



Functional Scoliosis caused by leg length inequality

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“Scoliosis” is a term of antiquity, first used by Hippocrates. It describes abnormal lateral curvature of the spine.

Types of Scoliosis

Viewed from the front or back, the alignment of the spine depends largely on the level of the pelvis. If both legs are of equal length, the pelvis should be level. The spine will then be balanced in an erect manner upon this level base. When the pelvis is level the spine viewed from the front or back should be vertical.

A short leg upsets this pelvic balance. The pelvis drops down on the side of the short leg and is no longer level. The spine has to curve to regain balance to its center of gravity. A spinal curve that results from a pelvis that is not level in a flexible spine is called a functional scoliosis. Scoliosis refers to this abnormal lateral curvature of the spine. Functional implies that it is temporary and without bony change to the spine. A functional scoliosis occurs only when the person is erect and reduces when the patient flexes or laterally bends or is not weight bearing.

A pelvis that is not level, due to a short leg, causes a functional scoliosis and is considered a common cause of low back pain. Usually the imbalance in leg length or leg length inequality (LLI) will exceed 7mm. Depending on which study you read, significant LLI ranges vary from 3 mm to in excess of 20 mm.

Measuring LLI

Measuring LLI can be very inaccurate and difficult. The oldest and most common means is by use of a tape measure. The length between the anterior superior iliac spine and the medial malleolus is

measured and compared between the two lower limbs. The drawback is that this method is relative and can be inaccurate.

Chiropractors will commonly request x-rays that include the Anterior-Posterior Pelvis view. If the central beam of the x-ray is near the level of the hip joints the resulting film can be used to directly measure the difference between the levels of the hips.

Other health professionals use a CAT scan of the thigh and leg as a more appropriate means of measurement. This method is expensive, not readily available, and does not address the issue of weight bearing.

An approximate 'in-office' solution is to palpate the iliac crests during erect weight bearing. Judging the level of the hand position determines the inequality and placing graduated blocks under the short leg aids in the calculation. The same technique can be used while the hands palpate the anterior superior iliac spine (ASIS) and then on the posterior superior iliac spine (PSIS).

Clinical Features of Functional Scoliosis and LLI

In many instances correction of the short leg with a heel lift will correct the functional scoliosis. In studies done by Giles and others, of a group of more than a thousand Australian children, the majority of those that demonstrated scoliosis had LLI. With the addition of heel lifts, exercises and other leveling methods, a good proportion of those children had their spinal curvatures reduced. Few of these children deteriorated to need further bracing and/or surgical procedures.

In more chronic (adult) cases this approach will be less effective. Other research has shown that func-



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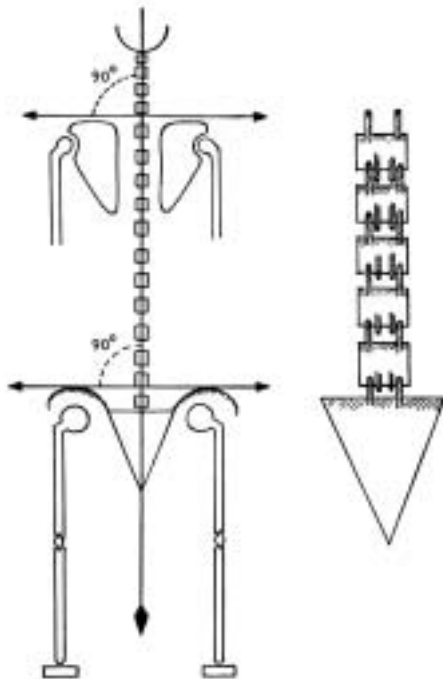
tional scoliosis causes degenerative change to occur in the spine. Giles and Taylor and many others have found that functional scoliosis with LLI of more than 1cm, causes joint cartilage to thicken on the concave side of the curvature and subchondral bone to be thicker on the convex side. They also found that the vertebrae become wedge-shaped over time to assume the shape of the curve. They reasoned that asymmetrical disc degeneration and unbalanced joint stress are likely to be a cause of spinal osteoarthritis. If this bony remodeling (and associated soft tissue changes) have occurred chiropractic intervention is essential to improve abnormal biomechanics of the hip, sacroiliac and lumbar joints and their associated muscle groups.

The intent of this article is not to be a thorough dissertation on the subject of functional scoliosis, but

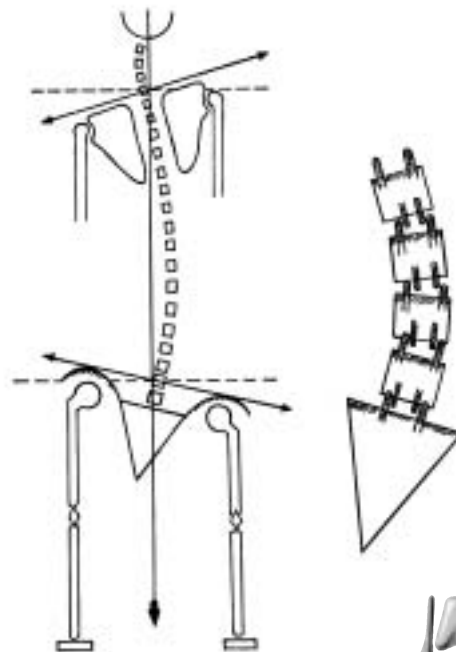
to stimulate inter-professional interest in this condition. Recognition will result in better treatment or referral to the appropriate health professional.

References

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Spinal alignment - with both legs equal in length the spine supports the pelvis in a level horizontal plane, and the spine taking off at a right (90°) angle, ascends in a straight line.



Leg length inequality causes pelvic slant, and the spine taking off at a lateral angle. The flexible spine will curve in an attempt to compensate.

