

### Significant Loss of Skeletal Muscle Mass Occurs After Femoral Fragility Fracture

Aspen Miller,<sup>1</sup> John Davison,<sup>1</sup> Lisa Reider,<sup>2</sup> Jason Wilken,<sup>1</sup> Natalie Glass,<sup>1</sup> Tessa Kirkpatrick,<sup>3</sup> Cindy Headlee,<sup>3</sup> Daniel Fitzpatrick,<sup>4</sup> Erin Owen,<sup>3</sup> J Lawrence Marsh,<sup>1</sup> Michael Willey,<sup>1</sup> and Ruth Grossmann<sup>5</sup>

<sup>1</sup>University of Iowa Hospitals and Clinics; <sup>2</sup>John Hopkins University; <sup>3</sup>Slocum Research and Education Foundation; <sup>4</sup>Slocum Center for Orthopedics and Sports Medicine; and <sup>5</sup>University of Iowa

**Objectives:** Femoral fragility fractures in the elderly result in devastating loss of physical function and muscle mass, which is a direct result of immobilization and nutrient deficiencies during healing. A better understanding of how muscle mass responds to injury is needed to critically evaluate nutrition interventions designed to prevent muscle loss and optimize function. The purpose of this study was to document sarcopenia, nutrition status, and changes in muscle mass after femoral fragility fractures.

**Methods:** A two-center prospective observational study enrolled individuals  $\geq 65$  years old admitted for operative fixation of a low-energy femoral fracture. Body composition was assessed within 72 hours of admission using bioelectrical impedance and repeated 6 and 12 weeks after injury. Sarcopenia was defined by gender-specific cutoffs

for appendicular skeletal muscle mass index. Malnutrition was defined by Mini Nutritional Assessment<sup>®</sup>. Wilcoxon Signed Rank test was used to assess 6 and 12-week change from baseline in skeletal muscle mass (SMM). Wilcoxon Rank Sum test was used to compare the change in SMM in those with vs without malnutrition and sarcopenia. SMM results are presented as median (interquartile range).

**Results:** Thirty participants (27% male) age  $76.9 \pm 8.9$  years were enrolled. At baseline, 11 (37%) were sarcopenic, and 17 (59%) were at risk of malnutrition. SMM decreased 1.75 kg ( $-3.30$  to  $-0.40$ ,  $p < 0.001$ ) by 6 weeks post-injury. By 12 weeks, participants lost 3.04 kg of SMM ( $-4.49$  to  $-1.45$ ),  $p < 0.001$ . Participants with adequate baseline nutrition status lost more SMM at 6 weeks compared to those with at risk of malnutrition ( $-3.56$  kg ( $-4.65$  to  $-1.60$ ) versus  $-1.22$  kg ( $-2.00$  to  $-0.20$ ),  $P = 0.01$ ). No difference was observed in SMM loss between those with vs without sarcopenia at baseline.

**Conclusions:** Femoral fragility fractures result in devastating losses of skeletal muscle mass. Most were at risk of malnutrition, but participants with adequate baseline nutrition lost more muscle mass, indicating that future investigations of interventions to prevent muscle loss should focus on all fragility fracture patients regardless of nutrition status. These results highlight the need for further investigation into interventions to mitigate muscle loss after injury.

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