### **Sources**

APCP 'In-toeing Gait' (Information leaflet)

APCP 'Flat Feet in Young Children' (Information leaflet)

Referral Guidelines for Children's MSK Physiotherapy Oxford University Hospital NHS Foundation Trust

Jones S, Khandekar S, Tolessa E: 'Normal variants of the lower limbs in Paediatric Orthopaedics'. Int.'I J. Clin. Med. 2013. 4. 12-17



Bwrdd Iechyd Prifysgol Caerdydd a'r Fro Cardiff and Vale University Health Board

# Normal Variation of Gait in Early Years



CHILDREN AND YOUNG PEOPLE'S PHYSIOTHERAPY SERVICE TEL: 02921 836 908

Llandough Children's Centre Penlan Road Llandough Penarth CF64 2XX Phone 02920715580

St David's Children's Centre Cowbridge Road East Canton CF11 9XB Phone 02920836802

Dolphin Outpatient Physiotherapy Children's Hospital for Wales Heath Park Way CF14 4XW Phone 02921847577

## Intoeing

Some children's feet turn in when they walk. This is called intoeing or 'pigeon toe' and is very common in young children. It is one of the most common normal variants in children and is usually seen in both feet but may be just one.

Children who intoe can be just as good at sport and are no more likely to suffer back or hip problems or arthritis than anyone else. It will not get worse and should improve over time. Falling is not necessarily caused by intoeing as falling is a normal part of the process of learning to walk. However, often children can trip more frequently. Intoeing will not affect your child's ability to walk, run or jump in the long term. Intoeing may be more obvious if your child has flexible joints or when they are tired.

There are three main causes of intoeing in the healthy child:

Femoral anteversion: this is where the femur (thigh bone) turns inwards causing the whole leg to turn in. This is the most common cause of intoeing. It is most evident between the ages of 2-4 and will usually resolve spontaneously by the age of 10. This is twice as common in girls as boys and can run in families.





Tibial Torsion: this oc-

curs when the shin bone is twisted causing the foot to turn in even though the kneecaps point forwards. This will normally correct by age 4-5 as the bones grow, the walking pattern matures and the knees straighten. Splints or special shoes are not necessary.

### Genu Varum/Genu Valgum ('Bow legs' and 'knock knees')

A child with bow legs (genu varum) has a large gap between their knees when they are standing with their feet together. Many babies and toddlers have bow legs. It is evident up until around age 2 before it should correct. It can be associated with early walkers and overweight babies or toddlers.

A child with knock knees (genu valgum) has a large gap between their feet when they're standing with their knees together. Many young children have knock knees, which tend to be most obvious at around the age of 4. It's a normal part of their development, and their legs will normally straighten by the age of 6 or 7. Slight knock knees can continue into adulthood, but this also isn't usually anything to worry about unless it causes other problems. Femoral anteversion (see intoeing) can make knee valgus appear more severe.



### **Outoeing**

Some children's feet turn outwards slightly when they walk. This is called outoeing. It is less common that intoeing but is still a <u>normal variant that</u> <u>does not require any treat-</u> <u>ment</u>. Outoeing may be associated with genu valgum and flat feet.



One cause of outoeing is femoral retroversion. This is where the femur (thigh bone) turns outwards causing the whole leg to turn out. It is common in early infancy as this is thought to be caused by a child's position in the womb. It is also observed commonly in obese children.

A further cause is external tibial torsion, the twisting outwards of the tibia (shin bone) which is usually observed between 4 and 7 years of age.



<u>Metatarsus Adductus:</u> this is when the foot curves in and often results from cramped space in the womb and is evident from birth. Most will resolve spontaneously but in severe cases when the foot is stiff, stretches or advice on footwear may be necessary.

En-



Following a growth spurt, tightness at the muscles at the back of the thigh (hamstrings) may cause intoeing to worsen. A programme of stretches may help improve this. Sometimes, the muscles on the outside of the hip that turn the leg out can be slightly weaker resulting in the legs turning in—strengthening these muscles can help in some cases. For most children, both stretching and strengthening can generally be achieved through play, encouraging them to be as active as possible.



<u>courage your child not to 'W sit' but to cross legged instead</u> to stretch the hips in the opposite direction. This is if it is comfortable for them to do so.

Out-toed activities such as ballet, horse riding, martial arts or swimming breast stroke may help an intoeing gait. As your child gets older, practising activities to strengthen the hip muscles such as out-toed walking (penguin walking) or walking along a straight line (keeping feet straight) may help.

#### Flat Feet

Most adult feet have an arch along the inside edge of the foot. Flat foot is when the arch is apparently absent or reduced in standing. The arches may 'appear' when your child is sitting, when the big toe is bent backwards or if your child stands on tip toe.



Flat feet are usually due to loose or soft ligaments (stretchy bands that hold the bones of the foot together), and baby fat between the bones of the foot.

Ordinarily before the age of 3 all children have flat feet, as the arch on the inside of the foot does not begin to develop until after this age. Even in older children flat feet do not usually cause any problems.

We know that the majority of children between 1-6 years of age have flat feet. This is part of normal development of their feet and over 95% of children grow out of their flat feet and develop a normal arch. The other 5% continue to have flat feet, but only a small number will ever have a problem.

Most children with a persistent flat foot participate in physical activi-



ties, including competitive sports, and experience no pain or other symptoms.

#### Most children with painless flexible flat feet do not need any treatment. more effectively and may help reduce some of the symptoms.

If your child does not have any associated problems with their flat feet treatment is unlikely to be indicated. Many people have a long standing belief that flat feet are abnormal and require treatment with special shoes, insoles or even splints or braces.

Treatment for a more severe or painful flat foot can consist of exercise prescribed by your physiotherapist for your child to do. It may also include your physiotherapist referring your child to an orthotist or podiatrist who specialises in providing corrective devices such as arch supports or orthotics (insoles) to put in your child's shoes. Insoles will not change the shape of the foot and are therefore not a 'cure'; they simply hold the foot in a better position so that it can work more effectively and may help reduce some of the symptoms.

Physical activity is important for all children's development. If your child does not have symptoms, you do not need to restrict your child's activities. Supportive footwear is always recommended for your child's feet.

There are different terms that are used to describe flat feet but essentially they all mean the same thing. They are:

- Pes planus
- Pes valgus
- Pronated feet
- Fallen arches