

## Metal Failure of Pedicle Screw System

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### – Abstract –

**Study design :** The metal failure of pedicle screw system followed by posterolateral or posterior fusion used in variable cases(spine fracture, degenerative disorder of spine, deformity of spine) was analyzed retrospectively.

**Purpose :** The goal of this study was to analyze frequency and clinical consequence of pedicle screw fixation system failure in the treatment of different etiology(spine fracture, degenerative disorder, deformity of spine) and to evaluate affected factors in metal failure.

**Materials and Methods :** We performed survivorship analysis on 442 patients treated with pedicle screw system from September 1990 to December 1999. The average follow-up period was 54 months(from 18 months to 129 months). As affected factors, some variables such as etiology, kinds of system and extent of fusion were subjected to analyzed their influence on metal failure. We also performed analysis about relationship between metal failure and clinical results. We defined the metal failure as 1) breakage of screw or rod 2) screw bending above 5 degrees 3) dissociation of rod-screw coupling system and 4) screw pull out from vertebral body or pedicle.

**Results :** We found out 33 cases of metal failure: among 2786 screws, 41 screws had a problem. The metal failure rate was different between each etiology ; 12 cases in fracture(10%), 21 cases in degenerative disorder(6.9%). There was also difference between a kinds of implants; 13 cases in side assembling type(5.4%), 20 cases in back open type(10.5%). However, there were no difference according to extent of fusion; 6 cases in one segment(6.9%), 21 cases in two segments(8.1%), 6 cases in more than three segments(6.3%). Among the overall patients with metal failure (33 cases), only eight patients were complaint significant symptoms. And three of this eight patients were improved after reoperation The mean interval to metal failure was 14.4 months from operation.

**Conclusion :** The metal failure was more common in spine fracture( $p<0.05$ ) and back open type pedicle system( $p<0.05$ ). However, there was no relationship with extent of fusion( $p>0.05$ ). And metal failure did not significantly affect the clinical results( $p>0.05$ ).

**Key Words :** pedicle screw system, metal failure

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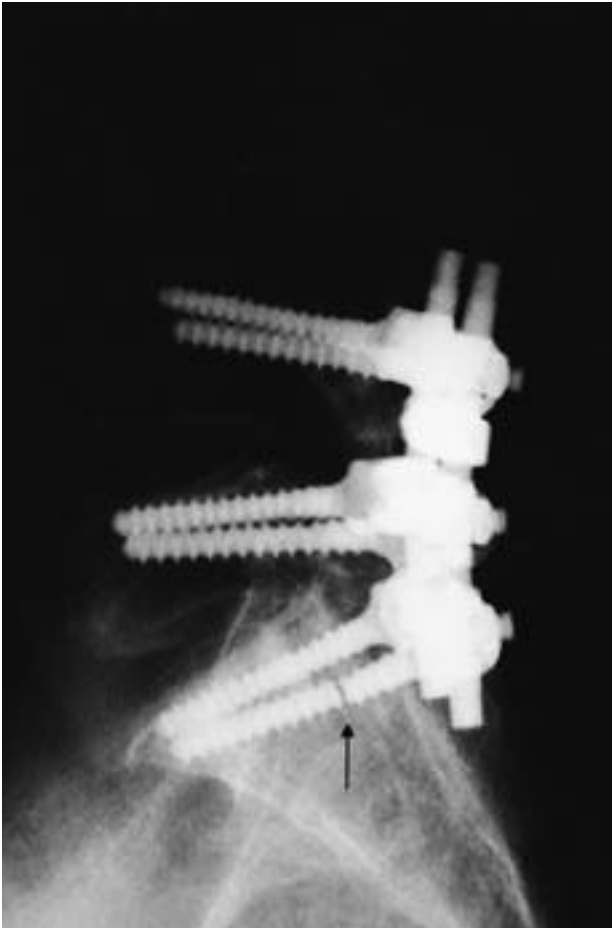
Tel : 82-51-240-2867, Fax : 82-51-243-9764, E-mail : gylee@mail.donga.ac.kr

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442 가 240 ,  
가 202 , 49.8 (10~84) .  
18 129 54 .  
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Kaplan-Meier  
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1)  
(Fig. 1, 2) 5  
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120  
 , 305 , 17 ,  
TSRH 가 243 ,  
Cotrel-Dubousset , Diapason 199 .  
1 87 , 2 260 , 3



**Fig. 1.** 69 years old female with spinal stenosis had breakage of screw and no symptom after postoperative 6 months



**Fig. 2.** 35 years old female with spinal stenosis showed screw bending above 5 degrees after postoperative 3 months

98 .

5 가 9 , 33 (7.5%)  
 가 4 , 15 ,  
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2786 41(1.5%)  
 가 .

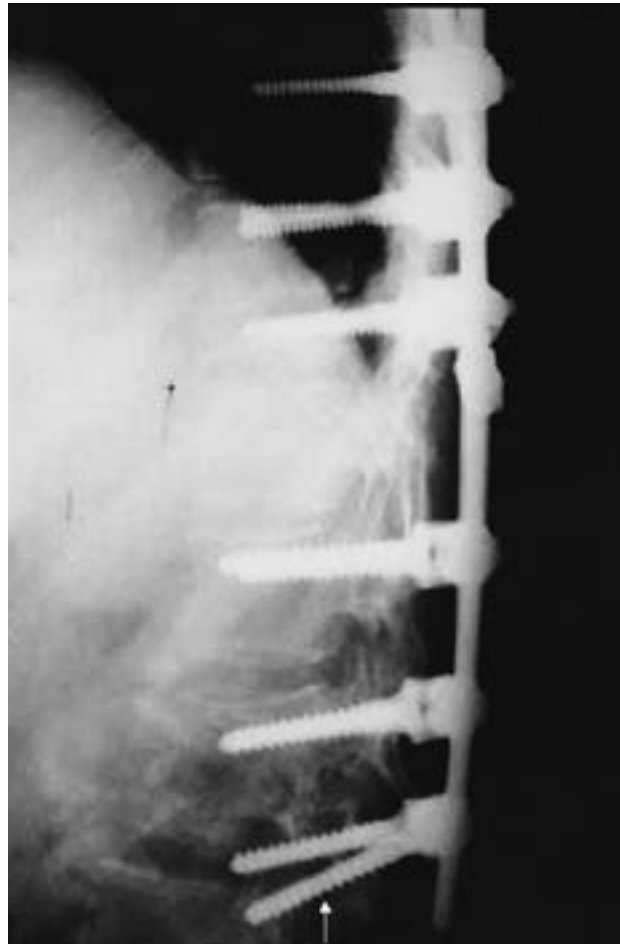
305 120 12 (10%),  
 21 (6.9%)  
 (p<0.05),  
 TSRH 243 13 (5.4%),



**Fig. 3.** 60 years old female with spinal stenosis showed dissociation screw rod coupling system after postoperative 2 years

Cotrel-Dubousset 199 20  
 (10.5%) ,  
 TSRH 512 14 (2.7%),  
 Cotrel-Dubousset 439 22  
 (5%) , TSRH  
 (p<0.05).

TSRH 62 3 (4.8%),  
 Cotrel-Dubousset 58 9  
 (15.5%) TSRH  
 (p<0.05),  
 TSRH 173  
 10 (5.8%), Cotrel-Dubousset  
 Diapason 132 11 (8.3%)  
 (p>0.05).  
 1 87 6 (6.9%), 2  
 260 21 (8.1%), 3 95 6 (6.3%)



**Fig. 4.** 31 years old male with fracture-dislocation showed pull-out of screw from vertebral body after postoperative 20 months

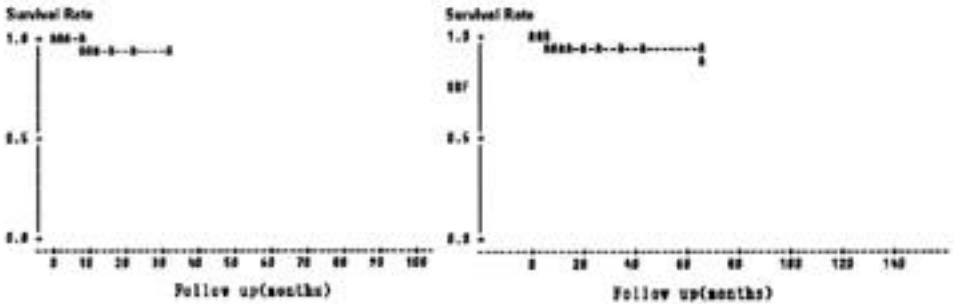


Fig. 5. Cumulative survival rate according to disease( $p>0.05$ )

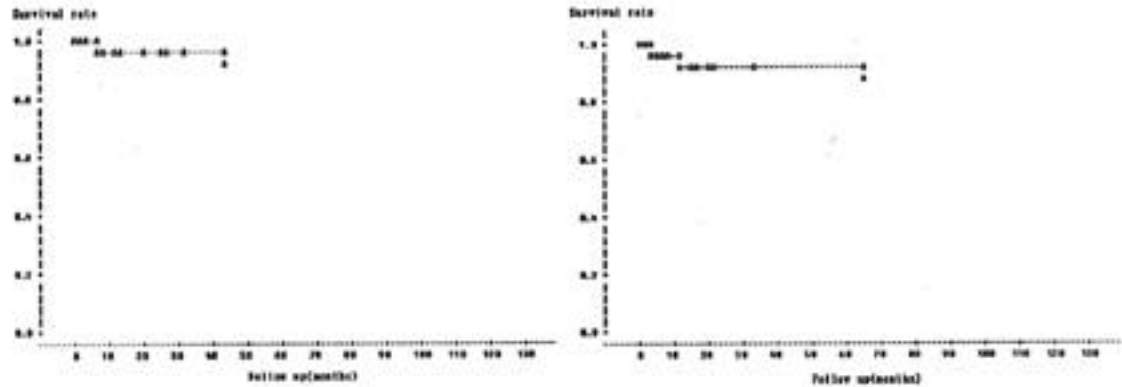


Fig. 6. Cumulative survival rate according to instruments( $p>0.05$ )

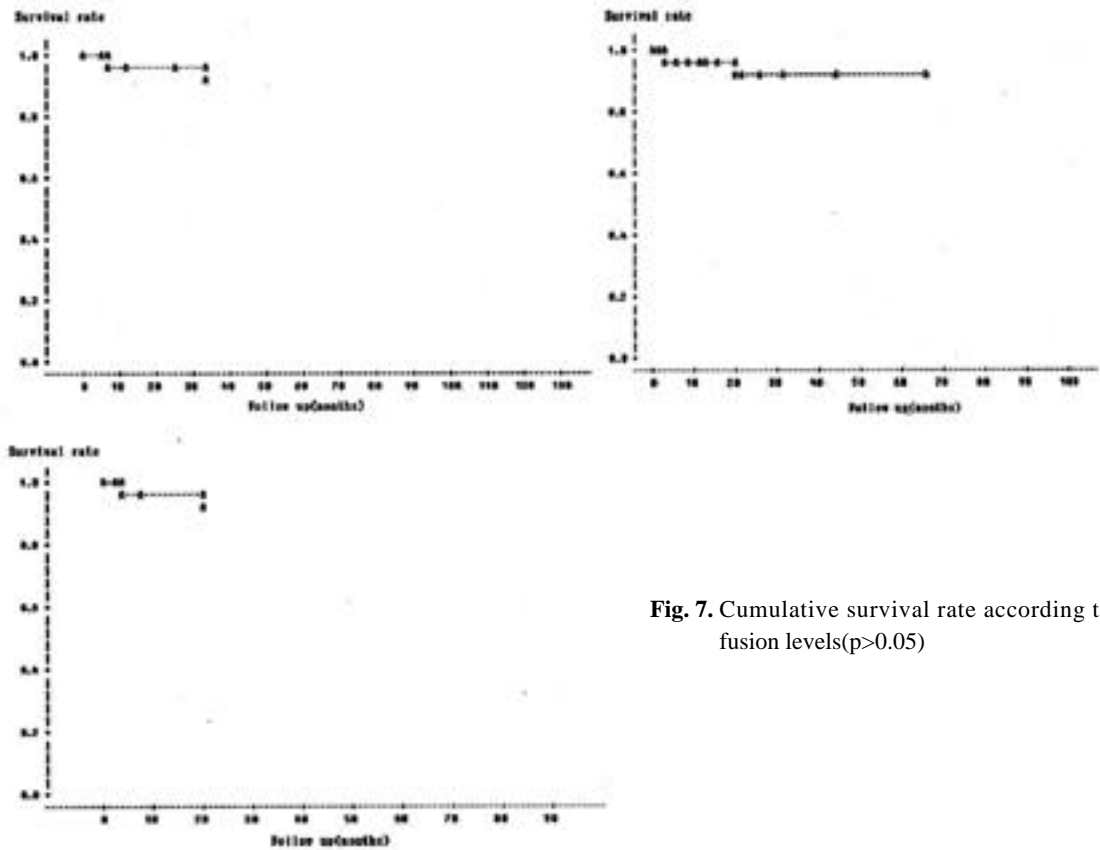


Fig. 7. Cumulative survival rate according to fusion levels( $p>0.05$ )

(p>0.05).

McAfee<sup>5)</sup> 200

25 6 9.7 14.4

8 3 , 2 , 1 , 1 ,

1 3 Ohlin<sup>6)</sup> , ,

10 89.4%,

90.8% McAfee<sup>4)</sup> ,

(p>0.05)(Fig. 5), TSRH 93.3%,

Cotrel-Dubousset Diapason 88.7%

(p>0.05)(Fig. 6).

TSRH 93.8%, Cotrel-Dubousset

Diapason 84.2% (p<0.05),

TSRH 92.8%, Cotrel-Dubousset

Diapason 89.5%

(p>0.05). 1 92.4%, 2

90.1% 3 93.4%

(p>0.05)(Fig. 7).

2 65 가

, 14.4 가 가

가

, Diapason Cotrel-Dubousset

가 TSRH 가

가

3 1 가

가

10). ,

8).

McAfee<sup>4)</sup> 가

10 80% 가

10 80% , ,

, Ebelke<sup>2)</sup> 가

VSP 10 50%

, Ohlin<sup>6)</sup> 10 85%

9) 88.7% 10 , McAfee<sup>4,5)</sup> 9)

90% (survivorship) 가

1986 Roy Camille<sup>7)</sup> 1) 가

115 가

25 (22%) 가 65

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가 2  
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가  
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가  
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5  
가  
가  
가  
(p<0.05),  
가  
가  
(p<0.05),  
가  
(p>0.05).

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2786

41(1.5%)

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12 (10%),

21 (6.9%)

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TSRH

13 (5.4%)

20 (10.5%)

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6

(6.9%), 2

21 (8.1%), 3

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(6.3%)

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25

8

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14.4

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( $p < 0.05$ ),

( $p < 0.05$ )

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( $p > 0.05$ ).

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3가 1

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