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Ankle replacement

“The good the bad and the ugly”

John P Negrine FRACS
Approximately how many hip replacements were done in Australia last year?

- A) 10,000
- B) 20,000
- C) 30,000
- C) 40,000
- C) 50,000
Approximately how many knee replacements were done in Australia last year?

- A) 10,000
- B) 20,000
- C) 30,000
- C) 40,000
- C) 50,000
Approximately how many ankle replacements were done in Australia last year?

- A) 100
- B) 200
- C) 300
- C) 400
- C) 500
Causes of ankle arthritis

- Osteoarthritis secondary to trauma &/or abnormal ankle biomechanics (primary osteoarthritis is exceedingly rare)
- Inflammatory arthropathies
- Haemochromatosis
- Infection
- Neuropathic arthropathy
- Tumour
Incidence

- 0.75% general population (compared with knee 6%)
- Average 14% risk post-trauma, however lesser or greater depending on severity & location of original fracture
Ankle Fusion

The traditional time tested way to treat an end-stage arthritic ankle
Gait analysis of patients with a fused ankle has shown

- Decreased knee flexion before heel strike
- Less time in single-limb stance
- Reduced sagittal ground-reaction force, which is important only with barefoot walking
Complications

- Non-union 5 – 10% incidence
- Factors associated with non-union include infection, smoking (4x greater risk), impaired vascularity, neuropathy, osteonecrosis of the talus, malalignment, poor technique, & post-operative non-compliance

- Mal-union
- Pseudoarthrosis
- Neurovascular injury
- Stress fracture of the tibia
- Infection
- Subsequent arthritis development in joints of hind- & midfoot
Longterm follow-up

- 23 patients followed for a mean of 22 years
- 100% developed arthritis in the surrounding joints
- More pain, disability and limitation of movement than contralateral limb

??were surrounding joints injured in the first place??
BUT

None of these patients had had any further surgery!!!
Fusion 6/2000 M 63
A wise man once said:

Nothing ruins a series more than longterm follow-up!
10 years later
Case study

61 year old man

- Ankle pain
- Disabling
- Walking distance 100m
- Not responding to NSAIDS
Case study
Ankle and talo-navicular OA
Fusing the ankle and talonavicular joints will leave him with no hindfoot movement

“Function little better than a below knee amputation”
Ankle replacement and TNJ fusion 2010
3 operations later 2016
Total ankle replacement

- Began in the 1970’s
- Mostly disastrous...
- Failure because of poor techniques, poor implants, poor patient selection
- Largely abandoned for 30 years by most surgeons
Ankle replacement renaissance

- Better techniques
- Better implants (3 component)
- Very encouraging results from the Danish (Kofoed) and the Swiss (Hintermann) and the French (Bonnin)
Ankle arthroplasty

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Ankle arthroplasty
Hakon Kofoed

58 ankles
- 10 year follow-up
- 80% survivorship
- CORR 424:73-79, 2004
Published results

- **Total ankle replacement**
  - THE RESULTS OF 100 MOBILITY TOTAL ANKLE REPLACEMENTS
  - P. L. R. Wood, M. T. Karski, P. Watmough
  - DOI: 10.1302/0301-620X.92B7.23852 Published 30 June 2010

  – This study suggests that the early outcome of ankle replacement is comparable to that of other total joint replacements.

  - The occurrence of pain which defied our attempts at diagnosis is a cause for concern. We explore the ankle when we think there is malleolar impingement, but despite this, one patient in this series in whom we made this diagnosis obtained only temporary benefit.
Published results

The outcome of the Mobility total ankle replacement at a mean of four years
Can poor outcomes be predicted from pre- and post-operative analysis?
D. Muir, J. Aoina, T. Hong, R. Mason
DOI: 10.1302/0301-620X.95B10.30204 Published 27 September 2013

• The outcome of the Mobility TAR at a mean of four years is satisfactory in > 85% of patients. However, there is a significant incidence of persistent pain, particularly on the medial side, for which we were unable to establish a cause.
Published results Hinterman

- 722 ankles
- 94% at 5 years
- 84% at 10 years
- 1% incidence of cysts

- JBJS (Am) 95: 1175 - 1183
The author or one or more of the authors have received or will receive benefits for personal or professional use from a commercial party related directly or indirectly to the subject of this article. In addition, benefits have been or will be directed to a research fund, foundation, educational institution, or other nonprofit organisation with which one or more of the authors are associated.
What’s wrong with ankle replacement?
The problems

- Pain relief unpredictable
- High re-operation rate
- Cysts
- Very unforgiving of deformity
- Young active people are not good candidates
“I've had the STAR replacement in January 2013 and a revision in October 2013 since the tibial component was tilted. I have had problems with peroneal tendonitis since this surgery and am in constant pain when I walk. I get steroid shots whenever it swells too much but I don't feel that I should be feeling like this after all this time. I thought I was the only one with problems with the STAR”
“If there are any of you still out there... I have a Salto ankle implanted about a year ago. Still in pain, irritable, exhausted, finally a SPEC CT showed huge bone activity under the implant of the talus - revision surgery in three weeks. Terrified now of what next. I had distraction, osteotomy, cleanouts, replacement... if this does not work I AM WORN OUT. Done. Old. Finished. Blech. OMG, what happened to my sense of humor.”
The problems

• Pain relief unpredictable
• High re-operation rate
• Cysts
• Very unforgiving of deformity
• Young active people are not good candidates
Re-operation rate
Replacement vs Fusion

- 9% at one year (5%)
- 23% at 5 years (11%)
- Based on 480 cases
- JBJS (Am) 89:2143-2149. 2007
The problems

- Pain relief unpredictable
- High re-operation rate
- Cysts
- Very unforgiving of deformity
- Young active people are not good candidates
Another example
Cysts

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What causes the cysts?

- Osteolysis from implant wear debris
- Stress shielding
- Continuous high joint fluid pressure
- Pre-existing osteoarthritic cysts
Talar cut referenced from tibia
Peri-prosthetic cysts

- Hintegra ankle prosthesis
- 99 ankles
- 37% incidence of cysts
- “No major association was found between the presence of osteolysis and clinical or radiological outcomes”

Foot. Ankle. Int 35(1) 2014
JC 6 years – “very happy Doc. Best thing I’ve ever done”
JM 6 years – no pain, no swelling, no analgesia

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Interestingly

- All these cysts were found on routine follow-up
- CT scanning is far more revealing than plain x-ray
- Most of the cysts were asymptomatic and worried me far more than the patient!
- A large cyst can obviously lead to catastrophic failure necessitating urgent revision
Osteolysis in TAR: Take home messages - Murray Penner

1. It’s common & typically occurs early

2. The cause(s) is not yet well understood

3. PE wear may be a factor, but other implant design & insertion factors are likely equally or more important

4. When cysts are identified and seen to progress, bone grafting or revision is likely warranted, though evidence is lacking

IFFAS Chicago 2011
LC ankle replacement 2010
grafted cyst 2015 – Golf 3x/week
When a patient has complications

• Make them your friend – Des Bokor

• If you do ankle replacement you will have lots more friends!!

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The problems

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81 y.o lady progressive deformity
The problems

- Pain relief unpredictable
- High re-operation rate
- Cysts
- Very unforgiving of deformity
- Young active people are not good candidates
The problem with young ankle arthritis

- Fusion not ideal as they will live long enough to get arthritis in the surrounding joints
- You can’t replace the ankle in a 30 year old
- Stem cells ??? Well enough said!!!!!

In my opinion an unsolved problem
Total hip replacements in Australia 2015

48,000
Total knee replacements in Australia 2015

48,000
Total ankle replacements in Australia 2011

274
Total Ankle replacements in Australia 2015

130
While hip and knee replacements continue to be performed in increasing numbers, ankle replacement in Australia has been declining since 2011.
Remember

- An MRI scan is suggested to help the Cronulla sharks!