Total ankle replacement

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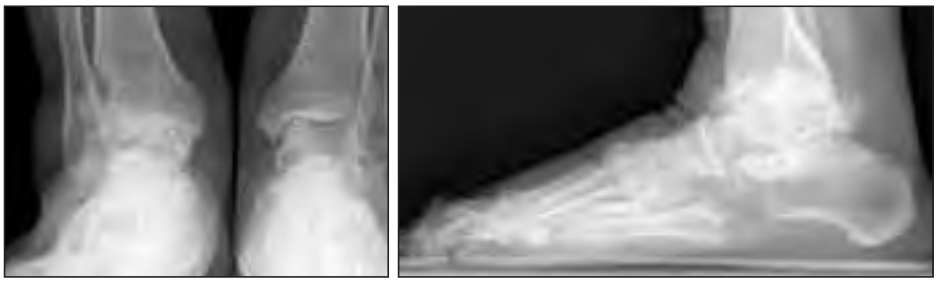
Although painful ankle arthritis may be successfully treated with fusion, long term results deteriorate because arthritis eventually develops in neighbouring joints that are forced to compensate for lost ankle motion. Total ankle replacement (TAR) is now a worthwhile option in selected patients.

Ankle arthritis

The prevalence of symptomatic ankle arthritis is around one-eighth that in the knee. Past trauma accounts for 70-80% of cases of symptomatic ankle arthritis, with the incidence on the rise despite advances in the treatment of injuries.

Inflammatory arthritis is the other main cause but rheumatoid disease modifying agents may reduce the progression to end stage disease in years to come.

Primary osteoarthritis (OA) of the ankle is relatively uncommon, compared to the hip and knee.



Views of advanced ankle OA.

Difficulties with ankle replacement design

The ankle carries loads of up to five times the body weight during normal walking. Yet the surface area available for implant fixation is considerably less than in the hip or knee.

First generation implants lacked success because they:

- Did not preserve the strongest bone, resulting in frequent bone collapse from the high pressures applied.
- Had constrained articulation design with motion that was a poor mimic of the normal ankle – both stressed the fixation surface.

Wound healing complications are more common with ankle replacement due to a less robust soft tissue envelope, perhaps already compromised by prior trauma. Moreover, blood supply to the anterior midline region is from a single artery and the usual incision divides this region.

Ankle replacement was first attempted in the 1970s and although labeled "very promising", an unacceptably high proportion of these implants failed within a few years. Salvage was difficult due to the amount of bone lost and the procedure was largely abandoned in favour of arthrodesis.

Modern mobile bearing total ankle implant (Mobility, DePuy).

Results from modern ankle replacements

The best design for a durable TAR aims to make optimal use of the available bone stock, reduce stress on the implant-bone interface, and minimise bearing wear. For implantation, the surgical technique must be accurate and reproducible, and revision or salvage should be feasible.

Over the last decade, new materials, improved biomechanics and more accurate surgical techniques have greatly improved results. More anatomic components require less bone resection. Highly congruent mobile bearings of modern polyethylene are used. Fixation is better with porous (bone ingrowth) uncemented components.

Implant survival for those designed in the 1980s range from 80% at 5 years to 94% at 10 years, with patient satisfaction around 90% (for those joint replacements not revised).

Of the two implants most commonly used in Australia, one was designed in 2000 and has results at three years that are an improvement on its forebears. The other has only been on the market for four years. It is closely modelled on the ankle replacement that achieved the best results earlier, with modifications based on knowledge gained from ankle replacements and arthroplasties elsewhere.

While medium-term follow-up of a hip or knee replacement almost invariably reveals a delighted patient, 20-30% of patients undergoing TAR will express reservations. This may be due to a disappointing gain in motion or mild residual discomfort. Patient satisfaction is high overall, however, and some are pleased to return to golf, bowls, hiking, or even skiing.

Alternatives to ankle replacement

Non-surgical treatment: This is tried first – simple analgesia, NSAIDs, and a variety of braces, orthotics and shoe modifications provide some relief.

Joint sparing surgery: Many post-traumatic ankle deformities are amenable to reconstructive or realignment procedures. Examples are correction of fibular malunion combined with repair of the distal tibio-fibular syndesmosis, and wedge osteotomies of the distal tibia. These joint-sparing operations should often be considered first, particularly in younger patients who frequently tolerate arthrosis well if alignment is optimal. Arthritis progression can be slowed when a predisposing hindfoot deformity (cavovarus or planovalgus) is corrected. Arthroscopic removal of osteophytes is helpful in earlier arthritis.

Ankle fusion: The most reliable procedure for many patients is still ankle arthrodesis (fusion). If a solid fusion is achieved in good position, as happens in over 90% of cases, the pain relief is excellent and function is surprisingly good. The risks include non-union, malleolar impingement on footwear, and mal-position. Difficulty walking on uneven ground or stairs is common and rehabilitation is long. Gait studies reveal many near normal parameters, however lost ankle motion is compensated for by adjacent joints in the foot, resulting in premature arthritic changes of the subtalar and talonavicular joints in particular. Stiffness and pain may take more than 10 years to develop.

Current indications for total ankle replacement

While each patient should be counselled and treated according to their individual situation, the ideal patient for TAR is >60 years old and non-obese, with a well aligned ankle.

The benefits of preserving ankle motion are greater for those with a prior subtalar or triple fusion, bilateral disease, or rheumatoid arthritis.

Contraindications include vascular disease, neuropathy, compromised soft tissues, avascular talus and major malalignment. ■

Post-op total ankle replacement (different patient).