

Structural Imbalance and Postural Support

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Overpronation of the foot is one of the most common conditions affecting the human frame. This is a condition wherein the foot rolls inward, creating a foot that is flatter, wider and longer. A subluxation pattern of the various tarsals and metatarsals results.

As chiropractors, we understand that the foundation of the spine is the pelvis, and that any pelvic misalignment can affect the biomechanics of the lumbar, thoracic and cervical sections of the spine. What we must remember is that the pelvis is itself dependent upon the status of balance in the lower extremities and the pedal foundation.

Consequences of Imbalance

Any structural imbalance - such as an anatomical leg-length inequality or *pes planus* - requires compensating movements in the lower extremities and pelvis in order to minimize, as much as possible, stresses and strains that could affect the spinal column. Over time, however, specific muscle imbalances and shortenings will develop. Eventually, both the soft tissues and bones are damaged by microtrauma, which can eventually lead to pain and discomfort.¹⁻⁵

A functional imbalance, such as collapse of the arches of the foot, also results in excessive motion during the various phases of gait. With excessive pronation, the entire leg spends too much time in internal rotation, placing twisting stresses on the pelvis with each step. In time, this results in overstretching of the hip and pelvic support ligaments, and can also be a cause of chronic pain and dysfunction.

Screening for Imbalance

An evaluation to check for lower extremity imbalance should be performed on every patient who presents with chronic musculoskeletal conditions of the spine or lower extremities. This can be done with a quick and easy screening procedure, such as a weight-bearing examination. The following is a recommended series of observations to make while the patient is barefoot and standing:

Foot flare: Toeing out while walking indicates hyperpronation. Weight falls on the medial longitudinal arch, leading to plastic deformation that weakens the foot's supportive qualities.

Knee rotation: Hyperpronation forces the patella to rotate medially, indicating excessive leg movement. The tibia and femur rotate medially, increasing the risk of abnormal hip rotation.

Bowed Achilles tendon(s): The Achilles tendon bows in on the side of hyperpronation. The calcaneus tilts inward, bringing the talus with it. The stress can extend to the tibia and along the entire kinetic chain.

Low medial longitudinal arches: With the patient in a normal, relaxed stance, insert two fingers beneath each medial longitudinal arch. Tight plantar fasciae, with possible pain or pressure, indicate foot imbalance. As the patient shifts weight outward, note tissue relaxation and absence of

pain.

Shoe wear: With hyperpronation, excessive heel wear on the outer edges occurs. Check also for lateral distortion in the counter and/or shoe vamp.⁶

The 20-30 seconds required to perform the above exam is time well-spent in avoiding treatment frustration and improving patient outcome. The information you gather about the feet will be very helpful in dealing with postural distortions and pain farther up the body. For example, positive findings often indicate a need for custom-made, flexible foot orthotics to help stabilize the spine and pelvis and absorb heel-strike shock.

Typical Subluxation Pattern of the Pronated Foot

When the foot pronates, creating a longer, wider and flatter foot, the tarsal bones subluxate in a predictable pattern. The first, second and third cuneiforms will subluxate in an inferior direction.

Adjustment for Inferior Cuneiforms 1-2-3

The doctor stands on the involved foot side, facing the opposite foot. The superior, or headward, hand makes a U-shaped contact over the talus-navicular-cuboid area on the dorsal surface of the foot. The doctor applies inferior traction with this hand while keeping the forearm as parallel as possible to the tibia.

The medial-anterior border of the doctor's inferior or thrusting hand contacts the plantar surface of the foot. A dynamic thrust is given in a superior line of drive, while the superior/headward hand applies inferior traction.

Rotating the foot slightly internally or externally can bring about relaxation, making this adjustment more effective.

References

1. Kavanaugh J, Yu JS. Too much of a good thing: overuse injuries of the knee. *Magn Reson Imaging Clin N Am* 2000;8(2):321-334.
2. Kibler WB, Safran MR. Musculoskeletal injuries in the young tennis player. *Clin Sports Med* 2000;19(4):781-792.
3. Chambless KM, Knudtson J, Eck JC, Covington LA. Rate of injury in minor league baseball by level of play. *Am J Orthop* 2000; 29(11):869-872.
4. Gabbett TJ. Incidence, site, and nature of injuries in amateur rugby league over three consecutive seasons. *Br J Sports Med* 2000;34 (2):98-103.
5. Hyland J, Yochum T, Barry M. Posture and weightbearing biomechanics: unproved theory or clinically important concept? *Dynamic Chiropractic* 1996;14(16):21-24.
6. Charrette MN. Examination of the foot and ankle: non-weightbearing and weightbearing procedures. *Success Express* 1996;16(3):20-22.

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