

## THE NECESSITY OF REDUCTION IN SPONDYLOLISTHESIS CASES TREATED WITH DIAPOSON SYSTEM

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### ABSTRACT:

We treated 17 patients who had chronic low back pain and/or neurologic deficit due to spondylolisthesis with Diaposton system at the Orthopaedics and Traumatology Department of Gülhane Military Medical Academy between January 1989 and May 1994. We applied decompression, reduction and fusion to the patients with an average of 38. We externally supported the patients with body cast in first 3 months postoperatively. Average follow-up was 18 months and all of the complaints of the patients were ceased at the postoperative period. We do believe in the necessity of reduction in order to obtain the mechanical axis of spinal column in spondylolisthesis cases.

**Key Words:** Spondylolisthesis, surgical treatment, reduction.

Spondylolisthesis is defined as slipping forward or backward of one vertebrae on another and it is a major cause of chronic low-back pain. Surgical treatment is inevitable in grade I and grade II cases which cause limitations in daily activities and resistive to conservative treatment.

Anterior fusion, posterior fusion + decompression, reduction + posterolateral fusion, in-situ posterior fusion or combined anterior + posterior interventions are among the surgical techniques defined, applied and published in the literature. The decision about the best technique can not be made in this stage. Our aim was to evaluate the results of posterior reduction + instrumentation and fusion in low grade spondylolisthesis cases and to compare them with the other techniques and studies.

### MATERIAL AND METHOD

We applied posterior reduction and fusion with Diaposton system to 17 patients with spondylolisthesis in Orthopaedics and Traumatology Department of Gülhane Military Medical Academy Hospital between 1989 and 1994 and laminectomy was applied to 14 cases. 13 of the cases were female and other 4 were male, average age being 55 (range 42-76). We used plain radiography, electromyelography, myelography, CT and MRI to diagnose the patients. Preoperative average pain period was 10 years. In 8 cases the spondylolisthesis was at level of L4-L5 and in 9 cases the level was L5-S1 and average slipping rate was 30 % in all cases. 8 of the cases had degenerative type, 5

had ischemic type, 1 had congenital type and 3 had posttraumatic type spondylolisthesis. While average follow up was 14 months the average reduction rate was found 45.15 % postoperatively. We did not observe any neurologic deficit in the postoperative period. We observed pseudoarthrosis in 3 cases, and implant sensitivity in 2 patients, thus we applied 5 revision surgery. 2 of them were previously operated with DICK system and we replaced them with Diaposton system. In this system, transpedicular screws are applied to one level above and below the slipped vertebrae. The screws which are applied to slipped vertebrae are especially designed for reduction during the instrumentation.

### RESULTS

Average reduction loss was 2.9 % postoperatively. We used the criteria below to evaluate the results after operations :

Excellent : No pain and no activity limitation.

Good : Intermittent pain without activity limitation.

Poor : Moderate degree of pain and activity limitation requiring medication.

Fair : No change in preoperative pain level, severe activity limitation requiring narcotic analgesics.

We obtained excellent results in 9 cases (52.9 %), good results in 5 cases (29.5 %), and poor results in 3 cases (17.6 %). The poor cases were 3 pseudoarthrosis cases. The severity of pain was found decreased after the revision surgery.

We extracted internal fixators in the postoperative 12th and 14th month in 2 cases and we did not observe pain and pseudoarthrosis. We evaluated the

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changes in size of the spinal canal, root compression, quality and degree of fusion with postoperative MRI with and without internal devices. We observed that root compression was eliminated in problematic cases and there were 3 cases with pseudoarthrosis.

We immobilized all of the patients with body cast for 3 months, later on with lumbostat corset for another 3 months. The average mobilization time was 7 days postoperatively and we began the dorsal strengthening exercises immediately.

## DISCUSSION

There are numerous methods in treatment of spondylolisthesis and it is difficult to decide which one is the "treatment of choice".

Kazuhiko recommends anterior fusion in degenerative spondylolisthesis in case of compression of neural elements with inferior articular process of slipped vertebrae in the early period of the disease, but he favors posterior fusion if the osteophytic process over the superior articular process of lower vertebrae causes compression to neural elements in the late phase of the disease, also in combination of fusion with decompression. He blames the intervertebral disc degeneration in the aetiology of degenerative spondylolisthesis thus recommends anterior interbody fusion to prevent the slippage. He declared 77 % successful results in anterior surgery, and 56 % healing rate in posterior surgery. Mc Guire et al compared the in-situ posterolateral fusion with internal stabilization in Grade I and II spondylolisthesis cases and found that these two had no superiority to each other. They applied laminectomy to both groups and used body cast for 3 months. He reported complications such as pseudoarthrosis (25 %), haematoma, screw breakage, root lesion and pedicle fracture.

Kazuhiko et al. had reported 40 % pseudoarthrosis rate in a series of 34 patients who had treated with anterior interbody fusion.

David S. Bradford and Norberd Boss et al. had applied reduction and pedicle fixation in spondylolisthesis Grade III and IV and reported 21 % pseudoarthrosis rate without fusion thus emphasizing the importance of fusion in these particular cases.

Hirkowitz et al. had treated a series of 50 patients with decompressive laminectomy with or without arthrodesis of intertransvers process and reported 73 % successful results in cases with arthrodesis.

Cheng et al. applied anterior discectomy and anterior fusion in cases with Grade I and II lesions, ob-

tained successful results but also he favored the necessity of posterior decompression and fusion in case of root compression.

John Verloy et al. reported 56 % successful results with lumbar interbody fusion technique in Grade I and II cases. Alexander et al. had used the same technique in Grade III and IV lesions but they all had needed revision surgery. Biomechanical analysis showed that transpedicular screws create a more stable spinal column in posterior fusion. Steffe et al. favored the internal fixation (with transpedicular system) + reduction to eliminate the intermittent symptoms and to prevent the increase of destabilization created by decompression.

## CONCLUSION

We strongly recommended the reduction in spondylolisthesis Grade I and II since it contributes to the decompression of neural elements, spontaneous correction of thoracic and lumbar hyperlordosis thus allowing a healthy body biomechanics especially in young patients who did not reach his/her skeletal maturity.

There are many controversial opinions about necessity of discectomy. Some authors say that it may cause instability if it is done. We do agree with this opinion but we applied discectomy in case of disc protrusion.

We recommend surgery in Grade I and II lesions with persistent pain, resistive to medication and increasing slipping whether or not with the presence of neural arc compression.

Surgical reduction, distraction, rigid fixation, fusion and excision of loose laminae are the milestones of successful surgical treatment. Postoperative immobilization with body cast severely reduces the pseudoarthrosis rate and loss of reduction. With our posterior method there is no necessity for anterior surgery which has more risk and hard to apply.

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