

Stability of the Lumbar Spine

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There are two measurements commonly used to evaluate the stability of the lumbosacral region: the lumbosacral angle and the lumbar gravity line. These two measurements can be utilized to assess the biomechanical factors associated with lower back pain. To review, let's discuss each measurement separately:

The lumbosacral angle, sacral base angle or Ferguson's angle is evaluated on the lateral lumbar projection. Two lines are drawn and the resultant angle is measured. The first line is made parallel to the bottom edge of the film, drawn through the sacrum. The second line is drawn obliquely through and parallel to the sacral base.

Figure 1

A wide range of normal values is documented in the literature, ranging from 26 degrees to 57 degrees, the average being 41 degrees. There are measurements obtained in the weightbearing position. An increased angle suggests a mechanical factor in producing low back pain by increasing the shearing and compressive forces on the articular facets at the lumbosacral junction.¹ Unfortunately, there is no definite consensus of opinion as to the exact significance of either a decreased or increased lumbosacral angle, partly because of the large range of normal, 26 to 57 degrees. For medicolegal purposes, it would not be advisable to use just this one measurement to document radiographically the apparent instability of a patient's lumbosacral spine.

The other commonly used measurement of the lumbosacral spine is the lumbar gravity line, or Ferguson's weightbearing line. This measurement is obtained in the lateral projection by drawing a vertical line through the center of the third lumbar vertebral body to intersect the anterior one third of the sacral base. If this line passes anterior to the sacrum by more than 10 mm., an increase in the shearing stress to the lumbosacral facets is suggested.² In contrast, a posterior shift in this line may suggest increased weightbearing forces on the lumbosacral facets, particularly the pars interarticularis.³ It is, however, a consensus of opinion that the anterior shift in this line is a more significant factor when considering instability. Incidentally, the original article by Ferguson describing this measurement was performed on recumbent lateral lumbar projections, back in 1934.⁴ S.D. Banks, however, has suggested in later studies that the patient's position, whether upright or recumbent, is irrelevant in regard to this particular measurement.⁵

I would suggest using both of these measurements in conjunction with clinical findings as a method of correlating the radiographic and clinical findings associated with instability of the lumbosacral spine.

Figure 2

References

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