

Study design. Retrospective cross-sectional study. Objective. The aim was to describe existing global sagittal alignment parameters across ages and to analyze differences according to gender and pelvic incidence (PI). Summary of background data. Variability with age has been reported. It remains unclear how gender and spinopelvic morphology could additionally influence global alignment parameters. Methods. Radiographs of 2599 individuals (5-93 years) were analyzed. Translation parameters were: Sagittal Vertical Axis (SVA)-C7, SVA-C2, SVA-Center Acoustic Meatus (CAM), C7/Sacro-Femoral Distance (SFD) ratio. Inclination parameters were: C7-, T1- and T9-Vertical Tilt (VT), Odontoid-Hip Axis (OD-HA), OD-CAM. Pelvic compensation parameters were: T1-Pelvic Angle (TPA), Global Tilt (GT), Spino-Sacral Angle (SSA). Global sagittal alignment (GSA) was considered among formulae. The distribution of parameters was analyzed using a Bayesian inference. Correlations with spinopelvic parameters were investigated. Results. SVA-C7, SVA-C2, SVA-CAM were larger in males and high PI, and increased significantly after 50 years ( $Pr > 0.9999$ ). C7/SFD decreased during growth and was larger in low PI ( $Pr = 0.951$ ). There was no correlation with spinopelvic parameters. Age-related variations of inclination parameters were non-significant. T1-VT and T9-VT increased with PI and were significantly larger in high PI ( $Pr > 0.95$ ). C7-VT was significantly larger in low PI ( $Pr > 0.9999$ ). OD-HA and OD-CAM were constant and increased after 80 years. TPA and GT increased with PI ( $Pr > 0.9999$ ) and age after 35 years ( $Pr > 0.9999$ ). SSA decreased non-significantly after 50 years. TPA correlated with PI ( $\rho = 0.6130$ ) and pelvic tilt (PT) ( $\rho = 0.8375$ ). GT correlated with PI ( $\rho = 0.5961$ ) and PT ( $\rho = 0.8996$ ). SSA correlated with sacral slope ( $\rho = 0.9026$ ). GSA was larger in high PI ( $Pr > 0.9999$ ) and increased after 35 years ( $Pr > 0.9999$ ). GSA correlated with PT ( $\rho = 0.7732$ ). Conclusion. Translation parameters increase with age, more prominently in males and high PI. Variations of inclination parameters are smaller. Pelvic compensation parameters and GSA increase with age and are closely related to PT and spinopelvic morphology.

