

Survey of Current Articles Published on Total Ankle Arthroplasty and Ankle Fusion

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Abstract

In the United States, ankle fusion is more commonly performed than total ankle arthroplasty (TAA) for treatment of degenerative joint disease of the ankle. However, recent advances in implant design and technique have led to a renewed interest in research on TAA. To shed light on current research trends and limited data rather than examine the merits between both methods, we performed a PubMed search of studies on TAA and ankle fusion between January 1, 2009, and January 1, 2015, published in both the American edition of the *Journal of Bone and Joint Surgery (JBJS)* and *Foot & Ankle International (FAI)*. We chose these journals because of their combined audience of both a specific orthopaedic subspecialty and the general orthopaedic community. A total of 132 articles met our inclusion criteria, with 76% and 3% of articles on TAA alone and ankle fusion alone published in *JBJS*, respectively, and 61% and 19% in *FAI*, respectively. Additionally, we found that a relatively small number of authors accounted for 65% of the articles in *JBJS* and 18% in *FAI*. The replacement of one procedure by the other will not likely occur in the near future, but our findings indicate a current research trend toward TAA more than ankle fusion. The clinical impact of an increased amount of studies on TAA has yet to be determined.

Introduction

In the United States, the gold standard for treatment of advanced ankle arthritis has been ankle fusion, performed more than six times as often as total ankle arthroplasty (TAA).¹ Because first-generation TAA in the 1970s had high failure rates associated with inadequate fixation of implants and soft-tissue complications, the procedure was gradually discontinued.² For the past several years, however, advances in surgical technique and implant design have resulted in an increased success of second-generation TAA in treating select patients with painful end-stage ankle arthritis. Although comparative long-term studies are still limited, interest has been renewed in TAA.³

We conducted a review of the number of articles on

TAA compared with ankle fusion published in both the American edition of the *Journal of Bone and Joint Surgery (JBJS)* and *Foot & Ankle International (FAI)* from 2009 to 2015. We searched subtopics such as treatment outcomes, complications, gait analysis, and revision operations to examine possible trends in research. We also noted individual and groups of authors who reported most often on the topic.

Methods

The time period was arbitrarily set to include current and recent studies on newer-generation implants used by TAA and ankle fusion, revealing probable trends in direction of research. *JBJS* and *FAI* were chosen for article extraction because, combined, the journals targeted general orthopaedic audiences and the subspecialty of foot and ankle surgery. *JBJS* is available to all members of the American Academy of Orthopaedic Surgeons, which includes more than 30,000 members. *FAI* is distributed among more than 2100 members of the American Orthopaedic Foot and Ankle Society.

Articles on TAA and ankle fusion published in these journals from January 1, 2009, to January 1, 2015, were identified by searches of PubMed with Boolean modifiers of “ankle fusion,” “ankle arthrodesis,” “total ankle arthroplasty,” and “total ankle replacement.” Letters to the editor, commentaries, and author replies were not included. All articles were reviewed for inclusion by the first author and an independent review was done by the second. We selected articles that described outcomes, complications, gait analyses, and revision procedures. In addition, we tracked which group or set of authors published the most papers on these subjects in *JBJS*. We noted how often these authors and groups with multiple publications appeared in *FAI*.

Results

The primary search strategy for PubMed yielded 132 articles that met our inclusion criteria (Table 1). During the time period examined, a total of 29 studies on TAA and ankle fusion were published in *JBJS*. About 76%, 21%, and 3% of studies were on TAA alone, TAA and ankle fusion, and ankle fusion alone, respectively. In *FAI*, a total of 103 studies were included, with about 61%, 20%, and 19% on TAA alone, TAA and ankle fusion, and ankle fusion alone, respectively. In the *JBJS* articles, three multi-published authors or groups accounted for 65% of the articles. These same three authors and groups accounted for 18% of the articles reviewed in *FAI*.

Table 1. Combined amount of articles (132 total) on total ankle arthroplasty and ankle fusion in *Journal of Bone and Joint Surgery* (29 total) and *Foot & Ankle International* (103 total) between 2009 and 2015 defined by inclusion criteria

Topic	JBJS articles	FAI articles	Total
	No. (%)	No. (%)	No. (%)
Outcomes and complications			
TAA	19 ^a (51.72)	62 ^b (60.19)	81 (61.36)
Ankle fusions	1 (3.45)	19 ^b (18.45)	20 (15.15)
TAA vs ankle fusion	2 (6.90)	12 (11.65)	14 (10.61)
Gait Analysis			
TAA	2 (6.90)	0 (0)	2 (1.52)
Ankle fusion	0 (0)	1 (0.97)	1 (0.76)
TAA vs ankle fusion	1 (3.45)	2 (1.94)	3 (2.27)
Revision			
Ankle fusion to TAA	3 (10.34)	1 (0.97)	4 (3.03)
TAA to TAA	1 (3.45)	1 (0.97)	2 (1.52)
TAA to ankle fusion	0 (0)	5 (4.85)	5 (3.79)

TAA, total ankle arthroplasty; *JBJS*, American edition of *Journal of Bone and Joint Surgery*; *FAI*, *Foot & Ankle International*.

^aIncludes two and four studies on cadavers an complications, respectively.

^bIncludes studies on technique.

Conclusion

Although ankle fusion is more commonly performed for treating advanced ankle arthritis in the United States,¹ the studies published on TAA alone in *JBJS* and *FAI* from 2009 to 2015 that met our inclusion criteria were greater in number. In *JBJS*, only one study⁴ on ankle fusion (vs 19 on TAA) described outcomes and complications, and only two articles compared treatment outcomes between the procedures. The total percentage of published articles only

on TAA compared with ankle fusion in *FAI* (about 61% and 19%, respectively) was not as notable as in *JBJS* (about 76% and 3%, respectively), yet a considerable discrepancy still existed.

These findings may support a current research trend toward TAA more than ankle fusion. The results of our search also suggested that most available studies were performed by a relatively small group of authors. However, our study was limited to two peer-reviewed journals, albeit well-circulated and respected in orthopaedic subspecialty and general communities. These journals did not include studies from the field of podiatry in which TAA and ankle fusion are also prevalent topics.

Numerous reasons may explain the discrepancy between the percentage of TAA performed and the popularity of the topic in current research. We can only speculate on how these numbers affects surgeon and patient perceptions of TAA and ankle fusion. Additionally, we applaud the small group of authors who described most of the available research on these two procedures. Their findings and insights are essential in improving the success of treatment.

References

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