Physiotherapy management of paediatric flat feet

Presented by Julie Allen and Sharon Solan
Who we are

• Paediatric Orthopaedic Specialists Physiotherapists

• Where we work – ward, outpatients and triage clinics
Introduction

Referral pathways

Physiotherapy assessment and management

Pathways and proforma used locally and nationally
Our Referrals

- Through choose and book
- Triage clinic
- Direct to physiotherapy department from GPs/consultants.
Paediatric Flat feet

Universal finding – flexible flat feet is the flattening of the medial longitudinal arch on weight bearing (Harris et al 2004)

Distinguished from rigid flat foot using the great toe extension test or standing on tip toes if able / co-operative
Opinions

• Flexible flat foot is physiological and will self correct (Echarri and Forriol, 2003; Forriol and Pascual, 1990; Staheli1987, Volpon,1994)

• Flexible flat foot may cause gait disorders in the future and is a precursor of foot dysfunction (Cohen- Sobel et al 1995 and D’Amico 1984)
Associated Factors

- Age is a predictive factor in determining the prevalence of flexible flat feet

- Increased joint laxity, reduced walking speed and poor locomotion skills are associated with flexible flat feet

- Therefore flexible flat feet may be considered to be part of musculoskeletal maturity
Assessment

- History – age, symptoms, trauma, family history, activity level.
- Objective examination – L.L. alignment, tenderness, ROM.
- Toe raise test.
- Suspected flexible flat foot – consider risk factors.
Management

• Painfree flexible flat feet – advice and reassurance given
• Orthoses improve the structural alignment of the foot – determined by X ray (Bordelon 1980, Kuhn et al 1999)
Management Contd

• Randomised control trial found that orthoses did not alter the natural progression of flexible flat feet (Wenger et al 1989 and Gould 1989)

• Orthoses may be useful in alleviating symptoms of pain associated with FFF (Mortazavi et al 2007)
<table>
<thead>
<tr>
<th>Aim</th>
<th>Exercises and activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flexibility</strong></td>
<td>Passive ROM exercise of ankle and all foot joints</td>
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<tr>
<td></td>
<td>Global movement (to approximate anterior and posterior foot columns)</td>
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<td></td>
<td>Stretching of gastrocnemius soleus complex and peroneus brevis muscles (to induce varus</td>
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<tr>
<td></td>
<td>and adduction of the foot).</td>
</tr>
<tr>
<td><strong>Strengthening</strong></td>
<td>Anterior and posterior tibialis muscles and the flexor hallucis longus (to neutralize</td>
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<tr>
<td></td>
<td>valgus)</td>
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<tr>
<td></td>
<td>Intrinsic, interosseus plantaris muscles and the abductor hallucis (to prevent anterior</td>
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<tr>
<td></td>
<td>arch flattening</td>
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<tr>
<td></td>
<td>Global activation/movement of the muscles involved in maintaining the medial longitudinal</td>
</tr>
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<td></td>
<td>arch and the varus with and without load</td>
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<td></td>
<td>Single leg weight bearing</td>
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<td></td>
<td>Toe walking</td>
</tr>
<tr>
<td>**Proprioception and</td>
<td>Toe and heel walking</td>
</tr>
<tr>
<td>balance**</td>
<td>Single leg weight bearing (to make the foot cavus after dynamic pronation of the forefoot)</td>
</tr>
<tr>
<td></td>
<td>Descending an inclined surface</td>
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</tbody>
</table>
Pathways...

- Gateshead
- South Tyneside
- Cornwall
- Warwickshire
Paediatrics – Pathway for the flexible flat foot
Physiotherapy subjective and objective assessment

Fig 1. Classification of plantar footprint according to Denis described in “Methods.”

<table>
<thead>
<tr>
<th>Normal foot position</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>No intervention required</em></td>
<td><em>Intrinsic foot muscle exercises</em></td>
<td><em>Intrinsic &amp; extrinsic foot exercises</em></td>
<td><em>Intrinsic and extrinsic foot exercises</em></td>
</tr>
<tr>
<td><em>Advice regarding supportive footwear</em></td>
<td><em>Referral to orthotics for insoles</em></td>
<td><em>Referral to orthotics for insoles</em></td>
<td><em>Referral to orthotics for ? boots</em></td>
</tr>
</tbody>
</table>

Orthopaedic corrective footwear confines the foot in a rigid mould that limits the normal function of the extrinsic and intrinsic muscles of the foot. Furthermore insoles remove the alternating stimuli that strengthen the foot muscles that maintain the arch and without this exercise the muscles tend to lose tone and weaken. Thus unnecessary orthopaedic arch support can cause twofold damage and perpetuate the problem. Always seek advice from the orthotist.

Grade 1 – The support of the lateral edge of the foot is half that of the metatarsal support.
Grade 2 – The support of the central zone and forefoot are equal.
Grade 3 – The support of the central zone of the foot is greater than the width of the metatarsal support.

Review Date: April 2015
Flat Feet in children

Tip-toe and Jack test

Outcome

Pain

Yes

Footwear/Orthosis/Exercise advice. May require Orthopaedic referral depending on amount of pain and response to exercise and/or orthotics

Negative i.e. structural problem with or without pain

Orthopaedic opinion

No

Advice and discharge

Yes

Advice and discharge

Differentiation

Appropriate referral

No
2.2.1.1. **Asymptomatic** flexible flat feet do not require treatment but an advice leaflet titled “flat feet in young children” is available that can be given in primary care if there is parental concern. The link is available on the referral management system website.

2.2.1.2. **Symptomatic** flexible flat feet in children are appropriate for referral depending on age. See table below

<table>
<thead>
<tr>
<th>Symptom Description</th>
<th>Referral Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to easily (and bilaterally) go up onto tiptoes (age appropriate)</td>
<td>No treatment required. Referral to physiotherapy or podiatry is not appropriate. If there is parental concern, consider issuing the flat feet advice leaflet from the link on the referral management system.</td>
</tr>
<tr>
<td>Arch present on tip toe</td>
<td>Refer to Consultant Paediatricians RCHT</td>
</tr>
<tr>
<td>No tightness on ankle dorsiflexion</td>
<td>Refer to Consultant Orthopaedic Surgeon via Referral Management Service</td>
</tr>
<tr>
<td>Normal neurology</td>
<td>Refer to Paediatric Orthopaedic Physiotherapist via Referral Management Service</td>
</tr>
<tr>
<td>No painful symptoms</td>
<td>Refer to podiatry department</td>
</tr>
<tr>
<td>No poor function, eg tripping / falling</td>
<td></td>
</tr>
<tr>
<td>Absence of associated syndromes eg. Downs, Marfans, Ehlos Danlos, hypermobility syndrome</td>
<td></td>
</tr>
<tr>
<td>Abnormal neurology</td>
<td></td>
</tr>
<tr>
<td>Arch not present on tip toe</td>
<td></td>
</tr>
<tr>
<td>Asymmetrical flat foot</td>
<td></td>
</tr>
<tr>
<td>Significant pain affecting activities of daily living</td>
<td></td>
</tr>
<tr>
<td>Tightness on ankle dorsiflexion</td>
<td></td>
</tr>
<tr>
<td>Difficulty rising onto tip toes</td>
<td></td>
</tr>
<tr>
<td>Marked tripping / falling</td>
<td></td>
</tr>
<tr>
<td>Pain in knees or hips</td>
<td></td>
</tr>
<tr>
<td>Painful feet in child <strong>under 5 years of age</strong></td>
<td></td>
</tr>
<tr>
<td>If child <strong>6 years of age and older</strong> and any of following:</td>
<td></td>
</tr>
<tr>
<td>Pain in feet / ankles</td>
<td></td>
</tr>
<tr>
<td>Skin pressure lesions of feet / ankles</td>
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<tr>
<td>Excessive medial shoe wear causing poor function</td>
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</table>
“2 – 10 YEAR OLD FLAT FOOTED CHILD”

TWO TYPES
Flexible ↑ (painless, physiological)
Stiff and fixed ↑ (pathological, usually painful)

HISTORY
Same + pain history

EXAMINATION KEY POINTS
Flexibility (re-formation of the arch during sitting and tip-toeing)
Exclude tightness in tendo-achilles
Check if the foot is painful
Check passive ROM in sub-talar joint

MANAGEMENT

Flexible

Painless
< 7 yrs
Reassurance as it is physiological stage in development.
(However, if associate with tight T.A.)

Painful
> 9 yrs
Refer to hospital

Stiff (fixed)

< 7 yrs
> 9 yrs
Refer to hospital

NB: (Foot orthosis and shoe wear adjustment has no effect on physiological flat foot and does not affect its natural course)
Paediatric flat foot proforma

Suggested to use a simple traffic light framework to identify 3 subtypes of paediatric flatfoot.

1. Treat symptomatic PFF **RED**
2. Monitor or with discretion simply treat asymptomatic non-developmental PFF **AMBER**
3. Identify and advise asymptomatic PFF **GREEN**
paediatric Flat Foot Proforma (p-FFP)

|--------------|--------------|-----------------|-------------|-----------|-------------|-------------------|--------------|
| Findings     | 1. Tender areas | 2. Gait | 3. Obesity (ok / + / ++)
|              | 1. y/n | 2. size | 3. barefoot shoes on | 4. limp y/n | |

**DIAGNOSIS**

A. Typical flexible flatfoot +/- other factors
- Neurological eg Cerebral palsy, hypotonia
- Muscular eg Muscular dystrophies
- Genetic eg Down’s, Marfan’s
- Collagen eg Ehlar’s Danlos, ligament laxity

B. Rigid flatfoot
- Vertical talus
- Tarsoal coalition
- Peroneal spasm
- Iatrogenic
- Trauma

C. Skewfoot
- Metatarsus adductus

**A. Typical flexible flatfoot** 1. Symptomatic*

**or**

A1. Non-developmentual**
(Structural deformity progressing with age)

A2. Developmental
(Structural deformity reducing with age)

<table>
<thead>
<tr>
<th>Observe</th>
<th>L</th>
<th>R</th>
<th>Measure</th>
<th>L</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medial arch height (ok / reduced)</td>
<td></td>
<td></td>
<td>Navicular height (mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heel eversion (ok / more everted)</td>
<td></td>
<td></td>
<td>RCSP (*inv/ev)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heel inversion with tip toe (y / n)</td>
<td></td>
<td></td>
<td>Consider</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tibial, knee positions (med / 0 / lat)</td>
<td></td>
<td></td>
<td>Muscle tone, ligament laxity (y / n)</td>
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</tr>
</tbody>
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**Action plan:**

1. TREAT
2. MONITOR
3. LEAVE ALONE

To be used in conjunction with:

Paed FFP © Angela M. Evans, PhD 2008.
What does this tell us?

- The prevalence of flexible flat foot decreases with age
- The alignment of the foot can be changed with foot orthoses
- Foot and leg pain symptoms associated with FFF can be alleviated with foot orthoses
Leaflets

Symptomatic Hypermobility

Association of Paediatric Chartered Physiotherapists

Flat Feet in Young Children

Choosing Footwear for Children

Association of Paediatric Chartered Physiotherapists

Association of Paediatric Chartered Physiotherapists

PEACOCKS IN PARTNERSHIP