Temporary coracoclavicular screw fixation for displaced distal clavicle fractures

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ABSTRACT

Purpose. To assess the treatment outcome of temporary coracoclavicular screw fixation for displaced distal clavicle fractures.

Methods. From January 1995 to December 2003, 30 consecutive patients with Neer type II displaced distal clavicle fractures were treated with open reduction and internal fixation using a coracoclavicular screw. The screw was removed under local anaesthesia after bony union. Patients were evaluated by clinical and radiological examination. Functional outcome was assessed by a simple shoulder test.

Results. There was 100% union rate. All patients returned to their pre-injury activity level by 12 months. One patient developed a superficial wound infection, which resolved with oral antibiotics. Two patients had problems with mild backing out of the screw, but both had bony union by the time of screw removal. The mean score of the simple shoulder test of 28 patients was 11.

Conclusion. Treatment outcome using temporary coracoclavicular screw fixation for displaced distal clavicle fractures is favourable. The implant is readily available and the technique is simple, safe, cost-effective, and reproducible.

Key words: bone screws; clavicle

INTRODUCTION

Fractures of the distal clavicle constitute about 15% of all clavicular fractures.1 Neer first pointed out the significance of these fractures and classified them into 3 types. The Neer type II fractures, though not the commonest, are the most significant due to the unstable nature of the fracture pattern. Displacement is common as a result of the opposing forces acting on the 2 fragments. The trapezius attached to the proximal fragment displaces it superiorly and the weight of the arm draws the distal fragment inferiorly resulting in major displacement and a high incidence of non-union.1,2 Many surgical options have been described for these fractures,1–7 but none is widely accepted as the gold standard.
MATERIALS AND METHODS

Between January 1995 and December 2003, 30 consecutive patients with Neer type II displaced distal clavicle fractures (Fig. 1a) were treated with open reduction and internal fixation using a temporary coracoclavicular screw. All the injuries were closed and there were no neurovascular complications or other associated injuries. The mean age of the 22 men and 8 women was 29 (range, 21–53) years. In 18 patients the cause of the injury was a fall from a bicycle and a simple fall in 12. The time between injury and operation varied from one to 19 (mean, 4) days. The mean follow-up period was 17 (range, 14–24) months.

All procedures were carried out under general anaesthesia via a sabre cut incision with the patient in a beech chair position. The fracture site and coracoid process were exposed without disturbing the acromioclavicular joint. The fracture was then reduced and the base of the coracoid identified. The clavicle and the base of coracoid were drilled under direct vision with a 3.2-mm drill and held with a 6.5-mm partially threaded cancellous screw with a washer (Fig. 1b). The wound was closed in layers.

Postoperatively the arm was placed in a poly sling and the patient given instructions not to abduct or flex the arm beyond 90° until screw removal. Pendular exercises were commenced within the first 24 hours after surgery. All the patients were seen 2 weeks postoperatively for a wound check. After fracture union, the coracoclavicular screw and washer were removed as a day case procedure under local anaesthesia (Fig. 1c). All the patients were referred for physiotherapy and assessed regularly by clinical and radiological follow-up. A simple shoulder test questionnaire was used to assess shoulder function 12 months post-injury. This is a subjective questionnaire about 12 functional tasks that patient was asked to answer either yes or no.

RESULTS

All 30 patients returned for clinical and radiological follow-up. 28 patients successfully completed the simple shoulder test questionnaire, with a mean score of 11 (range, 9–12) [Fig. 2]. Complications included mild backing out of the coracoclavicular screw at 4 weeks in 2 patients. There was no radiographic fracture displacement and in every patient union ensued without any other intervention. One patient had a superficial wound infection that resolved after oral antibiotics. All fractures united clinically...
and radiologically between 6 and 10 weeks. There were no complications related to screw removal and all patients returned to their pre-injury activity level within 12 postoperative months.

**DISCUSSION**

Surgical intervention is indicated for Neer type II displaced distal clavicle fractures. Several surgical techniques have been reported, but none is widely accepted as the gold standard. Transacromial Kirschner wire has been shown to have a 32% rate of infection and non-union, with a potential risk of wire migration. An extra articular tension band technique gives no protection against wire migration, and the metal work may cause skin problems that require removal under general anaesthetic. Coracoclavicular mersilene has been associated with fatigue and fracture of the coronoïd process and requires extensive dissection at the base of the coracoid process. Similarly coracoclavicular slings using Dacron or polydioxanone have been reported to produce satisfactory outcome, but considerable dissection is required to pass the slings below the coracoid process. Internal fixation using plates demands a wide exposure and may devascularise the distal clavicle and acromion and there is a risk of stress shielding and refracture after plate removal. A hook plate (designed by AO/ASIF) pre-contoured to fit under the posterior part of the acromion confers a major risk of acromion osteolysis and requires plate removal under general anaesthesia.

Temporary coracoclavicular screw fixation achieves bony union without violating the acromioclavicular joint and requires minimal soft tissue dissection. Screw back out is a potential complication, as observed in 2 of our patients. However, both had begun active rehabilitation early and were relatively noncompliant. Strict compliance with the postoperative physiotherapy regimen is therefore necessary, thereby avoiding early scapular-thoracic motion, which causes rotation and tilting of the fracture site, which predisposes to screw back out.

Displaced fractures of the distal clavicle are unstable injuries with a high potential for symptomatic non-union that affects function. Therefore, open reduction and internal fixation is recommended to obtain optimum results. Temporary coracoclavicular screw fixation is a simple, safe, cost-effective, and reproducible technique with a readily available implant.

**REFERENCES**