The Evolving Role of Biomechanics in Prevention of Overexertion Injuries

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This paper describes occupational biomechanics as an evolving body of knowledge that has required not only a sophisticated development of fundamental biomechanical principles and human failure data, but also has required epidemiological information to enable a more complete understanding of how certain types of musculoskeletal injuries can be caused by specific physical work requirements. It also is argued that even with adequate biomechanical and epidemiological information, the ability to change working conditions and manual task requirements in companies required management and workers to become organized into formal ergonomics teams that could be trained and empowered to reduce the known biomechanical risk factors present in various jobs. It is demonstrated that in the last 35 years occupational biomechanics research continues to provide the intellectual machine that is driving development of important ergonomics guidelines. Despite these successes, however, some major limitations in contemporary biomechanics knowledge are discussed, particularly related to situations where high-speed motions and repetitions are involved. Finally, the evolving importance and limitations in occupational biomechanical simulation models for proactive ergonomics are presented.