Can Laminoplasty Maintain the Cervical Alignment even when the C2 Lamina is Contained?
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INTRODUCTION: Decompression of the C1 and/or C2 lamina is often mandatory in elderly patients, in congenital stenosis or with meandering spinal curves. But no prior study has ever shown whether the cervical alignment is maintained even when the laminoplasty includes the C2 lamina and subaxial laminae.

METHODS: Seventy-two patients with cervical spondylotic myelopathy underwent laminoplasty. The films and charts were reviewed and the outcome was assessed by the motor function scores of the upper/lower extremities for cervical myelopathy made by the Japanese Orthopaedic Association (upper/lower m-JOA scores). Mean patient age at surgery was 60.0 years (26-83 years) with a preoperative period of 3.0 years (2 months-17 years) from onset. Follow-up averaged 4.0 years (2-11 years). Patients were stratified into three groups depending on the handling of the C2 lamina. In eighteen cases, a C2 lamina was fully split (S group). In twenty cases, a C2 dome-like laminotomy was performed (D group). In thirty-four cases, a subaxial laminoplasty was performed with the C1 and C2 laminae kept intact (I group). Age at surgery averaged 59.7±15.0, 64.1±10.5, and 58.1±10.8 years, respectively. Symptom duration averaged 3.0± 3.3, 2.0± 2.5, and 3.5±4.1 years, respectively. Change of the C2/7 angle of each group was compared by ANOVA and post-hoc test with the significance level of 0.05. The C2/7 angle change or postoperative C2/7 angle were analyzed for correlation with the postoperative upper/lower m-JOA scores.
RESULTS: Including all patients, the C2/7 angle averaged 19.9±12.6 degrees preoperatively and decreased to 15.8±14.8 degrees postoperatively. The angle decreased in all three groups: S group (split); 8.3±11.0 degrees, D group (dome); 5.2±8.8 degrees, I group (intact); 1.5±8.2 degrees, respectively. The S group significantly lost cervical alignment compared to the I group (p<0.05). Five patients had kyphosis preoperatively and three others developed this condition. Postoperative C2/7 angle change and the postoperative C2/7 angle had no significant correlation with the postoperative m-JOA score of upper/lower extremities (upper: p=0.18, lower: p=0.08).

Fifty-seven patients (79 percent) improved more than one point either in upper or lower m-JOA score. The upper m-JOA score increased three points in four patients, two points in 18, and one point in 28, but 25 patients had no change. Average upper m-JOA score increased from 2.4±0.9 to 3.4±0.8 (p<0.0001). Preoperatively, the S group had a lower upper m-JOA score compared to the I group, but all groups improved with no statistical difference. The lower m-JOA score increased three points in two, two points in 17, and one point in 26, but 27 patients did not change. Average lower m-JOA increased from 2.0±0.9 to 2.9±1.1 (p<0.0001). The score changes between the three groups were not statistically different.

CONCLUSION: Postlaminectomy kyphosis that can deteriorate the surgical result is a serious concern. Destruction of facet joints or joint capsule can follow kyphosis, and ligaments and muscles are regarded as restraints against flexion force. Our laminoplasty technique could retain cervical alignment at the subaxial level, but it could not prevent loss of this alignment when the C2 lamina is contained.