Postoperative Pain Course following Primary and Secondary Targeted Muscle Reinnervation: A Temporal Description of Pain Outcomes

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INTRODUCTION: Targeted muscle reinnervation (TMR) has been demonstrated to be an effective option in the surgical treatment of neuropathic pain for amputees. However, insufficient data has been presented regarding the postoperative pain course for patients that undergo either primary (<14 days since amputation) or secondary (≥14 days) TMR surgery. This study aims to outline the postoperative pain course for these patients to aid in educating patients on expectations after TMR surgery.

METHODS: A retrospective review of amputee patients, treated with either primary or secondary TMR who were enrolled in a prospective repository between 2018 and 2022, was performed. Patient-reported outcome measurements (PROMs) of pain interference short form 4a and pain intensity short form 3a, and pain scores with VAS/NRS instruments were collected throughout the first six months postoperatively. Locally weighted scatterplot smoothing (LOWESS) curves were utilized to visualize postoperative pain courses. Mean PROMs and pain scores were compared between primary and secondary TMR cohorts.

RESULTS: A total of 77 amputee patients were included in this study, with 64% of these patients being male and 57% being secondary TMR patients. The median duration of follow up was 153 days (IQR 62 - 281). Primary and Secondary TMR patients show a decline in pain scores, PROM pain interference, and PROM pain intensity within the early postoperative phase, which stabilizes at decreased levels, as evidenced on the LOWESS curve throughout the study period examined (see Figure 1, Figure 2, Figure 3 respectively). At the 1-month, 3-month, and 6-month mark, primary TMR patients reported a mean pain score of 5.3, 2.9, and 2.6 respectively, while secondary TMR patients reported a mean score of 6.2 (P=0.28), 4.0 (P=0.28), and 4.0 (P=0.42) respectively. For PROM pain interference, this was 58.6, 53.2, and 55.5 for primary TMR patients and 67.8 (P=0.004), 61.3 (P=0.08), and 61.2 (P=0.50) for secondary TMR patients respectively. For PROM pain intensity, this was 54.8, 47.5, and 48.4 for primary TMR patients and 57.7 (P=0.30), 50.2 (P=0.47), and 47.3 (P=0.90) for secondary TMR patients respectively.

DISCUSSION AND CONCLUSION:

Primary TMR patients illustrated rapid initial postoperative decrease in pain scores and PROM pain interference, which stabilizes at a decreased level showing mild pain levels. Secondary TMR patients experienced a slower initial decrease in pain scores and PROM pain interference for the early postoperative period as well before stabilizing at a higher level compared to primary TMR patients. The early postoperative course for PROM pain intensity shows a rapid decline for secondary TMR patients which stabilizes at the level of the primary TMR group. At 6 months there is a mean difference in pain between the primary and secondary cohort of 1.4 points on a 0-10 VAS/NRS scale, which is not significant with this sample size. The current trends may assist in understanding the postoperative pain course and help in counseling patients in their pain expectations and pain management. Future studies may provide more insight in the differences in postoperative pain courses and may also identify factors influencing the rate and extent of pain decrease.

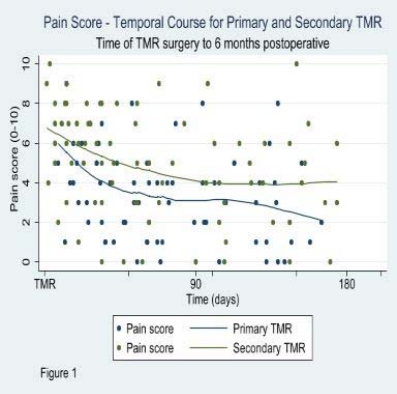

Figure 1

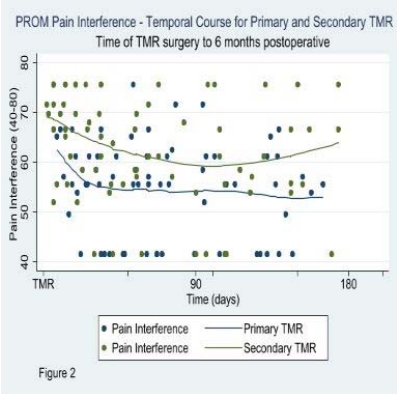

Figure 2

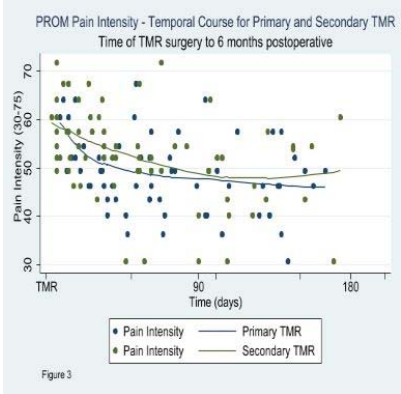

Figure 3