

**Fact or Fiction: The “Five Millimeter” Rule in Greater Tuberosity Fractures of the Proximal Humerus**

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**Purpose:** It has been suggested that 5 mm of displacement of an isolated greater tuberosity (GT) fracture of the proximal humerus is an operative indication. The purposes of this study were (1) to assess the outcome of nonoperative management of GT fractures with >5 mm of displacement and (2) to assess whether there is a correlation between degree of displacement and outcome.

**Methods:** This study was a retrospective review of isolated GT fractures (OTA classification 11.A1.1) in a single surgeon’s practice from 2011 to 2020. Radiographs were reviewed independently by 3 physicians in standardized fashion. The direction of maximal displacement was assessed. The subjects were stratified into groups based on the amount of maximal fragment displacement: Group 1: 0-5 mm, Group 2: 5-10 mm, Group 3: >10 mm. A line was drawn tangential to the superior most aspect of the articular surface (the superior articular tangent line), and the relationship of the GT fragment to this line was assessed. Range of motion (ROM) at the time of final follow-up was assessed. The presence of persistent shoulder pain after healing was noted, as well as whether supplemental corticosteroid injection was provided as part of long-term treatment.

**Results:** A cohort of 93 fractures treated nonoperatively comprised the primary study group. Mean age was 62 years. Mean follow-up period was 20 months. All fractures went on to bony union. Mean displacement was 6.2 mm (standard deviation 5.9 mm). There were 43 patients in Group 1, 43 in Group 2, and 7 in Group 3. Direction of maximal displacement was most commonly inferolateral or lateral, accounting for a combined 77% of all patients. There was no difference in final ROM between displacement groups, with an acceptable average outcome of at least 155° of forward elevation and 45° of external rotation in all 3 groups. There was no difference between Group 1 and Groups 2/3 in terms of frequency of persistent pain or likelihood of receiving a steroid injection. The GT was superior to the articular surface in 5 patients (5%) initially and 9 patients (10%) at final follow-up, but there was no difference in the above outcomes in these groups.

**Conclusion:** In this series of nonoperatively treated GT fractures, there were no differences in ROM or presence of persistent pain between patients with <5 mm and >5 mm of greater tuberosity displacement. Our findings do not support a 5-mm threshold for surgical repair of isolated greater tuberosity fractures.