

## Mental Health Patient-Reported Outcomes Predict Reported Physical Function for Tibial Plateau Fractures at Midterm Follow-up More Strongly than Injury Characteristics

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**Purpose:** Our objective was to assess the relationship between mental health patient-reported outcomes (PROs) on physical function PROs at midterm follow-up in operatively treated tibial plateau fractures.

**Methods:** Operatively treated tibial plateau fracture patients were identified at a single Level I trauma center (2016-2020). Patients were contacted to complete PROMIS (Patient-Reported Outcomes Measurement Information System) Physical Function (PROMIS-PF), PROMIS-29, and Knee Injury and Osteoarthritis Outcome Score (KOOS) questionnaires. PROMIS Anxiety (ANX), depression (DEP), and overall mental health (MH29) T-scores were derived from PROMIS-29 data. MH29 is a summary score that incorporates several PROMIS domains including pain, fatigue, social activities, emotional distress, and sleep disturbance into a single score. Multivariate models were created to determine predictors of PROMIS-PF and KOOS-ADL (activities of daily living). Predictive variables were included in multivariate models based on a significance of less than 0.010 in univariate regression. Mental health scores (ANX, DEP, MH29) were separately added to the base models to assess added predictive value.

**Results:** 167 patients responded to the survey (response rate: 54.8%). Average follow-up was 3.2 years and 44% of fractures were bicondylar. Prior to the inclusion of mental health outcomes, female gender ( $B = -2.98$ ;  $P = 0.04$ ) and increasing body mass index (BMI) ( $B = -0.25$ ,  $P = 0.01$ ) were independently associated with worse PROMIS-PF while ipsilateral lower extremity injury ( $B = -10.92$ ,  $P = 0.031$ ), increasing BMI ( $B = -0.53$ ,  $P = 0.007$ ), and postoperative infection ( $B = -10.12$ ,  $P = 0.023$ ) were independently associated with worse KOOS-ADL. For PROMIS-PF and KOOS-ADL, respectively, MH29 ( $B = 0.68$ ,  $P = 0.001$ ;  $B = 1.25$ ,  $P = 0.001$ ), ANX ( $B = -0.39$ ,  $P = 0.001$ ;  $B = -0.74$ ,  $P = 0.001$ ), and DEP ( $B = -0.47$ ,  $P = 0.001$ ;  $B = -0.86$ ,  $P = 0.001$ ) were the strongest independent predictors of reported physical function when separately added to the base multivariate models. Addition of MH29 to the base model resulted in the largest adjusted  $R^2$  and was associated with the largest  $R^2$  change (adjusted  $R^2 = 0.557$ ,  $R^2$  change = 0.371; adjusted  $R^2 = 0.578$ ,  $R^2$  change = 0.310) for PROMIS-PF and KOOS-ADL, respectively.

**Conclusion:** These data raise the possibility that improving mental health parameters may be more important than the surgical method of treatment in the patients' final outcome. Mental health PROs are more strongly associated with self-reported physical function than fracture severity, soft-tissue injury, or comorbidity status. MH29 outperformed ANX and DEP in predictive value for both PROMIS-PF and KOOS-ADL models.