



# Suture anchor fixation of displaced olecranon fractures in the elderly: a case series and surgical technique



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**Background:** Olecranon fractures are common in elderly patients, causing significant morbidity and functional impairment. Traditional surgical treatments are often complicated by hardware failure and prominence, frequently requiring reoperation. To address these concerns, a suture anchor fixation technique was developed and clinically evaluated.

**Methods:** A consecutive series of elderly patients treated with this technique from 2006 to 2013 at a single institution were studied. All cases were surgically repaired with nonmetallic fully threaded suture anchors in a double-row fashion. Clinical outcome measures including the shortened Disabilities of the Arm, Shoulder, and Hand score, the Oxford Elbow Score, and the 12-Item Short Form Health Survey score were obtained.

**Results:** Eight female patients with Mayo IIA or IIB fractures were identified. The mean age of the patients at time of operation was  $73.5 \pm 10.7$  years (range, 59.3-88.8 years). The average time from injury to operation was  $5.7 \pm 3.7$  days. The average follow-up was  $5.1 \pm 2.5$  years (range, 0.8-7.4 years). Six patients were available for long-term follow-up; 1 patient had died, and 1 patient was unable to be contacted despite multiple attempts. There were no intraoperative complications or reoperations. All 8 patients healed uneventfully in an acceptable position without displacement. Postoperatively, the average Oxford Elbow Score was  $47.17 \pm 2.04$ ; the average shortened Disabilities of the Arm, Shoulder, and Hand score was  $6.43 \pm 9.47$ ; and the average 12-Item Short Form Health Survey scores were  $49.02 \pm 16.59$  and  $55.38 \pm 4.05$  for the physical and mental component scales, respectively.

**Conclusion:** Suture anchor fixation of olecranon fractures in the elderly population provides excellent long-term radiographic and clinical outcomes without hardware complications associated with traditional fixation methods.

**Level of evidence:** Level IV, Case Series, Treatment Study.

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**Keywords:** Olecranon fracture; suture anchor; elderly patients; Mayo classification; tension band; symptomatic hardware



**Figure 1** (A and B) Preoperative left elbow radiographs reveal a widely displaced transverse olecranon fracture with minimal comminution. The patient fell after slipping on ice 2 days before presentation.

Olecranon fractures are common in the population of elderly patients and present unique challenges for the surgeon.<sup>9</sup> Elderly patients without elbow extension secondary to an olecranon fracture may have severely compromised function as they lose the ability to mobilize from the seated position and to use assistive devices for ambulation. This makes nonoperative treatment less likely to be successful in all but the most infirm patients. Operative treatment, however, may be complicated by fracture comminution, osteopenia, poor wound healing, and hardware prominence. This has led to high levels of intraoperative and immediate postoperative complications as well as unacceptably high levels of reoperation.<sup>5,10,19</sup> In this population of patients, avoidance of further operations is of paramount importance, given their frailty and frequent medical comorbidities.

For these reasons, we sought an operative technique that would reduce the frequency of complications and reoperations in this population of patients. The main goals of the technique were to avoid the risk of hardware prominence and to mitigate the effects of profound osteopenia frequently encountered in these patients. We hypothesized that a suture anchor fixation technique could reliably reduce and fixate olecranon fractures with a low complication rate and excellent clinical outcomes. To document the results of this technique, we set out (1) to determine if reduction and fixation of these fractures can be safely obtained, as measured by intraoperative ability to obtain reduction and operative complications; (2) to determine if reduction and fixation were reliably

maintained, as measured by postoperative and final radiographic outcome; and (3) to determine if patient outcomes were acceptable, as measured by validated functional outcome measures as well as long-term reoperations and complications.

## Materials and methods

Eight consecutive patients with olecranon fractures treated with this technique were identified from January 1, 2006, to December 31, 2013. Selection criteria for this technique were focused on the physiologic and chronologic age of the patients involved. It was employed for patients with osteopenia and older physiologic age (>60 years old). Intraoperatively, the soft tissue envelope as well as the cancellous bone of the intact shaft was assessed. The cancellous bone of the intact shaft had to be intact to inspection and be supportive of anchor fixation. This technique was also preferred in patients with severely traumatized or thin soft tissue envelopes. It was not used in any patients with shaft extension or associated elbow instability. This amounted to roughly 15% of the isolated olecranon fractures that the treating surgeon (J.A.A.) operated on in this period.

All patients had preoperative, immediate postoperative, and final follow-up radiographs. These were reviewed by the operating surgeon to assess for adequacy of reduction, loss of reduction, hardware failure, delayed union, and nonunion. Each patient was contacted by telephone or mail to complete a questionnaire regarding the operative elbow including the following clinical outcome measures: Oxford Elbow Score (OES), shortened Disabilities of the Arm, Shoulder, and Hand (QuickDASH), and 12-Item Short Form Health Survey (SF-12).

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