

Radiological and Clinical Analysis of Degenerative Lumbar Retrolisthesis -Comparative Study of Degenerative Spondylolisthesis-

**Whoan Jeang Kim, M.D., Jong Won Kang, M.D., Jae Guk Park, M.D.,
Kun Young Park, M.D.[#], Hwan Il Sung, M.D., Won Sik Choy, M.D.**

*Department of Orthopaedic Surgery, Eulji University School of Medicine,
Daejeon Veterans Hospital[#]*

– Abstract –

Study design: This is a retrospective study.

Objectives: We wanted to analyze the radiological features of degenerative lumbar spondylolisthesis and retrolisthesis, and we wanted to verify what radiological factors are related to the development of the retrolisthesis. We also wanted to determine these radiological factors' clinical significance.

Summary of the literature review: There is little information about the pathological mechanism and the clinical and radiological aspects of degenerative lumbar retrolisthesis.

Materials & methods: Sixty patients were reviewed and divided into three groups. The degenerative lumbar retrolisthesis patients were in group A. The degenerative lumbar spondylolisthesis patients were in group B. Group C patients had no vertebral shift in any direction. The factors we measured were the facet joint angle, the disc height of L3-4, L4-5 and L5-S1, and the lordosis of the lumbar spine. The evaluation of the clinical results was then quantified.

Results: The facet joint angle showed no statistical significance between the two groups. The disc height of group A at L4-5 and L5-S1 was more decreased in group A than in group B ($p<0.05$). Lumbar lordosis was decreased significantly in group A ($p<0.05$). The preoperative pain was improved at the final follow up, but preoperative pain was significantly higher in group A than in group B ($p<0.05$). The clinical results were improved in each group, but there was no statistically significant difference between the two groups.

Conclusions: The disc height and lumbar lordosis were considerably reduced in the patients with retrolisthesis, especially compared to those patients with spondylolisthesis. Preoperative pain was higher for the retrolisthesis patients than for the spondylolisthesis patients, but there was no significant difference.

Key Words: Degenerative lumbar retrolisthesis, Degenerative lumbar spondylolisthesis, Disc height, Lumbar lordosis

Address reprint requests to

Jong Won Kang, M.D.

Department of Orthopaedic Surgery, Eulji University College of Medicine,
1306, Dunsan-dong, Seo-gu, Daejeon, 302-799, Korea

Tel: 82-42-611-3270, Fax: 82-42-259-1289, E-mail: jwkang@eulji.ac.kr

hanns가 1930
 가 (peu-
 dospondylolisthesis)
 Stone 가 , 1963 Newman

1).

가 20
 20 A , 20
 B , 가 20 C
 , A 60.4 (49~72),
 B 60 (43~79), C 57.5 (41~69)
 , , A 10:10, B 8:12, C
 10:10 . MRI 3-4 ,
 4-5 5 - 1 (facet
 joint angle) Farfan
 index²⁾

(Fig. 1, 2, 3).

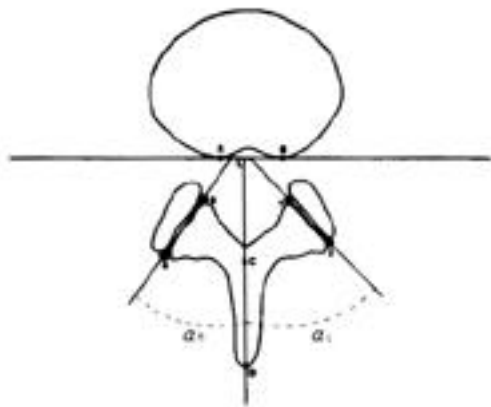


Fig. 1. Measurement of facet joint angulation in the transverse plane. A line parallel to the posterior vertebral body wall serves as reference.

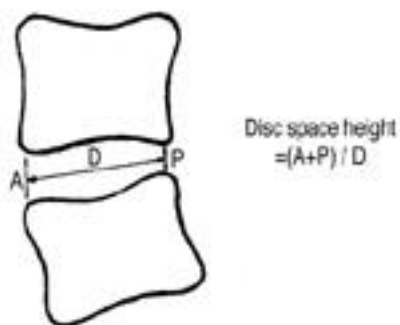


Fig. 2. Measurement of disc height as Farfan index. The sum of anterior disc height A and posterior height B is divided by sagittal disc width D.

Farfan index²⁾

1

Cobb

VAS (Visual Analogue Scale)

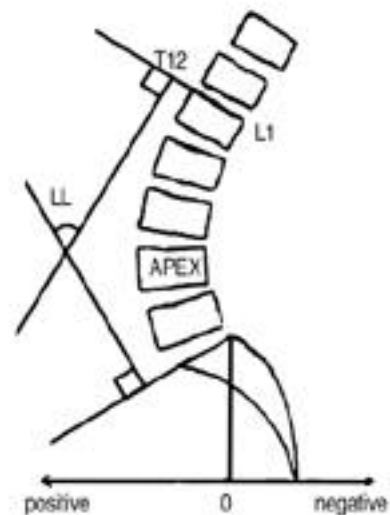


Fig. 3. Measurement of lumbar lordosis.

4-5 5 - 1 가
(p<0.05)(Table 2).
Kirkaldy-Willis
NPar test Kruskal-Wallis A 24.68 ± 9.85 ° B
test , SPSS v.11.0 48.35 ± 9.28 ° C 50.07 ± 10.18 ° A
(p<0.05)(Table 3). A 8.8 ± 1.03
, B 7.5 ± 0.97 A
(p<0.05), A
3.8 ± 0.78 , B 3.6 ± 0.69
A 2-3
2 (10%), 3-4 6 (30%), 4-5 (p>0.05)(Table 4). Kirkaldy-Willis
12 (60%) , B
3-4 2 (10%), 4-5 14 (70%),
5 - 1 4 (20%)
4-5 가
A 3-4 , 4-5 5
- 1 37.25 ± 6.22 °, 41.61 ± 6.19 °
45.82 ± 7.59 ° , B 43.57 ± 10.84 ° 가 가 가
44.89 ± 8.94 °, 48.16 ± 9.6 ° 가
(p>0.05)(Table 1).
A 3-4 , 4-5 5
- 1 47.55 ± 11.57, 46.28 ± 14.82, . Inoue 3)
47.63 ± 13.77 , B 54.17 ± 6.50,
60.55 ± 12.39, 65.63 ± 12.30, C 55.23 ±
5.34, 62.89 ± 10.92, 66.19 ± 9.75 A

Table 1. Average values of facet joint angle in each group

	Group A	Group B
L3-4 (°)	37.25 ± 6.22 °	43.57 ± 10.84 °
L4-5 (°)	41.61 ± 6.19 °	44.89 ± 8.94 °
L5-S1 (°)	45.82 ± 7.59 °	48.16 ± 9.6 °

Table 2. Average values of disc height in each group

	Group A	Group B	Group C
L3-4	47.55 ± 11.57	54.17 ± 6.50	55.23 ± 5.34
L4-5	46.28 ± 14.82	60.55 ± 12.39	62.89 ± 10.92
L5-S1	47.63 ± 13.77	65.63 ± 12.30	66.19 ± 9.75

Table 3. Average values of lumbar lordosis in each group

	Group A	Group B
lumbar lordosis	24.68 ± 9.85 °	48.35 ± 9.28 °

가

4). 가

(axial force)

(anterior shear force)

5). 3~35% 33%

6,7), 4.2%가 3-4 , 4-5 , 5 - 1

가 11% 9.4%, 5 - 1

3-4 , 4-5 , 5 - 1

가 17.8%,

10.4%, 14.6%

가

가

가

van Akkerveeken 13)

Grobler 9)

가

4-5

가

4-5 , 5 - 1

가

4-5

가

Boden 10)

(tro-

Berlemann 11)

가

가

(sagittal plane) 가

Berlemann 11)

4-5 20 5 - 1

가 4-5 가 4

Rosenberg 14)

Table 4. Outcomes of treatment result in each group

	Group A		Group B	
	preop	last F/U	preop	last F/U
10 point pain scale	8.8 ± 1.03	3.8 ± 0.78	7.5 ± 0.97	3.6 ± 0.69

Table 5. Outcomes of Kirkaldy-Willis test result in each group

	Group A	Group B
excellent	13 cases	15 cases
good	7 cases	5 cases

- 가 (posterior shear force) 가
- 가
- 가
- 가
- 1) **Farfan HF, Huberdeau RM, Dubow HI:** Lumbar inter - vertebral disc degeneration. The influence of geometrical features on the pattern of disc degeneration. *J Bone Joint Surg Am* 1972; 54: 492-510.
 - 2) **Farfan HF:** *Mechanical disorders of the low back.* Lea and Febiger, Philadelphia 1973; 33-40.
 - 3) **Inoue S, Watanabe T, Goto S, Takahashi K, Takada K, Sho E:** Degenerative spondylolisthesis. Pathophysiology and results of anterior interbody fusion. *Clin Orthop* 1988; 227: 90-98.
 - 4) **Knutsson F:** The instability associated with disc degener - ation in the lumbar spine. *Acta Radiol* 1944; 25: 593-609.
 - 5) **Kummer B:** Funktionelle und Pathologische Anatomie der Lendenwirbelsaule. *Orthop. Praxis*, 1982; 18: 84-90.
 - 6) **Lorenz R, Patwardhan A, Vanerby R Jr:** Load-bearing characteristics of lumbar facets in normal and surgically altered spinal segments. *Spine* 1983; 8: 122-130.
 - 7) **Yang KH, King AI:** Mechanism of facet load transmis - sion as a hypothesis for low-back pain. *Spine* 1984; 9: 557-565.
 - 8) **Farfan HF, Sullivan JD:** The relation of facet orientation to intervertebral disc failure. *Can J Surg* 1967; 10: 179-185.
 - 9) **Grobler LJ, Robertson PA, Novotny JE, Pope MH:** Eti - ology of spondylolisthesis. Assessment of the role played by lumbar facet joint morphology. *Spine* 1993; 18: 80-91.
 - 10) **Boden SD, Riew KD, Yamaguchi K, Branch TP, Schellinger D, Wiesel SW:** Orientation of the lumbar facet joints: Association with degenerative disc disease. *J Bone Joint Surg Am* 1996; 78A: 403-411.
 - 11) **Berlemann U, Jeszenszky DJ, Buhler DW, Harms J:** Mechanisms of retrolisthesis in the lower lumbar spine. A radiologic study. *Acta Orthopaedica Belgica* 1999; 65: 472-477.
 - 12) **Vogt MT, Rubin DA, Palermo L, Christianson L, Kang JD, Nevitt MC, Cauley JA:** Lumbar spine listhesis in older African American women. *Spine* 2003; 3: 255-261.
 - 13) **van Akkerveeken PF, O'Brien JP, Park WM:** Experi - mental induced hypermobility in the lumbar spine: A pathologic and radiologic study of the posterior ligament and annulus fibrosus. *Spine* 1979; 4: 236-241.
 - 14) **Rosenberg NJ:** Degenerative spondylolisthesis. Predis - posing factors. *J Bone Joint Surg Am* 1975; 57: 467-474.

[illegible]