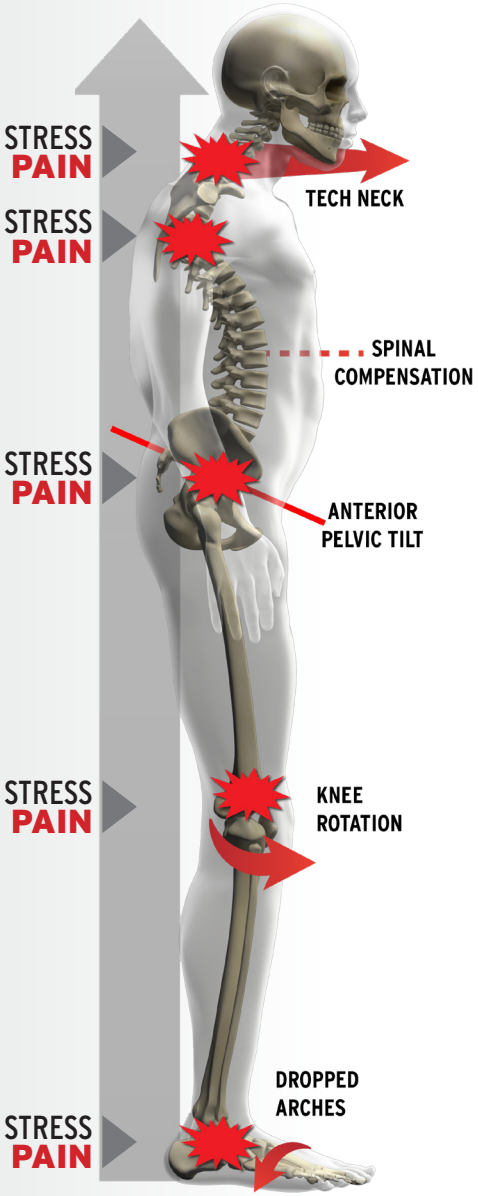
Orthopedic NOTES
Vol. 2, 2019

The Foot/Spine Connection



A 2017 **randomized control trial** conducted by National University of Health Sciences, and published in the Archives of Physical Medicine and Rehabilitation produced results that showed Foot Levelers Stabilizing Orthotics **reduced low back pain in participants by 34.5%**.

Arch Collapse and Back Pain

Most people develop strong, flexible arches in childhood. Over the long term, the repetitive stresses of daily life lengthen the connective tissues, causing a slow breakdown of the normal support for the bones and joints of the feet and a decrease in elasticity, eventually leading to a sagging of the foot's arch.

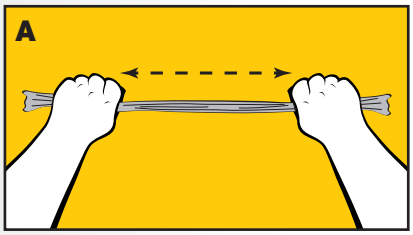
The foundation provided by **the feet and legs must bear the weight of the entire body** (and considerably more during running and other sports). If there is **insufficient or inadequate support from the pedal foundation**, the spine will be exposed to abnormal stresses and strains that **eventually develop into low back pain**.

Excessive stresses on the spine can be the result of abnormal foot biomechanics, poor function of the foot/ankle complex, excessive shock transmission, or leg length asymmetry. Recognizing and then responding appropriately to these factors **separate the Doctors of Chiropractic from the spinal technicians**.

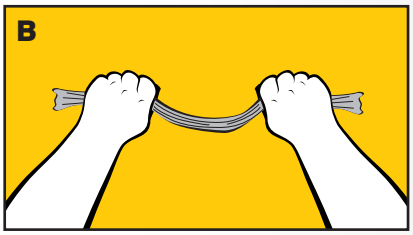
Plastic Deformation

How to explain to your patients the way the foot stretches:

The foot is not a rubber band...



Soft tissue in the arches is constantly under stress



Over time, that stress results in fallen arches (plastic deformation), leading to knee, back and even neck pain.

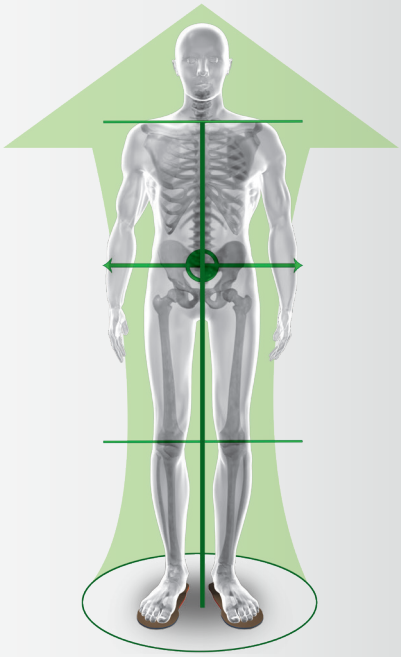
By supporting the feet, orthotics help alleviate pain throughout the body.

Orthotics and the Foot/Spine Connection

- **Static support.** During a standing posture, the alignment of the arches in each foot has a significant impact on the position of the legs and pelvis. When the arches are low and/or pronating excessively, the knee will rotate medially. A research study using radiographic measurements found that **custom-made, flexible orthotics can significantly improve the alignment of the arches when standing.**[3]

- **Dynamic support.** During gait, the foot must permit a **smooth transfer of the body's center of mass over the leg to conserve energy and keep the work expenditure to a minimum**.[4] This requires an orthotic to be **flexible yet supportive**, and orthotic designs must consider:
  - weight and intensity of forces
  - proper movement and function of the foot
  - support of all three arches to prevent eventual arch collapse

- **Postural benefits.** Improving foot alignment can help maintain knee, hip, pelvis, and even spinal postural alignment.[5] Preventing hip, knee, or spinal joint degeneration requires the additional support and shock absorption provided by orthotics. And a **pelvic or spinal tilt or recurrent subluxations will often respond rapidly to orthotic support.**[6]



With Orthotics

References
1 Schafer, R.C. Chiropractic Management of Sports and Recreational Injuries. Williams & Wilkins, 1982, p. 517.
2 White, A.A. and Panjabi, M.M. Clinical Biomechanics of the Spine (2nd ed.). Lippincott, 1990, p. 692.
3 Kuhn, D.R., et al. "Radiographic Evaluation of Weight-Bearing Orthotics and Their Effect on Flexible Pes Planus." Journal of Manipulative and Physiological Therapeutics, vol. 22, no. 4, 1999, p. 221-226.
4 Kirby, K.A., "Biomechanics of the Normal and Abnormal Foot." Journal of the American Podiatric Medical Association, vol. 90, no.1,2000, p. 30-34.
5 Baylis, W.J. and Rzonca, E.C. "Functional and Structural Limb Length Discrepancies: Evaluation and Treatment." Clinics in Podiatric Medicine and Surgery, vol. 5, no.3,1988, p. 509-520.
6 Rothbart, B.A. and Estabrook, L. "Excessive Pronation: A Major Biomechanical Determinant in the Development of Chondromalacia and Pelvic Lists." Journal of Manipulative and Physiological Therapeutics, vol. 11, no. 5, 1988, p. 373-379.