

# Children's Feet Require Your Special Attention

Mark Charrette, DC

Patients often have questions for their chiropractor if they notice something unusual about their child's feet or the way the child walks or runs. For many years, the most common pediatric foot problem seen in doctors' offices has been in-toeing, especially whenever the child is observed [running](#).<sup>1-3</sup> Let's briefly discuss several of the more common pediatric foot conditions that result in the feet turning inwards, as well as how these conditions can (and should) be managed by chiropractors, since specialized bracing and surgery are only rarely necessary.

A case relating to pediatric in-toeing often begins when the parent reports an abnormal appearance of the child's foot, an awkward gait or a "clumsiness," with a tendency to trip or fall. A structural and biomechanical examination of the lower extremities - including watching the child walk - will allow for differential diagnosis and appropriate treatment recommendations. In-toeing is generally caused by the following three conditions, whose corrective timing and treatment considerations vary.

## Tibial Torsion

Tibial torsion is a common condition in which the tibia has not completed its external rotation to normal adult position (resulting, therefore, in a lack of normal torsion). The key to diagnosis is the closed-chain postural evaluation. On standing examination, the child's knees face forward while the ankles and feet turn inward.



The natural history of tibial torsion is a gradual normalization with growth and use of the lower leg muscles. Most cases resolve by 2 years of age, but rotation values continue to increase an average of 1.5 degrees a year up to age 6.<sup>4</sup> By age 7, the vast majority of children have achieved normal adult position.<sup>5</sup> There is a familial tendency among those who fail to reach normal values. When tibial torsion persists, compensatory pronation commonly develops.<sup>6</sup>

*Suggested Care:* Parents need to be involved in the care of their children. Train parents to frequently stretch the medial soft tissues of their child's lower leg. Show them how to strengthen the peroneal muscles (using a home exercise program and an extremity rehab system) when the child is old enough to cooperate sufficiently.

In addition, recommend buying shoes for the child that have flexible soles and good support to decrease pronation stresses. In cases of hyperpronation, individually designed pediatric orthotics should be considered. Finally, recommend beneficial activities and sports that emphasize lower-leg training and coordination (such as [soccer](#)).

### Femoral Torsion

Femoral torsion is an inward (medial) rotation of the entire lower leg that begins at the neck of the femur. It is a relatively common childhood condition, one which can be recognized by the medial facing of the knee as well as the ankle and foot.<sup>5</sup> With walking, more than 90 percent will resolve by the 8th year.

Any persistence is thought to be due to ligament laxity of the hip joint capsule.<sup>7</sup> In such cases, physical examination will find excessive passive internal hip rotation. Lumbar hyperlordosis, genu recurvatum, and hyperpronation are frequently associated.

*Suggested Care:* Begin strengthening the external rotator muscles and extensors of the hip by using an extremity rehab system. Parents can passively stretch the hips into external rotation, and the child should be encouraged to sit cross-legged.

Let parents know that shoes with good support are very important. When hyperpronation is noted, individually designed stabilizing orthotics are indicated to prevent further problems. Also, encourage physical activities such as ballet, skating and bike riding – all of which tend to engage the external rotator musculature of the hips.

### Metatarsus Adductus

Metatarsus adductus (also known as a "hooked foot") is a contracture of the medial soft tissues of the foot. This condition has been found to be present in 6 percent of schoolchildren.<sup>8</sup> On examination, the in-toeing can be passively stretched to normal, since there is no bony abnormality associated.

More than 90 percent of infants with this condition will resolve by the age of 18 months.<sup>7</sup> When more than mild adduction persists beyond 1 year of age, a consultation with a pediatric podiatrist or orthopedic surgeon for consideration of casting is appropriate. However, casting and special foot braces are seldom necessary.

*Suggested Care:* Instruct parents to massage and stretch the medial soft tissues of the infant's foot for several minutes following each diaper change. Frequent stretching is the key. Consider an evaluation by a specialist if significant adduction persists beyond 1 year of age, or if the deformity feels fixed and cannot be temporarily reduced with gentle stretching. [Orthotics](#) are needed only if mild adduction continues beyond age 7.

**Footwear:** What to Look for Developing feet require proper footwear. Whenever safety and comfort allow, going barefoot stimulates proprioceptors and encourages muscular coordination and strength. Children's shoes should have flexible soles to allow for proper foot-joint movement (thick rubber soles may hamper and confine).

Proper shoe sizing and fit are critical, since the developing bones are soft and malleable. Tight, constricting shoes will interfere with normal growth and may result in deformity. Frequent evaluation of shoe size and fit (palpate the child's foot for pressure points while they are standing with shoes on) is an important concept for parents.

### When to Recommend Orthotics

As described above, the majority of pediatric foot problems will resolve with normal childhood activities, exercise and proper footwear. Orthotics are seldom needed in the early years of growth. If excessive pronation associated with in-toeing is seen to persist beyond the age of 7 or 8, or is responding poorly to home care interventions, individually designed stabilizing orthotics are appropriate.

The additional corrective support they provide will encourage normal development while preventing further deformity and reducing abnormal kinetic-chain stresses on the pelvis and spine during formative years. Parents will need to be educated to bring their child in for regular evaluations of orthotic fit and function, since children's feet can rapidly outgrow any orthotic.

### Serving the Next Generation of Patients

Parents need reassurance and appropriate recommendations when they bring in a child with a "foot problem." In particular, in-toeing can raise concerns in parents and may be frustrating to athletically oriented children. Most of the common causes of in-toeing in children will resolve during normal growth and development, needing only home-care recommendations and monitoring by the family's chiropractor.

As always, the child's developing spine should be evaluated and appropriate chiropractic care is recommended. Specific home exercises may hasten the maturation and coordination of the support muscles. In some cases, pediatric orthotics may be needed to provide additional corrective stimulus.

### References

1. Sass P, Hassan G. Lower extremity abnormalities in children. *Am Fam Physician*, 2003; Aug 1;68(3):461-468.
2. Turek SL. *Orthopedics: Principles and Their Applications, 4th Edition*. Philadelphia: JB Lippincott, 1984.
3. Mital M. Children's feet: common worries of parents. *Prof Care Mother Child*, 2000;10(2):33-34.
4. Valmassy RL. Tibial torsion: normal values in children. *Journ Am Podiatric Med Assn*, 1989;79:432-435.
5. Valmassy RL. Biomechanical evaluation of the child. *Clin Podiatr*, 1984;1:563-574.
6. Root ML. *Normal and Abnormal Function of the Foot*. Los Angeles: Clinical Biomechanics Corp., 1977.
7. Cohen KB. In-toeing, the examination and treatment of this common pediatric complaint. *Am Chiro*, 1989 Aug;21-22.
8. Notari MA. A study of the incidence of pedal pathology in children. *Journ Am Podiatric Med Assn*, 1988;78:518-521.

MARCH 2012