Outcomes for Acute versus Delayed Targeted Muscle Reinnervation After Upper Extremity Amputation

Meera Gill DO (Presenter), Holden Heitner MD, Jason Nydick DO

INTRODUCTION:

A significant number of amputees within the US suffer from post amputation pain, with many suffering from either phantom limb pain (PLP), residual limb pain (RLP), or both. This leads to a considerable decrease in function as well as an increase in medication/narcotic usage. Fortunately, over the last couple decades, there has been significant developments with targeted muscle reinnervation (TMR). The purpose of this study was to compare the outcomes between acute versus delayed intervention TMR for upper extremity limb loss, in order to emphasize the importance of quick referral and coordination of care. While TMR has been shown to be beneficial in both acute and chronic amputee patients, there is a concern that delay in treatment does provide a ceiling effect to their recovery.

METHODS:

All patients who underwent TMR after all levels of upper extremity amputation either with acute or delayed (>6 weeks) intervention by a single physician were included in this study from January 1, 2018 to July 1, 2020 at Tampa General Hospital. A total of 9 patients (ages 34-71, 3 females and 6 males) underwent TMR for upper extremity amputation with 6 acute and 3 chronic cases with average time from amputation to TMR of 767.7 days. Primary outcome measures compared postoperative residual and phantom limb pain. Secondary outcome measures were postoperative narcotic use and QuickDASH scores at average 6.5 months.

RESULTS:

The initial postoperative PLP and QuickDASH scores between the acute and delayed intervention groups did not have statistically significant differences. RLP had a statistically significant difference (mean 4.517 vs 9.00, $p<0.05$). At 6.5 month follow up, the acute intervention group RLP (mean 2.5 vs 8.5, $p<0.05$) and PLP (9.0 vs 3.17, $p<0.05$) did have statistically significant decreases compared to the delayed intervention group. The QuickDASH (65.9 vs 78.4) and narcotic use (66% vs 0% narcotic free) scores trended towards improvement in the acute intervention group at 6.5 month follow up, but did not reach statistical significance.

Table 1: Patient Demographics

Number of patients	9
Sex	
Male	6
Female	3
Age at TMR (years)	46.7
Amputation Level	
Transcarpal	2
Transradial	6
Transhumeral	1
Amputation to TMR (days)	
Acute	1.5
Delayed	767.7
Follow-up (months)	6.5
Number of nerve transfers	
Acute	2.8
Delayed	4

Table 2: Residual Limb Pain

Visit	Acute	Delayed	p-value
Pre-Op		8.67	
Initial	4.52	9.33	0.01
6-7 Month	2.50	8.50	0.004

Table 3: Phantom Limb Pain

Visit	Acute	Delayed	p-value
Pre-Op		4.5	
Initial	4.34	6	0.68
6-7 Month	3.17	9	0.03

Table 4: QuickDASH

Visit	Acute	Delayed	p-value
Pre-Op		82.5	
Initial	71.03	94.7	0.06
6-7 Month	65.9	78.4	0.58

CONCLUSION:

While this study lacks power, the results are promising that acute intervention results in better outcomes than delayed intervention, underscoring the importance of prompt and appropriate referral for TMR evaluation.

Figure 1:

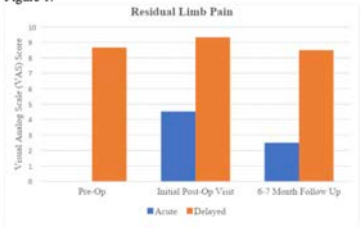

Figure 2:

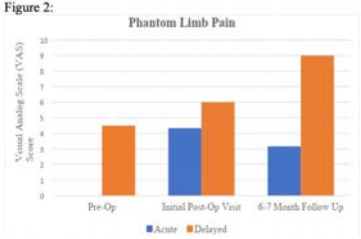

Figure 3: