Sustentaculum screw placement during calcaneal open reduction internal fixation: when is the screw out?

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My disclosure is in the Final AOFAS Program Book. I have no potential conflicts with this presentation.
**Background**

- During fixation of calcaneal fractures a screw is often placed from lateral to medial into the sustentaculum as the constant fragment offers excellent medial support when fixing the posterior facet.

- Can be technically difficult as the sustentaculum is a small structure and is not directly visualized with the commonly used lateral approaches to the calcaneus.

- Axial Harris heel view is used intra-operatively to fluoroscopically verify accurate placement of the sustentacular screw.

- Aim of the study was to determine whether the Harris heel view can accurately confirm placement of the sustentacular screw and, if not, to determine which views are needed to confirm placement of this screw.
Background

Representative images of calcaneus fracture status post open reduction internal fixation using the lateral approach with the sustentaculum screw placed from a lateral approach, under fluoroscopic guidance.
Methods

- A 4.0 cancellous screw was placed in a cadaveric specimen, from medial to lateral in five configurations:
  - Anatomically within the sustentaculum
  - Misdirected inferior to the sustentaculum
  - Misdirected superior to the sustentaculum
  - Misdirected anteriorly to the sustentaculum
  - Misdirected posteriorly to the sustentaculum.

- Harris heel views were obtained at five different angulations and were analyzed to determine screw placement.
Results

- A screw placed anatomically was radiographically confirmed to be within the sustentaculum in all Harris heel views.
- Inferiorly misdirected screw appeared to be inaccurately radiographically within the sustentaculum at 30, 40 and 50 degrees.
  - Confirmed to be misplaced on the 10 and 20 degree view.
- Anteriorly misdirected screw appeared to be inaccurately radiographically within the sustentaculum on the 10 degree view.
  - Confirmed to be misplaced on all other views.
Screw that is misplaced, inferior to the sustentaculum. Harris heel view at 40 degrees. Incorrectly indicates that the screw is within the sustentaculum.

Screw that is misplaced, inferior to the sustentaculum. Harris heel view at 10 degrees. Confirms misplacement of the sustentacular screw.
Photograph of the screw misplaced inferior to the sustentaculum that is represented by fluoroscopic images on the previous page.
Conclusion

- Clinicians should be aware that several specific axial heel views are required to verify placement of the sustentacular screw.

- Specifically, an inferior misdirected screw will inaccurately appear to be within the sustentacularum with the standard Harris heel view (at 35 to 45 degrees).

- Axial heel view must be obtained at 10 to 20 degrees to assess for inferior misplacement of the screw and 20 to 50 degrees to evaluate for anterior misplacement of the screw.


