Posterior Tibial Slope Reducing Osteotomy At The Supra- Versus Infratuberosity Level: A Comparative Radiography-Based Morphometric Analysis Of Wedge Thickness Required To Correct One Degree Of Slope In A Multiple Revision ACL Cohort

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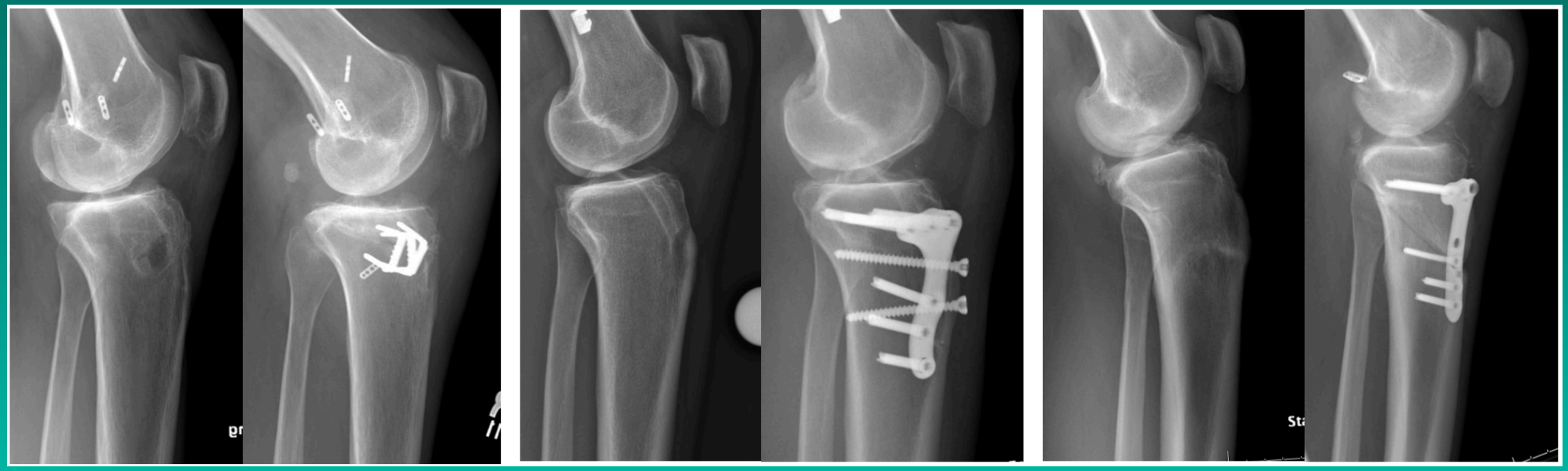
Background

Different techniques for slope reducing osteotomy

- Supratuberosity
- Tubercle reflecting transtuberosity
- Infratuberosity



Background

- Successful results reported after all techniques
- Indicated mostly in multiple revision ACL surgery
- No comparative studies
- "Matter of choice”

<u>Wedge thickness per degree correction in previous studies:</u>

1 mm is equal to 1°

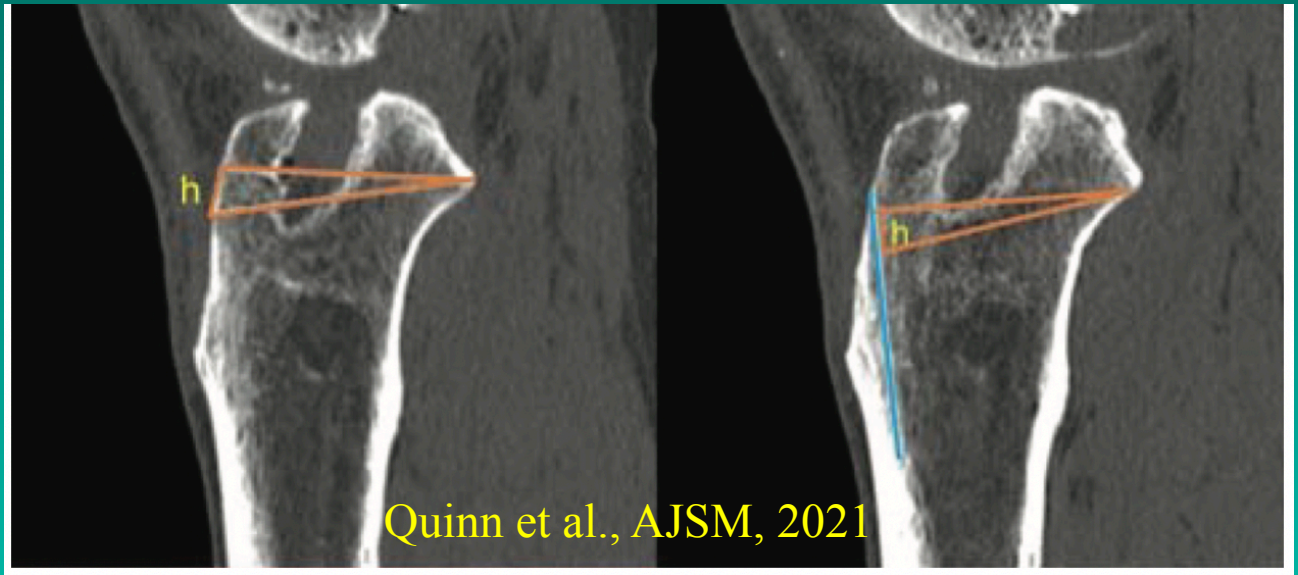
1.67 mm of anterior resection of the tibia equates to 1° of slope correction

Background

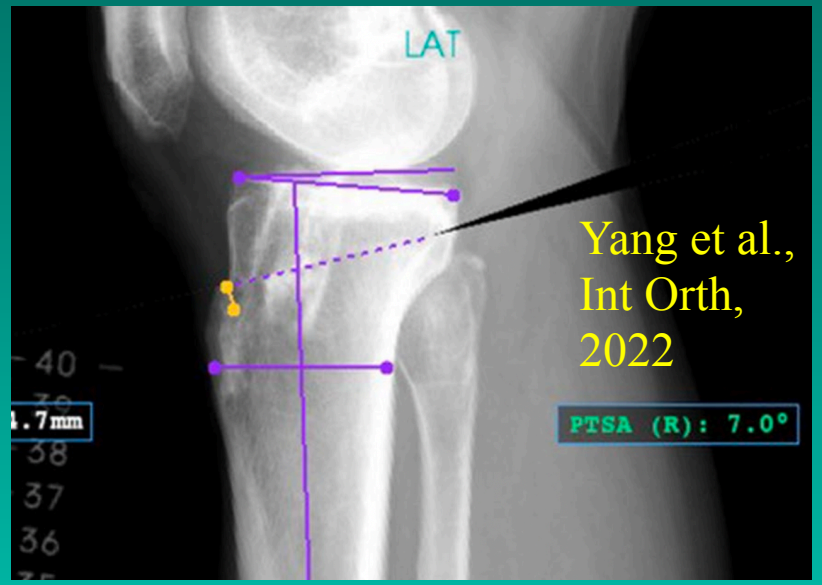
Analysis of wedge thickness and slope correction:

Supra- versus transtuberosity level: 1 mm per 1° for ST versus 0.8 mm per 1° for TT

Transtuberosity level: 1 mm per 1° results in overcorrection



Quinn et al., AJSM, 2021



Yang et al., Int Orth, 2022

Aims

- Determine surgical parameter differences between supra- versus infratuberosity level osteotomies
  - Required wedge thickness per 1˚ correction
  - Anterior cortical step-off distance after projected osteotomy
  - The effect of proximal tibial width on lateral view on the required wedge thickness per 1˚ correction
  - Cutting plane angle in relation to the anterior tibial crest
- Validate the measurements in a selected number of patients using MIMICS software and osteotomy modeling incorporating CT scans

Methods

Last 10 year surgical records
- revision ACL surgery
- of 7 high load surgeons

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Database search: 522 patients

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Surgical note confirmation: 504 patients

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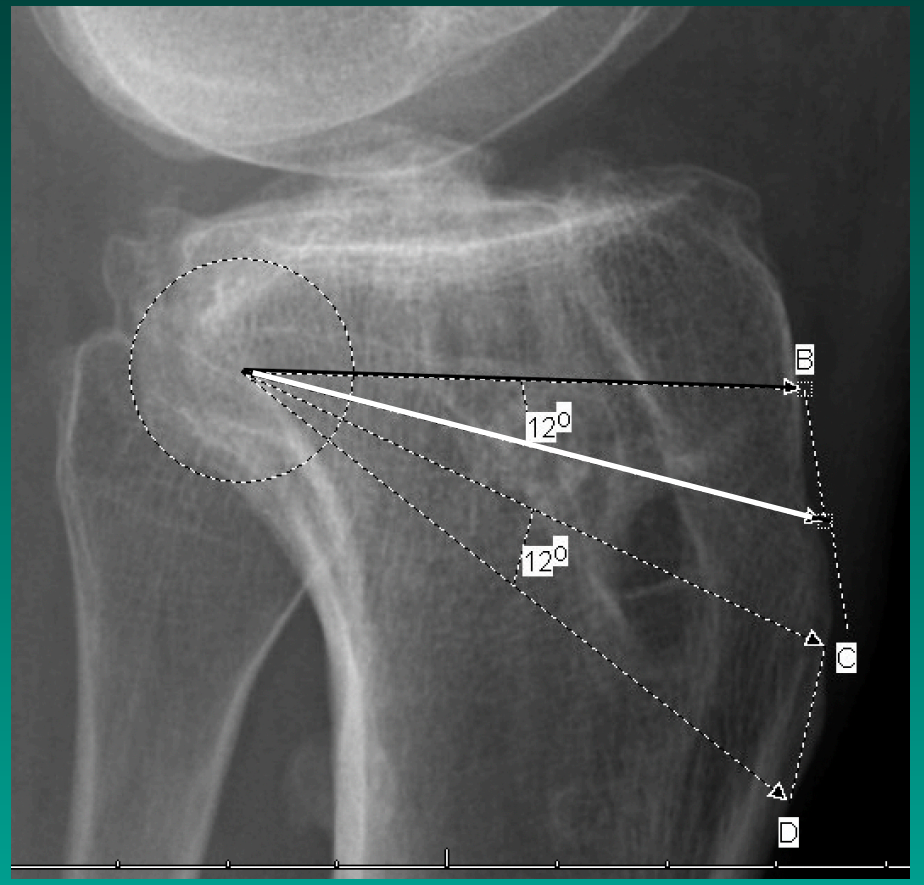
94 (19%) multiple revision ACL patients

- Of the 94 patients, 11 (12%) did not have appropriate strict lateral x-ray images in their medical records, i.e. ≤5 mm posterior or distal femoral condylar overlap and shorter than 12 cm proximal tibial lenght, and were excluded.
- The remaining 83 patients were analyzed.

- A total of 50 patients (60%) with a slope ≥12˚ were identified and included in this study

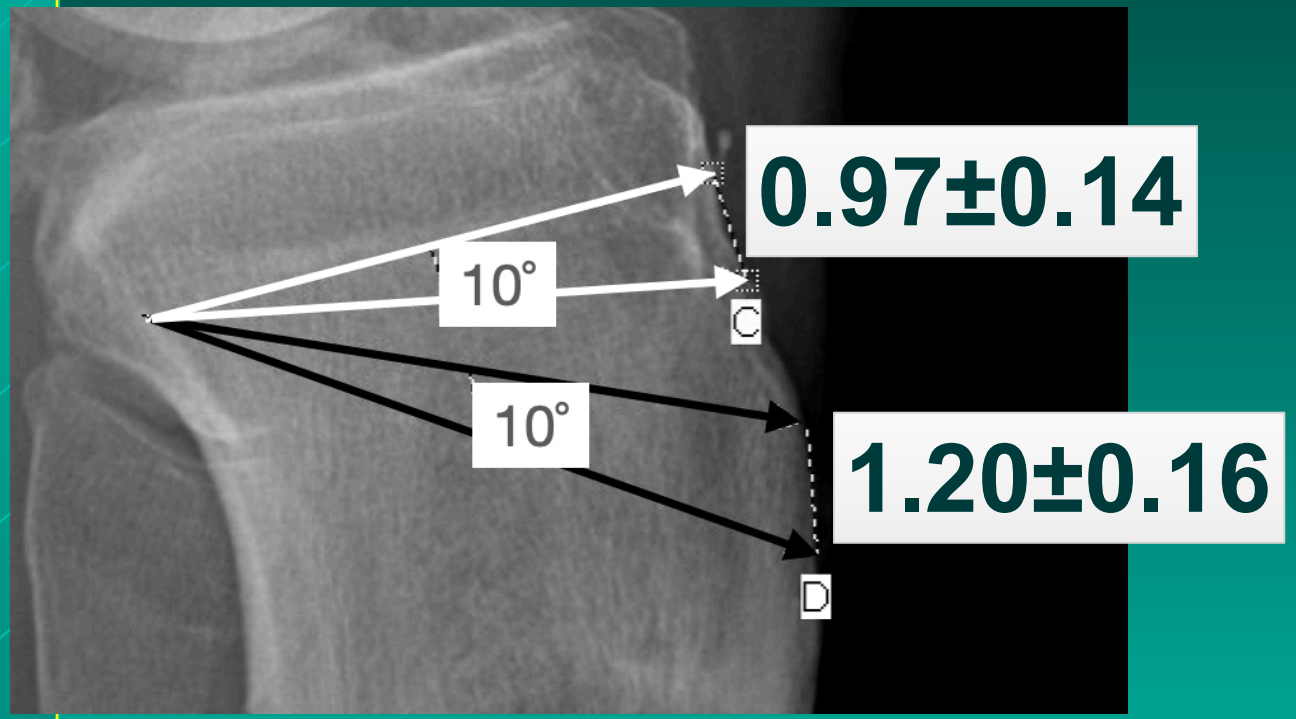
Methods

- The slope was measured in all patients using strict lateral x-ray using two circles
- The goal for the projected postoperative slope angle was set as 5˚
- A circle with a 1-cm radius was created and placed at the posterior curve of the proximal tibia
- The midpoint of this circle served as the hinge point
- Upper and lower osteotomy plane distances (from hinge point to anterior cortex) were measured for both techniques
- Proximal tibial width was measured: test for correlation with required wedge thickness per degree correction



Results

- Average tibial slope: 14.5˚±2
- Wedge thickness in cm per 1˚ correction:

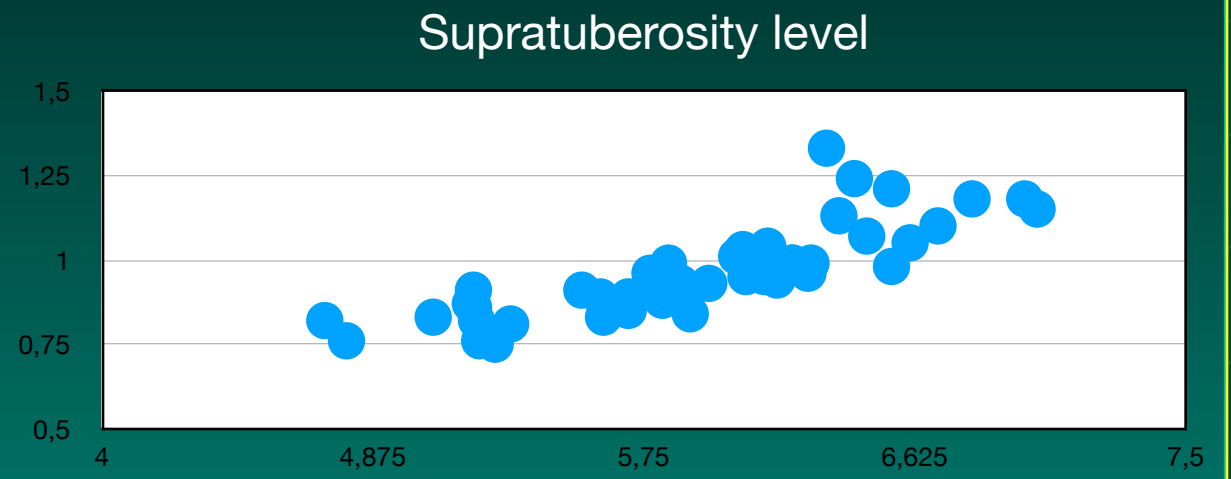


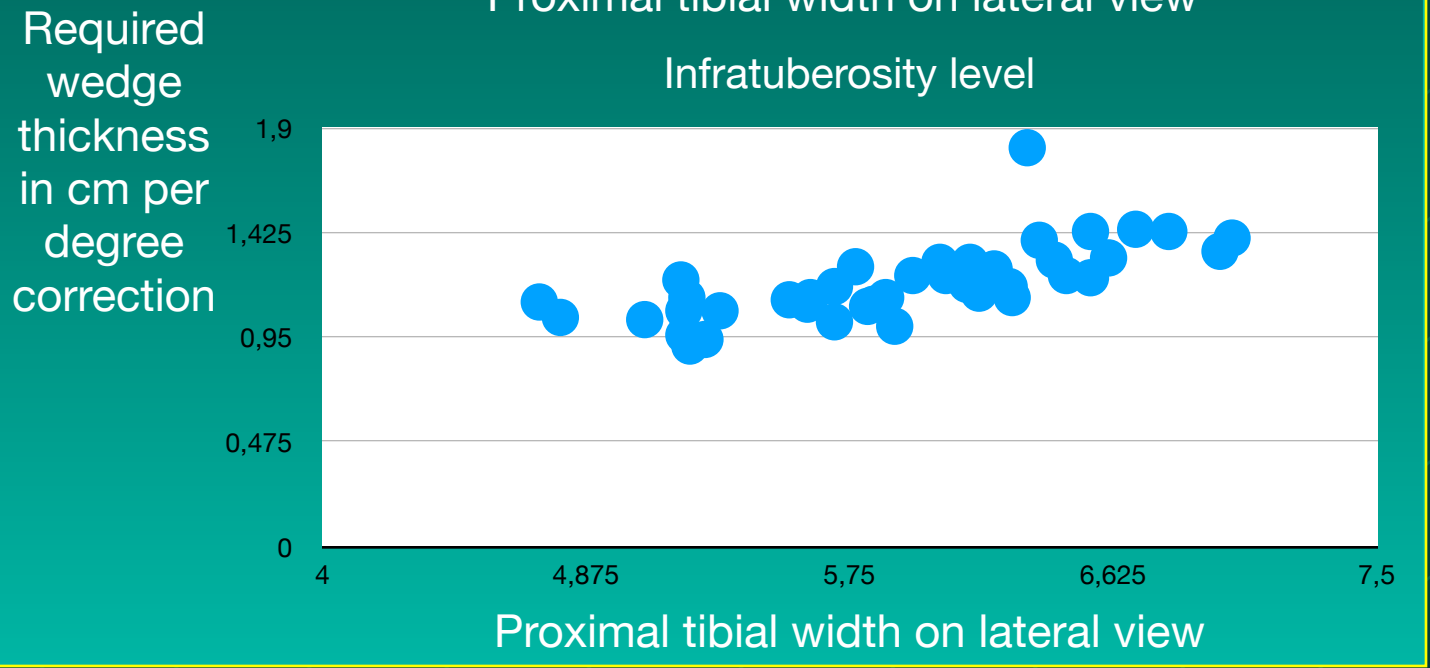
- Anterior step-off distance in cm

Results

Correlation between lateral tibial width and required wedge thickness per 1°

- Pearson Correlation:
- The value of R is 0.82 This is a strong positive correlation (supratuberosity)
- The P-Value is < .00001.
- The value of R is 0.65 This is a moderate positive correlation (infratuberosity)
- The P-Value is < .00001.





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Thank you

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