

IN BRIEF:

Topics in Pediatric Orthopedics

Evaluating Pediatric Intoeing and Outtoeing

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Intoeing and outtoeing are common concerns of families who have young children. Intoeing may result from internal rotation of the femur (femoral anteversion), internal tibial torsion and/or metatarsus adductus. Outtoeing usually results from an external rotation of the femur (femoral retroversion), external tibial torsion and/or flatfoot. In most cases, treatment is not needed—observation and reassurance is sufficient—after the history and physical exam have ruled out more serious conditions.

History

Review family history, as these conditions often are inherited. Discuss birth history: Breech vs. vertex? Premature or full-term? Any perinatal complications that suggest an underlying neurological abnormality? Additionally:

- Age when walking started?
- Interfering with function/tripping?
- Worse when tired/running?
- Alignment improving or worsening?
- Pain or limping?
- Ligamentous laxity (“loose joints”)?

Physical Examination

Always observe children's gait. The child should be wearing a diaper or shorts so both lower extremities are visible. Confirm that gait is smooth with a heel-toe progression. Does the child seem to bear weight evenly on both legs? Is toe walking present? Is there any evidence of pain or asymmetry? Scrutinize knee position/patella direction and foot progression angle. On physical examination, is there any evidence of hypermobility (increased hip range of motion (arc greater than 90 degrees), elbow/knee hyperextension, flat feet)? Hypermobility is often associated with intoeing.

With the child prone, perform a rotational profile examination:

- Hips** – Flex the knee to 90 degrees, evaluate hip range of motion (internal and external rotation) and femoral anteversion. Femoral anteversion is approximately 45 degrees in newborns, and approximately 15 degrees in normally developing 8-year-olds.
- Tibias** – View foot and thigh from above and evaluate the long axis of the foot relative to the thigh. The foot is typically mildly internal on toddlers (-20 to -10 degrees), neutral for children 3-5 years old, and mildly external in children older than 5 years (0 to +10 degrees).
- Feet** – Does the foot have a straight lateral border, or is it curved/bean shaped? With metatarsus adductus, which is associated with intrauterine positioning, the forefoot is curved inward compared to the hindfoot. The forefoot should be flexible. If the foot is flexible, no treatment is indicated. Radiographs are usually not required.

Treatment

Treatment is rarely indicated for intoeing and outtoeing. Historically, “corrective shoes” and braces were recommended for these conditions. Natural history studies have confirmed that intoeing and outtoeing spontaneously improve in the vast majority of typically developing children. *Shoes, braces and therapy have no effect.* Not only are orthotics ineffective, they also may result in significantly lower self-esteem (Diano, Staheli and Staheli, 1998). The best course is to explain the anticipated natural progression of the child's alignment to the family, reassure them that the condition almost always improves with growth, and recommend observation. In unusual cases, the foot alignment may not be normal by age 8 years. If that occurs, a pediatric orthopedic surgical consultation would be appropriate.



As a pediatric nurse practitioner at Gillette Children's Specialty Healthcare, **Sarah Gutknecht, D.N.P., R.N., C.P.N.P.**, specializes in pediatric orthopedics and sees children who have a variety of orthopedic conditions, including fractures, developmental dysplasia of the hip (DDH), clubfoot, scoliosis, intoeing and outtoeing.

She received a bachelor of science degree in nursing, a master of science degree in pediatric nursing, and a doctorate of nursing practice from the University of Minnesota. She is certified by the Pediatric Nursing Certification Board in acute and primary care. Gutknecht is also an adjunct faculty member at the University of Minnesota School of Nursing and an expert panel member of the National Association of Pediatric Nurse Practitioners. She is a member of the National Association of Pediatric Nurse Practitioners and the American Academy of Cerebral Palsy and Developmental Medicine.

Key Insights

- Complete a thorough history and physical exam to rule out any underlying developmental concern.
- Always observe children's gait with the child in a diaper or shorts.
- Perform a rotational profile while the patient is prone, and document it for comparison in subsequent exams.
- Most normally developing children's lower extremity alignment issues will spontaneously improve, so treatment is not indicated.
- Consider a referral if there are developmental concerns, rigid feet, pain, or if intoeing/outtoeing causes tripping/functional challenges.

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About *InBrief*

InBrief has been developed by pediatric orthopedic specialists at Gillette Children's Specialty Healthcare as a resource for primary care providers. If you have comments or questions, please contact Paul Fiore, M.B.A., F.A.C.H.E., program manager, Center for Pediatric Orthopedics, at pfiore@gillettechildrens.com.

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