Evaluation of Hounsfield Unit Values of the Subchondral Bone in the Healthy Talus

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ISAKOS CONGRESS 2025

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Disclosure of Conflict of Interest

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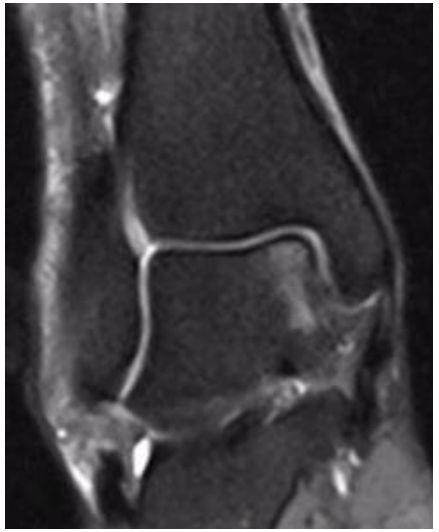
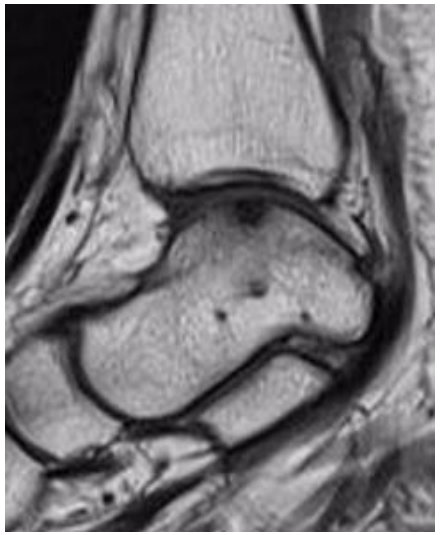
The presenter has no financial conflicts of interest to disclose concerning the presentation.

Osteochondral lesions of the talus (OLTs)

- ✓ OLTs are lesions of the articular cartilage of the talus and underlying the subchondral bone, which occur most frequently in the centromedial zone of the talus.





Hounsfield unit (HU)

- ✓ HU values on computed tomography (CT) allow quantitive evaluation of the bone quality.
- ✓ The HU values correlate with bone mineral density measurements at the femoral neck and lumbar spine.

Purpose

- ✓ To clarify the HU values of
  the healthy subchondral bones of the talus.

Hypothesis

- ✓ The subchondral bone quality of the talus may be related to occurring OLTs and the HU values in the centromedial zone would be lower than in the other zones of the talus.

Materials

August 2017 – March 2024

- Patients who underwent CT of the ankle

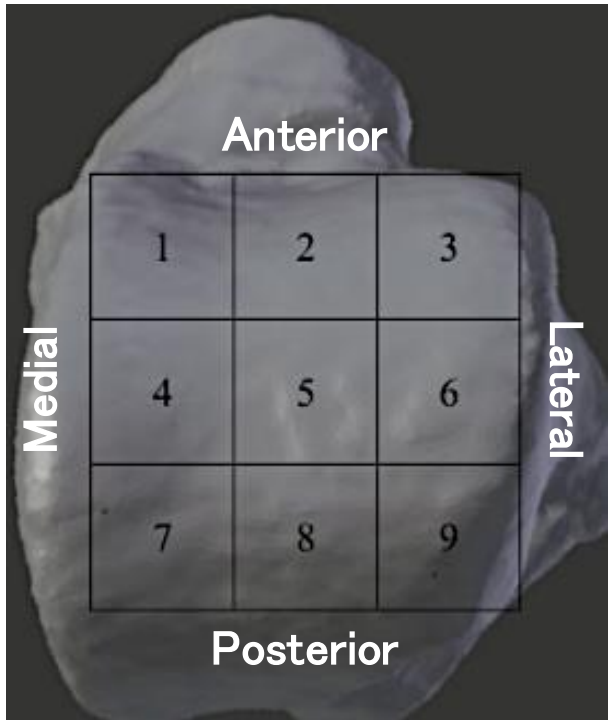
Exclusion criteria;

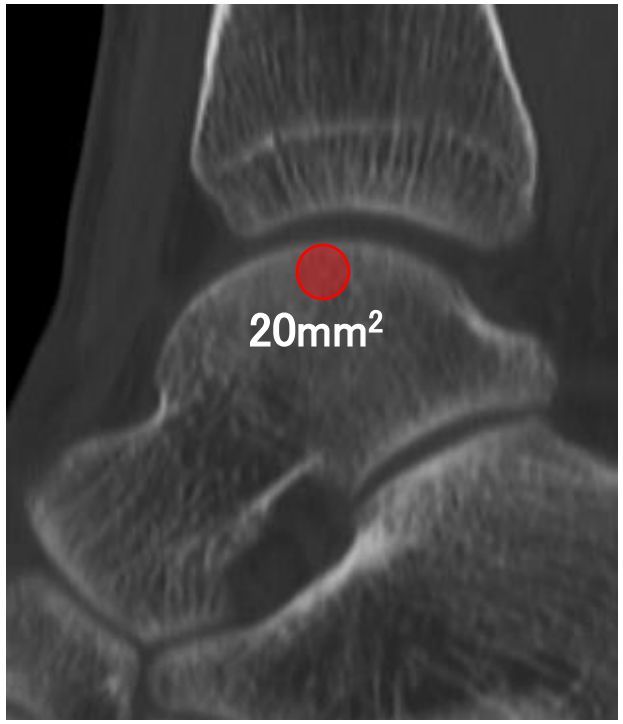
- ✓ The patients younger than 18 years and older than 60.
- ✓ The patients with histories of ankle trauma.
- ✓ The patients with histories of surgery in lower extrimities.
- ✓ The patients with histories of systemic inflammatory diseases such as rheumatoid arthritis.

Methods

- ✓ Assigned nine zones to the talar dome in an equal 3 × 3 grid configuration according to the previous studies, the HU values of the region of interest (ROI) were measured.

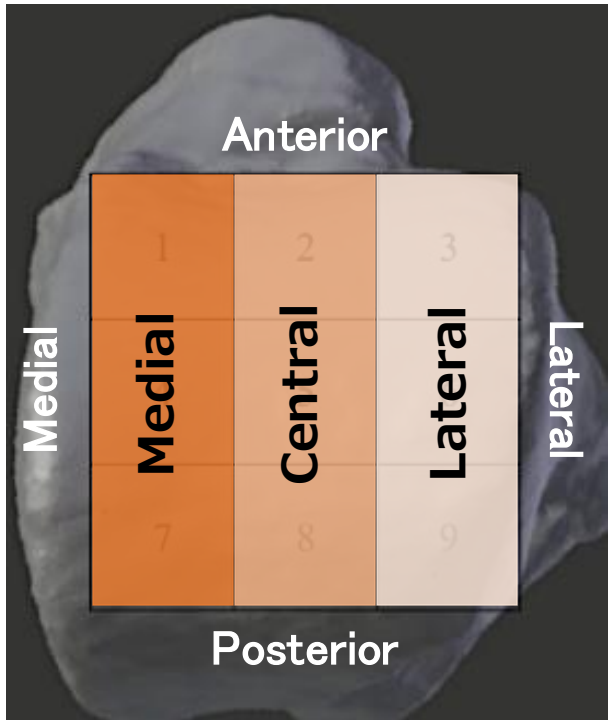
- ✓ The ROI in a 20-mm^2 circle in the subchondral bone on CT sagittal images was evaluated on the talus in each 9-zones.

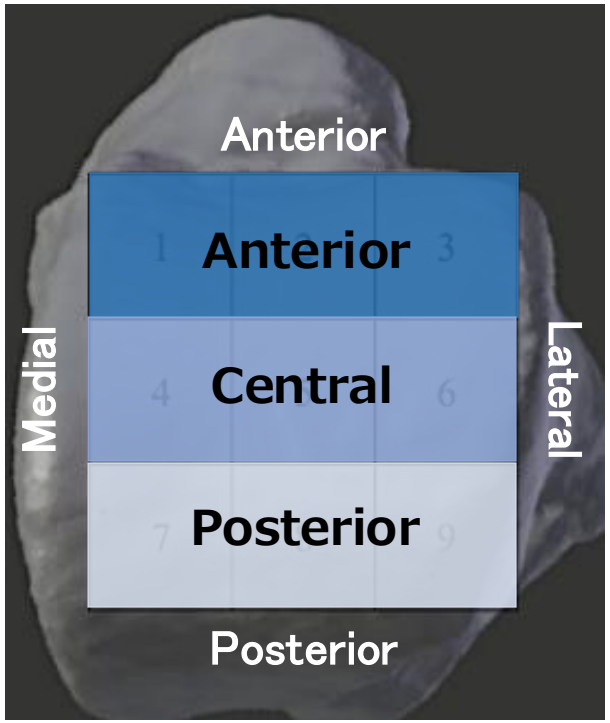




Methods

- ✓ The mean HU values were measured for the three row groups: medial, central and lateral.
- ✓ The mean HU values were measured for the three row groups: anterior, central and posterior.





Results

Patients who underwent CT of the ankle between August 2017 and March 2024.

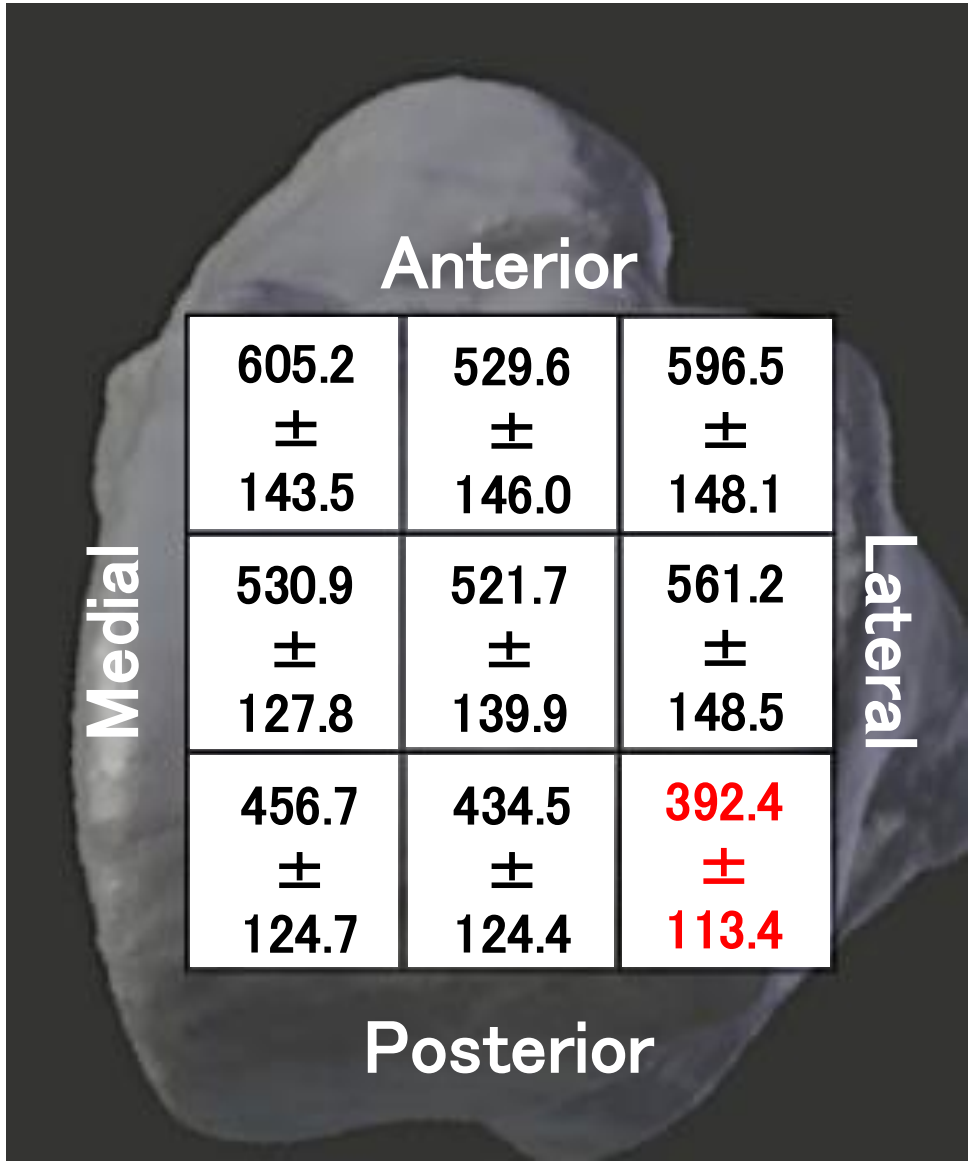
Exclusion criteria;
- Younger than 18 years and older than 60.
- Histories of ankle trauma.
- Histories of surgery in lower extrimities.
- Histories of systemic inflammatory diseases such as rheumatoid arthritis.

A total of 43 ankles of 40 patients included in the study.

n	43 ankles in 40 patients
Sex, male/female, n	26/14
Age, years*	35.3±13.1
Side, right/left, n	20/23
Height, cm*	168.2±9.9
Weight, kg*	69.1±16.0
BMI, kg/m^2*	24.2±3.9

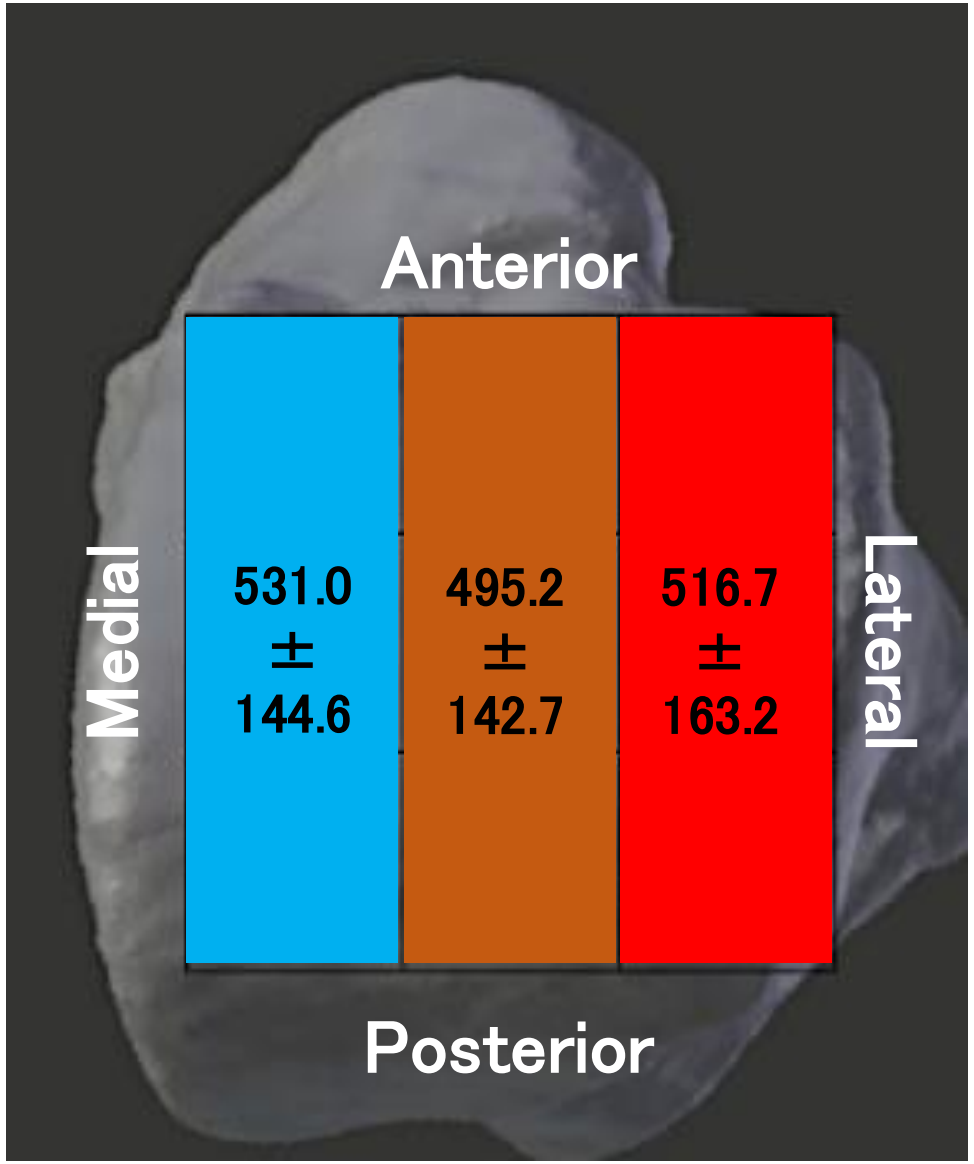
*Values are expressed as mean ± SD.

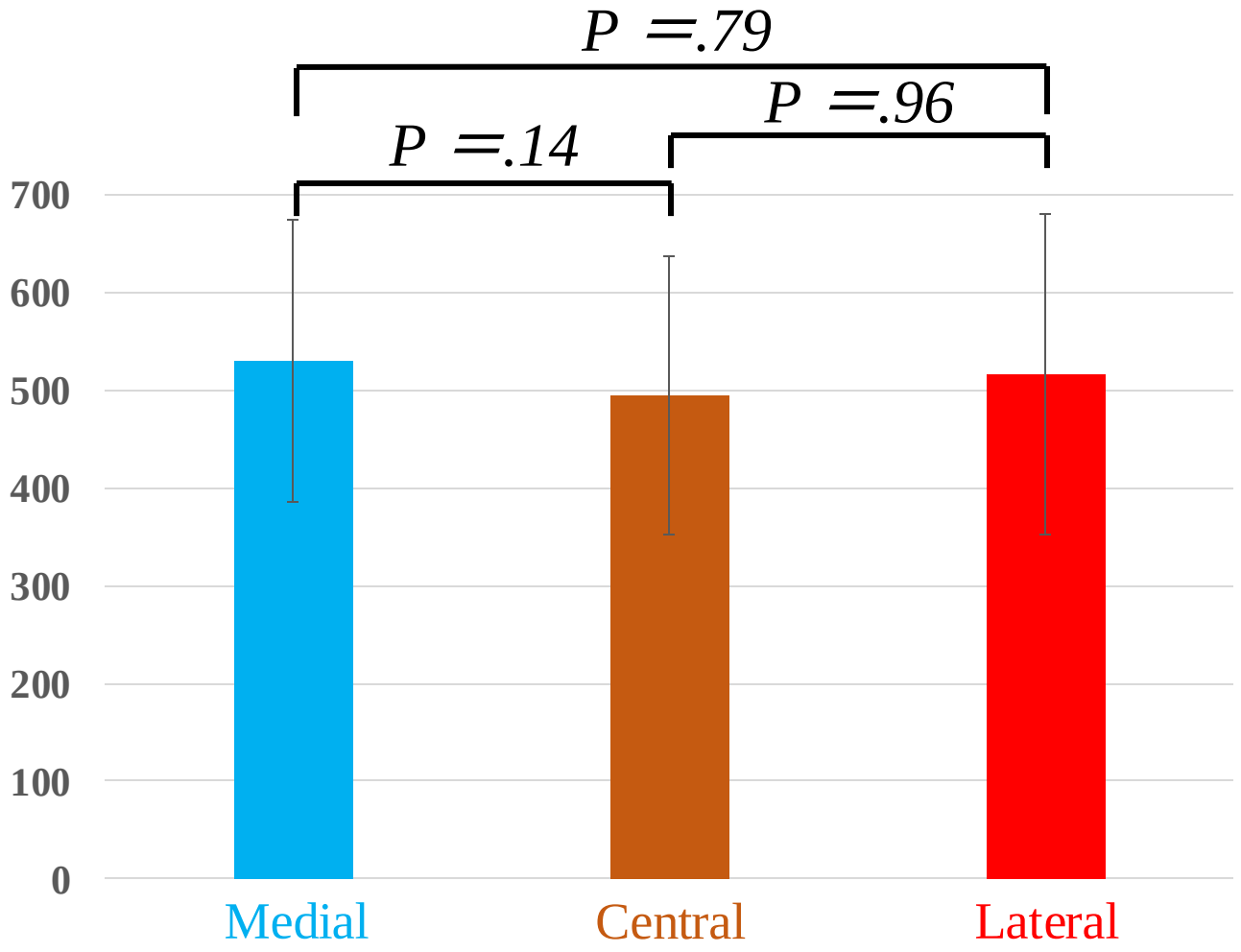
Outcomes



- ✓ The mean HU value in the posterolateral zone was the lowest.

Medial vs Central vs Lateral

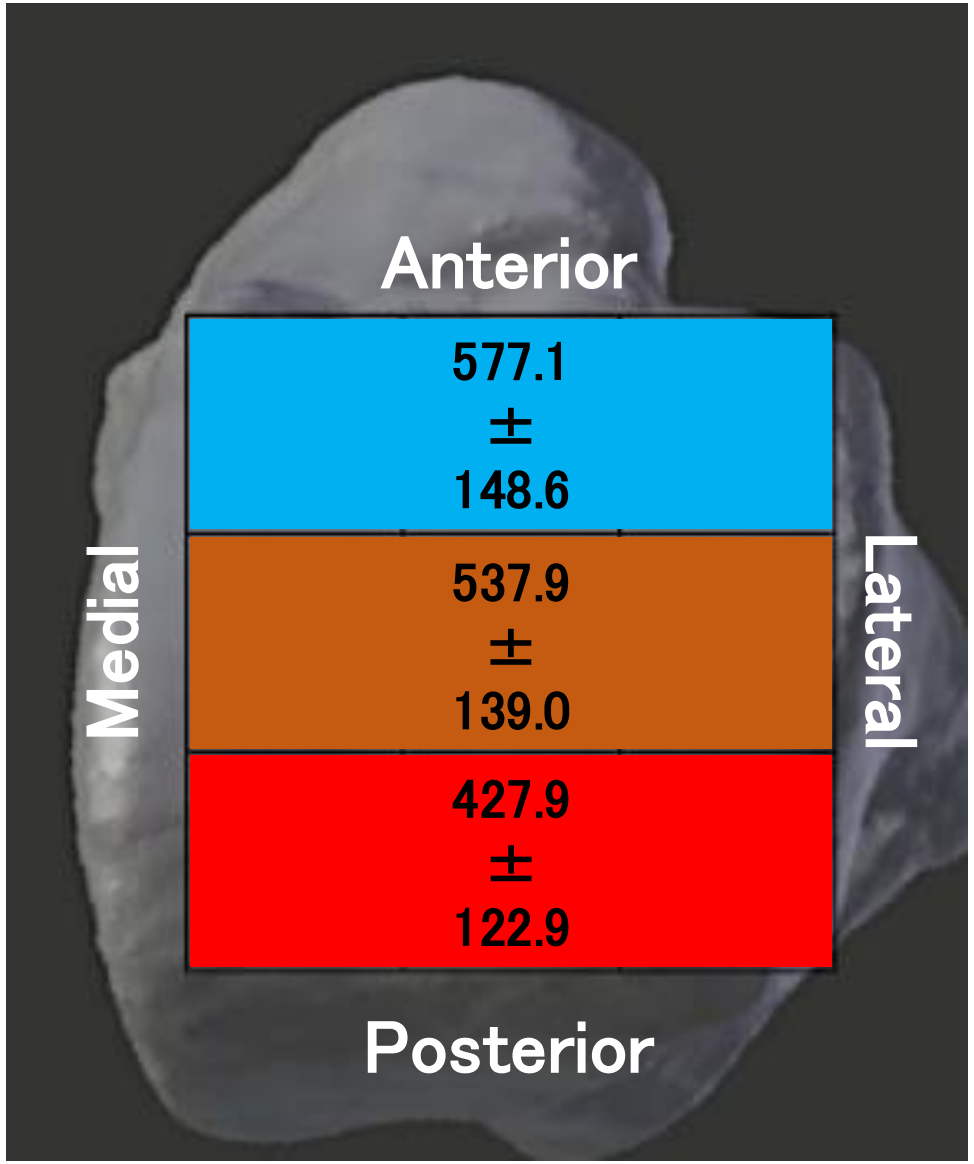


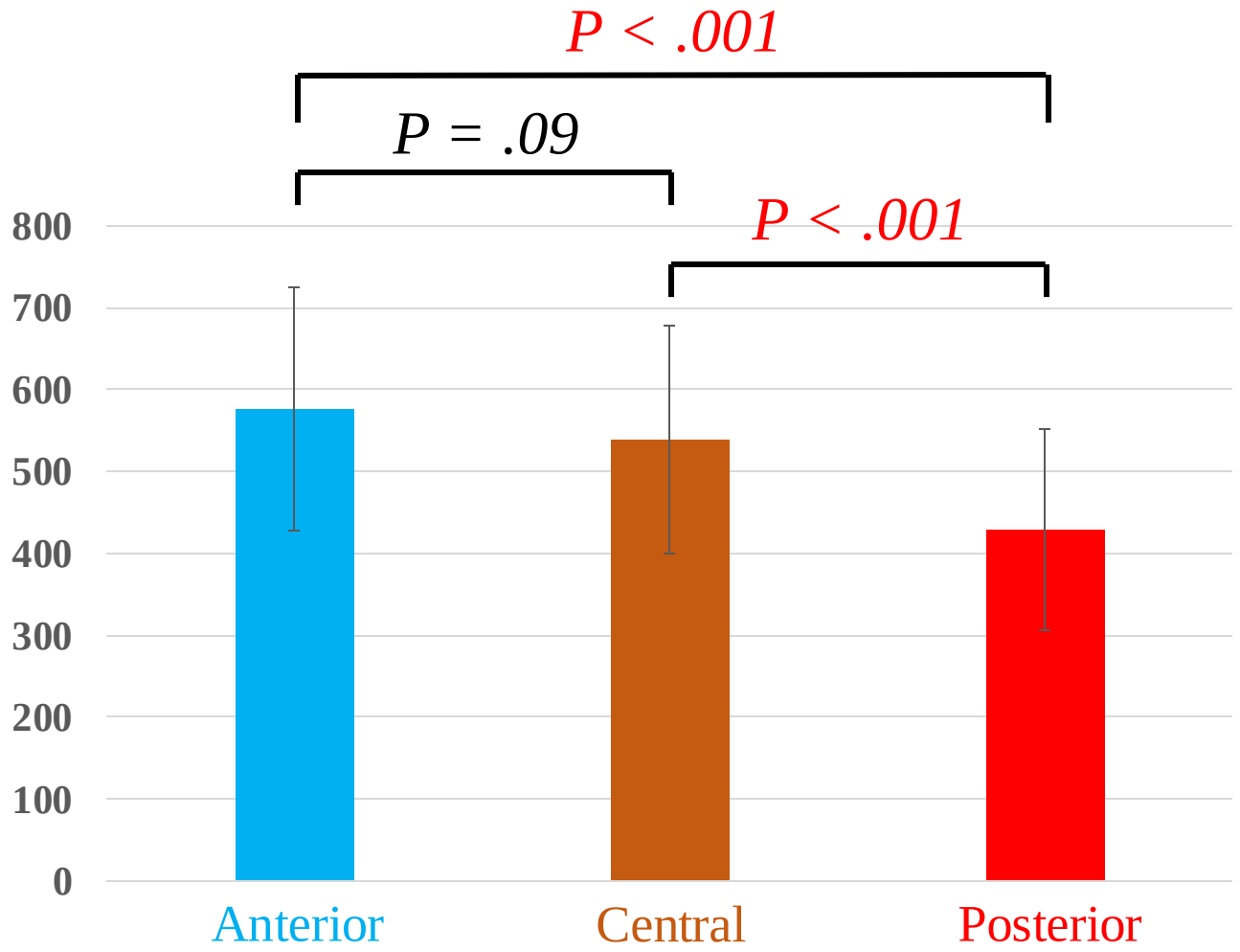


Statistical Analysis

Shapiro-Wilk test, One-way analysis of variance,
Kruskal-Wallis test, post-hoc test

Anterior vs Central vs Posterior





Statistical Analysis

Shapiro-Wilk test, One-way analysis of variance,
Kruskal-Wallis test, post-hoc test

Conclusion

- ✓ The HU value of the subchondral bone of the talus was lowest in the posterior part of the talus.
- ✓ The talar subchondral bone quality evaluated by the HU values may not be related to occurring OLTs.

References

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