

Chin incidence: a novel predictor of Cervical sagittal alignment

Background: Cranio-cervical connection is a well-established biomechanical concept. However, literature of this connection and its impact on cervical alignment is scarce. Chin incidence (CI) is defined as a complementary to the angle between chin tilt (CHT) and C2 slope (C2S) axes. This study aims to investigate the relationship between cervical sagittal alignment parameters and CI with its derivatives.

Methods: A retrospective cross-sectional study carried out in a tertiary center. CT-neck radiographs of non-orthopedics patients were included. They had no history of spine related symptoms or fractures in cranium or pelvis. Images' reports were reviewed to exclude those with tumors in the c-spine or anterior triangle of the neck.

Results/ Discussion: A total of 80 patients was included with 54% of them were males. The mean of age was 30.96 ± 6.03 . Models of predictability for c2-c7 cobb's angle (CA) and C2-C7 sagittal vertical axis (SVA) using C2S, CHT, and CI were significant and consistent $r^2 0.585 (f(df3,76) = 35.65, P \leq 0.0001, r=0.764)$, $r^2 0.474 (f(df2,77) = 32.98, P \leq 0.0001, r=-0.550)$, respectively. In addition, several positive significant correlations were detected in our model in relation to sagittal alignment parameters. Nonetheless, models of predictability for CA and SVA in relation to neck tilt (NT), T1 slope (T1S) and thoracic inlet axis (TIA) were less consistent and had a significant marginally weaker attributable effect on CA, however, no significant effect was found on SVA $r^2 0.406 (f(df1,78) = 53.39, P \leq 0.0001, r=0.620)$, $r^2 0.070 (f(df3,76) = 1.904, P 0.19)$, respectively. Also, it was found that obesity and aging are linked to decreased CI which will result in increasing SVA and ultimately decreasing CA.

Conclusion: CI model has a more valid attributable effect on the sagittal alignment in comparison to TIA model. Future investigations factoring this parameter might enlighten its linkage to many cervical spine diseases or post-op complications (i.e., trismus).