

Extensor Mechanism Injuries of the Knee: Patient Demographics and Comorbidities*Matthew R. Garner, MD; Elizabeth B. Gausden, MD; Marschall B. Berkes, MD;**Amelia Ni, BA; Dean G. Lorich, MD;**Hospital for Special Surgery, New York, New York, USA**New York Presbyterian Hospital, New York, New York, USA*

Purpose: Extensor mechanism injuries, defined as quadriceps rupture, patella fracture, or patellar tendon rupture, are common injuries. The purpose of this study was to describe and compare extensor mechanism injuries with regard to age, gender, comorbidities, and body mass index (BMI).

Methods: Patients greater than 16 years of age undergoing surgical management of extensor mechanism injuries were queried at two separate institutions from 1986-2012. Charts were reviewed retrospectively for age at time of surgery, gender, height, and weight. Patients with chronic disruptions of the quadriceps or patellar tendon, those undergoing revision surgery, and injuries in the setting of total knee arthroplasty were excluded. Continuous data was analyzed with one-way analysis of variance (ANOVA) and two-tailed *t*-test; categorical data were analyzed with χ^2 test.

Results: 750 patients were included: 427 (57%) patella fractures, 222 (29.5%) quadriceps ruptures, and 101 (13.5%) patellar tendon ruptures. 67% of all patella fractures were in females while 86% of quadriceps ruptures and 84% of patella tendon ruptures occurred in men ($P < 0.001$). Females were 12.7 times more likely to sustain a patella fracture rather than a tendon injury compared to men. Age distribution was also significantly different between the groups with quadriceps tendon ruptures averaging 61.1 ± 12.8 years (range, 20-92), patella fractures averaging 56.3 ± 17.4 years (16-91), and patellar tendons averaging 41.1 ± 14.0 years (18-80). Patella fractures showed a bimodal distribution with regard to both age and gender, with the median age of females being 62 years (range, 16-91) and the median age of males being 47 years (16-91), $P < 0.001$. BMI was also noted to vary significantly between the three groups with patella fractures averaging 24.9 ± 5.12 kg/m^2 , patellar tendon ruptures averaging 28.4 ± 5.5 kg/m^2 , and quadriceps tendons averaging 30.1 ± 6.57 kg/m^2 ($P < 0.001$). Of the female patients sustaining soft-tissue injuries (4 patellar tendon, 19 quadriceps rupture), all but one had an underlying comorbidity, including 8 (35%) with hypertension, 5 (21.7%) with end stage renal disease, 3 (13%) with a thyroid disorder and 2 (8.7%) with sarcoidosis.

Conclusion: This series represents the largest series of extensor mechanism injuries in the literature and reveals striking demographic patterns. Our females with extensor mechanism injuries are more likely to be older and to sustain patella fractures, which is likely secondary to osteoporosis. These patients also tend to be thinner than non-fracture patients. Young males are more likely to sustain patellar tendon ruptures or patella fractures while older males are more likely to have the diagnosis of a quadriceps rupture. In female patients with patellar tendon or quadriceps tendon rupture, treating surgeons should have a high suspicion for underlying medical comorbidities.