

## Dynamic Lumbar Stabilization with Peek Rod/Titanium to Prevent Adjacent Disc Pathology

Arrotegui I\*

University Hospital of Valencia, Spain

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### Introduction

Over the last decades segmental spinal fusion has become the standard surgical procedure for lumbar degenerative spondyloarthropathy [1]. Its evolution towards the most modern instrumentation techniques has achieved a very high percentage of success in spinal fusion in the lumbar region [2]. This varies between 72 and 91%, depending on the technique used. But the success of lumbar fusion has been seen to be accompanied by the appearance of what is known as adjacent segment disease [3]. These pathological changes, which may appear in the disc above or below the fusion as degenerative disc disease [4-7], segmental instability or spinal stenosis, have high prevalence and reoperation rates. Spinal fusion resulting in the increase of intradiscal pressure (IDP) on the adjacent segment has been pointed at as being the etiopathogeny of this syndrome.

### Method

The sample comprises 50 patients who were operated on between January and December 2014. They age range was between 28 and 45, 38 of whom were male and 12 female.

Pre and post-surgical Oswestry questionnaire was carried out, resulting in figures, which varied from 56.8% to 21.4% respectively. Pre and post-surgical simple x-ray studies have been analysed. Possible Modic and intervertebral disc rehydration changes have also been evaluated. We used the standard surgical approach via the lumbar midline until we identified the articular capsule endeavouring not to damage the same [8]. When it was necessary to carry out a discectomy the habitual procedure was followed until the neural elements were uncovered. This was followed by the placement of screws in the transverse facet angle. The pathology intervened was determined based on the classification of the degenerative pathology established by GDubois [9], based on what is known as the Kirkaldy-Willis degenerative cascade dating from 1978 (Table 1).

The pathology corresponds to degenerative disc disease, spinal stenosis and lumbar instability. The most frequent pathology operated on was degenerative discopathy (Table 2).

### Result

In the 50 cases treated using this method, we have, in general, observed a notable improvement of the patients' symptoms. Based on our experience we can say that sciatica symptoms disappear in 80% of cases, absence of lower back pain in 70% and a sufficient reduction of the said symptoms to enable the majority to carry out a normal active life, progressing from a 56.8% in the pre-surgery Oswestry questionnaire to an a post-surgery evaluation of 21.4%. There has been recuperation of work activity in 46 cases, i.e., 82%. Logically, reincorporation becomes more compromised depending on how demanding the work activity is (Table 3).

### Discussion

1995 saw the first implant of a dynamic neutralization system for the treatment of a degenerative disc disease. In 1998 they published the first results from 50 cases and, in 2000, their update on 150 cases. In these works, apart from presenting the technique, the authors describe their indications, based on the classification they themselves have established for degenerative lumbar spine disease according to the Kirkaldy-Willis criteria, excluding primary disc pathology, hypomobile disc disease and structural deformities [4,10,11].

Our series represents a statistical number comparable to the results obtained by other authors, by prescribing the use of the PEEK rod system in patients with degenerative disc disease (Figure 1), although we have also included mono-segmental degenerative slipped discs in the same.

The main advantage compared to instrumented fusion precisely lies in the fundamental concept of maintaining the elements mobile as against those of keeping them rigid (Figure 2).

### Conclusion

The short term results seem to be encouraging as regards dynamic stabilization systems using pedicle screws and semi-rigid rods and it obvious that long term clinical trials are necessary to analyse how efficient they are in comparison to traditional fusion procedures [10-13].

Phase	Instability
Phase 1	Spondylarthritis + disc primary
Phase 2	Disc prolapse + Phase 1
Phase 3	Discopathy + Phase 1
Phase 4	Functional Instability + Phase 3
Phase 5	One level stenosis + Phase 4
Phase 6	Multi-level stenosis + Phase 4
Phase 7	Structural Deformities

Table 1: Phases of instability.

Pathology	No. of Cases
Disc Degenerative	35
Canal stenosis	10
Lumbar instability	5

Table 2: Pathology involved.

\*Corresponding author: Arrotegui I, Consultant Neurosurgeon, University Hospital of Valencia, Spain, Tel: +34 961 97 35 00; E-mail: [athbio@yahoo.es](mailto:athbio@yahoo.es)

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Type of Work	Measure of activity
Mild	10
Moderate	25
Heavy	15

Table 3: Work activity.

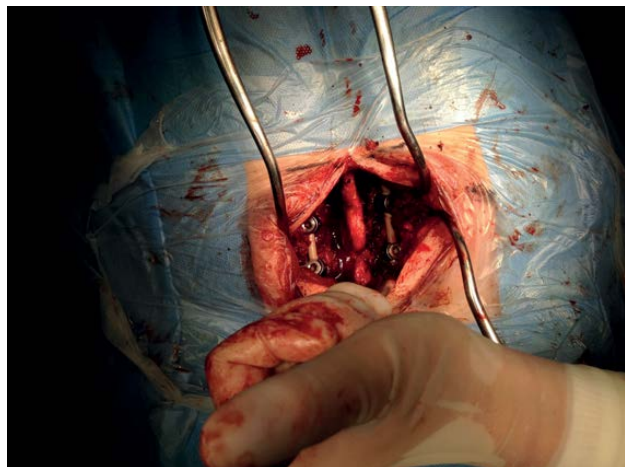


Figure 1: The use of the PEEK rod system in patients with degenerative disc disease.



Figure 2: Concept of maintaining the elements mobile as against those of keeping them rigid.

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Biomechanical studies of the adjacent segment allow the same to be protected by means of the use of semi-rigid PEEK cages, which means that it would be a good alternative means of protection given that it is not necessary to involve the ligament or the pedicles of the segment adjacent to the fusion.

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