Priority Statement Title: Biomechanical Mechanisms and Sequelae of Tissue Injury

Priority Statement Code: (CJ3D)

Domain: Body/Joint/Tissue/Cell

Priority Statement

Background and Relevance

It is likely that all tissue injuries begin with a biomechanical insult. Tissue injury leads to altered joint loading patterns and, in some cases, functional limitations. There is a lack of objective data available regarding acute and chronic mechanics of tissue injury and the resulting adaptations that occur in the surrounding structures. Our lack of understanding and lack of effective intervention strategies may lead to a cascade of events that ultimately results in premature joint degeneration, progressive functional limitations and potential disability.

Addressing the fundamental gaps in our knowledge allows development of treatment and rehabilitation interventions that preserve joint function after injury and potentially mitigate risk for future disability.

Objectives

- In tissue, define acute response and chronic adaptation to injury.
- Characterize the acute and chronic joint adaptation(s) to acute tissue injury.
- Characterize biomechanical and biological factors that predispose individuals to subsequent tissue injury.
- Develop and validate novel tools that can be implemented in clinical settings that will direct treatment and quantify joint function.
- Encourage translation of these biomechanical concepts to the establishment of patient treatment algorithms.

Recommended Actions

1. Request RFAs for longitudinal studies to understand tissue and joint adaptation to injury as well as to create appropriate treatment interventions.
2. Request RFAs for long-term studies of joint properties that exceed the current five-year funding period.
3. Provide a list of device development needs to The Association of Biomedical Engineering Chairs, the Biomedical Engineering Society (BMES), the American Society of Biomechanics (ASB) and the industry liaison representative of the American Academy of Orthopaedic Surgeons (AAOS).