Priority Statement Title: High Fidelity Biomechanics of Pathological Movement

Priority Statement Code: CJ1G

Domain: Joint Function, Full Body

Priority Statement

Background and Relevance

Very valuable moment or muscle-actuated forward dynamic simulations of human movement are becoming more common. Nearly all gait simulations have been based upon global optimization, and the majority of the data sets that seed these simulations have derived from the conventional gait model. Induced acceleration analyses use a similar foundation for a multitude of other human activities. Inherent in these analyses are assumptions about expected degrees-of-freedom at normal anatomical joints. (Here, degrees-of-freedom include joint rotations and translations (i.e., sliding motions).) A need exists to foster development of techniques to characterize true pathological motion, as opposed to global optimizations based upon normal joints.

Objectives

Identify technologies that are currently available for high fidelity characterization of joint mechanics during functional tasks.
Identify technological gaps preventing high fidelity characterization of joint mechanics during functional tasks.
Use current technology to characterize pathological joint motion during functional tasks.
Develop new technologies to characterize pathological joint motion during functional tasks.

Recommended Actions

Through current or new funding mechanisms, support the development of techniques to provide high fidelity characterization of pathological joint mechanics during functional tasks.