Factors affecting quality of acromioclavicular joint reduction in arthroscopic indirect coracoclavicular fixation technique

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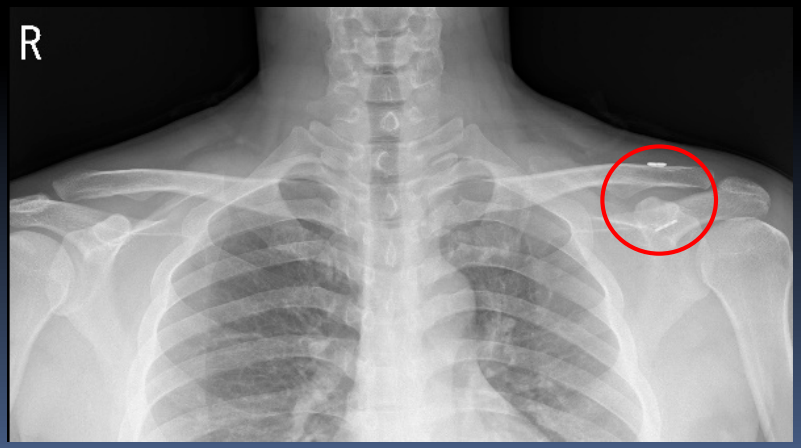
We have no financial conflicts to disclose

Background

- A/S indirect CC fixation using Tight-rope®
  - became popular due to strong fixation strength with minimal invasiveness and simplicity

- But, no exact guidelines allowing optimal reduction of AC joint on 3 dimensional view



Purpose

A/S indirect fixation technique using Tight-rope®,

- To know factors affecting the quality of AC joint reduction
- To determine the proper location of clavicle and coracoid in achieving optimal AC joint reduction

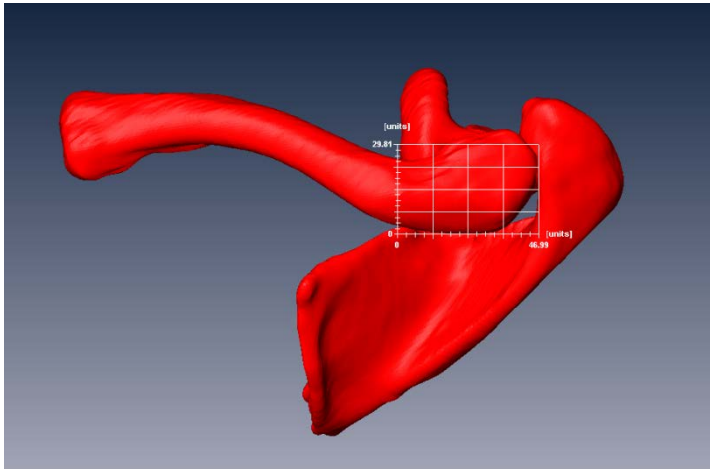
Study Design

- 47 patients(fixed using Tight-rope®)

- Postoperative CT scans : checked on postoperative 1day
- Reconstruction of 3D model from CT images Using Amira software with Grid system

- Evaluating
1) accuracy of reduction on 3D CT scans
2) tunnel position of clavicle/coracoid (Grid system)
3) type of dislocation
4) timing of surgery

- Exclusion criteria
- insufficient reduction on plain x ray
- delayed surgery over 1month



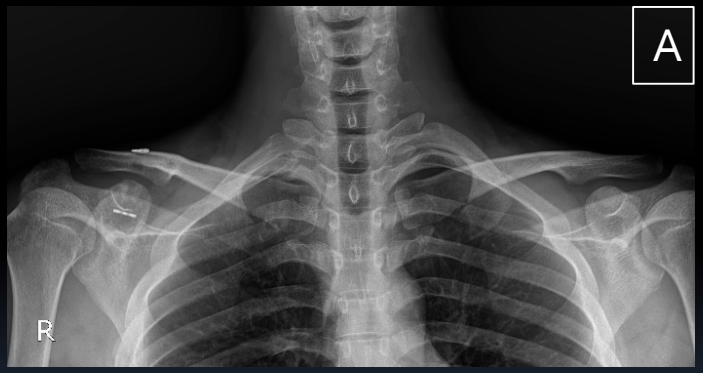
Methods & Materials

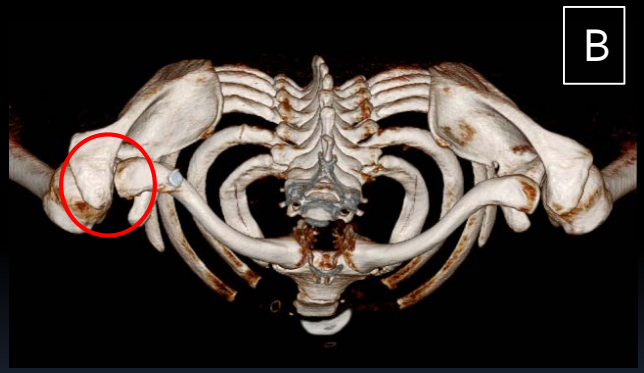
- Radiologic evaluation

- All patent had perfect reduction of AC and CC interval on plain shoulder AP x ray

A = high quality of reduction : Best fit or less than 1mm difference compared with contralateral AC joint on 3D CT scans

B = low quality of reduction: more than 1mm difference compared with contralateral AC joint on 3D scans





- The k statistic :

Interobserver and Intraobserver agreement (high/low)

2 assessors were 0.92 ($P < .001$) and 0.81 ($P<.001$)

Statistical Analysis

- Logistic regression analysis

- Evaluation of variables that can affect the quality of reduction
- Analysis of each clavicle and coracoid tunnel location influencing on quality of reduction based on Grid system

Independent variables

- mode of injury
- type of dislocation
- clavicle tunnel position
  lateral to medial
  posterior to anterior
- coracoid tunnel position
  medial , central, lateral
- timming of operation

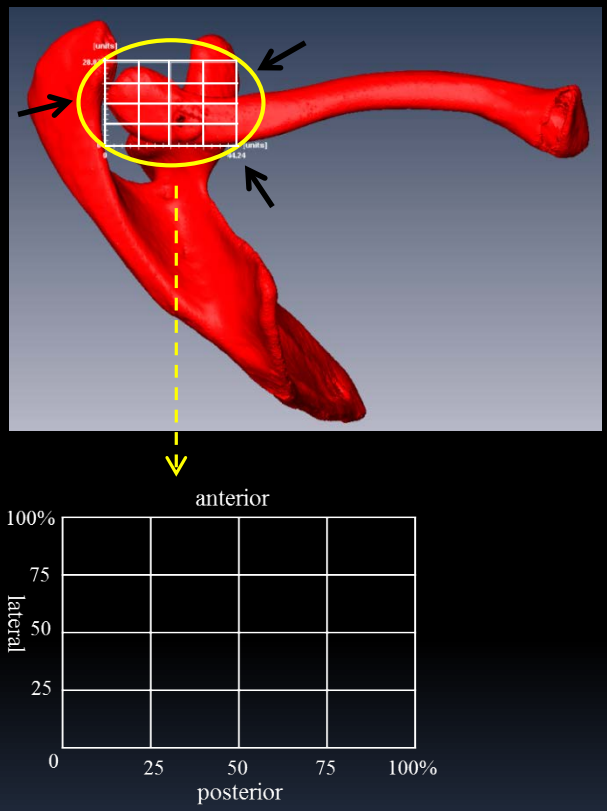
Dependent variables

- Quality of reduction
  High/low

Methods & Materials

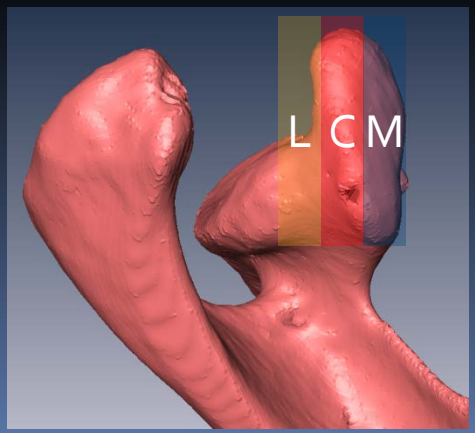
- Clavicle Tunnel position (Grid system)

  - Grid parallel to clavicle longitudinal axis
  - ant.margin: most anterior part of distal clavicle
  - post.margin: posterior cortex of clavicle
  - medial margin: just medial surface of coracoid process
  - lateral margin: most lateral tip of clavicle
  - subdivide by percentile

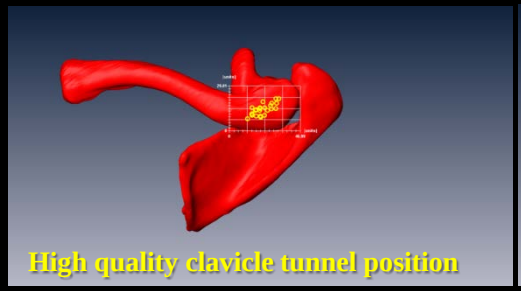


- Coracoid Tunnel position

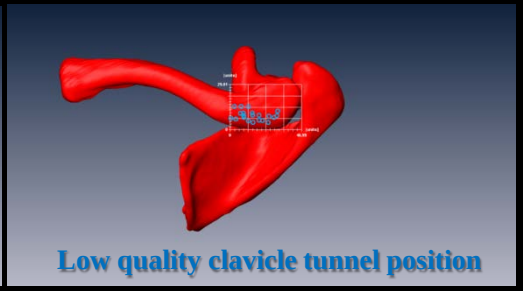
  lateral,center,medial



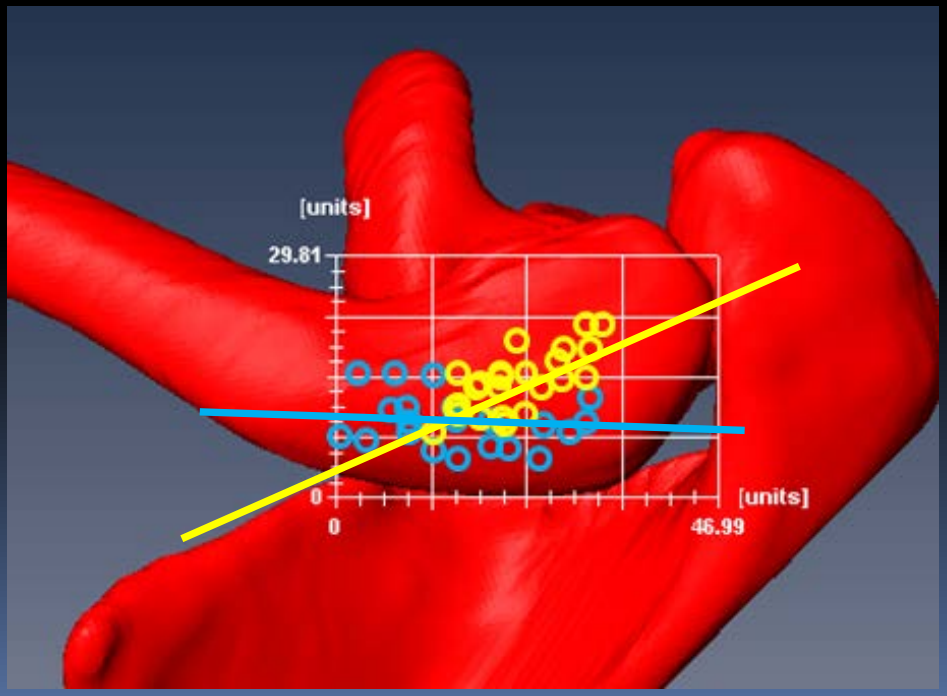
Results

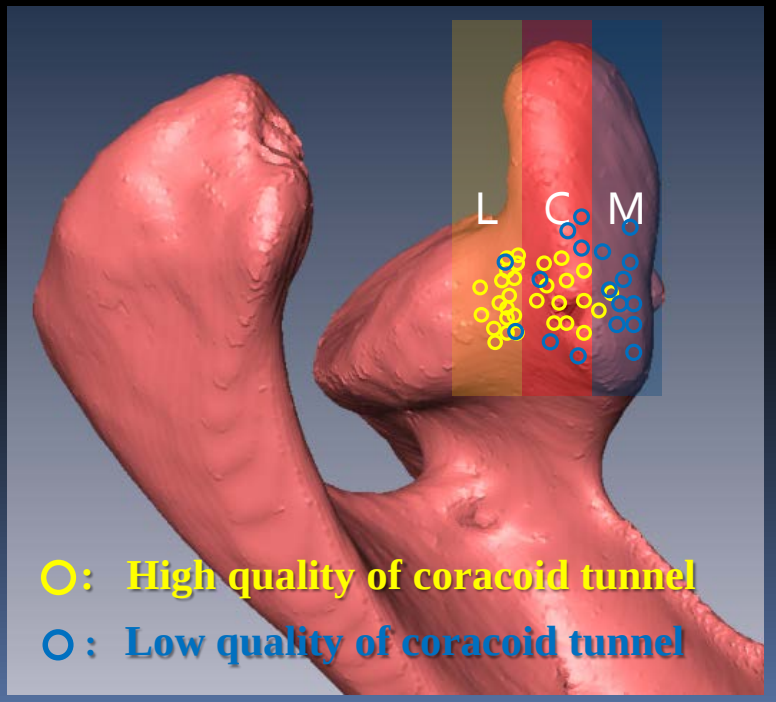


High quality clavicle tunnel position



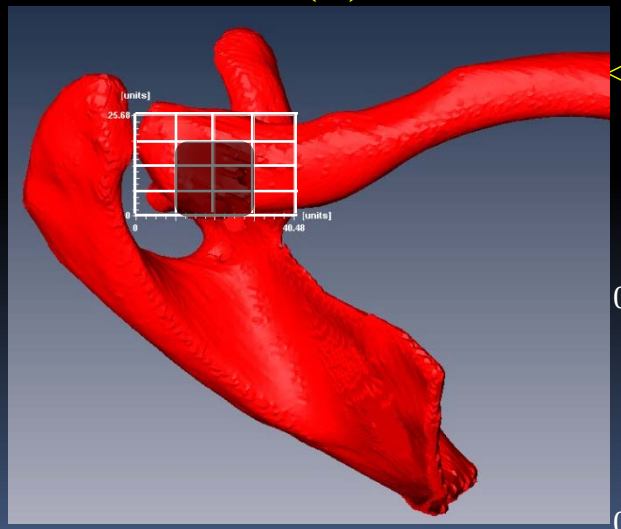
Low quality clavicle tunnel position





Results

	Degree of Reduction		p value
	high quality	low quality	
Rockwood classification			0.46
type 3	10 (14)	5 (14)	
type 4	0 (4)	4(4)	
type 5	17 (29)	13 (29)	
Coracoid tunnel position			<0.01
lateral	16 (18)	2 (18)	
cental	11 (17)	6 (17)	
medial	2 (12)	10 (12)	
Clavicle tunnel position			
longitudinal direction			<0.01
0-25%	0 (0)		
26-50%	10 (12)		
51-75%	19 (26)		
75-100%	0 (9)		
orthogonal direction			0.12
0-25%	8 (17)		
26-50%	21 (30)		
51-75%	0 (0)		
75-100%	0 (0)		
Time of surgery			0.33
> 7day	22 (40)	18 (40)	
< 7day	2(7)	5 (7)	



Result Summary

- All patients had a favorable radiologic result on plain x ray after A/S indirect reduction technique using endobutton
- 27/47 showed a 3 dimensional best fit of distal clavicle on medial acromion with top view of 3D CT
- Type of dislocation and timing of surgery did not affect radiologic outcome
- The group of laterally located coracoid tunnel showed high quality of reduction with statistical significance
- The group of midline located clavicular tunnel along distal clavicle showed high quality of reduction with statistical significance

Conclusion

- Lateral location of coracoid tunnel and midline location of clavicular tunnel along the long axis of distal clavicle were the best intraoperative predictor for reduction high quality of reduction during A/S indirect flip button technique

- However, this technique might not be appropriate for type IV dislocation although we failed to reach an agreement with statistical significance due to a small number of these cases

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