Orthotics

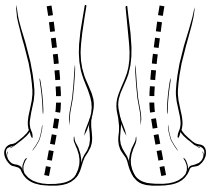
Orthotics are shoe inserts that are designed to provide cushioning, support, stability, and/or relief to pressure areas of the foot. They can be soft, semi-rigid, accommodative, or rigid; they can be custom-made from a mold or impression of the foot or bought by size "off the shelf."

Orthotics are used to treat foot and leg problems caused by foot abnormalities or variations in foot structure, like a flat foot or foot with a high arch. They can also be used to treat leg injuries where the foot structure may be a contributing factor. How well an orthotic works depends on the fit, the design, and if it is being used correctly. (Note: Other treatments for the condition also may affect recovery.)

Examples of orthotics.

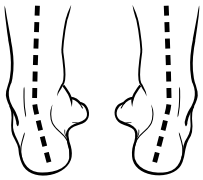
Mechanics of walking and running

When walking or running, the foot undergoes pronation and supination. Everyone pronates and everyone supinates. However, when pronation or supination is excessive, injury may occur.



Pronation

Rear view of pronated feet.



Supination

Rear view of supinated feet.

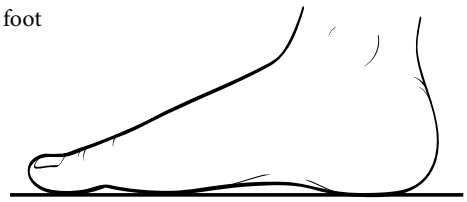
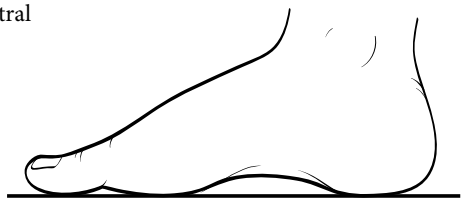
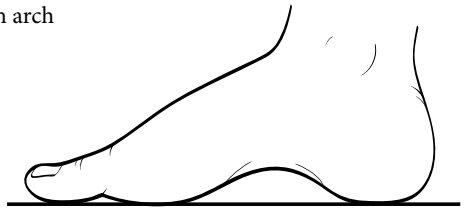
Pronation occurs when the foot lands on the ground. The arch flattens, the heel flares out, and the shin bone rotates inwardly. This allows the foot to absorb shock and adapt to the surface.

A flat foot pronates excessively. Even if the foot appears to have an arch, excessive pronation results in the arch collapsing with weight bearing. Due to the instability of a pronated (flat) foot, the leg muscles have to work extra hard to stabilize the foot during walking or running. This can cause shin splints and stress fractures. A flat foot also is associated with increased internal tibial rotation (when the knee turns inward) and can lead to patellar tracking problems and overuse injuries of the knee. An orthotic that supports the arch can help treat these conditions.

Supination happens before pushing off with walking or running. Supination raises the arch, inverts the heel, and makes the foot more rigid to allow for push-off.

A foot with a high arch is rigid and supinates. This foot type has stability and support but lacks flexibility for shock absorption. This rigidity can lead to stress fractures or overuse injuries. A rigid orthotic for this foot type is not recommended because it may actually increase the risk of injury, but a shoe or insert that provides cushion may be helpful.

Orthotics and foot type

Foot Type	Foot Characteristics	Orthotic Recommendation
Flat foot 	Flexible, adaptable, good shock absorption; associated with internal rotation of shin bone and patellar tracking problems; can lead to overworking of the leg muscles that help stabilize the foot	Rigid or semi-rigid orthotic designed for motion control, stability, and hind foot control.
Neutral 	Average level of stability and shock absorption	No orthotic needed if a stable and supportive shoe is available. May need neutral, accommodative orthotic in a cleated shoe (like a soccer shoe).
High arch 	Rigid, poor shock absorption; contributes to overload of the tibia and leg muscles	Cushioned shoe or shock-absorbing insole.

Orthotics and treatment of foot conditions

Conditions	Type of Orthotic	Comment
Painful accessory navicular (extra bone on inner part of the foot that becomes painful when arch flattens)	Non-rigid arch support	Preventing the arch from collapsing will decrease stress on the painful bone.
Sever's disease (pain in the growth plate of the heel where the Achilles tendon and plantar fascia attach)	Heel cup and/or heel lift along with a shoe with built-in arch support	The heel lift is most important, but combining it with an arch support is useful if flat foot is present.
Chondromalacia of patella (soft cartilage behind the knee cap)	Neutral arch support	Flat feet can contribute to abnormal patellar tracking. Goal is to control the internal tibial rotation associated with flat foot.
Shin splints (with flexible, flat foot)	Neutral arch support	A flat foot needs control and stability to relieve stress on leg muscles.
Shin splints (foot with rigid, high arch)	Cushion; shock-absorbing insole	A rigid foot transmits more stress to the leg. A cushioned orthotic can relieve stress on leg muscles.
Sesamoiditis (pain in small bones under big toe)	Arch support with extension under the first toe; cutout area for sesamoid	The orthotic should shift the stress away from the painful sesamoid.
Tarsal coalition (abnormal fusion between bones in foot)	Neutral arch support	This is a rigid flat foot. An arch support can relieve pain at the abnormal joint.
Achilles tendonitis	Arch support if the foot is flat; heel lift if the foot has a high arch	Depending on foot type, the orthotic should either control bending/torsion on the Achilles (with flat foot) or decrease tension on the Achilles (with high arch).

Is an orthotic right for you?

An orthotic is just a tool to be used in the treatment of specific injuries. There is no clear evidence that it can prevent injuries. However, an incorrect orthotic can cause or worsen an injury. An orthotic will not change a flat foot to a normal foot over time.

In deciding if an orthotic is a useful part of the treatment, you should ask

- Is the injury caused by a problem with the structure of the foot?
- Can an orthotic correct this problem?
- What other options are available to treat the condition besides orthotics? Is there a shoe or over-the-counter product that would work?
- What are the risks of using an orthotic? Could it cause other injuries?

NOTES

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