Assessment of lateral hindfoot impingement with weightbearing multiplanar imaging

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NO CONFLICT TO DISCLOSE

< Assessment of lateral hindfoot impingement with weightbearing multiplanar imaging >

< Yasuhisa Yoshida >

My disclosure is in the Final AOFAS Mobile App.

I have no potential conflicts with this presentation.
Patients with flatfoot deformity frequently suffer from pain around the lateral malleolus and sinus tarsi.

There have been some previous reports of association between these pains and osseous impingement at lateral hindfoot caused by the deformity and weightbearing.

However, it can be difficult to estimate the impingement in the standing position on conventional radiographs due to superimposition of the different bones.

Pomeroy GC, et al. JBJS (Am), 1999
Malicky ES, et al. JBJS (Am), 2005
Ellis SJ, et al. Foot Ankle Int., 2010
In this study we assessed the availability with flatfoot patients by performing the system that makes it easier to take multiplanar tomographic images in the standing position.

**SONIALVISION safire II**
(Shimadzu Co., Kyoto, Japan)
The images that taken by such a system is called “Tomosynthesis images”.

Multiplanar (coronal, sagittal, axial)
CT-like images are taken with the patient standing upright and fully weightbearing.
Materials and Methods

14 feet
-13 patients, mean age 63.5 (55-80) years, with flatfoot deformity and lateral hindfoot pain.

The weightbearing multiplanar images, weightbearing radiographs, and (non-weightbearing) CT images were performed on all patients.

Talofibular (TF), calcaneofibular (CF), and talocalcaneal (TC) impingement were determined independently for each image.
Criteria for determining of impingement

Judge clearly?

- **NO**
  - Osseous impingement directly?
    - **NO**
      - Osteoarthritic changes?
        - **YES**
          - “Suspected”
        - **NO**
          - “Negative”
    - **YES**
      - “Positive”

- **YES**
  - Osseous impingement directly?
    - **YES**
      - “Impossible”
On weightbearing multiplanar image, we could detect the most impingement “Possitive” compared to normal radiographs and CT images.
“Suspected”, we evaluated indirectly by osteoarthritic changes without osseous impingement, were the greatest numbers on weightbearing-free CT images than on the others.

“Impossible” were the most in number on normal radiographs, we could not determine whether TF impingement was present in particular more than half of all cases. On CT images, they were the lowest than on the others.
Comparison of standard radiographs and CT images to multiplanar image in a patient with lateral hindfoot pain. TF impingement and the subtalar arthrosis are more readily apparent on the multiplanar image.
Weightbearing multiplanar imaging

- Weightbearing multiplanar image makes it easier to take CT-like images for a brief time in free-position including the standing.

- According to previous studies, it is lower dose irradiation and suitable for postoperative assessment because the metal artifact is suppressed compared with CT image.

  Gomi T, et al., J digit imaging., 2008
  Machida H, et al., Jpn J radiol., 2011

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Ellis SJ, et al., Foot Ankle Int., 2010

Multi Diagnostic Eleva System / Philips Co.
On CT image, although we can interpret them by multi-planar reconstruction (MPR) avoids osseous overlapping, we are to infer a presence of impingement indirectly from osteoarthritic changes because it is on non-weight bearing. However, we might also miss impingement of the timing of non-osteoarthritic changes.

Therefore, while there were several reports using simulated weightbearing CT, not only the device vary among studies, but most often is not reproduced the patient’s fully weightbearing.
Conclusions

- Multiplanar images are taken with the each patient standing upright and fully weightbearing, and could detect most whether impingement is present.

- This imaging provides useful information for assessing lateral pain in patients with flatfoot deformity.

References

