

Commentary

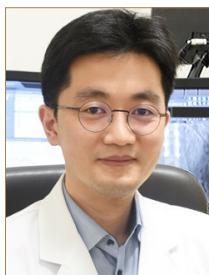


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See the article “Cervical Inclination Angle: Normative Values in an Adult Multiethnic Asymptomatic Population” via <https://doi.org/10.14245/ns.2244892.446>.



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Commentary on “Cervical Inclination Angle: Normative Values in an Adult Multiethnic Asymptomatic Population”

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The incidence of adult spinal deformity (ASD) increases with age. The current incidence of spinal deformity ranges from 29% in adults aged up to 54 years to more than 65% in adults aged ≥ 65 years.¹ A better understanding of the sagittal alignment of the spine allows for comprehensive surgical planning for ASD. This is the key to achieving optimal surgical alignment and improving results.² A recent study of ASD postoperative outcomes reported high complication (8.4%–42%) and mortality (9%–17.6%) rates.³

The roles of the craniocervical complex (CCC) and upper thoracic spine have rarely been analyzed as mechanical complications of ASD. Cerpa et al.⁴ recently suggested that a posterior skull plumbline in front of the instrumented upper spine on postoperative standing radiography may be a risk factor for proximal junctional kyphosis (PJK). Passias et al.⁵ reported that age-adjusted alignment goals and distal inclination angle are important parameters for distal junctional kyphosis in cervical deformity surgery. Le Huec et al.⁶ reported on the cervical inclination angle (CIA) in 2018, a new angle proposed to analyze the role of CCC in global spinal alignment and PJK risk. CIA was defined as the angle between the center of the dentate process, the midpoint of each thoracic upper endplate, and a horizontal line starting at the center of each thoracic endplate. They analyzed, based on ergonomics, that the thoracic and cervical spine should be aligned and have a small anterior lever arm to maintain sagittal alignment and reduce strain on the spinal muscles. For every 1-cm forward displacement of the line of gravity, a bending moment of +3.5 Nm occurs. This increases the risk of spinal and intervertebral disc injuries.

Le Huec et al.⁶ reported that the CIA is the angle whose mean value varies little between T1 and T5 (74.9°–76.85°) and gradually increases from T6 to T12. The T1–5 vertebrae always align within each participant’s thoracic vertebrae and can be viewed as linear T1–5 segments. The vertical slope of the T1–5 segment is correlated with the C7 slope. They analyzed the normative value of the CIA angle in an adult asymptomatic multiethnic cohort. A total of 468 asymptomatic adult patients were included in this study (176 Caucasian, 119 Japanese, 91 African American, 80 Arab-Berber, and 81 Asian).⁷ The mean overall CIA value was $80.12^\circ \pm 2.8^\circ$, while the maximum difference between all thoracic vertebrae was 9° (minimum T5 = 77.05° ; maximum T12 = 86.05°).⁷ An analysis of the CIA every few decades

revealed a significant decrease after 60 years of age; however, it remained constant until 60 years of age and then decreased at all thoracic levels from a mean of 82.25° to 73.65°.7 Considering ethnicity, there were differences between the Arab-Berber and other groups. Arab-Berbers had a statistically lower mean CIA at each thoracic level.7

In this study, CIA was suggested as a factor related to mechanical complications after ASD.7 Thoracic kyphosis (TK) is known to increase with age due to degeneration of the intervertebral discs and decreased spinal wedge and paraspinal muscle strength.6 An increase in TK corresponds to a major C7 tilt and anterior displacement of the trunk, resulting in a larger odontoid-hip axis angle and a larger odontoid-thoracic distance.8 As the torso moves forward, the bending moment increases, increasing the risk of spinal fractures or PJK.6 In the future, more research on the relationship between CIA and clinical results is needed; if this is proven, it is expected to be a meaningful parameter for ASD surgery.

- **Conflict of Interest:** The authors have nothing to disclose.

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