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# Response to Letter to the Editor regarding Barlow et al: "Locking plate fixation of proximal humerus fractures in patients older than 60 years continues to be associated with a high complication rate"


*In reply:*

We certainly appreciate the correspondence regarding our manuscript "Locking plate fixation of proximal humerus fractures in patients older than 60 years continues to be associated with a high complication rate."[1] We hope we can provide some clarification to the specific points of emphasis of this response.

Regarding the possibility of information bias, we agree that the retrieval of data based on a retrospective review of patients is prone to error given inconsistent reporting and documentation. Although our data were gathered from an institutional registry of patients with fractures, the data reported is that which can be obtained from clinical notes and standard of care follow-up. A prospective study would likely ensure a lower rate of patients lost to follow up, and more consistent outcome measures.

The question of the implications of fibular allografting in proximal humerus fracture remains a compelling and important question. Although several series have documented success with this technique, there have been concerns about the necessity of endosteal fibular augmentation if calcar screws are used, and about the revisability of these augments with conversion arthroplasty.[3-5] Although indications for fibular allografting were based on surgeon discretion, the technique and indications for usage became fairly consistent throughout the study period. The primary indication for fibular augmentation was proximal humeral bone loss, particularly when the proximal humeral posteromedial calcar was fractured and nonsupportive. This is commonly seen in varus posteromedial patterns. This remains the current indication for augmentation for the authors. We stopped short of this description in the manuscript given that this was not universal for the study period. Given this indication, however, it is likely that the fibula was used in more unstable fracture configurations. Therefore, having equivalent failure rates in both fractures cannot be interpreted as either an implication of success of the fibular augmentation or failure, but rather did not demonstrate any clear improvement in final outcomes.

Tension band sutures were used in all cases in this series. Calcar screws and/or medial support of the head was demonstrated in 95% of cases, demonstrating consistency in achieving this goal. Given the high rate of these techniques, subset analyses were not possible.

We appreciate the comments regarding clinical outcome scores utilized. We used visual analog scale and Single Assessment Numeric Evaluation (SANE) scores given that these scores were most consistently recorded in this patient group. Using Disabilities of the Arm, Shoulder, and Health questionnaire or Constant score may provide meaningful information going forward. However, the SANE score continues to be correlated highly with other scores in shoulder arthroplasty and rotator cuff repair.[2,6,7] Although not validated for proximal humerus fractures, we believed it would provide a meaningful record of their functional recovery. In addition, we agree with the assessment that the clinical outcomes of those patients with "failure" were less severely affected than anticipated. This likely explains the discrepancy between failure rate and revision operation. This may be related to lower expectations in this geriatric population, or to a general tolerance of avascular necrosis and arthritic conditions of the shoulder. Although some reviewers and colleagues have commented on the low revision rate as an indication to continue offering open reduction and internal fixation for these patients, we feel it is important to be transparent about radiographic failures, with progressive humeral collapse, intra-articular screw penetration, and severe glenohumeral arthritis, in addition to reoperation alone.

We certainly appreciate the careful and thoughtful feedback for this article. We hope that we have provided helpful feedback and clarification.

## Disclaimer

The authors, their immediate families, and any research foundations with which they are affiliated have not

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