

Tibialis Posterior tendon Dysfunction

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Tibialis posterior tendon deficiency

“Like Gall Stones”

- Fair
- Fat
- Female
- Forty to Fifty
- Hypertension
- Diabetes
- Steroids/Local surgery

Pathoanatomy

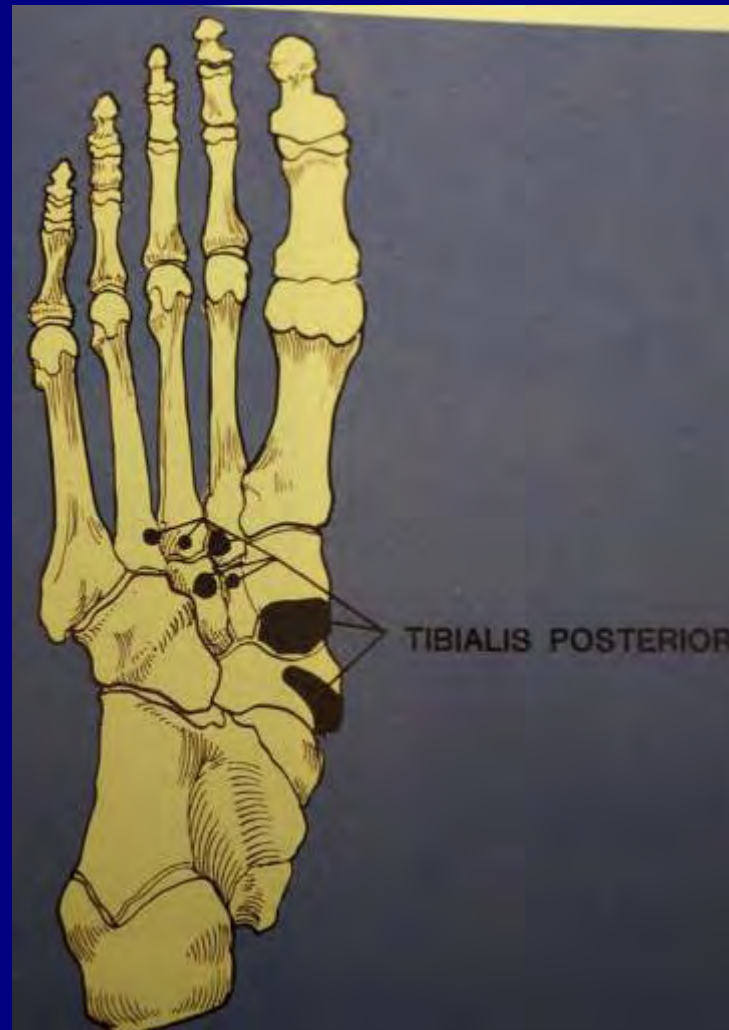
- Strong tendon with short excursion
- Opposed by peroneus brevis
- Weakness results in flattening of the arch
- Medial restraints become attenuated
- Valgus of the hindfoot results in the achilles tendon becoming a deforming force

The myth of muscle balance

Comparison of the relative strength of tendons of the foot and ankle

Tendon	Strength (relative)
Tibialis anterior	5.6
Extensor digitorum longus	1.7
Extensor hallucis longus	1.2
Tibialis posterior	6.4
Flexor hallucis longus	3.6
Flexor digitorum longus	1.8
Achilles	49.1
Peroneus brevis	2.6
Peroneus longus	5.5
Peroneus tertius	0.9

Silver et.al JBJS (Br) 67:432. 1985



Aetiology

- Vascular watershed is behind the malleolus but most tendon tears are distal
- Accessory navicular
- Inflammatory arthropathy
- Most tears are a degenerate tendinosis probably overload related
- Congenital pes planus probably important

Clinical presentation

- Insidious onset of medial ankle pain and swelling
- Start-up pain typical
- Many patients recall a traumatic event
- As arch collapses pain becomes lateral as impingement occurs between calcaneus/fibular and sinus tarsi
- In later stages pain more generalised

Physical examination

- Swelling over the tendon
- “Too many toes” sign (not specific to tib. Post)
- Assess strength in plantarflexion and inversion
- Single stance weight-bearing..”The getting arrested test”
- Also look for the heel inverting
- Has the midfoot/forefoot compensated ?supination
- Assess flexibility of the deformity

81 y.o lady progressive deformity

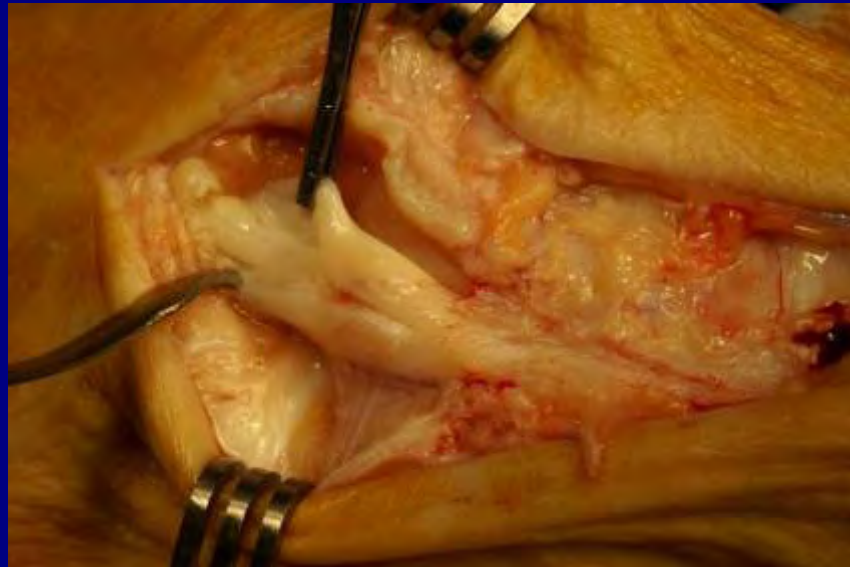




Dr John Negrine
Adult Foot and Ankle surgeon



Operative appearance



Clinical staging – Very useful

Johnson and Strom CORR 1989

- Stage 1 No deformity
- Stage 2 Flexible deformity
- Stage 3 Fixed deformity
- Stage 4 Add ankle arthritis and deltoid insufficiency (Myerson)

Imaging

- A clinical diagnosis
- All patients get weightbearing AP/lateral ankle as well as AP/ IR oblique foot x-rays
- If accessory navicular suspected get an external rotation oblique foot
- Bone Scan/ Ultrasound largely superseded by MRI....which does unearth an occasional surprise (arthropathy)

Hindfoot alignment view

Saltzman Foot Ankle Int. 16:572.1995

- Standing PA
- Angle cassette and beam 20°
- Centre beam on the ankle
- Include a lead strip

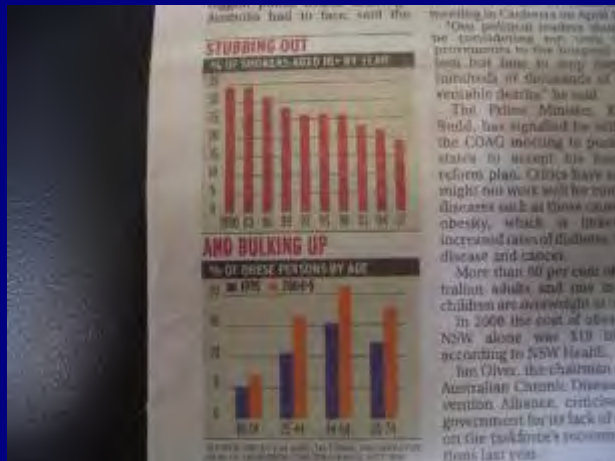


**Natural history is variable so that
most of my patients get a trial of
non-surgical treatment**

Non-surgical treatment

- Weight-loss
- Removable boot
- UCBL heel cup
- Short MAFO

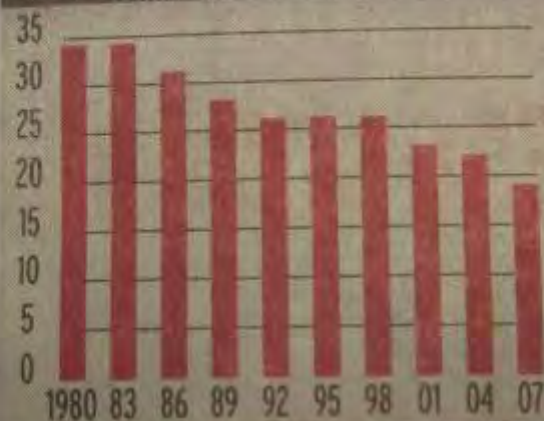
Obesity a major problem



biggest public health challenge Australia had to face, said the

STUBBING OUT

% OF SMOKERS AGED 18+ BY YEAR



AND BULKING UP

% OF OBESE PERSONS BY AGE



SOURCE: OBESITY IN AUST, NATIONAL PREVENTATIVE HEALTH TASKFORCE, CANCER COUNCIL VICTORIA

meeting in Canberra on April 11

"Our political leaders should be considering not only improvements to the hospital system but how to stop litter hundreds of thousands of preventable deaths," he said.

The Prime Minister, Kevin Rudd, has signalled he will take the COAG meeting to push states to accept his hospital reform plan. Critics have said the plan might not work well for common diseases such as those caused by obesity, which is linked to increased rates of diabetes, heart disease and cancer.

More than 60 per cent of Australian adults and one in five children are overweight or obese.

In 2008 the cost of obesity in NSW alone was \$19 billion, according to NSW Health.

Ian Olver, the chairman of the Australian Chronic Disease Prevention Alliance, criticised the government for its lack of action on the taskforce's recommendations last year.



ORTHOSPORTS

www.orthosports.com.au

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JPN and Gladys Chan Obesity Study

- 55 patients
- Average BMI 39.2 (weight/height²)
- Followed for 12 months
- 20 refused to return for follow-up
- Average change in BMI in those who did 0.7!!!

Take home message...They can't or don't want to lose weight!!

Weight loss

We should all be more aggressive about getting these patients to lose weight!

Surgical treatment

Stage 1

- Tenosynovectomy
- Repair of small longitudinal split tears
- Patients with advanced degenerative changes or intrasubstance rupture may require tendon transfer using the flexor digitorum longus

Stage 2: The “interesting” stage

- Flexor digitorum longus transfer
 - Prerequisites: adequate subtalar (15 degrees of inversion) and transverse tarsal (10 degrees adduction) motion
- Flexor tendon transfer is rarely done as an isolated procedure. Typically performed in conjunction with one or more of the following:
 - Achilles tendon lengthening or gastroc recession if equinus contracture present
 - Medial slide calcaneal osteotomy
 - Arthroreisis temporary splintage
 - opening-wedge medial cuneiform osteotomy
 - closing-wedge planar flexion first metatarsocuneiform arthrodesis
 - naviculocuneiform arthrodesis
 - repair of spring ligament
 - lateral column lengthening (late stage 2 (stage 2B) disease)
 - Evans procedure(calcaneal lengthening osteotomy)
 - calcaneocuboid distraction arthrodesis

Tendon passing tip



Heel shift technique tip

- Do the medial calcaneal slide with the patient in the lateral position
- Use a non-toothed laminar spreader to open the osteotomy
- Use a periosteal elevator to reflect the periosteum from either side of the calcaneus to allow for more shift
- One screw is sufficient...”They call it the heel bone.....”

Results of Treatment Stage 2

- Mann and Thompson 17 patients isolated FDL transfer JBJS 1985
- Heel shift + FDL transfer Myerson et. al. Foot. Ankle Int. 1996 32 patients
- Saxby et. al 44 patients 2002 3-5 yr results
- JPN experience 60 cases in last 10 years mostly happy

What's new?

The Scooter



Conical subtalar implant Arthroreisis peg



Arthroreisis

- Conical subtalar implant
- Used as a temporary splint for late stage 2
- Aim to remove at 6 months
- At present experimental



Fixed forefoot supination (varus)

- Consider the opening wedge medial cuneiform osteotomy..”The Cotton 1936” Jeff Johnson Foot and Ankle 2004..paediatric 9/16
- Weil has a good video on youtube!
- Consider also first TMT fusion

Stage III

- Triple arthrodesis
- Subtalar arthrodesis
 - indicated for fixed/restricted subtalar joint, correctable transverse tarsal joint and fixed forefoot varus less than 10 degrees

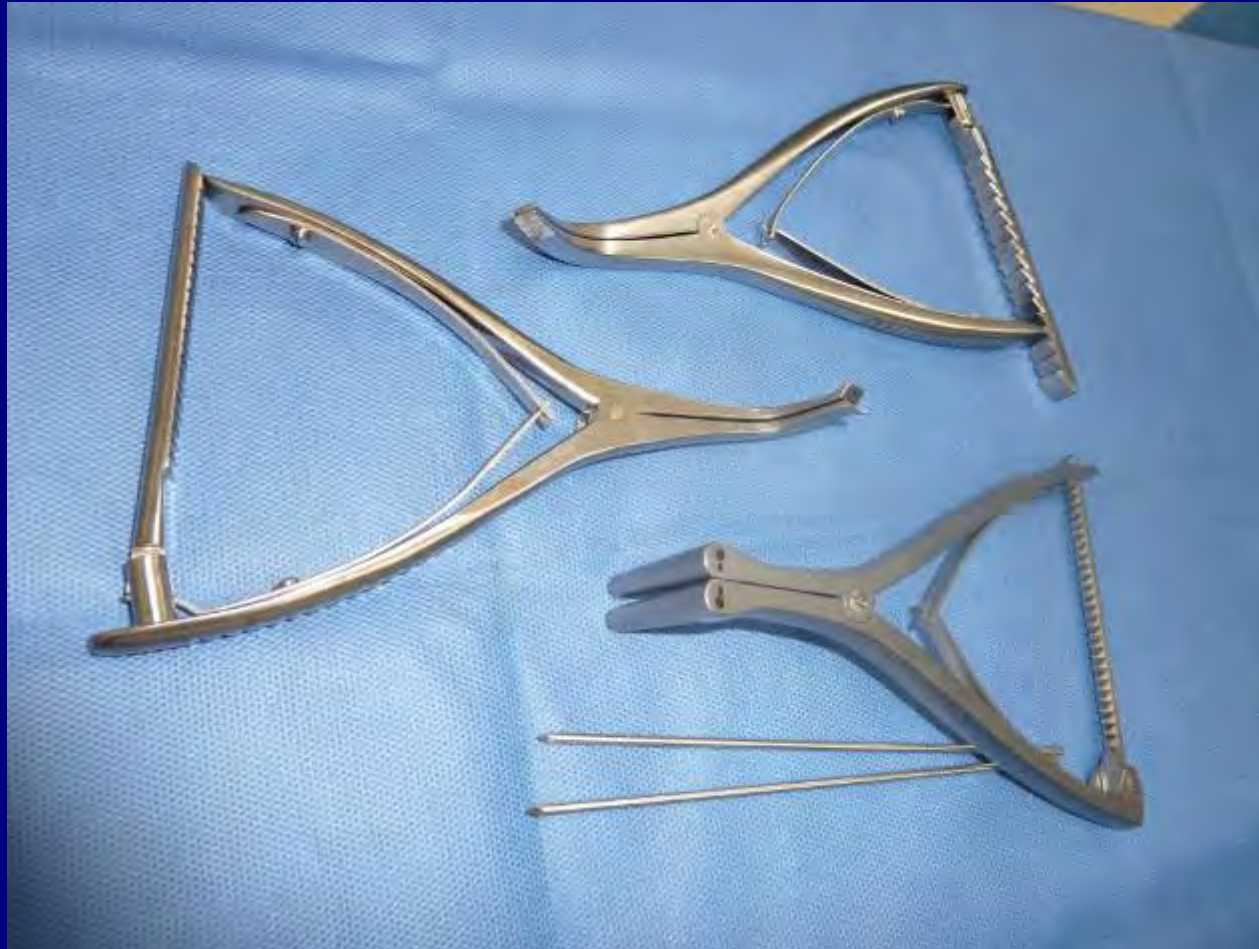
Arthrodesis of Talo-navicular and Subtalar joints but not calcaneo-cuboid joint

Technique tip

Hintermann Distractor



Good tools



Technique

- Meticulously remove joint cartilage using curettes

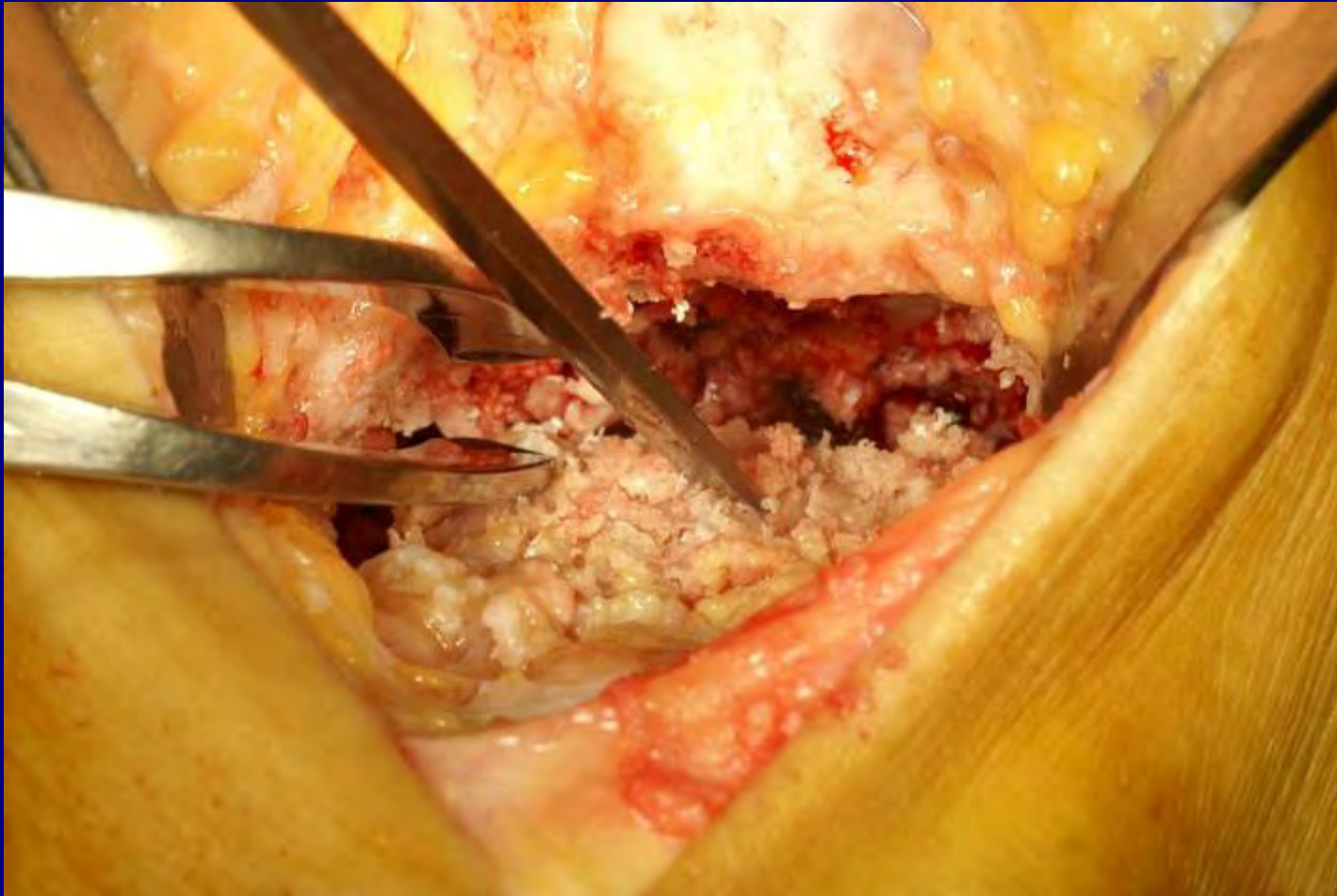


Technique

- Freshen joint surfaces using 2.5mm drill bit



Petalling joint surfaces 4mm osteotome



Subtalar fixation



Some fixation constructs



CT scan talo-navicular fusion



Results of triple arthrodesis

- Myerson and Schon 132 triples JBJS (Am) 2000
- Fortin and Walling 32 triples CORR 1999
- JPN 52 triples in 10 years for posterior tibial tendon deficiency mostly happy

Stage IV – The “unsolved” stage

- Tibiotalocalcaneal fusion
- Pantalar fusion
- Triple + TAR + deltoid ligament reconstruction

Lessons learned

- They don't all progress
- Heel shift/tendon transfer works but takes a long time to recover
- Triple is a good operation for correcting the deformity – Consider leaving the calcaneocuboid joint

The future

- Fusion accelerators (OP1, Infuse etc.)
- Cheaper products – better evidence
- Better fixation

Is nothing constant anymore?

Particles found to
break speed of light,
challenging laws of
physics

September 23, 2011

