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# Assessment of Outcome of Posterior Dynamic Stabilization System in Degenerative Lumbar Disease

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**Abstract**---Background: Degenerative disc disease is a leading cause of chronic back pain in the aging population in the world. The present study was conducted to assess outcome of posterior dynamic stabilization system in degenerative lumbar diseases. Materials & Methods: 78 patients of degenerative lumbar diseases of both genders were divided into 2 groups of 39 each. Group I patients underwent decompression and implantation of Dynesys and group II patients underwent PLIF. ODI, VAS scores for back pain and leg pain, operation time, blood loss, and complications were compared in both groups. Results: There were 25 males and 14 females in group I and 20 males and 19 females in group II. The operative time (min) was 136.2 in group I and 172.4 in group II. Blood loss (ml) was 362.4 in group I and 438.2 in group II. Complications were dural tear seen 2 in group II, wound infection was seen in 1 in group II, screw loosening was 1 in group I and 2 in group II and back & leg pain seen 3 in group I and 4 in group II. The mean ODI was 32.5 and 38.5, VAS back pain was 2.6 and 3.12.

**Keywords**---chronic back pain, degenerative lumbar disease, dynesys, PLIF.

## Introduction

Degenerative disc disease is a major reason for chronic back pain in the geriatrics people worldwide (Davis & Maxwell, 2005). Disc consists of nucleus pulposus, annulus fibrosus and adjacent cartilaginous end plates (Lin et al., 2013). Numerous factors found to be the cause of degenerative disc disease and its pain generation pathway in patients with degenerative disc disease. There have been association genetics, environmental, biomechanics and anatomical variation in cases of degenerative disc disease (Erbulut et al., 2013). Pain generators are thought to be discogenic origin, though researchers found some link with adjacent vertebral end plates and vertebral bodies, known as modic changes (Ilharreborde et al., 2011). A normal disc is aneural and avascular, but pathological pain innervation pathways are generated by stimulation by inflammatory pathways with its secreted cytokines resulting in inflammatory response leading to neurotization of the diseased disc (Beastall et al., 2007; Yu et al., 2012).

Dubois and Graf designed Dynamic neutralization system which was later approved in the USA for providing spinal alignment and stabilization in patients with radiculopathy and degenerative spondylolisthesis, spinal stenosis or the other stenosing lesion (Schnake et al., 2006). This system is made up of pedicle screws, polyethylene terephthalate cords, and polycarbonate urethane spacers to stabilize the functional spinal unit and preserve the adjacent motion after surgeries (Bordes-Monmeneu et al., 2005). This system can confine the amount of flexibility through polyethylene terephthalate cords and polycarbonate urethane spacers (Stoll et al., 2002; Lee et al., 2008). The present study was conducted to assess outcome of posterior dynamic stabilization system in degenerative lumbar diseases.

## Materials and Methods

The present study comprised of 78 patients of degenerative lumbar diseases of both genders. The consent was obtained from all patients. Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 39 each. Group I patients underwent decompression and implantation of Dynesys and group II patients underwent PLIF. Parameters such as ODI, VAS scores for back pain and leg pain, operation time, blood loss, and complications were recorded in both groups. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

## Results

Table 1  
Distribution of patients

| Groups | Group I | Group II |
|--------|---------|----------|
| Method | Dynesys | PLIF     |
| M:F    | 25:14   | 20:19    |

Table 1 shows that there were 25 males and 14 females in group I and 20 males and 19 females in group II.

Table 2  
Comparison of parameters

| Parameters           | Variables       | Group I | Group II | P value |
|----------------------|-----------------|---------|----------|---------|
| Operative time (min) |                 | 136.2   | 172.4    | 0.01    |
| Blood loss (ml)      |                 | 362.4   | 438.2    | 0.02    |
| Complications        | Dural tear      | 0       | 2        | 0.05    |
|                      | Wound infection | 0       | 1        |         |
|                      | Screw loosening | 1       | 2        |         |
|                      | Back & leg pain | 3       | 4        |         |

Table 2, Figure 1 shows that operative time (min) was 136.2 in group I and 172.4 in group II. Blood loss (ml) was 362.4 in group I and 438.2 in group II. Complications were dural tear seen 2 in group II, wound infection was seen in 1 in group II, screw loosening was 1 in group I and 2 in group II and back & leg pain seen 3 in group I and 4 in group II. The difference was significant ( $P < 0.05$ ).

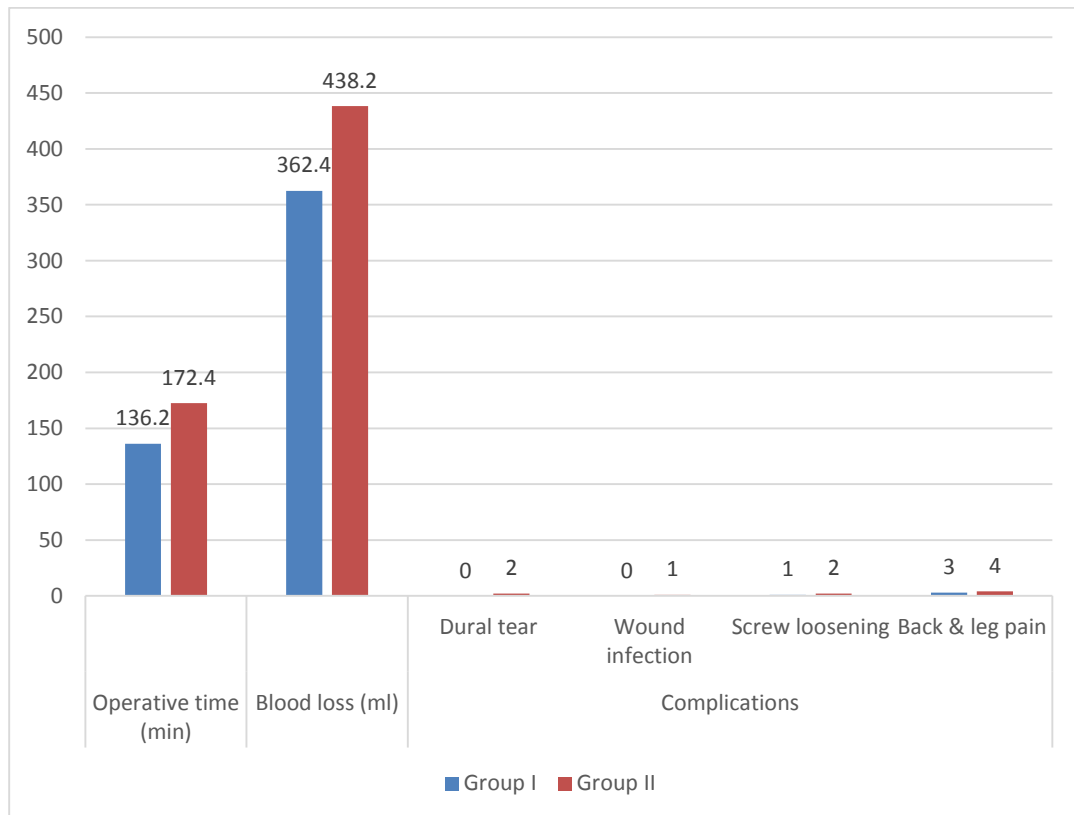


Figure 1. Comparison of parameters

Table 3  
Assessment of parameters

| Variables                | Group I | Group II | P value |
|--------------------------|---------|----------|---------|
| ODI                      | 32.5    | 38.5     | 0.12    |
| VAS back pain            | 2.6     | 3.12     | 0.25    |
| VAS leg pain             | 3.13    | 3.05     | 0.32    |
| Height of operated level | 10.5    | 10.6     | 0.91    |
| ROM of operated level    | 2.91    | 1.55     | 0.05    |
| ROM of adjacent segment  | 8.1     | 8.3      | 0.95    |

Table 3, Figure 2 shows that mean ODI was 32.5 and 38.5, VAS back pain was 2.6 and 3.12. VAS leg pain was 3.13 and 3.05, height of operated level was 10.5 and 10.6, ROM of operated level was 2.91 and 1.55 and ROM of adjacent segment was 8.1 and 8.3 in group I and II respectively. The difference was significant ( $P < 0.05$ ).

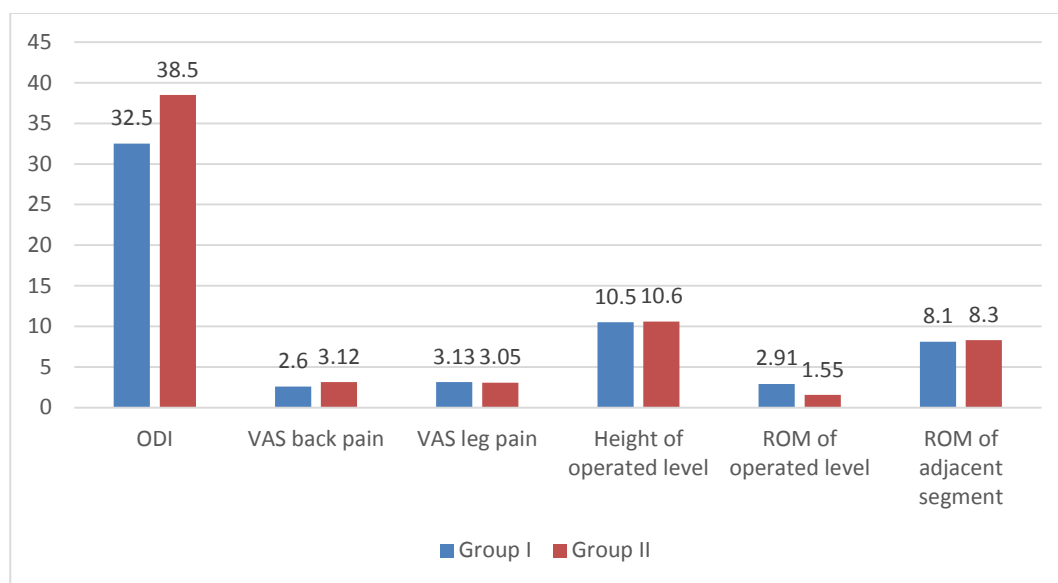


Figure 2. Assessment of parameters

## Discussion

There are numerous treatment options for degenerative lumbar disease such as decompression and fusion surgery. PLIF is one of the most used therapies known as “gold standard.” (Reyes-Sánchez et al., 2010; Mandigo et al., 2007). Although this is a recent treatment modality but there are numerous drawbacks such as donor site pain, pseudoarthrosis, non-union, loosen screw, failure of instrumentation, infection, adjacent segment disease (ASDis) and degeneration are common one in treatment of degenerative conditions of the lumbar spine (Meyers et al., 2008; Zhi-Jie et al., 2013). The present study was conducted to assess outcome of posterior dynamic stabilization system in degenerative lumbar diseases.

We found that there were 25 males and 14 females in group I and 20 males and 19 females in group II. Yang et al. (2014), in their study 75 cases of lumbar degenerative disease operated were divided into 2 groups based on different surgeries. 30 patients underwent decompression and implantation of Dynesys in two levels ( $n = 29$ ) or three levels ( $n = 1$ ) and 45 patients underwent PLIF in two levels ( $n = 39$ ) or three levels ( $n = 6$ ). It was found that 31 patients were in Dynesys group and 45 patients in the PLIF group. The average follow up in Dynesys group was 2.22 years and 2.17 years in PLIF group. The operation time was 141 min in Dynesys group and 176 min in Dynesys group. The mean intraoperative blood loss was 386.76 ml in Dynesys group vs. 430.1 ml in PLIF group. Visual analogue scale (VAS) for back and leg pain improved from 6.87 to 2.92 in Dynesys group, and 6.99 to 3.25 in PLIF group. Similarly, VAS for back and leg pain also improved significantly ( $6.97 \pm 0.84$ – $3.19 \pm 0.19$  and  $7.26 \pm 0.76$ – $3.56 \pm 0.38$ , both  $P < 0.001$ ). Oswestry disability index (ODI) score also had significant improvement in both groups in. Dynesys group had better improvement in ODI and VAS back and leg pain scores compared with the PLIF group. They found no difference between two groups regarding height of the operated level whereas for range of motion (ROM) of operated level, significant decrease was found in both groups. There was no significant difference in the % change of ROM of adjacent levels between both groups.

We observed that operative time (min) was 136.2 in group I and 172.4 in group II. Blood loss (ml) was 362.4 in group I and 438.2 in group II. Complications were dural tear seen 2 in group II, wound infection was seen in 1 in group II, screw loosening was 1 in group I and 2 in group II and back & leg pain seen 3 in group I and 4 in group II. Grob et al. (2005), in their study on 31 consecutive patients treated with Dynesys found that 6 (19%) patients had required or were scheduled for further surgical intervention and they supposed these results provide no support for the notion that semi-rigid fixation of the lumbar spine results in better patient-oriented outcomes than those typical of fusion.

We found that mean ODI was 32.5 and 38.5, VAS back pain was 2.6 and 3.12, VAS leg pain was 3.13 and 3.05, height of operated level was 10.5 and 10.6, ROM of operated level was 2.91 and 1.55 and ROM of adjacent segment was 8.1 and 8.3 in group I and II respectively. Haddad et al. (2013), conducted retrospective study on 32 patients treated with Dynesys and 32 patients with fusion and found that ODI and VAS scores were better in the fusion group. Similarly, more patients were very much satisfied after fusion than after Dynesys: 87.5% vs. 68.8% ( $P = 0.04$ ).

## Conclusion

Authors found that Dynesys group found to be better as compared to PLIF group in patients in patients with degenerative lumbar diseases.

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