

Does Open versus Arthroscopic Surgical Technique Affect the Union Rate of Tibiotalar Arthrodesis?

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Introduction/Purpose: To date, there are only a handful of studies directly comparing outcomes of open versus arthroscopic ankle arthrodesis. Major limitations of these studies are small patient cohorts, lack of long-term follow-up, lack of assessment pre-operative patient demographics and imaging, and post-operatively evaluation of clinical outcomes but not union rates. The purpose of this clinical study is to compare the rate of union in ankle fusions in patients that underwent open arthrodesis to those that underwent arthroscopic arthrodesis. The hypothesis of this study was that there would be no difference in union rate in patients that underwent open versus arthroscopic arthrodesis.

Methods: This is a retrospective review of 521 consecutive patients from October 2002 to April 2016. One hundred twenty-five ankles from 121 patients met inclusion criteria. These patients underwent primary tibiotalar arthrodesis without the use of autograft. Fifty-nine patients underwent open tibiotalar arthrodesis and 66 patients underwent arthroscopic tibiotalar arthrodesis. Age, gender, body mass index, smoking, and preoperative radiographic deformity were controlled. The primary outcome measure was union rate of tibiotalar arthrodesis. Secondary outcome measures were time to union, rate of wound complications, rate of return to operating room, and rate of development of post-operative deep vein thrombosis (DVT).

Results: One hundred twenty-one patients (125 ankles) were available for final follow-up. Average age of the patients was 55.3 +/- 17.2 years. Mean follow-up time was 35.4 months. Unions were assessed on routine post-operative radiographs. If there was a concern for nonunion, computerized tomography scan was utilized for further assessment. Nonunion rate of patients who had open surgery was 10/59 (17%) and nonunion rate of those who had arthroscopic surgery was 13/66 (20%) ($p=0.69$) [Table 1]. There was a statistically significant difference between those who had open versus arthroscopic surgery in wound complication rate (39% vs 6%, $p<0.001$) and DVT rate (7% vs 0%, $p=0.047$). There was no statistically significant difference in rate of return to the operating room. No major complications occurred in this study.

Conclusion: This study is the largest study to directly compare union rate and complications in patients who had open versus arthroscopic ankle arthrodesis. In this study, no significant association was found between surgical technique and union rate in patients undergoing ankle arthrodesis. Additionally, use of the arthroscopic technique has significantly lower rates of wound complication and post-operative DVTs.

Table 1. Descriptive summary of outcomes by ankle arthrodesis technique.

Variable	All ankles (N=121)	Open (N=59)	Arthroscopic (N=66)	P-value
Nonunion	23 (18%)	10 (17%)	13 (20%)	0.69
Time to union - Median (IQR)	3.6 (2.9, 6.6)	5 (3.2, 7)	3.2 (2.8, 5.8)	0.009
Wound Complications	27 (22%)	23 (39%)	4 (6%)	<0.001
DVT/PE	4 (3%)	4 (7%)	0 (0%)	0.047
Return to OR	54 (43%)	28 (47%)	26 (39%)	0.057
Removal of hardware	23 (18%)	13 (22%)	10 (15%)	

OR = operating room

PE = pulmonary emboli