## Cannabis Usage is Associated with Increased Nonunion Rates in Operatively Managed Tibial Shaft & Femoral Shaft Fractures: A 1-Year Propensity-Matched Analysis

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INTRODUCTION: In consideration of the growing economic and mortality burden associated with the ongoing opioid epidemic, cannabis has been proposed as an adjunct therapeutic option for acute and chronic pain management. Despite its potential as an analgesic, cannabis has been associated with increased postoperative pain in patients undergoing orthopaedic surgery. Within the orthopaedic literature, no studies have examined the effects of cannabis use upon nonunion rates in operatively managed tibial or femoral shaft fractures. Therefore, this study aims to compare postoperative infection, nonunion, and delayed union rates in patients using cannabis with operatively treated femoral and tibial shaft fractures versus a propensity-matched cohort of patients with operatively treated femoral and tibial shaft fractures who do not use cannabis.

METHODS: The TriNetX, LLC Diamond Network was queried to identify patients utilizing cannabis who sustained tibial or femoral shaft fractures and successively underwent operative intervention with either intramedullary nailing or open reduction internal fixation using plate fixation. Patient identification was performed using a combination of International Classification of Disease-10 (ICD-10), Current Procedural Terminology (CPT), and Veterans Administration Drug Classification codes. Patients were propensity-matched in a 1:1 ratio based upon eight preoperative characteristics including: age at surgery, female sex, BMI, nutritional deficiency, nicotine dependence, cannabis-related disorders, diabetes, and race. Rates of infection, nonunion diagnosis, and repeat operative intervention for nonunion were assessed at the 1-year mark.

RESULTS: A total of 36,013 patients with femoral shaft fractures and 32,705 patients with tibial shaft fractures who underwent operative treatment were initially identified. Amongst these cohorts, 1,166 patients with femoral shaft fractures using cannabis (FSCU) were matched with 1,166 patients not using cannabis (FSnCU). Similarly, 1,541 patients with tibial shaft fractures using cannabis (TSCU) were matched with 1,541 patients not prescribed SSRIs (TSnCU). At the 1-year mark postoperatively, the TSCU group exhibited a significantly higher rate of nonunion compared to the TSnCU group (p = 0.021), but showed no significant difference in procedure for nonunion, delayed union, or infection rates (p =1.000, p = 0.165 and p = 0.105, respectively). No significant differences were observed between the FSCU and FSnCU groups with respect to nonunion, procedure for nonunion, delayed union, or infection rates (p = 0.803, p = 0.767, respectively).

DISCUSSION AND CONCLUSION: Overall, our findings suggest that patients using cannabis may have an increased risk of nonunion following the operative treatment of tibial shaft fractures up to 1-year postoperatively. In patients with operatively treated femoral shaft fractures, cannabis usage did not result in significant differences in nonunion, delayed union, infection, or the need for further nonunion procedures. These results suggest that while cannabis use may drive nonunion in operatively managed tibial shaft fractures, further research is warranted to elucidate the osteological underpinnings underlying cannabis' effect on long bone fracture healing in orthopedic trauma patients.