

Effect of Lifting Belts, Foot Movement, and Lift Asymmetry on Trunk Motions

STEVEN A. LAVENDER,¹ *Rush-Presbyterian-St Luke's Medical Center, Chicago, Illinois*, JAMES S. THOMAS, *University of Illinois at Chicago, Chicago, Illinois*, and DENNIS CHANG and GUNNAR B. J. ANDERSSON, *Rush-Presbyterian-St Luke's Medical Center, Chicago, Illinois*

Whether or not lifting belts protect workers from injury is a topic of considerable interest in industry. Not only is the protective effect uncertain, but the biomechanical basis for belt function is unclear. The objective of this study was to determine if lifting belts provide a means for controlling trunk motions during asymmetric material-handling tasks. We recruited 16 nursing personnel as experienced lifters to participate in two lifting sessions. A lifting belt was worn in one session and for a week prior to this session during the subjects' routine work activities. Each session required 42 lifts, distributed across three asymmetry conditions (0, 45, and 90 deg) and temporally spaced 30 s apart. Foot motion was not permitted in half the lifts. Results indicated that during lifting, lateral bending and twisting motions were reduced by both the lifting belt and foot motion; the most pronounced effect was observed at 90 deg of asymmetry. Trunk motions in the sagittal plane during lifting were not affected by the lifting belt. These results appear to support the use of lifting belts in asymmetric lifting conditions, but more research is needed to determine whether the muscles in the torso benefit from the reduced motion or are working harder to overcome this resistance to motion, causing increased internal loads on the spine during asymmetric material-handling tasks.

¹ Requests for reprints should be sent to Steven A. Lavender, Department of Orthopedic Surgery, Rush-Presbyterian-St. Luke's Medical Center, 1653 W. Congress Pkwy., Chicago, IL 60612.