Total Ankle Replacement
Rehabilitation guidelines

At the RNOH, our emphasis is patient specific, which encourages recognition of those who may progress slower then others. We also want to encourage clinical reasoning.

Milestone Driven

These are milestone driven guidelines designed to provide an equitable rehabilitation service to all our patients. They will also limit unnecessary visits to the outpatient clinic at RNOH by helping the patient and therapist to identify which specialist review is required.

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Indications for Surgery

- Pain and decreased function not responsive to conservative treatment. Causes include post-traumatic osteoarthritis, primary osteoarthritis, Rheumatoid Arthritis, systemic joint disease, idiopathic arthritis.

Possible Complications

- Infection
- Wound healing problems
- Persistent swelling
- Loosening / subsidence / migration of components
- Impingement
- Bleeding
- Nerve damage
- Deep Vein Thrombosis
- Pulmonary Embolism
- Non-union
- Persistent / recurrent pain
- Fracture of bone / components
- Tendon injuries
- Contractures
- Complex Regional Pain Syndrome
- If failure, may require subsequent revision ankle replacement or conversion to fusion or to below knee amputation
Surgical Techniques
The commonly used Total Ankle Replacement (TAR) prostheses at RNOH are the BOX Ankle Replacement (MatOrtho) or the Infinity Ankle System (Wright Medical Technology). The BOX is a three component, cementless, unconstrained, mobile-bearing prosthesis. The Infinity is a two component, cementless, semiconstrained prosthesis.

The surgery may also include one or more of the following, depending on the clinical presentation of the patient:

- Tendo-Achilles lengthening
- Calcaneal osteotomy
- Tendon transfers
- Ligament reconstruction
- Other osteotomies or joint fusions

Clinical Trials
A multi-centre randomised clinical trial is being led by the Royal National Orthopaedic Hospital comparing ankle replacement against ankle fusion (TARVA) – further details can be found at http://anklearthritis.co.uk

Expected Outcome
- Improved function / mobility
- Improved pain relief
- Increased walking tolerance with decreased walking aid requirement
- Return to no-impact / low-impact sports may be possible but strenuous sport inadvisable
- Maintenance or improvement in range of movement (if the ankle was very stiff before surgery, range of motion may not be improved due to soft tissue constraints)
- Full recovery may take up to twelve months

Pre-operatively
When practical the patient will be seen pre-operatively, and with consent, the following assessed:

- Current functional levels
- General health
- Social / work / hobbies
- Functional Range of Movement
- Gait / mobility, including walking aids and orthoses
- Post-operative expectations
- Patient information leaflet issued
- Post-operative management explained

Post-operatively
Always check the operation notes, and the post-operative instructions. Discuss any deviation from routine guidelines with the team concerned. This is very important if the patient has had any other techniques as well as the Total Ankle Replacement as weight-bearing status and progressions may be different as well as other restrictions.
Initial rehabilitation phase
0-4 weeks

Goals:
• To be safely and independently mobile with appropriate walking aid, adhering to weight bearing status
• To be independent with home exercise programme as appropriate
• To understand self management / monitoring, e.g. skin sensation, colour, swelling, temperature, circulation
• Exercises to strengthen core

Restrictions:
• Ensure that weight bearing restrictions are adhered to:
  o Total Ankle Replacement (TAR)
    ▪ Non weight bearing (NWB) for 2 weeks in Back Slab
    ▪ Below Knee Plaster of Paris (BK POP) at 2 weeks. Progress to Full Weight Bearing (FWB) in POP.
    ▪ POP removed at 4-6 weeks. May require Aircast™ boot. FWB.
  o If any other surgical technique used ensure you check any restrictions with team as these may differ from TAR alone
• Elevation
• If sedentary employment, may be able to return to work from 4 weeks post-operatively, as long as provisions to elevate leg, and no complications

Treatment:
• Likely to be in POP
• Pain-relief: Ensure adequate analgesia
• Elevation: ensure elevating leg with foot at the level of the heart
• Exercises: teach circulatory exercises
• Education: teach how to monitor sensation, colour, circulation, temperature, swelling, and advise what to do if concerned
• Mobility: ensure patient independent with transfers and mobility, including stairs if necessary

On discharge from ward:
• Independent and safe mobilising, including stairs if appropriate
• Independent with transfers
• Independent and safe with home exercise programme / monitoring

Milestones to progress to next phase:
• Out of POP. Team to refer to physiotherapy at 4-6 weeks from clinic.
• Progression from NWB to FWB phase. Team to refer to physiotherapy if required to review safety of mobility / use of walking aids
Adequate analgesia

Recovery rehabilitation phase
4 weeks – 3 months

Goals:
- To be independently mobile out of Aircast™ boot
- To achieve optimal range of movement (as described in operation note)
- To optimise normal ankle and foot movement & restore gait

Restrictions:
- Ensure adherence to weight bearing status.
- No strengthening against resistance until at least 3 months post-operatively of any tendon transfers if performed.
- Do not stretch any tendon transfers / ligament reconstructions if performed. They will naturally lengthen over a 6 month period

Return to driving:
- Current advice from the DVLA is that health professionals cannot tell a patient when they are safe to drive but can only give guidance to help a patient make this decision. Legally patients:
  - must be safe to do an emergency stop
  - must inform their insurance company that they have had surgery and are planning to return to driving
- As a rough guide patients can normally return to driving three months after ankle surgery

Treatment:
- Pain relief
- Advice / Education
- Posture advice / education
- Mobility: ensure safely and independently mobile adhering to appropriate weight bearing restrictions. Progress off walking aids as able once reaches FWB stage.
- Gait Re-education
- Wean out of Aircast™ boot once advised to do so. If patient unable to get into normal footwear advise to try Crocs™ or other wide fitting shoes.
- Exercises:
  - Passive range of movement (PROM)
  - Active assisted range of movement (AAROM)
  - Active range of movement (AROM)
  - Strengthening exercises as appropriate
  - Core stability work
  - Balance / proprioception work once appropriate
  - Stretches of tight structures as appropriate (e.g. Achilles Tendon), not of tendon transfers / ligament reconstructions if performed.
  - Review lower limb biomechanics. Address issues as appropriate.
If tendon transfer performed, encourage isolation of transfer activation without overuse of other muscles. Biofeedback likely to be useful.

- **Swelling Management**
- **Manual Therapy:**
  - Soft tissue techniques as appropriate
  - Joint mobilisations as appropriate ensuring awareness of osteotomy sites and those joints which may be fused, and therefore not appropriate to mobilise
  - **Monitor** sensation, swelling, colour, temperature, circulation
  - **Orthotics** if required via surgical team
  - **Hydrotherapy** if appropriate
  - **Pacing advice** as appropriate

**Milestones to progress to next phase:**
- Full range of movement
- Independently mobilising out of Aircast™ boot
- Neutral foot position when weight bearing / mobilising
- Tendon transfers activating if performed

**Failure to meet milestones:**
- Refer back to team / Discuss with team
- Continue with outpatient physiotherapy if still progressing
Intermediate rehabilitation phase
12 weeks – 6 months

Goals:
- Independently mobile unaided
- Wearing normal footwear
- Optimise normal movement
- Grade 5 muscle strength around ankle

Treatment:
Further progression of the above treatment:
- Pain relief
- Advice / Education
- Posture advice / education
- Mobility: Progression of mobility and function
- Gait Re-education
- Exercises:
  - Range of movement
  - Strengthening exercises as appropriate
  - Core stability work
  - Balance / proprioception work
  - Stretches of tight structures as appropriate (e.g. Achilles Tendon), not of transfers / ligament reconstructions if performed.
  - Review lower limb biomechanics. Address issues as appropriate.
  - If tendon transfer performed progress isolation of transfer activation without overuse of other muscles. Biofeedback likely to be useful.
- Swelling Management
- Manual Therapy:
  - Soft tissue techniques as appropriate
  - Joint mobilisations as appropriate ensuring awareness of those which may be fused and therefore not appropriate to mobilise
- Monitor sensation, swelling, colour, temperature, circulation
- Orthotics if required via surgical team
- Hydrotherapy if appropriate
- Pacing advice as appropriate

Milestones to progress to next phase:
- Independently mobile unaided
- Wearing normal footwear
- Adequate analgesia
- Tendon transfers to be activating if performed (to at least grade 4)

Failure to meet milestones:
- Refer back to team / Discuss with team
- Continue with outpatient physiotherapy if still progressing
Final rehabilitation phase
6 months – 1 year

Goals:
- Return to gentle no-impact / low-impact sports
- Establish long term maintenance programme
- Grade 5 muscle strength

Treatment:
- **Mobility / function**: Progression of mobility and function, increasing dynamic control with specific training to functional goals
- **Gait Re-education**
- **Exercises:**
  - Progression of exercises including range of movement, strengthening, transfer activation, balance and proprioception, core stability
- **Swelling Management**
- **Manual Therapy:**
  - Soft tissue techniques as appropriate
  - Joint mobilisations as appropriate ensuring awareness of those which may be fused and therefore not appropriate to mobilise
- **Pacing advice**

Milestones for discharge:
- Independently mobile unaided
- Appropriate patient-specific functional goals achieved, eg. return to low/no impact sport
- Independent with long term maintenance programme
# Failure to progress

If a patient is failing to progress, then consider the following:

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<tr>
<th>POSSIBLE PROBLEM</th>
<th>ACTION</th>
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<tr>
<td>Swelling</td>
<td>Ensure elevating leg regularly&lt;br&gt;Use ice as appropriate if normal skin sensation and no contraindications&lt;br&gt;Decrease amount of time on feet&lt;br&gt;Pacing&lt;br&gt;Use walking aids&lt;br&gt;Circulatory exercises&lt;br&gt;If decreases overnight, monitor closely&lt;br&gt;If does not decrease overnight, refer back to surgical team or to GP</td>
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<tr>
<td>Pain</td>
<td>Decrease activity&lt;br&gt;Ensure adequate analgesia&lt;br&gt;Elevate regularly&lt;br&gt;Decrease weight bearing and use walking aids as appropriate&lt;br&gt;Pacing&lt;br&gt;Modify exercise programme as appropriate&lt;br&gt;If persists, refer back to surgical team or to GP</td>
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<td>Breakdown of Wound e.g inflammation, bleeding, infection</td>
<td>Refer to surgical team</td>
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<td>Transfer not activating</td>
<td>Start working in NWB gravity eliminated position with AAROM and then build up as able&lt;br&gt;Biofeedback&lt;br&gt;Ensure adequate analgesia as appropriate&lt;br&gt;Ensure swelling under control as appropriate&lt;br&gt;Ensure foot neutral when mobilising to avoid excessive shear. Consider orthotics referral via surgical team if unable to keep neutral&lt;br&gt;Refer back to surgical team if no improvement</td>
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<td>Numbness / altered sensation</td>
<td>Review immediate post-operative status if possible&lt;br&gt;Ensure swelling under control&lt;br&gt;If new onset or increasing refer back to surgical team or GP&lt;br&gt;If static, monitor closely, but inform surgical team and refer back if deteriorates or if concerned</td>
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Summary of evidence for physiotherapy guidelines

A comprehensive literature search was carried out to identify research relating to total ankle replacement and subsequent rehabilitation. After reviewing the articles and information, the physiotherapy guidelines were produced on the best available evidence.

- Conti S & Wong YS (2001) “Complications of Total Ankle Replacement” Clinical Orthopaedics and Related Research 391, 105-114