

## **Total Ankle Replacement**

Surgeon: Mr KP Meda, Mr H Prem, Mr J McKenzie

### **Surgical Techniques:**

The commonly used primary Total Ankle Replacement (TAR) prostheses at the ROH are the STAR and Zenith. Both are a three component, cementless, unconstrained, mobile-bearing 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

### **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

**Physiotherapy: milestone driven to encourage clinical reasoning**

**Please consult Operative notes for any variations in rehabilitation**

## **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:
  - Non weight bearing (NWB) for 2 weeks in Back Slab
  - Mr McKenzie can FWB in aircast boot when wound healed (normally 2 weeks)
  - Mr Meda and Mr Prem remain in cast for 4-6 weeks after which POP removed and place in Aircast™ boot FWB.
  - If any other surgical technique used please 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:
- 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 if any tendon transfers performed.
- Do not stretch any tendon transfers / ligament reconstructions if performed as they will naturally lengthen over a 6 month period
- Return to driving:
- 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.
- 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:

<b>POSSIBLE PROBLEM</b>	<b>ACTION</b>
Swelling	Ensure elevating leg regularly Use ice as appropriate if normal skin sensation and no contraindications Decrease amount of time on feet Pacing Use walking aids Circulatory exercises If decreases overnight, monitor closely If does not decrease overnight, refer back to surgical team or to GP
Pain	Decrease activity Ensure adequate analgesia Elevate regularly Decrease weight bearing and use walking aids as appropriate Pacing Modify exercise programme as appropriate If persists, refer back to surgical team or to GP
Breakdown of Wound e.g. inflammation, bleeding, infection	Refer to surgical team or to GP
Recurrent Instability	Refer back to surgical team Ensure exercises not too advanced for patient Address core stability Liaise with podiatrist/orthotics re, footwear
Numbness/altered sensation	Review immediate post-operative status if possible Ensure swelling under control If new onset or increasing refer back to surgical team or GP If static, monitor closely, but inform surgical team and refer back if deteriorates or if concerned

## 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.

- Ali et al (2007) "Intermediate results of Buechel Pappas unconstrained uncemented Total Ankle Replacement for osteoarthritis" *The Journal of Foot and Ankle Surgery* 46, (1): 16-20
- Buechel et al (2004) "Twenty-year evaluation of cementless mobile-bearing Total Ankle Replacements" *Clinical Orthopaedics and Related Research* 424, 19-26
- Coetzee J & Castro M (2004) "Accurate measurement of ankle range of motion after Total Ankle Arthroplasty" *Clinical Orthopaedics and Related Research* 424, 27-31
- Conti S & Wong YS (2001) "Complications of Total Ankle Replacement" *Clinical Orthopaedics and Related Research* 391, 105-114
- Griesberg J & Hansen S (2003) "Total Ankle Arthroplasty in the advanced flatfoot" *Techniques in Foot and Ankle Surgery* 2, (3): 152-161
- Knecht et al (2004) "The Agility Total Ankle Arthroplasty" *The Journal of Bone and Joint Surgery* 86-A, (6): 1161-1171
- Kobayashi et al (2004) "Ankle arthroplasties generate wear particles similar to knee arthroplasties" *Clinical Orthopaedics and Related Research* 424, 69-72
- Kotnis et al (2006) "The management of failed ankle replacement" *The Journal of Bone and Joint Surgery* 88-B, (8): 1039-1047
- Lalonde K & Conti S (2006) "Ankle arthritis: current status of ankle replacement versus fusion and other treatment modalities" *Current Opinion in Orthopaedics* 17, (2): 117-123
- Mendolia et al (1005) "Lond term (10-14 years) results of the Ramses Total Ankle Arthroplasty" *Techniques in Foot and Ankle Surgery* 4, (3): 160-173
- Spirt et al (2004) "Complications and failure after Total Ankle Arthroplasty" *The Journal of Bone and Joint Surgery* 86-A, (6): 1172-1178
- Tochigi et al (2005) "The effect of accuracy of implantation on range of movement of the Scandinavian Total Ankle Replacement" *The Journal of Bone and Joint Surgery* 87-B,(5): 736-740
- Valderrabano et al (2006) "Sports and recreation activity of ankle arthritis patients before and after Total Ankle Replacement" *The American Journal of Sports Medicine* 34, (6):993-999
- Zaidi et al (2013). How do patients with end-stage ankle arthritis decide between two surgical treatments? A qualitative study. *BMJ Open*, 3 (7).
- Zaidi et al (2013). The outcome of total ankle replacement: a systematic review and meta-analysis. *The Bone & Joint Journal*, 95-B (11), 1500-1507.