

**Association of Preoperative Vitamin D Levels and Severity of Fracture Among Orthopaedic Trauma Patients in a Single, Tertiary-Level Hospital**

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**Purpose:** The high prevalence of hypovitaminosis D among trauma patients has been related to conflicting reports on risk of fractures, falls, nonunion, and poor clinical outcomes after surgery. There is limited evidence that ties up vitamin D levels with fracture severity with specific fractures. The primary objective of this study is to determine the association of preoperative level of vitamin D and the fracture severity among adult trauma patients. No previous study used the AO classification to stratify fracture severity and related this to vitamin D levels at time of injury.

**Methods:** All patients operatively treated for extremity fractures with preoperative vitamin D levels were reviewed. AO classification was assigned to all fractures present at injury. Demographics, presence of osteoporosis, mechanism of injury, and comorbidities were obtained for each patient. Follow-up clinical and radiographic data and fracture union were all recorded.

**Results:** 96 patients with 104 surgically treated extremity fractures were included. Patients presenting with more severe fractures were associated with lower levels of vitamin D and higher prevalence of hypovitaminosis D compared to patients with less severe fractures ( $\chi^2 [4, N = 104] = 20.6, P < 0.001$ ). There was a strong, positive correlation between hypovitaminosis D and increasing fracture severity, which was statistically significant ( $r_s [4] = 0.426, P < 0.001$ ). This association remains present in a subgroup analysis of patients without osteoporosis ( $P = 0.030$ ), and in another subgroup of patients who sustained low-mechanism injuries ( $P < 0.001$ ). Union rate among our subjects is 97%.

**Conclusion:** Preoperative vitamin D level is associated with the severity of fracture as described in the AO classification sustained at the time of injury.