

# Clinical Report (1st)

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## The efficacy of air corset(Disk Dr.) to lumbago patients

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This clinical experiments was carried out by a medical research team led by professors Kim, Byung Jik and Park, Sin Woo at the orthopedic laboratory of Inje Medical College and Seoul Pail Hospital.

### Introduction

Lumbago is one of the most important problem which needs much cost in industrialized modern society. This report is the results evaluated from the efficacy of air corset(Disk Dr.) by measuring changes of the pain, radiographic changes and muscular strength of the flexor and the extensor at the lumbar vertebrae by making use of uniform motion measuring machine after having lumbago patients wear the air corset(Disk Dr.).

### The subject & the methods of the study

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22 patients with acute or chronic lumbago; Age range covers from 19 to 58. Average Age:44, 8 patients with slipped disks, 9 patients with acute lumbago and 4 patients with chronic lumbago by diseases.

Table 1. Age & Sex distribution

Age	Male	Female	Total
20 ~ 29	2	1	3
30 ~ 39	1	3	4
40 ~ 49	2	4	6
50 ~ 59	3	5	8
60 ~ 69	1	0	1
Total	9	13	22

## 2. Method of the study

In order to evaluate the efficacy after wearing Disk Dr., Macnab's criteria was firstly used to examine changes of the pain. Secondly, radiographic method was used to analyze by photographing side views of lumbar vertebrae and sacral vertebrae, comparing with those photographed before wearing Disk Dr., and thirdly, Cybey 6000 Trunk Extension Flexion(TEF). Unit was used to measure and analyze muscular strength of the flexor and the extensor at the lumbar vertebrae.

### Results of the study

#### 1. Changes of the pain

Macnab's criteria was used to evaluate the pain. 'Excellent' grade is a state without pain, without any restrictions on movements and that makes it possible to get back to normal working. 'Good' grade is a state with pain sometimes, but possible to get back to normal workings. 'Fair' grade means slight progress and 'Poor' is just like as it is written. As a result, 85% of the patients have taken great favorable turns within 3 days showing 3 'Excellent' and 15 'Good' among the total 22 patients.

**Table 2. Pain relief before & after application of the air corset**

	Pre-corset	After-corset
<b>Excellent</b>	-	3
<b>Good</b>	1	15
<b>Fair</b>	17	3
<b>Poor</b>	4	1

#### 2. Radiographic changes

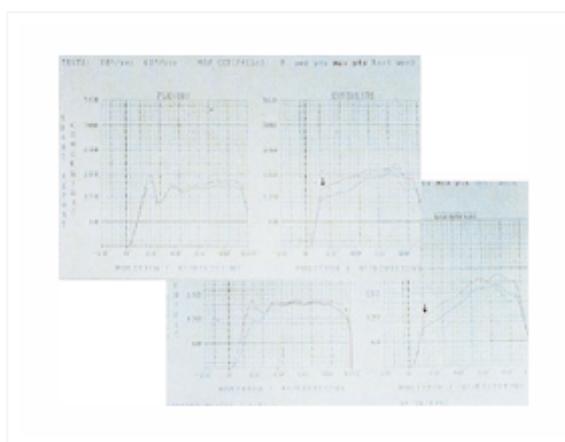
According to the results from comparing x-rays of side views of lumbar vertebrae and sacral vertebrae before and after the application of Disk Dr. in 12 patients cases, the anterior curvature of lumbar vertebrae has been increased and the interval of intervertebral disk at the 4th and 5th segment of lumbar vertebrae has been broadened by 3mm average.

#### 3. The evaluation of uniform motion

We have measured the muscular strength of lumbar vertebrae of randomly selected three persons among 12 patients by using Cybex 6000 TEF unit. According to the results from comparing the graphs measured before and after the application of Disk Dr. about the total joule at 60 angular velocity, maximum couple, maximum couple to the weight and average power, we decided that Disk Dr. was useful to proportion reinforce the muscular strength as it showed in the following graphs that the extensor muscle power remained longer. These examinations were made for two days in consideration of the muscular fatigue. From this result, we could say that the radiographic increase of the anterior curvature of lumbar vertebrae was caused not only by physical body softness but also by strengthening the muscle power.

#### Review

Spinal auxiliary devices correct deformity, limit motion, and protect the spine for stability. Among various mechanical principals of auxiliary devices, the air-



injected lumbar corset which the authors of this paper used widens the space between the fourth and fifth lumbar vertebrae, making use of air pressure, by giving tension through distraction. Therefore, it can provide immobilization and stability to the spine to some degree and protect the lumbar vertebrae and cartilaginous disk from damage and impacts brought about by exercises and works. Although it does not reduce the load on the spinal muscles, it strengthens the extensor muscles to some extent. The research by Nachemson and Morris, after an isometric test of the myoelectric level of the erector spinal and the oblique abdominal muscles, claimed that the inflated corset can reduce the pressure on the spinal disk by 25%. Reports, including Lantz's, regarding the effects of the limited spinal motion from the use of the auxiliary devices also indicated that the lumbar corset and auxiliary devices were very effective in the therapy for chronic lumbago. Although there is no solid scientific evidence, 30~80% of the patients who used them showed progress in the view of a backward analysis. We believe that this progress was brought about by the reduced load on the lumbar muscles and the spine as a result of the limited motion of the whole body. This reduced load proves the high mechanical effect whether it is because of its direct role or because of its indirect role. Considering the recent trend in which the importance of the strengthened extensor muscles of the lumbar area in the therapy for chronic lumbago and in the recovery of the lumbar function is stressed, the effect of the air-injected corset in strengthening the extensor muscles, as it is confirmed by the uniform velocity test, can be acknowledged.

## Conclusion

In the radiographic test, pain evaluation and uniform velocity test after using the air-injected lumbar corset, two cases of progress from Fair or Poor to Excellent and 15 cases to Good were found. In the radiographic and uniform velocity tests after using the auxiliary device, and increases of the anterior curvature of lumbar vertebrae and an increased distraction between the fourth and fifth lumbar vertebrae were found. Also, mobility of the extensor lasted longer. Based on these results obtained from different perspectives about the effectiveness of the air-injected corset, we believe that the corset can play an auxiliary role in the treatments for chronic and acute lumbago.

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## Analysis of Questionnaire after the application of The Air Inflated Lumbar Corset (Disk Dr.)

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Three kinds of study were performed to evaluate the efficacy of inflated lumbar corset.

At first, pain was objectified by MacNab's criteria. Secondary lateral standing roentgenograms were compared before and after fitting the corset.

Finally inkinetic evaluation of the trunk flexors and extensors were performed by the use of Cybex 6000 TEF unit.

Most patients demonstrated significant back pain, loss of lumbar lordosis and weaknees of extensor muscle before fitting the corset but they experienced pain relief and stability in various degrees, after fitting int inflated lumbar corset.

**Key Words:** Low back pain, Inflated lumbar corset.