Cervical spine sagittal balance

- Three-dimensional gait analysis reveals differences in spinal balance and muscle activity during prolonged walking in patients with dropped head syndrome based on global spinal alignment
- The Influence of Cervical Ossification of the Posterior Longitudinal Ligament on Retro-odontoid Soft Tissue Thickness and Cervical Sagittal Balance
- Impact of T1 Slope Visibility on Cervical Sagittal Alignment: A Comparative Study of Radiographic Parameters According to T1 Slope Visibility
- Exploratory Cluster-Based Radiographic Phenotyping of Degenerative Cervical Disorder: A Retrospective Study
- The Impact of Atlantoaxial Intra-Articular Fusion on Cervical Spine Curvature and Sagittal Balance
- Paraspinal Muscle Parameters Predict Postoperative Sagittal Balance in Cervical Disc Arthroplasty: A Structural Equation Model Analysis
- Changes in cervical sagittal parameters and the impact on axial symptoms after two types of posterior single-door cervical decompression surgeries
- Response to the Letter to the Editor: Effect of core stabilization exercises on cervical sagittal balance parameters in patients with forward head posture: a randomized controlled trial in Egypt

Many factors interact with the cervical sagittal alignment and balance of the cervical spine. In terms of the normality of the measured parameters, the values vary widely in the reported literature. It seems that factors, such as age, sex, race, and methods for measuring can cause some disparity [1)]

A preponderance of the literature analyzing the correlation between sagittal imbalance and patient outcomes is focused on the thoracolumbar or spinopelvic region, with little attention paid to studying the cervical sagittal balance [2)].

Cervical sagittal balance has received increased attention as an important determinant of radiological and clinical outcomes.

Postoperative cervical sagittal alignment and balance were maintained after anterior cervical discectomy and fusion (ACDF) but deteriorated following cervical laminoplasty, especially in patients with preoperative center of gravity of the head-C7 sagittal vertical axis ≥40 mm. In these patients, neurological recovery after LAMP was unsatisfactory. LAMP is not suitable for degenerative cervical myelopathy patients with preoperative cervical sagittal imbalance [3)].

Cervical sagittal balance is a complex phenomenon, influenced by many factors, which cannot be described by cervical lordosis alone. Attention has been focused on the relationship between T1 slope, thoracic inlet angle, and cervical sagittal balance.

Neck tilt measurements were not influenced by position of the cervical spine. T1 slope was significantly influenced by flexion and extension of the neck. This puts the concept that Thoracic inlet angle (TIA) is a morphologic parameter into question. This information should be taken into consideration when analyzing lateral radiographs of the cervical spine for clinical decision-making [4)].

The surgical treatment of fixed cervical kyphotic deformity with myelopathy can be challenging. Although restoring sagittal balance and neural decompression via a combined anterior and posterior approach makes intuitive sense, the outcome of such a major undertaking must be weighed against the perioperative complications, comorbidities, patient expectations, and expected neurological improvement [5].

Parsing out the independent effects of surgical approach and sagittal balance is difficult in that sagittal balance seemed to play more of a role for patients undergoing posterior surgery, but the sagittal vertical axis (CSVA) was significantly greater both pre- and post-operatively in the posterior group. All of the correlation coefficients describing the relationship between CSVA and outcomes were less than 0.5, indicating relatively weak correlations. Most of the correlations were not statistically significant, and it is unclear if CSVA was not related to most outcomes or if the study was simply underpowered to detect the weak correlations.

It would have been helpful if the authors provided baseline characteristics for the CSVA > 40 mm and CSVA < 40 mm groups rather than simply the correlations between CSVA and baseline scores. It seems likely that the relationship between CSVA and symptoms is not linear, and there is likely a threshold above which sagittal imbalance is more likely to be symptomatic. This study certainly raises awareness about cervical sagittal balance, but given that many other factors such as age, comorbidities, severity of cord compression, duration and severity of symptoms, number of levels involved, degree of lordosis/kyphosis, and surgical approach also affect outcomes, this study does not allow for strong conclusions to be made about the role of cervical sagittal balance in CSM. Hopefully future studies with more patients and multivariate analysis will allow for better clarification of its role in determining outcomes.

Parameters

Cervical spine sagittal balance Parameters

Cervical spine deformity

see Cervical spine deformity.

1)
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[5)]

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