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:

POSSIBLE PROBLEM	ACTION
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.

Azmaipairashvili et al (2005) “Correction of cavovarus foot deformity in Charcot-Marie-Tooth disease” Journal of Pediatric Orthopaedics 25, (3): 360-365

Giannini et al (2002) “Surgical treatment of adult idiopathic cavus foot with plantar fasciotomy, naviculocuneiform arthrodesis, and cuboid osteotomy: a review of thirty-nine cases” American Journal of Bone and Joint Surgery 84-A Supplement 2, 62-69

Sanmarco G & Taylor R (2001) “Cavovarus foot treated with combined calcaneal and metatarsal osteotomies” Foot and Ankle International 22, (1): 19-30

Sizensky J (2007) “The pes cavovarus foot: update on current advances” Current opinion in Orthopaedics 18, (2): 118-123

Younger et al (2005) “Adult Cavovarus Foot” Journal of American Academy of Orthopaedic Surgeons 13, (5): 302-315