



Targeted Muscle Reinnervation (TMR) for neuropathic groin pain

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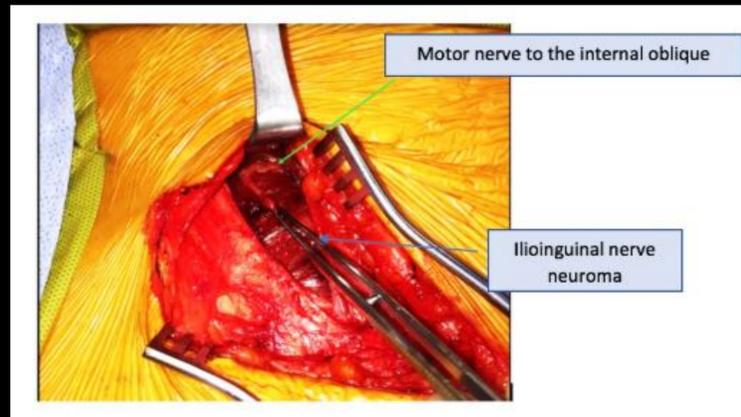
BACKGROUND

Ilioinguinal and Genitofemoral neuroma pain are post operative complications from common general surgery procedures. As they can lead to disability and decreased quality of life, effective methods of treatment are indicated.

Current treatments with variable efficacy include simple excision of the inflamed peripheral nerve/neuroma, and excision and implantation of the freshened proximal nerve segment into local muscle.

Targeted Muscle Reinnervation (TMR) can successfully treat and prevent post amputation pain syndromes. Thus, TMR may be employed as effective, curative treatment of abdominal wall neuroma pain. This may be because after excision of the abdominal wall neuroma, giving the fresh nerve ending a *place to go and something to do* prevents aberrant growth associated with the development of painful neuromas. The purpose of this study is to investigate outcomes of employing TMR for painful abdominal wall neuromas.

Figure 1. TMR of Ilioinguinal N. to Motor N. Internal Oblique



METHODS

We conducted a retrospective chart review investigating outcomes after TMR for treatment of post-surgical abdominal wall neuroma pain. This study was approved by the Northwestern University IRB.

Our inclusion criteria involved all patients who underwent surgical treatment with TMR for painful abdominal wall neuromas by one surgeon (the senior author G.A.D.) at one academic institution, from 1/2009-6/30/2019.

TABLE 1. PATIENT DEMOGRAPHICS

Patient	Gender	Age	BMI at Surgery	Smoking status	DM	PVD	Prior Abdominal Surgeries
1	M	53	26.14	Former	No	No	Bilateral inguinal hernia repair, neurectomy and RPNi (failed), appendectomy
2	M	65	26.3	Current	No	Yes	Right inguinal hernia repair, sigmoid colon resection
3	F	29	21.32	Never Smoker	No	No	Appendectomy, Right oophorectomy, ectopic pregnancy, Left gonadal vein clipping, hysterectomy with Left oophorectomy, colonoscopy, Bartholin gland cyst excision, gallbladder surgery
4	F	45	26.55	Never Smoker	No	No	Abdominal exploration, hysterectomy, vagina repair, inguinal hernia repair, salpingo-oophorectomy
5	F	57	29.94	Never Smoker	No	No	Mastectomy and free TRAM flap, mesh overlay for lower abdominal wall laxity after TRAM
6	F	44	23.49	Former	No	No	Robotic ovarian cyst removal, appendectomy, abdominal exploration and RPNi2 for inguinal nerve pain

Figure 2. Abdominal Procedures Prior to Development of Painful Neuroma

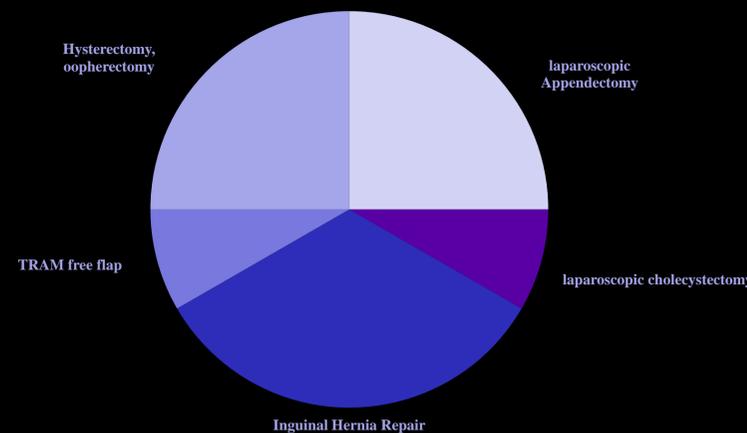
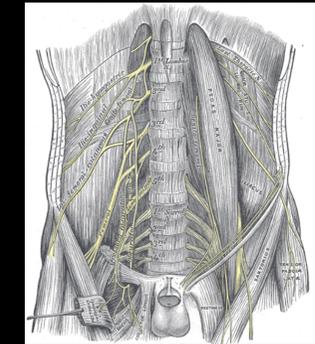


TABLE 2. SURGICAL CHARACTERISTICS

Patient	Type of Abdominal Neuroma Surgery	Nerve Reconstructed	Post-operative Complications	First Post-operative Visit	Revisional Surgeries	Most Recent Post-operative Visit	Length of Follow-up (months)
1	TMR: coaptation to motor nerve to internal oblique	Ilioinguinal	None	Complete resolution of pain	Implantation of subcutaneous programmable pulse generator for ilioinguinal and genitofemoral peripheral nerve stimulating electrode	Patient developed inguinal pain in region distinct from the prior painful neuroma site. Pt subsequently had peripheral nerve stimulator placed. Pain improved during last Functional Neurosurgery visit.	21.0
2	TMR: coaptation to motor nerve to internal oblique	Ilioinguinal	None	Pain improved and different than preop	None	Pain entirely resolved	5.1
3	TMR: coaptation to motor nerve to internal oblique	Ilioinguinal	None	Pain improved and different than preop	None	Pain resolved	1.4
4	TMR: coaptation to motor nerve to internal oblique	Ilioinguinal	None	Pain improved and different from preop	None	Pain improved significantly	2.3
5	TMR: coaptation to motor nerve to internal oblique	Ilioinguinal	None	Patient states improvement and change in quality of pain compared to preop	None	N/A	0.4
6	TMR: coaptation to motor nerve to internal oblique	Genitofemoral	None	Pain different from preop	Possible left groin exploration	Pain different but bothersome	2.0



RESULTS

Six patients (6 nerves) were treated with TMR for painful abdominal wall neuromas.

In 5/6 cases TMR was used to treat a painful ilioinguinal neuroma, and in 1 case a genitofemoral neuroma was treated. The motor target in each case was the motor nerve to the internal oblique muscle.

The average follow up time was 5.4 months after surgery.

All patients experienced pain relief after surgery.

CONCLUSIONS

Six patients had significant improvement in ilioinguinal and genitofemoral neuroma pain from TMR nerve transfers to a motor nerve of the internal oblique.

This supports the potential efficacy of TMR to treat abdominal wall neuroma pain.

Future directions include prospective clinical studies examining pain outcomes from TMR, allograft reconstruction and standard excision and burying of nerve endings into local muscle. Standardized pre and post op pain measures will assist strengthening the results of these investigations.