

## Original Article

## Low Back Pain — Spondylolisthesis — Management and Outcome

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Kilian coined the term spondylolisthesis in 1894 from the Greek words, *spodylos* meaning vertebra and *olithenein* meaning slip<sup>1</sup>. Surgery is not mandatory for spondylolisthesis. When there are definite neurological symptoms supported by radiological features, urgent surgery is considered to give relief to the patient. The basic point of surgery is to remove the impinging and malfunctioning structures and maintaining stability. Internal fixation devices are longitudinal rods or plates, attached to the screws placed within the pedicles<sup>2</sup>. This prospective study is from January 2007 to end of 2012 and was to study spondylolisthesis surgeries and their subsequent follow up.

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**Key words :** Spondylolisthesis, fusion.

Low back pain is very common in our society. A large number of people suffer from this problem due to disorder of muscles, nerves, bones and other related structures in the back. There is a lot of morbidity due to Acute (less than 6 weeks) and Chronic (more than 12 weeks) form of pain. Backache is the chief complain rather than a specific disease. It may be due to mechanical causes like Musculoskeletal (muscle spasm, disc disease etc), Inflammatory (due to different forms of arthritis), Malignancy (commonly metastasis), Infectious (osteomyelitis), Related to female reproductive system (fibroids) or can be from functional like depression etc<sup>1,2</sup>.

Spondylolisthesis was used as a term by Kilian in 1894 which was derived from the Greek words. *Spodylos* means vertebra and *olithenein* means slip. It is better defined as anterior or posterior slipping of one segment over the next lower segment<sup>3</sup>. In normal persons, the spinal structures comprise of vertebrae, interposing discs, ligaments along with muscles, support and protection of spinal cord and nerve roots that pass through the spinal canal and foramen. These components in abnormal state can affect the quality of life leading to various symptoms and signs. Most common presenting complain is Low Back Pain. The de-

gree of lordosis and the position of gravity line are also important – more anterior the line more is the increase in spondylolisthesis. Bony changes, such as a trapezoid – shaped L5 body and a dome shaped sacrum are also indicative of instability and dysplasia<sup>4,5</sup>. Surgery is not always necessary for spondylolisthesis. It depends on patients symptoms signs and the radiological features. Restriction of patient activities, muscle rehabilitation and use of other measures including intermittent use of rigid back brace are often helpful. Otherwise when there are definite neurological features supported by radiological features, urgent surgery is considered in order to give relief to the patient<sup>5</sup>. The basic principle of underlying surgery is to remove the impinging and malfunctioning structures and maintain stability. Internal fixation devices such as longitudinal rods or plates attached to the screws are placed within the pedicles<sup>3,6</sup>. This prospective study is from January 2007 to end of 2012 and their subsequent follow up of the result of surgeries are studied.

### MATERIALS AND METHODS

The age of patients vary from 32 to 57 years with a mean age of 53 years. Total number of patients was 62. Among them 19 were males and 43 were females. The Male : Female ratio was 19:43, slightly more than 1:2. Among them, all of the cases had Low back pain. The other features were as follows - difficulty in walking (51 cases, 82%), numbness of lower extremities (57 cases, 91%) and 6(4%) had sphincter problems. There was significant history of trauma in 8(5%) patients. In all patients, as a investigative method X-Ray followed by MRI has been done. Some patients already attended with NCV report. Urodynamic study was indicated for patients with sphincter problems.

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Level of lesions L4-5 / L5-S1	38 (61%)/24(39%)
Radiological Grade II/III	41 (66%)/21(34%)
Pathological Type Traumatic/Isthmic	12(19%)/50(81%)

Patients were selected for surgery after proper anesthetic check up. After general anesthesia the patients were placed prone and properly positioned. Using a posterior midline approach – laminectomy, inferior facetectomy and nerve root decompression were done. Discectomy were done for better mobile reduction. Bone graft chips were inserted in 23 cases where sufficient gap were found between the two vertebral bodies. Preparation and tapping the pedicles were done under intraoperative radiological guidance. Pedicle screws were inserted bilaterally and two reduction screws were inserted on either side. After satisfactory radiological verification and securing screws within the bone, appropriate length of rod were attached with suitable locking fixator. With gradual tightening and adjusting the reduction screws, almost satisfactory correction of alignment were achieved which was verified by X-ray. After hemostasis wounds were closed in anatomical layers with a drain (Figs 1-3).

**Results and Complications :**

Overall significant improvement were observed. Pain decreased in all cases except two (Visual analogue score difference of 5). Hypoesthesia improved in 41 (65%) cases. Walking difficulty improved in 53 (85%) cases. Only those patients having urological problems failed to improve or not significantly improved.

**Intraoperative complications —**

- (1) In 4 cases screws almost touched the root – identified and corrected
- (2) In 7 cases dural tear occurred – identified and repaired
- (3) One case had sudden full reduction – increased in motor weakness and pain during the postoperative period but improved within 6 months of medication and physiotherapy. Now the patient can walk and pass urine on his own.



Fig 1 — Lateral view L/S Spine- L4 /L5 Spondylolisthesi



Fig. 2 — T2 weighted MRI ..L4/L5 Spondylolisthesis



Fig 3 — Reduction of Spondylolisthesis with transpedicular screws and rod fixation.(Titanium)

**Post-operative Complications :**

Superficial wound infection, fever and UTI, pressure sore – all total less than 10 patients.

In one case, there was implant failure, resulting in breaking off of screws from its head when the patient fell on ground after three years of surgery and there was associated loosening from the bone, which was identified and corrected after a second procedure.

**DISCUSSION**

The prevalence of spondylolisthesis in general population is about 5-6 %<sup>2</sup>. Men and women are equally affected. Cyron *et al* found that the pars interarticularis is thinner and vertebral disc is less resistant to shear in young than adults. It is more common in certain types of athletes<sup>2,3</sup>. These observations indicate that this condition is acquired rather than congenital. However as many as 50% of Eskimos were reported to have the problem, where as only 6% to 7% of white and 1.1% of adult black women have the condition, indicating a definite genetic predisposition<sup>7</sup>.

The key to diagnosis of spondylolisthesis lies in routine radiograph in anteroposterior and standing lateral view. Lowe *et al* found a 26% increase in slipping on standing film compared to recumbent study. Oblique view can put the pars area apart from the underlying bone elements. Bone scan may be considered particularly useful in the children group where plain film can not detect acquired pars defect. CTscan can also be helpful in this case. Even a SPECT scan may show increased uptake in the pars<sup>6,8</sup>.

Slip angle is used as a good guide for prediction of instability and also for progression of pathology of the spondylolisthesis. The normal slip angle without spondylolisthesis is lordotic<sup>5,6</sup>.

**Conclusion :**

Low back pain with spondylolisthesis presented an important pathology, that need immediate attention in order to prevent further progression. The success lies in lumbar fusion. Fusion depends on local factors (mechanical disposition, fusion site preparation, blood supply and bone graft). Systemic factors (osteoporosis, hormone drug, smoking) are important. Literatures suggests that the use of spinal device promotes healing or fusion process. Devices helps to restore stability. The bone screw interface could be the most influential factor for successful outcome.

The stress related effects of spinal devices on the quality of bone are minimal. Bone density fusion changes occurs even without use of instrumentation.. Future studies in biomechanical research are needed for giving more benefit to the patients.

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