

20 Years of Operative Treatment of Displaced Intra-Articular Calcaneal Fractures in a Level-I Trauma Center in the Netherlands: Results of Epidemiology and Physical and Functional Outcomes

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Purpose: This study was conducted to study the patient characteristics, classification, treatment, complications and functional outcome of operatively treated displaced intra-articular calcaneal fractures (DIACFs) in a Level-I trauma center in the Netherlands over a period of 20 years.

Methods: Patients with a DIACF, classified as Sanders ≥ 2 and operatively treated with percutaneous screw fixation (PSF) or open reduction and internal fixation (ORIF) between January 1998 and December 2017 were identified. Pre- and postoperative radiological assessment was performed. Functional outcome, range of motion, and change in footwear were evaluated with the use of the American Orthopaedic Foot & Ankle Society (AOFAS) score and the Maryland foot score (MFS). General health and patient satisfaction was assessed using the Short Form-36 (SF-36) and the visual analog scale (VAS).

Results: In total 188 with a DIACF were identified of which 121 were operatively treated with PSF or ORIF. Of these patients, 72 patients with 80 DIACFs completed the questionnaires (60%). There were 55 males; mean age at trauma was 46 years. Average follow-up was 130 months. 22 were classified as Sanders type 2, 39 as Sanders type 3, and 19 as Sanders type 4. 40 were joint depression and 40 were tongue-type fractures. There were no significant differences in Sanders classification between the groups treated with ORIF and PSF ($P = 0.379$). Mean AOFAS, MFS, SF-36, and VAS were 74, 75; 78, 78; 68, 61; and 7.7, 7.5 for, respectively, PSF and ORIF. Mean pre- and post-Bohler angle were 11, 25 and -1 , 23 for, respectively, PSF and ORIF. Seven underwent an ankle arthrodesis, 6 and 1 for, respectively, PSF and ORIF. Sanders type 4 fracture was associated with an arthrodesis in 21% and 25% for PSF and ORIF. Surgical site infection and deep infection occurred in 16.5%, 30% and 12%, 8% in, respectively, PSF and ORIF. Hardware removal was performed in 58% and 24% of patients in the PSF and ORIF groups, respectively.

Conclusion: Long-term comparison shows no significant differences between ORIF and PSF in treatment of Sanders fracture type, Bohler angle reduction, or on functional outcome. ORIF showed a higher infection rate and PSF-treated fractures required more hardware removal interventions.