

# Targeted Muscle Reinnervation in Non-Amputees: Using Expendable Motor Nerve Targets for the Treatment of Refractory Neuroma

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## Introduction

- Targeted muscle reinnervation (TMR) is effective at treating and preventing neuropathic and phantom limb pain. This technique has been increasing in popularity, particularly when performed prophylactically at the time of amputation.
- Unreconstructable nerves in nonamputee patients have traditionally been managed with neurectomy and implantation into muscle. The results from this approach are often marginal and recurrence is not uncommon.
- We present our series of superficial sensory neuromas that were successfully treated with TMR to an expendable local motor nerve in non-amputee patients.

## Methods

- This series presents a single surgeon's consecutive cases of non-amputee patients with recurrent symptomatic neuromas treated with TMR during a one year period. All patients had failed previous interpositional nerve reconstruction. Pre- and postoperative pain outcomes were compared.

## Results

- 16 TMR's in 13 patients
- Average age - 49.7 years (range 33-72)
- Average preoperative pain score - 8.8 (range 7-10)
- Average postoperative pain score - 2.8 (range 0-7)
- Average pain score decrease - 68%
- Percent of patients using opioids preoperatively - 61.5%
- Percent of patients using opioids postoperatively - 0%
- 100% of patients experienced improvement in pain. 10 out of 13 patients had greater than 50% reduction in pain

## Figure 1.



## Figure 2.



Figure 1. Radial sensory nerve (RSN) transected distally and translocated proximally to radial tunnel. Motor targets to ECRB identified. Figure 2. RSN transferred to redundant distal branch of extensor carpi radialis brevis motor nerve, sparing proximal nerve branch.

## Table 1

Case	Sensory nerve	Donor motor nerve target
1	Saphenous	Sartorius
2	RSN	ECRB
3	Sural	Medial gastrocnemius
4	DCU	FCU
5	RSN	ECRB
6	SPN	PL
7	LABC	BR
8	Sural	PB
9	SPN (x2)	PB (x2)
10	IDC, DPN	EHL, Tibialis anterior
11	DPN, SPN	EHL, PB
12	3rd webspace	PQ
13	Intercostal	Rectus abdominis

## Table 2

	Preop	Postop
Pain Score	8.8 (7-10)	2.8 (0-7)
Narcotic Use	61.50%	0%

## Conclusions

- TMR is an effective technique for the prevention or treatment of symptomatic neuroma.
- The approach to TMR must be patient-specific and follow conceptual guidelines, including an expendable motor target nerve and favorable anatomic proximity, ideally located within the same anatomic compartment with reasonable size match.
- Sensory nerves should be reconstructed after neuroma excision whenever possible. However, if a distal target cannot be identified or the patient has already failed interpositional nerve reconstruction, TMR is a viable alternative.