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What I Have Learned Most About Fixing Displaced Fractures of the Clavicle

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1. Introduction: Clavicle fractures are common injuries accounting for 2.6% of all fractures[1] and occur most commonly in young active individuals[2]. Middle third (or mid-shaft) fractures account for approximately 80% of all clavicle fractures[1,2], and have traditionally been treated non-operatively, even when significantly displaced. However, more recent studies have shown non-union rates of up to 21% in displaced midshaft clavicle fractures and unsatisfactory patient oriented outcomes in up to 31%. In addition, clavicular malunion has recently been described by multiple authors as a distinct clinical entity with characteristic clinical and radiographic features. It is clear that there is a role in selected individuals for primary operative fixation of displaced fractures of the shaft of the clavicle.

2. The incidence of nonunion following non-operative care of displaced mid-shaft fractures of the clavicle

A number of recent studies of completely displaced, mid-shaft fractures of the clavicle reveal nonunion rates between 15% and 20%[5,6]. These studies were recently summarized in a meta-analysis that found a nonunion rate of 15.1% following non-operative care of these fractures[7].

3. The incidence of symptomatic clavicular malunion following non-operative care

Malunion of the clavicle is a distinct clinical entity with characteristic orthopaedic (weakness, easy fatigueability, scapular winging), neurologic (thoracic outlet syndrome) and cosmetic (droopy, asymmetric shoulder, difficulty with backpacks, shoulder straps etc.) symptoms[9-12]. It is associated with increasing degrees of clavicular shortening. While radiographic malunion is

always seen following displaced clavicular shaft fractures, clinically symptomatic malunion has an incidence of 15-20%.

4. The rate of nonunion following surgical repair

There are multiple, modern studies that show plate fixation is an extremely effective technique for treatment of clavicular shaft fractures with a low complication and nonunion rate[14,15]. A meta-analysis described a nonunion rate with plate fixation of 2.2%, which represents an 86% risk reduction for nonunion compared to the same fracture treated non-operatively (nonunion rate 15.1%)[7]. Intramedullary fixation is another option with a high, albeit variable, success rate.

5. Strength deficits following non-operative care.

Hill et. al. were the first to use a patient-oriented outcome measure, and found 31% of patients described unsatisfactory outcome after non-operative care of displaced clavicle fractures[6]. This may be explained by significant residual strength deficits following the conservative treatment of these fractures. Using an objective strength testing protocol for both maximal effort and endurance (which had not been done previously) strength deficits ranging from 10% to 35% were found in patients a mean of 54 months after non-operative care of a displaced fracture of the clavicular shaft[16].

6. Evidence-based medicine

There are a number of randomized clinical trials that compare operative to non-operative treatment of displaced fractures of the clavicle. These studies provide clear facts that can be used when counseling patients regarding treatment options.

7. Substance Abuse

It is clear that patients with substance abuse have a much higher rate of complications with clavicle fracture fixation: the treating surgeon should be very careful in offering primary fixation to active substance abusers.

7. Summary

The choice to proceed with operative intervention for a displaced mid-shaft fracture of the clavicle will be a decision made between surgeon and patient. There is increasing evidence from Level 1 prospective and / or randomized trials that, for carefully selected patients, primary operative fixation of displaced clavicular fractures results in superior outcome.

8. References

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