

The Humeral Head Push-Pull Plate Technique Significantly Diminishes Secondary Screw Penetration in the Treatment of Osteoporotic Varus-Displaced Proximal Humeral Fractures

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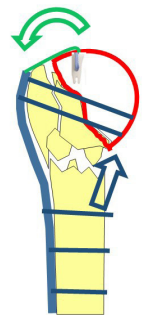
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Purpose: Osteoporotic varus-displaced fractures of the proximal humerus treated with an angular stable plate have a high risk of recurrence and/or screw penetration. This comparative study investigates if a pulling humeral head subchondral anchor fixed to an angular stable plate with inferiorly directed angular-stable screws can decrease the complication rate. [JA1]

Methods: This study is a comparison between 2 groups of a consecutive case series, prospectively collected, treated by a single surgeon. Inclusion criteria are a minimum age of 70 years, varus-displaced 2- or 3-part fractures of the proximal humerus (11A2 and 11B1.1) treated with an angular-stable plate osteosynthesis. The first group was treated with a common proximal humeral locking plate technique with rotator cuff tension-reducing sutures. The second group was treated with 1 or 2 humeral head apex subchondral anchor(s) tightened to a proximally molded locking plate with inferiorly directed variable angle locking screws. Penetration of the screws to the humeral head, recurrence of varus displacement, and reoperation were compared using the χ^2 test.

Results: The first group consisted of 12 cases. Mean age was 82.4 years. Mean follow-up was 5.5 months (range, 3-11 months). There were 5 cases of recurrence, 3 cases of screw penetration, and 3 revision plate osteosynthesis. The second group consisted of 23 cases. Mean age was 78 years. Mean follow-up was 6 months (range, 3-14). There were 4 cases of recurrence, no secondary screw penetration, and 1 revision plate osteosynthesis. The statistical analysis showed a significant difference in screw penetration ($P = 0.012$) and a nonsignificant difference in recurrence ($P = 0.119$) and reoperation rate ($P = 0.068$).

Conclusion: This humeral head push-pull plate technique using apical subchondral anchors and inferiorly directed angle-stable screws significantly decreases secondary screw penetration and appears to decrease secondary recurrence and reoperation rate in the treatment of osteoporotic varus-displaced proximal humeral fractures.



**Humeral Head
Push -Pull
Plate technique**