

Normal lower limb variants in children

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Learning objectives

- Identify common normal lower limb variants seen in children
- Decide when treatment is required
- Consider appropriate referral pathway

Practical tips rather than evidence

- Flat feet
- Intoeing / out toeing
- Valgus / varus knees
- Tiptoe walking
- Curly toes



Flat Feet

- May cause children to complain of 'tired' feet
 - Children ask to be carried
 - Excessive wear on sole of shoes
 - Very concerning to parents!
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- Normal up to age 5 years
 - May be present in older non-weightbearing children

Assessment

Establish if structural or flexible

- tip toe standing



- dorsiflexion of great toe



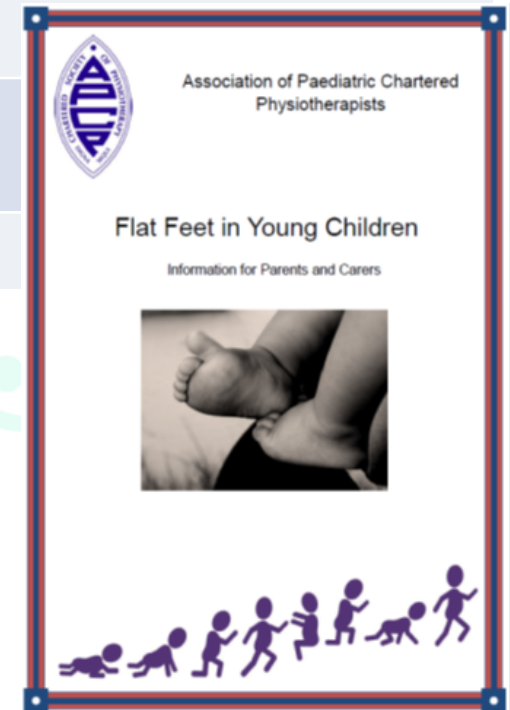
Palpate to identify pain, ↓joint ROM, muscle tightness

Observe gait

Screen for other biomechanical problems or pathologies

Management

Flexible	Structural
Reassure +++	Orthopaedic opinion
Consider orthotic provision if painful or in association with other biomechanical problems	
Strengthen arches in older children who have insoles	

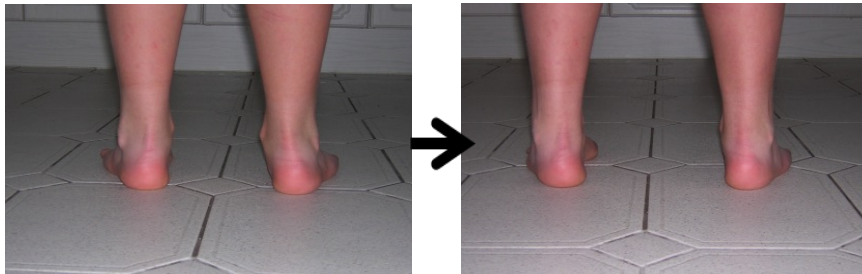
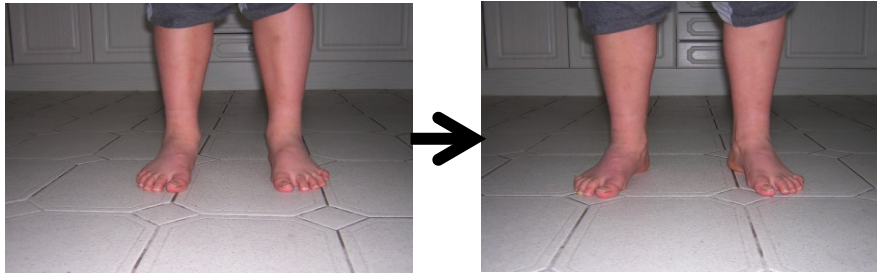


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POSTURAL FLAT FEET

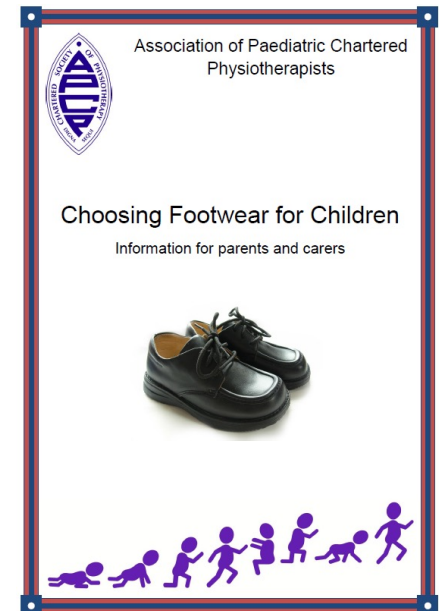
Many children have postural flat feet. This means that your feet look flat when you are standing on the floor, but an arch appears when you stand on tiptoe. In most cases this is just a slight variation of the normal foot position, but occasionally it can lead to pain in the foot, or sometimes in the knee or hip.

You may benefit from having insoles fitted to wear inside your shoes. These will support the foot in the correct position when you are standing or walking. However many children can strengthen the muscles under the arch of the foot by carrying out exercises at least twice every day.



How to carry out the exercise (see illustration)

- Stand with feet slightly apart and with toes pointing a little outwards
- Lift the arch of the foot slightly, by transferring the weight slightly onto the outside part of the foot
- Make sure you keep the joint at the base of the big toe on the floor, and the toes relaxed
- Hold this position for 5 seconds, then relax
- Repeat for 6 seconds and relax
- Then repeat for 7 secs, 8 secs, 9 secs, and 10 secs, relaxing between each one.



In toeing / Out toeing

- Usually symmetrical and painfree
- Normal up to age 10
- Usually few functional problems
- Well child



What is causing the problem?

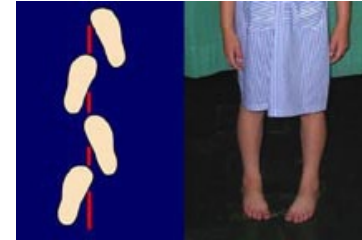
- Hip – femoral anteversion
- Knee – tibial torsion
- Foot – metatarsus adductus


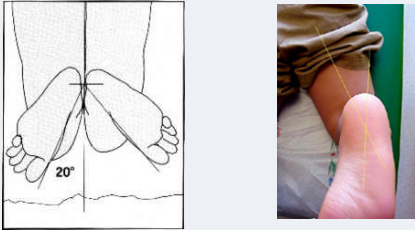
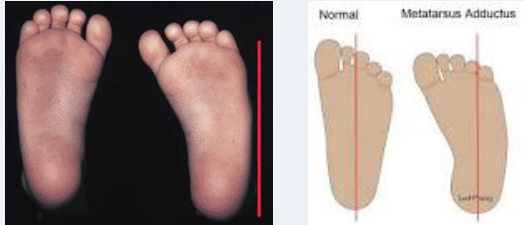


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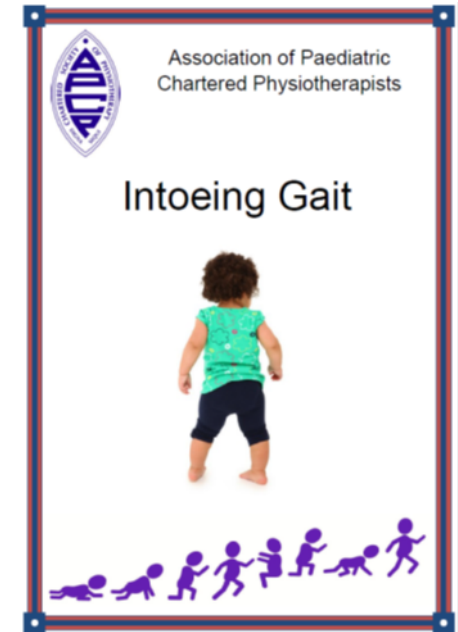
Assessment

- Stance position and gait
- ROM
- Preferred sitting position



Hip	Knee	Foot
Modified Craig's test	Thigh foot angle	Vertical heel – toe
		
Improves spontaneously up to age 10	Improves spontaneously up to age 6	Normal foot has straight lateral border

Management



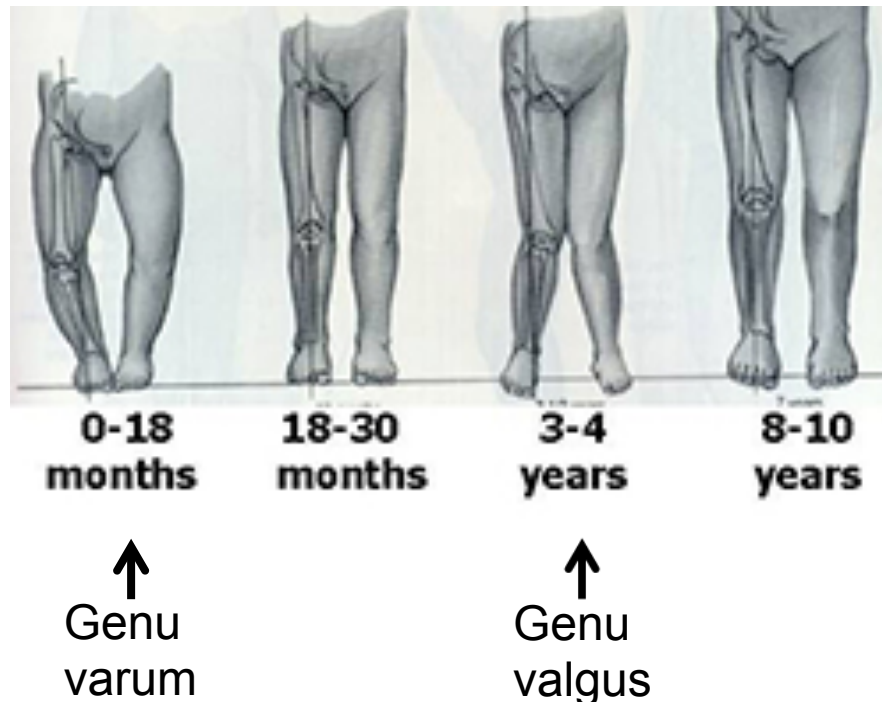
Reassure +++

Refer if child 'clumsy' – Community paediatric physio, OT or paediatrician



Refer to orthopaedics if painful or asymmetrical

Knock knees / bow legs

- Abnormal angular alignment
- Usually symmetrical and painfree
- No impact on function or mobility



Assessment

Genu Varum (bow legs)	Genu Valgus (knock knees)
	
Child aged 10 – 24 months	Child aged 3 – 4 years
Occurs alongside development of weightbearing	Accentuated by obesity, flat feet and hypermobility
Intercondylar distance measures > 6cm	Intermalleolar distance > 8cm
Usually resolves by age 3	Usually resolves by age 8

Management

Reassure +++

Refer to orthopaedics if extreme, persistent, painful or asymmetrical

Consider inflammatory arthritis and refer appropriately

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Tip toe walking

- Transient / intermittent tiptoe walking common in young children
- Usually symmetrical
- Well child with normal developmental milestones
- Can be an indicator of other problems, eg CP, DMD, inflammatory arthritis etc

Assessment

Child aged < 5 years

Careful history taking

Palpate to identify pain, ↓ joint ROM, muscle tightness

Observe gait



Observe functional movement and changes of position



Screen for other biomechanical problems or pathologies

Management

If no 'red flags' identified, reassure+++

Discourage use of babywalkers

Refer to paediatrician or paediatric rheumatologist as appropriate



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Curly Toes

- Commonly affect 3rd 4th 5th toes
- Tend to run in families
- Rarely symptomatic, but become fixed over time
- Child may develop excessive thickening of skin, pressure from adjacent toe nails, difficulty wearing certain shoes

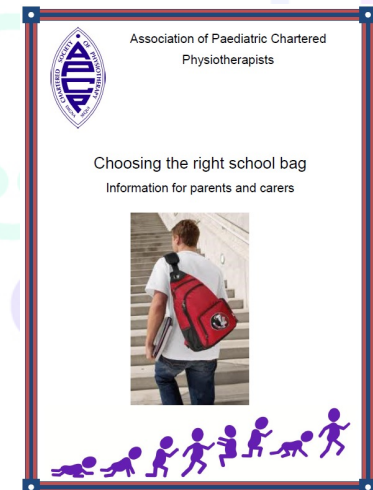
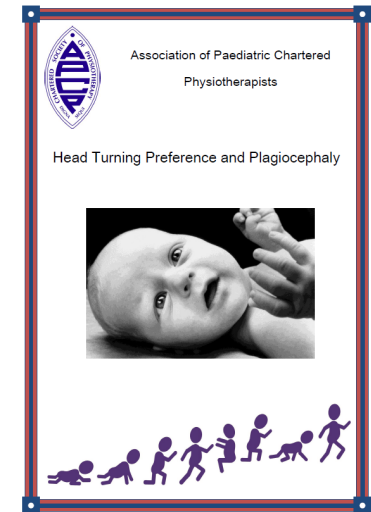
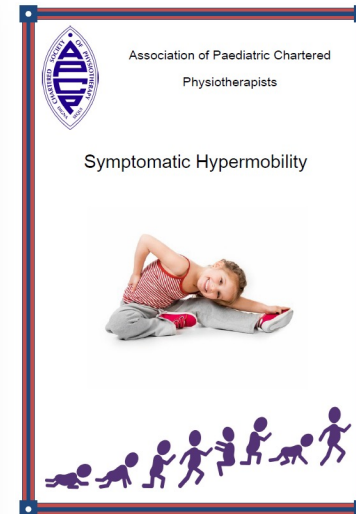
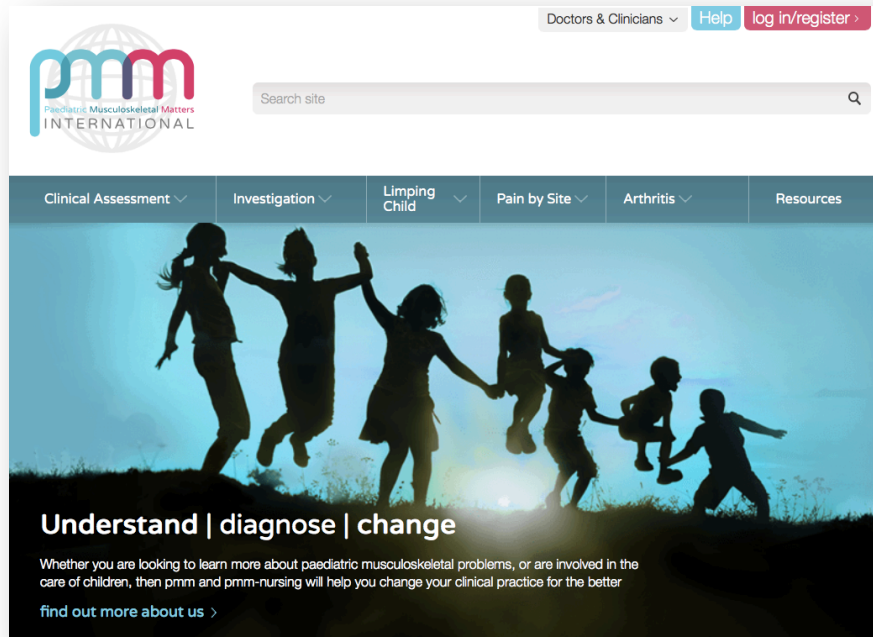
Assessment and Management

- Identify type of curly toes
- Observe for pressure or skin thickening
- Assess degree of deformity

Underlapping	Overlapping
	
More likely to be problematic	
Occasionally require surgery	Treatment not indicated

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Additional Resources



Take home messages

- Normal Variants are common in paediatric practice
- Most do not need treatment except parental reassurance
- Occasionally they will be indicators or more significant problem that requires onward referral to specialist