Fuse or Refuse ?

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Is Ankle Arthrodesis the Future?

And you think you're overworked…

NO

But.....

- Ankle more forgiving joint to fuse?
- Better option for young, high demand patient?

Who?

- Young, 20 to …….. 60
- High demand
- Significant deformity
- Previous infection
- Failed TAR

When?

- Failure to respond to conservative measures
  - Education and reassurance
  - Analgesia
  - More supportive footwear
  - Bracing
  - Improved control of inflammatory arthropathy
  - Steroid injections – no good evidence base
  - Hyaluronan injections – no good evidence base
- Affecting work, daily activities and sleep
- Radiographic ± arthroscopic evidence of advanced degenerative changes

Consider

- Arthroscopic debridement
  - If joint reasonably preserved
  - Impingement
    - Synovial hypertrophy
    - bony spurs/osteophytes
    - Loose bodies

Arthroscopic debridement for impingement had a 75% success rate at 5 years in the presence of spurs, but only 50% with loss of joint space (Tol et al 2001).

Consider



- Periarticular osteotomies

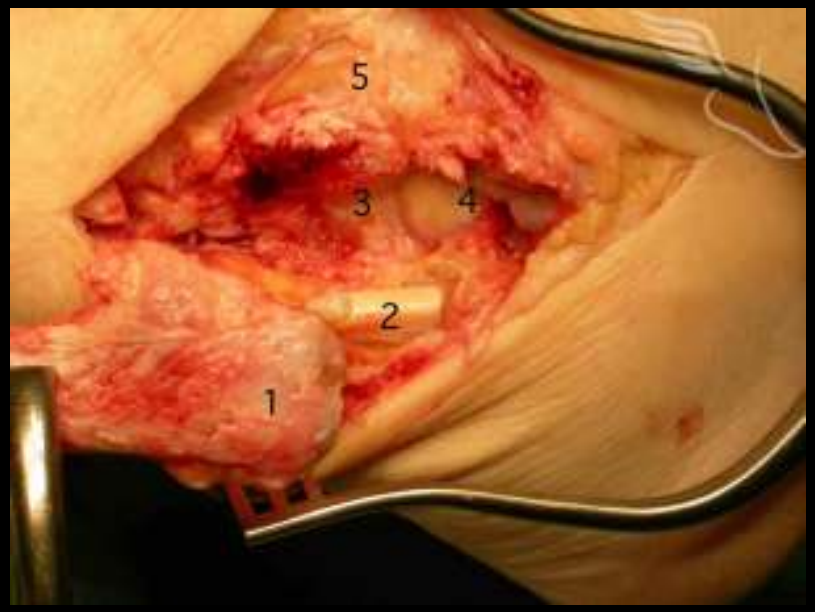
- Distraction arthroplasty
  - Articulated Ilizarov frame across the ankle with a distraction force.
  - requires complex apparatus and specialised staff
  - Weightbearing radiographs suggest that joint cartilage thickness is regenerated

Improvement in pain and movement have been reported (Marijnissen et al 2003)

Tellisi (2009) reported 23 patients, distraction was applied for 12 weeks. At a mean of 30 months follow-up the mean AOFAS score was 74/100. Pain scores improved in 21/23 patients and there was some improvement in SF-36 scores but this did not reach statistical significance. Patients with pre-operative equinus gained dorsiflexion, but the average range of movement of the group overall did not change.

Ankle Arthrodesis

- **Open**
  - **Approach**
    - Anterior
    - Posterior
    - Lateral ± short medial arthrotomy
      - Excise lateral malleolus
      - Morcellise for bone graft
  - Cuts
    - Flat
    - Chevron
    - Anatomical
  - **Arthroscopic**
    - Becoming standard technique
  - Plantigrade, 5° valgus, 5-10° external rotation



•Fixation
•2-4 cancellous screws
•± plate

Results of Open Arthrodesis

A study of 17 patients 20 years after ankle fusion (Fuchs et al 2003)

- reduced SF-36 pain, physical functioning and emotional disturbance scores
- Most patients wore customised footwear, but few had walking aids
- All but one had returned to work
- There was significant progressive OA in the other hindfoot (Subtalar and Talo-Navicular) joints in >50%.
- The surgery included more external fixation than would be expected in a current population

Results of Open Arthrodesis

(Buchner et al 2003)

- 48 patients
- little or no pain or restriction of activity in 92% of patients at an average of 9.3 years follow-up

An independent study of fusion in OA (Anderson et al 2002)

- true fusion rate was 80-89%

In rheumatoid disease, Felix et al (1998)

- union in 96% of 26 ankles at 2-8 year follow-up
- no pain

Results of Arthroscopic Arthrodesis

>15 series reported

- Winson (2005)
  - 118 reported
  - 105 were followed clinically for a mean of 65m
  - 109/118 procedures fused at a mean of 12weeks
  - Most non-unions happened early in the series
  - subsequently all patients immobilised for a minimum of 12/52
  - Smoking was twice as common in non-unions
  - 3 superficial and 1 deep infection
  - 1malunion
  - 2pulmonary emboli
  - recommended arthroscopic fusion even if the ankle was in valgus or varus provided the forefoot was plantigrade.

Results of Arthroscopic Arthrodesis

- Gougiolias (2007)
  - mortise deformity and the foot was not plantigrade, by excising bone from the mortise arthroscopically to align the ankle
  - 30/78 patients had a pre-operative coronal deformity of >15deg
  - none had more than 3deg post-operatively
  - 5 patients had simultaneous arthroscopic subtalar fusion
  - 5 delayed unions
  - 2 non-unions
  - time to union was 2months extra in smokers
  - 1 PE, 1 nerve injury and 6 patients had subtalar pain

Results of Arthroscopic Arthrodesis

Overall ± 550 arthroscopic arthrodeses reported

- total fusion rate of 93.3%
- all series diagnosed union on plain radiography rather than CT

- Myerson (1996) mean time of fusion of 8.7 weeks in arthroscopic versus 14.5 weeks in open arthrodeses

- Nielsen (2008) 90% of arthroscopic and 57% of open fusions were united at 12 weeks.

Arthrodesis vs. Arthroplasty

Ideally compare patients with

- No major deformity
- No infection
- No significant bone loss
- No neuropathy

There are no RCT's comparing patients in whom both AA and TAR would be an option

Arthrodesis vs. Arthroplasty

Saltzmann (2009, 2010)

- FDA approved study
- STAR TAR or open AA through a fibular osteotomy with screw fixation
- Buechel-Pappas ankle score was main outcome measure improved by
  - 40 points for the STAR
  - 26 points for the fusions
  - mainly accounted for by significant improvements in most of the functional scores

  - no significant difference in pain relief or patient satisfaction
  - more intra-operative problems, nerve injuries and wound problems in the STAR group
  - similar infection rates
  - union rate in the fusions was 64/66
  - 7/415 loose replacements at 24 months , 5 revisions.

  - At 4 years the clinical results of TAR were similar to those of fusion
    - TAR better pain relief and
    - more postoperative complications that required surgery.

Arthrodesis vs. Arthroplasty

A systematic review of the literature by Haddad et al (2007)

- overall reported results of both procedures similar
- 70% satisfactory results after both procedures
- non-union rate for ankle fusion was 10%
- arthroplasty survival rate 77% at 10 years
- more variation in results for arthroplasty.

Kinematics and Gait

- AA affects ROM and Kinematics more than TAR (Valderrabano et al 2004a,b)
- Gait analysis is closer to normal in TAR (Butcher 2004, Piriou 2008)
- TAR should place less stress on adjacent joints

Clinical confirmation required

Kinematics and Gait

Naal (2009)

- 2/3 of 101 TAR patients were active in sports 4 years after ankle replacements
  - swimming, cycling, fitness training and downhill skiing
  - average of 4.4hr/week
  - 35% had radiolucencies around the tibial implant but this did not affect the likelihood of sports activity

Finally

- Not enough data to say whether TAR or AA better for patients in whom either procedure would be an option
- At 10 years clinical success rates appear similar
- TAR probably has a small functional advantage
- But
  - TAR failure rates vary widely
  - TAR has a much higher rate of secondary surgery

Finally

- Does the onset of OA in adjacent joints reduce the success of AA after 10 years?
- Do the improved kinematics of TAR reduce wear on adjacent joints
- No comparative studies yet……..

Cases

JM

- 69. Retired man
- Severe pain and deformity left ankle
  - Rest pain, pain at night
  - Affecting daily life
- Injury to ankle 30 years ago
- O/E:
  - Varus hindfoot deformity
  - Antero-medial tenderness
  - Dorsi flex 10° plantar flex 15°. Normal subtalar movements

Pre-op

Intra-op

2/12 post op

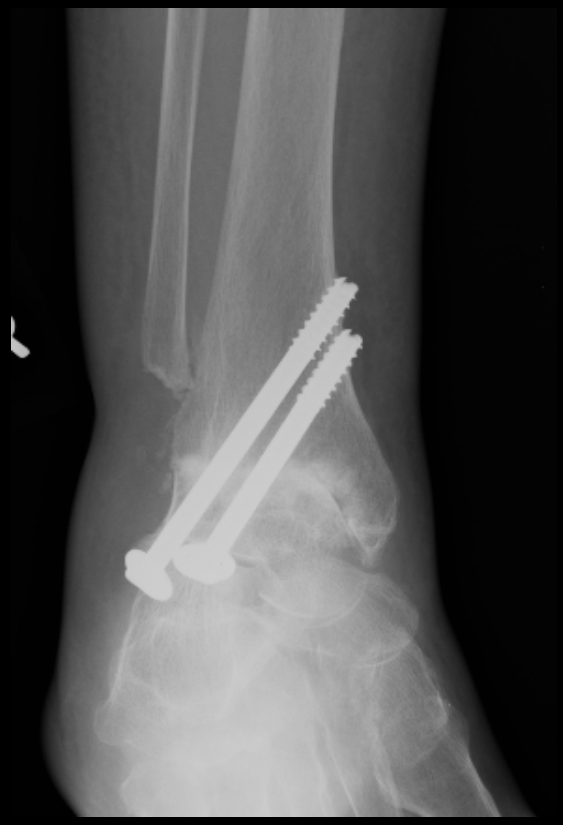
JT

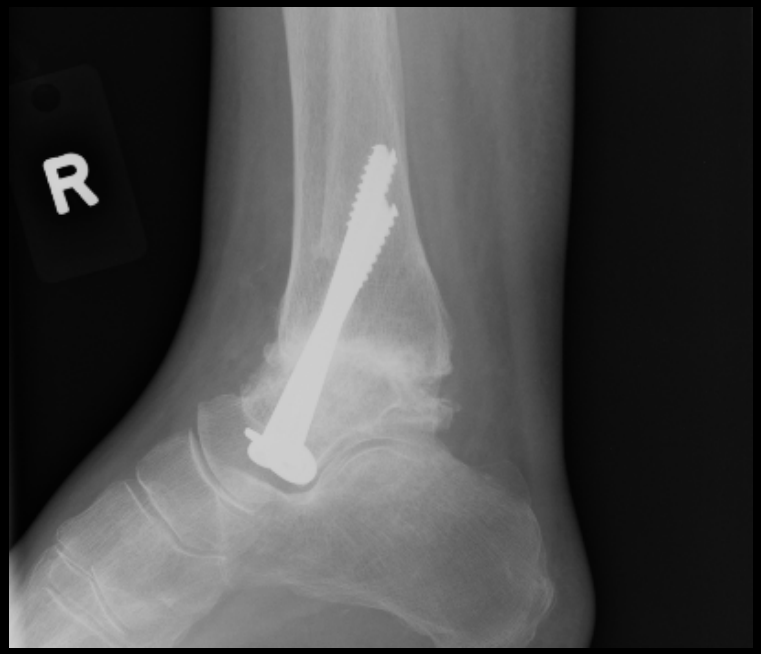
- 86, nun
- Very active with gardening, walking etc
- Severe pain at rest
- Declined offer of TAR

Pre-op

Intra-op

Post-op 4/12





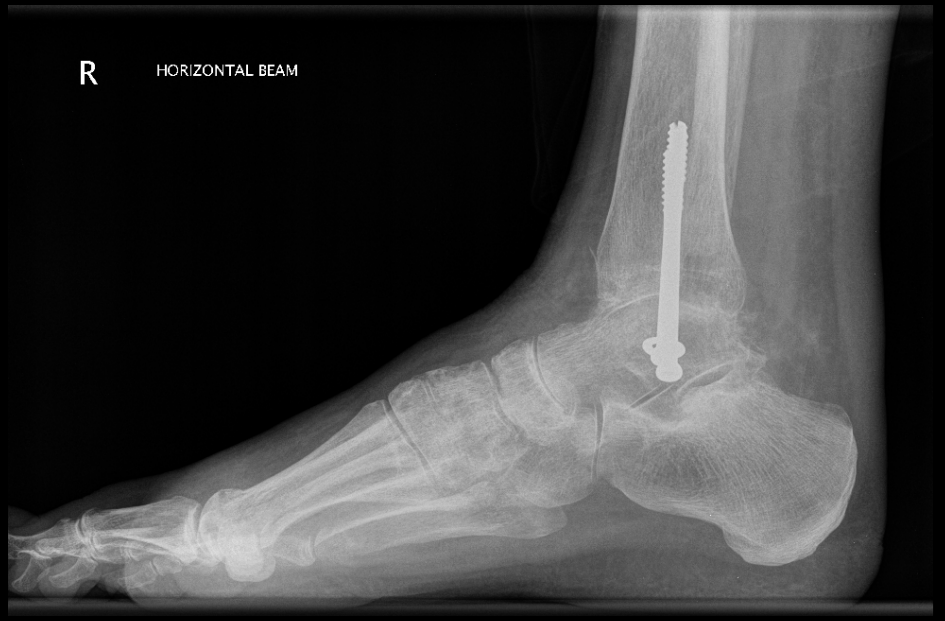
DF

- 66. Self-employed. Fit and well
- Long history of pain right ankle
  - Pain on weight bearing, walking, rest pain and night pain
- Injury to ankle 20 years ago.
- O/E:
  - Medial/anteromedial tenderness
  - Dorsi flex 10° plantar flex 25°. Normal subtalar movements

Pre-op

Intra-op

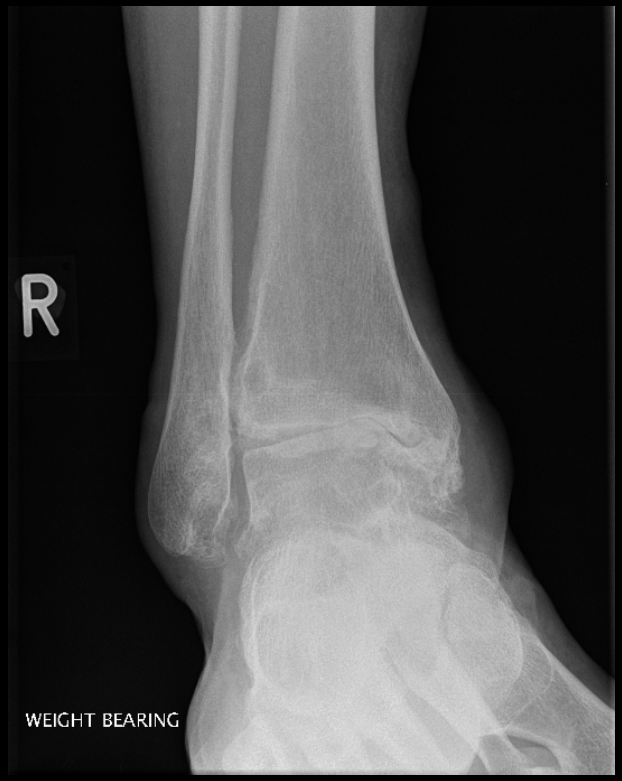
Post-op



PF

- 53. Labourer. Fit and well
- 3 year history pain right ankle
  - Severe, at rest, difficulty working
- Injury to ankle in 20s.
- O/E:
  - Hindfoot varus
  - Globally tender
  - Dorsi flex 5° plantar flex 15°. Normal subtalar movements

Pre-op



Intra-op

Post-op 2/12

PH

- 47. Forklift truck driver. Fit and well
- Worsening pain right ankle
  - Constant pain at rest and nocturnal symptoms
- No known injury
- EUA – Lateral instability
- Arthroscopy – multiple full thickness chondral defects
- O/E:
  - Globally tender
  - Dorsi flex 10° plantar flex 10°. Normal subtalar movements

Pre-op

Intra-op


BISHOP AUCK
TORRES PSDS
RADIOL
62


HICKS
PAUL
4147875
29-12-1962
BISHOP AUCKI
TORRES PSDS
RADIOLI
=1
=0
=255
=127

Acknowledgements

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