A QUANTITATIVE INVESTIGATION OF THE TRUNK GEOMETRY IN DIFFERENT SITTING POSITIONS AS COMPARED TO THE CORRECT STANDING POSTURE

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Introduction

Prolonged sitting in unfavourable postures is considered a frequent cause of back pain. Exercise programs try to stimulate a biomechanically more favourable sitting behaviour. Their scientific basis is most often questionable, however. The curvature of the spine is considered to play a major role in this context. While the curvature of the spine in upright standing position has frequently been examined in the past, only few comparable data have been elaborated for sitting postures. [Endo, 2012]

Methods

In our study we have investigated in 100 subjects various postures: maximal kyphotic and maximal lordotic sitting as well as relaxed and self-corrected upright sitting. Using the Spinal Mouse® Measurement System (IDIAG) we acquired comprehensive data of the curvature of the thoracic and lumbar spine, of the pelvic tilt and of the inclination of the trunk. The results obtained were compared with the corresponding data of correct standing.

Results

Some of the results confirmed our previous expectations, in particular as to the total kyphotic curvature pattern of the spine in maximal kyphotic sitting and the reduction of the trunk inclination during trunk erection. Some other results were rather unexpected, e.g. the finding, that in self-corrected upright sitting the spinal curvatures observed were less pronounced than those measured in upright standing. The observation that the lordosis in maximal lordotic sitting exceeds the lordosis in corrected standing only by a few degrees had not been expected, too. It was also observed that in self-corrected upright sitting the range of the results obtained in our measurements was significantly narrower than those obtained in correct standing.

Discussion

We conclude from our observations that the subjective correction of the sitting posture is a rather clearly defined body movement task in all individuals. Moreover, our results show that the biomechanics of trunk posture control in sitting is significantly different from that in the standing posture. The curvature of the spine observed in the standing position of an individual can, therefore, not readily be considered a model for the postural adjustment in sitting.

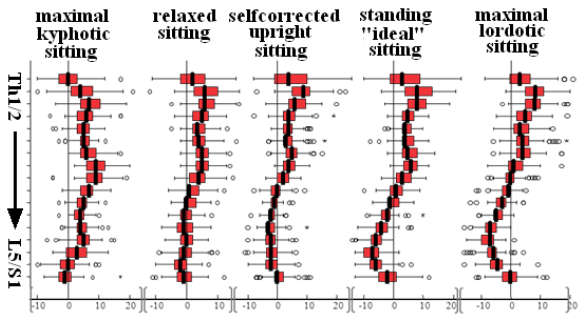

Figure 1: Group averages (n=100) of measured spine curvatures in various sitting postures.

References

Endo K, Suzuki H, Nishimura H, Tanaka H, Shishido T, Yamamoto K, J Orthop Sci., 17(6):682-6, 2012