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**BOOK OF
ABSTRACTS**

Symposium 2 - Longitudinal Analyses of Workplace Distal Upper Limb Disorders: Findings from the NIOSH Consortium Studies

S02-1

ASSOCIATIONS BETWEEN FORCE, REPETITION, POSTURE, DUTY CYCLE, THRESHOLD LIMIT VALUE FOR HAND ACTIVITY LEVEL (TLV FOR HAL) AND RISK OF CARPAL TUNNEL SYNDROME

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Carpal tunnel syndrome (CTS) is a costly disease for employers and a source of long-term disability to workers. Force, repetition, and deviated posture are commonly believed risk factors for CTS. The aim of this study was to quantify associations between workplace biomechanical factors and incidence of dominant-hand CTS after adjusting for personal risk factors.

2751 incident eligible workers were followed prospectively for up to 6.4 years and contributed 6243 person-years of data to this longitudinal study. Applied force, frequency and duty cycle of exertions, wrist posture, and ACGIH TLV for HAL were quantified for each worker and periodically remeasured throughout the study. Incident cases of CTS were determined from symptoms and electrodiagnostic studies. Hazard Ratios were estimated using proportional hazards regression. All models were adjusted for age, gender, BMI, and orthogonal physical exposures.

In the adjusted models, associations were found between CTS and peak force (HR=2.17; 95% CI 1.38 to 3.43), frequency of forceful exertions (HR=1.84; 95% CI 1.19 to 2.86), % of time spent in forceful exertions (HR=2.05; 95% CI 1.34 to 3.15), and the TLV for HAL as a continuous variable (HR=1.32 per unit; 95% CI 1.11-1.57). Conversely, statistical associations with increased risk of CTS were not found between total frequency of, or total % time under exertions, nor for deviated wrist postures.

These results suggest that peak force acts as an independent risk factor for CTS. However, frequency of exertion and % time under exertion are only associated with CTS when a non-trivial amount of force is being applied, thus "repetition" does not appear to be an independent risk factor per se. We found no evidence to suggest that hand/wrist posture is an independent risk factor for CTS.

S02-2

THE STRAIN INDEX AND RISK OF UPPER LIMB MUSCULOSKELETAL DISORDERS: RESULTS FROM THE WISTAH HAND STUDY

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The Strain Index (SI) is a widely used distal upper limb (DUL) physical exposure model that combines six putative risk factors (force, repetition, percent duration of exertion, hand/wrist posture, speed of work,