

# Operative Fixation Options for Elective and Diabetic Ankle Arthrodesis

Crystal L. Ramanujam, DPM, MSc<sup>a</sup>, John J. Stapleton, DPM<sup>b,c,\*</sup>, Thomas Zgonis, DPM<sup>d</sup>

## KEYWORDS

- Ankle arthrodesis • Internal fixation • External fixation • Surgery
- Diabetic Charcot neuroarthropathy

## KEY POINTS

- Ankle arthrodesis techniques that are not destabilizing and maintain the lateral and medial malleoli are preferred when feasible.
- Crossed screw configuration for an ankle arthrodesis provides great osseous stability and compression when compared with parallel screws.
- Anatomic reduction and positioning of an ankle arthrodesis is paramount to improving functional outcomes and pain levels.
- Utilization of a multiplane circular external fixator for an ankle arthrodesis is advantageous for revision and lower extremity preservation cases.

Traditionally, ankle arthrodesis was reported using lag screws and intramedullary nails; however, with time, alternate fixation choices, such as a variety of plating techniques, have emerged leading to numerous reports in the literature. On the other hand, there are clinical scenarios that may benefit from an ankle arthrodesis with external fixation, including bone quality that cannot support internal fixation, history of infection at the arthrodesis site, and compromised soft tissue envelope. Combined internal and external fixation may also be beneficial; however, studies with longer periods of

---

Disclosure: The authors have nothing to disclose.

<sup>a</sup> Division of Podiatric Medicine and Surgery, Department of Orthopaedics, University of Texas Health Science Center San Antonio, 7703 Floyd Curl Drive, MSC 7776, San Antonio, TX 78229, USA; <sup>b</sup> Foot and Ankle Surgery, Lehigh Valley Hospital, 1250 South Cedar Crest Boulevard, Suite 110, Allentown, PA 18103, USA; <sup>c</sup> Penn State College of Medicine, 500 University Drive, Hershey, PA 17033, USA; <sup>d</sup> Division of Podiatric Medicine and Surgery, Department of Orthopaedics, University of Texas Health Science Center San Antonio, 7703 Floyd Curl Drive, MSC 7776, San Antonio, TX 78229, USA

\* Corresponding author. Foot and Ankle Surgery, Lehigh Valley Hospital, 1250 South Cedar Crest Boulevard, Suite 110, Allentown, PA 18103.

E-mail address: [jostaple@hotmail.com](mailto:jostaple@hotmail.com)

Clin Podiatr Med Surg ■ (2017) ■-■  
<http://dx.doi.org/10.1016/j.cpm.2017.02.006>

[podiatric.theclinics.com](http://podiatric.theclinics.com)

0891-8422/17/© 2017 Elsevier Inc. All rights reserved.

follow-up are lacking. Many biomechanical studies have been performed attempting to compare fixation methods; however, the results of such studies have limited application in the clinical realm, as multiple variables in real-world scenarios may affect surgical outcomes.<sup>1-3</sup> One of the most frequent complications of ankle arthrodesis is nonunion. A better understanding of minimizing bone resection when feasible while preserving the periarticular blood supply along with meticulous joint preparation and stable fixation can potentially improve the union rates for ankle arthrodesis. The optimal choices of fixation relies on several factors including and not limited to patients' overall medical status, presence of multiple medical comorbidities, severity of deformity, presence of infection, vascular supply, and patients' compliance with treatment modalities.

### ANKLE ARTHRODESIS IN ELECTIVE AND RECONSTRUCTIVE SURGERY

Elective ankle arthrodesis can include those performed for osteoarthritis, rheumatoid arthritis, posttraumatic arthritis, paralysis, and severe ankle instability or soft tissue contracture. In 1988, Lynch and colleagues<sup>4</sup> studied the outcomes of 62 ankle arthrodeses for treatment of mostly osteoarthritis with an average of a 7-year follow-up. Methods included screw fixation for compression arthrodesis, transfibular arthrodesis, anterior sliding graft, and the dowel technique, with an overall 14% nonunion rate. In 1990, a retrospective case series of 26 patients for treatment of mostly posttraumatic arthritis using crossed cancellous screws in 41% showed a high overall union rate.<sup>5</sup> External fixation in this study also demonstrated a high union rate. In a 1994 study by Frey and colleagues<sup>6</sup> with an average 4-year follow-up, 33 patients underwent ankle arthrodesis using cancellous screws, yet 36% (12 patients) of these experienced nonunion. In the same study, internal compression plates were used in 17 patients, with a 35% (6 patients) rate of nonunion. Furthermore, this study found a 55% (6 out of 11 patients) nonunion rate in those patients undergoing ankle arthrodesis with external fixation. A 2002 study by Hanson and Cracchiolo<sup>7</sup> for tibiototalcalcaneal arthrodesis in 10 patients using a blade plate with posterior approach showed 100% union rate with an average of 37 months' follow-up.<sup>7</sup> This case series included patients with posttraumatic arthritis, primary degenerative arthritis, and rheumatoid arthritis and postpolio deformity. In 2005 a study by Anderson and colleagues<sup>8</sup> used a retrograde intramedullary nail for ankle arthrodesis in 26 patients with rheumatoid arthritis, resulting in radiographic fusion of all but one case and a high rate of patient satisfaction at a median 3 years of follow-up. A systematic review by Donnerwerth and Roukis<sup>9</sup> found a 24.2% nonunion rate for patients with tibiototalcalcaneal arthrodesis with retrograde compression intramedullary nail fixation for failed total ankle replacement. A study by Napiontek and Jaszczak<sup>10</sup> in 2015 analyzing 23 patients who underwent ankle arthrodesis for posttraumatic arthritis, osteoarthritis, and paralytic causes using screw fixation with an average follow-up of 32 months demonstrated effective arthrodesis with only one patient requiring surgical revision.<sup>10</sup> In a study with a mean follow-up of 4.4 years after ankle arthrodesis using triangular external fixation for posttraumatic arthrosis, Kiene and colleagues<sup>11</sup> reported comparable nonunion rates with internal fixation; however, they also showed increased pain and complication rates commenting that this method may best be reserved for cases of infected arthritis and soft tissue compromise. Easley and colleagues<sup>12</sup> analyzed the use of internal and external fixation for revision ankle arthrodesis in 45 patients with an average follow-up of 50.3 months, demonstrating that circular external fixation achieves acceptable union rates when internal fixation is contraindicated.

Download English Version:

<https://daneshyari.com/en/article/5678449>

Download Persian Version:

<https://daneshyari.com/article/5678449>

[Daneshyari.com](https://daneshyari.com)