



# Does the MPTA Change During Slope Correction Due to Hinge Rotation?

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Conflict of Interest: None

# Posterior Tibial Slope

- An increased posterior tibial slope is discussed as a risk factor for anterior cruciate ligament (ACL) rupture<sup>1,2</sup>
- A critical threshold of  $\geq 12^\circ$  has been described<sup>3</sup>
- Slope-reducing osteotomies include, for example, infratuberositary anterior closing-wedge tibial osteotomy<sup>4</sup>
- These corrections are often performed during revision surgeries following ACL re-rupture.

# Changes in MPTA after Slope Reduction:



## MPTA Reduction

- 1.3° - Mayer et al. AJSM 2023
- 1.0° - Weiler et al. KSSTA 2022
- 0.95° - Cance et al. AJSM 2024

Does hinge axis rotation influence alignment?  
Is there a “neutral” hinge axis?

# Methods

## Retrospective data analysis



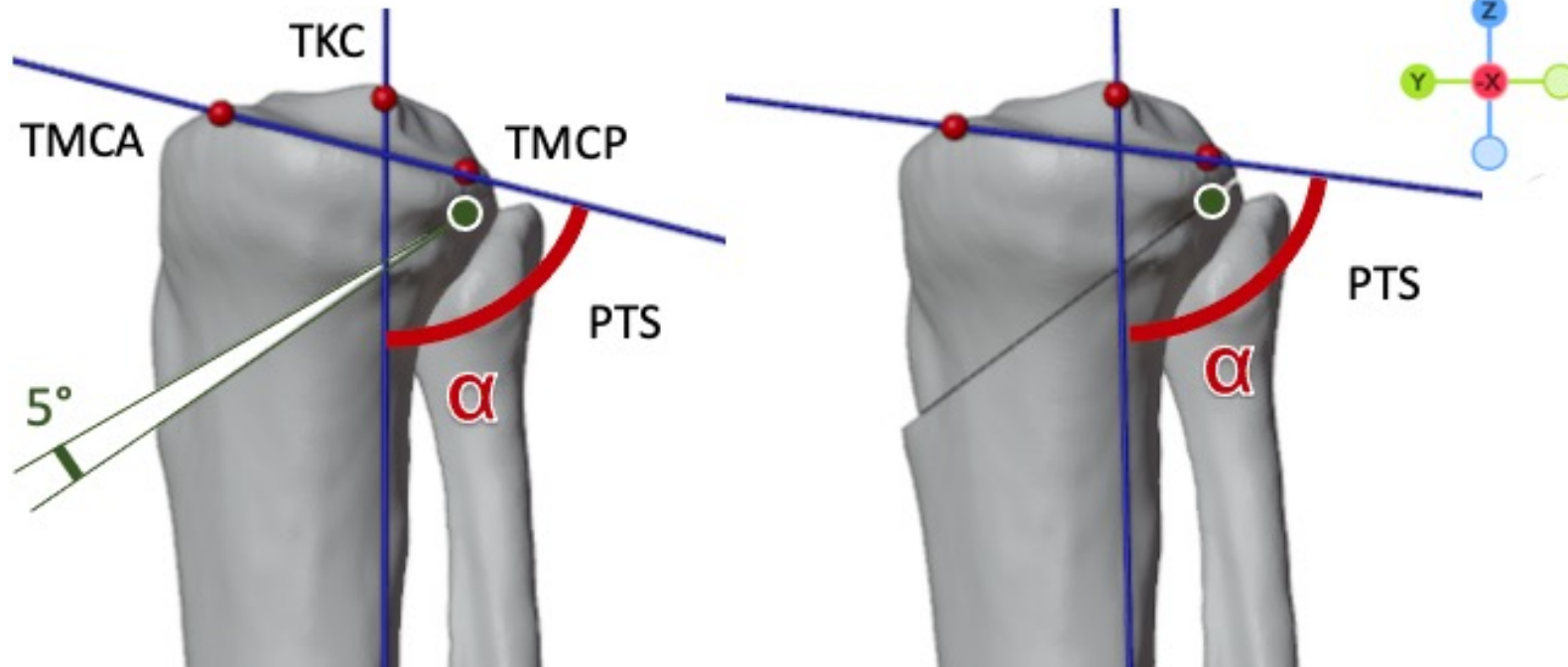
Generation of surface models and  
3D determination of anatomical  
landmarks<sup>1,2</sup>

## Outcome Parameter

Bony alignment:

- Hip-Knee-Ankle Angle (HKA)
- Posterior Tibial Slope (PTS)
- Mechanical Proximal Tibial Angle (MPTA)
- Tibial Torsion (TT)

# Anterior Closing-Wedge Tibial Osteotomy

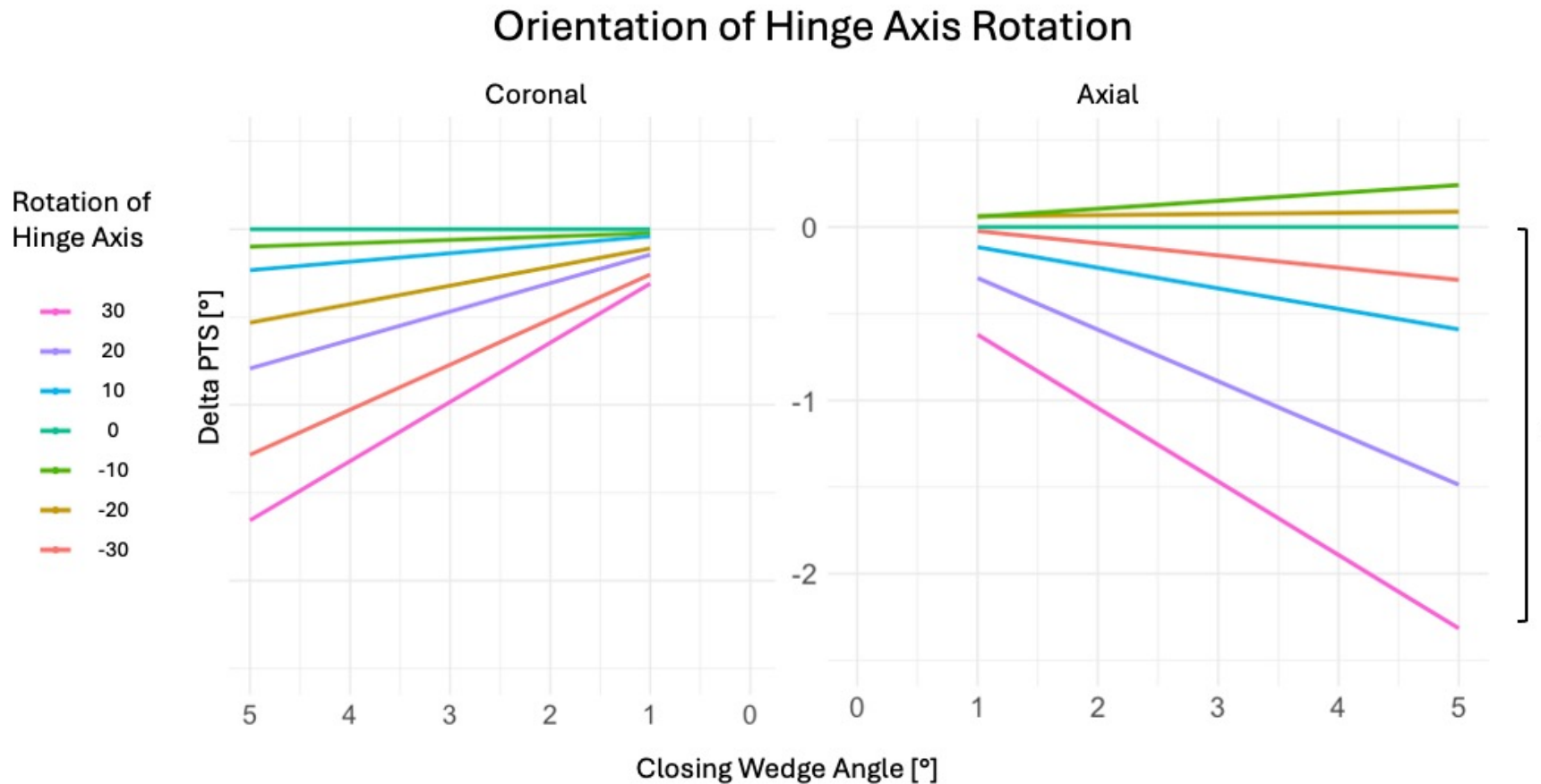


Infratuberositary osteotomy



# Posteriorer tibialer Slope

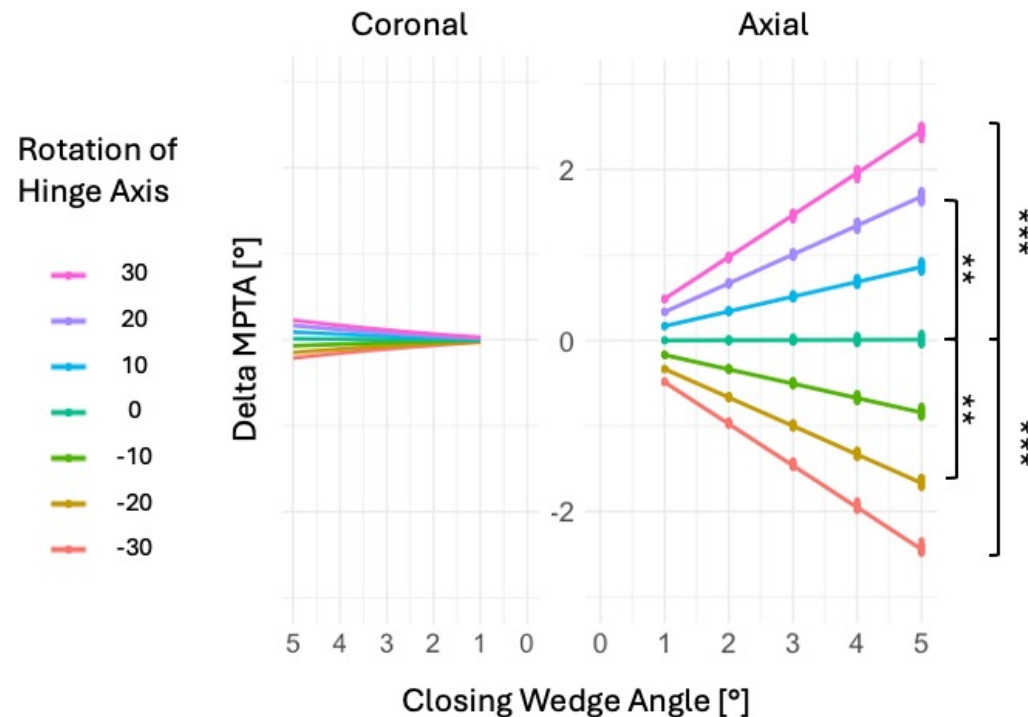
With hinge rotation, the slope-reducing effect of the osteotomy decreases



# MPTA Changes

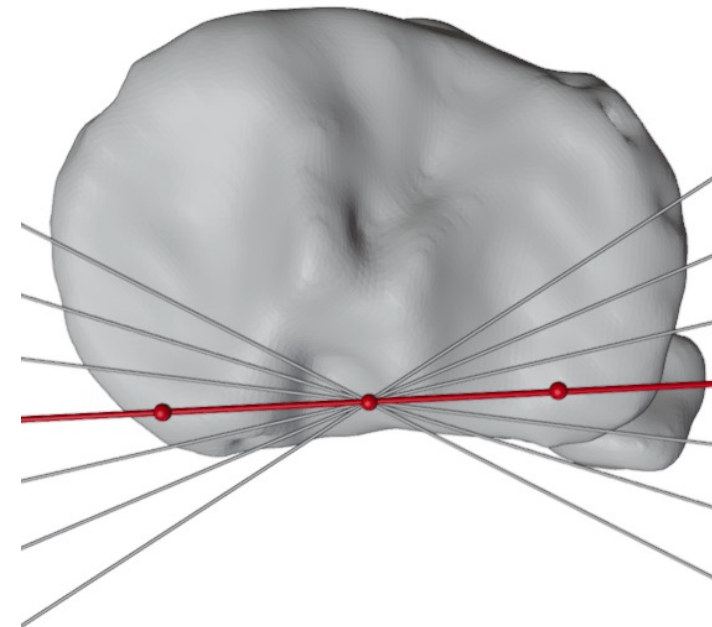
## Axial hinge rotation leads to changes in MPTA

### Orientation of Hinge Axis Rotation



Medial Anterior Lateral

+30°  
+20°  
+10°  
0°  
-10°  
-20°  
-30°

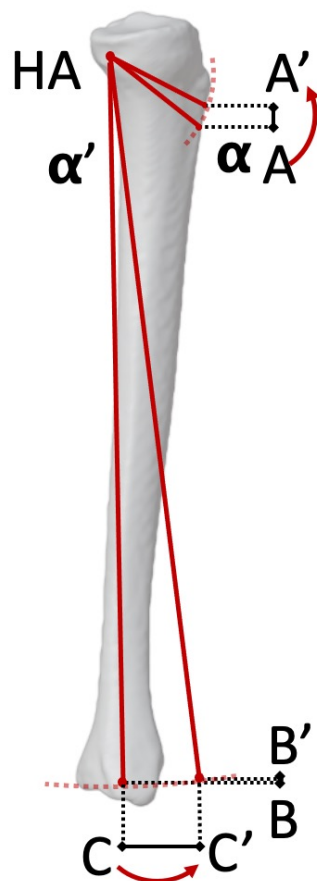


No correlation with the initial MPTA

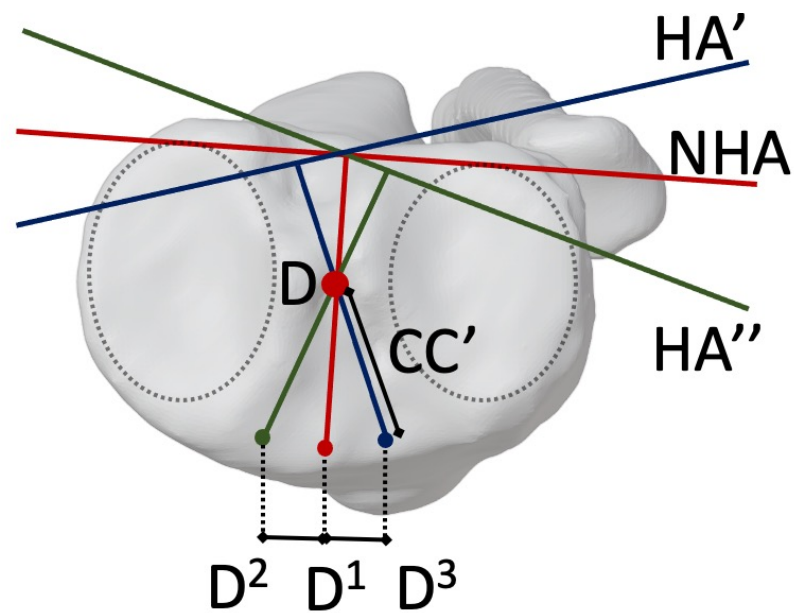


# Discussion

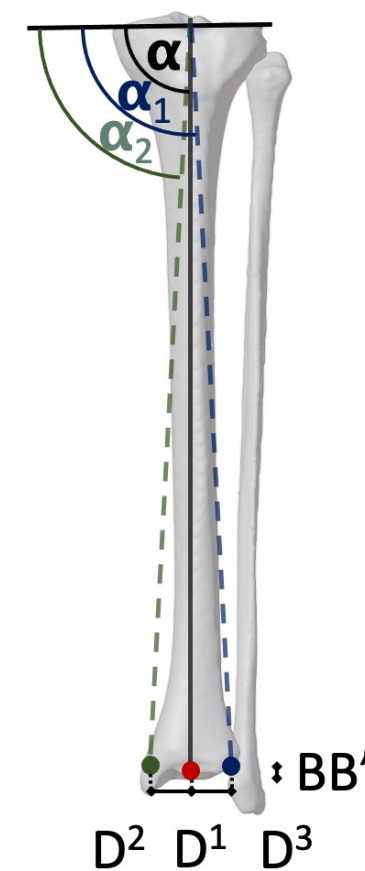
Sagittal



Axial



Coronal



# Limitations

## Theoretical considerations

- not all osteotomies are practically feasible

## Digital simulation

- soft tissue structures not considered

## Simulation-based design

- no physical execution of osteotomies

# Conclusion

## Axial hinge rotation alters the postoperative MPTA

### Clinical Relevance

Neutral hinge axis

parallel to posterior tibial cortex

Careful planning

Consider initial MPTA  
Ensure high-quality radiographs

Intraoperative control

Critically assess osteotomy on intraoperative  
radiographs

# References

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- Imhoff AB, et al. KSSTA 2019.
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- Dejour D, et al. KSSTA, 2015.
- Mayer SW, et al. AJSM, 2023.
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# Thank you!

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