

# Re-Fracture Following Operative vs. Non-Operative Management of Adolescent Diaphyseal Clavicle Fractures

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# Background

- **Peds/adolescent clavicle treatment:**
  - Pediatric orthopaedic surgeons follow adult orthopaedic surgery trends
  - Overall trend towards increasing fixation
  - Sparse evidence regarding outcomes, complications for younger population

## A Survey of Physician Opinion

### *Adolescent Midshaft Clavicle Fracture Treatment Preferences Among POSNA Members*

*Patrick M. Carry, BA,\* Ryan Koonce, MD,† Zhaoxing Pan, PhD,‡ and John D. Polousky, MD§*

# Background

- **Little information regarding refracture of clavicles, including in adult literature**
  - Especially lacking in comparative assessments

Operative Versus Nonoperative Care of Displaced Midshaft Clavicular Fractures: A Meta-Analysis of Randomized Clinical Trials

Robbin C. McKee, Daniel B. Whelan, MD, FRCS(C), Emil H. Schemitsch, MD, FRCS(C), and Michael D. McKee, MD, FRCS(C)

THE JOURNAL OF BONE AND JOINT SURGERY

**TABLE II Complications**

Adverse Event	Operative Group (N = 62)	Nonoperative Group (N = 49)	P Value
Nonunion	2*	7	0.042
Malunion requiring further treatment	0	9	0.001
Wound infection and/or dehiscence	3	0	0.253
Hardware irritation requiring removal	5	0	0.065
Complex regional pain syndrome	0	1	0.441
Surgery for impending open fracture	0	2	0.192
Transient brachial plexus symptoms	8	7	0.690
Abnormality of the acromioclavicular or sternoclavicular joint	2	3	0.653
Early mechanical failure	1	0	1.000
Other	2	2	0.784
Total	23 (37%)	31 (63%)	0.008

\*One patient who was randomized to operative fixation declined surgery. He had a nonunion of the fracture at one year. According to the "intention-to-treat" principle, the complication was included in the operative group as a nonunion. See text.

1 One patient in the operative group experienced premature hardware failure in an all-terrain vehicle accident six weeks after fixation and required repeat fixation.

# Background

## Rate of Re-fracture

- **Peds:**
  - n=286, mean age 7.9 (range: 2-16), non-op
  - Re-fx fate <1 year = **1.6%**

## Management of paediatric clavicle fractures – is follow-up necessary? An audit of 346 cases

JDF Calder<sup>1</sup>, M Solan<sup>2</sup>, S Gidwani<sup>1</sup>, S Allen<sup>2</sup>, DM Ricketts<sup>1</sup>

*Ann R Coll Surg Engl 2002;*

# Purpose

- **Assess features of a sub-population of diaphyseal clavicle fracture patients treated at pediatric center over a 10-year period who sustained a re-fracture**
  - Rare but potentially debilitating complication of clavicle fracture treatment
- **Compare features of these cases within 2 different treatment groups: operative vs. non-operative**
  - Demographics
  - Timing, Etiology
  - Etiology
  - Radiographic characteristics
  - Healing rates
  - Additional complications (of re-fracture treatment)

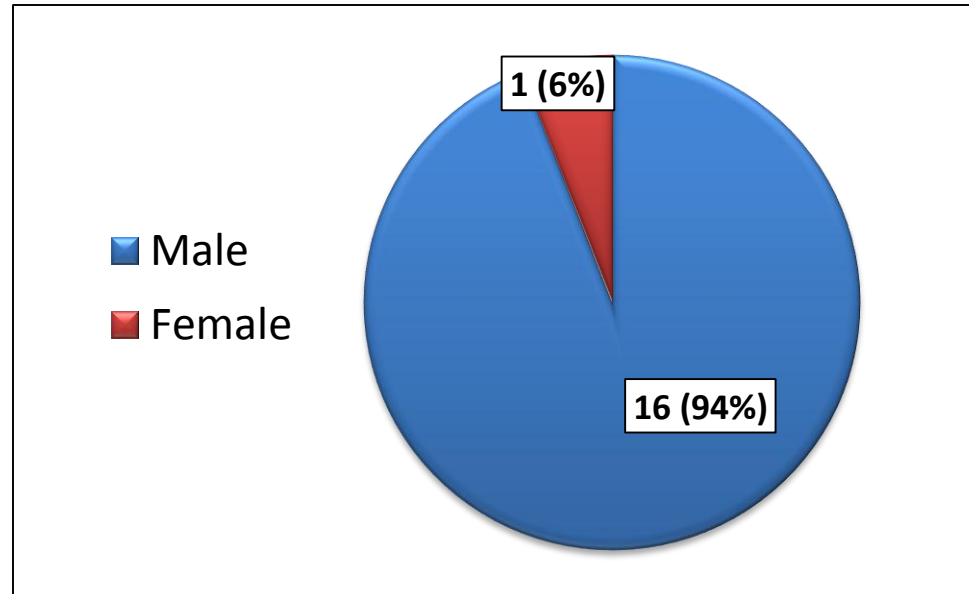
# Methods and Materials

- Analyzed refracture patients within previously established database of all diaphyseal clavicle fracture patients (n=659)
  - Primary treatment at BCH 2003-2012
  - Ages 10-19 y/o
  - 17 (2.6%) re-fracture patients identified
- Clinical/OR chart review and radiographic assessment performed

# Results: Demographics, Timing

## Demographics

- **n=17 patients**
- **Mean age = 15.5 years**
  - Range, 10-19 years



## Timing:

- **Mean time to re-fracture: 15.4 months**
  - Range, 1-38 months
- **<3mo post-1°Fx: n=6 (35%)**
  - 50% were non-compliant w/ restrictions

# Results: Re-Fx Rates per Tx Type

**ORIF**



**1.7% (2/117)**

**SLING**



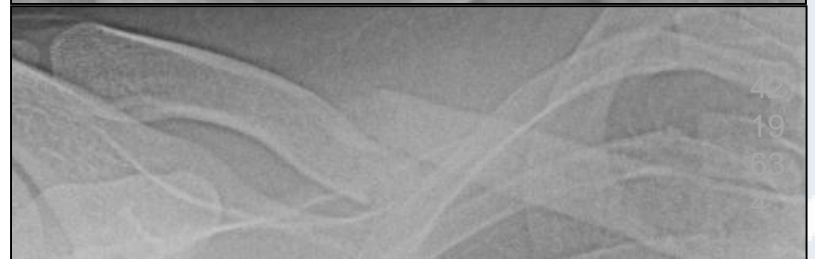
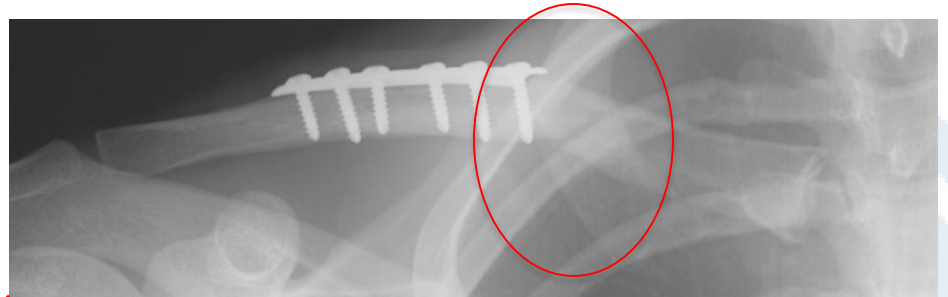
**2.9% (15/524)**

**∧**  
(p=0.03)

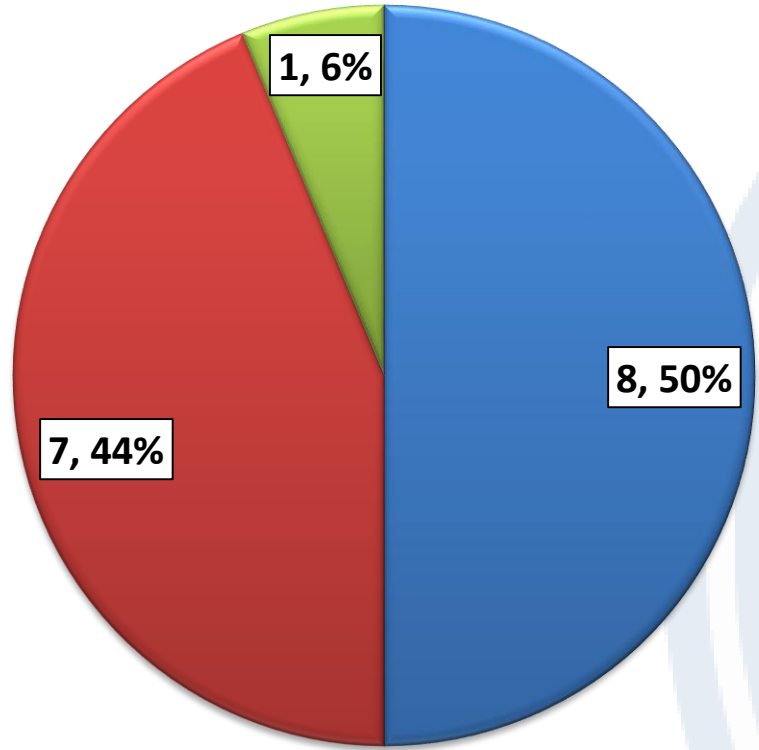


# Results: X-ray, Fx pattern

- **Non-Op (n=15)**
  - 100%: through prior site
- **Op (n=2)**
  - 1: adjacent to medial edge of plate
  - 1: through original fx site
    - 1.5y p plate removal



# Results: Re-Fracture Pattern



- Non-/minimally displaced
- Partially displaced/angulated
- Completely displaced

# Results: Treatment, Healing

## Treatment:

- **Plate fixation:**
  - 1 pt (previous fx treated non-operatively)
- **Non-Op**
  - All others

## Healing:

- **2-4 months: all successful union, RTS**

# Conclusions

- **Rate of Re-Fracture:**
  - Rare in adolescents (3%)
- **More common p non-operative tx**
- **Often occur prior to complete healing**
- **Possible contributing factors:**
  - Non-compliance
  - Insufficient f/u

# THANK YOU

