

## Clinical Features of Degenerative Scoliosis

Yung Tae Kim, M.D., Choon Sung Lee, M.D., Jung Hwan Kim, M.D.\*,  
Jong Min Kim, M.D. and Jai Hyung Park, M.D.

Department of Orthopedic Surgery, Asan Medical Center, Ulsan University, College of Medicine, Seoul, Korea  
Department of Orthopedic Surgery, Asan Foundation, Kang Nung Hospital\*

### - Abstract -

**Purpose** : To describe and analyze the clinical features of degenerative scoliosis so that we could guess the pathogenesis of the disease.

**Materials and Methods** : Forty-eight adults with degenerative scoliosis were reviewed. We evaluated the symptoms and physical findings. Simple radiographs of the lumbar spine and MRI films were investigated.

**Results** : All patients had low-back pain, and eleven of them had severe low-back pain. Forty-six patients(96%) had lower extremity symptoms, and 80% of them had severe symptoms. The mean curve was 18°(range,11°- 44°). The mean lordosis was 27°(range, - 16° - +45°). The frequency of significant degenerative change was highest in the low-lumbar region. Stenosis detected on MRI was present in the low-lumbar area in most cases and a limited number of cases revealed stenosis on the mid-lumbar area. The most frequent incidence of stenosis was at L4-5.

**Summary and Conclusion** : The frequency of degenerative change was highest in the low-lumbar region and significant cases revealed degenerative change only in low-lumbar area. This may imply that degeneration and instability of low-lumbar area can cause secondary biomechanical compensation at above levels, resulting in scoliosis and degenerative change.

**Key Words** : Degenerative lumbar scoliosis, Clinical features

가, Bridwel<sup>13)</sup> 가  
3-4, 4-5  
. Grubb Lipscomb<sup>9)</sup>,  
Moon <sup>9)</sup>  
가  
Prichett <sup>12)</sup> 4  
1-6,8,9,11-15)

Address reprint requests to

**Yung Tae Kim, M.D.**

Department of Orthopaedic Surgery, Asan Medical Center, Ulsan University, College of Medicine

#388-1 Poongnap-dong, Songpa-gu, Seoul, 138-736, Korea

Tel : 82-2-2224-3530, Fax : 82-2-488-7877, E-mail : ytkim2@www.amc.seoul.kr

가

가

method

Moe<sup>10)</sup>

Jackson <sup>7)</sup> criteria

Cobb

Nash

가

41

Toyama<sup>14)</sup>

1994 1 1998 12

60

12 48

가 42 (88%), 가 6

42 78 61

1

1) 40

11 (23%)

가 2

, 38 (79%)

가 10

4 (8%)

**Table 1.** Symptoms and physical findings

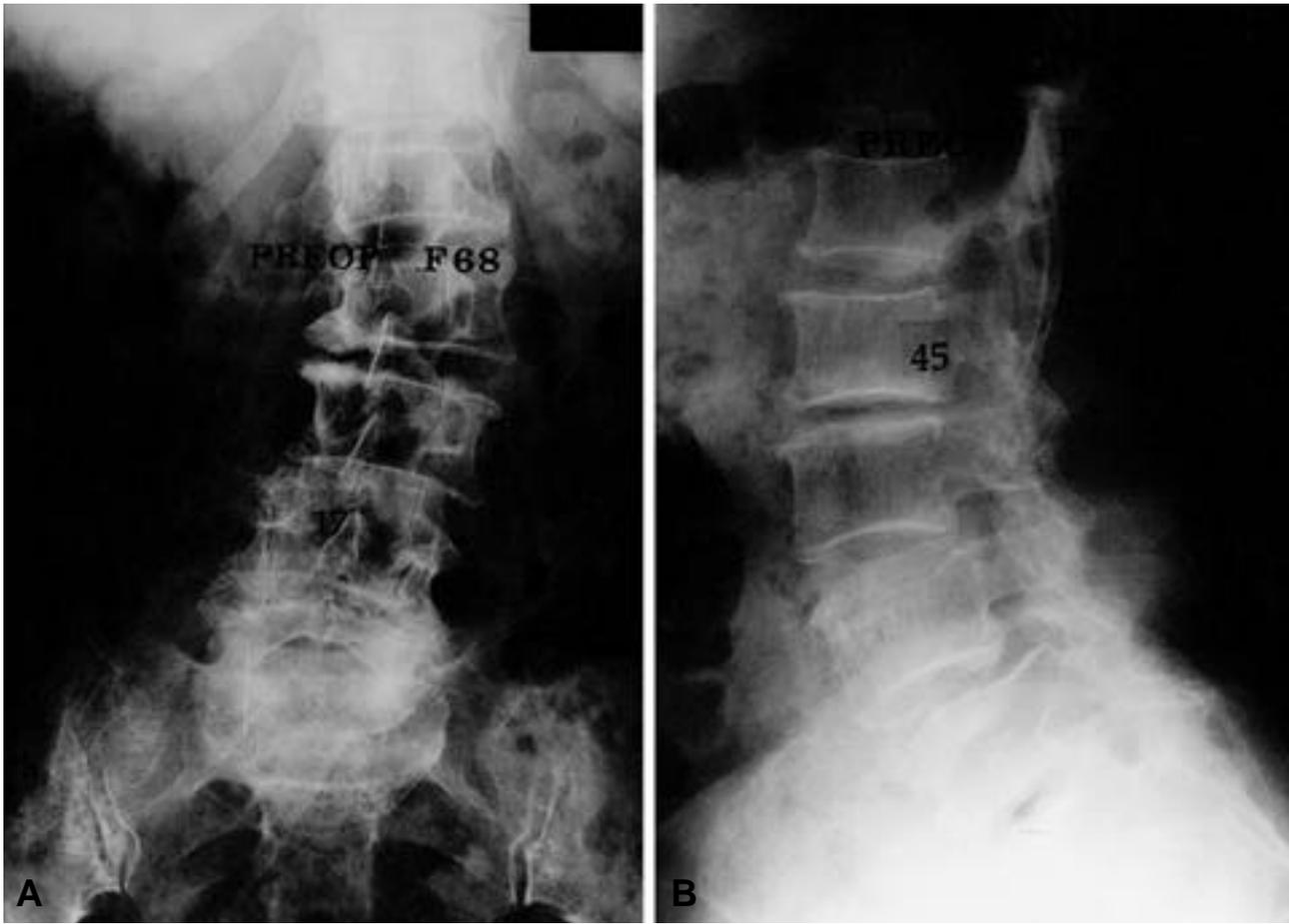
	No. of patients(%)
Symptoms	
Back pain	48(100)
Leg pain and/or buttock pain	46(96)
Anterior thigh pain	4(8)
Stooping	5(10)
Physical findings	
Nerve root tension sign	2(4)
Motor and/or sensory deficit	14(29)

**Table 3.** Associated olisthesis

Level	No. of levels		
	Spondylolisthesis	Retrolithesis	Total
L1-2	1	0	1
L2-3	2	5	7
L3-4	8	3	11
L4-5	15	6	21
L5-S1	6	4	10
Total	32	18	50
No. of patients	23(48%)	16(33%)	33(69%)

**Table 2.** Radiographic features of the curves

Curve features	No. of patients(%)
Curve direction	
Right side	17(35)
Left side	31(65)
Number of segments involved	
5	8(17)
4	21(44)
3	17(35)
2	2(4)
Mean : 3.7 segments	
Curve magnitude	
11~20°	36(75)
21~30°	10(21)
31~40°	1(2)
41~50°	1(2)
Mean : 17.8°	
Lordosis, L1-S1	
-19~-10°	1(2)
-9~0°	1(2)
1~10°	3(6)
11~20°	6(13)
21~30°	11(23)
31~40°	8(17)
41~50°	18(38)
Mean : 27.8o	



**Fig. 1.** These radiographs of a patient with scoliosis show typical pathologies of degenerative scoliosis including scoliosis, tilt, rotation of vertebral bodies, lateral subluxation and olisthesis.

2) 11 가 20 3  
 . 37 . 가 가 level 4-5 가  
 가 19 , . 가 가 level 3-4, 4-5  
 가 18 가 . 가 . level, 33 (69%) 가 가 50  
 가 . 가 가 (Table 3).  
 3) 가 5 4-5  
 4) 2 (4%) 7) 2 Grade 2  
 14 (29%) (Fig. 1). 7 (15%) 가  
 (Table 1).  
 5) 3 5 가 15 (31%), 4-5 4  
 3.7 . 31 (65%) 17 가 13 (27%), 5 가 20 (42%)  
 (35%) . 11 44 , 가 가  
 18 . 45 -16 8)  
 28 (Table 2). L1-2 2 (5%), L2-3 5 (12%), L3-4 14 (34%), L4-5  
 6) Jackson 7) Grade 2 3 23 (56%), L5-S1 17 (45%)  
 가 25 , (Table 4). 가 가 4-5

**Table 4.** Stenosis on MRI(n=41)

Level	No. of levels			No. of patients(%)
	Central, Recess	Foraminal	Total	
L1-2		2	2	2(5)
L2-3	1	5	6	5(12)
L3-4	9	9	18	14(34)
L4-5	14	16	30	23(56)
L5-S1	6	16	22	17(35)
Total	30	42		
No. of patients	21(44%)	27(56%)	33(69%)	33(69%)

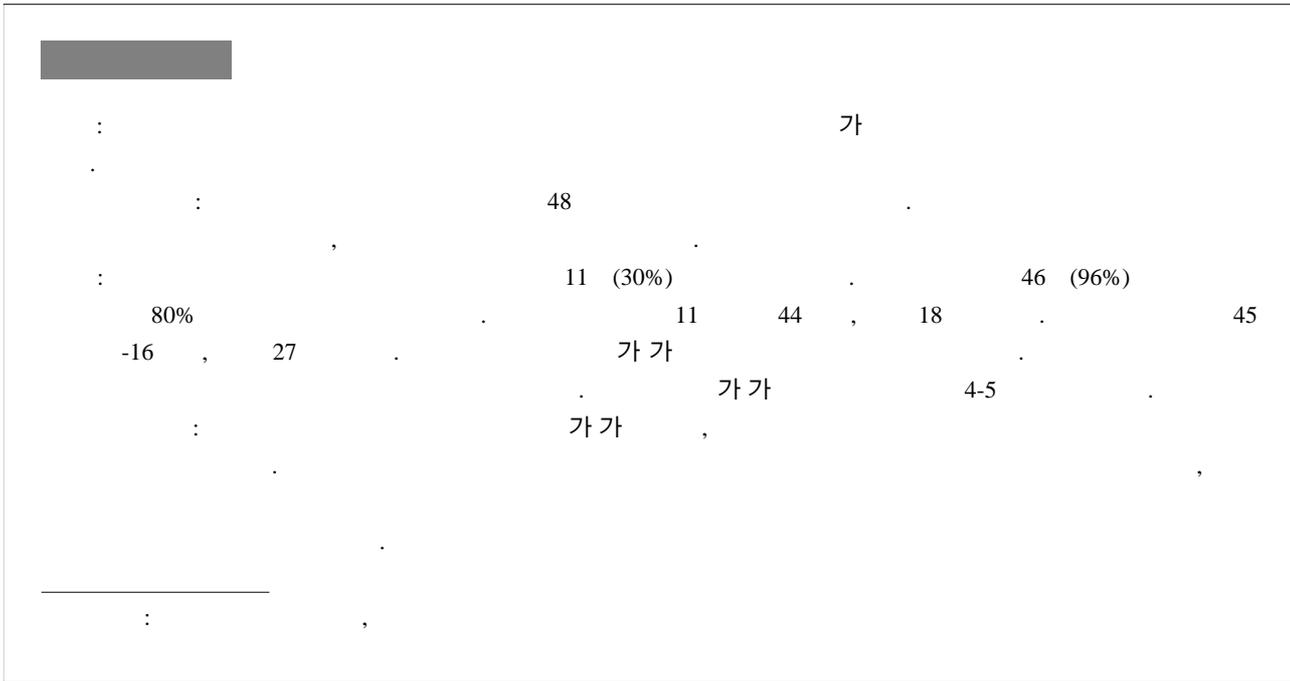
Moon<sup>9)</sup> 18, 14 가  
 9) Toyama<sup>14)</sup> 1, 11, 2 가  
 10 27 가 가 23 Pritchett<sup>12)</sup> 55% 가  
 1 9, 2 14, 3  
 Toyama 가 33  
 (69%) , 4-5  
 가 (Table 3).  
 Moon  
 52%~71%<sup>1,3,5,12)</sup> 9) L3-4 62%, L4-5 92% , Toyama<sup>14)</sup> L2-  
 88% 3 9%, L3-4 35%, L4-5 70%, L5-S1 52%  
 (Table 4).  
 Grubb Lipscomb<sup>5)</sup> 85%,  
 45%  
 3,5,6,11) Pritchett Bortel<sup>12)</sup> 4, 5 Toyama 4-5  
 , P rennou<sup>11)</sup> 3, 4  
 가 4 (8%)  
 Bridwel<sup>13)</sup> , Toyama 가 가  
 , Pritchett<sup>12)</sup> 가 1 5 - 1 가  
 11 level  
 22, 30  
 7.0, 5.3 mm 가  
 ( P=0.10, P=0.12)<sup>5,9)</sup>  
 4 (8%)  
 가 (Table 4).  
 35% 65% , 가  
<sup>5,9,12,14)</sup>

and DeWald RL eds. *The textbook of spinal surgery*. 2nd ed, Philadelphia, Lippincott-Raven: 777-795, 1997.

- 4) **Epstein JA, Ebstein BS and Jones MD** : *Symptomatic lumbar scoliosis with degenerative changes in the elderly*. *Spine*, 4:542-547, 1979.
- 5) **Grubb SA and Lipscomb HJ** : *Diagnostic findings in painful adult scoliosis*. *Spine*, 17:518-527, 1992.
- 6) **Grubb SA, Lipscomb HJ and Suh PB** : *Results of surgical treatment of painful adult scoliosis*. *Spine*, 19:1619-1627, 1994.
- 7) **Jackson RP, Simmons EH and Stripinis D** : *Coronal and sagittal plane spinal deformities correlating with back pain and pulmonary function in adult idiopathic scoliosis*. *Spine*, 14:1391-1397, 1989.
- 8) **Marchesi DG and Aebi M** : *Pedicle fixation devices in the treatment of adult lumbar scoliosis*. *Spine*, 17(8S):1619-1627, 1992.
- 9) **Moon MS, Lee KS, Lim CI, Kim YB and Lee HS** : *A clinical study of degenerative lumbar scoliosis*. In Yonenobu K ed. *Lumbar fusion and stabilization*. Springer-Verlag: 98-112, 1992.
- 10) **Nash CL and Moe JH** : *A study of vertebral rotation*. *J Bone Joint Surg*, 51A:223-229, 1969.
- 11) **P rennou D, Marcelli C, H risson C and Simon L** : *Adult lumbar scoliosis- Epidemiologic aspects in a low back pain population*. *Spine*, 19:123-128, 1994.
- 12) **Pritchett JW and Bortel DT** : *Degenerative symptomatic lumbar scoliosis*. *Spine*, 18:700-703, 1993.
- 13) **Robin GC, Apan Y, Steinberg R, Makin M and Mencil J** : *Scoliosis in the elderly: A followup study*. *Spine* 7:355-359, 1982.
- 14) **Toyama Y** : *Surgical management of degenerative lumbar scoliosis*. In Yonenobu K ed. *Lumbar fusion and stabilization*. Springer-Verlag: 113-134, 1992.
- 15) **Vanderpool DW, James JIP and Wynne-Davies R** : *Scoliosis in the elderly*. *J Bone Joint Surg*, 51A:446-455, 1969.

## REFERENCES

- 1) **Abei M** : *Correction of degenerative scoliosis of the lumbar spine-a preliminary report*. *Clin Orthop*, 232:80-86, 1988.
- 2) **Benner B and Ehni G** : *Degenerative lumbar scoliosis*. *Spine*, 4:548-552, 1979.
- 3) **Bridwell KH** : *Degenerative scoliosis*. In *Bridwell KH*



:

388-1

Tel : 82-2-2224-3530, Fax : 82-2-488-7877, E-mail : ytkim2@www.amc.seoul.kr