Deformities of the Spine – Scoliosis

Dr. Ludvig, M. Stabholtz, Low Back Disorders. Innovative Ambulatory Treatment, Self-treatment and Prophylaxis (pp. 259-262)

Scoliosis is a lateral curvature of the spine and considered the most common spinal deformity. Almost 90 percent of scoliosis are referred to as idiopathic with female- male ratio of 6:1 and mean incidence in 1 percent of the population. The number of adults in the United States with scoliosis of over 30° is about a half- million. Scoliosis in adults over twenty years of age begins in childhood or adolescence, and is mostly overlooked until it is quite severe.

There are two different forms of scoliosis: structural, with definite changes in the vertebrae, and postural, which is of functional character.

In structural scoliosis the lateral deviation is associated with torsion and rotation of the vertebral bodies. These deformations are aggravated in the period of accelerated growth as well as during pregnancy, lactation and postmenopausal age. Osteoporosis is also a cause of progression. The torsion is the cause that the lateral deviation of the spinal processes line seen in roentgenograms is much greater than this deviation observed during clinical examination. Rotation is circular shifting of the vertebral body. It causes uneven distance between the lateral surfaces of the vertebral bodies and creates the asymmetrical position of the spinal processes. Together with vertebral bodies the ribs also rotate and this is the cause of the "ribs-gibbus" on the side of convexity. Such a condition is sometimes wrongly termed kypho-scoliosis. The other characteristic feature of structural scoliosis is diminution of the lateral height of the affected vertebra. The vertebra located at the apex is changed most. The rotation of the vertebrae is followed by the rotation of the posterior longitudinal ligament. This type of scoliosis can develop only during the growth period. The curvature may be simple - C-curve or compound S-curve. (Fig. 73)

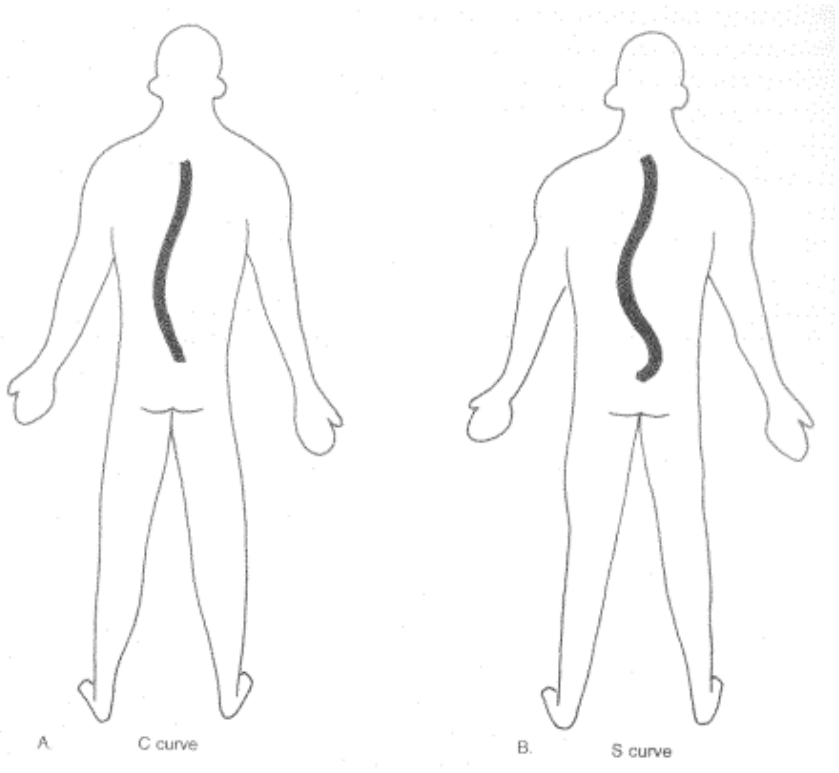
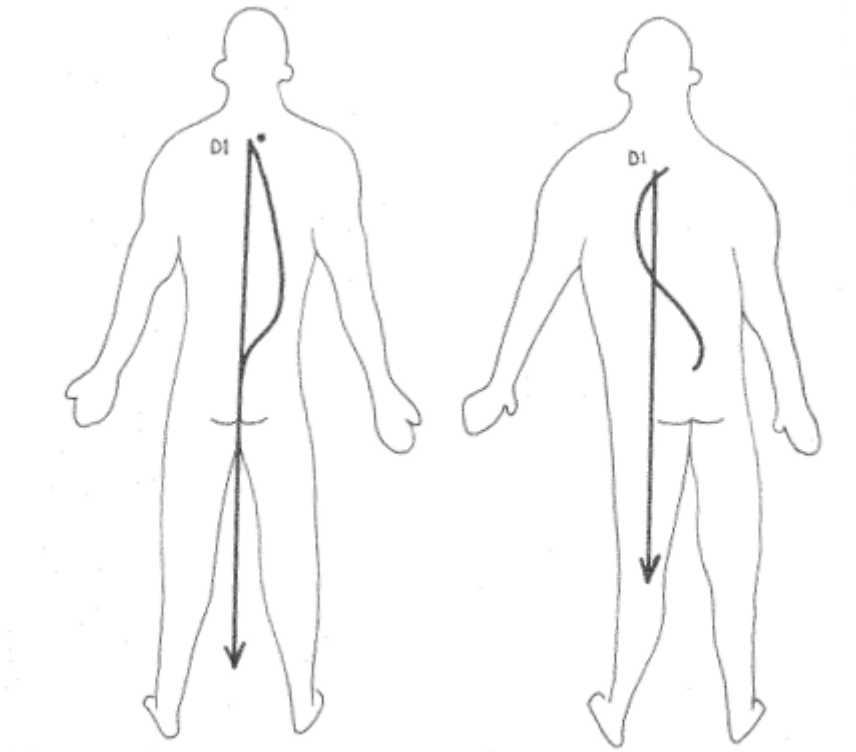


Fig. 73. Scoliosis of the spine.

It may also be a double compound curve. The curvature is referred to the side according to the convexity with upper curve named first: left thoracic, right lumbar scoliosis.

Postural scoliosis is of the nonorganic, functional type. It disappears during recumbency and on suspension. This form may also be produced artificially. The curve is usually unilateral and total. It is mostly observed in girls of school age and may be overlooked until quite severe. If the iliac crests are level and the lateral deviation of the spine exists, there is scoliosis, the origin of which is in the spine itself.

If the pelvis is tilted to one side, the normal spine will show scoliosis with convexity to the low side. The human being will have a strongly developed reflex to keep the eyes level and to center the head over the feet. Therefore there is a tendency to compensate for every lateral deviation of the spine by an opposite deviation. The scoliosis is compensated the D1 vertebrae (Fig. 74) is centered over the sacrum, independently of what the deviation of the spine is, between these points. The scoliosis is not compensated when a plumb dropped from the D1 falls to the right or to the left of the gluteal cleft. The patient with uncompensated scoliosis is spoken of as having a list.



A. Compensated right dorso-lumbar scoliosis

B. Uncompensated left-dorsal, right-lumbar scoliosis with left list

Fig. 74. Scoliosis of the spine.

The first formed scoliotic curve is termed primary; the later formed, compensatory, or secondary. The middle curve is always a primary curve and it is fixed. The single, primary, long C curves are predominantly right, the double curves are mostly right thoracic, left lumbar; in quadruple patterns of deformity, the two middle curves are the primary curves. The different forms of scoliosis are clinically manifested by prominent hip and high shoulder,

accompanied usually by a prominent shoulder blade. In more severe conditions the ribs are found considerably below their usual level and may even rub against the crest of the ilium.

There are several measuring techniques to determine scoliosis angle according to radiographic findings. I use the Cobb Method, which seems to be most simple and exact. To measure a curve one needs two end vertebrae of the curve: superior and inferior. From the superior surface of the superior end vertebrae and from the inferior surface of the inferior end vertebrae the intersecting perpendiculars are drawn. The complementary angle indicates the extent of the curve.

Marked intervertebral disc changes are observed in scolioses. Along with disc changes, scolioses are accompanied by marginal spurs, especially in older people. Pain in the back in scolioses not very far advanced is mainly of disc origin. Only significant changes in Apophyseal joints and increased torsion with narrowing of the inter-vertebral foramina cause encroachment upon the nerve roots and severe pains. But even in such cases, the spine may adapt itself to the pathological changes, making the condition asymptomatic. More advanced cases of scoliosis impair thoracic function and causes shortness of breath and a rapid heart. Paraplegia due to scoliosis is a very rare complication. Many postural scolioses are caused by external factors.

One of the most characteristic is *sciatic scoliosis*. Pain along the course of the sciatic nerve causes shifting of the entire trunk to one side in order to avoid pressure on the nerve roots. There is no curvature of the spine; and therefore the term, although in general use, is a misnomer. Similar scolioses are sometimes seen in kidney and gall-bladder diseases. Other external factors producing lateral deformities are muscular paralysis, amputations, difference in the length of the legs and improper pelvic position.