Individual and contextual characteristics as determinants of sagittal standing posture: a population-based study of adults.

Fábio Araújo, Raquel Lucas, Nuno Alegrete, Ana Azevedo, Henrique Barros

**Background:** Sagittal standing posture was shown to be associated with musculoskeletal symptoms and quality of life in patients of heterogeneous clinical settings. However, the frequency and determinants of suboptimal sagittal alignment outside the clinical context remain to be clarified. **Objectives:** To estimate the association of sociodemographic, anthropometric and behavioral characteristics with sagittal standing posture among adults from the general population. **Methods:** As part of the EPIPorto study, 489 adults were assessed during 2005-2008. Individual spinopelvic parameters were recorded from 36-inch sagittal radiographs obtained in free-standing posture. Additionally, participants were classified into 1 of 4 types of sagittal postural patterns as proposed by Roussouly (types 1, 2 and 4 corresponding to non-neutral postures and type 3 to a neutral one). Data regarding age, sex, education, occupation, body mass index (BMI), waist circumference, total physical activity, leisure-time physical activity, time spent in sitting position, smoking status and tobacco cumulative exposure were collected. Individual parameters and patterns of sagittal posture were compared across categories of participants' characteristics. **Results:** Older age, lower formal education, blue collar occupation, and overall and central obesity were associated with increased sagittal vertical axis and pelvic-tilt/pelvic-incidence ratio. Taking the neutral postural pattern (type 3) as reference for the outcome in a multinominal regression model, independently of age, sex, education, total physical activity and smoking status, overweight adults had higher odds of type 2 (odds ratio [OR]=1.92) and type 4 (OR=2.13) postural patterns, in comparison to normal weight subjects. Overall and central obesity were positively related with type 1 postural pattern (OR=6.10 and OR=3.54, respectively). There was also a weak direct association between female sex and a type 1 postural pattern. Regarding behavioral factors, subjects with total physical activity above the first tertile exhibited all non-neutral postural patterns less frequently, and current smokers were more likely to present a type 4 postural pattern. **Conclusions:** Higher BMI and central obesity were important potential determinants of non-neutral posture among adults from the general population.
Strategies focused on reducing adiposity are expected to prevent all non-neutral pathologic standing postures at a population level.
Sagittal standing posture and quality of life among adults from the general population: a sex-specific association

Fábio Araújo, Raquel Lucas, Nuno Alegrete, Ana Azevedo, Henrique Barros

**Background:** Clinical studies have shown the association of sagittal standing posture with pain and reduced quality of life, but this relation has not been assessed in the general adult population. **Objectives:** To analyze the relation of sagittal standing posture with back pain severity and health-related quality of life among men and women from the general population. **Methods:** As part of the EPIPorto population-based study of adults, 178 men and 311 women were evaluated during 2005-2008. Age, education and body mass index were recorded. Radiographic data collection consisted of 36-inch sagittal radiographs obtained in free-standing posture. Sex-specific thirds of individual spino-pelvic parameters were computed and 1 of 4 sagittal types of postural patterns attributed to each participant (Roussouly classification). Back pain prevalence and severity were assessed based on self-reported data and health-related quality of life using 2 main components of the Short Form 36 (SF-36). **Results:** In men, only pelvic-tilt/pelvic-incidence ratio was significantly associated with back pain severity. Women in the 1st and especially in the 3rd third of pelvic incidence and sacral slope presented higher prevalence of and more severe back pain. In women, sagittal vertical axis, pelvic tilt and pelvic-tilt/pelvic-incidence ratio were directly associated with back pain severity, also showing an inverse dose-response relation with the physical component of SF-36 (highest z-score mean difference of 8.8 between the 1st and 3rd thirds of sagittal vertical axis; p<0.001). **Conclusions:** Sagittal standing posture was not consistently associated with pain and quality of life among men. Pelvic incidence and sacral slope outside neutral ranges, increased sagittal balance, pelvic tilt and pelvic retroversion may be involved in causing severe back pain and consequently decreased quality of life among women.