



Q / How should you treat a child with flat feet?

EVIDENCE-BASED ANSWER

A / THAT DEPENDS on whether the pes planus (flatfoot) is flexible or rigid. Flexible flatfoot (FFF)—an arch that is flat only with weight bearing—usually doesn't require treatment at all, unless it's symptomatic. Rigid flatfoot (RFF)—a low-lying arch that persists with and without weight bearing—may require surgery.

FFF doesn't increase the risk of injury or pain during exercise (strength of recommendation [SOR]: **B**, 2 small prospective cohort studies). Treating FFF with orthotics doesn't change the course of arch de-

velopment (SOR: **B**, 2 small randomized controlled trials [RCTs]). FFF is usually asymptomatic, but symptomatic FFF may respond to activity modification, orthoses, and stretching (SOR: **C**, expert opinion).

Rigid flatfoot results from trauma, neuromuscular disorders, or congenital bone malformations (SOR: **C**, expert opinion). Treatment may require surgery, including osteotomy and arthrodesis, depending on the underlying pathology (SOR: **C**, expert opinion). No long-term outcome studies of surgical treatment have been performed.

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 **Flexible flatfoot doesn't increase the risk of injury or pain during exercise.**

Evidence summary

Pes planus has no universal radiographic or clinical definition, although it can be classified as rigid or flexible based on the mobility of the longitudinal arch. In the absence of an accepted definition, prevalence estimates vary widely.

An Austrian survey of 835 kindergartners ages 3 to 6 years found the prevalence of FFF to be 44%; the prevalence of pathologic flatfoot was less than 1%. Flatfoot was defined by clinical inspection and laser scanning. The study also found that prevalence decreases with age (54% at 3 years, 24% at 6 years) and that boys had a higher rate of FFF (52%) than girls (36%).¹

Flexible flatfoot doesn't affect function

Ligament laxity is thought to be the primary cause of the abnormally low-lying longitudinal arch associated with weight bearing that characterizes FFF. A small (N=230) prospective cohort study showed that the foot shape of Australian military recruits was unrelated

to pain, injury, and functioning during an 8-week basic training course.²

Another prospective cohort study of 246 male US Army recruits enrolled in a rigorous 12-week infantry training program found that trainees with low or flat arches actually had a lower risk of foot injury than trainees with high arches.³

Few studies evaluate FFF conservative treatment

Conservative therapies traditionally used to treat symptomatic FFF include physical therapy, orthotics, and corrective shoes. Few studies of their efficacy exist, however. Although we found no studies of adults or adolescents with symptomatic FFF, we did find a few studies of younger children with noticeably flat feet and concerned parents or physicians who referred them for therapy.

A prospective study followed 129 children with FFF (1-6 years old, mean age 29 months) who were referred by pediatricians to Texas Scottish Rite Hospital Flatfoot Clinic, which was set up entirely for the sake of

> Treating flexible flatfoot with orthotics doesn't change the course of arch development.

the study, based on cosmetic appearance as well as functional symptoms. The children were randomized to 1 of 4 groups—controls, corrective orthopedic shoes, heel cups, and custom-molded inserts—and followed for 3 years.

The authors, who were blinded to group assignment, measured 14 outcomes related to foot shape and function. They quantified radiographic changes, not patients' clinical or functional outcomes. All of the outcomes showed improvement in all 4 groups; no significant differences were noted between children who received active interventions and controls. Thirty-one patients were dropped from the study because of noncompliance and weren't included in the final analysis.⁴

A small, randomized, single-blind controlled trial studied 160 Australian children between 7 and 11 years of age with bilateral flexible excess pronation (everted calcaneus and lowered medial transverse arch) associated with weight bearing. The investigators evaluated gross motor proficiency, self-perception, exercise efficiency, and pain over 12 months in 3 groups of children who received no treatment, noncustom orthoses, or custom-made orthoses. They found no significant difference in any outcomes measure among the groups after 3 and 12 months.⁵

Better results with heel cups than insoles

A small (N=30) retrospective study enrolled children (mean age 3.8 years) based on clinical and anatomical characteristics of FFF. The study found that a polyethylene "dynamic varus heel cup" worn for 14 months was superior to static insoles for treating severe pes planus, characterized by poor formation of the longitudinal arch and valgus deviation of the calcaneus. The study was not randomized or blinded, and the authors evaluated only physical examination features and radiographic findings, not patient symptoms or functional outcomes.⁶

Rigid flatfoot often causes symptoms

RFF is often symptomatic and is caused by underlying pathology.⁷ Tarsal coalition is the most common cause, but trauma, neoplasm, infection, and rheumatologic and neuromus-

cular disorders can all contribute. A very small retrospective study of 9 patients found that "children and adolescents with painful idiopathic rigid flatfeet ... can have significant, persistent disability."⁸

Surgical treatment depends on underlying pathology

No long-term studies similar to studies of FFF have compared surgery with conservative therapies for RFF. The type of surgical treatment used depends on the underlying pathology and which planes of the foot are affected.⁹ Surgery may include 1 or more of the following procedures, depending on clinical and radiographic evaluation:

- tendon transfers or lengthening
- tarsal arthrodeses or subtalar joint motion blockers
- calcaneal osteotomy.

Several small studies of different surgical treatments found varying degrees of radiographic and symptomatic improvement. None reported long-term outcome data, however.

Recommendations

A Cochrane review of interventions for pes planus is in process.

Recommendations from the Clinical Practice Guideline Pediatric Flatfoot Panel of the American College of Foot and Ankle Surgeons state that "most flexible flatfeet are physiologic, asymptomatic, and require no treatment. Physiologic flexible flatfoot follows a natural history of improvement over time. Periodic observation may be indicated to monitor for signs of progression. Treatment is generally not indicated."⁹

If FFF is symptomatic, "initial treatment includes activity modifications (primarily avoiding painful activities), stretching, foot strengthening exercises, and orthoses. When all nonsurgical treatment options have been exhausted, surgical intervention can be considered."⁹

Regarding RFF, the panel notes that the condition "can be symptomatic or asymptomatic. Most cases are associated with underlying primary pathology" and its treatment. "Surgical consideration should be given to those who fail to respond to nonsurgical treat-

ment.”⁹ Tendon transfers and tendon lengthening are not recommended for children. **JFP**

References

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Flexible flatfoot that is symptomatic may respond to activity modification, orthoses, and stretching.