5-10 Year Outcomes of Operatively Treated Scapula Fractures

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Background/Purpose: There is increasing recognition that a subset of patients who sustain scapula fractures have poor outcomes with nonoperative management. Furthermore, recent series of patients who sustained scapula fractures meeting certain displacement criteria have been shown to have good range of motion, strength, and functional outcomes following surgical fixation. The majority of nonoperative scapula outcomes studies consist of small retrospective series that include heterogeneous fracture types with varying degrees of displacement. There is only one study of 68 patients that reports outcomes at a minimum of 5 years from nonoperative treatment, which suggested patients with residual scapular deformity had significantly more clinical symptoms. There is another study of 22 patients documenting good to excellent outcomes at a mean of 10 years following open reduction and internal fixation (ORIF) of intra-articular fractures of the glenoid. The purpose of this study is to report 5- to 10-year functional outcomes after ORIF of both intra- and extra-articular scapula fractures.

Methods: Between January 2005 and December 2010, the senior author operated on 105 patients who sustained scapula fractures, of which 59 (56%) were referred for treatment. 46 patients (44%) presented directly to our institution, which represents 8.8% of all presenting scapula fractures. Patients were prospectively enrolled into a registry and completed standard follow-up. Medical records were reviewed to report demographics, fracture classification, complications, and subsequent procedures. For this study, patients were called back to clinic to record shoulder range of motion (ROM) and strength, return to work status, and to complete a Disabilities of the Arm, Shoulder and Hand (DASH) form as well as a Short Form General Health Survey (SF-36, SF-12). To date, 48 patients have either returned to clinic for examination (46) or completed mailed DASH and SF-36 forms (2). Patients with intra-articular fractures were analyzed separately from those with extra-articular fractures.

Results: There were 24 intra-articular fractures (OTA 14-B, 14-C2, 14-C3) with or without extra-articular patterns and 21 extra-articular fractures (OTA 14-A, 14-C1) with no intra-articular involvement. Three isolated acromion fractures (14-A1) were excluded from these results. Mean follow-up was 7.4 years (range, 4.3-10.7). There were 40 males and 5 females with a mean age of 51 years. The only perioperative complication was a screw placed intra-articularly, which was promptly exchanged 3 days postoperatively. Of the 24 intra-articular fractures, 2 went on to have a shoulder arthroplasty, 3 underwent removal of superficial implants, and 4 underwent manipulation of the shoulder under anesthesia at a mean of 1 year after surgery. In the extra-articular group, there were no subsequent arthroplasties, 4 patients desired implant removal, and 2 had manipulation under anesthesia at 13 and 14 weeks after surgery. In the intra-articular group, there were 7 suprascapular and 3 axillary nerve injuries. Mean DASH score was 10.5 (normative mean = 10.1). Mean ROM in degrees (injured/uninjured) was 128/136 (94%) in forward flexion, 103/112 (92%) in abduction, and 49/62 (81%) in external rotation. Mean strength in pounds of force was 17/20 (85%)

in forward flexion, 11/13 (85%) in abduction, and 14/16 (83%) in external rotation. In the extra-articular group, there were 2 suprascapular nerve injuries. Mean DASH score was 10.2. Mean ROM in degrees (injured/uninjured) was 145/151 (96%) in forward flexion, 116/125 (93%) in abduction, and 58/67 (89%) in external rotation. Mean strength in pounds of force was 16/18 (89%) in forward flexion, 12/13 (88%) in abduction, and 13/15 (87%) in external rotation. A paired t test revealed significant differences between the injured and uninjured shoulders in all ROM and strength measurements ($P < 0.05$). The mean SF-36 and SF-12 scores were comparable to the normal population (50 ± 10). Following surgery, 41/48 (85%) reported returning to a similar prior occupation.

Cohort classification, description, outcomes, and complications					
		Intraarticular		Extraarticular	
n		24		21	
Mean Follow Up (months)		89		88	
DASH		10.5		10.2	
		Injured/Uninjured (%)	P value (paired student t-test)	Injured/Uninjured (%)	P value (paired student t-test)
Range of motion (Injured/Uninjured degrees)	Forward flexion	128/136 (94%)	0.0277	145/151 (96%)	0.0308
	Abduction	103/112 (92%)	0.0350	116/125 (93%)	0.0035
	External rotation	49/62 (81%)	0.0003	58/67 (89%)	0.0359
Strength (Injured/Uninjured lbs of force)	Forward flexion	17/20 (85%)	0.0091	16/18 (89%)	0.0159
	Abduction	11/13 (85%)	0.0022	12/13 (88%)	0.0041
	External rotation	14/16 (83%)	0.0098	13/15 (87%)	0.0017
Suprascapular nerve injury		7		3	
Axillary nerve injury		2		0	
Complications		none		Intra-articular screw removed 3 days post-op	
Shoulder arthroplasty		2		0	
Implant removal (scapula)		3		4	
Shoulder manipulation under anesthesia		4		2	

Conclusion: Midterm outcomes of operatively treated scapula fractures reveal a small yet significant difference in shoulder ROM and strength compared to the uninjured shoulder; however, there were normal functional outcomes assessed with DASH and SF-36 forms.

See pages 49 - 106 for financial disclosure information.