

Early vs. Delayed Targeted Muscle Reinnervation (TMR): Why wait?

Michael B Geary, Samuel Posey, Sarah Pierrie¹, Bryan J. Loeffler, Raymond Glenn Gaston

¹San Antonio Military Medical Center

INTRODUCTION:

While targeted muscle reinnervation (TMR) has been used for both prophylaxis and treatment of painful neuromas after upper extremity amputations, no studies have looked at whether the timing of TMR impacts patient outcomes. We hypothesized that early TMR within 30 days of the last amputation would decrease patient-reported pain scores at long-term follow-up compared to patients undergoing delayed TMR.

METHODS:

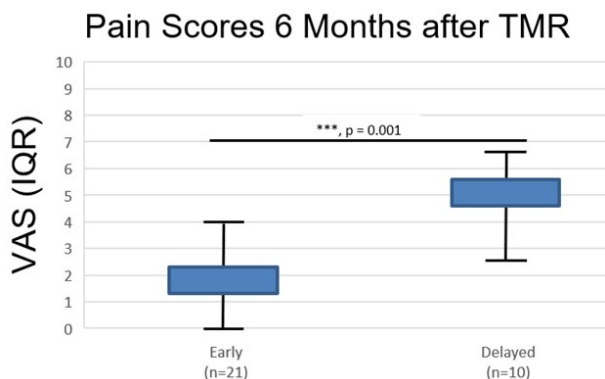
Our institution's amputee registry was reviewed for all patients undergoing a major upper extremity amputation. Inclusion criteria included patients older than 18 years-old with either a transradial or transhumeral amputation and history of TMR performed at our institution. Patients were excluded from this study if they had less than 6-months of follow-up since the date of their TMR. Demographic data and associated comorbidities were collected for all patients. Groups were categorized as early or delayed based on whether TMR was performed within or after 30 days of the initial amputation, respectively. Postoperative complications, patient-reported outcome measures, and visual analog pain scores (VAS) were collected. All data underwent descriptive statistical analysis using SAS version 9.4 (SAS Institute, Cary, NC; <http://www.sas.com/software/sas9>).

RESULTS:

31 limbs in 29 patients met inclusion criteria with most of them coming from a traumatic injury. 19 of these patients were stratified into the early TMR cohort while 10 of the patients were in the delayed TMR cohort. The indication for delayed TMR was predominantly due to symptomatic neuroma after initial amputation, and there was no difference between cohorts in the distribution of transradial and transhumeral amputations (Table 1). No difference between cohorts was found amongst all demographic and associated comorbidity data collected except for worker's compensation status being higher in the delayed TMR group ($p=0.02$). VAS scores were significantly lower in the early TMR group, 1.6 vs 5.1 (Figure 1). There were no differences in the rates of postoperative complications or amount of prosthetic use between groups ($p>0.95$).

DISCUSSION AND CONCLUSION:

Amputees undergoing early TMR have lower VAS pain scores postoperatively than those undergoing delayed TMR but worker's compensation status remains a possible confounder. Early TMR can be performed safely and does not increase the risk of complications. The amount of prosthetic use appears similar between early and delayed TMR patients. Further study is required to determine if a more meaningful patient-reported outcome measure could help delineate a clinical difference for the amputee community.



	Early (n=21)	Delayed (n=10)	P-value
TMR Recipie, n(%)			
Transradial	14 (66.7%)	7 (70.0%)	
Transhumeral	7 (33.3%)	3 (30.0%)	>.99
Indication for Delayed TMR, n(%)			
Symptomatic neuroma after initial amputation	0 (0%)	6 (60.0%)	
Prophylaxis for neuroma and to optimize myoelectric prosthesis function	0 (0%)	2 (20.0%)	
Symptomatic neuroma after initial amputation + increase function through myoelectric/prosthesis	0 (0%)	1 (10.0%)	
Flexion osteotomy + TMR to improve prosthetic fit and function after transhumeral amputation	0 (0%)	1 (10.0%)	