

Transtibial Osseointegration Confers Mobility Benefits with Limited Complications

Munjed Al Muderis, MB, ChB; Jason S. Hoellwarth; Kevin Tetsworth
munjed@almuderis.com.au

What was the question?

Transfemoral osseointegration consistently improves amputee quality of life (QOL) and mobility. Transtibial osseointegration (TTOI) is understudied: only six publications exist, describing 27 total procedures. This study asks: what are the differences in the subjective and objective outcomes, and complications following TTOI?

How did you answer the question?

We prospectively followed all skeletally mature adults who either 1) reported pain or mobility dissatisfaction with their transtibial socket prosthesis (TSP); 2) had an intact limb with incapacitating pain, complex deformity, or profound distal weakness, whose functional capacity was considered improvable by amputation; or 3) were recent amputees preferring osseointegration to TSP rehabilitation. Short Form 36 (SF-36) and modified Questionnaire for Persons with a Transfemoral Amputation (QTFA) surveys, physician examinations, Timed Up and Go (TUG), and Six Minute Walk Test (6MWT) were performed before osseointegration and postoperatively for at least two years.

What are the results?

102 procedures were performed for 91 patients. Statistically significant improvements following osseointegration: prosthesis use (>13 daily hours 40% versus 86%, $p<.001$), SF-36 physical component score (40.1 ± 9.5 versus 50.3 ± 11.4 , $p<.001$), K-level ($1.4\pm .9$ versus $3.0\pm .5$, $p<.001$), TUG (9.9 ± 2.6 versus 8.2 ± 1.7 seconds, $p<.001$), and 6MWT (339 ± 94 versus 437 ± 117 m, $p<.001$). Complications: thirteen patients (13%) required surgical debridement only, another 9 (9%) eventually required implant removal, including 2 patients (2%) who required transfemoral amputation for infection. Unplanned refashioning and nerve reinnervation occurred in 8 patients (8%) each. No periprosthetic bone fractures occurred. One patient died due to atherosclerosis-induced myocardial infarction after nearly three years.

What are your conclusions?

TTOI confers subjective and objective improvements for the majority of transtibial amputees experiencing difficulty using a TSP. Complications are manageable and should decrease with surgical and implant improvements.