

Broadcast Summary

All About The Foot

With Prof Bill Ribbans

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About Bill Ribbans

- PhD in the orthopaedic aspects of HIV and immunocompromised patients and haemophilia
- Director of the Chris Moody Centre
- Consultant orthopaedic surgeon since 1991
- Specialises in knee, ankle and foot surgery
- Has a great interest in sports injuries: works with Northampton Saints, English National Ballet, UK athletes and is Chief Medical Officer of Northants Cricket.
- Runs research and writes lectures in his spare time.

Most frequent clinical problems

- Surgery ratio is about one-third knee and about two-thirds foot and ankle.
- Knee practice is weighted more towards cartilage and ligament injury. Does carry out some joint replacement surgery.
- Foot and ankle in particular:
 - Elderly patients with arthritic change.
 - Achilles tendon injuries
 - Peroneal tendons
 - Hallux valgus/rigidus
 - Morton's Neuromas

The need for surgery

- Sees an average of 20 new patients a week, converting just over 30% to surgery
- Most patients coming to see an orthopaedic surgeon believe they are going to finish with an operation
- Now spends far more time in clinic as opposed to at the operating tables.

GP Procedure and their experience of foot and ankle conditions

- The foot and ankle tends to be a rather cloudy area
- Medical Schools seem to teach foot and ankle anatomy the week before the exam, then not ask questions about it, so GP knowledge is likely to be limited
- However, if you know the flexor tendons, extensor tendons and intrinsic muscles of the hand, you're 90% of the way to understanding the foot.

In clinic

• 90% of the assessment is the history rather than watching the patient move, but always use the distance from waiting room to consulting room to watch patient walk.

• Mechanism of injury usually indicates which ligaments, tendons and joints are most likely to be affected.

• Each set of ligaments varies in how they respond and how they're likely to heal, how long they're going to take

• A lot of time is spent going through the natural history of soft tissue healing with patients.

• Examination supine and prone is very important

• Essential to examine them barefoot. Otherwise easy to miss, for example:

- Dislocated lesser metatarsophalangeal joints.

• Quite a common problem, frequently missed. Cause of considerable discomfort: the plantar plate is ruptured.

• Felt beneath the metatarsal head, most commonly the second metatarsal joint.

• Seen in International Athletes, runners, women, often in the 30-40 age group (where Mortons Neuromas are more common).

• Use a similar test to Lachman for the knee – feel the joint subluxing or dislocating.

• Often missed on x-ray: requires a weight-bearing image.

Most commonly caused by the use of steroid injections (e.g. for

Morton's Neuroma) - volume of fluid can rupture ligament.

Arch-Height

• There are people who are naturally flat-footed who are perfectly symptom-free: the flattest foot seen by Bill belonged to an Olympic Champion 4x400 relay runner.

• Certainly not a reason to consider surgery.

• Therapy could help in terms of strengthening.

• Orthotics possibly useful.

• Identify the flat-foot which is inherited: generally not a problem.

• The adult-acquired flat foot, in a patient who previously had a reasonable arch, is different:

- The arch begins to flattens, usually insidiously, sometimes acutely.

- Swelling and discomfort just behind the medial malleolus.

- Often misdiagnosed as an ankle sprain

- Usually a sign of Tibialis Posterior Dysfunction.

- Could be anything from the mildest form of tenosynovitis through to a complete rupture.

- If untreated, arch progressively flattens, the rearfoot becomes increasingly valgus and progressive Achilles tendon shortening which is one of the most important aspects of therapy:

• As the hind foot goes into valgus, the Achilles tendon follows it, taking the shortest route, therefore shortens.

• When undertaking restorative surgery, the heel is repositioned and if the Achilles tendon is tight, with the patient unable to dorsiflex the ankle beyond neutral, it's indication for the lengthening of the Achilles

tendon at the time of surgery.

Morton's Neuroma

- Can be confused with arthritis. Can get synovitis and pain.
- Often occur in isolation.
- Usually between the middle and fourth toe:
 - About 60% will occur in that space.
 - About 35% occur between the second and third toe.
 - Very rare between the first and second.
 - May occur between the fourth and the fifth (small group).
- "Mulder's Click" is not always present
- Always takes an x-ray:
 - Exclude stress fracture.
 - Identify OA in lesser MTPJs.
 - In order to look at the metatarsal parabola.
 - Look to see the relative lengths of the metatarsals, particularly in relationship to the hallux. Often, patients with Morton's Neuroma have a long second and third metatarsal.
- Biomechanical analysis may show overloading, indicating underlying biomechanical reasons, which will remain an underlying cause even if other measures damp down symptoms.

• Ultrasound better than MRI to confirm: more accurate and allows for a more dynamic examination of the lesser MTP joints to see if there is any instability there. Is important to guide injections.

- Always begin with conservative treatment
 - Discuss footwear, especially with women. Flatter heels better.
 - Some intrinsic foot muscle strengthening exercises may help.
 - Orthotics first port of call.
- Injection used before surgery: larger Morton's Neuromas will probably not respond, but it's worth trying.
 - 4-5 alcohol injections, which are actually quite painful and need to be taken about a week apart (and are expensive)
 - Steroid injections no set limit before surgery, but overuse of steroids runs serious risk of rupturing ligaments/plantar fascia. Three is a rule of thumb, provided they have worked previously.
 - Dependent on the nature of the pathology and the response.
 - Reasonable to offer it again if there have been no complications.
 - Injecting too frequently can rupture the plantar fascia.
 - Steroid delivery can be a problem as it causes the thinning of the skin, and
 - sub-cutaneous fat layer (indicated by hypo-pigmentation).
- Surgery: should always be last resort:
 - Around 20% of patients will still not be satisfied afterwards (possibly due to misdiagnosis).
 - May be multiple neuromas
 - Neuroma regrowth is possible, especially if underlying cause not
 - addressed.
 - There will be a patch of numbress in the interspace.
 - Surgery increasingly performed under local anaesthesia; but some patients

prefer general anaesthetic.

- Debate over whether to operate through the dorsal or the plantar aspects.
 - Dorsal Approach: through the intermetatarsal ligament, which
 - connects the necks of the metatarsals. Can destabilise the ligament.
- Rehab:
 - A heel weight-bearing shoe is worn for two weeks.
 - Stitches come out after two weeks.
 - Patients usually referred for therapy to reactivate intrinsic foot muscles. Electro stimulation can be used.
 - Exercises post-surgery are simple: e.g. scrunching up a handkerchief using the toes.
 - Multiple neuromas:
 - Usually either side of the middle toe.
 - Can be bilateral.
 - Removing more than one neuroma could remove the entire sensory supply to the middle toe patients much less likely to tolerate this (feels like a "wooden" toe).

- Not all neuromas may be clinically active. Injection therapy (inject the largest) may show which is most active, and may dictate surgical approach.

- It might be prudent to just undertake a neurolysis of the second.

Clinical diagnosis of Morton's neuroma?

- Take the history sensation of a pebble under the foot/in the shoe.
- Altered sensation or shooting pain between the toes.
- Splayed toes on weightbearing could indicate a large neuroma or bursa.
- Look at the neurological status of the patient may have very subtle reduction of sensation in the webspace. Examine each of the toes and interspaces: look for sensitivity or irritable feeling
- Surgically, vascular compromise (eg Raynaud's) will affect healing
- The soles of the feet give important indicators of how the patient walks callus formation
- Digitally palpate with the index finger and thumb across the interspaces. Check for sensitivity compare both sides.
- Examine joint mobility and stability.
- Squeeze laterally and medially. Theory suggests you'd hear the Mulder's click but not always present. Likely to be accompanied by pain.

<u>Plantarfasciitis</u>

• Shock Wave Therapy is an effective method, increasingly used, should not be the first line of treatment.

- First line is stretching review of biomechanics and a steroid injection (which buys time for other approaches to work).
- Plantarfasciitis in most cases is an overuse injury.
- Some surgeons will deal with the problem by release of medial head of gastrocnemius alone. Results, in patients who have first tried alternative conservative treatment, in terms of pain relief and return to work, are at least as good as plantar surgery. Not aware of biomechanical problems with the knee, ankle or foot associated with an isolated release.

Are ballerinas and dancers simply damaging themselves?

Unfortunately, many are - many retired dancers in their late 40's-50 have feet that look much older.
There was a trend of giving the ballerinas many steroid injections to ensure they could carry on. Many of these dancers finish up with an illness almost like a diabetic Charcot foot. So some problems are iatrogenic.

• Long-term dancers have as many back problems as they do foot problems.

• Those who have worked hard without sufficient medical therapy care at bigger risk than the 'real greats'.

• Most common injury in dancers¹: posterior

impingement. Incidence of os trigonum in normal population is about 10%, in ballerinas it's about 100%. It impinges on flexor

hallucis longus, particularly when on point, leading to posterior ankle pain.

- Cannot normally palpate os trigonum
- Ask the patient to flex their knee to 90 degrees whilst prone.
- Take their foot passively into planter flexion.

- Apply pressure downwards through the heel and ask if it reproduces the pain.

- Can be misdiagnosed as Achilles problem, but pain is deeper. Pain pre posterolateral to Achilles likely to be osseous, posteromedial likely to be FHL. Sometimes may be able to determine hallux saltans (the tendon "triggers") by passively flexing the hallux.

Osteoarthritis in the Ankle

• Incidence of osteoarthritis in the ankle is much smaller than it is in the knee: 90,000 hips and 90,000 knees replaced each year in the UK, only 500 ankles.

• The same forces go through the ankle as the knee and hip but over a much smaller area.

• Usually, trauma is involved in

the case of the ankle (unlike knee and hip). Not necessarily due to fracture but often reccurring ankle sprains: 800,000 ankle sprains each year in the UK.

• Often pain is at front of ankle, accompanied by large spurs – evidence for removing these is not great, although younger patients can benefit. Done arthroscopically, by shaving the bone.

- Many cases of advanced ankle OA never need surgery:
 - orthotics to realign the joint

- injections, either steroid or viscous supplementation (hyaluronic acid) to produce a degree of lubrication within the joint capsule. Initially only licensed for use in the knee, but has been used in the ankle more recently (can be used off-licence if efficacy explained to the patient). Good in

Charcot Foot Charcot Foot The hallmark deformity associated with this condition is midfoot collapse, described as a "rocker-

bottom" foot

Ankle Osteoarthritis Imaging



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¹ Also common in fast bowlers (front foot) and in long jumpers or triple jumpers

younger patients who are not ready for surgery. Some evidence that it helps in recovery of soft tissues after eg ankle sprain or tibialis posterior sheath.

- Ankle fusion is regarded as the gold standard:
 - Good operation in terms of pain relief.

- Often difficult to explain to a patient how it's going to be afterwards: effects similar to wearing a ski-boot – used as a 2-week trial to see how patients cope.

- If concomitant subtalar, talar-naviculars or calcaneo-cuboid OA problem is more difficult: as with fusing a segment of the spine, there is a risk of adjacent segments developing arthritis later on. Therefore pre-existing OA does not augur well.

• **Osteotomy** of distal tibia or hindfoot can realign the weight bearing forces if wear is predominately on one side of ankle. (search Prof B Hintermann for

examples of good results)

• Ankle Replacement: fewer

people are having joint-replacement surgery

- some joint replacements have been taken off the market because of high loosening rates.
- Ideal patient for a replacement is:
 - Aged 70-75
 - Has good bone stock
 - Not diabetic
 - Not on steroids
 - Non-smokers preferred, due to infection risks/wound breakdown
 - No signs of Osteoporosis
 - Obesity not a contraindication in terms of clinical outcomes, but patients encouraged to lose of weight before surgery:

• People often cannot lose weight before surgery due to painful joints

• Patients often gain weight after surgery

• Anaesthetic applies stress onto the cardiovascular system and stress onto the respiratory system as well.

- Larger the weight, the more anaesthetic
- agents needed

• OA of great toe:

- Hallux limitus/rigidus is a very common problem, even in teenagers

- Seen in sport where toes have been trampled on (riding) or in rugby/dancing.

- Usually complain of dorsal pain
- GPs can confuse bunions with osteophytes

Hallux Rigidus



AH. of 4/07. 18/12 post-op

- Non-surgical means sought e.g. footwear, orthotics (Morton's Extension), guided injections

- Surgical options:
 - Manipulation under general anaesthetic
 - Cheilectomy removal of spurs (early OA, dorsal pain, imaged osteophytes)
 - Kellers Operation (joint resection arthroplasty) uncommon.
 Adjacent joint surfaces removed rarely indicated.

• Arthroplasty (joint replacement). Well tried (first in 1952), 6 year results not great. Generally does not restore full range of movement Sometimes only one half of joint replaced (metatarsal head). Ceramic

or metallic.

 Arthrodesis (fusion) regarded as gold standard. Need not impair mobility – many elite athletes have fusions. Women often harder to persuade as they may be wedded to their high heels.

1st MTP fusion



• Sinus Tarsi Pain

- Avulsion fracture of navicular possible. Tenderness over N-spot (superior aspect of navicular) – suspect navicular fracture

- May be consequent to sprain – avulsion at the edge of talar-navicular joint

- Lateral weight-bearing xray needed (unless specified, xrays usually AP, off weight-bearing)

- Can give local discomfort on activity - therefore reproducible in clinic

- May indicate ligamentous injury – talo calcaneal ligament is better seen on MRI than ultrasound

<u>Difference between deformed RA and OA joints</u>

- Rheumatoid patients have specific deformities and pathologies mainly in the hand and the foot.

- Commonly thought of as a problem in the hand; the foot is the most common site of primary RA presentation

- Concern, especially if considering surgery, is quality of bone – likely to be osteopoenic (especially I previously less mobile). Steroids or other immunosuppressant drugs may reduce quality. May slightly increase their risk of infection. Tendon quality also may be affected.

- Outcomes for surgery generally may be affected by low vitamin D (epidemic of low Vitamin D in the UK). Often supplemented alongside calcium to bring to a normal range. Vit D affected by Lack of exposure to sunlight (increasingly working indoors/children covered in sun cream). UV index must be 3 to provide adequate Vitamin D - summer's day in the UK reaches a UV index of 6-7. 20 minutes exposure is then enough to gain the required Vitamin D intake.

<u>Surgical Options for Achilles Tendonopathy</u>

- Chronic Achilles tendonopathy is a major part of the practice

- First step is to decide whether it's a problem of the tendon itself or insertion.

- In Bill's practice, 60% are tendon problems noninsertional/ 40% insertional

- Insertional defines the very point of insertion. Can produce the "rhino horn" effect seen on xray to right. If high pitch angle on calcaneus, can abrade deep surface of tendon.

- Achilles itself can be tendinopathic.
- May get superficial and deep bursitis.
- Can get inflammation of paratenon.

- Over the last 10-15 years, less surgery has been performed on tendons and more insertional problems.

- Eccentric stretching, done properly, is effective, but will take 6-8 weeks to produce results.

- Surgery would entail stripping the inflamed tissue around the tendon, removal of any degenerate core.

- Some tendons are so unhealthy that a Tendon Transfer is performed.

- Involves taking the Flexor Hallux Longus and using it as a secondary Achilles tendon to take the strain off the Achilles. Originally began as a treatment in polio.

- Shock wave therapy can improve the condition over time.

- GTN patches can help.

 Direct steroid injections into Achilles not advised – can predispose to rupture.







- Glucosamine chondroitin
 - Often difficult to isolate effects from concomitant therapy
 Clinical experience suggests that it may be useful