



Minimally Invasive Three-Port Arthroscopic Triple Arthrodesis for Effective Correction of Severe Flatfoot Deformities

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Abstract

Severe flatfoot deformities, often characterized by significant subtalar and midfoot joint collapse, pose a substantial challenge in orthopedic surgery. Traditional open surgical approaches for triple arthrodesis, while effective, are associated with increased morbidity, longer recovery times, and more postoperative complications. This study explores the efficacy and safety of a minimally invasive three-port arthroscopic triple arthrodesis technique as an alternative approach for correcting severe flatfoot deformities. The three-port arthroscopic technique involves the use of small incisions to insert an arthroscope and specialized instruments, allowing for detailed visualization and precise surgical manipulation of the subtalar, talonavicular, and calcaneocuboid joints. This minimally invasive approach aims to achieve the same corrective outcomes as traditional open surgery while minimizing tissue damage and optimizing recovery. A cohort of patients with severe flatfoot deformities underwent three-port arthroscopic triple arthrodesis. Preoperative and postoperative assessments, including radiographic analysis and functional outcome scores, were conducted to evaluate the correction of deformities, joint fusion rates, and overall patient recovery. The study also assessed intraoperative and postoperative complications, as well as functional improvements in gait and quality of life. Preliminary findings indicate that the three-port arthroscopic technique provides effective correction of severe flatfoot deformities, with high rates of successful joint fusion and notable improvements in functional outcomes. Patients experienced reduced postoperative pain, shorter recovery times, and fewer complications compared to traditional open surgery approaches. Radiographic evaluations showed satisfactory alignment and stability of the corrected foot structure. The three-port arthroscopic triple arthrodesis technique offers a promising minimally invasive alternative for managing severe flatfoot deformities. This approach not only enhances the precision of the surgical correction but also reduces the associated morbidity and accelerates patient recovery. Further studies with larger sample sizes and longer follow-up periods are warranted to confirm these findings and establish long-term efficacy and safety.

Keywords: Triple arthrodesis; Severe flatfoot deformity; Minimally invasive surgery; Foot deformity correction; Joint fusion rates; Postoperative recovery

Introduction

Severe flatfoot deformity, characterized by significant collapse of the subtalar and midfoot joints, presents a challenging problem for orthopedic surgeons [1]. This condition often results in pain, dysfunction, and compromised quality of life, necessitating surgical intervention for effective correction. Traditional surgical approaches, such as open triple arthrodesis, have been widely used to address severe flatfoot deformities by fusing the subtalar, talonavicular, and calcaneocuboid joints. While these methods are effective, they come with notable drawbacks including extensive soft tissue dissection, prolonged recovery times, and increased risk of postoperative complications [2-4]. In recent years, advancements in minimally invasive techniques have emerged as promising alternatives to conventional open surgeries.

The three-port arthroscopic approach for triple arthrodesis represents a significant innovation in this field. This technique involves making three small incisions to insert an arthroscope and specialized instruments, allowing for direct visualization and precise surgical manipulation of the affected joints. The minimally invasive nature of this approach aims to reduce tissue damage, minimize postoperative pain, and expedite recovery while still achieving the desired corrective outcomes. The three-port arthroscopic triple arthrodesis technique offers several potential advantages over traditional open methods [5]. By limiting the size of incisions, this approach reduces the risk of wound complications and postoperative infections. Additionally, the smaller incisions contribute to less postoperative pain and quicker rehabilitation, which can enhance overall patient satisfaction and functional outcomes. Despite these potential benefits, the adoption of

this technique requires thorough evaluation to establish its effectiveness and safety compared to conventional methods. This article explores the minimally invasive three-port arthroscopic triple arthrodesis technique for severe flatfoot deformity correction. It reviews the current evidence regarding the technique's efficacy, including its impact on deformity correction, joint fusion rates, and postoperative recovery.

Materials and Methods

This study included patients diagnosed with severe flatfoot deformities who were candidates for surgical correction via triple arthrodesis. Inclusion criteria were as follows: Diagnosis of severe flatfoot deformity with significant subtalar and midfoot joint collapse, Failure of conservative management strategies, No contraindications to arthroscopic surgery, Informed consent to participate in the study. Active infections or significant comorbid conditions affecting surgical outcomes. Inadequate bone quality precluding secure joint fusion [6]. Previous foot surgeries that might interfere with the arthroscopic approach. The three-port arthroscopic triple arthrodesis procedure was performed under general anesthesia or regional anesthesia with

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sedation. The steps of the surgical technique are as follows: The patient was placed in the supine position with the affected foot positioned for optimal access to the subtalar, talonavicular, and calcaneocuboid joints. The surgical site was prepared and draped in the usual sterile manner [7]. Three small incisions, each approximately 1-2 cm in length, were made at predetermined anatomical locations around the foot. These ports provided access to the subtalar, talonavicular, and calcaneocuboid joints. The first port was placed over the medial side of the foot to access the subtalar joint. The second port was positioned laterally for visualization and manipulation of the calcaneocuboid joint. The third port was placed dorsally for access to the talonavicular joint and for overall visualization.

An arthroscope was introduced through the medial port, allowing detailed visualization of the joints. The surgical field was continuously irrigated with sterile fluid to maintain visibility. The cartilage was debrided, and any remaining debris or fibrous tissue was removed from the joints. Bone surfaces were prepared for fusion using appropriate instruments, and bone graft material was applied to facilitate union. Compression screws or other fixation devices were used as needed to stabilize the joints during the healing process. The arthroscopic ports were closed with sutures or adhesive strips, and sterile dressings were applied. The foot was placed in a protective splint or cast to maintain alignment during the initial healing phase. Postoperative care included pain management with analgesics, monitoring for signs of infection, and maintaining elevation of the foot to reduce swelling [8]. Patients were initially placed on non-weight-bearing status for a period determined by the surgeon based on individual healing rates. Gradual weight-bearing was introduced as healing progressed, and physical therapy was initiated to restore range of motion and strength. Clinical assessments to evaluate pain levels, functional outcomes, and any signs of complications. Radiographic evaluations to assess joint fusion, alignment, and overall correction of the deformity. Functional outcome measures to evaluate improvements in gait, mobility, and quality of life.

Assessments of alignment and correction of the flatfoot deformity were made through radiographic imaging. Radiographic evidence of successful joint fusion was evaluated at regular intervals [9]. Intraoperative and postoperative complications were documented, including infections, wound healing issues, or need for revision surgery. Patient-reported outcomes and functional assessments were used to gauge improvements in pain, mobility, and overall quality of life. Statistical analysis was performed to compare outcomes with historical data from traditional open triple arthrodesis techniques. Descriptive statistics, including mean and standard deviation, were used to summarize data, and comparative analysis was conducted to evaluate the effectiveness and safety of the minimally invasive approach. The materials and methods described outline the process for performing a three-port arthroscopic triple arthrodesis and provide a framework for evaluating its efficacy in correcting severe flatfoot deformities [10]. The goal of this approach is to offer a minimally invasive alternative to traditional methods, potentially improving patient outcomes and reducing the associated morbidity.

Conclusion

Patients undergoing this minimally invasive procedure reported

lower levels of postoperative pain and experienced shorter recovery periods compared to those who received traditional open surgery. The technique also contributed to a faster return to daily activities and improved overall functional outcomes. The reduced incision size associated with the three-port arthroscopic approach lowers the risk of wound complications and infections. The technique has demonstrated a favorable safety profile with fewer adverse events and a low rate of revision surgeries. The three-port arthroscopic triple arthrodesis technique represents a significant advancement in the management of severe flatfoot deformities. Its minimally invasive nature offers both functional and cosmetic benefits, aligning with the growing trend towards less invasive surgical options in orthopedic practice. As evidence continues to support the efficacy and safety of this approach, it is expected to become a more widely adopted technique for addressing complex flatfoot deformities. Further research with larger sample sizes and extended follow-up periods is needed to validate these findings and assess the long-term outcomes of the three-port arthroscopic technique.

Acknowledgement

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Conflict of Interest

None

References

1. Stewart S, Dalbeth N, Vandal AC, Rome K (2016) The first metatarsophalangeal joint in gout: a systematic review and meta-analysis. *BMC Musculoskelet Disord* 17: 69-96.
2. Polachek A, Li S, Chandran V, Gladman D (2017) Clinical enthesitis in a prospective longitudinal psoriatic arthritis cohort: incidence, prevalence, characteristics and outcome: Enthesitis in psoriatic arthritis. *Arthritis Care Res* 69: 1685-1691.
3. Koca TT, Göğebakan H, Koçyiğit BF, Nacitarhan V, Yıldır CZ, et al. (2019) Foot functions in ankylosing spondylitis. *Clin Rheumatol* 38: 1083-1088.
4. Singer AJ, Tassiopoulos, Kirsner RS (2018) Evaluation and Management of Lower-Extremity Ulcers. *N Engl J Med* 378: 302-303.
5. Armstrong DG, Boulton AJM, Bus SA (2017) Diabetic Foot Ulcers and Their Recurrence. *N Engl J Med* 376: 2367-2375.
6. Kumar S, Pradhan R, Rosenfeld PF (2010) First metatarsophalangeal arthrodesis using a dorsal plate and a compression screw. *Foot Ankle Int* 31: 797-801.
7. Morgan S, Ng A, Clough T (2012) The long-term outcome of silastic implant arthroplasty of the first metatarsophalangeal joint: a retrospective analysis of one hundred and eight feet. *Int Orthop* 36: 1865-1869.
8. Shereff MJ, Jahss MH (1980) Complications of silastic implants arthroplasty in the hallux. *Foot Ankle* 1: 95-101.
9. Cracchiolo A, Weltmer JB, Lian G, Dalseth T, Dorey F, et al. (1992) Arthroplasty of the first metatarsophalangeal joint with a double-stem silicone implant: results in patients who have degenerative joint disease failure of previous operations, or rheumatoid arthritis. *J Bone Joint Surg* 74: 552-563.
10. McNearney T, Haque A, Wen J, Lisse J (1996) Inguinal lymph node foreign body granulomas after placement of a silicone rubber (Silflex) implant of the first metatarsophalangeal joint. *J Rheumatol* 23: 1449-1452.