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Title: Quantifying risk assessment: Biomechanical analysis of musculoskeletal injury risk in an industrial setting.

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Introduction: Occupational Therapists working with industry are confronted with work related musculoskeletal disorders as the most common injuries sustained during manual handling tasks in heavy industry.

Therapists are involved in workplace assessment to assist injured workers return to work and for injury prevention. Risk assessments are used to assess and identify risk and propose control measures to reduce injury risk.

This study presents an innovative and evidence-based method for assessing musculoskeletal injury risk in an industrial setting.

Objectives: The purpose of the study was to conduct a comprehensive manual handling risk assessment of a range of tasks at the Carbon Plant of an Aluminium Smelter, using an evidence based method of risk assessment.

Methods: A modified Manual Task Risk Assessment (ManTRA) was used to integrate the following data: 1) digital video taken of workers performing specific tasks with biomechanical analysis; 2) force gauge measurements compared with Snook tables; and 3) worker surveys about task frequency and duration. Factors contributing to the inherent risks of tasks were identified, and recommendations for actions to control risk were prioritised.

Results: Results from the analysis in an industrial setting showed that six of eight tasks needed some re-engineering. The ManTRA identified four potentially hazardous tasks, with another two identified using the force measurements and the Snook tables. Biomechanical analysis confirmed that risk control actions were needed for two of these tasks.

Conclusions: Combining the ManTRA, force data and biomechanical analysis with the frequency and duration workers performed each task provided the most accurate and thorough assessment of overall risk. This risk assessment method enables workers, managers and health support staff to objectively identify tasks with greater injury risk for workers and prioritise risk control of these tasks.

Contribution to the practice/ evidence base of OT: This research builds upon the evidence base for risk assessment tools enabling occupational therapists to utilise evidence, a future and emerging trend, to sustain practice in the work environment.