

COMPARISON OF THREE LUMBAR ORTHOSES USING MOTION ASSESSMENT DURING TASK PERFORMANCE.

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STUDY DESIGN: Four conditions (three orthoses, one no orthosis), full cross-over, randomized order, 12 subjects tested 3 months after a lumbar surgical arthrodesis. **OBJECTIVES:** To assess whole torso and lumbar motions and comfort for each orthoses condition during performance of activities of daily living. **SUMMARY OF BACKGROUND DATA:** Previous noninvasive studies measured whole torso (not just lumbar) movement. Recent development of a low profile, flexible, strain-gauged device ("Lordosimeter") facilitated this study. **MATERIALS AND METHODS:** The Lordosimeter was taped to the skin along the midline of the lumbosacral region. Orthoses studied were Boston anterior opening, Aspen lumbosacral, and Cybertech. Specified activities of daily living were performed for each orthosis condition. Subject effort during the flexion/extension task was assessed by surface electromyography (EMG). Comfort was assessed by visual analog scale. **RESULTS:** There were no significant differences in EMG between orthoses. For lumbar flexion, trunk flexion, total lumbar motion, and total trunk motion, the mean values for Aspen and Boston (but not Cybertech) were significantly smaller than for no orthosis for most of the tasks and there were no significant differences between Aspen and Boston. The total lumbar motion allowed by each orthosis (averaged across tasks and relative to the no orthosis condition) was 81% for Aspen, 79% for Boston, and 97% for Cybertech. The comfort rating averaged across tasks was 2.24 for Aspen, 4.12 for Boston, and 3.92 for Cybertech (0 = very comfortable, 10 = very uncomfortable). Aspen was significantly more comfortable than Boston or Cybertech. Boston and Cybertech did not differ significantly. **CONCLUSIONS:** The Lordosimeter is useful for measuring lumbar motion during orthosis wear. The Aspen and the Boston orthoses provided significant flexion-extension motion restriction compared with no orthosis, but for almost all of the motion measures did not differ from each other. The Cybertech did not differ significantly from the no orthosis condition. The Aspen orthosis was rated significantly more comfortable than the Boston or the Cybertech.

SELECTED QUOTATIONS

Introduction

"The major objectives of lumbosacral orthosis use are to reduce low back pain¹⁻⁴ and to increase the likelihood of solid fusion development after surgical bone grafting across two or more vertebrae.⁵⁻⁷" (Pg. 2359)

"The Boston anterior opening orthosis...has been used by the senior author for a number of years for postoperative immobilization, but fitting of it generally requires more than one visit to a skilled orthotist and it can be uncomfortable for some patients. Fitting of the two orthoses selected for comparison in this study is simpler and can be performed in one visit. One of them [Aspen Lumbosacral Orthosis, Long Beach, CA] can be modified to optimize the fit by adjusting the lower edge and by bending the lumbar support rods to produce the desired amount of lumbar lordosis." (Pg. 2359)

Discussion

"In conclusion, for limiting lumbar motion, the Aspen LSO was found to be equal to the Boston orthosis and for comfort, the Aspen was found to be superior. Based on these findings, and on its ability to be fit and customized at the bedside, the Aspen LSO appears to be the orthosis of choice." (Pg. 2366)