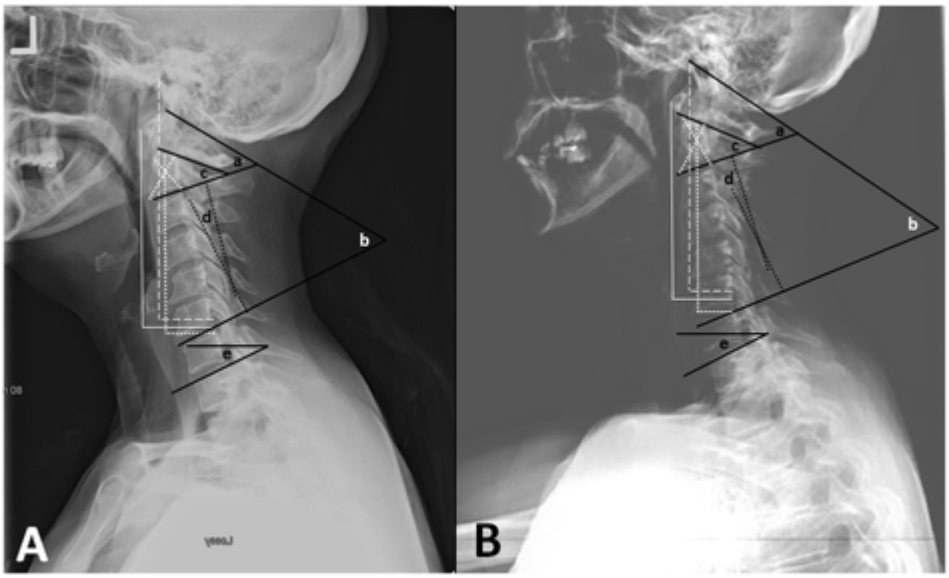
C1-C2 sagittal Cobb angle



Cervical lateral radiograph; b Detail of 36-inch lateral radiograph showing measurements a. Occiput-C2 sagittal Cobb angle, b. Occiput-C7 sagittal Cobb angle, c. C1-C2 sagittal Cobb angle, d. C2-C7 sagittal Cobb angle, e. T1 tilt. Horizontal solid white line: C1-C7 Sagittal Vertical Axis - distance between plumb line dropped from anterior tubercle of C1 and posterior superior corner of C7; Horizontal white dotted line: C2-C7 Sagittal Vertical Axis—distance between plumb line dropped from centroid of C2 and posterior superior corner of C7; White dashed line: Center of Gravity-C7 Sagittal Vertical Axis—distance between plumb line dropped from anterior margin of external auditory meatus and posterior superior corner of C7.

Twenty-three patients who underwent C1 lateral mass screw (LMS)-C2 translaminar screw (TLS) and 29 who underwent C1 LMS-C2 pedicle screw (PS) fixation with ≥ 2 years of follow-up were retrospectively analyzed. Three-planar (sagittal, coronal, and axial) radiographic parameters were measured. Patient-reported outcomes (PROs) including the Neck Disability Index (NDI), Japanese Orthopaedic Association (JOA) score and the Short Form 36 Physical Component Summary (SF-36 PCS) were documented. Factors potentially associated with PROs were identified.

The radiographic parameters significantly changed postoperatively except the C1-2 midlines' intersection angle in the TLS group ($p = 0.073$) and posterior atlanto-dens interval in both groups ($p = 0.283$, $p = 0.271$, respectively). The difference in bilateral odontoid lateral mass interspaces at last follow-up was better corrected in the TLS group than in the PS group ($p = 0.010$). Postoperative PROs had significantly improved in both groups (all $p < 0.05$). Thereinto, NDI at last follow-up was significantly lower in the TLS group compared with PS group ($p = 0.013$). In addition, blood loss and operative time were obviously lesser in TLS group compared with PS group ($p = 0.010$, $p = 0.004$, respectively). Multivariable regression analysis revealed that a change in C1-C2 sagittal Cobb angle was independently correlated to PROs improvement (NDI: $\beta = -0.435$, $p = 0.003$; JOA score: $\beta = 0.111$, $p = 0.033$; SF-36 PCS: $\beta = 1.013$, $p = 0.024$, respectively), also age ≤ 40 years was independently associated with NDI ($\beta = 5.40$, $p = 0.002$).

Three-planar atlantoaxial instability (AAI) should be reconstructed by C1 LMS-C2 PS fixation, while sagittal or coronal AAI could be corrected by C1 LMS-C2 TLS fixation. PROs may improve after

atlantoaxial reconstruction in patients with chronic AAI. The C1-2 Cobb angle is an independent predictor of PROs after correcting chronic AAI, as is age ≤ 40 years for postoperative NDI [1].

1)
Pan Z, Xi Y, Huang W, Kim KN, Yi S, Shin DA, Huang K, Chen Y, Huang Z, He D, Ha Y. Independent Correlation of the C1-2 Cobb Angle With Patient-Reported Outcomes After Correcting Chronic Atlantoaxial Instability. Neurospine. 2019 Jun;16(2):267-276. doi: 10.14245/ns.1836268.134. Epub 2019 Jun 30. PubMed PMID: 31261466.

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