INTRODUCTION

The body of epidemiological data suggests that occupations with a heavy work classification carry risk of low back injury (Latza, Karmaus, Strurmer, et al. 2000). Asymmetric movement coupling and repetitive loading in flexion are considered to be components of undesirable functional working postures (McGill 1997, Marras 2000). Biomechanical analysis and literature guidelines suggest that occupational lumbo-sacral compressive forces exceeding 3433 Newtons (Marras, 2000) and anterior shear forces exceeding 500 Newtons (Yingling & McGill 1999) should be considered for workplace intervention. This research investigates the spinal force profiles of a sample of sheep shearers and investigates the effect of a commercially available back support (Warrie Back Aid™) on these force profiles.

METHODS

A cross-sectional kinematic and kinetic analysis of 12 experienced shearers was undertaken in an industry standard shearing shed. Anthropometric, survey and 3D Motion Analysis™ data were gathered in order to construct the parameters for analysis. Surface mounted retro-reflective markers placed on sufficient trunk parameters defined three linked segments; Pelvis, Lumbar and Head, Arms, Trunk (HAT). Markers were also placed on the back support to determine the kinematics of this device. A 3D, link segment, top down, inverse dynamics approach was used to construct the kinematic and kinetic profiles. Load cell data were gathered from the back support. Three specific shearing tasks were qualitatively defined and prioritised for primary analysis.

RESULTS AND DISCUSSION

The peak and mean spinal force profiles at the lumbo-sacral joint centre of this sample of shearers demonstrates considerable compressive (Figure 1) and shear forces (Figure 2) that are close to the described action limits across all three tasks. The use of the back support reduces these forces by substantial and highly significant amounts with the effect consistent across all three tasks.

SUMMARY

The results of this study indicate that sheep shearsers develop high levels of compressive and shear forces within the spine and that the use of a back support can substantially reduce these forces. Recommendations are made for further research, the shearing profession, and occupational health professionals.

REFERENCES