine anatomical vs functional LLD.
- Best assessed after 6 months post-op.
- Physio's explanation and encouragement is crucial.
- Abductor strengthening and stretching.

18

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Case 2

- 65yo male 4 years after R THR.
- Anterior groin pain putting on pants, getting out of car.
- Has been this way since surgery but getting worse.
- GP has arranged some current xrays.

19

Iliopsoas Impingement/Tendinitis – Clinical assessment

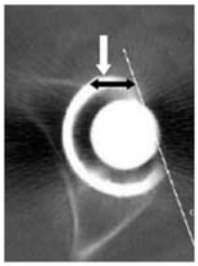
- History:
  - Anterior groin pain with active flexion activities eg stair climbing, putting on pants, into/out of car/bed.
- Examination:
  - May be subtle.
  - Groin pain with resisted seated hip flexion.
  - May use "tricks" to avoid active hip flexion.

20

Iliopsoas Impingement – Radiographic Assessment

- Lateral xray

Axial CT



21

Iliopsoas Impingement - Pathophysiology

- Relates to acetabular cup prominence > 12mm → Psoas tendon runs over the prominent cup anteriorly.
- Causes of cup prominence:
  - Inadequate anteversion.
  - Reduced cup inclination (ie flatter, <40°)
  - Cup too large.
- ~4% of THR.

22

Iliopsoas Impingement - Treatment

- Non-operative
  - Physiotherapy: Hip flexor stretching. No evidence-based protocols.
  - NSAIDs
  - US-guided local anaesthetic and corticosteroid injections (diagnostic and therapeutic)
  - ~50% resolution of symptoms
- Operative:
  - Open/arthroscopic iliopsoas tenotomy
  - Acetabular cup revision

23

Key messages – Iliopsoas Impingement

- Classic history and examination features.
- Related to cup prominence. Look for signs on xray.
- Physiotherapy may be a useful adjunct for non-operative treatment but no good evidence.
- Treatment: Refer to surgeon if no improvement with physiotherapy. Image-guided steroid injection. Surgery for recalcitrant cases only.

24

NOTES:

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Achilles tendon rupture the controversy:

Achilles tendon rupture has been well described elsewhere. In brief the condition is more common in the "weekend Warrior" than in the seasoned athlete.

I was on call for the Sydney Olympics there was only one Achilles tendon rupture in all the competition. Traditionally, in Australia Achilles tendon ruptures have been managed surgically. Traditionally in Canada Achilles tendon ruptures have been managed nonsurgically.

The important point is that in a relatively young active patient treatment of the Achilles tendon rupture must be done properly. Surgical treatment requires one day in hospital two weeks nonweight bearing to allow for wound healing and four weeks in a walking boot.

The nonsurgical protocol recommended by Prof Bruce Twaddle from Auckland, an enthusiastic non-operator of Achilles tendon ruptures requires eight weeks of treatment. The first 2 to 3 weeks on nonweight bearing with gradual progression of weight bearing.

The advantage of nonsurgical treatment is obviously that the patient does not need an operation. The risks of surgery including infection and anaesthetic problems are therefore avoided. Nonsurgical treatment must however be done properly. It is not sufficient to tell a patient to go and put a boot on and go away. The boot must be on day and night in plantar flexion basically for the first four weeks with gradual resumption of neutral and gradual resumption of weight bearing.

Surgical treatment is faster in the sense that the patient can mobilise at two weeks and in my practice only requires another four weeks in the boot. Advances in management of tendon rupture and tendon laceration indicate that movement within a certain range is beneficial to tendon healing. The benefits are thought to be due to collagen being laid down along the lines of stress, the reduction of joint stiffness, lessening of muscle wasting and theoretically a lower risk of blood clotting.

For this reason, after the wound has healed surgically I allow the patient range of motion and weight bearing gradually reaching neutral by six weeks.

What we are trying to achieve with nonsurgical and surgical treatment is healing of the Achilles tendon without significant lengthening of the tendon. Lengthening of the tendon is detrimental as the patient will suffer loss of push off strength. This is particularly an issue in an athlete and may explain why following treatment either surgical or nonsurgical a percentage of patients do not return to their previous level of activity.

Naturally if the patient experiences a wound complication with surgical treatment the results can be devastating. The Achilles region is not an area of great blood supply and if a wound problem occurs and is significant it may require reconstructive surgery with a suboptimal result.

Nonetheless I believe as do many of my foot and ankle colleagues that surgical treatment results in a faster stronger tendon with an earlier return to activity and an earlier return to sport.

The operation is not pretty (it is like trying to sew the two ends of a hairy mop together).

Achilles tendon rupture at surgery

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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.

Normal first MTP joint and grossly arthritic first MTP joint

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.

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

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

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

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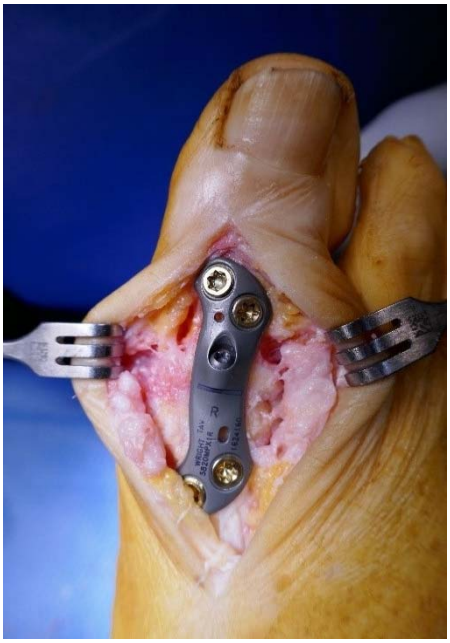
The traditional answer for grade 4 or advanced arthritis was a first MTP joint fusion. A fusion is a good operation in that it does relieve pain. Patients are able to walk, cycle, swim and play tennis. Women are however limited to a 3 cm heel and activities such as yoga which involve bending the great toe are compromised.

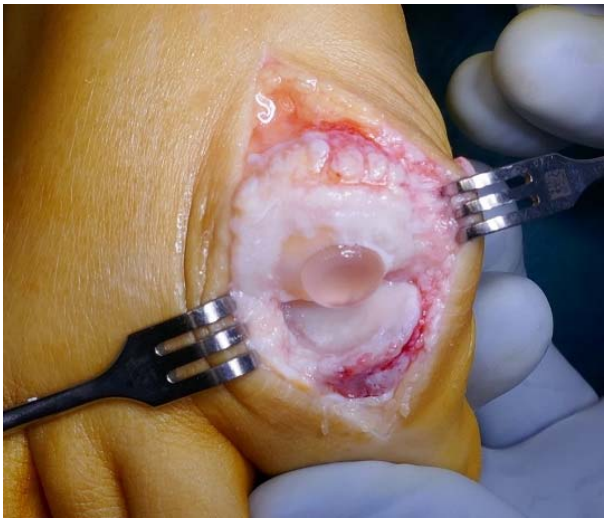
A new device has become available known as a "Cartiva". This is a synthetic material inserted into the metatarsal head as a joint spacer. A randomised controlled trial comparing fusion to Cartiva interestingly in intermediate and advanced grades of arthritis showed "a noninferiority" of the Cartiva compared 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

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