

## **Ankle and Hindfoot fusion**

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### **Surgical techniques:**

Ankle and hindfoot fusions incorporate surgical preparation and stabilisation of one or several joints. All fusions can be done open or arthroscopically. Fixation techniques can be with screws, staples, plates, or hindfoot nails. Other hindfoot fusions can involve the ankle or subtalar joint alone, or a double or triple arthrodesis involving a combination of the ankle, subtalar, talonavicular and calcaneocuboid joints.

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

### **Expected outcome:**

- Improved pain relief
- Improved function/mobility
- Increased walking tolerance with decreased walking aid requirement
- Return to no impact/low-impact physical activities may be possible but
- Strenuous sport unlikely
- Full recovery may take up to twelve to eighteen months

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

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

## **Initial rehabilitation phase: 0 – 2 weeks**

### **Goals:**

- To be safe and independently mobile with appropriate walking aid, adhering to weight bearing status
- To understand self management/monitoring, e.g. skin sensation, colour, swelling, temperature, circulation

### **Restrictions:**

Non-weight bearing (NWB) for at least 2 weeks in back slab or cast

### **Treatment:**

- **Pain-relief:** ensure adequate analgesia
- **Elevation:** ensure elevating leg with foot higher than waist for 55 minutes of every hour initially
- **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 with appropriate walking aid, including stairs if necessary

### **On discharge from ward:**

- Independent and safe mobilising, including stairs if appropriate with appropriate walking aid
- Independent with transfers
- Understanding of post-operative routine, self-management and monitoring

### **Milestones to progress to next phase:**

- Safe and independently mobile with appropriate aid non weight bearing in back slab or cast
- Adequate analgesia

## **Sub-acute rehabilitation phase: 2 – 6 weeks**

### **Goals:**

- To be safe and independently mobile with appropriate walking aid, adhering to weight bearing status
- To understand self management/monitoring, e.g. skin sensation, colour, swelling, temperature, circulation
- To understand the post-operative plan e.g. pacing of activities, requirement for short-term lifestyle adaptations, limitation in indoor/outdoor mobility

### **Restrictions:**

Ensure that weight bearing restrictions are adhered to

### **Treatment:**

- Likely to be in below knee fibreglass cast
- Pain-relief: Ensure adequate analgesia
- Elevation: ensure elevating leg with foot higher than waist
- 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

### **Milestones to progress to next phase:**

- Safe and independently mobile with appropriate aid NWB or PWB in cast and flat shoe as per post-operative instructions
- Team to refer to physiotherapy if required to review safety of mobility/use of walking aids
- Adequate analgesia

## **Recovery rehabilitation phase: 6 – 12 weeks**

### **Goals:**

- To be safe and independently mobile with appropriate walking aid, adhering to weight bearing status

### **Restrictions:**

Ensure that weight bearing restrictions are adhered to:

- **Ankle:** commence PWB in POP with flat shoe if not doing so already. Progress to FWB pneumatic walker when instructed by surgical team, which will be at 6 weeks at the earliest.
- **Subtalar:** commence PWB in POP with flat shoe if not doing so already. Progress to FWB pneumatic walker when instructed by surgical team, which will be at 6 weeks at the earliest.
- **Triple arthrodesis:** commence PWB when instructed by team dependent on bone healing. At earliest this will be 6 weeks. Otherwise continue NWB in cast until 12 week clinic review.
- If sedentary employment, may be able to return to work from 6-12 weeks postoperatively, as long as provisions to elevate leg and no complications

### **Treatment:**

- **Pain relief**
- **Advice/education**
- **Mobility:** ensure safely and independently mobile with appropriate walking aid adhering to appropriate weight bearing restrictions.
- Wean out of Aircast boot if provided with one once advised to do so
- Provision of flat shoe as appropriate, if patient unable to get into normal footwear
- **Swelling management**
- Monitor sensation, swelling, colour, temperature, circulation
- **Pacing advice** as appropriate

### **Milestones to progress to next phase:**

- Independently mobilising with/without aircast boot +/- walking aid
- Team to refer to physiotherapy if required to review safety of mobility/use of walking aids, gait re-education on commencing FWB

### **Failure to meet milestones:**

- Refer back to team/discuss with team
- Continue with out-patient physiotherapy if still progressing

## Recovery rehabilitation phase: 3 months - 6 months

### Goals:

- To be safe and independently mobile +/- appropriate walking aid, progressing to independently mobile unaided
- Wearing normal footwear
- Optimise normal movement

### Restrictions:

Ensure that weight bearing restrictions are adhered to:

- Subtalar: continue FWB following removal of aircast
- Triple arthrodesis: surgical team to decide when cast exchanged for Aircast FWB. This is usually at 12 weeks post-operatively

### Treatment:

- **Pain relief**
- **Advice/education**
- **Mobility:** ensure safely and independently mobile. Progress off walking aids as able once FWB.
- **Wean out of Aircast boot** once advised to do so, and provide post-op flat shoe, if patient unable to get into normal footwear
- **Exercises:**
  - ROM exercises - specify AROM/AAROM/PROM
  - Strengthening exercises as appropriate
  - Core stability work
  - Balance / proprioception work once appropriate
  - Stretches of tight structures as appropriate (e.g. Achilles Tendon)
  - Review lower limb biomechanics. Address issues as appropriate.
- **Gait re-education**
- **Manual techniques** of soft tissues and non-fused joints if appropriate
- Electrotherapy if appropriate
- **Orthotics** if required via surgical team
- Hydrotherapy if appropriate

### Milestones to progress to next phase:

- Independently mobile unaided
- Wearing normal footwear

### Failure to meet milestones:

- Refer back to team / discuss with team
- Continue with out-patient 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

### 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 functional strengthening, balance and proprioception, core stability
- **Swelling management**
- **Pacing advice**
- Return to work advice

### Milestones for discharge:

- Independently mobile unaided
- Appropriate patient-specific functional goals achieved, e.g. return to low/no impact activities and normal daily routines
- 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 surgery for hindfoot arthrodesis and subsequent rehabilitation. After reviewing the articles and information, the physiotherapy guidelines were produced on the best available evidence.

Martin, R.L. Stewart, G.W. Conti, S.F. (2007), 'Post-traumatic ankle arthritis: an update on conservative and surgical management. Journal of orthopaedic & sports physical therapy', (v.35 (5) pp 253-259)

Smith, C.L. (1980), 'Physical therapy management of patients with total ankle replacement. Physical therapy', (v.60 (3) pp 303-306)

Knupp, M. Schuh, R. Stufkens, S.A.S. Bolliger, L. Hintermann, B. (2009), 'Subtalar and talonavicular arthrodesis through a single medial approach for the correction of severe planovalgus deformity'. Journal of bone & joint surgery, (v.91 (5) pp 612-615)

Deorio, J.K. Leaseburg, J.T. Shapiro, S.A. (2008), 'Subtalar distraction arthrodesis through a posterior approach'. Foot & ankle international. (v.29 (12) pp 1189-1194)

Lee, KB. Saltzman, C.L. Suh, JS. Wasserman, L. Amendola, A. (2008), 'A posterior 3-portal arthroscopic approach for isolated subtalar arthrodesis'. Arthroscopy. (v.24 (11) pp 1306-1310)

Knupp, M. Skoog, A. Tornkvist, H. Ponzer, S. (2008), 'Triple arthrodesis in rheumatoid arthritis'. Foot & ankle international. (v.29 (3) pp 293-297 )

Jackson, W.F.M. Tryfonidis, M. Cooke, P.H. Sharp, R.P. (2007), 'Arthrodesis of the hindfoot for valgus deformity'. An entirely medial approach. Journal of bone & joint surgery. (v.89 (7) pp 925-927)