Can Sesamoid Dislocation in Hallux Valgus be Evaluated by Dorsoplantar Radiography?

Comparison between the Sesamoid Displacement in Dorsoplantar Radiography and Computed tomography.

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My disclosure is in the Final AOFAS Mobile App.
I have no potential conflicts with this presentation.
Introduction

The sesamoid displacement in hallux valgus (HV) have been evaluated usually by dorsoplantar radiographs or tangential sesamoids radiographs. But it is difficult to evaluate the precise sesamoid displacement only by the plane radiographs. Computed tomography (CT) can obtain the sesamoid position relating to the metatarsal head and evaluate the precise sesamoid displacement.

The purpose of this study was to evaluate the sesamoid position by CT and compare the results with the conventional evaluation by dorsoplantar radiographs, and to detect the true meaning of sesamoid position in dorsoplantar radiographs.
Materials and Methods

Patients treated for HV in our institute

Exclusion criteria
- Recurrent HV
- Juvenile HV
- Hallux rigidus
- Absence or hypoplasia of the medial sesamoid

52 pts 89 feet
- 47 female, 5 male
- Mean age: 62.5 years (range 33-80)

The hallux valgus angle (HVA) measured on the dorsoplantar weight-bearing radiograph

HVA: 13–65° (mean: 34.1°)
HVA < 20°: 7 feet
(Contralateral normal feet were included in this study)
Methods of CT

Position
- Patients: Supine
- Knees: Extension
- Feet and ankles: Neutral

Simulated weight bearing
The patients pushed the acryl board by their feet
The measurement of sesamoids displacement in dorsoplantar radiograph

The distance between the lateral border of the medial sesamoid and the longitudinal line bisecting the first metatarsal was measured. The distances were expressed as a percentage of the width of the medial sesamoids.

If the medial sesamoid was medial to the longitudinal line, the distance defined as minus value.

If the medial sesamoid was overlapping or lateral to the longitudinal line, the distance defined as plus value.
The measurement of sesamoids displacement in CT
The distance between the lateral border of the medial sesamoid and the crista was measured. The distances were expressed as a percentage of the width of the medial sesamoids.

If the medial sesamoid was medial to the crista line, the distance defined as minus value.

If the medial sesamoid was overlapping or lateral to the crista line, the distance defined as plus value.
Correlation between the sesamoid displacement in CT and dorsoplantar radiograph

\[ y = 0.9182x + 0.6728 \]

\[ R^2 = 0.7594 \]
Correlation between the sesamoid displacement in CT and dorsoplantar radiograph

\[ D_{ct} = 0.9D_{xp} + 67 \]

- \( D_{ct} \): displacement in CT
- \( D_{xp} \): displacement in dorsoplantar radiograph

\[ D_{ct} < 67^\circ \text{ (14 feet)} \]

- \( D_{xp} \): mean -4\% (range from -25 to 24\%)
- \( D_{xp} < 0 \): 11 feet (79\%)
What does the sesamoids displacement in dorsoplantar radiograph mean?

- **Normal**: Dxp < 0%, Dct < 0%
- **Mild**: 0% - 67% for Dxp, < 0% for Dct
- **Moderate or Severe**: > 67% for Dxp, > 0% for Dct

- Rotation of metatarsal head without sesamoid dislocation.
- Rotation of metatarsal head and sesamoid dislocation.
Conclusion

- We revealed the correlation between sesamoids displacement in dorsoplantar radiographs and CT.
- Dorsoplantar radiographs can evaluate the displacement of sesamoids, but the displacement in dorsoplantar radiographs were overestimated.
- If the displacement in dorsoplantar radiograph is less than 67 %, it means rotation of metatarsal head without sesamoid dislocation.
- If the displacement in dorsoplantar radiograph is more than 67 %, it means degree of sesamoid dislocation, but the value of displacement in radiograph is greater than CT.
References