

ASSESSMENT OF PELVIC INCIDENCE ANGLE IN NORMAL INDIAN POPULATION AND SPONDYLOLISTHESIS

Abstract: In our study the control group which comprised of 50 healthy volunteers exhibited a minimum pelvic incidence of  $33^\circ$  and a maximum of  $60^\circ$  with an average of  $50.12^\circ$ . The minimum pelvic incidence in the study group was  $42^\circ$  and the maximum was  $75^\circ$ . The average pelvic incidence in the low grade listhesis group was  $57.78^\circ$  and in the high grade listhesis group it was  $64.75^\circ$ . The combined average of pelvic incidence angle in the study group was  $58.34^\circ$  and only one patient had a Pelvic incidence Angle of 75 degrees and the remaining three were only one patient had a Pelvic incidence Angle of 75 degrees and the remaining three were below 65 degrees.

Keywords: pelvic, listhesis

INTRODUCTION:

Pelvic vertebra is the key point connecting the trunk and the posterior limbs. As the femoral heads are mobile, it is a significant part in the orientation of the pelvic vertebra. The surface and the mandatory point is the point where the vertebral column rest on the sacral plateau. The incidence angle is the main characteristics of the pelvic and this also becomes the reference angle. It becomes the major parameter in

balancing the spine. Pelvic tilt is the angle between a vertical line and the CS segment . The normal pelvis is horizontal, with symmetrical points at equal height. However, the geometry of the sagittal pelvic position is more complex. Characterisation of the sagittal balance of the pelvis requires the definition of certain parameters based on notable biomechanical features involved in the transmission of constraints [1]. the "local" sagittal imbalance of the lumbosacral junction is compensated by adjacent mobile segments in the upper lumbar spine, the pelvis orientation and the thoracic spine. The result is a not optimal but a satisfactory global sagittal balance of the trunk, even in the most severe grade of slipping.

As we know that isthmic spondylolisthesis has a multifactorial origin its incidence is 4-8% in general population. Aim of our study is to assess the pelvic incidence angle in normal Indian population and Indian population with spondylolisthesis

**Methodology:** A total of 50 normal volunteers without any history of back pain or any other spinal problems were included in this group-I and group II are patients with complaints of back pain or leg pain. Radiographs of the lumbar sacral spine were taken in anteroposterior view and in In group 2(study) additional to measuring the pelvic incidence, the spondylolisthesis was also graded.

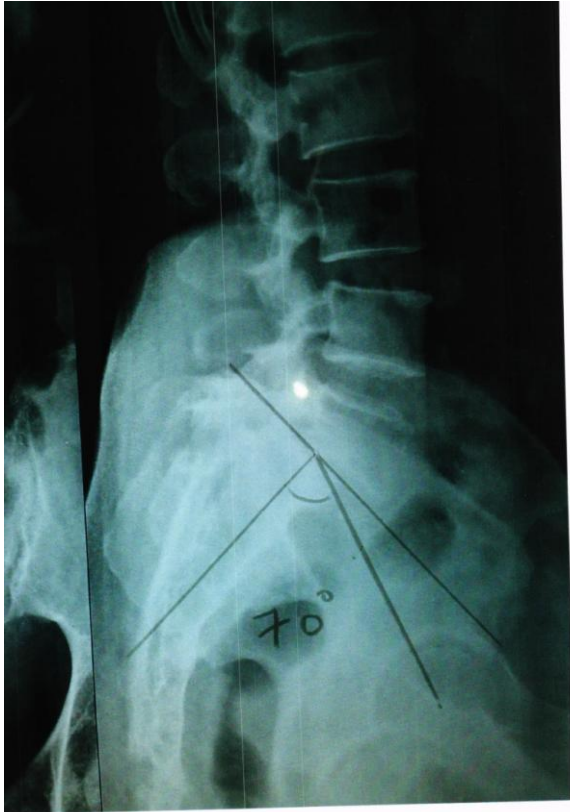
### **Results and discussion:**

In our study the control group which comprised of 50 healthy volunteers exhibited a minimum pelvic incidence of  $33^{\circ}$  and a maximum of  $60^{\circ}$  with an average of  $50.12^{\circ}$ , whereas in a study by G.Vaz et al the incidence was  $33^{\circ}$  to  $85^{\circ}$ . From the study it was confirmed that the pelvic incidence was lower in women than men.

In our study the study group consisted 50 patients with Isthmic spondylolisthesis who were sub divided into two groups, low grade spondylolisthesis group and high grade

spondylolisthesis group. The minimum pelvic incidence in the study group was  $42^\circ$  and the maximum was  $75^\circ$ . The average pelvic incidence in the low grade listhesis group was  $57.78^\circ$  and in the high grade listhesis group it was  $64.75^\circ$ . The combined average of pelvic incidence angle in the study group was  $58.34^\circ$ . In a similar study by Hanson DS et al, the incidence was 47.4 degrees. In the study group 4 patients had high grade listhesis, out of which only one patient had a Pelvic incidence Angle of 75 degrees and the remaining three were below 65 degree. We do support the theory that a high pelvic incidence predisposes an individual with spondylolysis to spondylolisthesis, however its prognostic role in assessing the severity of slip is doubtful. Our sample size might not be adequate, but in the study by Raphael Vialle et al it was observed that the pelvic incidence progressively increased in grade 1 to grade 3 spondylolisthesis group, but started showing a decline in the value in grade 4 and grade 5 groups. The reason for this was postulated as this phenomenon is secondary to forces on the cranial sacral endplate in grade 1, 2 and 3 patients. In Grade 4 and 5 patients, the loss of contact between the L5 vertebra and the sacral cranial endplate is responsible for a progressive sacral and pelvic retroversion. This phenomenon explains the vertical sacrum pattern in high-grade spondylolisthesis patients

Fig:1 Listhesis grade- grade 2



Mrs.E,48 yrs old female, PIA-70°

fig:2 Listhesis grade- grade 1



Mrs.E,50 yrs old Male, PIA-61°

Conclusion: In the study group the lowest pelvic incidence recorded was 42° and the maximum recorded was 75° with an average of 58.34°. In the low grade spondylolisthesis group the average pelvic incidence was 57.78° and in the high grade spondylolisthesis group it was 64.75°. Pelvic incidence is an important anatomical parameter in regulating the sagittal curvature of spine.

**COMPETING INTERESTS DISCLAIMER:**

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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UNDER PEER REVIEW