

## Prognostic Factors Affecting the Results of the Surgery for Cervical Spondylotic Myelopathy

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### – Abstract –

**Study design:** This retrospective study was designed to investigate and define the factors affecting the results of surgery for cervical spondylotic myelopathy.

**Objective:** This study was performed in an attempt to investigate and define the factors affecting the results of surgery for cervical spondylotic myelopathy.

**Summary of the Literature Review:** There have been few studies about the factors affecting the results of surgery for cervical myelopathy, including MEP (Motor evoked potential) studies and gait analysis, so we investigated the factors that affect the results of surgery for cervical myelopathy.

**Materials and Methods:** We retrospectively studied 59 cervical spondylotic myelopathy patients who underwent operation from Nov. 1994 to Oct. 2002. We analyzed 13 prognostic factors: age, disease duration, the pre-op JOA score, the pre-op AP canal diameter, the Pavlov ratio, disease level, the AP and lateral cord diameter, the transverse area and the compression ratio at the level of the maximal cord compression on MRI, the cord signal changes on MRI, the MEP (Motor evoked potential) and the gait analysis. The mean follow up period was 29 months. The clinical results were evaluated according to the JOA score. Statistical analysis was performed using the Pearson correlation test, ANOVA and the Kruskal-Wallis test.

**Results:** The mean pre-op JOA score was 11.1 and the post-op JOA score was improved to 14.7. The average recovery rate was 67%. The following factors were proved to an influence on the surgical outcomes: age and multiplicity of involvement, and the signal changes of the cord on MRI showed a negative correlation with the recovery rate. The pre-op JOA score, the mean sagittal diameter and the transverse area of the spinal cord at the level of maximum compression showed a positive correlation with the recovery rate. Spasticity on the gait analysis and central conduction block on MEP had an influence on the surgical outcomes.

**Conclusions:** The prognostic factors affecting the results of surgery for cervical myelopathy are age, the pre-op JOA score, the disease level, the mean sagittal diameter and the transverse area of the spinal cord at the level of maximum compression, signal change of the cord on MRI, spasticity on the gait analysis and central conduction block on MEP.

**Key Words:** Cervical spondylotic myelopathy, Prognostic factor, JOA score, Gait analysis, MEP

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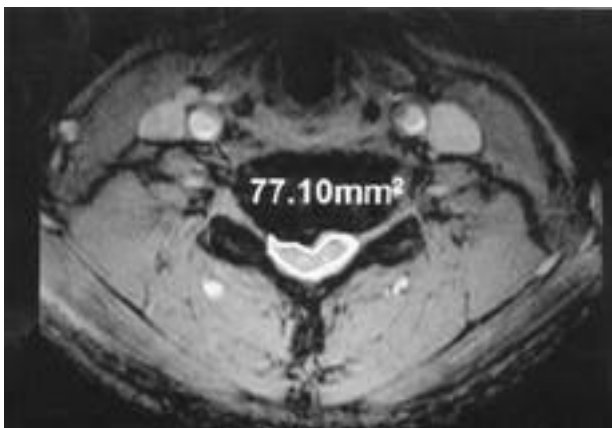
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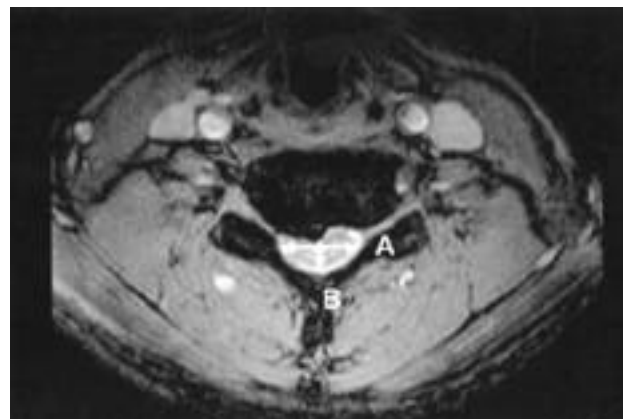
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가

Fujiwara<sup>1)</sup>  
가  
가 가 ,  
1994 11 2002 10  
가  
11가 59  
Kim <sup>2)</sup>  
JOA ,  
(Pavlov ratio),  
( ),  
가 ,  
Lyu <sup>3)</sup> 가  
가  
가 가  
가 가  
, De Mattei <sup>4)</sup> 가 가  
가 가 , Pavlov ratio 가  
PACS system  
가  
(Fig. 1).  
(compression ratio)  
(Fig. 2). T2  
가

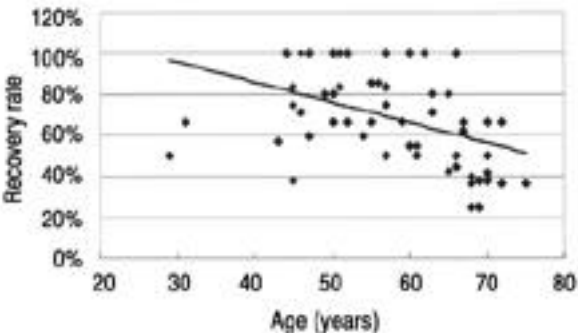


**Fig. 1.** Transverse area of the spinal cord.

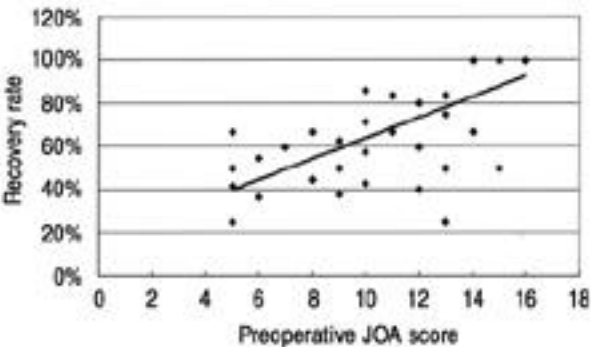


**Fig. 2.** Compression ratio = [sagittal diameter (B) / transverse diameter(A)] × 100(%).

59 38 21  
57 29  
29  
Hirabayashi 20 가  
Hirabayashi 2 Kurokawa  
5  
Hirabayashi  
가 3  
JOA 11.1 ± 3.3  
14.7 ± 2.3 67.0 ± 22.6  
57.0 ± 10.5 Pearson correlation  
coefficient -0.446  
가  
(p=0.000, Fig. 3). 28.3 ± 32.6  
가  
JOA 11.1 ± 3.3 0.683  
JOA 가  
(p=0.000)(Fig. 4).  
12.2 ± 1.5 mm , Pavlov ratio  
0.73  
( p=0.325, 0.156).  
1 가  
22 90.8 ± 12.2% 2  
11 75.5 ± 11.3%, 3 11  
55.7 ± 11.6%, 4 15 43.1 ± 12.5%  
Kruskal-Wallis method



**Fig. 3.** Correlation between age and recovery rate A negative correlation was observed between age and the recovery rate ( $r=-0.446$ ,  $p=0.000$ ).



**Fig. 4.** Correlation between preoperative JOA score and recovery rate. The preoperative JOA score showed significant correlation with the recovery rate ( $r=0.683$ ,  $p=0.000$ ).

Pearson correlation coefficient  $5.8 \pm 0.9$  mm  
0.702

(p=0.000).

,  
(p=0.000)(Fig. 5).

$15.0 \pm 2.3$  mm ,  
(p=0.170).

(compression ratio)  $39.2 \pm 8.4\%$   
(p=0.457).

$77.8 \pm 23.3$  mm<sup>2</sup>

0.462

(p=0.000)(Fig. 6).

T2

16

$82.57 \pm 19.01\%$  ,  
31

$70.1 \pm 22.8\%$ ,  
12  $49.5 \pm$

14.2%

가 ,

5 ,  
32 , 22 ,  
 $81.5 \pm 4.2\%$ ,  $73.5 \pm 26.6\%$ ,  $60.4 \pm 16.6\%$  .

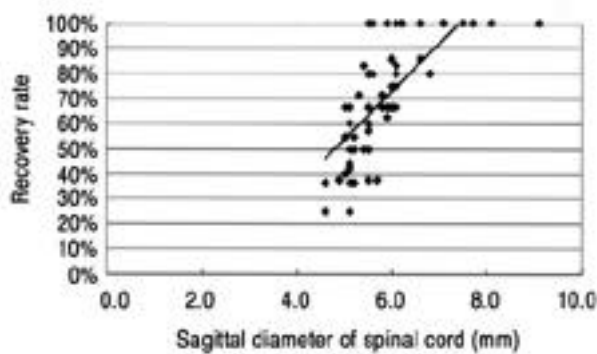
Kruskal-Wallis

(p=0.041), (r=-  
0.311, p=0.016)(Table 1).

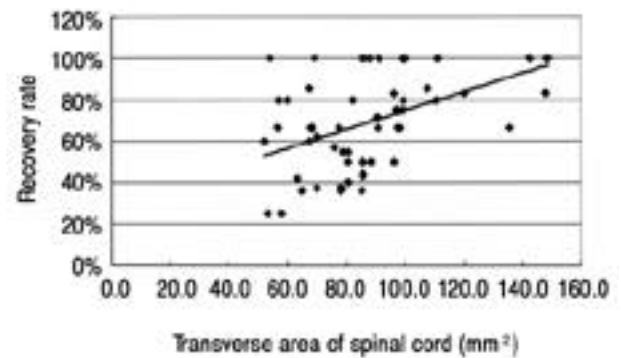
26 , 33 ,  
 $84.1 \pm 15.5\%$ ,  $57.6 \pm 21.3\%$  .

가

(p=0.000)(Table 2).



**Fig. 5.** Correlation between the sagittal diameter of spinal cord and recovery rate. The preoperative sagittal diameter of spinal cord was correlated with the recovery rate (r=0.702, p=0.000).



**Fig. 6.** Correlation between the transverse area of the spinal cord and recovery rate. The preoperative transverse area of the spinal cord showed a positive correlation with the recovery rate (r=0.462 and p=0.000).

**Table 1.** Recovery rate according to motor evoked potential

MEP	No.	Recovery rate(%)
Normal	5	$81.5 \pm 4.2$
Central conduction delay	32	$73.5 \pm 26.6$
Central conduction defect	22	$60.4 \pm 16.6$

(r=-0.311, p=0.016)

**Table 2.** Recovery rate according to gait analysis

Gait	No.	Recovery rate(%)
Normal	26	$84.1 \pm 15.5$
Spastic	33	$57.6 \pm 21.3$

(t-test, p=0.000)







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1994 11 2002 10 59 (Pavlov ratio),

JOA

13

29 JOA 가 Pearson

Kruskal-Wallis test

JOA 11.1 14.7 67.0%

JOA

JOA

JOA

JOA

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