



# Microsurgical Descending Tractotomy in Cases of Intractable Trigeminal Pain Syndromes

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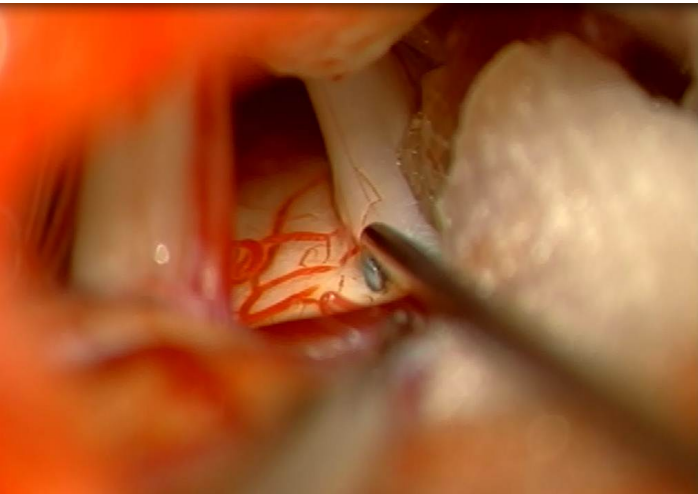
## Introduction

Trigeminal pain syndromes remain a therapeutic challenge. The International Association for the Study of Pain (IASP) defines TN as sudden, usually unilateral, severe, brief, stabbing, recurrent episodes of pain in the distribution of one or more branches of the trigeminal nerve. Incidence is estimated at 38.7 per 100,000 people per year. In 80-90% of trigeminal pain cases, an aberrant vascular structure is compressing the nerve. When a compressive vessel is not evident on a pre-operative MRI or during surgical exploration, tractotomy of the descending tract of the trigeminal nerve may be warranted and can be clinically efficacious.

## Learning Objectives

Participants should be able to: 1) Describe the role of descending tractotomy for TN and atypical facial pain and 2) Understand the potential utility of DTI in trigeminal neuralgia management.

### Intraoperative Tractotomy

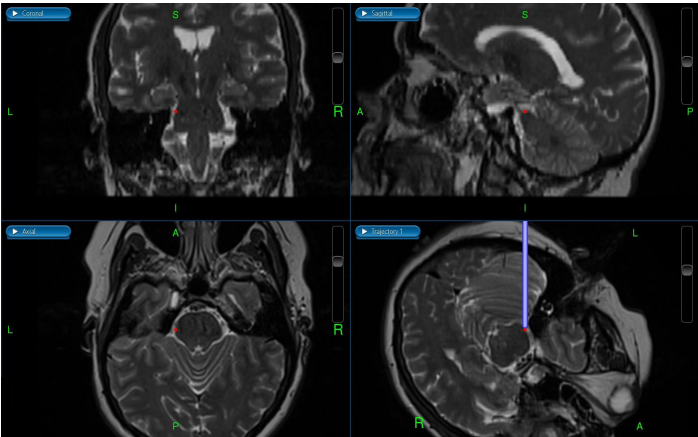


Nerve hook inserted into the REZ and producing tractotomy of the descending tract of the trigeminal nerve

## Methods

A retrospective chart review was approved by the Loyola University Medical Center IRB. **Surgical Procedure:** A standard retrosigmoid approach is performed. Tractotomies were performed by identifying the root entry zone (REZ) of the trigeminal nerve. Bipolar electrocautery is applied to a small area immediately inferior to the REZ. A microdissector is oriented in a plane with the trigeminal nerve and is inserted 6-7mm utilizing a 30 degree arc to disrupt the descending fibers.

### Intraoperative Target Area for Descending Tractotomy



The retrosigmoid approach is used to access the posterior fossa. The target area of the tractotomy is inferior to the root entry zone of CN V and superior to the CN VII and VIII complex.

## Results

Age	Gender	Previous OH	Diagnosis	Laterality	Distribution of pain	Compression	VAS Pre	VAS Post	VAS Current	Followup	Numbness Post	Surgical Success Shortterm	Surgical Success Longterm
83 F			1 TN	Left	V2 and V3	Very Clear	10	0	0		0 No	Complete Pain Relief	Complete Pain Relief
66 M			0 TN	Right	V2 and V3	Questionable	8.5	0			3 Yes	Complete Pain Relief	Complete Pain Relief
71 F			0 TN	Left	V3	Questionable	5						
28 F			0 TN	Left	V2	None visible							
35 F			2 TN	Left	V1 and V2	None visible	10	2	6	14 No	Significant Pain Reduction (66-99%)	Some Pain Reduction (33-65%)	
48 F			2 TN	Left	V2	None visible	9.5	2	10	9 Yes	Significant Pain Reduction (66-99%)	No Pain Reduction	
39 F			1 TN	Left	V3	None visible	6	1	0	3 Yes	Significant Pain Reduction (66-99%)	Complete Pain Relief	
74 F			0 TN	Left	V2 and V3	None visible	0			No	Complete Pain Relief	Complete Pain Relief	
79 M			0 TN	Right	V2	None visible	10	0	2	34 No	Complete Pain Relief	Significant Pain Reduction (66-99%)	
33 F			0 TN	Right		None visible				Yes			
56 F			0 TN	Left	V3	None visible		3	2	29 No	Some Pain Reduction (33-65%)	Significant Pain Reduction (66-99%)	
18 F			1 AFP	Right	V2 and V3	None visible	10	0	4	29 No	Complete Pain Relief	Some Pain Reduction (33-65%)	
50 F			2 AFP	Left	V3	None visible	0	3	11		No Pain Reduction		
38 F			0 AFP	Left	V2	None visible	10	4	10	20 No	Some Pain Reduction (33-65%)	No Pain Reduction	
45 F			3 AFP	Right	V1 and V2 and V3	None visible	9			Yes			

Patients without vascular compression or with an unclear compressive etiology found upon exploration of the posterior fossa who underwent a tractotomy had a long term VAS score that averaged 2.5. Patients that underwent tractotomy alone versus MVD with tractotomy had lower average VAS scores in the long term.

We found that patients that experienced atypical facial pain syndromes (including multiple sclerosis) required subsequent multiple MVD regardless of the addition of ventral tractotomy, additional medications, and these patients also had shorter intervals of pain free periods.

## Discussion

From all three divisions, the trigeminal nerve conveys proprioceptive information superiorly to the mesencephalic nucleus, medially, tactile and pressure information to the main sensory nucleus and inferiorly, pain and temperature information to the spinal trigeminal nucleus. By targeting the descending tract we eliminate the sensation of pain and temperature while maintaining the transmission of all other sensory information. With improvements in tractography resolution, the descending tract of the trigeminal nerve can be viewed. In patients who present with TN and have no obvious vascular compression evident on preoperative films, descending tractotomy is a potential therapeutic option. In patients that have had repeat MVD or have atypical facial pain, descending tractotomy is also an option that can yield good therapeutic results.

## Conclusions

Tractotomy can be used as an alternative to (or in coordination with) MVD to alleviate trigeminal pain effectively while limiting morbidity. Patients with Symptomatic TN (MS, tumor compression, etc.) are more difficult to treat with or without tractotomy. The use of DTI may be helpful in post-operative outcome analysis for patients with persistent or incomplete resolution of pre-operative facial pain.

## References

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