Rotator Cuff–Sparing Humeral Intramedullary Nail Technique

John R. Wickman, MD*; Gloria Zhang, BS; Daniel Ehren Goltz, MD; Jay Micael Levin, MD; Mark Gage, MD; Oke A. Anakwenze, MD; Christopher Klifto, MD*
Duke University Hospital, Durham, North Carolina, UNITED STATES

Purpose: Intramedullary humeral nailing remains a common surgical procedure for proximal humerus fractures. Many of the criticisms of intramedullary nailing are related to complications such as nail impingement, rotator cuff damage, and damage to the shoulder joint, which can lead to postoperative stiffness and shoulder pain. Here we present a novel surgical technique to access the proximal humerus through a deltopectoral approach utilizing the rotator interval for the placement of an antegrade humeral intermedullary nail. This technique was developed to minimize iatrogenic injury of the rotator cuff, which we hypothesize will result in lower rates of postoperative shoulder pain and stiffness related to rotator cuff tendinopathy.

Methods: Patient is positioned supine with a towel bump under the ipsilateral scapula. The proximal humerus is accessed via a deltopectoral approach. The biceps tendon is identified in its groove and tenodesis performed. The tendon is then traced to the rotator interval (RI) and truncated. With the arm in extension the guide pin is inserted through the RI, maneuvered to the starting point under multiplanar fluoroscopic guidance, and inserted in the proximal fragment. Opening reamer is passed over the guide pin which is then removed and a guidewire is passed into proximal fragment. The fracture is held reduced and the guidewire is advanced across the fracture into the distal canal. The canal is sequentially reamed and the intramedullary nail is passed over the guidewire and seated 1 cm deep to articular surface. Interlocking screws are placed proximally and then distally via targeting guide. The RI is closed with size 0 absorbable braided suture. The remaining layers are then closed in standard fashion.

Results: The described technique has been performed on a series of 19 patients, 2 of whom have 1-year follow-up. No intraoperative complications were observed in the cohort. Of the patients with 1-year follow-up, each demonstrated radiographic union, reported SANE (Single Assessment Numeric Evaluation) physical function scores of 100%, and were complication-free at 12 months postoperatively.

Conclusion: The presented technique describes performing intramedullary nail fixation of a humeral fracture with use of a deltopectoral interval and nailing through the RI. This technique prevents iatrogenic disturbance to the rotator cuff which may minimize postoperative complications. As the cohort of patients with longer-term data expands, a future formal analysis of patient outcomes is warranted to better elucidate the clinical impact of the proposed technique.