

Clinical Outcomes and Surgical Satisfaction Following Lateral Transfibular Total Ankle Arthroplasty: Early Follow-up Results From A Canadian Cohort

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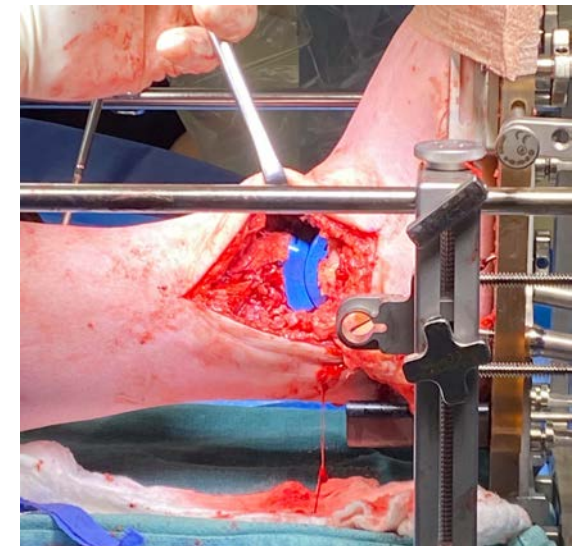
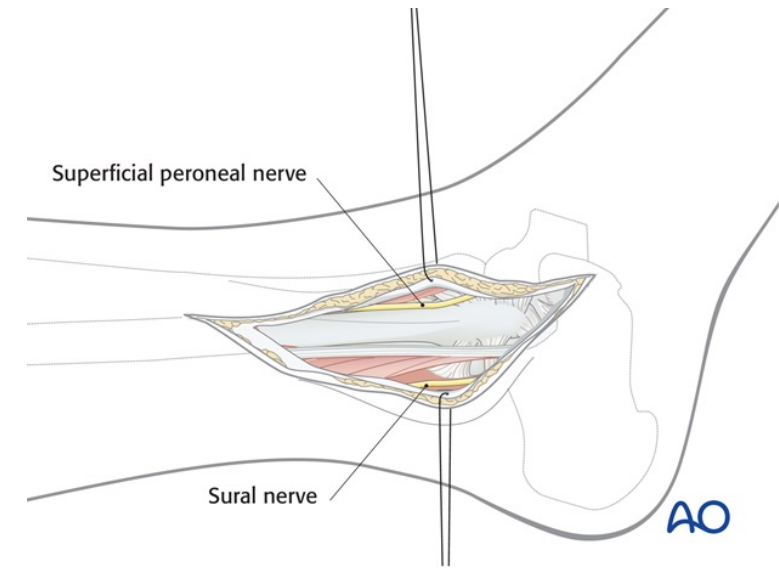


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- Affiliations:
 - I have no relationships with for-profit or not for profit organizations.
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Introduction

- **Total Ankle Arthroplasty (TAA)** has become standard of treatment for end-stage ankle arthritis as an alternative to arthrodesis once conservative management has failed [1]
- Main indications; primary osteoarthritis (OA), rheumatoid arthritis (RA), secondary and post traumatic OA
- **Anterior approach** to TAAs is the **most commonly used** approach [1,3]
- The **lateral approach** has gained interest as it;
 - Allows access to center of rotation of the talus allowing **better visualization** of the sagittal plane [1-5]
 - Theoretical **reduced risk of wound complications** by avoiding anterior vasculature of the ankle [3,4,6]
 - Proposed **reduction in instability**, early wear, and prosthetic loosening [1,3,5]
- Major drawback is a **prolonged operating time** [1-3]

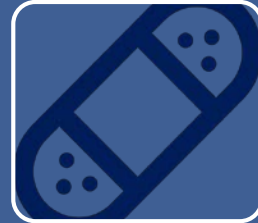


Objectives

- The objectives of this study were threefold;
- We hypothesized
 - Improved patient outcomes in the first year and this will correspond to positive patient satisfaction
 - Additionally, we did not anticipate significant early prosthetic complications



Assess short-term postoperative patient outcomes of pain, function, and quality of life



Determine early prosthetic and wound complications



Evaluate patient satisfaction with TAA surgery

Methods

- **Retrospective** clinical and radiographic data
- **26 patients** who underwent a primary TAA using the Zimmer Trabecular Metal Total Ankle Replacement
- Operations completed between September 2017 to September 2019
- Exclusion criteria;
 - Peripheral neuropathy
 - Recent history of septic arthritis
 - Neuromuscular disorders

Methods

- Clinical evaluation data was collected via questionnaire preoperatively and postoperatively at **3- and 12-month follow-ups**
- Specific outcome measures used included the **AOFAS Ankle-Hindfoot Score**, the **Short Form 36 (SF-36)**, and the **Visual Analog Scale (VAS)** of pain
- Patient satisfaction with surgery was assessed using a modified version of the **Surgical Satisfaction Questionnaire 8 (SSQ-8)**

Parameter	Scale	Points
Pain	None	40
	Mild	30
	Moderate	20
	Severe	10
Activity Limitations	None	10
	Some limitations on recreational activities	7
	Some limitations on daily & recreational activities	4
	Severe limitation on daily & recreational activities	0
Walking Distance	600m or more	5
	400-600m	4
	100-300m	2
	Less than 100m	0
Walking Surfaces	No difficulty on any surface	5
	Some difficulty on uneven terrain, stairs, inclines	3
	Severe difficulty	0
Gait Abnormality	None or slight	8
	Obvious	4
	Marked	0
Sagittal Motion	30° or more	8
	15-29°	4
	Less than 15°	0
Hindfoot Motion	75-100% normal	6
	25-74% normal	3
	Less than 25% normal	0
Ankle-Hindfoot Stability	Stable	8
	Unstable	0
Alignment	Good	10
	Fair	5
	Poor	0

Methods

- Range of motion captured in sagittal plane using a **goniometer**
- Standard plain **radiographs** obtained in the AP, lateral, and oblique views preoperatively and at **3, 6, and 12 months** to assess for **prosthetic complications**
- **Two tailed student t-tests** to assess differences between pre- and post-operative Ankle-Hindfoot Score and SF-36 scores
- VAS scores were assessed using Wilcoxon matched-pairs signed-rank test
- Significance was set as **$p < 0.05$**



Results - Complications

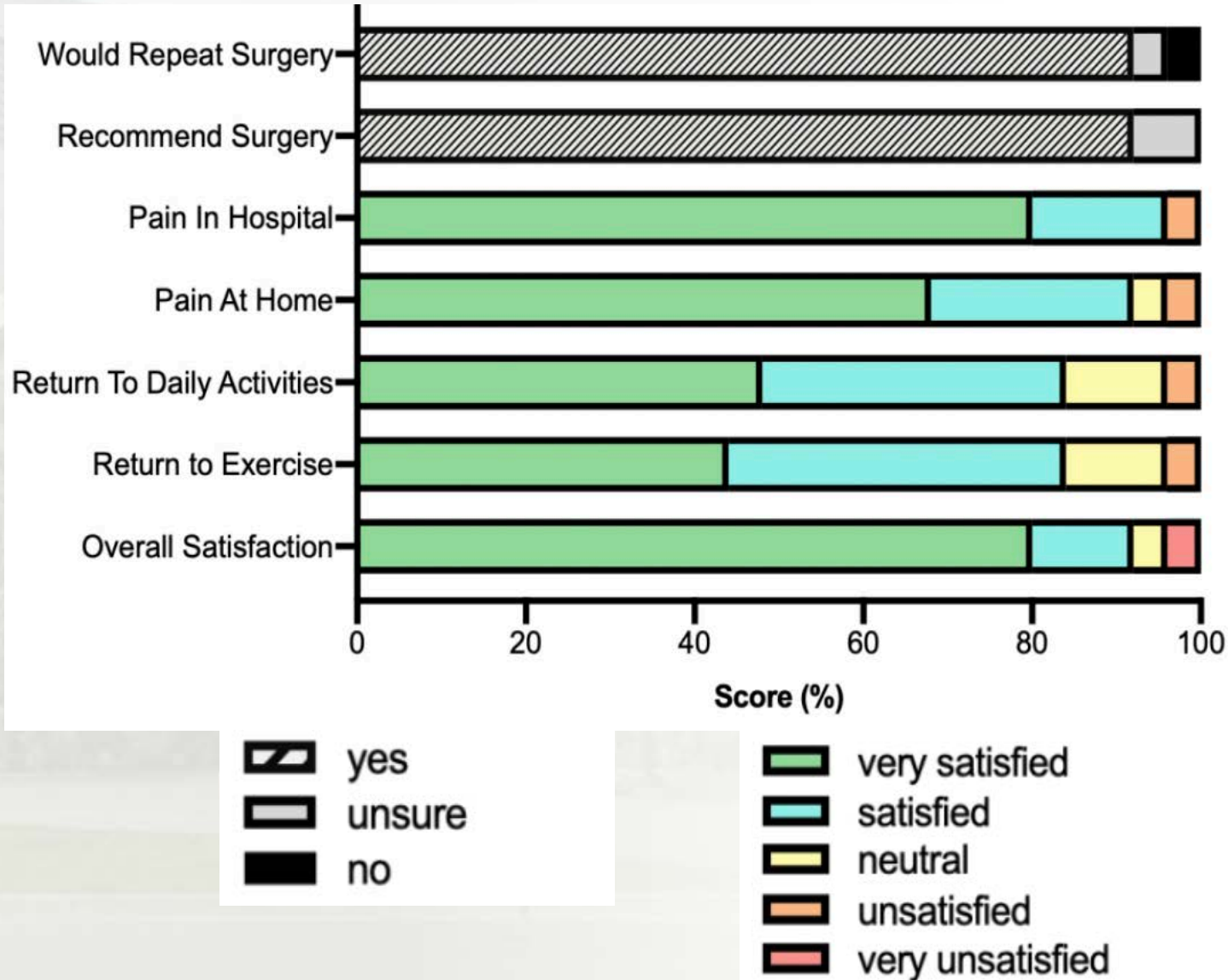
- Looking at complications;
 - 1 case of a fibular delayed union (4%)
 - 3 cases (12%) of superficial infections
 - 2 patients (8%) experienced operative nerve damage
 - There were no cases of early prosthetic failure
 - One individual did need a second surgery to remove a loose syndesmotic screw

Results – SF-36 + AOFAS

Parameter	Preoperative		Postoperative (3 mo)		Postoperative (12 mo)	
	Mean	SD	Mean	SD	Mean	SD
VAS (0-10)	8.00	1.3	1.70**	1.8	1.48**	2.0
AOFAS (%)	30.3	14.6	85.3**	9.9	87.6**	10.1
SF-36 Pain (%)	28.7	15.2	58.9**	25.6	63.6**	25.9
SF-36 Emotion (%)	72.2	19.2	84.2**	12.8	85.4**	11.9
SF-36 Social (%)	62.0	31.4	76.0*	27.2	91.0**	17.1
SF-36 Physical (%)	34.8	17.6	52.8*	22.8	61.2**	23.1

- At **3** and **12** months postoperatively, there were statistically significant **increases** in **AOFAS scores** from preoperatively (**p<0.001**)
- Statistically significant **increase** in **SF-36** preoperatively to **3 months postoperatively** across the **pain** (**p<0.001**), **physical** (**p<0.05**), **emotional** (**p<0.001**), and **social domains** (**p<0.05**)
- **SF-36** scores preoperatively to **12 months** postoperatively showed statistical significant **increase** in the **pain** (**p<0.001**), **physical** (**p<0.001**), **emotional** (**p<0.001**), and **social domains** (**p<0.001**)

Results – SSQ-8



- In terms of the SSQ-8, **23 patients (92.0%)** reported that they were “**very satisfied**” or “**satisfied**” with the their outcome
- Similarly, **23 patients (92%)**;
 - Would “do it all over **again**”
 - Would **recommend** it to other patients with a similar condition

Discussion

- Previous studies have assessed clinical outcomes of lateral TAA using the AOFAS, SF-36, VAS and ROM, but have not assessed **patient satisfaction** [1-3,5]
- Gagné et al. [6] identified difference in **reoperation rate** after lateral and anterior approach in an exclusively Canadian cohort, but not other outcome measures
- **SSQ-8** was adapted from validated gynecological, urological and otolaryngology studies, but has **not been used in orthopedic studies**

	Very Satisfied	Satisfied	Neutral	Unsatisfied	Very Unsatisfied
How satisfied are you with how your pain was controlled in the hospital after surgery?					
How satisfied are you with how your pain was controlled when you returned home after surgery?					
How satisfied are you with the amount of time it took for you to return to your daily activities, for example housework or social activities outside the home?					
How satisfied are you with the amount of time it took for you to return to work?					
How satisfied are you with the amount of time it took for you to return to your normal exercise routine?					
How satisfied are you with the results for your surgery?					

	Yes	Maybe	Unsure	Do not think so	No
Looking back, if you "had to do it all over again" would you have the surgery again?					
Would you recommend this surgery to someone else?					

Discussion – Wound Outcomes

- In our study, **3 patients** (12.0%) developed a **superficial infection**, a rate slightly higher than previous studies
 - Uselli et al. [7]: 3 of the 66 patients (4.5%) developed a postoperative infection
 - Barg et al. [3]: 2 of 54 patients (3.7%) developed superficial infections
- Tiusanen et al. [8] deduced a **higher rate of wound infection when a plate was used** to fix the fibular osteotomy vs. a 2-3 screw fixation (14% vs. 5.6%)
 - This rate is consistent with our patients having had lateral plates to fix their fibular osteotomy
- Although the lateral approach has been criticized for a proposed longer operative time, the average surgery time for our study was **111 minutes** (SD=13.8)
 - Uselli et al. [6] and DeVries et al. [9] revealed average surgery times of 165 and 176 minutes
- Two patients (8.0%) experienced **nerve injuries**, consistent with the plantar nerves

Discussion – Early Prosthetic Outcomes

- Another complication unique to the lateral approach is the risk of a delayed union or non-union, leading to instability of the prosthesis, improper alignment, and/or implant failure [5]
 - **One** of 25 patients (4.0%) experienced an asymptomatic **delayed fibular union**
 - **One** patient (4.0%) experienced a **loose syndesmotic screw** at their 3-month visit with an operative removal scheduled
 - **None** of the patients had early **periprosthetic failure**
- This is lower than numbers obtained from **Bianchi et al.** [2] which had a **6.7% fibular non-union rate** and lower than **Devries et al.** [9], with a **delayed/non-union rate of 18.8%**

Discussion – Short-term Patient Outcomes

- Overall, **statistically significant pain relief** was achieved at **3 and 12 months**
- The most significant **improvement in AOFAS occurred preoperatively to 3 months** with a greater than threefold increase in mean score
 - Similar results were obtained from a multicenter cohort with improvements from 39 preoperatively to 68.2 at 6 weeks and 82.6 at 1 year [10]
- **SF-36** scores revealed similar statistically significant improvements in pain and emotional, physical, and social domains at 3 and 12 months
 - Our cohort's mean physical function score preoperatively was greater than one standard deviation below the normative data's mean
 - Achieving a **score of 61.2** at 12 months postoperatively is encouraging

Discussion – Patient Satisfaction

- With an **overall positive response of 92.0%**, not only are objective measures of operative outcome promising, but we are re-assured that patients are also satisfied in short term follow-up
 - Despite this positive response, one patient (4.0%) was “very unsatisfied” with the results of the surgery and would not repeat the surgery
- One **major limitation** with this survey is that it was retrospectively administered; **follow-up time for questionnaire varied from 1-2 years**
- A secondary limitation of the **SSQ-8** is that although it has been validated in urological and gynecological surgeries, it has **not been studied in the context of elective orthopedic arthroplasty surgery**
 - That being said, questionnaire data regarding surgical satisfaction had a moderate correlation with AOFAS ($r = -0.71$)

Discussion – Limitations

- Major limitation is the limited **sample size** due to the volume of lateral TAAs performed at this center
- Additionally, **objective measurement of range of motion** performed using a goniometer opposed to radiographically
- Final limitation is results from this study are **short-term** and remain relatively preliminary
 - Next steps would be ongoing collection of clinical outcomes at 2- and 5-year follow-ups

Conclusion

The **lateral transfibular approach to TAA** using the Zimmer Trabecular Metal Total Ankle Replacement is an **effective procedure for end-stage ankle arthritis**



Good clinical outcomes as measured by the AOFAS and SF-36 at 3- and 12-month follow up, with the greatest improvement measured in the first 3 months



3 patients (12.0%) developed superficial infections, a rate slightly higher than previously shown



One (4.0%) asymptomatic delayed fibular union, a rate lower than previously shown, but no early periprosthetic failure or clinical or radiographic signs of instability



92% “very satisfied” or “satisfied” with their outcomes, and 92% of patients recommending surgery to others

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