Short-leg syndrome

Scoliosis is where the spine has an S-shape when viewed from behind. Although it can be caused by polio, congenital malformation of the spine, skeletal dysplasia, osteochondritis and spastic paralysis, in my experience, the most common cause is unequal leg length. Uneven hip heights, gluteal folds, dimpling over the posterior superior iliac spine and, occasionally, of the knee creases or even the shoulders should alert the osteopath or chiropractor to the problem. Orthodox orthopaedic treatment includes braces, casts, exercises and corrective surgery—and stops there (*Mosby's Medical, Nursing, and Allied Health Dictionary, 5th edn.* St Louis, MO: Mosby Year Book, 1998: 1460).

In short-leg syndrome—or its more technical name 'coronal plane asymmetry'—there is a major difference in the osteopathic and orthopaedic approaches towards dealing with the pelvic tilt, in this case, as a result of unequal leg lengths. Half a century ago, only a discrepancy in leg length of at least 25 mm was deemed worthy of treatment. Since then, that has only been halved: "Differences in leg length of greater than 12.5 mm may lead to the gradual onset of backache (usually in middle age), which may be initiated by minor trauma. Provided there are no structural changes, correction of discrepancies of greater than 12.5 mm should relieve or prevent pain" (Souhami RL, Moxham J, eds. *Textbook of Medicine, 3rd edn.* Edinburgh: Churchill Livingstone, 1997: 969). Any lesser discrepancy is simply ignored by orthopaedic medicine—but not by osteopathy or chiropractic.

Making the diagnosis

Osteopathic examination of the levelness, or otherwise, consists of inspecting, from behind, the standing patient's horizontal planes at the base of the head, and across the shoulders, hip bones and lower spine, and top of the legs. The findings should then be confirmed by standard standing postural X-ray images, using a specially grided film—a radiographic view introduced by osteopaths E.R. Hoskins and W.A. Schwab in 1921 for the diagnosis and treatment of coronal plane asymmetry (J Am Osteopath Assoc, 1936; 35: 414–8).

Because I use computerized thermographic imaging (CTI) extensively, I have found that scoliosis is clearly visible on CTI, as is a shorter leg.

In making the initial inspection, the feet should not be forgotten, as faults in both the feet and the footwear frequently give rise to biomechanical disturbances in the rest of the body.

Physiological effects

When one leg is shorter than the other, even by as little as 4 mm, it leads to lateral shifts away from the central line of gravity as compensation. In the case of the base of the sacrum (the curved bone at the base of the spine), if this is horizontal, then there will be no lateral curving unless some complicating factor is present higher up. It is possible, for example, for a 'wryneck' (twisted neck or torticollis) to cause spinal curvature, with compensations further down. But it is far more usual for compensations to take place above in cases of sacral tilt, with lateral shifts below.

To compensate for the short leg, alterations occur higher up. The first is at the sacroiliac joint on the shorter side. Sometimes this is enough and the sacrum remains level. But, if this isn't enough, then the lumbosacral joint and/or lower lumbar spine become involved. Occasionally, this may be enough but, more often than not, a more gradual compensation arises in the form of curvature, convex to the short side in the lower spine, and convex to the long side in the thoracic spine.

Compensation may sometimes spread even higher up into the neck area (Stoddard A. 'The short leg and low backache syndrome', presented at the International Congress of Physical Medicine, 1952; Stoddard A. *Manual of Osteopathic Technique, 7th impr.* London: Hutchinson Medical Publications, 1972: 39). Asymmetrical tensions can be felt in the muscles running along the spine: those on the side of the convexity are stretched while those on the side of the concavity are shortened. There is usually gapping on the inside knee of the short leg, while the inside knee of the longer leg closes in. Stress is also created in the hip and ankle joints of the longer leg (DiGiovanni EL *et al. An Osteopathic Approach to Diagnosis and Treatment, 2nd edn.* Philadelphia, PA: Lippincott–Raven Publishers, 1997: 246).

The intervertebral discs in the curved parts of the spine constantly experience what I call a 'tiddlywink' effect, being squeezed towards the side of the convexity where they eventually come to press upon the nerve roots, causing pain.

Treatment and resolution

Although there is the 'Heilig formula' for accurately determining the amount of heel-lift required (J Am Osteopath Assoc, 1978; 77: 466–72), the standard procedure used in manual-medicine clinics is to gradually place more sheets of A4 printer paper under the foot of the short leg, with the patient standing with body weight equally distributed down both legs, until the body planes are horizontal. The spine will also tend to return to the perpendicular. The thickness of the piled paper is then measured in millimetres to arrive at the amount to be added to the shoe heel of the shorter leg.

Correcting a short leg in this way will correct many other postural defects, since it is the key to a number of musculoskeletal abnormalities. In fact, the changed posture will affect the entire musculoskeletal system. For this reason, it usually takes about 10 days for the patient's muscles to fully adjust to the unaccustomed changes.

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