The influence of seat adjustment and a thoraco-lumbar-sacral orthosis on the distribution of body-seat pressure in children with scoliosis and pelvic obliquity

Authors: Yehudit Shoham[1]; Shirley Meyer[2]; Michal Katz-Leurer[2]; Patrice (Tamar) Weiss[3]

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Abstract:

Purpose: To determine the effect of a thoraco-lumbar-sacral orthosis (TLSO) on the distribution of body-seat interface pressure in children with concomitant scoliosis and pelvic obliquity and to determine the effects of two methods commonly used in customized seating--elevation (push up) of the lower side of the pelvis or a wedge insertion beneath the raised pelvis--on the distribution of body-seat interface pressure.

Methods: The study population comprised 15 children with an underlying neuromuscular disorder. All had scoliosis and pelvic obliquity when seated, and used a TLSO during sitting. Body-seat interface pressure was measured using the QA Pad. Maximum pressure, mean pressure and contact area were recorded at baseline and at 10° 'push up' and 10° wedge insertion, with and without the TLSO. X-rays were performed with and without the orthosis at baseline position.

Results: The TLSO reduced the scoliosis deformity by a mean of 5.3 degrees and significantly ($p < 0.05$) reduced the mean pressure and contact area in the sub-group of patients whose pelvic obliquity was contralateral to the side of the curve. Seat adjustment did not have any significant effect on pressure readings.

Conclusion: Application of a TLSO in a child with scoliosis and contralateral pelvic obliquity significantly reduced the spinal curvature and interface sitting pressure. Manipulation of sitting by use of wedges under the pelvis had no significant effect on pressure distribution.

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