

**Extra-Articular Malunions and Nonunions of the Scapula:  
A Comparison of Functional Outcome Before and After Reconstruction**

*Joseph Denis Schirmers, MD; Jeff Gilbertson; Lisa K. Schroder; Joscelyn Tatro;  
Peter A. Cole, MD*

*Regions Hospital, St. Paul, Minnesota, USA*

**Purpose:** This study includes the largest cohort of operatively treated scapula malunion and non-union reconstruction, and aims to assess surgical and functional results.

**Methods:** This is a review of 26 patients-16 malunions in 15 patients & 18 nonunions in 14 patients. Intervention involved surgical osteotomy of the malunion or debridement of the nonunion and ORIF. Outcome measures included: pre/post-op ROM, strength and DASH scores, and return to work.

**Results:** Among 21 of 26 (81%) patients with <sup>3</sup>12 months follow-up, mean=36 months. 5 patients were lost to follow-up and excluded. Mean age=48.5 years. Average time from injury to surgery=22.6 months. Preoperative ROM and strength were obtained on 18/26 (69%). Mean DASH score improved from 55 preoperatively to 18 postoperatively ( $p<0.001$ ). Among the patients with <sup>3</sup>1 year follow-up, range of motion improved from pre-operative to final follow-up in forward flexion and abduction ( $p=0.002$  and  $p=0.001$  respectively). Range of motion for ER and all strength measures improved but did not reach significance. Among the 20 of 26 patients for whom occupation data is available, 80% either returned to their original occupation ( $n=10$ ) or did not due to reasons other than their reconstructive surgery ( $n=6$ ). Two post-operative complications occurred: acromion stress fracture and hardware failure (3 months postoperatively). Both patients went on to heal after revision surgery. All reconstructions subsequently united without malunion.

**Conclusion:** Scapula reconstruction of malunion and non-union is possible and associated with an acceptable complication rate, restoration of function, and symptom relief.