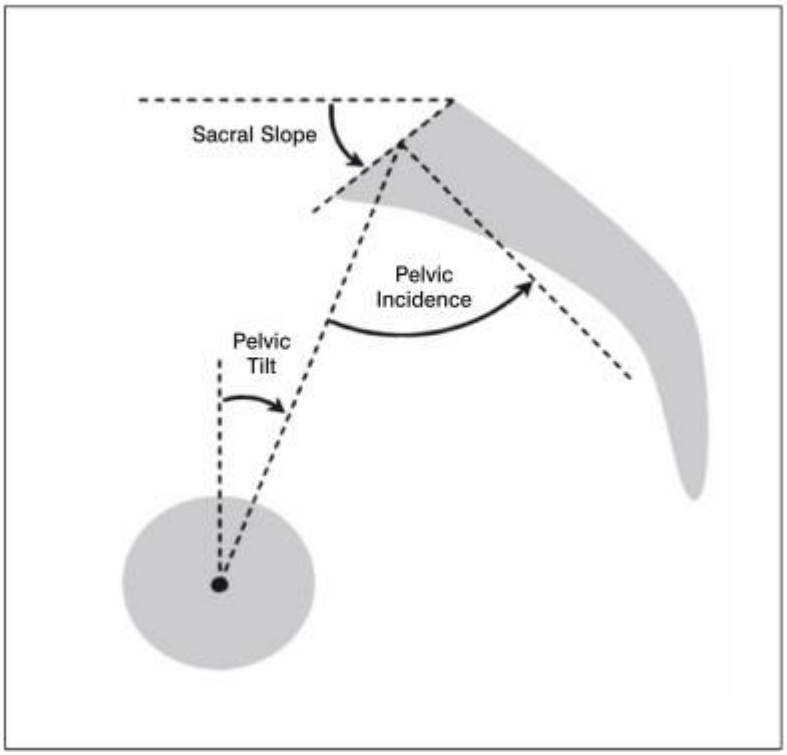
Sacral slope



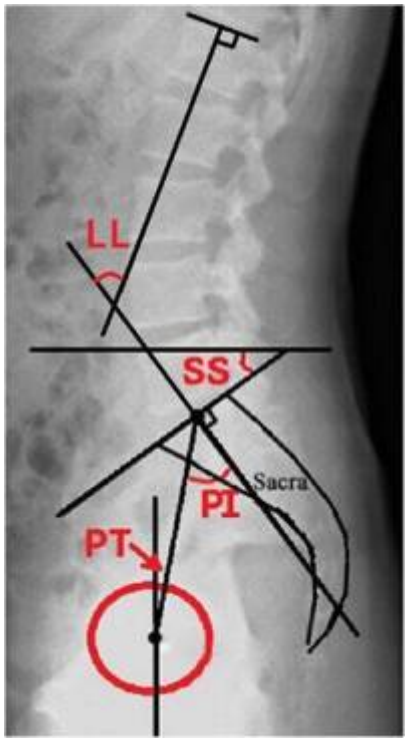
The angle between the superior plate of S1 and the horizontal reference line.

Normal 36 - 42 º

SS= Pelvic incidence - Pelvic tilt.

Abnormal sacral slope (SS) has shown to increase progression of spondylolisthesis, yet there exists a paucity in biomechanical studies investigating its role in the correction of adult spinal deformity, its influence on lumbosacral shear, and its impact on the instrumentation selection process.

At larger SSs, bilateral pedicle screw constructs with spacers were the most stable; however, none of the constructs were significantly stiffer than intact segments. For load to failure, the integrated spacer performed the best; this may be due to angulations of integrated plate screws. Increasing SS significantly reduced stiffness, which indicates that surgeons need to consider using more aggressive fixation techniques [1].



Measurement of Spino-pelvic sagittal parameters. Lumbar lordosis (LL) measured using the Cobb angle between the superior endplate of the L1 and S1. The pelvic tilt angle (PT) defined as the angle between a straight line connecting the midpoint of the bilateral femoral head centre to the midpoint of the sacral plate and the plumb line. The pelvic incidence angle (PI) defined as the angle between the perpendicular line of the sacral plate and the line of the midpoint of the superior endplate of S1 joining with the center of the hip axis. The sacral slope (SS) is defined as the angle formed by the upper endplate of S1 and the horizontal plane.

Lumbar interbody fusion for degenerative lumbar spondylolisthesis treatment showed better results in terms of the fusion rate and sacral slope, but which did not translate into better clinical outcomes. Further randomized and prospective studies are necessary to elucidate the optimal therapeutic options [2].

1)
Drazin D, Hussain M, Harris J, Hao J, Phillips M, Kim TT, Johnson JP, Bucklen B. The role of sacral slope in lumbosacral fusion: a biomechanical study. J Neurosurg Spine. 2015 Dec;23(6):754-62. doi: 10.3171/2015.3.SPINE14557. Epub 2015 Aug 14. PubMed PMID: 26273763.
2)
Dantas F, Dantas FLR, Botelho RV. Effect of interbody fusion compared with posterolateral fusion on lumbar degenerative spondylolisthesis: a systematic review and meta-analysis. Spine J. 2021 Dec 9:S1529-9430(21)01051-2. doi: 10.1016/j.spinee.2021.12.001. Epub ahead of print. PMID: 34896611.