Pes Cavus correction

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

Surgical technique:
Commonly the surgery includes:
- Calcaneal osteotomy
- 1st metatarsal osteotomy
- Peroneal tenodesis / longus to brevis transfer
- Tibialis posterior Z-lengthening

Surgery may also include one or more of the following:
- Soft tissue releases (eg TA)
- Tendon transfers (tib ant or tib post, partial or complete)
- Other osteotomies
- Joint fusions

Expected outcome:
- Stable, plantargrade foot
- Improved function / mobility
- Improved pain relief
- Increased walking tolerance and improved gait pattern with decreased walking aid and orthotic requirement
- Decreased muscle imbalance
- Decreased callosities / pressure areas
- Maintenance / improvement of range of movement
- Return to low-impact sports may be possible but strenuous sport unlikely
- 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:
0-6 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

Restrictions
- Ensure that weight bearing restrictions are adhered to:
- Standard pes cavus surgery:
  - Full Plaster of Paris (POP) with ankle plantargrade for 2 weeks NWB
  - POP changed at 2 weeks. Remain NWB until 6 weeks unless advised otherwise in postop instructions
  - POP removed at 6 weeks. May require aircast boot or other orthosis. FWB.
- If any other surgical techniques used ensure you check any restrictions with team as these may differ
- 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 higher than waist
- 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 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:
6 weeks to 12 weeks

Goals:
- To be independently mobile out of aircast boot
- To achieve full range of movement
- To optimise normal movement

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

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, and provision of plaster shoe as appropriate, if patient unable to get into normal footwear

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 to 6 months

Goals:
- Independently mobile unaided
- Wearing normal footwear
- Optimise normal movement
- Grade 4 or 5 muscle strength around ankle (NB. This may vary if neurological cause for pes cavus)

Treatment
Further progression of the above treatment:
- Pain relief
- Advice / Education
- Posture advice / education
- Mobility: Progression of mobility and function
- Gait Re-education
- Swelling management

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

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
Failure to meet milestones:
- Refer back to team / Discuss with team
- Continue with outpatient physiotherapy if still progressing
FINAL REHABILITATION PHASE:
6 months to 1 year

Goals:
- Return to gentle low-impact sports
- Establish long term maintenance programme
- Grade 5 muscle strength around ankle and grade 4 or 5 of tendon transfers if performed (NB. This may vary if neurological cause for pes cavus)

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
- Independent with long term maintenance programme
Failure to progress

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

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<th>POSSIBLE PROBLEM</th>
<th>ACTION</th>
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| 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 |
| Transfer not activating                | Start working in NWB gravity eliminated position with AAROM and then build up as able  
Biofeedback  
Ensure adequate analgesia as appropriate  
Ensure swelling under control as appropriate  
Ensure foot neutral when mobilising to avoid excessive shear. Consider orthotics referral via surgical team if unable to keep neutral  
Refer back to surgical team if no improvement |
| 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 rehabilitation for ankle instability and surgery for recurrent ankle instability and subsequent rehabilitation. After reviewing the articles and information, the physiotherapy guidelines were produced on the best available evidence.