## Nonunion and Malunion of the Clavicle



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## 2017: Nonunion & Symptomatic Malunion Rate

- Nonunion:
  - Non-operative 53 / 292
  - 19%



Symptomatic Malunion:
Non-operative 31 / 292
10%



#### **Nonunion / Malunion**

Primary fixation dramatically reduces the rate of nonunion and symptomatic malunion

- Nonunion operative 1%
- Nonunion non-operative 20%

- Malunion operative 1%
- Malunion non-operative 10%



## Symptoms

- Orthopaedic: easy fatigueability, weakness, pain with repetitive or overhead work
- Neurologic: numbness, paraesthesiae with overhead activity or with pressure on shoulder

- Cosmetic: shoulder appears "droopy", "driven in", narrow or asymmetric, difficulty with clothing, backpacks etc.
- Pain at fracture site: if non-united













## Scapular "winging"







#### **31 year old male**

Fracture clavicle at work 14 months ago

Treated with sling

Ongoing pain and weakness

Working modified duties





## 45 yr old male cyclist

- ORIF fracture clavicle 18 months ago
- Fixation failure, plate removed 12 months ago
- No obvious infection but no C&S done
- Weak, painful shoulder with obvious motion at fracture site





Does delay matter? The restoration of objectively measured shoulder strength and patient oriented outcome in immediate fixation versus delayed reconstruction of displaced mid-shaft fractures of the clavicle.

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#### Conclusions

- Malunion and nonunion can be dramatically reduced by primary operative intervention
- Malunion / nonunion share characteristic deformity and presentation
- Operative intervention with deformity correction, plate fixation, and bone grafting is an effective intervention with a low complication rate
- Reconstruction of non-malunion is technically more difficult and not quite as good as 1° repair