



Total ankle replacement and contralateral ankle arthrodesis in 16 patients from the Swedish Ankle Registry: Self-reported function and satisfaction



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ABSTRACT

Background: Both total ankle replacement (TAR) and ankle arthrodesis do show some problems in long-term studies. To choose either of these surgical options is a delicate task. There are no randomized studies reported in the literature and no previous studies in which patients constitute the own controls. **Methods:** Patients with a TAR and a contralateral ankle arthrodesis were identified in the Swedish Ankle Register. A self-reported foot and ankle specific questionnaire (SEFAS) was sent to these patients who also were asked to report their grade of satisfaction from 1 to 5.

Results: The median SEFAS score was 32 (16–44) for the prostheses and 27 (14–47) for the arthrodeses. The median satisfaction score was 2 (1–4) for the prostheses and 2 (1–5) for the arthrodeses. There were no statistically significant difference between the prosthetic side and the fused side regarding these scores.

Conclusion: Patients who had undergone ankle arthrodesis on one side and had the contralateral ankle replaced, were equally satisfied with both procedures.

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1. Introduction

Whether end stage ankle osteoarthritis should be treated by total ankle replacement (TAR) or by ankle arthrodesis is still under debate. No randomized studies have been published and indeed would be very difficult to perform [1]. Long-term results of ankle arthrodesis show several problems [2–4] and long-term results of TAR do not reach the levels of total hip- or knee replacements but reveal 10-year survival rates of 78–89% [5–8].

Most studies of TARs concern complications, revision rates and survivorship. Studies concerning ankle arthrodesis are about complications and re-arthrodesis rates. Reports of Patient Related Outcome Measures (PROMs) in patients with a TAR or an ankle arthrodesis are sparse in the literature.

We present a PROM study of 16 patients who had received a TAR in one ankle and had the contralateral ankle fused, i.e. the patients were their own controls.

2. Patients and methods

Twenty patients with a TAR and a contralateral ankle arthrodesis were identified from the Swedish Ankle Registry [9]. Two patients have died of unrelated reasons, one patient had too short follow-up and another patient could not be reached leaving 16 patients to evaluate.

Four patients had primary osteoarthritis, 3 posttraumatic osteoarthritis, 7 rheumatoid arthritis, one hemochromatosis and one psoriatic arthritis.

Seven patients had the TAR on the right side and 9 had arthrodesis on the left side and vice versa.

The designs were 4 STAR (Waldemar Link, Germany), 4 Mobility (DePuy, UK), 6 CCI (Wright Medical Technology, Arlington, TN, USA) and 2 AES (Biomet, UK). The ankle arthrodesis were performed with screw fixation in 5 cases and in 11 cases with a retrograde intramedullary nail.

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Previous or simultaneous subtalar fusion were performed in 4 patients with ankle replacement and in two other patients with ankle arthrodesis.

All patients were sent PROM questionnaires including the SEFAS score [10] and the satisfaction score according to Likert [11]. The SEFAS score has a maximum of 48 points where 0 points is profound dissatisfaction and 48 points a normal or close to normal ankle. The Likert score includes 5 grades of satisfaction: very satisfied, satisfied, neither satisfied or dissatisfied, dissatisfied and very dissatisfied. Very satisfied corresponds to 1 point and very dissatisfied to 5 points. The PROMs were sent to the patients with re-arthrodeses and revisions respectively at least 12 months after the secondary procedures.

For statistical analysis of differences between the two procedures the Wilcoxon signed-rank test was used.

3. Results

Two patients (no. 2 and 11) underwent re-arthrodesis 28 and 58 months after the primary procedure because of non-union (Table 1). The arthrodesis in patient no. 2 was performed with screws and for re-arthrodesis a retrograde intramedullary nail was used. In patient no. 11 the primary method was with a retrograde intramedullary nail and the re-arthrodesis was performed with external fixation. Both ankles fused without any complications and these cases are therefore included in the study.

Another three patients had secondary surgery of their TARs. One (no. 6) underwent a revision due to instability 11 months postoperatively, the deltoid was released and the PE meniscus was exchanged to a higher one. Despite this procedure the instability sustained and 1 month later a medial malleolar osteotomy and a lateral ligament augmentation was performed. After these procedures the ankle remains stable and the patient is satisfied.

The second patient (no. 10) had a revision 73 months postoperatively and the PE meniscus was exchanged due to plastic wear.

The third patient (no. 13) was revised with exchange of the tibial component due to aseptic loosening 12 months after the primary procedure. Also these 3 cases are included in the study.

All patients answered the questionnaires completely.

Follow-up time of the PROMs was mean 74 (12–145) months for the prosthetic side and 66 (12–156) months for the arthrodesis side (Table 1).

One patient (no. 3) was dissatisfied with the replaced ankle and 4 patients (no. 1, 9, 15, 16) with their fused ankle. Thirteen patients

with replaced ankles and 10 with arthrodesis were satisfied or very satisfied (Table 1). Four patients (no. 6, 8, 10, 13) reported a higher score for the fused ankle and the same patients were more satisfied with that ankle. Nine patients reported about the same scores for both ankles and were equally satisfied. All four patients with replaced ankle and subtalar fusion were satisfied with their ankles.

The median SEFAS score was 32 (16–44) for the prostheses and 27 (14–47) for the arthrodeses (Table 1). No difference between these procedures was detected ($p = 0.271$). The median Likert score was 2 (1–4) for the prostheses and 2 (1–5) for the arthrodesis. Equally, there was no difference between the two procedures ($p = 0.257$).

4. Discussion

This study shows no differences concerning outcome scores or patient satisfaction after having had an ankle replaced or fused. Most of the patients were satisfied with their ankles irrespective of treatment and few were dissatisfied.

There are several studies on differences between TAR and ankle arthrodesis but no randomized studies. One prospective study, where some centers implanted the STAR ankle and some centers performed ankle arthrodesis using the same inclusion/exclusion criteria, reported that the TAR group had better function and equivalent pain relief at 2 years [12].

In a meta-analysis of 852 TARs and 1262 ankle arthrodeses Haddad et al. found similar outcomes of the two groups when analyzing survival rates, revision rates and the AOFAS score [13].

Most studies using score systems for comparison are only short-term. Krause et al. and Singer et al. found no difference between TAR and ankle arthrodesis using the AOS score after 3 and 1 years respectively [14,15]. Equally were there no difference regarding the AOFAS and UCLA scores after 3 years in a study by Schuh et al. [16]. Esparragoza et al. studied the AOFAS and the SF-36 scores after 2 years and found statistically significantly better improvement for the prosthesis patients than the arthrodesis patients [17]. In a comparative study Braitto et al. report better outcome of the AOFAS-function subscore and using the FAOS score less pain of the TAR patients than of the arthrodeses patients [18].

Gait analyses show that gait after TAR is more close to normal gait pattern than gait after ankle arthrodesis [15,19,20], whereas Braitto et al. found no differences concerning gait pattern [18].

Courville et al. used a Markov model and concludes that TAR is a cost-effective alternative to ankle fusion [21].

Table 1
SEFAS and satisfaction scores.

Patient no.	Diagnosis	Age at the first procedure	FU TAR (months)	SEFAS score 0–48 p	Satisfaction 1–5 ^a	FU arthrodesis (months)	SEFAS score 0–48 p	Satisfaction 1–5 ^a
1	OA	75	135	27	2	23	14	5
2	Pta	65	51	31	1	127	31	2
3	RA	63	134	20	4	31	19	3
4	HChr	64	50	36	2	65	35	1
5	Pta	63	141	30	1	85	26	2
6	OA	57	68	33	2	92	40	2
7	RA	51	50	33	1	156	30	2
8	OA	59	12	36	2	26	47	1
9	RA	48	142	44	1	139	22	5
10	Pta	48	120	22	2	89	44	1
11	RA	44	45	22	1	132	20	2
12	RA	47	24	36	3	24	27	1
13	PsA	34	24	16	3	17	24	2
14	OA	61	12	30	1	23	30	1
15	RA	50	145	41	1	22	19	5
16	RA	56	24	41	1	12	24	4

OA, primary osteoarthritis; RA, rheumatoid arthritis; Pta, posttraumatic arthritis; HChr, hemochromatosis; PsA, psoriatic arthritis.

^a 1 = very satisfied, 5 = very dissatisfied.

Several studies have shown that complication rates requiring further surgery are more common following TAR operation than following ankle fusion [14,22,23].

The SEFAS score is validated for the ankle, hindfoot, and forefoot [10,24]. It has good reliability, validity and responsiveness, implying that it is a suitable instrument of evaluating outcomes of ankle and foot surgery. In our study with the patient acting as its own control the median SEFAS score was comparable in both TARs and ankle fusions. Since the median satisfaction score also was equivalent between the procedures no superiority of any of the surgical options can be concluded.

The number of cases was too few to compare the outcome of strict ankle fusion and those fusions also including subtalar fusion.

An obvious limitation of this study is the small number of patients. However, the condition with a TAR and a contralateral ankle arthrodesis seems to be unusual. In the Swedish Ankle Registry, which contains 1120 TARs and 1528 ankle arthrodeses (December 31, 2014), could thus only 20 cases be identified. The Swedish Ankle Registry has a procedure based coverage of 100% concerning TARs and 95.8% concerning ankle arthrodesis [25], a fact that rather well ensures the number of cases in this study. Furthermore the group is inhomogeneous with different prosthetic designs and different methods of arthrodesis. However, nine patients were satisfied with both ankles and only one dissatisfied with the prosthetic ankle. Since this is a registry study many data are missing. No radiological results are reported to the registry. Possible sports activities are missing too, though the SEFAS score adequately meets daily activities to a full extent. The use of statistical method with such small numbers implies a risk of type 2 error, the similarity of the outcomes of the scores is however convincing.

Most studies in the current literature that compare the outcome of TAR and ankle arthrodesis are short-term. Weighing all studies together there seems to be equal outcomes of the two procedures though TARs have some functional advantages, especially concerning gait pattern. However, the complication rate and thus the need for secondary surgery is higher after a TAR than after an ankle arthrodesis.

In conclusion this study has shown some advantage of TAR with the numbers available, however most patients with an ankle arthrodesis and a contralateral ankle prosthesis were equally satisfied with both the fused and the replaced ankle.

Conflict of interest

No conflict of interest declared.

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