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CONGRESS
2023



Boston
Massachusetts
June 18–June 21

TITLE:

Cortices of Fibula and Tibia Can Provide Landmarks for Accurate Syndesmotic Fixation Angle: Computed Tomography Validation of Angle Bisector Method

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Disclosures:
None.



- Syndesmotic injury accompanies approximately 10% of all ankle fractures.
- **M**alreduction rates up to 52%.

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Malreduction of the Tibiofibular Syndesmosis in Ankle Fractures

Michael J. Gardner, M.D.; Demetris Demetrakopoulos, M.D.; Stephen M. Briggs, P.A.-C.; David L. Helfet, M.D.; Dean G. Lorch, M.D.
New York, NY

- Syndesmotic reduction is the only significant predictor of functional outcome?

Predictors of Functional Outcome Following Transsyndesmotic Screw Fixation of Ankle Fractures

Brad Weening, MD,* and Mohit Bhandari MD, MSc, FRCSC*†



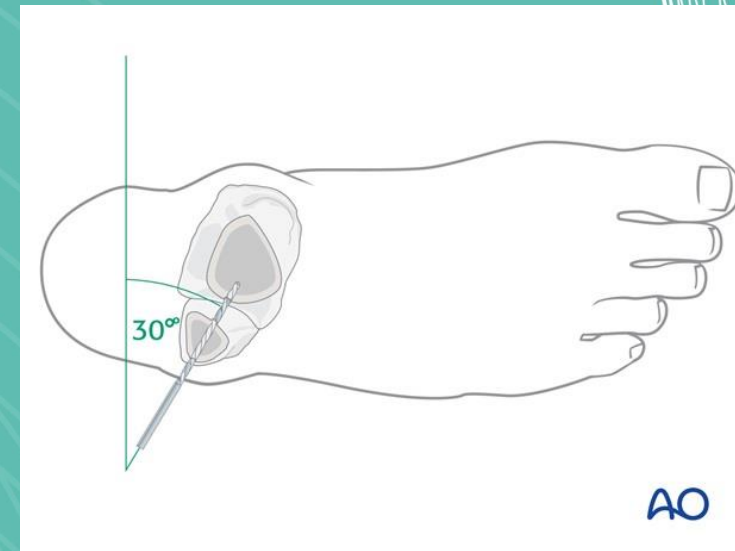
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General recommendations for fixation;

- 2 or 3.5 cm proximal to tibial plafond
- 20-30° trajectory in the coronal plane.



- Not patient-specific (8-38°)
- Not-level-specific
- Surgeon-dependent

FULL LENGTH ARTICLE | VOLUME 59, ISSUE 6, P1224-1228, NOVEMBER 01, 2020

Ideal Angle of Upper and Lower Syndesmosis Fixation Based on Weightbearing Computed Tomographic Imaging in Uninjured Ankles

Troy J. Boffeli, DPM, FACFAS • Collin G. Messerly, DPM • Tyler K. Sorensen, DPM

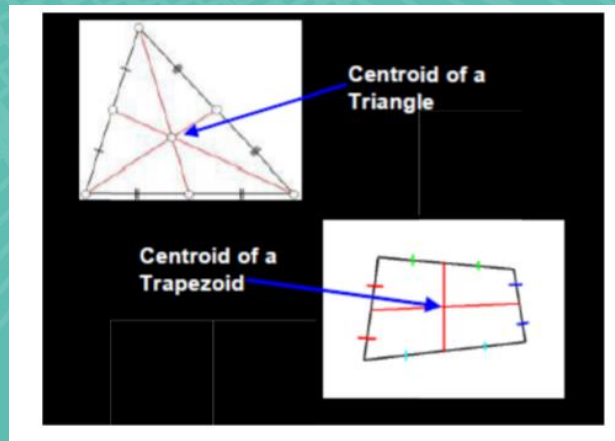


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The true syndesmotic axis:
centroidal axis which
connects trapezoidal or
triangular centroids of tibia
and fibula



If tibia and fibula were circles, then the angle bisectors of two lines tangent to tibia and fibula would be the true centroidal axis.

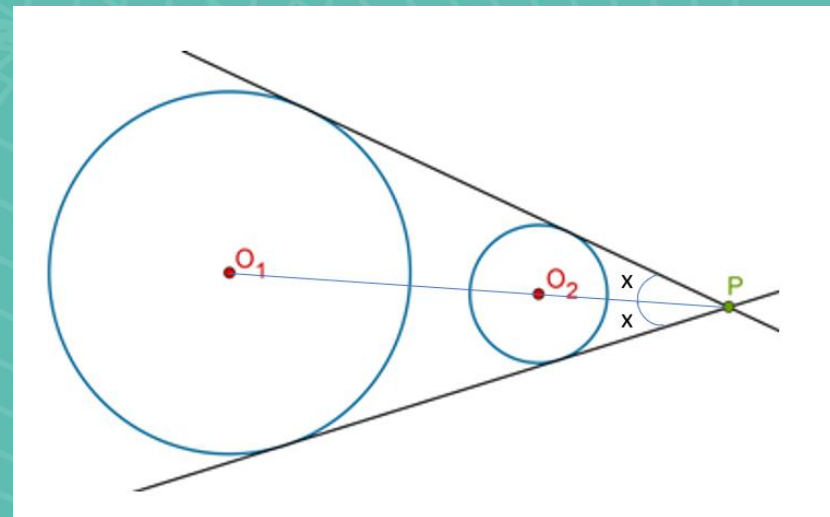
Contents lists available at ScienceDirect

The Foot

journal homepage: www.elsevier.com/locate/foot

A computed tomography evaluation of two hundred normal ankles, to ascertain what anatomical landmarks to use when compressing or placing an ankle syndesmosis screw

M.T. Kennedy^{a,*}, O. Carmody^a, S. Leong^b, C. Kennedy^c, M. Dolan^c



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AIM

This study aimed to evaluate a new patient specific and non-surgeon dependent method for determining the angle of syndesmotomic fixation

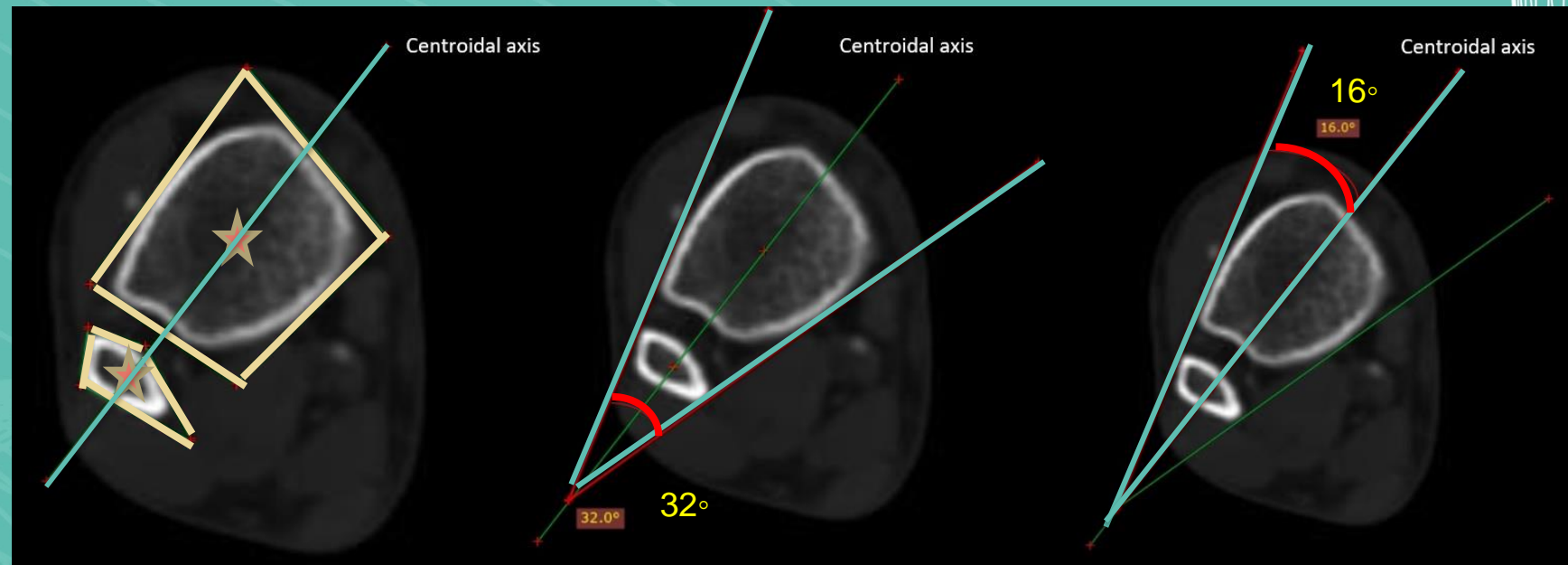
HYPOTHESIS

The angle bisector method provides an accurate angle with low variability for syndesmotomic fixation

METHOD

- Lower extremity CT angiography of 50 consecutive patients (25 male, 25 female) without foot and ankle pathology
- Lines tangent to anterior and posterior surfaces of tibia and fibula were drawn in axial plane 2 cm proximal to tibial plafond and the angle between these lines was calculated
- The bisector of this angle and the centroidal axis between tibia and fibula which is proposed to be the ideal syndesmosis line were drawn
 - The angle between bisector line and centroidal axis was calculated by two blinded observers





- The average value between centroidal axis and angle bisector;
 - Observer 1: 1.72 (± 1.14 , range: 0-4.2).
 - Observer 2: 2.34 (± 1.61 , range: 0-7.4).
 - Interobserver correlation coefficient: **0.96**
- The defined bisector method was found **reliable** providing precise direction for syndesmotic fixation.



Intraoperative simulation of angle bisector method;

- Two K-wires tangent to anterior and posterior surfaces of tibia and fibula were placed
- Angle between these K-wires was calculated with the help of a sterile goniometer.
- The drill and screw of syndesmotic fixation were applied in the direction of angle bisector.



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PITFALLS

- K-wires should not be bent during placement.
- Plates can interfere with the placement of K-wires and entry point.
- K-wires might disturb neurovascular structures.

LIMITATIONS

X Intraobserver reliability

X Measurement at different levels

X Clinical application



CONCLUSIONS

- Fixation angle that is patient-specific and non-surgeon-dependent
- Can help to prevent syndesmotic malreduction and to achieve better clinical outcomes
- The proposed method is suitable for the development of a syndesmotic guide.





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THANK YOU!



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