Punnett: Scholarly Interests and Key Publications

Work-Relatedness of Musculoskeletal Disorders (MSDs)
There has been substantial discussion in recent years of whether or not MSDs are causally associated with physical workload, whether dose-response curves can be defined, what proportion can be attributed to work demands, and how that should be partitioned between physical and psychosocial stressors. Some of this discussion occurred specifically in the context of OSHA’s attempt to establish an Ergonomics Standard to protect employees from work-related MSDs, which was ultimately unsuccessful. Challenges in interpreting the literature include the diversity of exposure assessment methods, definitions of endpoints, and other methodologic issues. We have also used international data to estimate that about 37% of low back pain world-wide could be attributable to working conditions.


Methods for Workplace Assessment
I am especially interested in the characterization of multiple job features in large epidemiologic studies and the role of work organization in explaining patterns of physical and psychosocial exposures. We were fortunate to have a large construction “laboratory” in Boston in the 1990’s: the “Big Dig,” i.e., the Central Artery/Third Highway Tunnel Project. In the Construction Occupational Health Project we developed the Posture, Activities, Tools and Handling (PATH) method and examined sources of variability in ergonomic exposures in highway construction. We have since continued to refine the PATH method and adapt it to other work settings, such as health care, agriculture, and manual material handling in the retail sector. These experiences have also informed an evolving overview of job analysis methodologies.

Physical Ergonomic Exposures:


Organizational Features of Work:


The Role of Working Conditions in Explaining Socioeconomic and Gender Disparities in Health

Differences between men’s and women’s patterns of injury and illness may in part reflect the effects of differences in occupation and thus in their working conditions. Women are over-represented in “light,” monotonous jobs that require precise, repetitive hand motions but high static loading of the neck and shoulder, with few opportunities for decision-making or job modification. Jobs at higher socioeconomic levels generally have lower physical workload and higher ‘job control.’ Perceptions of discrimination in the work climate may also contribute to psychosocial strain and impact on employees’ health and work outcomes (see also the UML Center for Women and Work, “Current Projects: Discrimination and Health”).


MSD Surveillance, Case Definitions, and Limitations of Reporting Systems
The characterization of musculoskeletal endpoints for epidemiologic studies is much debated. Administrative records such as workers’ compensation claims and OSHA 200 logs of injury and illness are easily available but typically underestimate the true frequency of work-related MSDs. Self-reported symptoms are highly sensitive and inexpensive to obtain, but it is difficult to measure their validity directly. The standard physical examination maneuvers, widely used in clinical practice, have uncertain sensitivity, specificity and reliability and may not reflect adequately all of the processes that cause pain. There is a need for more and better measures, both objective - to establish a more secure diagnosis - and subjective - for better description of impact on quality of life.


*Health-Related Selection out of the Workforce*

When people leave employment because of perceived hazards and/or health effects, this leads to under-estimates of work-related morbidity. Understanding these dynamics is important for correct interpretation of epidemiologic data and also to appreciate the externalized cost to workers of occupational health problems.


Musculoskeletal Disorders in Automobile Manufacturing

In a series of studies in the auto industry, we have documented multiple ergonomic exposures such as work pace, manual force, and non-neutral postures and their effects on musculoskeletal disorders (whether defined by administrative records, symptoms or physical examination). Methodological issues have included gender differences in exposure and morbidity; the magnitude of under-reporting in the OSHA log and compensation data systems; the extent of "healthy worker" selection effect in this population; and the validity of the psychophysical exposure ratings.


Work with Video Display Units


Selected Keynote and Other Invited Lectures


Where my former doctoral students and other advanced trainees are now:

Victor L. Paquet (graduated 1998) is now Associate Professor of Industrial & Systems Engineering and Rehabilitation Sciences at the University at Buffalo, The State University of New York. His dissertation was titled, “The assessment of ergonomic exposures in construction work.”

JungSoon Park (graduated 2000) now lives in Chicago, IL. Her dissertation was titled, “Ergonomic exposure assessment and musculoskeletal disorders in automobile manufacturing.”

Leslie A. MacDonald (graduated 2000) is a Research Industrial Engineer in the Industry-wide Studies Branch, Division of Surveillance, Hazard Evaluations, and Field Studies, National Institute for Occupational Safety and Health (NIOSH), in Cincinnati, OH. Her dissertation was titled, “Workplace stressors in mass production manufacturing: Exposure patterns and associations with upper extremity musculoskeletal disorders.”

Gerard Dybel (graduated 2000) is Associate Professor in the Department of Physical Therapy at U.Mass. Lowell. His dissertation was titled, “Ergonomic evaluation of work as home health care aide: Descriptive & epidemiological analysis.”

Kathleen Rockefeller (graduated 2002) is on the faculty in the Department of Physical Therapy & Rehabilitation Sciences, University of South Florida. Her dissertation was titled, “Evaluation of an ergonomic intervention in Washington State nursing homes.”
Judy Gold (graduated 2002) is Assistant Professor, Department of Public Health, Temple University, in Philadelphia, PA. Her dissertation was titled, “Indicators of upper extremity musculoskeletal disorders: Digital vibration threshold and infra-red thermography.”

Jenny (In-Chae) Ro (graduated 2004) now lives in Zurich, Switzerland. Her dissertation was titled, “Risk factors for musculoskeletal disorders among performing musicians.”

Angelo d’Errico (Research Professor, 2002-04) is Epidemiologist in the Servizio Sovrazionale di Epidemiologia, Grugliasco (TO), Italy.

SangWoo Tak (graduated 2005) is a researcher in the Division of Surveillance, Hazard Evaluations, and Field Studies, National Institute for Occupational Safety and Health (NIOSH), in Cincinnati, OH. His dissertation was titled, “Variability of mechanical exposures in the construction industry.”

Manuel Cifuentes (graduated 2006) is currently a post-doctoral research fellow in the Department of Work Environment, UML. His dissertation was titled, “Socioeconomic status and psychosocial working conditions in healthcare workers.”

Helena Miranda (Post-doctoral masters student, 2005-07) is now a Researcher in the Centre of Expertise for Health and Work Ability, Finnish Institute of Occupational Health, Helsinki, Finland.

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