

# The Scapular "Spike Sign," An X-Ray Proxy for Surgical Indications

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## INTRODUCTION:

The authors demonstrate a simple radiographic finding to act as a surrogate for known operative criteria. Operative indications for extra-articular scapular fractures include medialization (lateral border offset)  $\geq 2$  cm, angulation  $>45^\circ$ , glenopolar angle (GPA)  $<22^\circ$ . Even with appropriate radiographs (Grashey, Y view), accurate measurements can be unreliable.

The purpose of this study is to describe the scapular "Spike Sign," determine its prevalence on x-ray (XR), and correlate degree of medialization (lateral border offset) with established radiographic operative criteria.

## METHODS:

The "Spike Sign" is defined here as the caudal lateral border of the fractured scapula displaced beyond the glenoid. Four-hundred patients with displaced, extra-articular fractures of the scapula that presented to our institution from 2005 – 2021 were identified. Inclusion criteria for the study are  $>18$  years of age, presence of scapular body or neck fracture, and presence of XR imaging of the scapula at the time of injury. Exclusion criteria were scapula fractures  $> 3$  weeks post injury, an isolated acromion or coracoid process fracture, intra-articular fractures, and periprosthetic fractures. After exclusion, the final cohort was comprised of 268 patients.

Standard injury radiographs were reviewed to measure GPA, medialization, angulation, and presence of a "Spike Sign" of the fractured scapula. Two orthopaedic trauma fellows took independent measurements for patients with an identified positive "Spike Sign." These measurements were compared to determine inter-observer reliability.

## RESULTS:

Seventy-seven patients were found to have a "Spike Sign." Thirty-seven of those patients had a "Spike Sign" with a measurement of  $\geq 0$  cm (spike in line with the glenoid) or more. All 37 patients (100%) met at least one operative indication (medialization, angulation, or GPA).

Inter-observer reliability for "Spike Sign"  $\geq 0$  cm calculated with Cohen's kappa was found to be 0.843 indicating near perfect agreement.

## DISCUSSION AND CONCLUSION:

The Scapular "Spike Sign" is an easily identified radiographic finding in patients with extra-articular scapula fractures, that can serve as a reliable proxy for surgical intervention which should prompt preoperative CT examination.

