

## Neural Injury and Recovery of the Thoracolumbar Spine Fractures

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### – Abstract –

#### 1. Evaluation of the Neural Injury

For evaluation of neural injury from the thoracolumbar spine fracture, we should know the type and extent of injury. In case of the complete Spinal Cord Injury( SCI - Frankel classification A), they will not only lose the spinal cord function permanently distal to the injury site, but also show the probability 0-9% from Frankel A to D or E. But in case of the incomplete SCI, they will show sacral sparing and some kind of function will be recovered. The anticipation of recovery from the SCI depend on the results of neurologic examination after the spinal shock. If they have motor sparing, 86% of patients show the recovery of motor function during the first 6 month. The factor that influence to neurologic recovery are the initial kyphosis angle and canal compromising pattern, and do not influenced by treatment methods.

#### 2. The Factor of the Neural Injury Recovery

##### 1) Conservative treatment in acute stage

The initial pathophysiology of SCI is the mechanical injury, but secondary injury will be occur by impairment of blood supply and biochemical alteration, formation of free radical, release of glutamic acid, calcium influx, lipid peroxidation. Immediate methylprednisolone could minimize the spinal cord injury during the first 8 hours, and other GM-1 ganglioside, naloxone, TRH, spinal cord cooling, hyperbaric therapy will be helpful.

##### 2) Surgical treatment

The factor influence the recovery of SCI (1) time interval injury to operation, (2)decompression of neural element, (3) reduction of fractured fragment.

##### 3) Management of the Residual chronic stage

Most common cause of death in SCI is urinary complication. We always should consider the improvement bladder function in SCI and the maintenance of low bladder pressure and feel free a bladder symptom.

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**Key Words** : Thoracolumbar spine fracture, Neural injury and recovery

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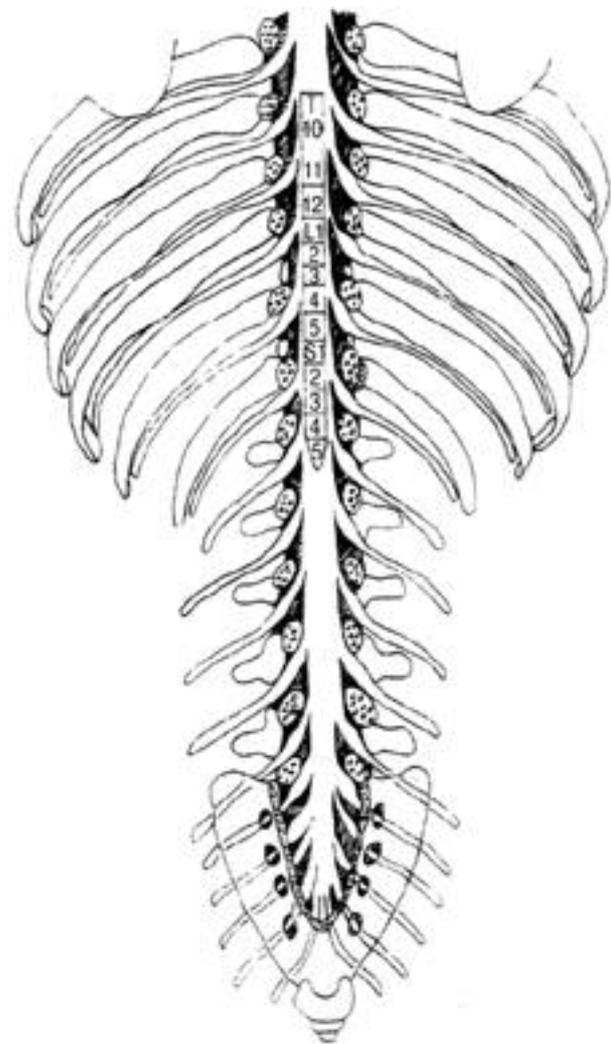


Fig. 1.

가  
 11 1  
 (spinal cord)  
 12 5 1  
 , 1  
 ( 2 3 )  
 (Fig. 1).  
 (lumbar enlarge-  
 ment) , 1 2  
 가  
 (conus medullaris) 3-4  
 12  
 - 1 , (cauda equina)  
 9-12  
 , 1-2  
 가 .  
 12 1  
 .  
 1.  
 1) 11-12  
 1-3 가 4-5  
 가 4-5  
 (flaccid)  
 가 , 1-3 가 .  
 .  
 2) 12 - 1  
 ,  
 가 가  
 (neurotmesis) 가 .  
 3) 2  
 1  
 ,  
 가  
 2.  
 1)  
 .  
 가  
 (rectum) , (anal wink  
 reflex),  
 가 .  
 12

Table 1.

Frankel

A.				
B.				
C.		1	2	
D.		3	4	
D1.	3			
D2.	3	4		/
D3.	4			
E.				

(Adapted) from Bradford DS and McBride GG:  
Surgical management of thoracolumbar spine fractures with  
incomplete neurologic deficits. Clin Orthop, 218:210-216, 1987.

2)

(segmental reflex)

(anal wink), (bulbocavernous reflex),  
(plantar reflex)  
( 2-4 ) ( 3-4 )

가

neuroplaxia

72

가가  
predictor

3

2~3  
10

1

cystometry

3.

Frankel A

가

Frankel B, C D

가

D

(Table 1)  
가  
가

Bradford McBride Frankel

4.

가

Denis

75%  
, 25%~50%

가  
24

99%  
가

가

Hashimoto 45% 가 35%, 55% , 52%, 35% , 49% , 63% , Trafton Boyd 가 , Hashimoto 가

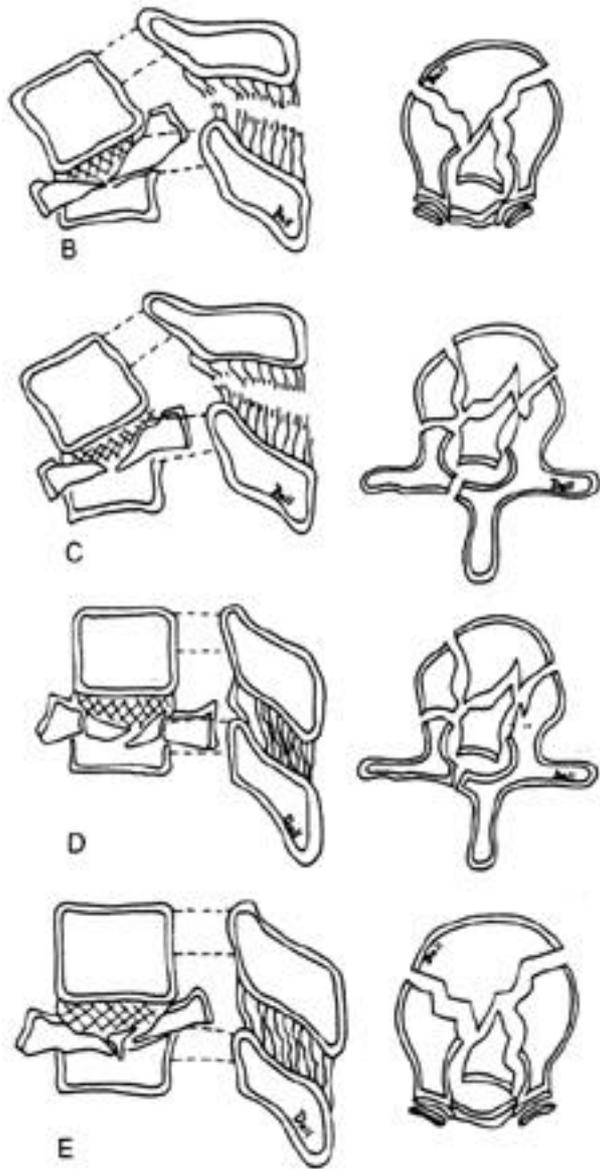


Fig. 2. CORR 233, Aug, 1988, p:173 : type I=B, type II=C, type III=D, typeIV=E

1 2 ( both > 15 ° )  
 90% 3 ( 3 < 15 ° )  
 50% 4 ( < 15 ° )  
 1 2 ( > 15 ° ) :  
 3 ( < 15 ° ) :

(free radical) (lipid peroxidation) 가 가

1.

A)

methylprednisolone . Bracken 8 methylprednisolone , naloxone placebo 8

가  
30 mg/kg 15  
23 5.4 mg/kg 3.  
(oxygen free radical)

가  
Acidic glycoside ganglioside  
ganglioside , Geisler GM-1  
neuritic growth  
naloxone thyrotrophin-releasing hormone(TRH)  
opiate-receptor antagonist opioid  
가  
tir-  
ilazard(21-aminosteroid), calciumchannel blocker  
nimodipine 가  
B) (spinal cord cooling)  
(spinal cord cooling)

C)  
(lipid peroxidation) 가  
2. 가  
가  
8(?)  
가 , McAfee  
가

가  
(detrusor)  
10 2 가  
가 2 4 가  
(Fig. 2).  
pontine mesencephalic reticular formation  
pontine mesencephalic reticular formation  
pathway 가 가  
pathway 가  
가  
detrusor external  
sphincter dyssynergia가<sup>51)</sup>  
(神經因性膀胱) 가 가  
, International Continence Society(ICS)

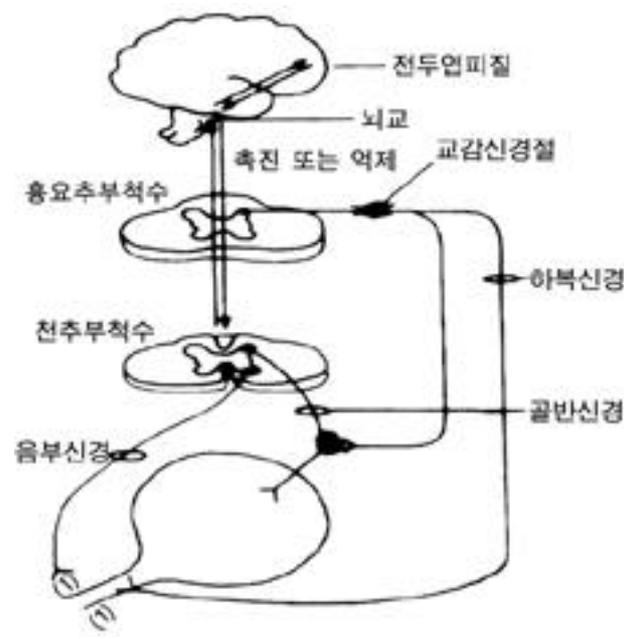


Fig. 3.

Com-ma , Bors-  
 (殘尿率) ,  
 20%, 10%  
 . Lapides 5가 ,  
 (reflex bladder)  
 (autonomous  
 bladder) .  
 (urodynamic syudy)  
 (maximal detrusor pressure)  
 (detrusor pressure)  
 (vesi-  
 coureteral reflux), (renal stone), (kidney  
 infection) (腎)  
 가 .  
 (cystometry), (sphincter EMG),  
 (uroflowmetry), (voiding cys-  
 tourethrography) (ultrasound)  
 , creatinine  
 가 가 .  
 가  
 suprapubic diversion  
 ,  
 (sphincter abla-  
 sion) drain .  
 oxybutinine, flavoxate, provan-  
 thine ,  
 bethanechol  
 chloride 가

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