Outcomes of Elective Transtibial Amputation with Osseointegration for Foot and Ankle Problems

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INTRODUCTION:
Some patients with foot and ankle deformity, chronic infection, or intractable pain elect for transtibial amputation instead of reconstruction surgery. Recently, press-fit titanium transcutaneous osseointegration nailing (TiTON) has been introduced which entails attaching prosthesis directly to the skeleton to bypass the need of a socket. Most osseointegration literature focuses on patients who were existing amputees. The aim of this study was to evaluate the clinical outcomes and patient satisfaction after undergoing elective transtibial amputation with simultaneous primary osseointegration.
METHODS:
Retrospective review was performed of all our osseointegration patients who had a primary tibia amputation (rather than existing amputation) with simultaneous osseointegration (rather than osseointegration performed at a different surgery). The primary outcome was adverse events. Secondary outcomes were patient-reported surveys (LD-SRS and PROMIS). Patients also rated their satisfaction from 1 (very unsatisfied) to 5 (very satisfied) and were asked if they would have the same management again (5=definitely yes, 1=definitely no).
RESULTS:
Twelve patients were included, with an average follow up of 26.0±15.6 months. The causes for amputation were posttraumatic complications of chronic painful deformity and arthritis (n=4), CRPS (n=2), failed ankle fusion (n=1), chronic hindfoot osteomyelitis with diabetic neuropathy (n=1), foot drop and neurogenic pain after traumatic brain hemorrhage (n=1), dislocation of revision total ankle replacement with total talus (n=1), nonunion of supramalleolar osteotomy with hx of neurofibromatosis and club foot surgeries (n=1), and Maffuci syndrome with hx of multiple surgeries of enchondroma and hemangioma excision (n=1).
Two patients had subsequent surgical debridement to address infection; there were no other postoperative adverse events. Multiple PROMIS domains significantly improved: Global Physical Health, Pain Interference, and Physical Function. All LD-SRS domains significantly improved except for the mental health domain (table 1). All patients were satisfied (50%) or very satisfied (50%) with their limb management. All patients stated they would have the same surgery again.
DISCUSSION AND CONCLUSION:
For patients with unilateral complex foot and ankle deformities, elective transtibial amputation with simultaneous osseointegration confers significant quality of life benefits and high satisfaction, with a very good safety profile. This treatment option seems very reasonable to offer well informed patients.

SURVEYS			
	Preoperative	**Postoperative**	**P**
LD-SRS			
Total (Domain)	2.5 ± 0.7 (1.5 - 3.5)	3.7 ± 0.5 (2.9 - 4.4)	**<.001**
Functionality	2.1 ± 0.7 (1 - 3)	3.5 ± 0.8 (2 - 4.6)	**<.001**
Pain	2.6 ± 0.8 (1.6 - 4.3)	4 ± 0.9 (1.8 - 5)	**0.002**
Self Image	2.2 ± 0.8 (1 - 3.2)	3.6 ± 0.6 (2.6 - 4.4)	**<.001**
Mental Health	3.2 ± 1.1 (1 - 4.6)	3.7 ± 0.6 (3 - 4.8)	0.202
PROMIS			
Physical Function	33.2 ± 9.2 (21.3 - 48)	44.4 ± 9.8 (27 - 57)	**0.011**
Pain Intensity	66.3 ± 9.9 (47 - 78)	45.9 ± 12.4 (31 - 72)	0.098
Pain Interference	55.5 ± 12.4 (31 - 71.8)	53.4 ± 12 (39 - 76)	**0.010**
Global Physical Health	35.4 ± 9.2 (16.2 - 50.8)	45.6 ± 8 (34.9 - 61.9)	**0.009**
Global Mental Health	40.7 ± 9.3 (25.1 - 50.8)	46.7 ± 7.3 (33.8 - 56)	0.101