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Radiologic Result of Displacement according to Position and Measurement Methods in Spondylolisthesis

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– Abstract –

Study Design : Prospective analysis was based on radiographic appearance in 80 cases of spondylolisthesis taken in positional change.

Purpose : The aim of the study was to investigate the flexion-extension lateral radiographs about the difference between decubitus and upright position and the measurement method of displacement in spondylolisthesis.

Summary of Literature Review : Although the flexion-extension lateral radiographs of spine were known the most preferable diagnostic method for spine instability, there are some debates about the difference of displacement according to the patient position and measurement methods.

Materials and methods : The radiographs of 80 patients with spondylolisthesis were taken in the decubitus and upright position. Extent of the displacement were measured by Taillard, DuPuis, modified Qunnell & Stockdale method and Ferguson angle, slip angle, lordosis angle and vertebral centroid measurement of lumbar lordosis(CLL) were measured, according to position.

Results : Significant difference between the positions was shown on the CLL and lordosis angle. Differences between positions analyzed from Taillard, DuPuis, modified Qunnell & Stockdale method, Ferguson angle and slip angle had no statistical significance. Differences between positions analyzed from the pathologic movement of translation(<4 mm) had a clinically significance in the upright position rather than the decubitus.

Conclusion : The lateral flexion-extension radiographs on upright position rather than decubitus position are considered as the more useful diagnostic method.

Key Words : Spondylolisthesis, Flexion-extension lateral view, decubitus and upright position

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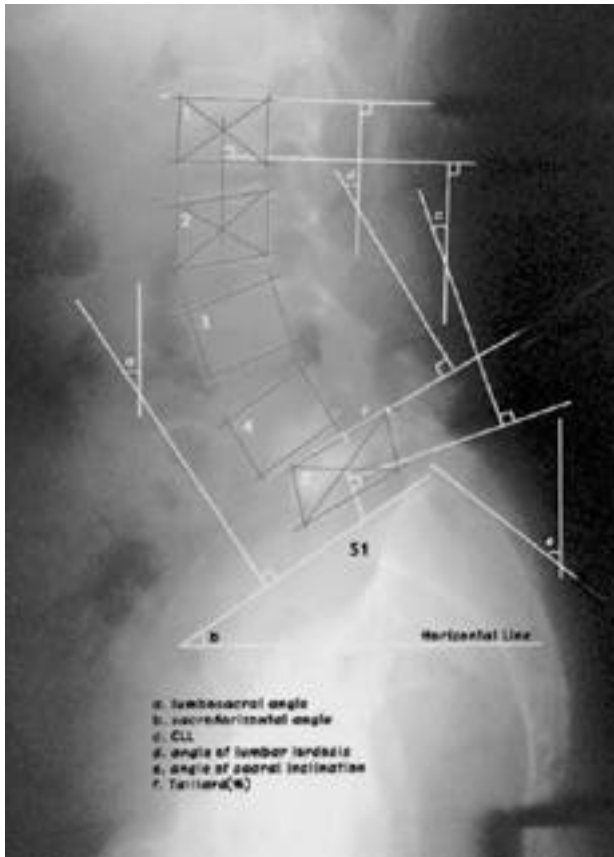


Fig. 1. Parameters that represents the radiographic measurement of the lumbar spine. **a.** lumbosacral angle **b.** sacrohorizontal angle **c.** CLL **d.** angle of lumbar lordosis **e.** angle of sacral inclination **f.** Taillard(%)

80 가 28 (35%),
가 52 (65%) 51
4-5 55 (68.7%),
5 -1 23 (28.8%), 3-4 2 (2.5%)
45 (56.3%),
35 (43.7%) (Table 1).

2.

2 가 2
4 mm
9 °
t-test

Table 1. Level of Spondylolisthesis

| Level Type | L3/4 | L4/5 | L5/S1 | |
|---------------|---------|-----------|-----------|-----------|
| Isthmic | 1 | 30 | 14 | 45(56.3%) |
| Degenerative | 1 | 25 | 9 | 35(43.7%) |
| | 2(2.5%) | 55(68.7%) | 23(28.8%) | 80(100%) |

Table 2. Radiologic Result according to Patient 's Position

| Variable | Mean \pm SD | | Two-tailed probability |
|--------------------------|-----------------|-------------------|------------------------|
| | Recumbent | Standing | |
| Vertebral slipping mm | 4.71 \pm 3.81 | 5.41 \pm 2.81 | NS |
| vertebral width | 30 \pm 25 | 31 \pm 25 | NS |
| Lumbosacral angle | 40 \pm 9.34 | 44.10 \pm 10.24 | P<0.05 |
| Sacral angle | 47 \pm 7.23 | 50 \pm 8.11 | P<0.05 |

Table 3. Radiologic Result according to Patient 's Position

| Variable (Flexion-Extension) | Mean \pm SD | | Two-tailed probability |
|---------------------------------|-------------------|-------------------|------------------------|
| | Recumbent | Standing | |
| Taillard (%) | 6.68 \pm 4.23 | 9.16 \pm 6.49 | N-S |
| Dupuis($^{\circ}$) | 24.89 \pm 4.90 | 25.52 \pm 4.75 | N-S |
| Quinnell & stockdale(mm) | 6.053 \pm 0.19 | 8.684 \pm 0.31 | N-S |
| Slip angle ($^{\circ}$) | 19.52 \pm 8.34 | 20.58 \pm 9.97 | N-S |
| Ferguson ($^{\circ}$) | 21.78 \pm 10.78 | 17.26 \pm 12.80 | N-S |
| CLL ($^{\circ}$) | 43.57 \pm 12.51 | 46.78 \pm 15.9 | P<0.05 |
| Lordosis angle ($^{\circ}$) | 42.434 \pm 8.51 | 47.52 \pm 9.24 | P<0.05 |

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(P<0.05).

1. 가 , 가 (Table 2).

80

가 2.

vertebral slipping(length width), ,

CLL

가 (Table 3).

가 . Macnab Junghanns^{8,11,12)} .
가 가
3. 가 . 1985 Dupuis³⁾
,
, 4 mm , Percy¹⁶⁾, Frymoyer⁶⁾
68 (85%),
71 (89%) . Freiberg⁵⁾
.
가 , 가
. Chen²⁾ cobb CLL
(Degenerative spondylolisthe-
sis)
,
¹⁵⁾, Inoue⁷⁾ 가
,
Matsunaga¹³⁾
가 30% Rosenberg^{18,19)}
14%
. 1944 Knutsson⁹⁾ 가
가 Rosenberg^{18,19)}
가 4-5
, Wiltse²²⁾ 가
, , , ,
, () 5 1
가
1981 Farfan⁴⁾ 가
가
가
가
가
Lowe¹⁰⁾ 50¹⁾
26%
2 mm , Saraste²⁰⁾
가 가
, vertebral slipping ,
가
가 가
가

가 .

1.

가

2.

가

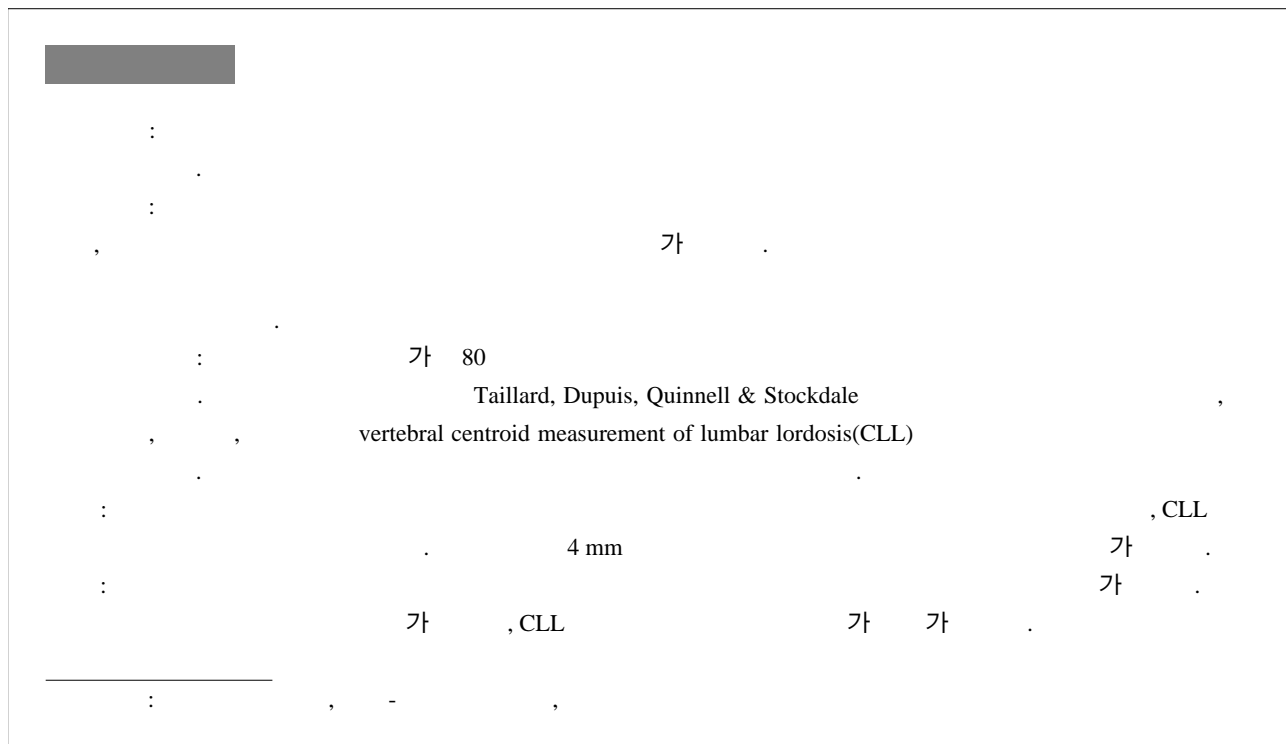
, CLL

가 가 .
가

CLL

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