

Ankle joint replacements

What is ankle joint replacement?

Ankle joint replacement is a newer operation than the well-established replacement operations for hip and knee joints.

Whereas the hip is a ball in socket joint and the knee is fundamentally a hinge joint, the ability of the ankle and forefoot to flex, extend, invert and evert makes it a complex joint. These actions are necessary to be able to walk over uneven ground.

Ankle arthritis affects approximately 1% of the adult population worldwide however, the clinical understanding of ankle arthritis is still incomplete.^[1] For end-stage ankle arthritis, ankle arthrodesis was considered as the "gold standard" in the past. However, ankle arthrodesis results in loss of joint mobility, limited daily activities, and accelerated degeneration of adjacent joints.

Indications and other options

Indications^[2]

Total ankle arthroplasty is indicated for patients with end-stage ankle arthritis who have sufficient bone stock available in the tibia and talus to support a prosthesis. Patients with associated arthritic changes in adjacent joints of the hindfoot and midfoot are ideal candidates.

Haemarthrosis is the most common and earliest manifestation of [haemophilia](#). Repeated haemarthrosis over time causes the development of haemophilic arthropathy.^[3] The ankle joint is often involved and there is often uncertainty about the best course of action.

Other treatments for ankle arthritis

Conservative treatments may be tried first:

- Non-surgical, including:
 - Analgesia.
 - Orthotics, such as a splint and/or a shoe with a 'rocker sole'.

- Surgical:
 - Arthroscopic debridement.
 - Ilizarov joint distraction - an external frame fixed around the joint.

Arthrodesis (ankle fusion)

This is the main alternative to ankle joint replacement:^[4] ^[5]

- It has a much lower rate of failure or complications and does not 'wear out'. It is equally effective for pain relief.
- The ankle joint will be rigid, although there can be some compensation from increased mobility at nearby joints.
- There is concern that it may lead to increased strain and therefore arthritis of nearby joints, particularly the subtalar joint. In practice, there seem to be radiological changes of the subtalar joint but few symptoms.

Replacement or fusion?

Research suggests there is a higher overall complication rate after ankle arthrodesis (AA), but a higher reoperation rate for revision after (total ankle arthroplasty) TAA so, the decision to proceed with TAA or AA for end-stage ankle arthritis should be made on an individual patient basis.^[6] Factors to consider:

- Function of the whole limb and mobility of surrounding joints.
- Suitable patients for joint replacement tend to be in the older age group (over 50) and prepared to accept a rather higher risk of failure than with hip or knee arthroplasty.
- Younger patients are approached with more caution, as they have longer expected life, and tend to be more active and so put prosthetic joints under more stress.
- Occupation and its likely stress on the joint must be considered.
- With bilateral ankle arthritis - a *bilateral* fusion can be disabling for certain tasks - eg, getting up from a chair; in this situation, it may be preferable to replace one or both joints.

Contra-indications for total ankle replacement^[7]

Absolute contraindications to total ankle replacement include: active infection, peripheral vascular disease, inadequate soft-tissue envelope and [Charcot neuroarthropathy](#).^[8]

Relative contraindications include: young, active patients, previous infection, severe lower extremity malalignment, marked ankle instability, marked [osteoporosis](#), and osteonecrosis of the talus.

Types of prosthesis

In the UK, most ankle replacements have a mobile component between the talar and tibial components, which moves forwards and backwards slightly during ankle motion. In some ankle replacements the plastic is fixed to the tibial component, and this is known as a two-component or fixed-bearing ankle replacement.^[9]

Primary ankle joint replacements in the UK currently include Zenith®, Box®, Salto®, Hintegra®, Star® and Rebalance®.^[10]

Pre-operative and postoperative practical considerations

- **Deep vein thrombosis (DVT)** prophylaxis may be needed (as with any leg operation).
- Practical points after ankle replacement surgery (details will vary according to surgical practice and patient need):
 - A splint or plaster cast will be fitted, and the patient may be non-weight bearing for up to six weeks.
 - Physiotherapy may be advised.
 - Driving may be possible after three months.

Outcomes

Data from joint registries suggest there is variation in primary ankle replacement survival rates across these national registries, although even after 5 years, these population derived data show an 80% revision free survival.^[11] There is also evidence that indicates total ankle replacement has a positive impact on patients' lives, with benefits lasting ten years, as judged by improvement in pain and function, improved gait and increased range of movement.^[12]

Function after ankle replacement

- Gait can be normal or near-normal (assuming the rest of the limb is unimpaired).
- Running is unlikely.
- Cycling and swimming are possible.

Complications of ankle joint replacements

The following complications may occur:^[13]

- Deep infection of the joint.

- Periprosthetic wound infection. ^[14]
- Delayed wound healing or breakdown.
- [DVT](#) or [pulmonary embolism](#).
- Pain and stiffness despite replacement.
- [Malleolar fracture](#).
- Impingement.
- Failure of implant.
- Further surgery needed.

Ankle arthrodesis may be an option for failed total ankle replacement. ^[15]

Both implant design and surgical technique are improving, leading to better patient outcomes. ^[16]

Further reading

- [Herrera-Perez M, Valderrabano V, Godoy-Santos AL, et al](#); Ankle osteoarthritis: comprehensive review and treatment algorithm proposal. EFORT Open Rev. 2022 Jul 5;7(7):448-459. doi: 10.1530/EOR-21-0117.

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