

Mechanisms and Classifications of Thoracolumbar Fractures

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– Abstract –

The goals of treatment of thoracolumbar injuries are to provide an adequately decompressed spinal canal and painless, stable, satisfactorily aligned spinal column. To achieve these goals, appropriate treatment is essential and accurate diagnosis of the spinal column injuries is the base to decide the treatment method. Classifications of fractures of the spinal column are standardly based on one of three variables: presumptive mechanism of injury, the fracture pattern and location, and the degree of fracture fragment displacement. Any classification scheme should ideally address both the skeletal and neurologic injuries, thereby offering a composite picture of the nature of any specific injury. Although there is no current classification that provides such a complete description, major advances in the categorization of thoracolumbar injuries have occurred. Useful classifications are three column concept of Denis, comprehensive classification of Magerl et al and load sharing classification of McCormack.

Key Words : Thoracolumbar fracture, classification

가 ,
가
가
가
(Table 1).
Denis McCormack load sharing
가 Magerl
1929 Boehler
가
가

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Table 1.

Boehler	1929		mechanism of injury	5가		
Watson-Jones	1931					
Nicoll ¹⁶⁾	1949		bony gap, disc			
Decoulx-Rieunau ³⁾	1958					
Holsworth ¹¹⁾	1963					
Kelly and Whitesides ¹²⁾	1968	‘spinal column’				
Roy-Camille	1970	disc annulus	, PLL, pedicle		‘intermediate vertebral segment’	
Louis	1973	three column system		Denis column	three column	post-column
		terior column				
		instability				
Denis ⁵⁾	1983	three column concept				
McAfee ¹⁴⁾	1983	three column concept	moment of force			
Ferguson and Allen ⁷⁾	1984	mechanistic classification				
Farcy ⁶⁾	1990	three column concept			6	3
Magerl ¹³⁾	1994	AO		compression, distraction, rotation		
McCormack ¹⁵⁾	1994			load sharing		

	1983	Denis ⁵⁾	CT		(compression fracture),	
umn			col-	(burst fracture),	(seat-belt injury),	-
		(anterior column)		(fracture-dislocation)	4	(major
	1/2,			spinal injury)		
(middle column)		1/2,			4	(minor spinal
	(posterior column)			injury)		
		가		1.	(compression fracture)	
Denis						
				가		(anterior
				wedge fracture)		(lateral com-
	가			pression fracture)		
						4
				, A		
				, B		
			C		, D	
		가				
				가		
	가					
Denis						

MRI

가

50%

가 . Guerra ¹⁰⁾

B

50%가

1/3

20

MRI

가 ¹⁹⁾

가

. Willen ²²⁾ A

2. (burst fracture)

가

B

D

가

가

. .

가 ,

가

,

,

^{2,17)} Fredrickson ⁸⁾

가 가

,

.

가

가 .

3. (seat-belt injury)

가

가

가 .

¹⁸⁾

가

-

가

,

.

-

가

C

가

가

Denis 5

. A

가

Denis

가
(hinge)

,

.

C

-

, B

. 가

Denis

2가

4

.

-

가 . C

, D

A

-

. E

1

, B

Chance

[illegible]

Table 3. Magerl

A . (vertebral body compression)		
1 .	(impaction fracture)	
	1 .	(end-plate infraction)
	2 .	(vertebral body collapse)
	3 .	(wedge impaction)
	(split fracture)	
	1 .	(saggital spilt)
	2 .	(coronal split)
	3 .	(pincer fracture)
	(burst fracture)	
2 .	1 .	(partial burst)
	2 .	(burst-split)
	3 .	(complete burst)
B . (anteior and posterior element injury with distraction)		
1 .	(posterior disruption, predominantly ligamentous)	
	1 .	(transverse disruption of the disc)
	2 .	(compression of the vertebral body)
2 .	(posterior disruption, including the arch)	
	1 .	(transverse disruption through the vertebral body)
	2 .	(transeverse disruption through the disc)
	3 .	(compression of the vertebral body)
3 .	(anterior disruption)	
	1 .	(hyperextension subluxation of the facet joint)
	2 .	(hyperextension spondylolysis)
	3 .	(posterior facet dislocation)
C . (anterior and posterior element injury with rotation)		
1 .	(vertebral body compression with rotation)	
	1 .	(impaction fracture)
	2 .	(split fracture)
	3 .	(burst fracture)
2 .	(distraction with rotation)	
	1 .	(posterior disruption, predominantly ligamentous)
	2 .	(posterior disruption, including the arch)
	3 .	(anterior disruption of the disc)
3.	(rotational shear)	
	1 .	(slice fracture of the vertebral body)
	2 .	(oblique fracture of the vertebral body)

Table 4.

가		가	
1.	offset		
2.			
2.			
3.	20)	2) B	(type B groups)
4.		B	
5.			1
6.			

가
A

2 가

가

Chance¹⁾, Nicoll¹⁶⁾, Holdsworth¹¹⁾

A McAfee¹⁴⁾ 가

가, White, Panjabi²²⁾, Denis⁴⁾

1 (first degree instability) 가 (mechanical instability)

(hyperextension spondylolysis) degree instability)

가, 2 (late neurologic instability)

3) C (type C groups) rologic instability), 3

C

가

(Table 4).

A B

가 C

가 C

가 C²²⁾

C 1 - 가 가

(rotational compression fracture), 2 - (static)

(rotational distraction fracture), 3 -

(rotational shear fracture) 1 2 가

A B 가, 3

가

Holdsworth¹¹⁾ 가

(slice fracture)

가 가

가

가

가

가

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