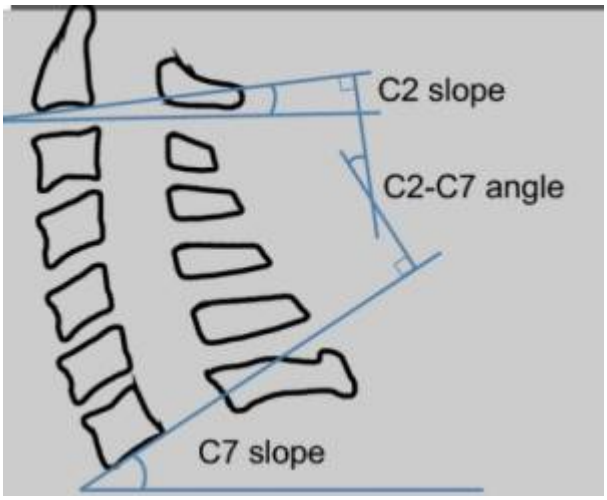
C7 Slope

Retrospective analysis of consecutive 45 radiographs and 120 kinematic magnetic resonance images (kMRI) OBJECTIVE.: The aim was to assess the visibility of C7 and T1 endplates on radiographs, and to verify the correlation between C7 or T1 slope and cervical balance parameters using kMRI.



Because the T1 slope is not always visible due to anatomical interference, several studies have used C7 slope instead of T1. However, it is still unclear whether the C7 endplate is more visible on radiographs than T1, and if C7 slope has similarity with T1 slope.

The endplate visibility was determined using weight-bearing radiography. Subsequently, using weight-bearing MR images, the C7 slope of upper and lower endplate, T1 slope, C1 inclination, C2 slope, atlas-dens interval (ADI), C2-C7 lordotic angle, cervical sagittal vertical axis (cSVA), cervical tilt, cranial tilt, neck tilt, thoracic inlet angle (TIA) were measured, for the analysis of correlation between three types of slopes and cervical balance parameters.

82% of the upper C7, and 18% of T1 endplate were clearly visible. The upper C7 endplate was significantly visible, whereas T1 endplate was significantly invisible (residual analysis, $p<0.01$). Linear regression analysis showed correlation between the upper C7 slope and T1 slope ($R=0.818$, $p<0.01$) and, lower C7 slope and T1 slope ($R=0.840$, $p<0.01$). T1 slope significantly correlated with neck tilt, TIA, C2-C7 angle, cSVA, cervical and cranial tilt, but not with the C1 inclination, C2 slope, and ADI. Upper and lower C7 slopes showed the close resemblance with T1 slope in terms of correlation with those parameters.

Both, upper and lower C7 slope correlated strongly with T1 slope and showed similar relationship with cervical balance parameters as T1 slope. Therefore, C7 slope could potentially substitute T1 slope, especially upper C7 slope due to the good visibility [1)].

1)
Tamai K, Buser Z, Paholpak P, Seesumpun K, Nakamura H, Wang JC. Can C7 Slope Substitute the T1 slope? An Analysis Using Cervical Radiographs and Kinematic MRIs. Spine (Phila Pa 1976). 2017 Aug 1. doi: 10.1097/BRS.0000000000002371. [Epub ahead of print] PubMed PMID: 28767624.