

O-7-8

Impact of T1 Slope as a Predictor of the Loss of Cervical Lordosis and Health-Related Quality of Life after Laminoplasty in Patients with Ossification of the Posterior Longitudinal Ligament

Jong-Hwan Hong¹, Jung-Kil Lee¹

¹Chonnam National University Hospital, Neurosurgery, Gwangju, South Korea

Title: Impact of T1 Slope on Cervical Lordosis and HR-QoL after Laminoplasty for OPLL

Background: Laminoplasty treats cervical OPLL, aiming to decompress the spinal cord. Success hinges on cervical alignment, with loss of cervical lordosis (LCL) affecting outcomes. The link between preoperative radiologic parameters, like T1 slope, and health-related quality of life (HR-QoL) post-surgery, is not fully established.

Research Question: The study examines preoperative predictors of LCL and their impact on HR-QoL post-laminoplasty in OPLL patients.

Design: A retrospective study on 109 patients assessed the correlation between preoperative parameters, LCL, and HR-QoL.

Methods: Analysis included demographics, radiologic parameters, and PROMs, employing statistical tests to identify LCL predictors and their clinical effects.

Results: We analyzed the data of 109 patients (92 men, 17 women; mean age, 60.31 ± 10.80 years). A higher T1 slope (T1S) (odds ratio [OR], 1.420; $p < 0.001$), a lower extension ratio (OR, 0.883; $p = 0.019$), and a higher pelvic incidence minus lumbar lordosis (PI – LL) increased the risk of LCL (OR, 1.091; $p = 0.023$, Table 1). T1S was an excellent predictor of LCL, with a cut-off value of 28° ($p < 0.001$, area under the curve = 0.918). Furthermore, T1S was the only factor associated with HR-QoL after laminoplasty ($r = -0.368$, $p < 0.001$, Table 2).

Discussion: This study investigates the implications of loss of cervical lordosis (LCL) on outcomes post-laminoplasty, highlighting suboptimal results in patients with kyphosis versus controls. It emphasizes the significance of preoperative parameters like T1 slope, extension ratio, and PI-LL in predicting LCL. Notably, high T1 slope was associated with worse postoperative LCL, impacting health-related quality of life (HR-QoL). The research underscores the complex interplay between cervical sagittal alignment and surgical outcomes, advocating for further prospective studies to validate these findings.

Fig. 1**Table 1. Logistic regression results of risk factors for LCL after laminoplasty**

	Univariate analysis		Multivariate analysis	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Age	0.986 (0.944-1.029)	0.511		
BMI(kg/m ²)	1.075 (0.949-1.217)	0.255		
Operation method		0.130		
ODL	0.366 (0.100-1.343)			
MSL	Ref.			
Decompression level	0.997 (0.479-2.079)	0.995		
K-line		0.705		
Positive	Ref.			
Negative	0.808 (0.268-2.435)			
CLA	1.056 (1.003-1.111)	0.038*	0.944 (0.859-1.039)	0.240
T1S	1.421 (1.223-1.651)	<0.001*	1.420 (1.184-1.701)	<0.001*
Flexion capacity	1.048 (1.000-1.099)	0.051	0.962 (0.870-1.064)	0.449
Extension capacity	0.886 (0.820-0.958)	0.002*	1.144 (0.961-1.361)	0.131
Extension ratio	0.935 (0.904-0.966)	<0.001*	0.883 (0.796-0.980)	0.019*
CGH-C7 SVA	1.001 (0.978-1.024)	0.942		
C7 SVA	1.009 (0.995-1.024)	0.211		
PI-LL	1.075 (1.022-1.131)	0.005*	1.091 (1.012-1.176)	0.023*

LCL, loss of cervical lordosis; BMI, body mass index; ODL, open door laminoplasty; MSL, midline splitting laminoplasty; K-line, kyphosis-line; CLA, cervical lordotic angle; T1S, T1 slope; CGH-C7 SVA, center of gravity of head to C7 sagittal vertical axis; SVA, sagittal vertical axis; PI-LL, pelvic index minus lumbar lordosis; OR, odds ratio; CI, confidence interval; Ref, reference.

* Statistically significant.

Fig. 2**Table 2. Multivariate logistic regression results of risk factors for low HR-QoL**

Variable	Δ EQ5D index		
	Unstandardized coefficient (β)	Standardized coefficient (β)	p-value
T1S	-0.010	-0.336	0.002*
Extension ratio	0.001	0.123	0.183
PI-LL	-0.001	-0.074	0.423

HR-QoL, health related quality of life; Δ , Final follow-up minus Preoperative; EQ5D, European Quality of Life Five Dimension; T1S, T1 slope; PI-LL, pelvic incidence minus lumbar lordosis.

* Statistically significant.