



Supplementary Material

10.1302/2633-1462.312.BJO-2022-0061.R1

Protocol



NAME: *Mr Parag Raval, Mr Abbas See, Prof. Harvinder Singh*
University Hospitals of Leicester NHS Trust

TITLE: *Treatment of Distal Third Clavicle Fractures: An epidemiological survey of surgical management*

BACKGROUND:

Distal third clavicle fractures represent 2.6 to 4% of all adult fractures and constitutes 21 to 28% of all clavicular fractures^{1, 2}. Due to their instability and nonunion risk, they can prove difficult to treat. In addition, there are several different operative options for distal third clavicle fixation. This can be broadly divided into rigid fixation, such as a locking plate, hook plate fixation and coracoclavicular screws, button fixation and flexible fixation such as K-wire fixation and tension band wiring². Current evidence suggests variability in operative fixation and evidence on the management of how best to manage these types of injuries is limited. Given the sheer volume of fixation methods, it would be interesting to better understand which operative option has the best outcomes for distal third clavicle fractures. However prior to this, it is important to determine the frequency of distal third clavicle fracture occurrence and the operative techniques used in current surgical management.

OBJECTIVE:

The primary aims of this observational epidemiological survey is to ascertain how many patients with distal third clavicle fractures are presenting to a given trust, how many undergo surgical management and to evaluate the current practice of which fixation methods are utilized for operative management e.g. hook plate fixation, coracoclavicular screws, lateral clavicle locking plates etc. Secondary aims include the observed union rate and any complications that might have occurred.

STUDY DESIGN:

This will be a retrospective multicenter study where data will be collected by independent collaborators across multiple NHS trusts. All patients who presented to the trust with a distal third clavicle fracture in a one-year period will be identified. The period for review will be from 1st of January 2019 to 31st of December 2019.

The following demographic data will be collected: Age, Sex, Side of injury, Mechanism of injury and Neer Classification grading for distal third clavicle fracture. In addition, the management (conservative, operative) will also be recorded and the outcome (whether the fracture united successfully) and if further procedures required and any complications identified. For all patients who were treated operatively, the operative technique undertaken will also be recorded e.g. hook plate fixation, lateral shaft locking plate, coracoclavicular buttons etc)

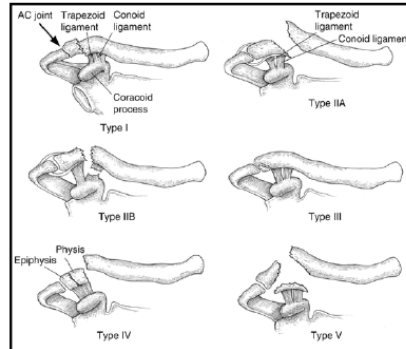
DATA ANALYSIS:

The data collected from collaborators, from across the country, will be collated for analysis. Baseline characteristics will be described for the demographic variables. Continuous variables will be analysed with means and standard deviations. Categorical variables will be expressed as frequencies and percentages. Analysis will predominantly be descriptive in nature.

INCLUSION CRITERIA:

All patients who presented with a distal third clavicle fracture over the age of 18 years. Neer³ Classification 1-5 are all included.

Neer Classification for distal third clavicle fracture



EXCLUSION CRITERIA:

Patients who presented with a clavicle fracture proximal to the distal third or patients with acromioclavicular joint disruption or patients under 18 years of age.

REFERENCES:

1. Postacchini F, Gumina S, De Santis P, Albo F. Epidemiology of clavicle fractures. *J Shoulder Elbow Surg.* 2002;11(5):452-6.
2. Sambandam B, Gupta R, Kumar S, Maini L. Fracture of distal end clavicle: A review. *J Clin Orthop Trauma.* 2014;5(2):65-73.
3. Neer CS, 2nd. Fracture of the distal clavicle with detachment of the coracoclavicular ligaments in adults. *J Trauma.* 1963;3:99-110.

Table i. A complete list of all participating trusts.

Trust	Patients, n (%)
Major trauma centre	373 (42)
Queen Elizabeth Hospital Birmingham	59 (7)
John Radcliffe Hospital Oxford	122 (14)
Royal London Hospital	30 (3)
University Hospital Coventry and Warwickshire	38 (4)
Southmead Hospital Bristol	124 (14)
Trauma unit	471 (56.4)
Basildon University Hospital	15 (2)
University Hospitals Birmingham NHS Foundation Trust	86 (10)
Royal Bolton Hospital	34 (4)
Royal Derby Hospital	42 (5)
Gloucestershire Royal Hospital	58 (7)
Kettering General Hospital	20 (2)
Leicester Royal Infirmary	54 (6)
Northampton General Hospital	43 (5)
Royal Liverpool and Broadgreen University Hospitals NHS Foundation Trust	4 (0.4)
Great Western Hospital	52 (6)
Musgrove Park Hospital	46 (5)
South Warwickshire NHS Foundation Trust	13 (2)
Wrightington, Wigan and Leigh NHS Foundation Trust	19 (2)

Table ii. A summary of the degree of union at most recent follow-up and the operative techniques used. Fixation with locking plate and hook plate remain the most popular surgical technique. Patients with radiological evidence of bony union had the widest range of operative techniques used.

Union	Locking plate	Hook plate	Locking plate and anchor suture	Ligament fixation and fragment excision	Tight rope	Locking plate and ACJ recon	Locking plate and CC ligament recon	Suture fixation	Locking plate and tight rope	Excision of distal clavicle	Lockdown procedure	Not recorded
Yes	26	32	1	0	5	2	4	1	7	1	1	3
No	3	4	0	0	0	0	0	1	0	0	0	0
Not recorded	5	11	0	1	0	0	0	0	0	0	0	2

ACJ, acromioclavicular joint; CC, coracoclavicular.