

# Calcaneal Fracture Management

## Extensile Lateral Approach Versus Small Incision Technique

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### KEYWORDS

• Calcaneus fracture • Extensile lateral approach • Percutaneous fixation calcaneus

### KEY POINTS

- Calcaneal fracture management continues to be an area of sustained interest.
- Extensile lateral approach to the calcaneus carries significant risks of wound complications and infection.
- Small incision techniques may reduce risks and improve recovery.
- Less invasive techniques have been shown to reduce risk of wound-healing complications.

### INTRODUCTION

Intra-articular calcaneus fractures have long been a vexing problem for the treating orthopedic surgeon. First described by Malgaigne in 1843, calcaneus fractures were not consistently diagnosed until the development of radiography in the late 1890s. The most common tarsal bone fracture, calcaneal fractures currently account for approximately 2% of all fractures; displaced intra-articular fractures represent 60% to 75% of all calcaneal fractures.

Historically these fractures were treated nonoperatively; but over the past few decades, surgical fixation has become more prevalent. Cotton<sup>1</sup> identified the poor outcome associated with treatment without reduction and favored closed manipulation using a hammer to reduce the lateral wall and reimpact the fracture and suggested that open reduction is contraindicated. By the 1920s, Cotton<sup>2</sup> reported on his treatment of

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healed malunions. He continued to endorse initial reduction in acute cases of calcaneal fractures to reduce the morbidity seen with malunions. In 1952, Essex-Lopresti<sup>3</sup> showed good results with open reduction through a lateral approach and stated that joint-depression fractures require formal open reduction with internal fixation. Operative management again fell into disfavor in the 1950s after Lindsay and Dewar<sup>4</sup> presented results that suggested primary subtalar fusions were being performed unnecessarily and that operative intervention of acute calcaneus fractures had many complications. Kitaoka and colleagues<sup>5</sup> evaluated gait analysis outcomes of 16 of 27 patients treated conservatively with casting. Most patients exhibited altered gait patterns, particularly on uneven ground, confirming nonoperative management led to at least some persistent functional impairment. Crosby and Fitzgibbons<sup>6</sup> reviewed their results of conservative management with casting. They showed good results of closed treatment of nondisplaced fractures and poor results of displaced fractures of the posterior facet based on computed tomography (CT) scans. They suggested operative treatment was indicated for displaced fractures of the posterior facet.

### NONOPERATIVE VERSUS OPERATIVE MANAGEMENT

Several studies have been published comparing nonoperative and operative management, many with contradicting results. Jarvholm and colleagues<sup>7</sup> and Parmar and colleagues<sup>8</sup> compared operative versus nonoperative treatment and found no difference in clinical outcome and that problems associated with internal fixation did not justify operative management. There were several limitations to their studies making meaningful conclusions difficult to reach. Studies by Agren and colleagues<sup>9</sup> and Ibrahim and colleagues<sup>10</sup> reported no significant advantage to surgical management. Agren and colleagues<sup>9</sup> found that surgical intervention was associated with a higher risk of complications and no improvement in outcome measures with surgical management at 1 year. However, at an 8- to 12-year follow-up there was a trend toward better outcomes with regard to patient-reported visual analog scale (VAS) pain and function scores and better physical component of the 36-Item Short Form Health Survey (SF-36) scores in the operative group. These results did not reach significance. There was also an increased prevalence of radiographically documented posttraumatic subtalar arthritis in the nonoperative group; however, the need for secondary subtalar arthrodesis was not increased. Ibrahim and colleagues<sup>10</sup> showed no difference at a 15-year follow-up between surgical and nonsurgical management. On the other hand, studies by O'Farrell and colleagues,<sup>11</sup> Leung and colleagues,<sup>12</sup> and Crosby and Fitzgibbons<sup>13</sup> showed better results with surgical intervention. A randomized, prospective study by Thordarson and Krieger<sup>14</sup> compared operative versus nonoperative management for displaced fractures. This study showed statistically significant improvement in functional results and overall outcome in the surgically treated group, confirming that operative intervention could lead to improved outcomes. Buckley and colleagues<sup>15</sup> reported on a prospective, randomized controlled trial comparing operative versus nonoperative treatment of displaced intra-articular calcaneal fractures. Their results showed no significant difference in outcome measures, including SF-36 and VAS scores, between operative and nonoperative management. However, nonoperative treatment did result in a subtalar fusion rate for failed outcomes 6 times higher than the operative group.

### SALVAGE OF CALCANEAL MALUNION

Nonoperative management of intra-articular calcaneus fractures increases the risk for malunion and posttraumatic subtalar arthrosis. Fractures left untreated result in

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