MASSACHUSETTS GENERAL HOSPITAL

DEPARTMENT OF
ORTHOPAEDIC SURGERY

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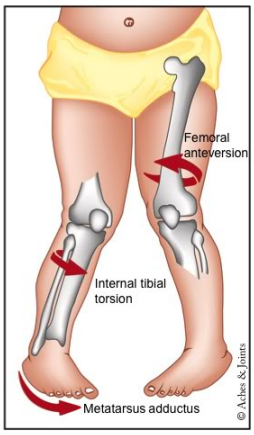
617-726-8523

Pediatric Orthopaedic Homepage



In-toeing Gait in Children

An in-toeing gait is very common in children, and is a frequent complaint of many parents. In fact, an in-toeing gait (pigeon-toed) is the most common rotational deformity seen in pediatric orthopaedics. In the overwhelming majority of patients, the in-toeing will correct with growth over time.

What causes an in-toeing gait in children? The three most common causes of in-toeing in children are femoral anteversion (twisting of the femur/thigh), internal/medial tibial torsion (twisted tibia/shin bone), and metatarsus adductus (curved foot). When the pediatric orthopaedic surgeon evaluates your child he/she will determine if the in-toeing is coming from the hips, legs, or feet.

Femoral Anteversion

Femoral anteversion/torsion is the most frequent cause of in-toeing in children between the ages of 3-10 years. The femur is the long bone that goes from the hip to the knee. Anteversion literally means leaning forward." Femoral anteversion is therefore a condition in which the femoral neck leans forward with respect to the rest of the femur. This causes the lower extremity on the affected side to rotate internally (the knee and foot twists towards the midline of the body). The normal child is born with approximately 40 degrees of femoral anteversion. This will gradually decrease to 10-15 degrees at adolescence and generally improves with further growth. Femoral anteversion is more common in females, and is usually most noticeable between the ages of 4-6 years. Parents will notice that when the child is standing with the feet forward, the patellae (kneecaps) will point inwards. Frequently, parents will also describe the child's gait as awkward or clumsy. The in-toeing will often appear worse with running and at the end of the day when fatigued. Femoral anteversion will decrease naturally in 99% of cases. Studies have repeatedly shown that special shoes, twister cables, and braces make no difference in outcome. Therefore, femoral anteversion is usually treated with simple reassurance and observation.

Children with femoral anteversion often prefer the "W" sitting position because it is more comfortable…this should not be discouraged or avoided.

Surgical correction is rarely indicated for femoral anteversion. The surgery done to correct the anteversion, called a derotational femoral osteotomy, is never done before the age of 8-9 years. This is because of the high spontaneous resolution rate. Indications for surgery include: 1.) femoral anteversion > 45 degrees, 2.) hip unable to laterally rotate beyond neutral, 3.) functional disability, and 4.) severe cosmetic deformity.

Internal [Medial] Tibial Torsion

Internal tibial torsion causes an in-toeing gait from a twisting of the tibia (shin bone). It is most often first noticed when a child is first starting to walk, and is most common between the ages of 2-4 years. The inward torsion is a variation of normal anatomy and is caused partially by the child's position in the uterus. The toddler or young child presents to the orthopaedic clinic with complaints of "bowing legs." Examining a child with internal tibial torsion with the patellae (kneecaps) straight, there will be medial rotation of the feet. Many different braces and special shoes have been prescribed in the past for internal tibial torsion. However, none of these shoes or braces have been shown to speed up the natural resolution of tibial torsion. Therefore, simple reassurance and observation is the best treatment for in-toeing caused by internal tibial torsion.

Studies have shown that adult runners who have a slightly in-toed gait are faster on average than those who do not.

Metatarsus Adductus

Metatarsus adductus is defined as a convexity (curving inward) of the lateral aspect of the foot. It is the most common foot deformity in infants, occurring in 1-3/1000 children. Although the exact cause is unknown, metatarsus adductus in believed to be caused by intrauterine positioning or crowding. The majority of patients will have flexible metatarsus adductus, meaning that the foot can passively be corrected to neutral (normal) position. The overwhelming majority of infants and children with metatarsus adductus require no treatment other than reassurance and observation. The foot will naturally straighten out in about 90-95% of patients. Parents can gently stretch the infant's foot to neutral a few times each day (with diaper changes, etc). Straight-last/Reverse-last shoes are also occasionally used in the treatment of metatarsus adductus. Occasionally, if the curved foot persists, serial casting can be done when the child is slightly older.

For more information on in-toeing, visit our department's patient portal Aches & Joints or the American Academy of Orthopaedic Surgeons.

Content developed by Erin S. Hart, RN, MS, CPNP