Bone Fragility
The Material and Micro-architectural Basis and Mechanisms Responsible for Bone Fragility in Spinal Cord Injury in Men

Spinal cord injury leads to profound muscular atrophy, bone loss and bone fragility. This leads to an increased incidence of fractures, which can compromise quality of life, lead to further deterioration in bone quality and compromise rehabilitation. The lifetime risk for fracture in people living with SCI is double the risk relative to a non-injured healthy person.

Criteria for assessing fracture risk in the spinal cord injury population have yet to be defined. High Resolution peripheral quantitative computed tomography (HR-pQCT) provides a potential method for assessing factors other than bone mineral density that contribute to fracture risk. This study will use HR-pQCT in combination with other imaging and assessment techniques to gather comprehensive data related to the pathogenesis and structural basis of bone change after spinal cord injury. The study will recruit people with acute and longstanding SCI as well as healthy non-injured volunteers. It is hoped that the results of this study will provide new insights into possible approaches to preventing and reversing the structural decay in patients with spinal cord injury.

General Aim
To identify the pathogenesis, time course and severity of the material and microarchitectural abnormalities responsible for bone fragility in patients with acute and longstanding spinal cord injury (SCI).

Specific Aims
1. To quantify the time course of appearance of material and structural changes following acute paraplegia
2. To quantify the severity of material and structural abnormalities in patients with long standing (> 1 year) paraplegia
3. To correlate the changes in material/structure and measure serum remodeling markers and sclerostin to better understand the roles of reduced bone formation and/or increased bone resorption in the pathogenesis of structural decay.

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