# Chapter 87
# Calcaneal Fractures

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## Description

### *Sanders Classification*

Calcaneal fractures have characteristic appearances based on the mechanism of injury and are divided into two major groups, intra-articular and extra-articular. Most calcaneal fractures (70–75 %) are intra-articular and result from axial loading that produces shear and compression fracture lines. Of the two major systems for classifying intra-articular fractures – Hannover and Sanders – the latter is used most often and is helpful in treatment planning and determining prognosis. The Sanders classification [1] (Fig. 87.1) is based on the pathophysiology proposed by Soeur and Remy and it relies on sagittal reconstructed CT images reformatted parallel and perpendicular to the posterior facet of the subtalar joint [2]. It is a four type classification.

**Type I** Undisplaced fractures

**Type II** These fractures constitute of two articular pieces. They involve the posterior facet and are subdivided into types A, B, and C, depending on the medial or lateral location of the fracture line (more medial fractures are harder to visualize and reduce intraoperatively).

**Type III** These fractures constitute of three articular pieces. They include an additional depressed middle fragment and are subdivided into types AB, AC, and BC, depending on the position and location of the fracture lines.

**Type IV** These fractures constitute of four articular pieces. They are highly comminuted fractures.

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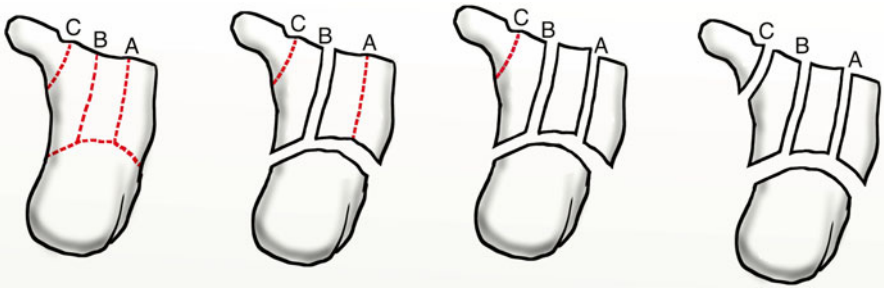


**Fig. 87.1** The four types of calcaneal fractures according to the Sanders classification system: type I undisplaced fracture - fracture lines A-B-C from lateral to medial; type II two articular pieces; type III three articular pieces; type IV four articular pieces

## Treatment Strategy

Various classification systems of calcaneal fractures based on CT and plain radiographic appearances have been developed for improving management of these fractures. There is still no consensus on surgical versus non-operative management of these fractures, which is due, in part, to the lack of standardized fracture classification and understanding of fracture anatomy [3–5].

The Sanders classification system is useful not only in treatment planning but in helping to determine prognosis. In Sanders et al.'s series of 120 intra-articular calcaneal fractures [6]:

- Type I fractures were treated without surgery
- Patients with type II and type III fractures who underwent surgery experienced excellent or good clinical results in 73 % and 70 % of cases, respectively.
- Alternatively, only 9 % of patients with type IV fractures had excellent or good clinical results after surgical treatment.

Sanders et al. have shown that although anatomic reduction is necessary for a good clinical outcome, success is not guaranteed, possibly related to cartilage necrosis at the time of injury.

No high level of evidence is available with regards to the treatment modalities.

## References

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