

# Radiology for the surgeon

## Musculoskeletal case 32

### Presentation

A 33-year-old man came to the emergency department after an assault. One of his complaints was pain in his anterior shin from a direct blow to the area with an iron bar. Physical examination revealed a superficial contusion in the region with focal underlying tenderness.

A coned anteroposterior radiograph of the distal tibia and fibula showed a small focal cortical break

with minimal upward displacement of a conical bone fragment at the site (Fig. 1, arrow). This abnormality was not visible on a coned oblique view (Fig. 2). Computed tomographic examination with axial imaging on the bone window demonstrated a subtle cortical lucency with minimal overlying periosteal elevation (Fig. 3). The abnormality is clear on a sagittal reconstruction from this examination (Fig. 4, arrow).

What is the diagnosis?

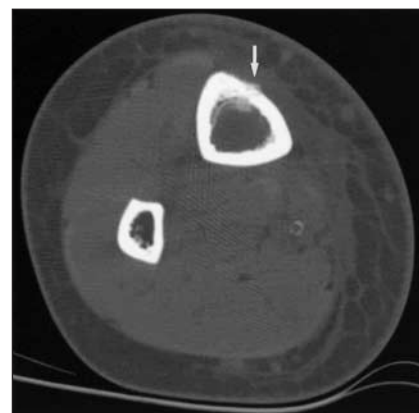


Fig. 3. Computed tomographic scan with axial imaging.



Fig. 1. Coned anteroposterior radiograph of the distal tibia and fibula.



Fig. 2. Coned radiograph, oblique view.



Fig. 4. Sagittal reconstruction image.

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## Diagnosis

### *Divot fracture of the tibia*

A divot fracture is an incomplete fracture of the outer cortex of a bone with displacement of a chip or conical fragment that occurs in association with direct (and sometimes penetrating) trauma.<sup>1</sup> A hidden divot (Brogdon's) fracture is a newer concept; it occurs when there is an incomplete fracture of the inner cortex with inward displacement of the fragment. The hidden divot variant has been described as a result of blunt trauma only.<sup>2,3</sup>

Both types of fracture occur most commonly in flat bones or along the margins of a long-bone metaphyses.<sup>1</sup>

Because of its anterior and superficial location, the tibia is very frequently involved.<sup>1-3</sup>

On plain radiographs divot fractures are more easily detected than the hidden divot type, but the radiographic appearance of either may be subtle. They can be diagnosed unequivocally with CT imaging; Figure 3 shows the fracture as well as early callus formation within the medullary space. More of these fractures are likely to be identified in future as the use of CT in the evaluation of trauma to the lower limb becomes more widespread.

Divot fractures are managed conservatively with immobilization and analgesia. Occasionally they are complicated by a fracture-line extension,

necessitating placement of a weight-bearing cast or functional brace while healing. Their course is entirely benign, and they heal by the formation of cortical bone along the defect.<sup>1,2</sup>

### References

1. Rose SC, Fujisaki CK, Moore EE. Incomplete fractures associated with penetrating trauma: etiology, appearance and natural history. *J Trauma* 1988;28:106-9.
2. Brogdon BG, Crotty JM. The hidden divot: a new type of incomplete fracture? *AJR Am J Roentgenol* 1999;172:789-90.
3. Petrow P, Page P, Differding P, Vanel D. The hidden divot fracture: Brogdon's fracture, a new type of incomplete fracture. *AJR Am J Roentgenol* 2001;177:946-7.

Competing interests: None declared.

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- CMAJ
- Canadian Journal of Surgery
- Clinical and Investigative Medicine
- Journal of Psychiatry & Neuroscience

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