

## Scapular Dyskinesia Following Displaced Fractures of the Middle Clavicle

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**Purpose:** This study was conducted to evaluate the rate of scapular dyskinesia and resulting patient outcomes following treatment of displaced, midshaft clavicle fractures.

**Methods:** Skeletally mature patients who sustained isolated, displaced midshaft clavicle fractures treated with or without surgery over a 16-month period were recruited. The minimum follow-up at study examination was 12 months. Patients were excluded with age less than 21 or over 80 years of age at the time of injury, and if they had concurrent traumatic injuries, prior fractures on the injured side, neurological injury (peripheral or spinal cord), frozen shoulder, shoulder replacement, and patients who were nonambulatory or not living independently. Based on these criteria, 32 patients were eligible for enrollment. Patient outcomes were documented using the SICK (Scapular malposition, Inferior medial border prominence, Coracoid pain and malposition, and dysKinesia of scapular movement) Scapula Rating Scale, Simple Shoulder Test (SST), three visual analog scale (VAS) pain scales, shoulder range of motion (ROM), and strength measurements. Scapular dyskinesia was defined as winging of the scapula at rest or with active abduction and at least a 1.5 cm or 5° difference in the resting position of the affected scapula compared to the unaffected. 24 patients (75%; 24 of 32) were successfully recruited.

**Results:** Average study participant age was  $46 \pm 17$  years with a mean follow-up at time of study evaluation of  $1.7 \pm 1$  years. Twelve (50%) underwent surgical fixation. Scapular dyskinesia was present in 37.5% ( $n = 9$ ) of patients, and only 1 (11%;  $n = 1$  of 9) of these patients had SICK scapula syndrome. The patients with scapular dyskinesia were similar regarding age, body mass index, psychiatric comorbidity, smoking status, initial fracture displacement, and length of time from injury or surgery to study examination compared to patients without dyskinesia. The patients with scapular dyskinesia had worse SICK scapula scores ( $5.8 \pm 2.2$  vs  $3.1 \pm 2.4$ ;  $P = 0.01$ ), worse SST scores ( $10.5 \pm 1.6$  vs  $11.7 \pm 0.8$ ;  $P = 0.029$ ), and worse average VAS pain scores in the week prior to examination ( $2.7 \pm 2.5$  vs  $0.2 \pm 0.4$ ;  $P < 0.001$ ) compared to patients without dyskinesia. ROM and abduction strength measures did not differ between groups. Only 1 patient treated with surgery (8%;  $n = 1$  of 12) developed scapular dyskinesia, compared to 8 of 12 patients (67%) treated nonoperatively ( $P = 0.009$ ).

**Conclusion:** Scapular dyskinesia is common after displaced, midshaft clavicle fractures and these patients experience more pain and have worse functional outcomes compared to patients who do not develop scapular dyskinesia. Surgical treatment of this injury may reduce a patient's risk for developing scapular dyskinesia and improve short-term outcomes.