

Relation of Postoperative Deformity with Clinical Results in Degenerative Lumbar Scoliosis with Spinal Stenosis

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– Abstract –

Study Design: A retrospective study

Objectives: This study was designed to compare the clinical results, with the correction of the lumbar lordotic and scoliotic angles, in degenerative lumbar scoliosis patients, with spinal stenosis, who underwent an operation.

Summary of Literature Review: Few studies have compared the postoperative lordotic angle with the clinical results in degenerative lumbar scoliosis, with spinal stenosis.

Subjects and Methods: Out of 68 cases, where the patients underwent posterior decompression, pedicle screw fixation and fusion, due to the degenerative lumbar scoliosis with spinal stenosis, between February 1997 and February 2001, 59 cases, with the possible follow-ups for over 2 year, were studied and are herein reported. The decompression was carried out over a segment that showed the neurological symptom and occlusion of the spinal canal or the compression on the nerve root observed on CT or MRI scans. The pedicle screw fixation and fusion were carried out over the segment that received the decompression. The average age of the patients was 63.4, ranging from 51 to 76 years, and the average follow-up period was 38, ranging from 24 to 56 months. The measurements were performed in relation to the vertebral rotation, scoliotic and lumbar lordotic angles preoperatively, postoperatively and at the time of the final follow-ups, respectively. The clinical results were classified by the Kirkaldy-Willis questionnaire, and the statistical calculations performed through chi-squared and Pearson's correlation tests.

Results: The average lumbar scoliotic angles preoperatively, postoperatively and at the time of the final follow-ups were 15.7 ± 4.9 , 8.9 ± 3.1 and 10.8 ± 4.7 degrees, respectively. The average lumbar lordotic angles were 14.2 ± 6.1 , 20.1 ± 7.3 and 19.4 ± 7.2 degrees, respectively. The vertebral rotation degrees were 0.88, 0.62 and 0.64, respectively. The clinical results by the Kirkaldy-Willis questionnaire indicated over 73% satisfactory results, showing 9 excellent, 34 good, 13 fair and 3 poor cases. The lumbar lordotic angle was statistically correlated with the clinical results ($p=0.04$), while the scoliotic angle ($p=0.41$) and the vertebral rotation degree ($p=0.29$) were not. The scoliotic and lordotic angles had negative correlations, but these were not statistically

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significant ($r = -0.09$ and $p > 0.05$).

Conclusion: It is my belief that the correction of the lumbar lordotic angle, in patients having spinal stenosis, with degenerative lumbar scoliosis, is associated with an improvement in the clinical results.

Key Words: Degenerative lumbar scoliosis, Spinal stenosis, Scoliotic angle, Lordotic angle.

가 50, 1-3), 가, 가, 가, 3-5), 3~4, TLSO, 3, Cobb, Propst-Proctor 5, Bleck⁷⁾ (20~60°), 1, Nash Moe⁸⁾, Kirkaldy-Willis 가, 4, chi-square test, Pearson, 1997 2, 2001 2, 68 2, 가 가 59, 10, 14.2 ± 6.1, 20.1 ± 7.3, 19.4 ± 7.2, 5.9(42%), 0.7, 63.4 (51~76), 5.2(37%), 38 (24~56), 24, 35, 15.7 ± 4.9, 8.9 ±

Table 1. Deformity correction

	Preop.	Postop.	Last-F/U	Last F/U-Preop.
Lordotic angle(°)	14.2 ± 6.1	20.1 ± 7.3	19.4 ± 7.2	5.2 (37%)
Scoliotic angle(°)	15.7 ± 4.9	8.9 ± 3.1	10.8 ± 4.7	4.9 (31%)
Pedicle rotation*	0.88	0.62	0.64	0.24 (27%)

*Pedicle method of determining vertebral rotation (grade 0-IV), F/U: follow up.

3.1 , 10.8 ± 4.7 (P=0.04)(Table 3).
6.8(43%) , 1.9 10 24
4.9(31%) 19 , 5 , 10 35
grade II 24 , 가 11
(P=0.41)(Table 4).
0.88, 0.62, 0.64
0.26(30%) , 0.02 grade 0, 24 19 , 가 5 ,
0.24(27%) grade I, 32 23 , 가 9 ,
grade II, 3 1 , 가 2
(P=0.29)(Table 5).
Kirkaldy-Willis 가 9 ,
34 , 13 , 3 73% 7 3
(Table 2).
20 26 가 , , 3
15 , 가 11 , 20 33 1 가
28 , 가 5 .

Table 2. Kirkaldy-Willis questionnaire (last follow up)

I. Excellent: The patient has returned to his normal work and other activities with little or no complaint	9 (15%)
II. Good: The patient has returned to his normal work but may on occasion after heavy work has recurrent back pain requiring a few day 's rest	34 (58%)
III. Fair: The patient has to reduce his working part-time, and may occasionally have recurrence of pain requiring absence from work for one or two weeks, once or twice a year	13 (23%)
IV. Poor: The patient does not return to work	3 (5%)
Total	59

Tabel 3. Correlation of total lumbar lordosis and clinical result (last follow up)

Total lumbar lordosis	Good	Fair	Total
< 20 °	14	12	26
20 °	27	6	33

P value = 0.04 (chi-square test)

Table 4. Correlation of scoliotic angle and clinical result (last follow up)

Scoliotic angle	Good	Fair	Total
< 10 °	19	5	24
10 °	24	11	35

P value = 0.41 (chi-square test)

Table 5. Correlation of pedicle rotation and clinical result (last follow up)

Pedicle rotation	Good	Fair	Total
Grade 0	19	5	24
Grade I	23	9	32
Grade II	1	2	3

P value = 0.29 (chi-square test)

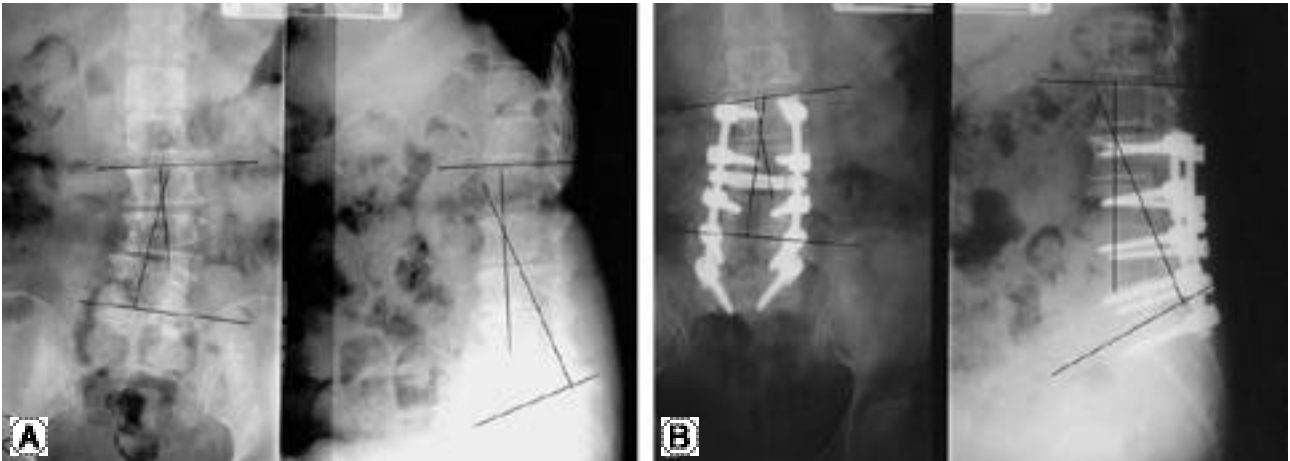


Fig. 1. 67 years old, female. (A) preop, SA: 17 ° LA: 30 ° PR: grade I. (B) last follow-up(24 months), SA: 10 ° LA: 30 ° PR: grade I, CR: excellent (SA: scoliotic angle, LA: lordotic angle, PR: pedicle rotation, CR: clinical result)

가 (r=-0.09, P>0.05). . Grubb¹⁸⁾

가

. Simmons Simmons¹²⁾

가 ,

가

9),

73% 15.7 10.8 31%

10-12)

Bruce¹³⁾ ,

, Bridwel¹⁴⁾

, Pritchett

15)

Grubb^{9,19)}

, Marchesi Aebi¹⁷⁾

가

. Booth

가 4,5,12)

Benner Ehni¹⁶⁾ 20)

가 . Simmons Simmons¹²⁾

가

Simmons Simmons¹²⁾

93% 37 19 50%

. Marchesi Aebi¹⁷⁾ 42%

50% , 86%

Jackson

McManos²¹⁾

가

Sagittal vertical axis가

22)

Sagittal vertical axis

Sagittal vertical axis,

Nash Moe⁸⁾

grade II

0.88, 0.64 27%

17,21-23)

sagittal vertical axis

가

REFERENCES

- 1) Kim YT, Lee CS, Kim JH and Park JH: Clinical feature of degenerative lumbar scoliosis, *J of Korea Spine Surg* 2001; 8:15-20.
- 2) Kostuik JP and Bentivoglio J: The incidence of low back pain in adult scoliosis. *Spine* 1981; 6:268-273.
- 3) Robin GC, Span Y, Steinberg R, Makin M, Menczel J: Scoliosis in the elderly. A follow up study. *Spine* 1982; 7:355-359.
- 4) Gelalis ID, Dawson E, Bernbeck J: The surgical treatment of low back pain. *Phys Med Rehabil Clin North Am* 1998; 9:489-495.
- 5) Nasca RJ: Rationale for spinal fusion in lumbar spinal stenosis. *Spine* 1989; 14:451-454.
- 6) Nasca RJ: Surgical management of lumbar spinal stenosis. *Spine* 1987; 12:809-816.
- 7) Propst-Proctor SL, Bleck EE: Radiographic determination of lordosis and kyphosis in normal and scoliotic children. *J Pediatr Orthop* 1983; 3:344-346.
- 8) Nash CL and Moe JH: A study of vertebral rotation. *J Bone joint Surg[Am]* 1969; 61A:223.
- 9) Grubb SA, Lipscomb HJ: Diagnostic findings in painful adults scoliosis. *Spine* 1992; 17:518-527.
- 10) Epstein BS, Epstein JA and Jones MD: Symptomatic lumbar scoliosis with degenerative changes in the elderly. *spine* 1979 4:542-547.
- 11) San Martino A, D 'Andria FM and San Martino C: The surgical treatment of nerve root compression caused by scoliosis of the lumbar spine. *Spine* 1983; 8:261-265.
- 12) Simmons ED, Simmons EH: Spinal stenosis with scoliosis. *Spine* 1992; 17:S117-S120.
- 13) Bruce E, Van Dam: Nonoperative treatment of adult scoliosis. *Scoliosis, Ortho. clin. of North Am.* 1988; 19:347-351.
- 14) Bridwell KH: Degenerative scoliosis. In Bridwell KH and DeWald RL eds. *The textbook of spinal surgery*. 2nd ed, Philadelphia, Lippincott-Raven 1997; 777-795.
- 15) Pritchett JW and Bortel DT: Degenerative symptomatic lumbar scoliosis. *Spine* 1993; 18:700-703.
- 16) Benner B and Ehni G: Degenerative lumbar scoliosis. *Spine* 1979; 4:548-552.
- 17) Marchesi DG and Aebi M: Pedicle fixation devices in the treatment of adult lumbar scoliosis. *Spine* 1992; 17:S304-S309.
- 18) Grubb SA, Lipscomb HJ and Suh PB: Results of surgical treatment of painful adult scoliosis. *Spine* 1994; 14:1619-1627.
- 19) Grubb SA, Lipscomb HJ and Conrad RW: Degenerative adult onset scoliosis, *Spine* 1998; 13:241-245.
- 20) Booth KC, Bridwell KH, Lenke LG, Baldus CR and Blanke KM: Complications and predictive factors for the successful treatment of flatback deformity (fixed sagittal imbalance). *Spine* 1999; 24:1712-1720.

- 302 -