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Good Short Term Outcomes With Percutaneous Fixation of Comminuted Displaced Intra-Articular Calcaneal Fractures

Jessica Thor, Darshana Chandrakumara, Raj Kumar Socklingam, Charles Kon

Department of Orthopaedic Surgery, Changi General Hospital, Singapore

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Background

- Open reduction and internal fixation of displaced intra-articular calcaneal fractures considered gold standard¹
 - However, it is associated with wound complications and infection²
- Technically challenging to restore anatomy of calcaneum (height, width and articular surface)
- Newer techniques e.g. minimally invasive approaches via the sinus tarsi or percutaneous fixation have been described
- Study aims to look at radiological outcomes, the Gissane angle and Böhler angle, with percutaneous fixation in the short term

Materials and methods

- Retrospective review of electronic medical records from January 2017 to December 2019
- Minimum 3 month follow up
- Inclusion criteria
 - Patients above 18 years of age
 - Intra-articular calcaneal fractures fixed percutaneously by a single surgeon
- Exclusion criteria
 - Pregnant women
 - Other types of calcaneal fractures e.g. tongue type or extra-articular fractures

Surgical technique

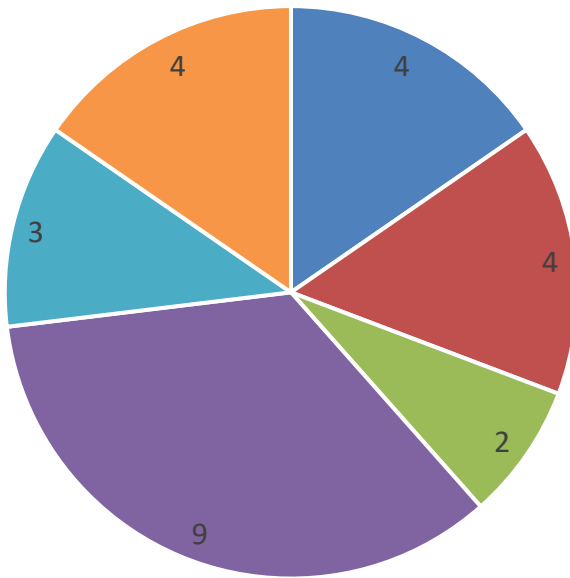
- Lateral position with use of tourniquet
- Image intensifier used
- Fixation with cannulated screws
- O-arm imaging used in some of the cases to determine position of implant e.g. breach of joint

Results

- Total of 23 patients with 26 calcaneal fractures
 - 22 males and 1 female
- Mean age 45.7 years
- Fall from height is the most common mechanism of injury
- Follow up duration: 3 to 8 months

Results

Sanders classification



■ IIA ■ IIB ■ IIC ■ IIIAC ■ IIIAB ■ IV

	Pre-operative (mean)	Immediate post-operative (mean)	Follow up (mean)
Gissane angle	109.9	113	113
Böhler angle	16.2	25.6	26.7

Figure 1: AP and lateral pre-operative plain radiographs of a displaced intra-articular calcaneal fracture



Figure 2: AP and axial post operative plain radiographs after percutaneous fixation of calcaneum



Discussion

- Percutaneous fixation is a viable option for fixation even in comminuted intra-articular calcaneal fractures (e.g. Sanders III type)
- Limited literature on use of percutaneous fixation in these fracture types
- Our study demonstrates reliable maintenance of Böhler and Gissane angles in the short term (3 – 8 months)
- Advantages: less wound complications, earlier surgery, faster rehabilitation and shorter inpatient stay

Conclusion

- Percutaneous fixation is a reliable even in comminuted intra-articular calcaneal fractures
- Restoration of radiological parameters and anatomical considerations of the calcaneum help to provide patients with a functional, shoeable plantigrade foot

References

¹Guerado E, Bertrand ML, Cano JR. Management of calcaneal fractures: What have we learnt over the years? *Injury* 2012;43:1640–50. <https://doi.org/10.1016/j.injury.2012.05.011>.

²Yu X, Pang QJ, Chen L, Yang CC, Chen XJ. Postoperative complications after closed calcaneus fracture treated by open reduction and internal fixation: A review. *J Int Med Res* 2014;42:17–25. <https://doi.org/10.1177/0300060513495626>.