

Childhood Foot Concerns and Orthotic Support

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Children's feet undergo marked developmental changes throughout their first 6 or 7 years. Incidence of flat feet, knock knees, or other abnormalities in a young patient does not always signal the need for therapeutic intervention, as is recommended for adults. Yet these conditions, along with gait abnormalities, pigeon toes, and bow legs, are the more common signs that cause parents to seek biomechanical evaluation of their children.¹

Normal Foot Function

The feet serve the body in three ways: bearing weight, assisting locomotion (gait), and absorbing the impact of gravitational force, also known as heel-strike shock. The underdeveloped foot of a child accomplishes gait without displaying any synchronized process. Before independent stance is possible, it is typical to observe bowed legs and feet which point inward.

As the child begins to walk and the lower extremities bear weight, the bowing and toe positions normalize. Then skeletal growth begins to accelerate, and genu varum (or toeing in) may reappear for the next few years. By age 6 or 7, when growth rates begin to stabilize, a return to normal, healthy alignment should be observed.

This is the stage when concern for the child's pedal integrity is appropriately pursued. A musculoskeletal examination can be conducted because ossification of bony structures is usually complete, even if the epiphyses are not entirely closed.²

Pedal Dysfunction

In children, the effects of pedal dysfunction may not be readily apparent, waiting until the subject is well into the adult years to manifest. Cases of low back, knee, and hip problems, postural fatigue, scoliotic deviations, and plantar fasciitis in adults have all been linked to untreated childhood pedal imbalance.^{3,4}

Hyperpronation may be the culprit in these cases. It is one of the leading foot problems detected among children in the elementary school years (ages 6 through 12).⁵ The immediate effect of hyperpronation on young feet is an abnormal abduction during gait. Body weight shifts over the foot before stance-phase muscles are prepared to provide adequate support.⁶

Examining Children's Feet

The same "five red flags" used to identify potential problems in adult feet can be applied to patients ages 6 or older:

1. Toe position. As the child walks, look for signs of toeing outward or inward. If possible, gait should be observed before the child is aware an examination is underway, to obtain the most natural results. The parent also may be able to provide information on the child's normal walking

patterns.

2. Dropped arches. As the child stands barefoot, slide an index finger beneath the longitudinal arches. Abnormally low arches will not comfortably accommodate the finger past the first knuckle. Pain on palpation and tissue tightness relieved by shifting weight outward are other indicators of imbalance.

3. Tendon bowing. Observation of the Achilles tendons usually will reveal bowing in the presence of hyperpronation.

4. Patellar displacement. The normal inroll of pronation causes an inward movement of the patella. Excessive pronation may be accompanied by perpetuation of this patellar displacement.

5. Shoe condition. Foot imbalance will cause excessive wear on the lateral aspect of shoe heels. Check the condition of shoes for more clues to the health of a child's feet.

Orthotic Support

Custom-made, flexible orthotics to enhance the supportive and biomechanical properties of the pedal foundation - and the kinetic interaction of upper body structures - have been validated via numerous studies and clinical experience.⁷⁻⁹ Flexible orthotics offer the developing foot a degree of control in motion that need not disrupt complex structural interrelationships.

The goal of orthotic therapy is to control, not restrict, motion. By enhancing support of the longitudinal arch, orthotics can reduce deformation of pedal tissues.⁹ This, in turn, encourages joint stability, which provides optimal support of the lower extremities and, ultimately, greater postural integrity of pelvic and spinal structures.

Shock absorption also is enhanced when pedal imbalance is alleviated with custom-made, flexible orthotics. Young bones and immature joints are especially vulnerable to the effects of pathological heel-strike shock. By normalizing subtalar pronation and accompanying internal leg motion, orthotics help the body's shock absorbers to function most effectively.⁷

Choosing orthotics for children must take into account the rapid growth rates of this patient group. The best results can be obtained when the shoe, foot, and orthotic function as an integrated unit.

Therefore, refit children with new orthotics for every increase of one-and-a-half sizes in shoes.⁸

References

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