

## Hawkins Sign of the Talus: The Impact of Patient Factors on Prediction Accuracy

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**INTRODUCTION:** Avascular necrosis (AVN) is a common complication of talar neck fractures and leads to chronic pain and poor functional outcomes. Hawkins sign, a radiographic subchondral lucency of the talar dome seen 6 to 8 weeks after trauma, is considered to be a strong predictor of preserved talus vascularity. The largest study to date on the Hawkins sign included 44 patients and demonstrated 100% sensitivity in the exclusion of AVN. The purpose of this study was to assess the prognostic reliability of the Hawkins sign in a larger, modern cohort of patients.

**METHODS:** A retrospective review of all talar neck fractures treated at a single level I trauma center from 2008 to 2016 with at least 6 months follow up was performed. Demographic and clinical data were collected from the medical record. The presence of Hawkins sign and AVN were determined by fellowship-trained orthopaedic surgeons based on anterior-posterior views of ankle and foot radiographs taken within 3 months of injury and final follow up, respectively. Prognostic reliability of the Hawkins sign was assessed using contingency tables with 95% confidence intervals (C.I.) calculated for proportions.

**RESULTS:** One-hundred-five talar neck fractures occurring in ninety-eight patients were included. Hawkins sign was observed in 21 tali, 3 (14%) of which later developed AVN (95% C.I., 3 – 36%). In the remaining 84 tali without Hawkins sign, 32 (38%) developed AVN (95% C.I., 28 – 49%) (Figure 1). Of the 3 tali that developed AVN following observation of Hawkins sign, all patients were smokers with an ipsilateral ankle fracture and of variable fracture patterns based upon Hawkins classification.

**DISCUSSION AND CONCLUSION:** This study indicates that the Hawkins sign may not be as strong a predictor of talar vascularity following fracture as previously thought. Considering all patients with positive Hawkins signs who developed AVN were smokers with ipsilateral ankle fractures, it is possible that patient factors limit the accuracy of Hawkins sign. Continued monitoring of patients with talar neck fractures, even those in which the Hawkins sign is observed, may still be warranted. Future research is needed to understand the factors that limit the accuracy of Hawkins sign.

**Figure 1:**

Hawkins Sign	Avascular Necrosis	
	Present	Absent
Present	3*	18
Absent	32	54

\*All 3 tali with Hawkins sign that developed avascular necrosis were in smokers with an ipsilateral ankle fracture