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The OC2 angle determines the hyoid bone position and the stiffness of the infrahyoid muscles in anterior cervical spine surgery

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Title: The OC2 angle determines the hyoid bone position and the stiffness of the infrahyoid muscles in anterior cervical spine surgery

Background: Anterior cervical spine surgery is generally performed with the cervical spine in extension, but it is important to pay attention to the tension of the anterior cervical soft tissues and the position of the hyoid bone.

Research question: The purpose of this study was to investigate the factors that determine the stiffness of the infrahyoid muscles and the hyoid bone position in the surgical position for anterior cervical spine surgery.

Design: A retrospective study.

Methods: Subjects were 67 cases of anterior cervical spine surgery (mean age 63.0 years, M44:F23) performed between August 2020 and October 2024. The surgical procedures included ACDF in 26 cases, ACCF in 44 cases, Hybrid ADF in 13 cases, TDR in 4 cases, and OALL resection in 2 cases, with an average of 2.6 fused segments (range 1-4). In the intraoperative position with cervical extension using a neck pillow, the stiffness of the infrahyoid muscles was measured by shear wave elastography (ARIETTA 750VE, Fujifilm Corporation) as an index of anterior cervical soft tissue tension. Intraoperative cervical alignment parameters including the O-C2 angle, C2-7 angle, and hyoid bone position (defined as b/a; on the posterior edge line of the C3 vertebral body, a: C3 vertebral body height, b: distance between the upper edge of C3 and the intersection of the perpendicular line from the hyoid bone; the smaller the value, the higher the hyoid bone position) were measured and analyzed along with patient background factors (age, gender, BMI, disease).

Results: The values of each parameter were as follows: shear wave elastography mean Vs value (m/s): 2.73 ± 0.66 , O-C2 angle: $26.3 \pm 7.8^\circ$, C2-7 angle: $20.7 \pm 10.7^\circ$, hyoid bone position: 2.05 ± 0.6 . Univariate analysis of the stiffness of the infrahyoid muscles showed a positive correlation with the O-C2 angle ($r=0.35$, P

Fig. 1

