

Consider the Pedal Foundation When Evaluating Low Back Pain

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Whenever a concern about low back pain brings a person in to see a chiropractor, a careful examination of the spine is required. Often neglected, however, is the importance of the feet to normal spinal function - especially in the lower back. When patients don't respond as well as expected to their chiropractic care, a source of interference is frequently located in the [pedal foundation](#). No matter the cause, an abnormal gait contributes to musculoskeletal imbalances throughout the lower extremities, and eventually back pain develops.

Research published this year in the *Journal of Manipulative and Physiological Therapeutics* reported that individually designed stabilizing orthotics have been clinically shown to help improve low back pain.¹ The peer-reviewed study offered the following "practical applications:"

- Improvements in back pain and disability between the randomization and week six visit with the use of orthotics compared with a control group.
- Improvements in pain and disability were maintained through the 12-week visit.
- Secondary outcomes showed a significant group difference between the randomization visit and the week six visit on the Visual Analog Scale for foot pain.

Biomechanics of the Feet

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 doctors of chiropractic from spinal technicians.

When some part of the foot is not moving properly (either insufficient or excessive joint motion), the resulting forces produce negative effects all along the [kinetic chain](#).² The following are some examples of common foot problems that have been found to interfere with spinal function.

First MTP joint. When the metatarsophalangeal (MTP) joint of the first toe is stiff and doesn't flex properly, the transition from midstance to toe-off is restricted. Studies have found that this movement limitation (called "functional hallux limitus") is a "major gait abnormality that causes lumbar stress."³ An ideal treatment for this condition is an individually designed stabilizing orthotic that supports the medial arch and yet still encourages motion at the first MTP joint.

Plantar fasciitis. When a patient complains of "a sharp heel pain that radiates along the bottom of the inside of the foot," and especially when the pain is worse when getting out of bed in the morning, inflammation of the connective tissue that supports the underside of the foot must be considered.⁴ This causes a significant problem with comfortable walking, often resulting in a

painful limp. A flexible, stabilizing orthotic with a heel spur cut-out will improve gait and lessen the impact of this condition on the pelvis and spine.

Dropped metatarsal heads. If there is no anterior arch to the foot, excessive weight-bearing on the metatarsal heads will cause the transition from foot flat to toe-off to be painful. This alters the timing of the gait cycle, resulting in a rushed propulsion phase. The effects are felt in the pelvis and spine, which are not able to move smoothly through the phases of gait. Orthotic support for the metatarsal arch can improve biomechanics in all weight-bearing joints.⁵

Foot and Ankle Function

The biomechanics of the [foot and ankle](#) are complex, and this region must handle repetitive physical forces. There is normally a smooth transition from pronation following heel strike to supination at toe-off. However, when there is excessive pronation or fixed supination, gait is affected and the entire musculoskeletal system is less efficient. In the case of excessive pronation, the entire lower extremity undergoes excessive medial (internal) rotation, which can cause a range of effects on the pelvis, sacroiliac joints and spine. Individually designed stabilizing orthotics work to restore and support proper foot function.

Shock Transmission and Asymmetry

Whether a foot tends toward hyperpronation or excessive supination, excessive shock may be transmitted into the spinal joints. "A high-arched (cavus) foot with limited range of motion attenuates shock poorly,"⁶ as does the collapsed-arch (planus) foot. In either case, the forces are felt in the joints of the pelvis and spine. Stabilizing orthotics that have been individually designed offer shock-absorbing materials to eliminate this damaging shock transmission.

When there is a discrepancy in the length of the legs (whether anatomical or functional), the pelvis will tilt to one side. This asymmetry will cause vertebral rotation and recurrent subluxation, and possibly even a functional scoliosis. The correct use of orthotics (occasionally with an added heel lift) can provide substantial correction for structural short legs.

Back to the Feet

When a good patient exam reveals any of the deficits in the pedal foundation listed above, recognize the need for supplementary treatment. This frequently requires the use of individually designed orthotics for long-term stabilization. Flexible orthotics made from viscoelastic materials have now been shown to be a useful approach. As one investigator has commented, "The full rehabilitation of the back patient with chronic back pain, must include reeducation in the optimal use of the spine in walking."⁷ Even expertly applied spinal corrections will often be only partially successful until the lower extremity problems are addressed and corrected.

References

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