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Presentation Title

Retromalleolar fibular groove morphology is affected by the captured level of the axial CT scans

Presenter / Author(s)

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Faculty Disclosure Information

- **The authors have nothing to disclosure**

Introduction and Objective

- **Peroneal tendon pathologies commonly cause symptoms on the posterolateral side of the ankle joint [1, 2]**
- **It still remains controversial whether the shape of retromalleolar groove is a risk factor of peroneal tendon pathologies [3]**
- **This study aimed to evaluate the influence of the level of axial CT scans on the assessment of the shape of retromalleolar fibular groove**

Materials and Methods

Between Jan 1, 2020 and Jan 1, 2023

Medical records and CT images of patients who underwent CT scans to evaluate foot or ankle pathologies were retrospectively reviewed

Exclusion criteria

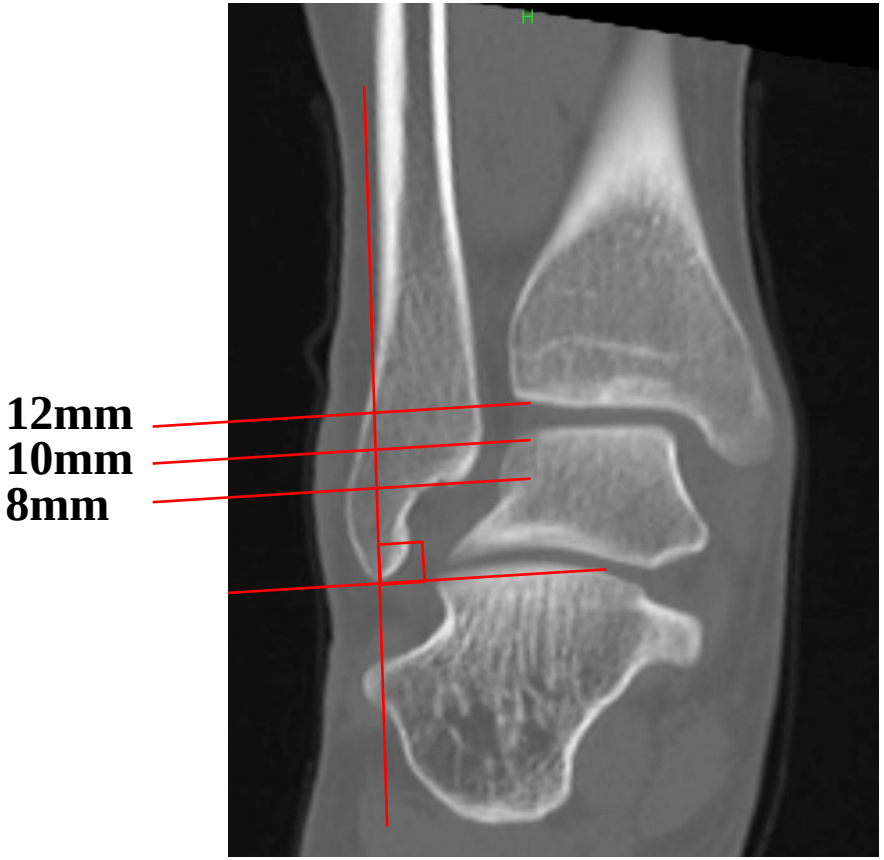
- ✓ **Foot or ankle fracture**
- ✓ **History of surgical treatment of the fibula**
- ✓ **OA ankle**
- ✓ **Peroneal tendon disorders**
- ✓ **Chronic lateral ankle instability**
- ✓ **Open growth plate of the distal tibia and/or fibula**
- ✓ **CT scans obtained without slice distance of 2.0mm**

CT scans
Slice distance: 2.0mm

Materials and Methods

Classification of the retromalleolar fibular groove shape

4 types: Concave, Flat, Irregular, Convex [4]



The groove shape was evaluated at 3 continuous axial CT images

Two orthopaedic surgeons independently evaluated the groove shape

κ coefficient

Intra-rater reliability > 0.8 (almost perfect)

Inter-rater reliability > 0.6 (substantial)

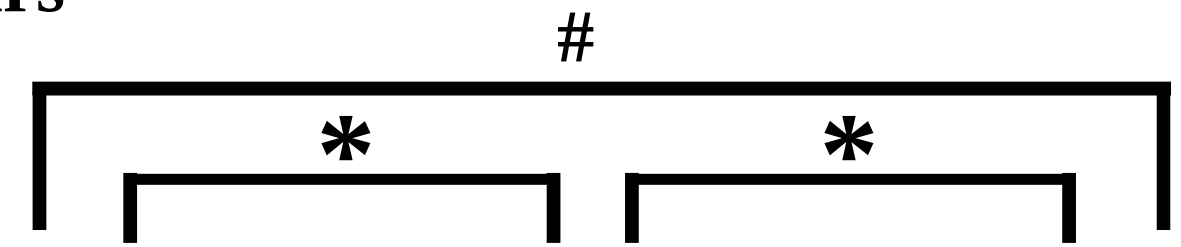
Results

A total of 122 ankles of 122 patients were finally included

mean age: 27.9±11.8 years

male/female: 69/53

right/left: 71/51



* P <0.001

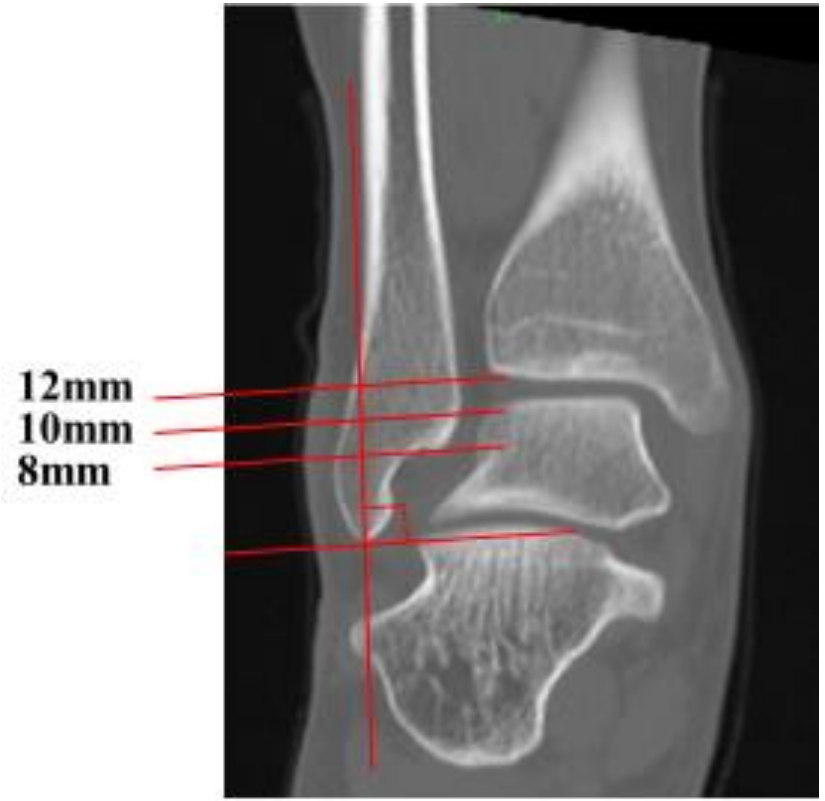
\# P =0.001

Type	8mm level	10mm level	12mm level
concave	32 (26.2%)	43 (35.2%)	32 (26.2%)
convex	58 (47.5%)	47 (38.5%)	41 (33.6%)
flat	30 (24.6%)	30 (24.6%)	39 (32%)
irregular	2 (1.6%)	2 (1.6%)	10 (8.2%)

Results

Retromalleolar fibular groove shape in each CT level

- **Same through three axial scan levels: 38/122 (31.1%)**
- **2/3 are same: 73/122 (59.8%)**
- **All different: 11/122 (9.0%)**



Results

Gender differences

8mm level

Type	Male	Female
concave	21 (30.4%)	11 (20.8%)
convex	32 (46.4%)	26 (49.1%)
flat	15 (21.7%)	15 (28.3%)
irregular	1 (1.5%)	1 (1.9%)

(p=0.64)

10mm level

Male	Female
28 (40.6%)	15 (28.3%)
27 (39.1%)	20 (37.7%)
13 (18.8%)	17 (32.1%)
1 (1.5%)	1 (1.9%)

(p=0.32)

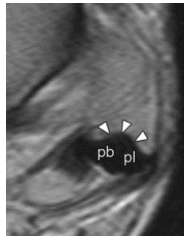
12mm level

Male	Female
17 (24.6%)	15 (28.3%)
24 (34.8%)	17 (32.1%)
20 (29.0%)	19 (35.9%)
8 (11.6%)	2 (3.8%)

(p=0.38)

Discussion

The majority of previous studies



- **Single axial MRI slice**
- **10mm above the tip of the lateral malleolus [1, 3, 4, 5]**

Evaluation at two levels

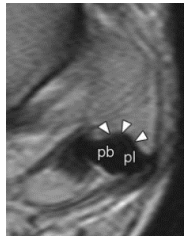
- ✓ **Tibial plafond level and 10mm proximal to the fibular tip [6]**
- ✓ **Tibial plafond level and center between the TP and fibular tip [7]**

☆ *In the present study*

- ✓**The groove shape statistically differed according to the axial CT scan level**
- ✓**About 70% did not show the same groove type through three CT scan levels**

Discussion

The majority of previous studies



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The study findings suggest that the type of retromalleolar groove should be assessed using multiple slices (not only one slice)

Limitations

- **Not evaluating other CT scan levels**
- **Not evaluating patients with peroneal tendon pathology**
- **Not considering 3D morphology of the groove**
- **Not evaluating MRI scans**

Conclusions

- **This study evaluated the retromalleolar fibular groove morphologies on the three different axial CT scans.**
- **The groove morphology was affected by the level of the axial CT scan.**
- **Approximately 70% of the patients showed different types of groove morphology among the three CT scan levels.**

References

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4. Rosenberg et al, AJR Am J Roentgenol, 2003
5. Wang et al, Radiographics, 2005
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7. Nishimura et al, Am J Sports Med, 2023