

A Biomechanical Study of Work-Related Shoulder Disorders

Project Summary

Although the National Institute for Occupational Safety and Health (NIOSH) has identified a clear epidemiological link between repetitive arm motion and shoulder disorders in the workplace, there are few scientific data available regarding the biomechanics of this connection. Shoulder overuse injuries may initially manifest as diffuse shoulder pain, however, the vast majority reflect pathology of the rotator cuff tendons in the subacromial space. The long-term goal of our research agenda is to identify the important biomechanical mechanisms associated with work related rotator cuff injuries and subsequently develop intervention and prevention strategies that address these mechanisms. The objective of this application is to identify the link between the integrity of the rotator cuff mechanism and changes in joint motion. To accomplish this objective, we have developed two specific aims. Our first specific aim is to establish the biomechanical response to high risk occupational work (dental hygienists). Our second specific aim is to establish the biomechanical response to diminished rotator cuff function (with a nerve block model). It is our expectation that the proposed research plan will identify the consequences of diminished cuff function observed in the workplace. These results will be significant because they represent the next step towards understanding the progression from fatigue and weakness to abnormal loading. Since there is strong evidence to support the concept that abnormal loading may lead to a progression from acute tendinitis to chronic rotator cuff tears, the results from this proposal will also serve as the basis for more effective workplace treatment and prevention strategies.

Relevance

In the United States, there are over 50,000 new cases of atraumatic occupational shoulder injuries reported annually, with an enormous financial impact due to utilization of healthcare services, lost workdays and worker disability costs. This proposal will help with our understanding of the mechanisms behind these injuries and will provide the basis for the development of appropriate treatment strategies in the future.