

Gastroc Recessions in Tongue-Type Calc Fractures

STATEMENT OF PURPOSE

Displaced tongue-type fractures of the calcaneus can cause severe pain and disability if not treated appropriately. Failure to reduce articular displacement may require STJ arthrodesis with subsequent loss of function. Reestablishment of calcaneal height, length, orientation, and position relative to the other tarsals is necessary to reestablish appropriate foot function. Inherent or acquired gastrocnemius equinus should be treated with recession to reduce destructive forces on the reconstruction. The aim of this study was to evaluate whether gastrocnemius recessions aid in the reduction of tongue-type calcaneal fractures.

METHODOLOGY

Retrospective analysis over 12 months on 18 patients who had calcaneal fractures (Intraarticular and tongue-type). 7 had a coinciding gastroc recession performed, while 11 did not. Inclusion criteria included:

- 1) Serial postoperative plain film radiographs and CT scans
- 2) Follow up for minimal 20 weeks postoperatively
- 3) No prior history of a calcaneal fracture.

One patient had a previous calcaneal fracture that was conservatively treated and one patient missed follow up visits and both were therefore excluded from the study. Serial plain film radiographs were performed postoperatively until restoration of calcaneal height, weight and proper reduction was observed. All postoperative imaging was reviewed by author to assess for correct reduction and consolidation of the fracture line. A lateral, broden, isherwood, and calcaneal axial view were all taken at each post operative visit. Bohler's Angle as well as the Critical Angle of Gissane were calculated with each new radiograph. Postoperatively, the radiographs were evaluated between all patients who had a concomitant gastroc recession versus those who did not, to determine which, on average achieved more successful reduction and proper alignment.

PROCEDURE

General anesthesia was performed by anesthesia services. The lower extremity was prepped in the usual aseptic technique and a thigh tourniquet was applied.

For the gastroc recession, the gastroc musculotendinous junction was palpated and a 4cm linear midline incision was made at this area with a 15 blade. Blunt dissection was made through the subcutaneous tissue, followed by release of the aponeurosis both medially and laterally with an assistant dorsiflexing and inverting the foot. Adequate release was tested with sufficient dorsiflexion, followed by subcutaneous closure with 3-0 vicryl and skin staples.

Attention was directed to the lateral ankle where a small 3-cm incision was made just lateral to the achilles tendon and just superior to the calcaneus most occluded border. Blunt dissection was carried down until palpating the superior aspect of the calcaneus. At this point, utilizing a bone reduction clamp, and the fracture fragment was reduced. Intraoperative fluoroscopy confirmed perfect reduction of the posterior facet and height of the calcaneus. At this time, a Steinmann pin was inserted medial to lateral across the plantar aspect of the calcaneus and traction was used to restore the foot into a valgus position. At this time, 2 4-0 cannulated screw were inserted perpendicular to the fracture line using standard AO technique.

PROCEDURES CONTINUED

If necessary, the following procedures were completed:

- 1) A drain was placed to prevent formation of a hematoma postoperatively
- 2) 3mL of bone cement was injected into the substance of the calcaneus to fill the void in the medullary canal of the calcaneus
- 3) Bone marrow aspirate was obtained from the calcaneus and used at the STJ and TNJ fusion sites

Postoperatively:

- 1) Patient was instructed to be non-weightbearing (NWB) for 4-6 weeks
- 2) Patient followed up every 2 weeks for cast change, and plain film radiographs

RESULTS

Of the 18 patients studied, 16 met inclusion criteria (7 with gastroc recession, 9 without); of which 7/7 with the gastroc recession achieved satisfactory reduction under fluoroscopy and clinically, which 7/9 without achieved satisfactory reduction. Reduction was deemed as satisfactory if Bohler's angle was between 25-40 degrees and the Critical angle of Gissane was between 125-140 degrees. Satisfactory reduction also had to include a restored calcaneal height, decreased calcaneal body widening, calcaneus out of varus, and articular reduction

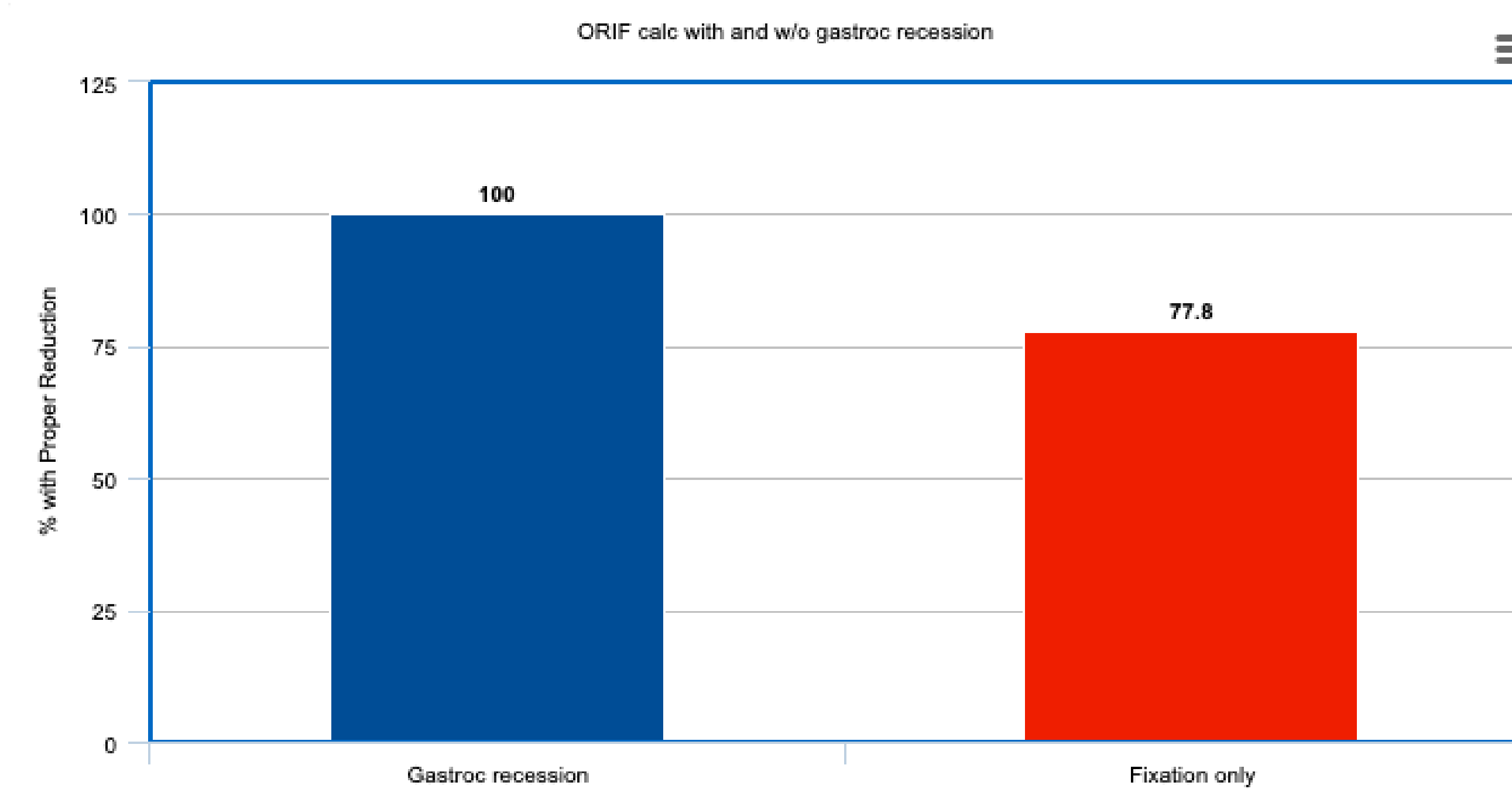


Figure: ORIF of the calcaneus with concomitant gastrocnemius recessions were, on average, 22.2% more successful after the post operative follow-up period in terms on alignment and reduction

DISCUSSION & CONCLUSION

Tongue-type calcaneal fractures are longitudinal fractures that exit the calcaneal tuberosity posteriorly and involve a portion of the articular surface. They are often displaced superiorly as a result of the achilles tendon and pull of the gastroc-soleus complex. While fixating these types of fractures, surgeons should consider performing a gastroc recession to alleviate the tension and aid in reduction of the calcaneus. Through radiographic angles and further evaluation clinically, it was determined that supplementing tongue-type calcaneal fractures with a gastroc recession was seen to more effectively aid in reduction and long term satisfaction.



REFERENCES

1. Leite CBG, Macedo RS, Saito GH, Sakaki MH, Kojima KE, Fernandes TD. Epidemiological study on calcaneus fractures in a tertiary hospital. *Rev Bras Ortop.* 2018;53(4):472-476. Published 2018 Jun 13. doi:10.1016/j.rboe.2018.05.014
2. Sanders RW, Clare MP. Calcaneus fractures. In: Rockwood and Green's Fractures in Adults, 7th, Buchholz, RW, Heckman JD, Court-Brown CM, Tornetta P (Eds), Lippincott Williams & Wilkins, Philadelphia 2010. p.2064 Shah R; Mohammed S; Saifuddin A; Taylor B: Comparison of plain radiographs with CT scan to evaluate interbody fusion following the use of titanium interbody cages and transpedicular instrumentation. *Eur Spine J* 12: 378-385, 2003.
3. iz, C., Barison, E., Ruggieri, P. et al. Radiographic and functional outcomes after displaced intra-articular calcaneal fractures: a comparative cohort study among the traditional open technique (ORIF) and percutaneous surgical procedures (PS). *J Orthop Surg Res* 11, 92 (2016) doi:10.1186/s13018-016-0426-6