



SPECIALISTS' CORNER



Flatfeet in Children – When to Worry, When to Not

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Flatfeet are a common cause of concern for parents and a frequent reason for referral to the orthopedist. The treatment of flatfeet remains controversial among practitioners because of the lack of a common understanding of the flatfoot itself and the potential for long-term disability. All flatfeet are not created equal and thus treatment varies depending on the type of flatfoot. Management thus ranges from no treatment to surgical intervention.

So what is flatfoot?

The most obvious deformity in the flatfoot is a decreased, or absent, longitudinal arch. However, a flatfoot is typically a complex deformity in which the hind-foot is in valgus, the midfoot sags in a plantar direction with reversal of the longitudinal arch, and the forefoot is supinated in relation to the hindfoot. [1] Studies have demonstrate that most children are flatfooted in infancy and develop an arch in the first decade of life, though up to 20% children do not develop a "normal" arch and remain flatfooted as adults. [2-8]

Are all flatfeet the same?

Flatfeet come in three different types; flexible flatfoot (FFF), a flexible flatfoot with a short tendo-achilles complex (FFF-STA), and a rigid flatfoot (RF) as originally described by Harris and Beath. [9] A flexible flatfoot is flexible in all joints including the subtalar and the ankle joints. The hallmark on physical exam of a flexible flatfoot is that the foot maintains a good arch in the non-weight bearing position but flattens out upon weight bearing. A FFF will also demonstrate an arch with toe walking and the jack toe raise test. The jack toe raise test is performed by passively raising the great toe. As the toe rises an arch will form in a flexible flat foot. A FFF will also demonstrate ankle dorsiflexion above 10 degrees both with the knee flexed and extended. The FFF accounts for the vast majority of flatfeet and rarely causes disability in contrast to the other two types of flatfeet. [9] The FFF-STA appears the same on physical examination as the FFF type except it lacks the adequate ankle dorsiflexion. The rigid flatfoot never demonstrates an arch even when the patient is non-weight bearing or walking on his toes and the jack toe raise test will fail to yield an arch. The ankle may or may not demonstrate a lack of dorsiflexion with the rigid flat foot.

When are X-rays indicated?

Xrays are not necessary in the asymptomatic painless flexible flatfoot. They are necessary when the patient has symptoms such as pain, decreased flexibility, excessive shoe wear, and recurrent ankle sprains. With a symptomatic flexible flatfoot, routine radiographs should include weight bearing anteroposterior (AP) ankle films and weight bearing AP and lateral foot films as well. The AP ankle xray is necessary as ankle valgus can produce the appearance of a flatfoot and can also be associated with a flatfoot. If the patient also has a rigid deformity then oblique and Harris axial views are recommended to evaluate for bony deformities such as a tarsal coalition.

When is treatment indicated for flexible flatfeet? (FFF)

Flexible flatfeet rarely cause disability and therefore an asymptomatic child does not require any treatment. Despite this knowledge many people still place these children into orthotics in an attempt to alter the growth of the child's foot. Two separate controlled prospective randomized studies of children have not demonstrated any effect of corrective shoes or inserts on the development of the child's arch. [5, 10] These studies demonstrate that orthotic use does not change foot development in children. Despite this information, practitioners frequently follow the thought process "well, it can't hurt and it will make the parents happy." In fact, a study by Driano et al. evaluated adults who wore accommodative foot wear as

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children and found they had lower self esteem as compared to controls who did not. [11] In summary, an asymptomatic painless flexible flatfoot does not require any treatment and does not need to be referred to the orthopaedic specialist. Occasionally, patients with FFF will have symptoms such as diffuse activity related pain, early fatigue, medial foot calluses, and excessive shoe wear. Soft and rigid over-the-counter inserts and rigid custom molded inserts have been shown to relieve symptoms, and increase the useful life of shoes, without a simultaneous permanent increase the height of the arch. [12-15] Over the counter orthotics should be considered in the treatment of children with symptomatic FFF, but not in asymptomatic children.

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What about flexible flatfeet with shortened tendo-Achilles complex?

Patients who have a flexible flatfoot associated with a tight tendo-Achilles complex are more at risk for developing symptoms as their talus cannot dorsiflex normally due to the tight Achilles complex.^[9] With a short achilles tendon, the only way the foot can contact the floor fully is by pronating through the subtalar joint, resulting in a flatfoot deformity. If symptoms develop, they are usually due to pain and callosity under the talar head and occasionally also have lateral sinus tarsi type pain. For the same reason, these patients do not do well with inserts and orthotics as the device puts pressure under the talar head and produces more pain. The first line of treatment for this group of people focuses on heel cord stretching in an attempt to convert a FFF-STA patient into a FFF patient. The patient and parent should be taught a home stretching program. If compliance is poor then a short course of physical therapy can be ordered. A night-time bracing program to stretch the shortened heel cord may be a useful adjunct. Stretching casts may be used for 2-4 weeks if the aforementioned methods are unsuccessful.

If prolonged conservative measures fail then surgical intervention is warranted. Multiple options are available for surgical correction including soft tissue reconstruction alone or in combination with osteotomies, arthrodesis of one or more joints, and interposition of bone or synthetic material into the sinus tarsi termed "arthroeresis". We prefer to perform a calcaneal osteotomy associated with soft tissue reconstruction as these procedures have been well-described and demonstrated excellent long-term outcomes in the literature.^[16-17] In the long run, arthrodesis is not a good option as the adjacent joints have demonstrated early degenerative changes.^[18-24] The complication rate with the synthetic implants used in arthroeresis procedures range from 3.5-30%.^[25-33] These complications include synovitis, implant induced pain, impingement pain, ganglion cyst within the talus, osteonecrosis of the talus, and calcaneal fracture. We have encountered many children in our practice that ended up with rigid, painful flatfeet after treatment of FFF with arthroeresis. Further there are no adequate long-term outcome studies on these procedures as most include a follow up of less than two years.^[25-33] Given these myriad issues, arthroeresis cannot be recommended in children at this time.

What about treatment of rigid flatfoot deformities?

Rigid forms of flatfeet can cause significant pain and disability. Causes of a rigid flatfoot include vertical talus deformity, tarsal coalition, and neuromuscular flatfeet (associated with Cerebral Palsy and Myelomeningocele). Vertical talus deformity is a rare congenital condition that affects 1 in 150,000 children and results in a severe rigid flatfoot. Congenital vertical talus (CVT) is evident at birth and presents as a foot with a convex arch and extremely limited (or no) passive plantar flexion past neutral. Up to 50% of children with CVT have associated anomalies and/or syndromes. CVT rarely responds to conservative measures and operative treatment is almost always required. Tarsal coalitions are defined as abnormal connections between bones of the feet (most typically between the talus and calcaneus, or the calcaneus and navicular). Tarsal coalitions are estimated to occur in 2-6% of the population. An estimated 25% of patients with a rigid flatfoot due to tarsal coalition will become symptomatic in early adolescence.^[34] Symptoms can include pain and recurrent ankle sprains. Cast immobilization for a brief period of time (typically 2-4 weeks), and/or the use of orthotics can be effective in relieving symptoms. Surgical treatment (excision of the coalition, with or without a hind-foot osteotomy) is reserved for those who fail non-operative therapy.

Neuromuscular feet are assessed on a case-by-case basis. The use of orthotics for the treatment of neuromuscular foot deformities may be helpful in individual cases. The typical indications for orthotic use in these children include: 1) foot deformity interfering with function, and 2) progressive foot deformity.

In conclusion then

Rigid flatfoot deformities warrant an evaluation and treatment by an orthopaedic surgeon. The real challenge is the evaluation of the flexible flatfoot and determining which of these feet needs intervention. An orthopaedic referral is warranted for any child who is having symptoms due to flexible flatfeet. Orthotics and heel cord stretching play a role in providing symptomatic relief but do not alter the growth or shape of the foot. Unnecessary bracing or corrective shoes are expensive and may have a detrimental psychological effect on the child in the long term. Surgery is reserved for flexible flatfeet that have pain and discomfort and have failed prolonged conservative therapy.

(References are available on request to the LAPS Office)

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