## Physiotherapy Rehabilitation Guidelines for patients undergoing Pes Cavus Correction

<table>
<thead>
<tr>
<th>Document Type</th>
<th>Guideline</th>
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<tbody>
<tr>
<td>Date Approved</td>
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<tr>
<td>Ratifying Body</td>
<td>Drugs &amp; Therapeutics Committee</td>
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| Related Documents   | Physiotherapy rehabilitation guidelines – Lateral ligament reconstruction of the ankle  
Physiotherapy rehabilitation guidelines – Anterior ankle arthroscopy  
Physiotherapy rehabilitation guidelines – Total Ankle Replacement  
Physiotherapy rehabilitation guidelines – Subtalar and Hindfoot fusion  
Physiotherapy rehabilitation guidelines – Hallux valgus deformity- Scarf Osteotomy  
Physiotherapy rehabilitation guidelines – Tibialis Posterior Reconstruction  
Physiotherapy rehabilitation guidelines – ACI of the ankle |
<p>| Author              | Joanna Benfield, Foot &amp; Ankle Specialist Physiotherapist, RNOH |
| Owner (Executive Director) | Lucy Davies       |
| Directorate         | Operations              |
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| Review Date         | 13/11/2022              |</p>
<table>
<thead>
<tr>
<th>Keywords and Phrases</th>
<th>Rehabilitation, foot and ankle surgery, pes cavus, pes cavus correction, high arch, pure cavus, calcaneocavus, equinocavovarus, heel varus, physiotherapy, complications, outcomes, milestones, function, treatment, exercise, pain relief, restrictions, limitations, sport, fitness, postural awareness, pain education, mobility, goals, precautions, compliance, ankle pain, leg pain, foot pain.</th>
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<tbody>
<tr>
<td>Consultation Group/Approving Bodies/Subject Matter Expert</td>
<td>Members of Foot and Ankle Unit Team (4 consultants, &amp; Clinical Nurse Specialist)</td>
</tr>
<tr>
<td></td>
<td>Members of Outpatient Musculoskeletal Physiotherapy Team (Band 5, 6, 7 and 8a staff members at Stanmore and Bolsover Street)</td>
</tr>
<tr>
<td></td>
<td>Members of Inpatient Orthopaedic Physiotherapy Team (Band 7 and 8a staff members)</td>
</tr>
<tr>
<td>Readership</td>
<td>All staff (inc. Clinical)</td>
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# Table of Contents

1. Equality Impact Assessment (EIA) Disclosure Statement.............................. 4
3. Introduction and aims.................................................................................. 6
4. Definitions.................................................................................................. 6
5. Duties and Responsibilities......................................................................... 6
6. Body of Policy............................................................................................. 7
7. Monitoring and the effectiveness of this policy........................................... 7
Appendix 1: Glossary of Terms........................................................................ 18
Appendix 2: Other linked trust policies and guidelines..................................... 19
Appendix 3: Extra sources of information and support..................................... 20
<table>
<thead>
<tr>
<th>Equality Impact Assessment (EIA) Disclosure Statement</th>
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<tr>
<td>This policy was assessed on the 1st day of June 2017 for its impact on equality. The assessment determined that the policy will not have a significant negative impact on equality in relation to each of the protected staff/patient groups below:</td>
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<tr>
<td>i.) Age; ii.) Sex (Male and Female); iii.) Disability (Learning Difficulties/Physical or Sensory Disability); iv.) Race or Ethnicity; v.) Religion and Belief; vi) Sexual Orientation (gay, lesbian or heterosexual); vii) Pregnancy and Maternity; vii) Gender Reassignment (The process of transitioning from one gender to another); viii) Marriage and Civil Partnership.</td>
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1. Privacy Impact Assessment (PIA) Disclosure Statement

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<td>This policy was assessed on the 1st day of June 2017 for its impact on privacy. The assessment determined that the policy will not have a significant negative impact on privacy of members of staff/patients.</td>
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2. Introduction and aims

Please note that this is advisory information only. Individual / your experiences may differ from those described. All exercises must be demonstrated to a patient by a fully qualified physiotherapist. We cannot be held liable for the outcome of you undertaking any of the exercises / interventions shown here independently of direct supervision from the RNOH.

As a specialist orthopaedic hospital we recognise that our broad and often complex patient group needs an individualised rehabilitation approach. Our emphasis is on patient-specific rehabilitation, which encourages recognition of those patients who may progress slower than others. These rehabilitation guidelines are therefore ‘milestone driven’ and designed to provide an equitable rehabilitation service to all our patients. They will also limit unnecessary visits to the outpatient clinic at RNOHT by helping the patient and therapist to identify when specialist review is required.

3. Definitions

See section 6.

4. Duties and Responsibilities

Not applicable for this guideline.
5. Body of Policy

Team Contact Details:
Foot & Ankle Unit Consultants: Mr Singh, Mr Cullen, Mr Goldberg & Mr Welck

Foot and Ankle Unit:
- Tel: 0208 909 5125
- E-mail: footandankle@rnoh.nhs.uk
(Please note that if e-mailing from an e-mail address external to RNOH that this e-mail address is not secure so please do not include patient identifiable data)

Physiotherapy Department:
- Tel: 0208 909 5820
Indications for surgery:
- Pain and decreased function not responsive to conservative treatment
- Instability
- To prevent further deterioration / deformity

Causes of pes cavus include:
- Neurological
- Traumatic
- Idiopathic
- Residual Clubfoot

Possible complications:
- Infection
- Wound healing problems
- Persistent swelling
- Persistent / recurrent pain
- Non-union / mal-union / delayed union
- Bleeding
- Nerve damage
- Deep Vein Thrombosis
- Pulmonary Embolism
- Recurrent heel varus
- Callosities
- Contractures
- Degenerative changes at other joints
- Stiffness
- May require subsequent revision surgery
- If neurological cause for pes cavus, progression of neurological symptoms may limit outcome, e.g. progressive weakness

Surgical techniques
The techniques used will depend on the clinical presentation of the patient.
Commonly at RNOH, the standard surgery includes:
- Calcaneal osteotomy
- 1st metatarsal osteotomy
- Peroneal tenodesis
- Tibialis posterior Z-lengthening

However, depending upon the clinical presentation of the patient, surgery may also include one or more of the following:
- Soft tissue releases
- Tendon transfers
- 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

**Pre-operatively**
The patient will be seen pre-operatively where able and with consent, the following will be assessed or discussed:
- Current functional levels
- General Health
- Social history and home set up
- Ability to mobilise, plus the provision of appropriate walking aids to be used post operatively
- Post-operative expectations
- Post-operative management explained, including the provision of bed exercises.

**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 as the patient may have had a combination of techniques which may affect weight-bearing status and progressions.
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, elevation

Restrictions:
- Ensure that weight bearing restrictions are adhered to:
  Standard RNOH pes cavus surgery:
  - Back slab with ankle plantargrade for 2 weeks Non Weight Bearing (NWB)
  - Below Knee Plaster of Paris (BK POP) at 2 weeks. NWB.
  - POP removed at 6 weeks. Into Aircast™ Boot. FWB.
  If any other surgical techniques used ensure you check any restrictions with team as these may differ
- 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
- 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: 6weeks- 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 by team and 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 and kinetic chain. 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 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
- 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 and kinetic chain. 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
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 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:

<table>
<thead>
<tr>
<th>POSSIBLE PROBLEM</th>
<th>ACTION</th>
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<tbody>
<tr>
<td>Swelling</td>
<td>Ensure elevating leg regularly</td>
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<tr>
<td></td>
<td>Use ice as appropriate if normal skin sensation and no contraindications</td>
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<td></td>
<td>Decrease amount of time on feet</td>
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<td></td>
<td>Pacing</td>
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<td></td>
<td>Use walking aids</td>
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<td></td>
<td>Circulatory exercises</td>
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<td></td>
<td>If decreases overnight, monitor closely</td>
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<tr>
<td></td>
<td>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</td>
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<td></td>
<td>Ensure adequate analgesia</td>
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<td></td>
<td>Elevate regularly</td>
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<td>Decrease weight bearing and use walking aids as appropriate</td>
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<td></td>
<td>Pacing</td>
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<td></td>
<td>Modify exercise programme as appropriate</td>
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<td>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 or to GP</td>
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<tr>
<td>Transfer not activating</td>
<td>Start working in NWB gravity eliminated position with AAROM and then build up as able</td>
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<td></td>
<td>Biofeedback</td>
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<td></td>
<td>Ensure adequate analgesia as appropriate</td>
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<td></td>
<td>Ensure swelling under control as appropriate</td>
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<td></td>
<td>Ensure foot neutral when mobilising to avoid excessive shear. Consider orthotics referral via surgical team if unable to keep neutral</td>
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<td></td>
<td>Refer back to surgical team if no improvement</td>
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<tr>
<td>Numbness/altered sensation</td>
<td>Review immediate post-operative status if possible</td>
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<tr>
<td></td>
<td>Ensure swelling under control</td>
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<td></td>
<td>If new onset or increasing refer back to surgical team or GP</td>
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<td></td>
<td>If static, monitor closely, but inform surgical team and refer back if deteriorates or if concerned</td>
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6. Monitoring and the effectiveness of this policy

This guideline will be reviewed 5 yearly.
Appendix 1: Glossary of Terms

Not applicable.
Appendix 2: Other linked trust policies and guidelines

Physiotherapy rehabilitation guidelines – Lateral ligament reconstruction of the ankle
Physiotherapy rehabilitation guidelines – Anterior ankle arthroscopy
Physiotherapy rehabilitation guidelines – Total Ankle Replacement
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Physiotherapy rehabilitation guidelines – ACI of the ankle

All other RNOH Physiotherapy Rehabilitation Orthopaedic Post-operative Guidelines (Knee, Sarcoma Unit, Peripheral Nerve Injuries, Shoulder & Upper Limb, Spinal Surgery Unit)
Appendix 3: Extra sources of information and support

Summary of evidence for physiotherapy guidelines

A comprehensive literature search was carried out to identify research relating to surgery for pes cavus correction and subsequent rehabilitation. After reviewing the articles and information, the physiotherapy guidelines were produced on the best available evidence.


This policy is available on request in large print and alternative languages. It is a manager’s responsibility to ensure employees are aware of these options.

* The following policies must be sent for review to the Local Counter Fraud Specialist:

- Fraud and Bribery
- Standard Financial Instructions
- Declaration of Interests
- Gifts and Hospitality
- Whistleblowing
- Disciplinary
- IT
- Anti-Money Laundering
- Managing Sickness Absence
- Secondary Employment
- Expenses
- Overpayment
- Financial Redress
- TOIL (Time off in Lieu)
- Code of Conduct/Standards of Business Conduct
- Data Protection
- Lone Worker
- Patient Transport
- Commercial Sponsorship
- Overseas Visitors
- Disclosure