

Abstract #635.docx

Biomechanical evaluation of the suture anchors used in cervical laminoplasty

Objectives.

Recently, the use of suture anchors to stabilize elevated laminae has been popularized in laminoplasty. To determine the validity of using suture anchors in laminoplasty, the mechanical loads and the pullout strengths of suture anchors when they were used in laminoplasty were determined.

Methods. Six intact fresh frozen cadavers were used. Open-door laminoplasty with a hinge on the cadaver's left side was performed on levels C3-C7. Elevated laminae were stabilized by suture anchors equipped with strain gauges, which were placed on C3, C5, and C7 left lateral masses. After incision was closed, the cervical spine was manually loaded passively to the full ROMs and the mechanical loads on each suture anchor during each motion were measured. Then, the incision was opened again, and suture anchors were placed on remaining lateral masses, right C3-C7, left C4, and left C6. Pullout strengths of 60 suture anchors were measured.

Results. The full ROMs were 39.9, 32.8, 51.8, 52.7, 24.0, and 22.6 degrees for flexion, extension, right rotation, left rotation, right bending, and left bending, respectively. The maximum load was 14.9 N measured during in left rotation. The loads during left rotation and left bending were significantly higher than those during the respective motion to the right at all levels, except in rotation at C3. Most of suture anchors were pulled out, however, the others were broken. The mean failure load of suture anchors was 131.7 N.

Conclusions. The maximum load on the suture anchors was one order of magnitude lower than the mean failure load. This may support the validity of using suture anchors in laminoplasty, although the loads during active motion may be higher than our results. Biomechanical laterality was demonstrated, reflecting the asymmetrical nature of open-door laminoplasty.