Taylor Spatial Frame Stacked Transport for Tibial Infected Nonunions with Bone Loss: Long-Term Functional Outcomes

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Introduction

- Infected nonunions with bone loss are a limb threatening problem
- Traditional Ilizarov transports are useful but can be unforgiving if malalignment occurs
- The stacked Taylor Spatial Frame bone transport may offer advantages
Purpose

- Analyze the long-term functional outcomes in patients undergoing stack Taylor Spatial Frame bone transport for infected tibial nonunions with bone loss
- Evaluate a subset of patients functional outcomes over time
Materials and Methods:

STACKED TSF TRANSPORT

- 2001-2015
- 75 tibiae with infected nonunions with bone loss
- Excluded 5 that underwent amputation leaving 70 possible patients for analysis

- Short Musculoskeletal Functional Assessment was sent to all patients
- Overall scores range from 0 to 100 with low scores indicating better function.
Materials and Methods: TSF TRANSPORT

- Radical debridement of infected bone and antibiotic bead placement
- Application of stacked TSF
- Distant corticotomy
Materials and Methods: TSF TRANSPORT

- Separate Total Residual Programs and transport
- Osteotomize fibula
- Removal of the beads and ICBG at the docking site
Materials and Methods: TSF TRANSPORT

- Dynamization and frame removal
Study Population (n=38)

- 38 patients responded to sMFA
- Mean 59 months of follow up
- Mean age 47
- 74% male
- 8% diabetic
- 29% smokers
- 45% required a free flap by plastic surgery
RESULTS

- Mean time in the frame was 9.3 months.
- The external fixation index was 1.9 months/cm.
- Average size of defect was 5.1 cm
- Mean sMFA was 27.1 at 59 months
Smokers had worse sMFA scores

![Bar chart showing sMFA scores for smokers and non-smokers. Smokers have a score of 39, while non-smokers have a score of 22. The p-value is 0.01.]
• 17 patients required adjunctive stability

• We defined adjunctive stability as requiring additional fixation with intramedullary nail, plate fixation or reapplication of the TSF
Adjunctive Stability had worse sMFA scores

- Use of Adjunctive Stability: MFA score = 33
- Removal of Frame: MFA score = 22

p = 0.04

Number of Subjects: 9
sMFA score was not related to gender or age

- Age and Gender did not correlate with functional outcomes
Direction of Transport

- Antegrade Transport: 26.4
- Retrograde Transport: 30.7

MFA score
Open vs Closed

MFA score

Open: 26.1
Closed: 30.4
Pilon vs Not Pilon

MFA score

Pilon: 23.4
Not Pilon: 29.3
Plateau vs Not Plateau

MFA score

Proximal: 30.7
Not Proximal: 26.4
Prox vs shaft vs pilon

Proximal Tibia: 30.7
Shaft: 28.8
Pilon: 23.4
16 patients with two complete MFAs

Mean time after removal of TSF

First MFA: 25.3 months

Second MFA: 98.8 months
Conclusions

• Stacked Taylor Spatial Frame for the infected tibial nonunions with bone loss is an effective tool for limb salvage.
• Non-smokers and patients that did not required adjunctive internal fixation had significantly better outcomes.
• Distal defects surprisingly did better than proximal defects.
• No significant difference in gender, age, or use of free flaps was seen.
• MFA scores of Limb Salvage patients improved over time and begin to approach normal functional outcome at 8 years.
THANK YOU