

Displaced midshaft clavicular fractures – A review of literature

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Fracture of the clavicle is a common injury, according to literature 5 to 12 % of all fractures and up to 44 % of injuries of the shoulder girdle (1-4). About 70 to 80 % of these fractures are in the middle third of the clavicle (1,5). Fractures of the clavicle have been traditionally treated nonoperatively. Functional and cosmetic results frequently fall short of the patient's and the surgeon's expectations. This review of up-to-date literature might help for re-evaluation of well accepted concepts concerning the treatment of mid-shaft clavicular fractures.

Discussion

According to aged literature the incidence of non-union of the clavicle following midshaft fracture has been described as 1 % or less (1,5,6). These results have often been used as a reason to avoid primary operative intervention. Recent studies resulted in non-union rates of 15 to 20 %, when analyzing completely displaced mid-shaft fractures of the clavicle (4,7). Zlowodzki et al. evaluated 2144 midshaft clavicle fractures in a meta-analysis and found a non-union rate of 15.1 % following nonoperative treatment (8). Reasons for this distinct increase of the non-union rate within 30 years might be approximated, but remain nebulous. Due to current results indication for primary operative treatment may be reconsidered. In literature a non union rate of 2.2 % is described in midshaft clavicle fractures, treated with plate fixation (8). According to these results an 86 % risk reduction for non-union in comparison to nonoperatively treated clavicle fractures can be achieved with plate fixation. Non-union is frequently associated with severe

symptoms, making the patient dissatisfied. Weakness, easy fatigability and scapular winging affect the patients in daily routine as well as on the job. Difficulty with backpacks and shoulder straps additionally impair quality of life. Cosmetic symptoms should be as well kept clearly in mind, when treating clavicle fractures (4,9,10). Information about the functional outcome of nonoperative treated clavicle shaft fractures is rare in literature. Mc Kee et al. examined the strength deficits following nonoperative care of displaced mid-shaft fractures. In an average follow up of 54 months they found strength deficits ranging from 10 to 35 % in 30 patients with nonoperative treated clavicular shaft fractures. The loss of strength can have a significant effect on an active young person recreationally or occupationally (11). Hill et al. reviewed 52 conservatively treated adults with mid-shaft clavicle fractures at a mean of 38 months after injury. Sixteen patients (31 %) reported unsatisfactory results after nonoperative treatment (4).

Lazarides and Zafropoulos reviewed 132 patients with united fractures of the middle third of the clavicle after conservative management in a retrospective study. Thirty four patients (25.8 %) were dissatisfied with the result of their management. Final clavicular shortening, amounting in mean 14.4 mm in male and 11.2 mm in female patients was significantly associated with the unsatisfactory result (12). Nordqvist et al. evaluated in turn the clinical significance of post-fracture shortening of the clavicle in 85 patients and found that permanent shortening of the clavicle is common after fracture, but has no clinical significance (13). McKee et al. analyzed the functional results of corrective osteotomy of malunited clavicular fractures

in patients with chronic disorders. In fourteen of the fifteen patients the corrective osteotomy resulted in a high degree of patient satisfaction and improved patient-based upper-extremity scores, the mean shortening of the clavicle improved from 2.9 to 0.4 cm (14). A recent multicenter, randomized clinical trial reports about 132 patients with a displaced midshaft fracture of the clavicle: operative fixation of a displaced fracture of the clavicular shaft results in improved functional outcome and a lower rate of malunion and nonunion compared with nonoperative treatment (15). Muller et al. performed elastic titanium nails for midclavicular fractures in 45 patients and observed good functional results with this minimally invasive technique (16).

Nevertheless the perfect way of nonoperative treatment remains as well indistinct. The figure of eight bandage is known to be the most common closed method of clavicular mid-shaft fracture fixation. Andersen et al. analyzed seventy-nine out-patients with mid-shaft clavicular fractures in a prospective, randomized trial comparing treatment with a figure-of-eight bandage and a simple sling. The functional and cosmetic results of the two methods of treatment were identical and alignment of the healed fractures was unchanged from the initial displacement. Treatment with a simple sling caused less discomfort and fewer complications than with the figure-of-eight bandage (17). These results put the sense of the figure-of-eight bandage treatment into perspective.

Finding the optimal kind of treatment for each patient remains a tough task. Knowledge of up-to-date literature might change a couple of surgeons' minds. Following detailed education of the patient concerning pros and cons of operative and conservative treatment, a decision has to be made between the surgeon and the patient. The dialogue might help to meet the patient's individual demands, ensuring satisfaction for both parties.

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