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Relationships between Posterior Ligament Complex Injury and Plain Radiograph in Thoracolumbar Spinal Fracture

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– Abstract –

Study Design: A prospective study of 100 patients with thoracolumbar spinal fractures.

Objectives: To assess the relationships between a posterior ligament complex injury and plain radiograph in thoracolumbar spinal fractures.

Summary of Literature Review: Some studies have reported the value of MRI for the evaluation of a posterior ligament complex injury. However, most of these did not evaluate the relationships between the posterior ligament complex and plain radiograph of the thoracolumbar spine fractures.

Materials and Methods: 100 patients with either a thoracolumbar compression or burst spinal fracture, from T11 to L2 levels, were evaluated by plain radiographs, taken in the supine position, and MRI taken within a week of the trauma. The wedge angle, Cobb's angle and anterior body height were measured on the plain radiographs, and the presence of posterior ligament complex injury on MRI was evaluated and analyzed.

Results: In the compression fracture group, the wedge angle, Cobb's angle and anterior body height loss were $19.9 \pm 1.4^\circ$, $14.3 \pm 2.2^\circ$ and $35.6 \pm 3.6\%$, respectively, in the posterior ligament complex injury subgroup, but only the anterior vertebral body height loss was statistically significant ($p=0.04$). In the burst fracture group, the wedge angle, Cobb's angle and anterior body height loss were $26.4 \pm 2.0^\circ$, $23.3 \pm 1.7^\circ$ and $57.4 \pm 5.2\%$, respectively, in the posterior ligament complex injury subgroup, which were all statistically significant ($p=0.00, 0.02, 0.00$). With a sensitivity of 75% or greater, the wedge angle, Cobb's angle and anterior body height loss in compression and burst fractures were more than 15° , 10° and 30% and 20° , 20° and 40%, respectively.

Conclusions: When the values of wedge angle, Cobb's angle and anterior body height loss in the compression and burst fractures were more than 15° , 10° and 30% and 20° , 20° and 40%, respectively, and the sensitivity for the presence of a posterior ligament complex injury was more than 75%. Therefore, these values in the screening test are indicators for the presence of a posterior ligament complex injury. Further careful evaluations, such as MRI, are still required in deciding the appropriate treatment method.

Key Word: Thoracolumbar spinal fracture, Posterior ligament complex, Magnetic Resonance Imaging, Plain radiograph.

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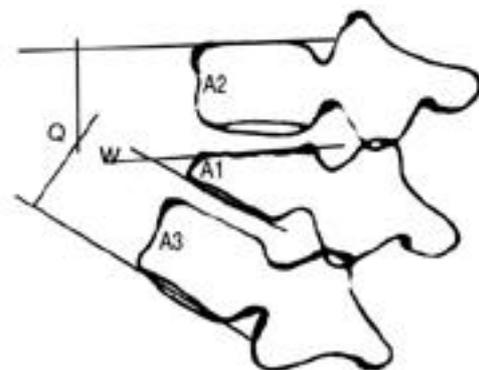


Fig. 1. Measurement of Cobb's angle, Wedge angle and anterior body height. Q: Cobb's angle, W: wedge angle, A: anterior body height, Compression of anterior body = $\frac{(A2+A3)/2-A1}{(A2+A3)/2} \times 100$

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ANOVA	ROC curve	t (t test), 1	(one way (p))	35.6 ± 3.8%,	28.1 ± 1.8%
0.05	가 75%	가	(p=0.04),	36.7 ± 2.8%	가 57.4 ± 5.2%, (p=0.00)
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1.		19.9 ± 1.4	16.7 ± 0.9 (p=0.74),	20 43% 75%	가 82% 15 14 50%, 50%
		26.4 ± 2.0	16.3 ± 1.3 (p=0.00).	가 75%	10 29% 91% 30% 40% 75%
2.		14.3 ± 2.2	14.6 ± 1.4 (p=0.89),	25 20 75%	가 56% 91% 23 50%
		23.3 ± 1.7	15.4 ± 1.5 (p=0.02).	, 83%	20 75% 57% 96% 75% 56% 40%
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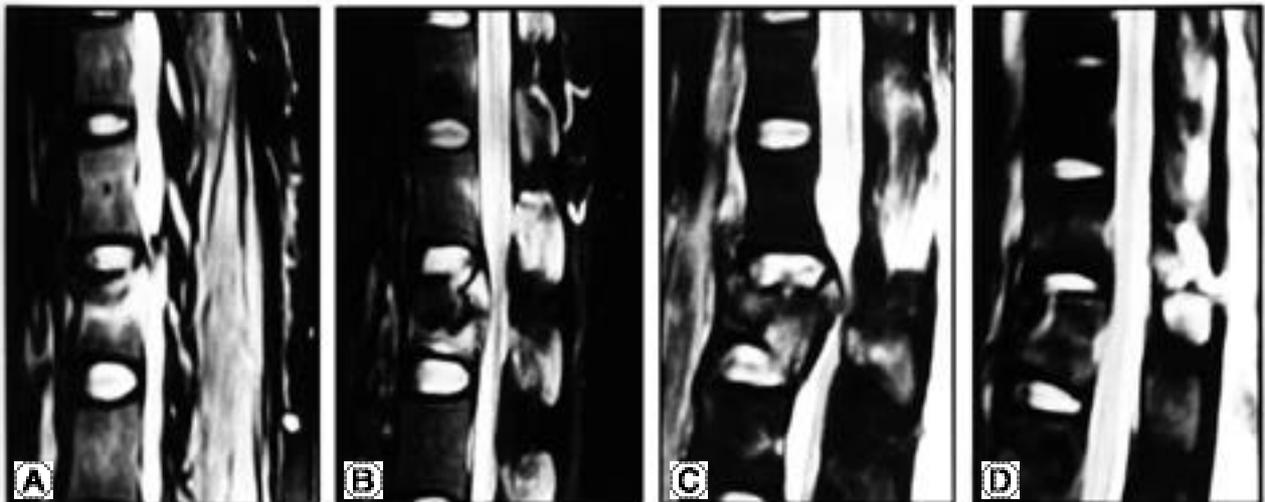


Fig. 2. State of the ligamentous structures observed on the MRI examinations. **(A)** No evidence of injury. **(B)** Edema in the interspinous space without evident discontinuity or elongation **(C)** Elongation of the interspinous space without discontinuity **(D)** Clear disruption of the posterior ligamentous complex

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