



# DIAGNOSIS AND INTERVENTIONAL TREATMENT OF CHRONIC FACIAL PAIN

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**“HOW TO MAKE \$70 PLACING NEEDLES  
INTO SMALL HOLES WHILE MAINTAINING  
EXCELLENT RECTAL TONE”**

# DISCLOSURES

- PRODUCT ROYALTY FROM EPIMED INTERNATIONAL
- FORMER ADVISORY BOARD MEMBER OF AIS

# OBJECTIVES

- REVIEW THE WORK UP FOR FACIAL PAIN
- DIFFERENTIAL DIAGNOSIS FOR FACIAL PAIN
- REVIEW THE TRIGEMINAL NERVE BLOCK
- REVIEW THE SPHENOPALATINE GANGLION BLOCK
- REVIEW THE GLOSSOPHARYNGEAL NERVE BLOCK



**PAIN IN FACE  $\neq$  TRIGEMINAL NEURALGIA**



# FACIAL PAIN

- PAIN IN THE HEAD AND NECK IS MEDIATED BY AFFERENT FIBERS IN THE TRIGEMINAL NERVE, NERVUS INTERMEDIUS, GLOSSOPHARYNGEAL AND VAGUS NERVES AND THE UPPER CERVICAL ROOTS VIA THE OCCIPITAL NERVES
- STIMULATION OF THESE NERVES BY COMPRESSION, DISTORTION, EXPOSURE TO COLD OR OTHER FORMS OF IRRITATION OR BY A LESION IN CENTRAL PATHWAYS MAY GIVE RISE TO STABBING OR CONSTANT PAIN FELT IN THE AREA INNERVATED
- CAUSE MAY BE CLEAR, BUT IN SOME CASES THERE MAY BE NO CAUSE APPARENT FOR NEURALGIC PAIN



# EVALUATION

- THOROUGH HISTORY
  - SOMETIMES THE PAIN THE PATIENT PRESENTS WITH IS NOT THE SAME PAIN THE PATIENT STARTED WITH
- PHYSICAL EXAM
  - EVALUATE THE FACE AS WELL AS THE NECK
    - PAIN ORIGINATING IN THE NECK CAN PRESENT ITSELF AS PAIN IN THE FACE
  - CRANIAL NERVES AS WELL AS C<sub>2</sub> AND C<sub>3</sub>
- RADIOLOGICAL EVALUATION
  - USUALLY MRI





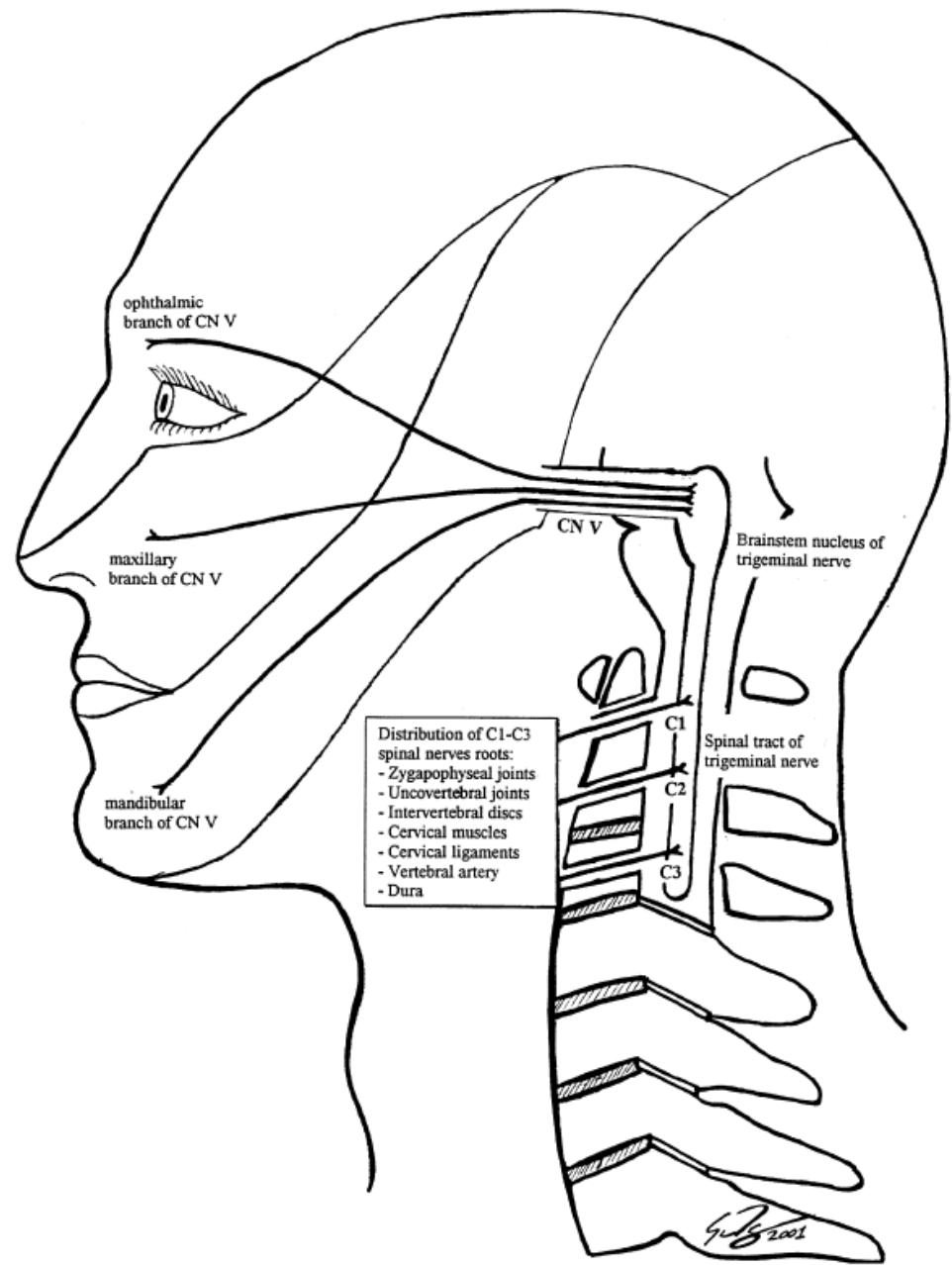
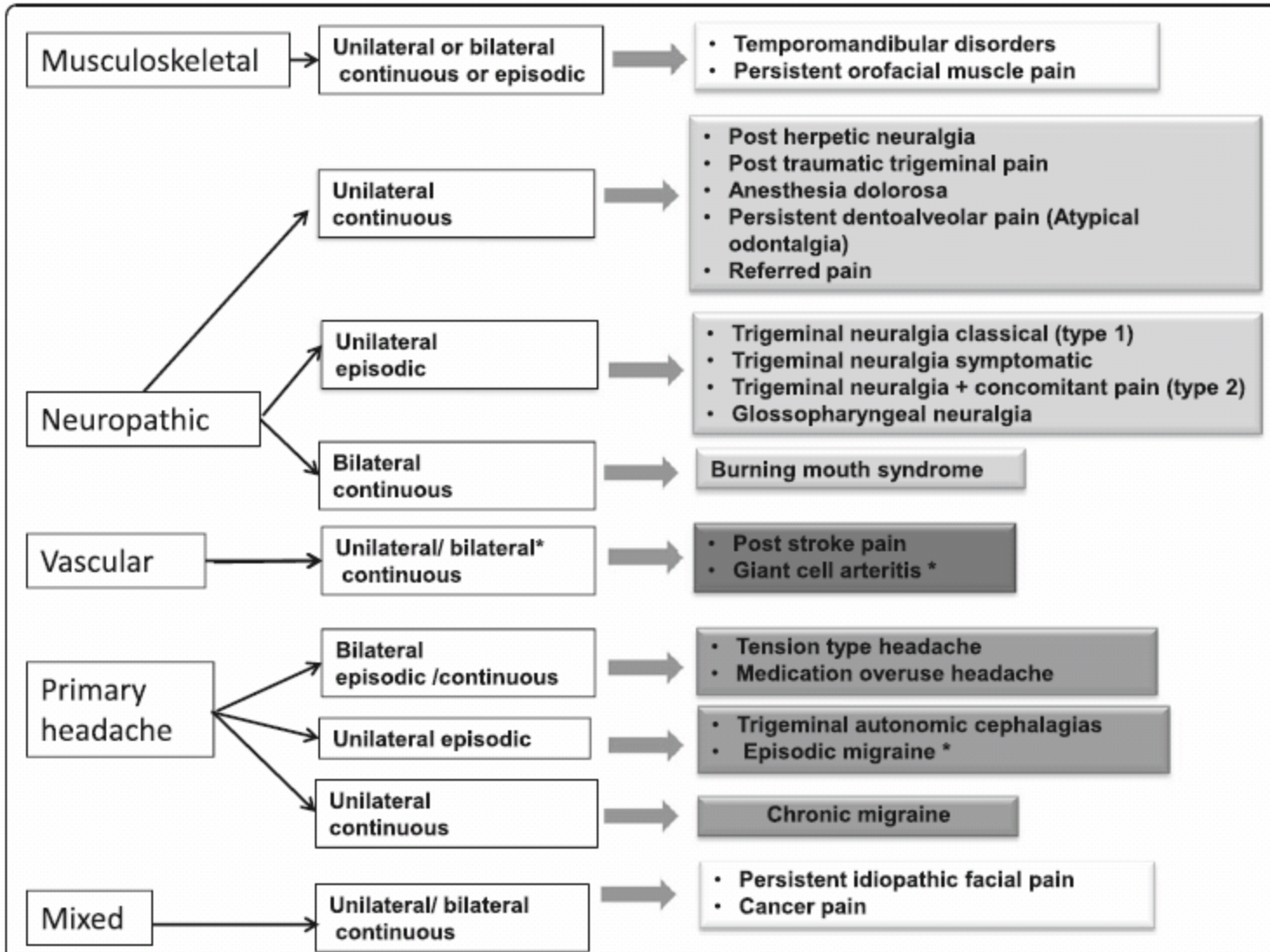


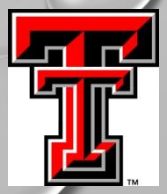
Fig. 1. Convergence of sensory input from the upper cervical nerve roots into the trigeminal nucleus.







**Figure 1** Type and causes of non dental chronic orofacial pain.



# IHS CLASSIFICATION ICHD-3

## 13. Painful lesions of the cranial nerves and other facial pain

### 13.1 Pain attributed to a lesion or disease of the trigeminal nerve

#### 13.1.1 Trigeminal neuralgia

##### 13.1.1.1 Classical trigeminal neuralgia

13.1.1.1.1 Classical trigeminal neuralgia, purely paroxysmal

13.1.1.1.2 Classical trigeminal neuralgia with concomitant continuous pain

##### 13.1.1.2 Secondary trigeminal neuralgia

13.1.1.2.1 Trigeminal neuralgia attributed to multiple sclerosis

13.1.1.2.2 Trigeminal neuralgia attributed to space-occupying lesion

13.1.1.2.3 Trigeminal neuralgia attributed to other cause

##### 13.1.1.3 Idiopathic trigeminal neuralgia

13.1.1.3.1 Idiopathic trigeminal neuralgia, purely paroxysmal

13.1.1.3.2 Idiopathic trigeminal neuralgia with concomitant continuous pain

#### 13.1.2 Painful trigeminal neuropathy

13.1.2.1 Painful trigeminal neuropathy attributed to herpes zoster

13.1.2.2 Trigeminal post-herpetic neuralgia

13.1.2.3 Painful post-traumatic trigeminal neuropathy

13.1.2.4 Painful trigeminal neuropathy attributed to other disorder

13.1.2.5 Idiopathic painful trigeminal neuropathy

### 13.2 Pain attributed to a lesion or disease of the glossopharyngeal nerve

#### 13.2.1 Glossopharyngeal neuralgia

13.2.1.1 Classical glossopharyngeal neuralgia

13.2.1.2 Secondary glossopharyngeal neuralgia

13.2.1.3 Idiopathic glossopharyngeal neuralgia

#### 13.2.2 Painful glossopharyngeal neuropathy

13.2.2.1 Painful glossopharyngeal neuropathy attributed to a known cause

13.2.2.2 Idiopathic painful glossopharyngeal neuropathy



# IHS CLASSIFICATION ICHD-3

## **13.3 Pain attributed to a lesion or disease of nervus intermedius**

### 13.3.1 Nervus intermedius neuralgia

13.3.1.1 Classical nervus intermedius neuralgia

13.3.1.2 Secondary nervus intermedius neuralgia

13.3.1.3 Idiopathic nervus intermedius neuralgia

### 13.3.2 Painful nervus intermedius neuropathy

13.3.2.1 Painful nervus intermedius neuropathy attributed to herpes zoster

13.3.2.2 Post-herpetic neuralgia of nervus intermedius

13.3.2.3 Painful nervus intermedius neuropathy attributed to other disorder

13.3.2.4 Idiopathic painful nervus intermedius neuropathy

## **13.4 Occipital neuralgia**

## **13.5 Neck-tongue syndrome**

## **13.6 Painful optic neuritis**

## **13.7 Headache attributed to ischaemic ocular motor nerve palsy**

## **13.8 Tolosa-Hunt syndrome**

## **13.9 Paratrigeminal oculosympathetic (Raeder's) syndrome**

## **13.10 Recurrent painful ophthalmoplegic neuropathy**

## **13.11 Burning mouth syndrome (BMS)**

## **13.12 Persistent idiopathic facial pain (PIFP)**

## **13.13 Central neuropathic pain**

13.13.1 Central neuropathic pain attributed to multiple sclerosis (MS)

13.13.2 Central post-stroke pain (CPSP)



# CLASSICAL TRIGEMINAL NEURALGIA

- PAROXYSMAL ATTACKS OF PAIN LASTING FROM A FRACTION OF A SECOND TO 2 MINUTES, AFFECTING ONE OR MORE DIVISIONS OF THE TRIGEMINAL NERVE AND FULFILLING CRITERIA B AND C
- PAIN HAS AT LEAST ONE OF THE FOLLOWING CHARACTERISTICS:
  - INTENSE, SHARP, SUPERFICIAL OR STABBING
  - PRECIPITATED FROM TRIGGER AREAS OR BY TRIGGER FACTORS
- ATTACKS ARE STEREOTYPED IN THE INDIVIDUAL PATIENT
- THERE IS NO CLINICALLY EVIDENT NEUROLOGICAL DEFICIT
- NOT ATTRIBUTED TO ANOTHER DISORDER





# CLASSICAL TRIGEMINAL NEURALGIA

- INCIDENCE 4-5/100,000/YEAR
- HIGHEST INCIDENCE AGES 50-70
- FEMALE : MALE - 1.5 : 1
- DISTRIBUTION
  - V2 + V3 - 32%
  - V2 ONLY - 17%
  - V1 + V2 + V3 - 17%
  - V3 ONLY - 15%
  - V1 + V2 - 14%
  - V1 ONLY - 4%



# ETIOLOGY OF CLASSICAL TRIGEMINAL NEURALGIA

- VASCULAR COMPRESSION OF THE TRIGEMINAL ROOT AT THE DORSAL ROOT ENTRY ZONE BY ARTERY OR VEIN
  - USUALLY THE SUPERIOR CEREBELLAR ARTERY
- TUMORS
  - FOUND IN 2% OF PATIENTS WITH TN
  - USUALLY POSTERIOR FOSSA MENINGIOMAS OR NEUROMAS AT THE CEREBELLOPONTINE ANGLE
- MULTIPLE SCLEROSIS
  - DIAGNOSED IN 2-5% OF PATIENTS WITH MS
  - 20-FOLD INCREASED RISK OF TRIGEMINAL NEURALGIA
- IDIOPATHIC
  - 11% OF PATIENTS WITH TN



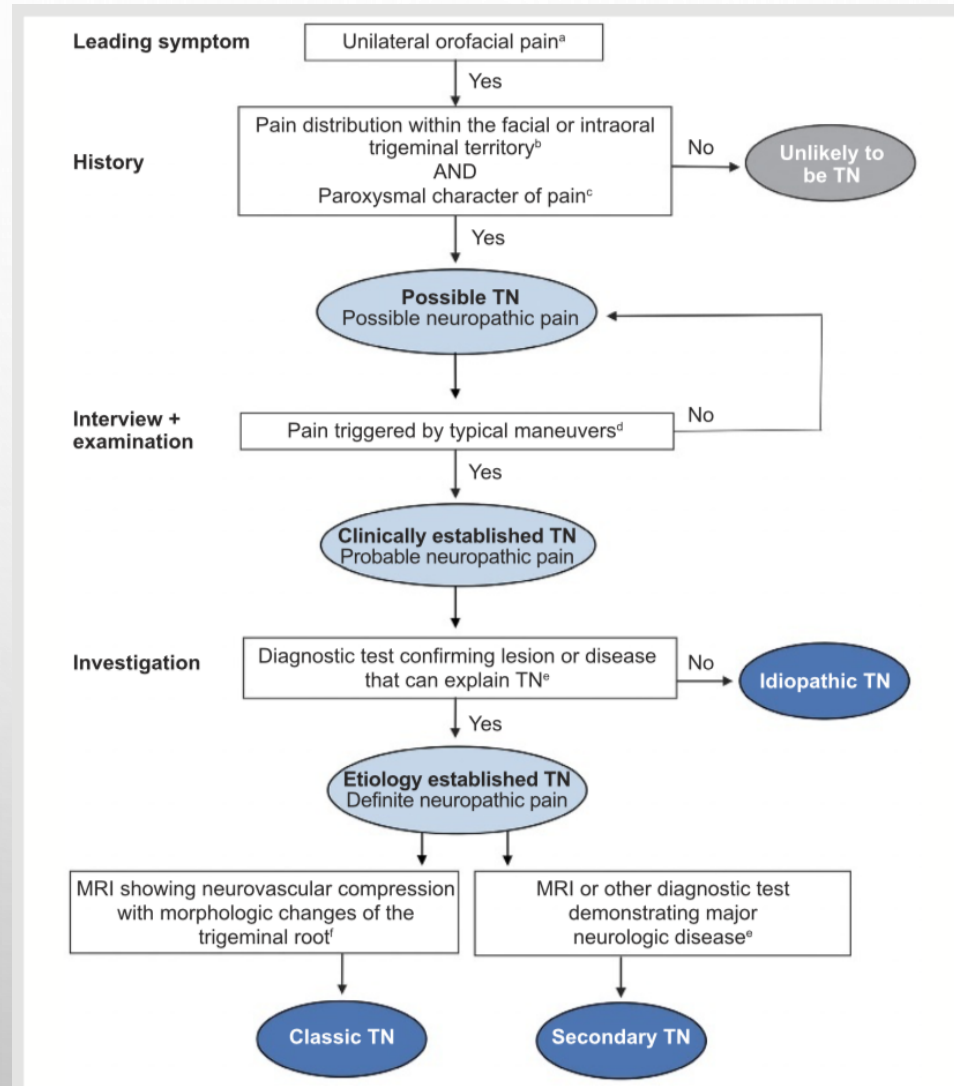
# PATHOPHYSIOLOGY OF TN

- SEVERAL LOCATIONS INVOLVED:
  - TRIGEMINAL GANGLION IS NOT NORMAL
    - DEGENERATIVE HYPERMYELINATION AND FORMATION OF MICRONEUROMITA
      - MECHANISM OF HOW THIS OCCURS IS UNKNOWN
  - TRIGEMINAL DORSAL ROOT ENTRY ZONE
    - COMPRESSION OR MS PLAQUES LEADS WITH TIME TO HYPEREXCITABILITY IN TRIGEMINAL AFFERENTS
  - TRIGEMINAL ROOT
    - SITE OF COMPRESSION SHOWS DEMYELINATION AND REMYELINATION IN THE PRIMARY AFFERENTS AT THE ENTRY OF THE ROOT INTO THE PONS
  - HYPERACTIVITY OF PRIMARY AFFERENTS SECONDARILY INDUCES CENTRAL SENSITIZATION OF WIDE DYNAMIC RANGE NEURONS IN THE SPINAL TRIGEMINAL NUCLEUS





# CLASSICAL TRIGEMINAL NEURALGIA



# SYMPTOMATIC TRIGEMINAL NEURALGIA

- PAROXYSMAL ATTACKS OF PAIN LASTING FROM A FRACTION OF A SECOND TO 2 MINUTES, WITH OR WITHOUT PERSISTENCE OF ACHING BETWEEN PAROXYSMS, AFFECTING ONE OR MORE DIVISIONS OF THE TRIGEMINAL NERVE AND FULFILLING CRITERIA B AND C
- PAIN HAS AT LEAST ONE OF THE FOLLOWING CHARACTERISTICS:
  - INTENSE, SHARP, SUPERFICIAL OR STABBING
  - PRECIPITATED FROM TRIGGER AREAS OR BY TRIGGER FACTORS
- ATTACKS ARE STEREOTYPED IN THE INDIVIDUAL PATIENT
- A CAUSATIVE LESION, OTHER THAN VASCULAR COMPRESSION, HAS BEEN DEMONSTRATED BY SPECIAL INVESTIGATIONS AND/OR POSTERIOR FOSSA EXPLORATION



# TRIGEMINAL NEUROPATHIC PAIN

- ONSET 3-6 MONTHS AFTER A TRAUMATIC EVENT
- PAIN CONSTANT WITH MINOR FLUCTUATIONS ALTHOUGH SOME MAY HAVE INTERMITTENT EPISODES
- PAIN IN THE DISTRIBUTION OF THE INJURED NERVE
- PE: ALLODYNIA AND HYPOESTHESIA



# INTERVENTIONAL TREATMENT OPTIONS FOR TRIGEMINAL PAINS

- INTERVENTIONAL THERAPIES

- TRIGEMINAL NERVE/GANGLION BLOCK/RFTC/PULSED RF
- SURGICAL MICROVASCULAR DECOMPRESSION (MVD)
- STERIODACTIC RADIATION THERAPY, GAMMA KNIFE
- BALLOON MICROCOMPRESSION
- PERCUTANEOUS GLYCEROL RHIZOLYSIS
- GASSERIAN GANGLION STIMULATION/PERIPHERAL NERVE STIMULATORS



# TRIGEMINAL NERVE/GANGLION BLOCK

- INDICATED FOR TREATMENT OF:
  - TRIGEMINAL NEURALGIA
    - TYPICAL
    - ATYPICAL
  - MIGRAINE HEADACHES
  - CLUSTER HEADACHES





# TRIGEMINAL NERVE ANATOMY

- THE TRIGEMINAL NERVE IS THE LARGEST AND MOST COMPLEX OF THE 12 CRANIAL NERVES.
  - IT SUPPLIES SENSATIONS TO THE FACE, MUCOUS MEMBRANES, AND OTHER STRUCTURES OF THE HEAD.
  - IT IS THE MOTOR NERVE FOR THE MUSCLES OF MASTICATION AND CONTAINS PROPRIOCEPTIVE FIBERS.
  - IT EXITS THE BRAIN BY A LARGE SENSORY ROOT AND A SMALLER MOTOR ROOT COMING OUT OF THE PONS AT ITS JUNCTION WITH THE MIDDLE CEREBRAL PEDUNCLE. IT PASSES Laterally TO JOIN THE GASSERIAN GANGLION IN THE MECKEL CAVE

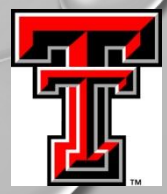
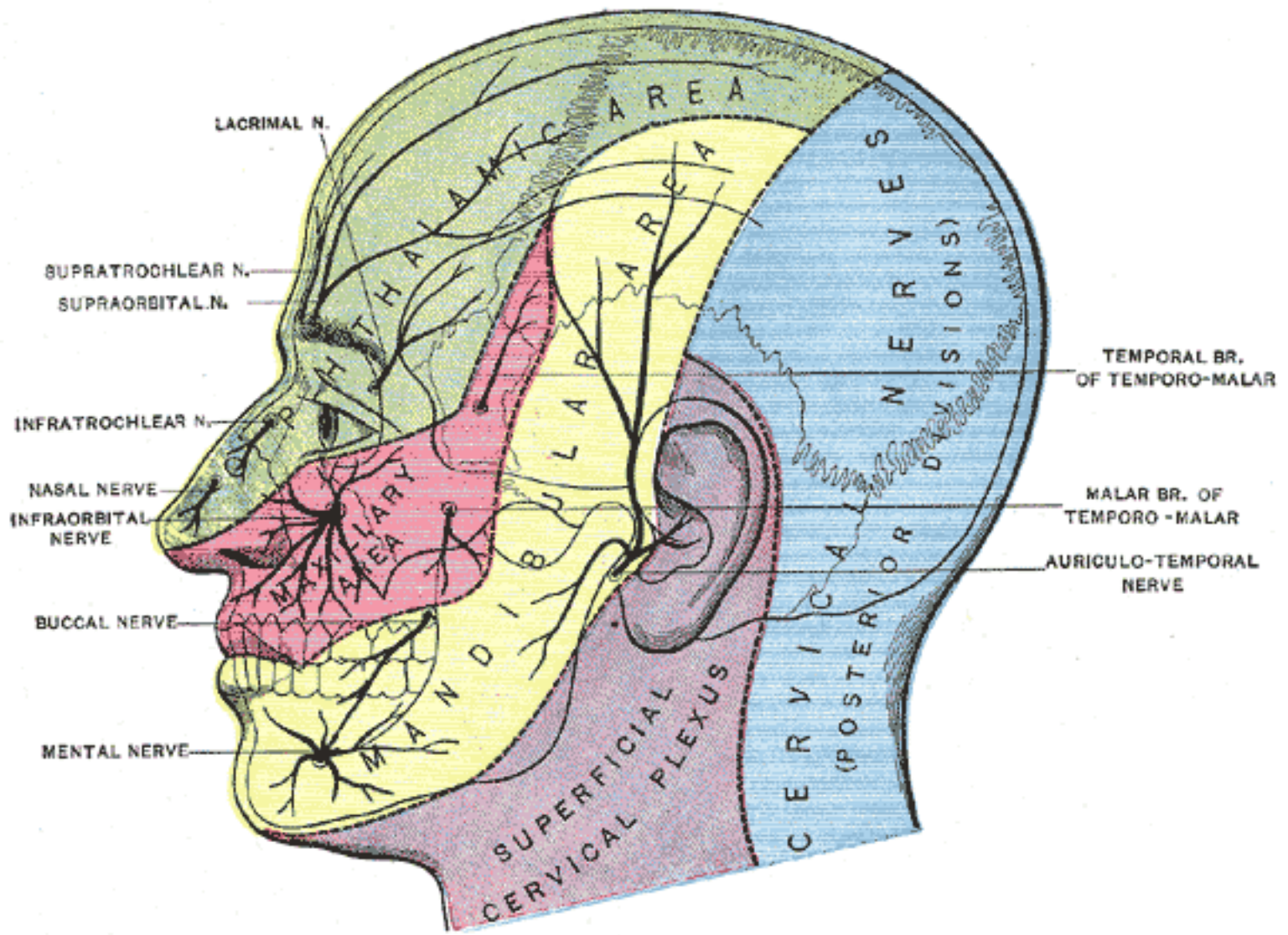


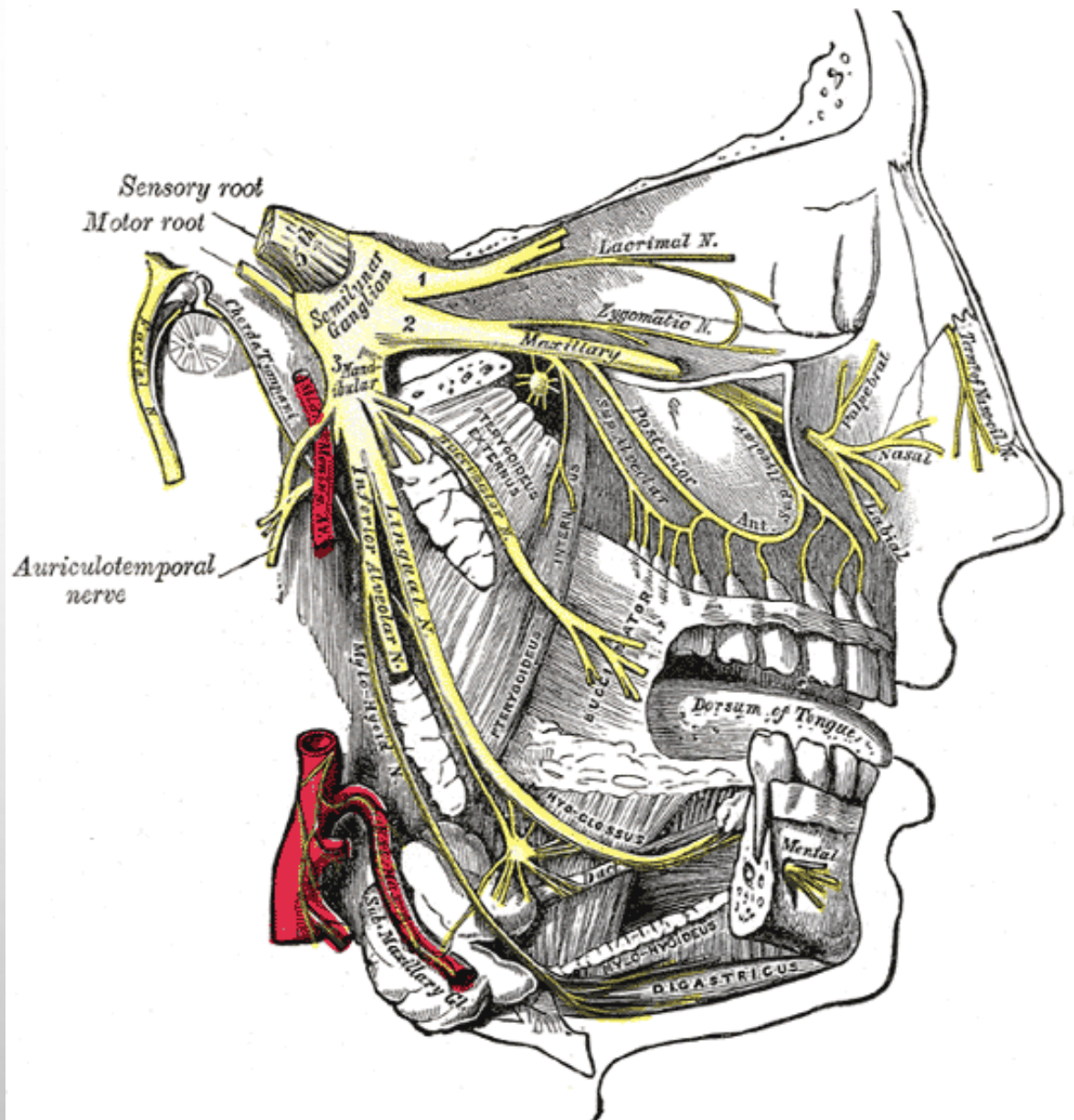
# TRIGEMINAL NERVE ANATOMY

- THERE ARE 3 MAJOR BRANCHES:
  - OPHTHALMIC – SENSORY
    - BRANCHES: FRONTAL, LACRIMAL, AND NASOCILLIARY NERVES
  - MAXILLARY – SENSORY
    - BRANCHES: MIDDLE MENINGEAL, ZYGOMATIC, PTERYGOPALATINE, POSTERIOR SUPERIOR ALVEOLAR
  - MANDIBULAR – SENSORY AND MOTOR
    - BRANCHES: RECURRENT MENINGEAL, MEDIAL PTERYGOID, MASSETERIC, DEEP TEMPORAL, LATERAL PTERYGOID, BUCCAL, AURICULOTEMPORAL, LINGUAL, INFERIOR ALVEOLAR











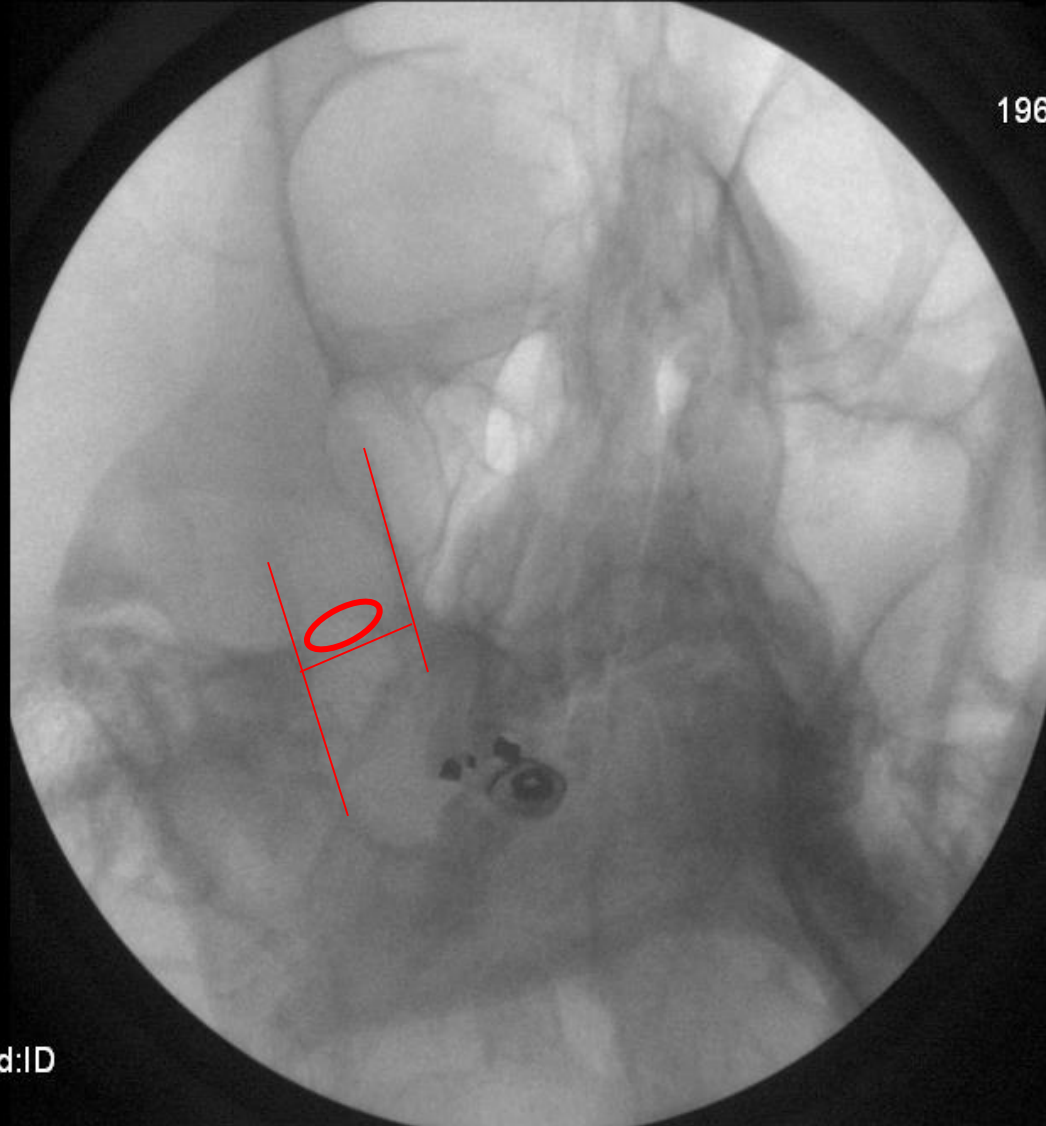
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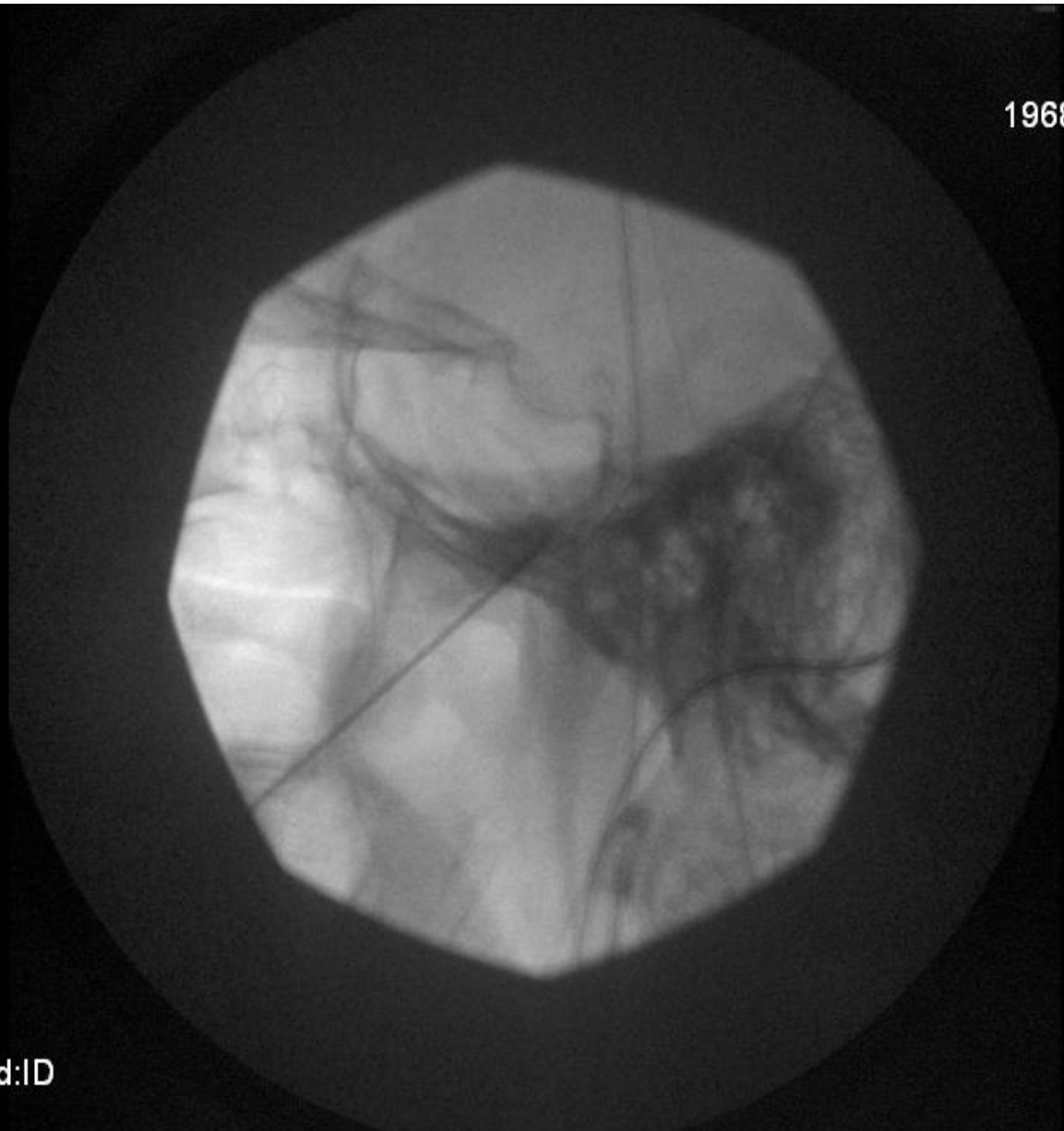
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# TRIGEMINAL GANGLION BLOCK

- COMPLICATIONS:
  - BLEEDING
    - INTRACRANIAL
    - EXTRACRANIAL
  - MENINGITIS
  - HIGH SPINAL
  - DECREASED CORNEAL REFLEX
  - HYPOESTHESIA
  - ANESTHESIA DOLOROSA
  - INJURY TO ADJACENT CRANIAL NERVES





## Review Article

### Various surgical modalities for trigeminal neuralgia: literature study of respective long-term outcomes

M. Tatli<sup>1</sup>, O. Satıcı<sup>2</sup>, Y. Kanpolat<sup>3</sup>, M. Sindou<sup>1</sup>

1. Among the surgical techniques, MVD provides the highest rate of long-term patient' satisfaction with the lowest rate of pain recurrence. In experienced hands, its side-effects are uncommon. Therefore, it might be considered as the first treatment choice for an experienced team when the patient's condition is satisfactory.
2. RF-TR provides a high rate of initial pain relief; however, it has not only a high rate of long-term failure but also serious complications. Despite of its various complications, it might be less invasive with experience, using neurophysiological tests. RF-TR is suitable for patients who do not tolerate general anaesthesia and in patients who have recurrent pain.
3. Among the surgical procedures, PBC has the highest rate of postoperative trigeminal motor dysfunction.
4. GR has both low initial pain relief and high pain recurrence rate; therefore, it may be suitable only in the treatment of elderly patients who desire no sensory loss and carry a high risk for open surgery to be used if the other modalities are not available.
5. Although SRS is associated with the fewest complications compared to those of the other destructive procedures, it has a low initial success rate as well as FU pain free rate. In our opinion, it may be a reasonable treatment option for those unwilling or unable to undergo more invasive surgical approaches, and in recurrence or failed TN.
6. Due to the low success rate, high complications, and available more eligible surgical options, there is no longer an identification to perform PSR compared to MVD in the treatment of TN.





Table 2. Literature review of all selected studies

Refs.	Surgical technique	No. of patients	Average FU (year)	APR Rate (%)	Pain free rate at FU (%)	Recurrence or failure rate (%)	Major complications
Menzel <i>et al.</i> [25]	RF-TR	315	12.7	*	20	80	keratitis, dysaesthesia
Van Loveren <i>et al.</i> [47]	RF-TR	700	6	81	61	20	troublesome dysaesthesia (5%) keratitis (4%), A–V fistula (0.14%)
Latchaw <i>et al.</i> [19]	RF-TR	96	5	*	53	35	sensory loss
Kolluri and Heros [15]	MVD	72	5	*	78	22	hearing loss
Apfelbaum [2]	MVD	466	6.4	*	67	18	hearing loss
Bederson and Wilson [4]	MVD	246	5.1	*	83	17	hearing loss (3%)
Broggi <i>et al.</i> [6]	RF-TR	1000	9.3	95	82	18.1	dysaesthesia, anaesthesia dolorosa
Lichter and Mullan [21]	PBC	61	5	97	80	20	dysaesthesia, paraesthesia
Steiger [37]	GR	122	5	84	59	41	sensory deficit, diminished corneal ref. (15%)
Klun [14]	MVD	178	5.2	94	84	6	hearing loss,
	PSR	42	5.2	86	51	49	death, motor weakness
Zakrzewska and Thomas [50]	MVD	65	5	*	62	38	hearing loss, facial hypaesthesia
Sun <i>et al.</i> [38]	MVD	61	6.6	*	82	18	hearing loss
Walchenbach <i>et al.</i> [48]	MVD	58	6.4	80	71	29	persistent neurological deficit (1.7%)
Mendoza and Illingworth [24]	MVD	60	7.5	*	71	18	death (0.7%), CSF leak
Barker <i>et al.</i> [3]	MVD	1155	6.2	98	70	30	hearing loss, facial hypaesthesia, death (0.2%)
Taha and Tew [41]	RF-TR	500	9	98	80	20	facial hypaesthesia (98%)
Oturai <i>et al.</i> [28]	RF-TR	185	8	83	49	49	facial paraesthesia (23%), dysaesthesia (4%)
	GR	45	8	42	18	84	
Kondo [16]	MVD	226	9.2	92.9	86.1	8.7	hearing loss
Lee <i>et al.</i> [20]	MVD	146	5.7	96.5	89	8.6	facial dysaesthesia, death (1.4%)
Yoon <i>et al.</i> [49]	RF-TR	81	6	87	26	74	dysaesthesia (25%), corneal hypaesthesia (15%)
Kanpolat <i>et al.</i> [12]	RF-TR	1600	5	97.6	57.7	42.3	diminished corneal reflex (5.7%), motor deficit (4.1%)
			10		52.3		
			20		41		
Skirving and Dan [35]	PBC	496	5	100	80.8	19.2	dysaesthesia (3.8%)
			20		68.1	31.9	
Tronnier <i>et al.</i> [44]	MVD	225	10.9	*	65	75	death (0.8%), hypacusis (5.3%)
	RF-TR	206	14		25		
Tyler-Kabara <i>et al.</i> [45]	MVD	1188	5	97	80	25	death (0.2%), meningitis, CSF leak
Olson <i>et al.</i> [27]	MVD	156	10	93	74	18	complication (2%)
Urgosik <i>et al.</i> [46]	SRS	107	5	80.4	58	25	hypaesthesia (20%)
Zakrzewska <i>et al.</i> [51]	MVD	220	5	89	84	4	hearing loss, facial hypaesthesia,
	PSR	53	5	72	54	30	eating problems
Sindou <i>et al.</i> [34]	MVD	362	8	86	80	15.1	gait disturbances, diplopia (0.83%), hearing loss (1.9%), death (0.44%)

\* Not clear.

APR Acute pain relief, FU follow-up, GR glycerol rhizotomy, MVD microvascular decompression, PSR partial sensory rhizotomy, PBC percutaneous balloon microdecompression, RF-TR radiofrequency thermorhizotomy, SRS stereotactic radiosurgery.



# PERIPHERAL NERVE STIMULATION

- TRIGEMINAL NERVE
  - CENTRALLY, I.E. GANGLION
  - PERIPHERALLY
- SUBRAORBITAL / SUPRATROCHLEAR NERVES
  - FOR NEURALGIAS AND MIGRAINES (USUALLY WITH ONS)
- INFRAORBITAL NERVE
  - NEURALGIAS
- AURICULOTEMPORAL NERVE
  - INTRACTABLE HEADACHES



**Table 1**  
**Summary of the case series in the literature assessing the efficacy of PFNS for complex craniofacial pain syndromes**

Author, Year	Patients (N)	Causes	Area of PFNS Implantation	Results	Follow-up
Dunteman, <sup>38</sup> 2002	2	Postherpetic (2)	Supraorbital (2)	Effectively treated	2 y
Johnson & Burchiel, <sup>11</sup> 2004	10	Postherpetic (4) Posttraumatic (5) Atypical face pain (1)	Supraorbital (8) Infraorbital (2)	50% pain relief in 70% of patients Medication use declined in 70% of patients Two failures (50%) in postherpetic group	26.6 ± 4.7 mo
Slavin et al, <sup>20</sup> 2006	30	Craniofacial pain	Occipital (21) Supraorbital (7) Infraorbital (6) In 19 patients more than 1 nerve was stimulated	73% of patients had >50% pain relief	35 mo
Asensio-Samper et al, <sup>37</sup> 2008	1	Posttraumatic	Supraorbital	VAS 9–10 out of 10 to 2 out of 10 following PFNS	4 y
Reverberi et al, <sup>28</sup> 2009	1	Trigeminal neuropathic pain	Supraorbital and infraorbital	>50% reduction in pain intensity	5 mo
Surjya Prasad Upadhyay et al, <sup>41</sup> 2010	1	Postherpetic	Supraorbital	>50% reduction in pain intensity with improvement in quality of life	8 wk
Yakovlev & Resch, <sup>42</sup> 2010	1	Atypical face pain	Mandibular nerve	>50% reduction in pain intensity	12 mo
Lenchig et al, <sup>39</sup> 2012	1	Posttraumatic	Supraorbital and infraorbital	>50% reduction in pain intensity with improvement in quality of life	3 mo
Stidd et al, <sup>40</sup> 2012	3	Posttraumatic (2) Postherpetic (1)	Supraorbital and infraorbital (2) Supraorbital (1)	>50% reduction in pain intensity	6–27 mo
Feletti et al, <sup>10</sup> 2013	6	Posttraumatic (2) Postsurgical (1) Postherpetic (1) PIFP (2)	Supraorbital (1) Infraorbital (2) Occipital nerve (1) Supraorbital nerve + infraorbital nerve + occipital nerve (1) Occipital nerve + infraorbital nerve + mandibular nerve (1)	VAS from 10 out of 10 to 2.7 out of 10	17 mo
Our experience (unpublished data)	80	Craniofacial pain	Supraorbital + infraorbital + mandibular + occipital nerve	80% of patients had >50% improvement	60 mo





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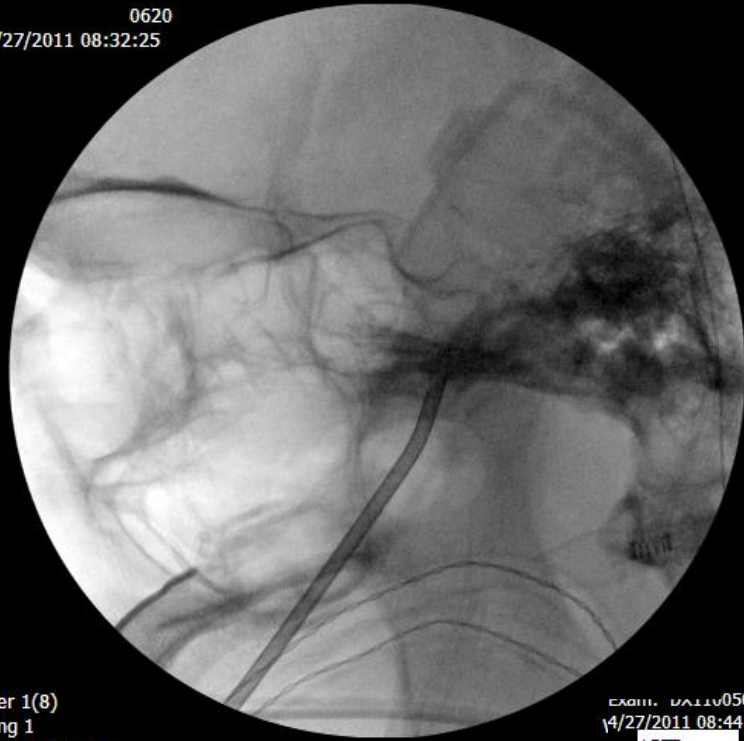


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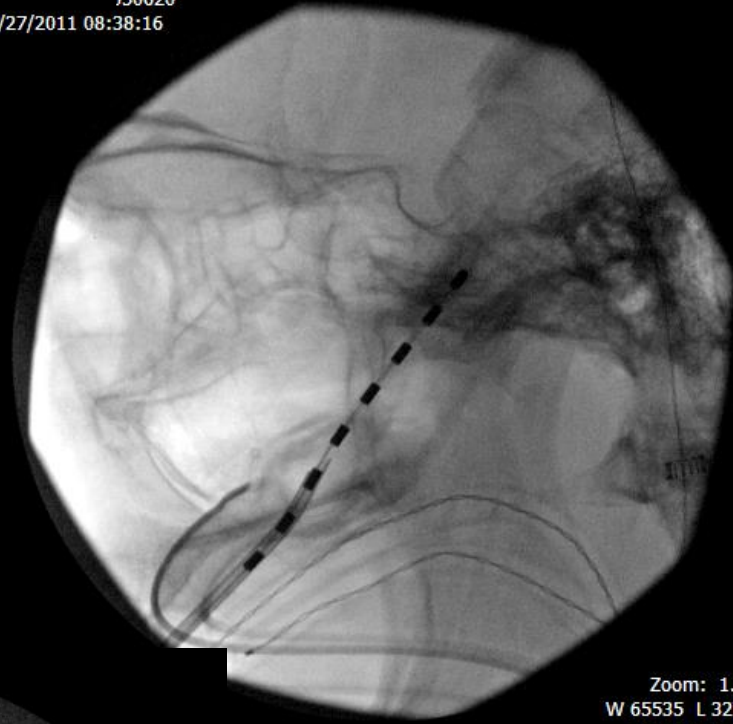
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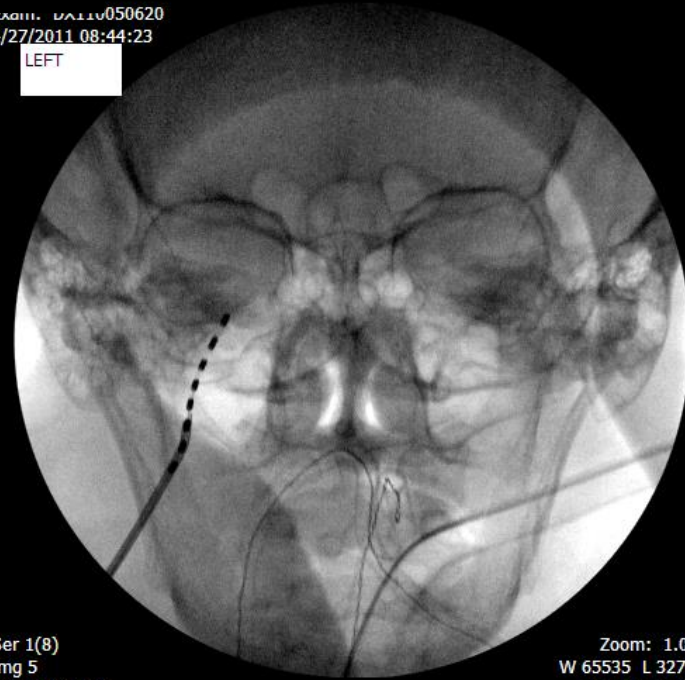
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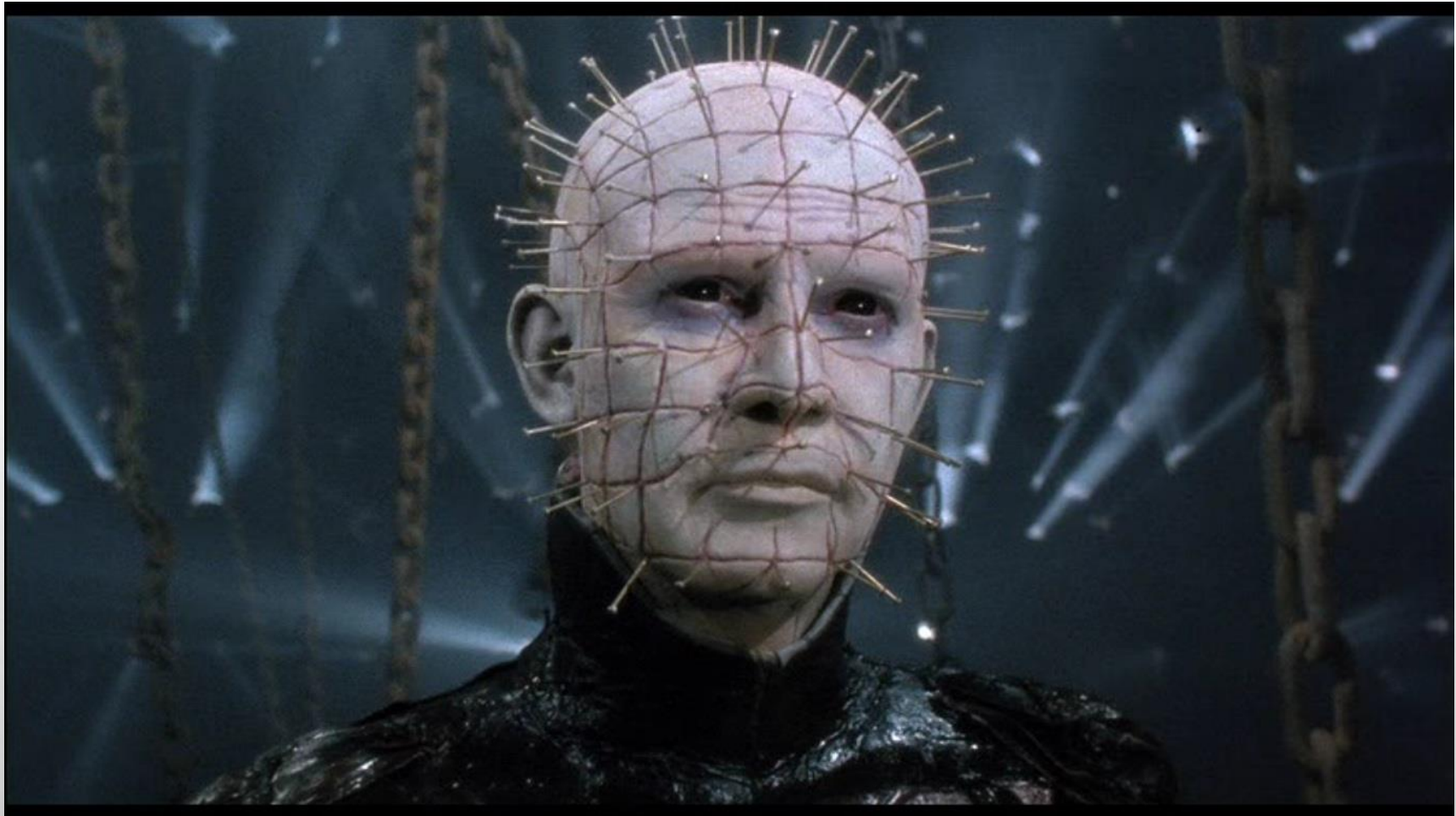
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Don't get carried away!



# PERSISTENT IDIOPATHIC FACIAL PAIN

- PREVIOUSLY USED TERM:
  - ATYPICAL FACIAL PAIN.
- DESCRIPTION:
  - PERSISTENT FACIAL AND/OR ORAL PAIN, WITH VARYING PRESENTATIONS BUT RECURRING DAILY FOR MORE THAN 2 HOURS/DAY OVER MORE THAN 3 MONTHS, IN THE ABSENCE OF CLINICAL NEUROLOGICAL DEFICIT.
- DIAGNOSTIC CRITERIA:
  - FACIAL AND/OR ORAL PAIN FULFILLING CRITERIA B AND C
  - RECURRING DAILY FOR >2 HOURS/DAY FOR >3 MONTHS
  - PAIN HAS BOTH OF THE FOLLOWING CHARACTERISTICS:
    - POORLY LOCALIZED, AND NOT FOLLOWING THE DISTRIBUTION OF A PERIPHERAL NERVE
    - DULL, ACHING OR NAGGING QUALITY
- CLINICAL NEUROLOGICAL EXAMINATION IS NORMAL
- A DENTAL CAUSE HAS BEEN EXCLUDED BY APPROPRIATE INVESTIGATIONS
- NOT BETTER ACCOUNTED FOR BY ANOTHER ICHD-3 DIAGNOSIS.





# SPHENOPALATINE GANGLION

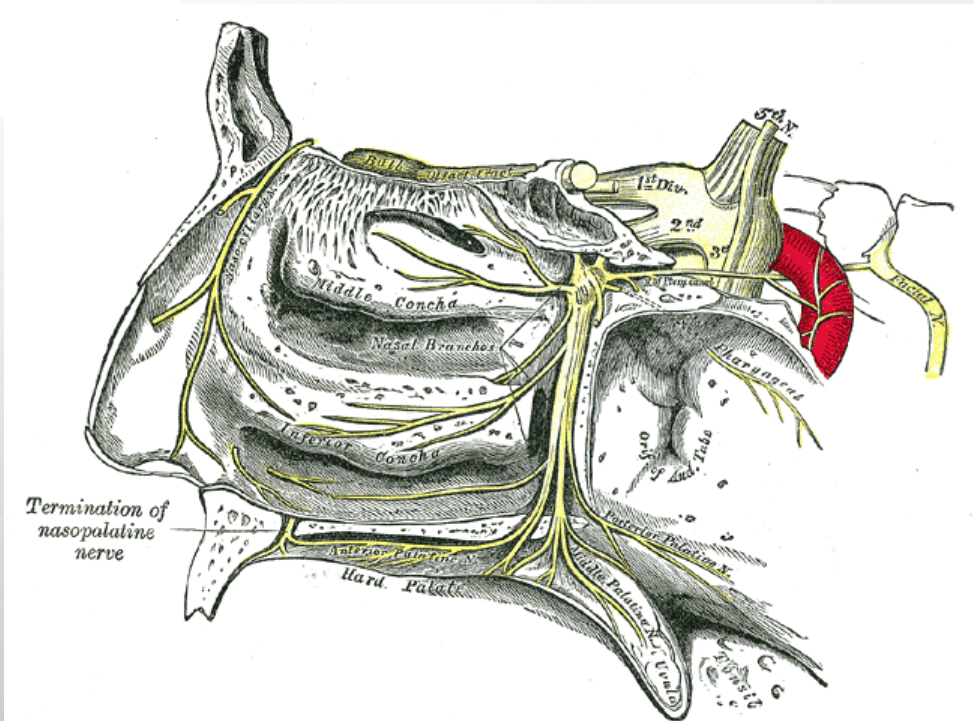
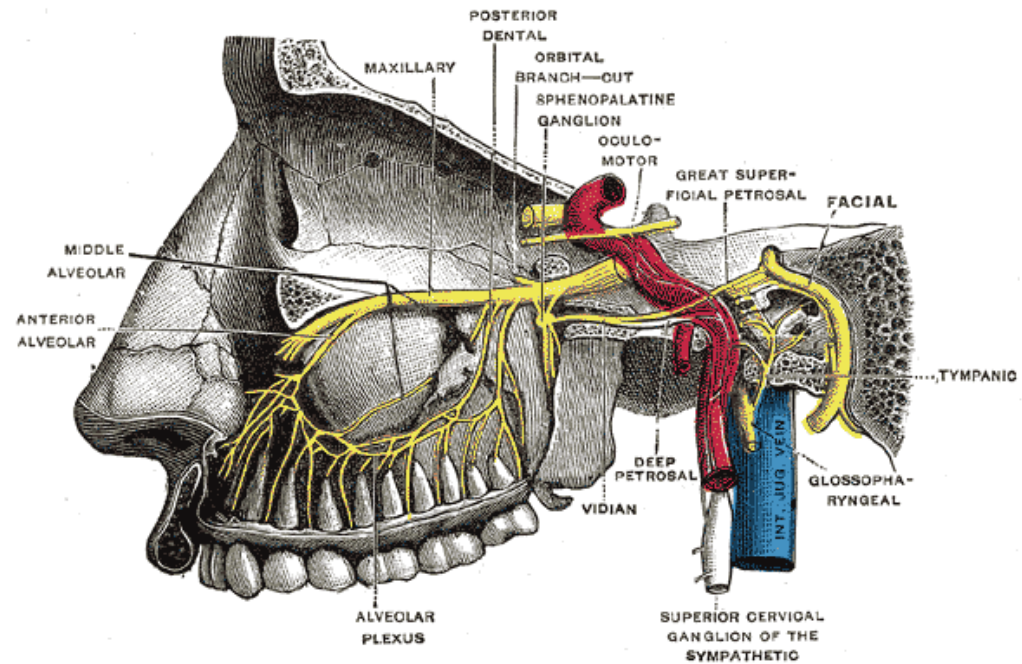
- SPG IS ONE OF FOUR AUTONOMIC GANGLIA INSIDE THE HEAD
- LOCATED IN THE PTERYGOPALATINE FOSSA WHICH IS LOCATED POSTERIOR TO THE MIDDLE TURBINATE AND IS 2 TO 7 MM DEEP TO THE LATERAL NASAL MUCOSA
  - ANTERIOR BORDER: MAXILLARY SINUS
  - POSTERIOR BORDER: MEDIAL PTERYGOID PLATE
  - SUPERIOR BORDER: SPHENOID SINUS
  - MEDIAL: PALATINE BONE



# SPHENOPALATINE GANGLION

- AUTONOMIC COMPONENTS
  - DEEP PETROSAL NERVE: POSTGANGLIONIC SYMPATHETICS FROM THE SUPERIOR CERVICAL GANGLION AND UPPER THORACIC SPINAL CORD
  - GREATER PETROSAL NERVE: PREGANGLIONIC PARASYMPATHETICS FROM THE SUPERIOR SALIVATORY NUCLEUS SYNAPSE IN THE SPG WITH POSTGANGLIONIC AXONS, VASODILATOR, AND SECRETORY FIBERS
- SENSORY FIBERS FROM TWO SPHENOPALATINE BRANCHES OF THE MAXILLARY NERVE PASS THROUGH THE SPG AND FORM THE PALATINE NERVES WHICH INNERVATE THE UPPER TEETH, NASAL MEMBRANES, SOFT PALATE AND SOME PARTS OF THE PHARYNX.
- ALSO HAS SECRETOMOTOR NERVES TO THE NASAL GLANDS FROM THE GREATER PETROSAL NERVE.





# SPHENOPALATINE GANGLION BLOCK

- INDICATED FOR TREATMENT OF:
  - PERSISTENT IDIOPATHIC FACIAL PAIN
    - AKA “ATYPICAL FACIAL PAIN”
  - TRIGEMINAL NEURALGIA
  - SPHENOPALATINE NEURALGIA
  - MIGRAINE HEADACHES
  - CLUSTER HEADACHES
  - POST-TRAUMATIC HEADACHES
  - CANCER PAIN OF FACIAL AND OROFACIAL STRUCTURES





# TREATMENT ALGORITHM

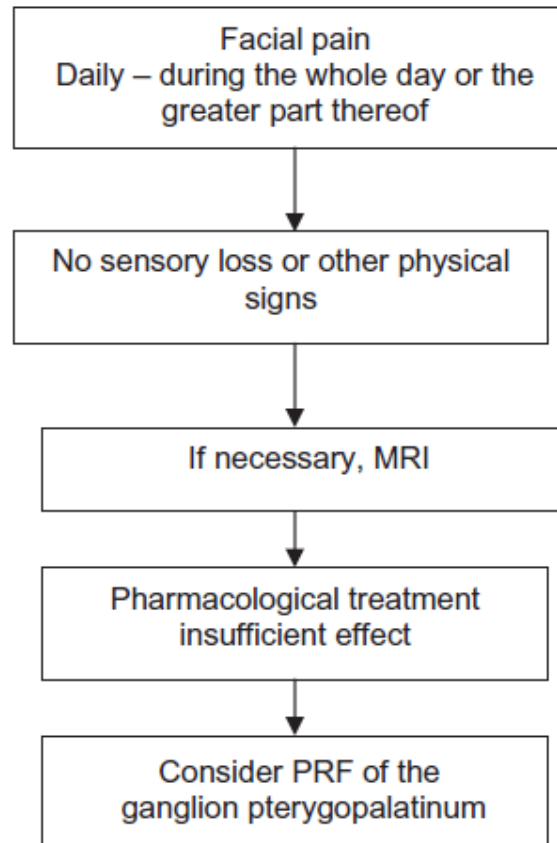


Figure 1. Clinical practice algorithm for the treatment of atypical facial pain. MRI, magnetic resonance imaging; PRF, pulsed radiofrequency.

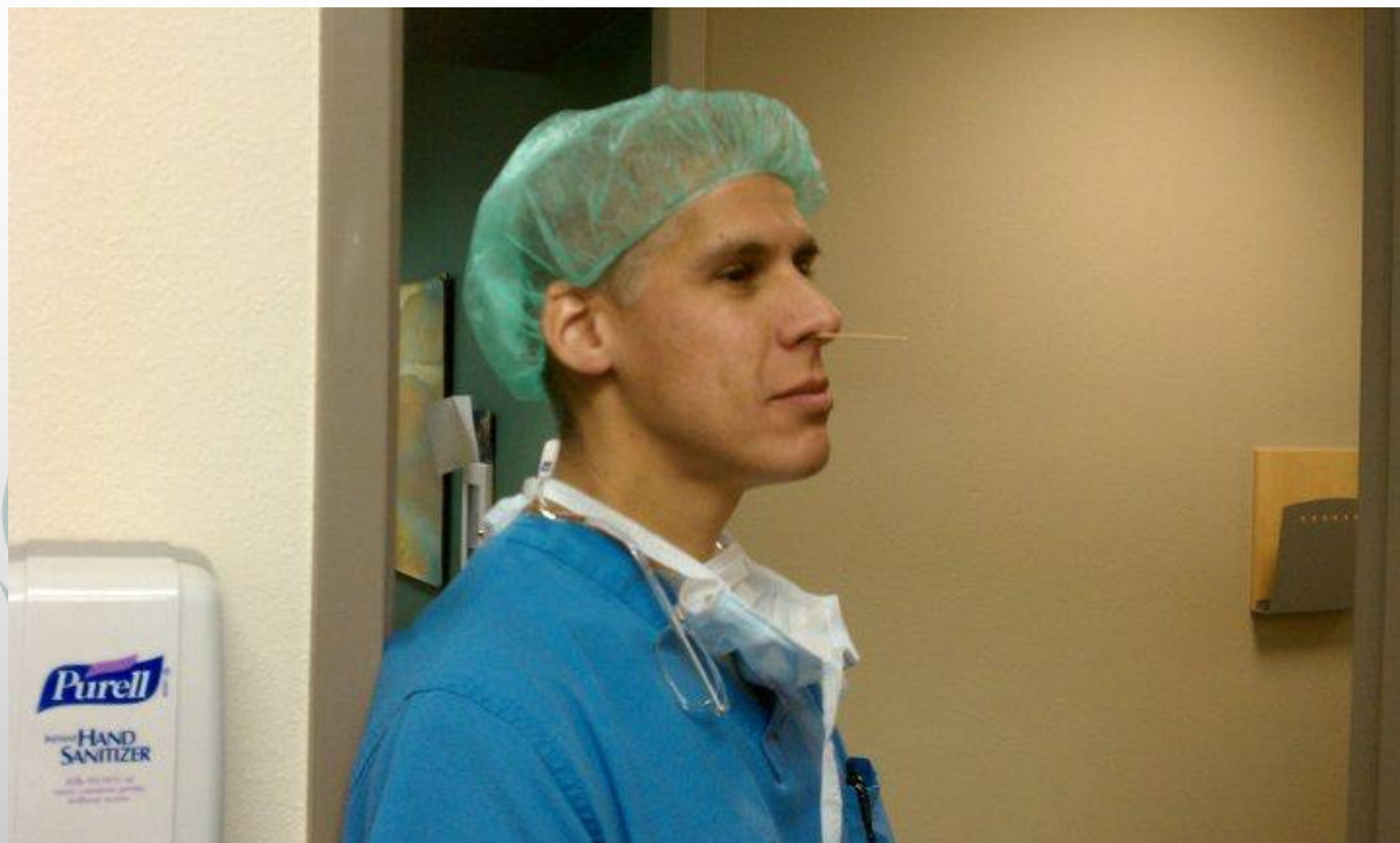


# SPHENOPALATINE GANGLION BLOCK

- TECHNIQUES:
  - INTRANASAL
    - COTTON SWABS SOAKED IN LOCAL ANESTHETIC
      - 4% COCAINE
      - 2% LIDOCAINE
      - VISCOUS LIDOCAINE
  - INTRAORAL VIA THE PALATINE FORAMEN
    - LOCATED MEDIAL TO THE 2<sup>ND</sup> MOLAR
    - FORAMEN ENTERED WITH A CURVED NEEDLE
  - INFRAZYGOMATIC THROUGH THE MANDIBULAR NOTCH
    - RFTC
    - PULSED RF



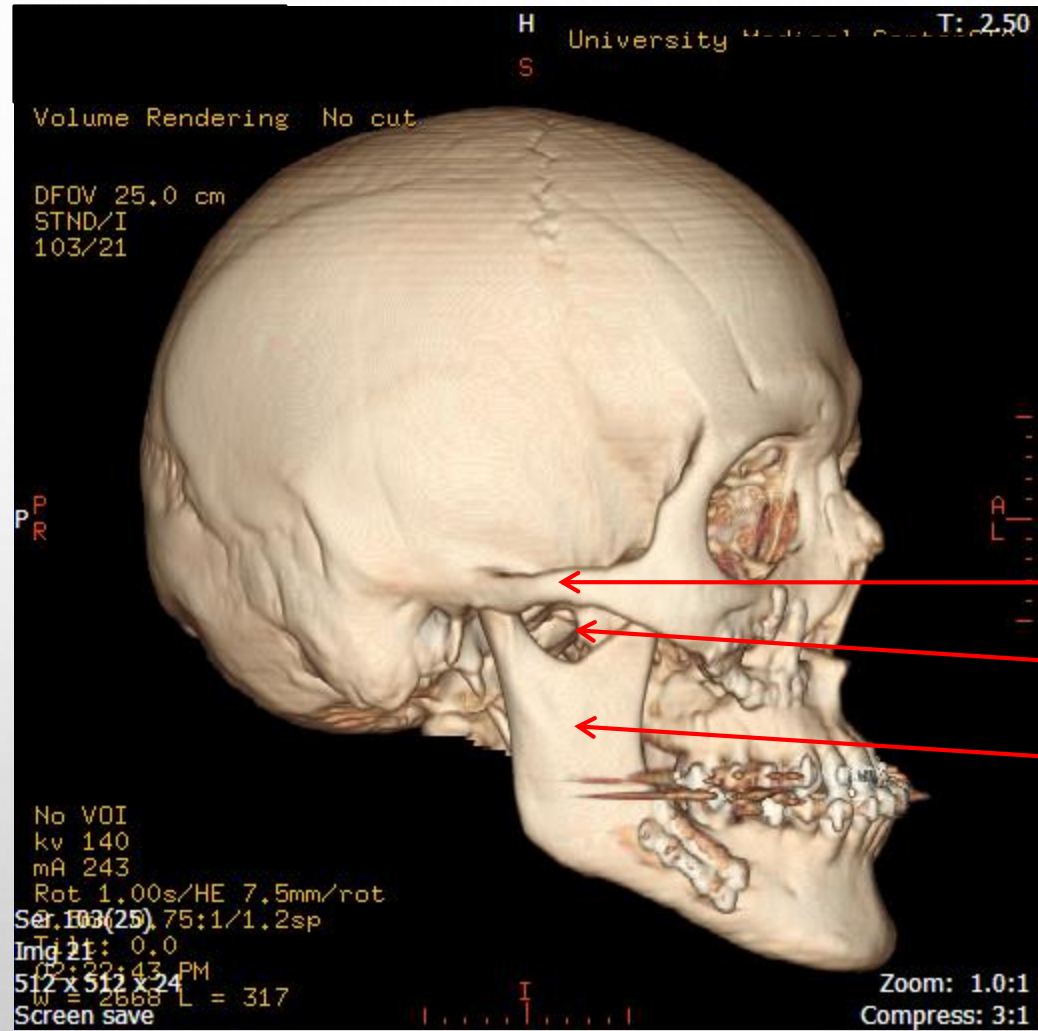




# TECHNIQUE

- FOR RFA, APPLY SENSORY STIMULATION AT 50 HZ TO LOCALIZE THE GANGLION
  - PLACEMENT OF THE NEEDLE AT THE GANGLION WILL GENERATE A PARESTHESIA AT THE ROOT OF THE NOSE
    - THE LOWER THE STIMULATION THE BETTER.
  - BEST TO USE A 2-3 MM ACTIVE TIP TO DECREASE THE POSSIBILITY OF LESIONING THE MAXILLARY NERVE OR PALATINE NERVES
  - LESION AT 67-80 DEGREES CELSIUS
  - PULSE RF CAN BE DONE AT 45 VOLTS





Zygoma

Mandibular notch

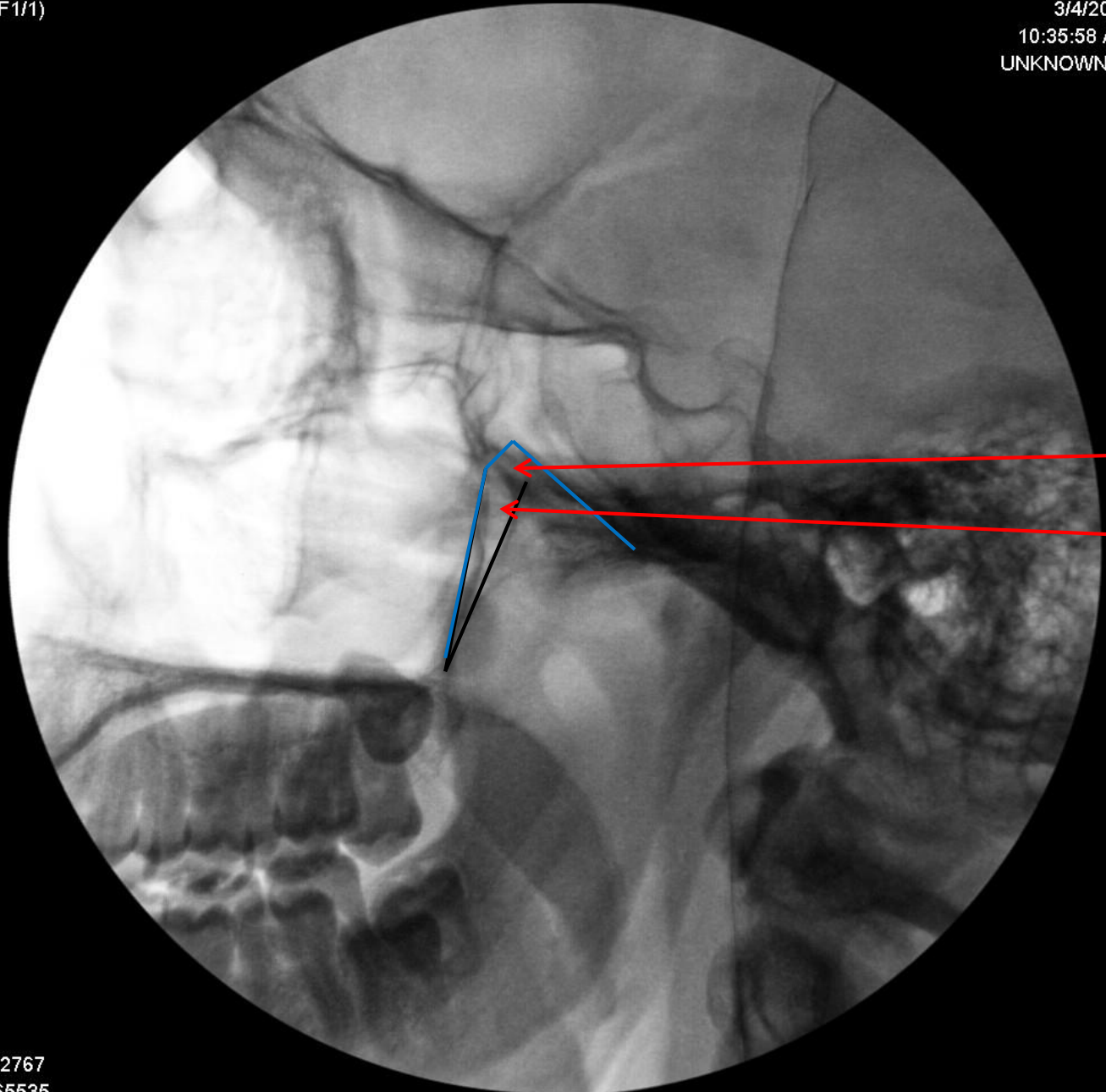
Ramus of mandible





UNNAMED  
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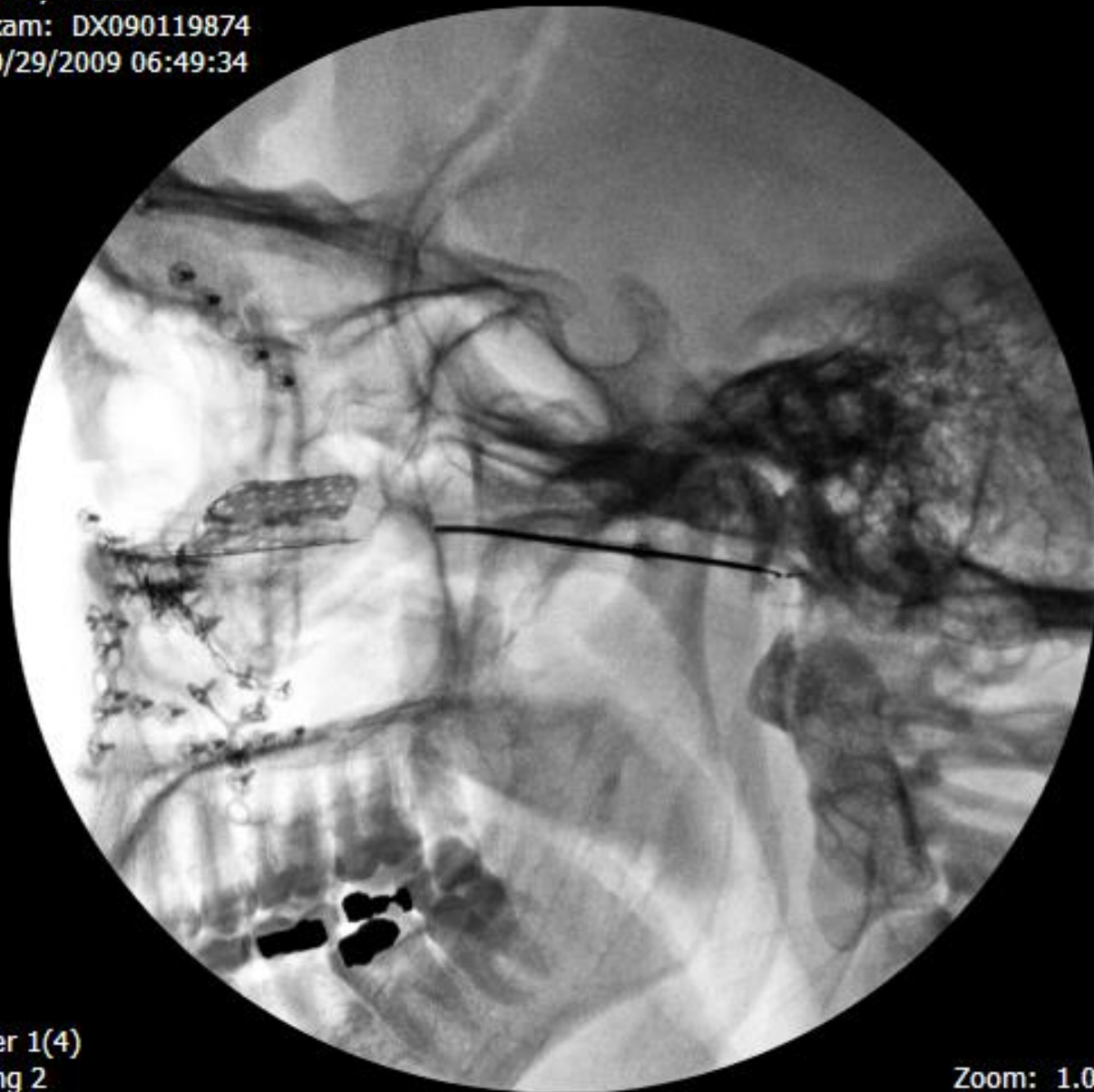
Base of  
"inverted vase"  
Pterygomaxillary  
fissure

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W65535  
Not for diagnostic use

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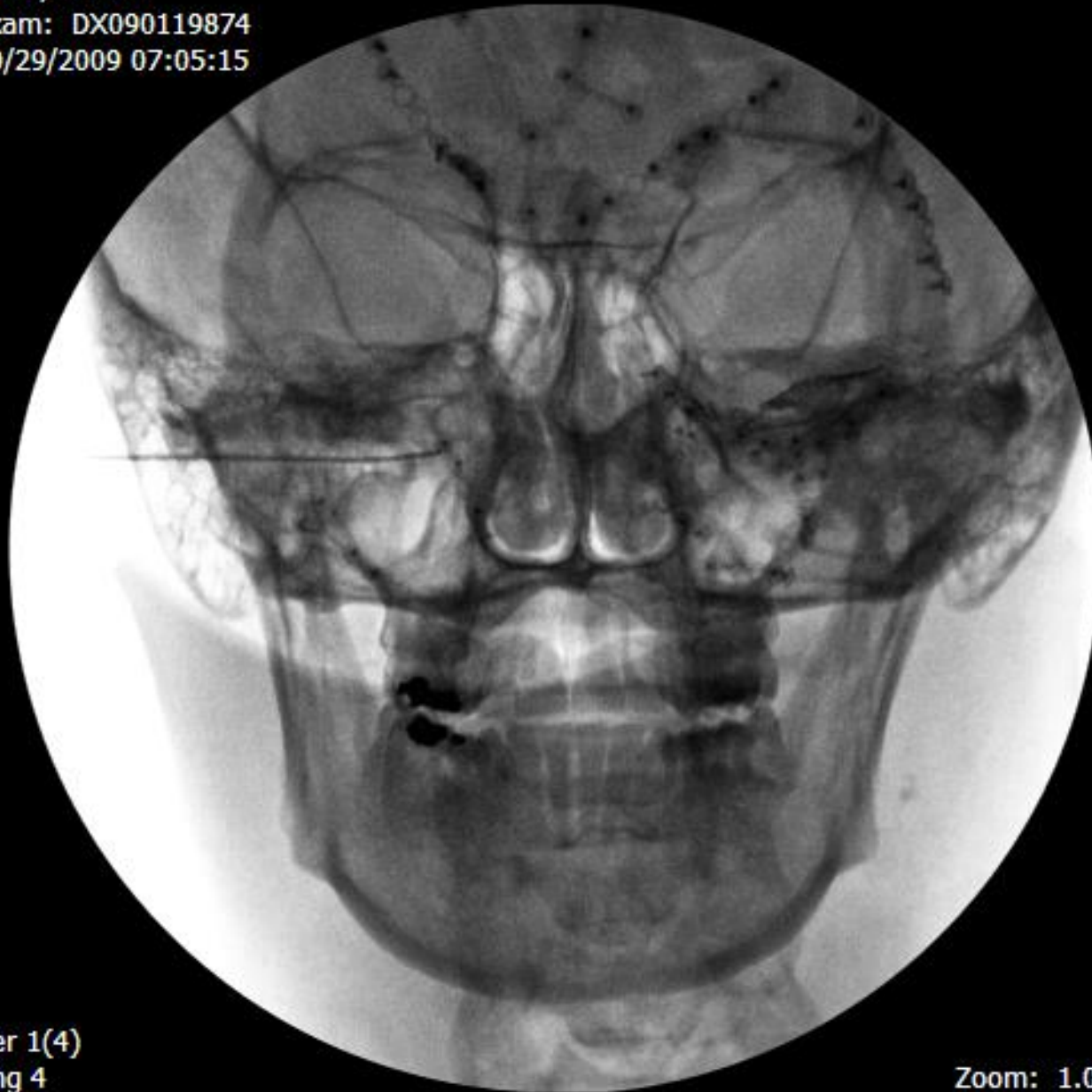


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# SPHENOPALATINE GANGLION BLOCK

- COMPLICATIONS
  - HEMATOMA
    - LARGE VENOUS PLEXUS
    - MAXILLARY ARTERY
  - EPISTAXIS
  - NERVE INJURY
  - EYE INJURY
    - RETROBULBAR HEMATOMA VIA THE INFRAORBITAL FISSURE
  - INTRAVASCULAR INJECTION
  - MAXILLARY SINUS FRACTURE



**Table 2. Summary of Sphenopalatine Block/Neurolysis Articles**

Authors	Study Type	Diagnosis	No. of Patients	Grade of Recommendation
Gregoire et al. <sup>7</sup>	CR	Trigeminal neuralgia	1	1C
Shah, Racz <sup>8</sup>	CR	Posttraumatic HA	1	1C
Yang, Oraee <sup>9</sup>	CR	Cluster HA	1	1C
Saade, Paige <sup>10</sup>	CR	CA	1	1C
Manahan et al. <sup>11</sup>	CR	Trigeminal neuralgia	1	1C
Peterson et al. <sup>12</sup>	CR	Trigeminal neuralgia, Tooth pain	2	1C
Quevedo et al. <sup>13</sup>	CR	CRPS lower extremity	2	2C
Salar et al. <sup>14</sup>	CS	Sphenopalatine neuralgia	7	1C
Sanders et al. <sup>15</sup>	CS	Cluster HA	66	1C
Puig et al. <sup>16</sup>	CS	Sphenopalatine neuralgia	8	1C
Bayer et al. <sup>17</sup>	RR	Atypical facial pain, sphenopalatine neuralgia, atypical trigeminal neuralgia, migraine HA	30	1C
Berger et al. <sup>18</sup>	DB,PC	Low back pain	21	2B
Janzen et al. <sup>19</sup>	DB,PC	Myofascial pain, fibromyalgia	21	2B
Ferrante et al. <sup>20</sup>	DB,PC	Myofascial pain head, neck, shoulders	23	2B

CR, case report; CS, case series; RR, retrospective review; DB,PC, double-blinded, placebo-controlled; CRPS, complex regional pain syndrome; HA, headache; CA, cancer.

Day M. Sympathetic blocks: the evidence. *Pain Practice* 2008;8:98-109



# EVIDENCE-BASED MEDICINE

Evidence-Based Interventional Pain Medicine  
according to Clinical Diagnoses

## 3. Persistent Idiopathic Facial Pain

Paul Cornelissen, MD\*; Maarten van Kleef, MD, PhD, FIPP<sup>†</sup>;  
Nagy Mekhail, MD, PhD, FIPP<sup>‡</sup>; Miles Day, MD, FIPP, DABIPP<sup>§</sup>;  
Jan van Zundert, MD, PhD, FIPP<sup>¶</sup>

*Pain Practice, Volume 9, Issue 6, 2009 443-448*

### Table 3. Summary of Evidence for Interventional Pain Management

Technique	Score
Pulsed radiofrequency treatment of the ganglion pterygopalatinum (sphenopalatinum)	2 C+

2 C+ Effectiveness only demonstrated in observational studies. Given that there is no conclusive evidence of the effect, benefits closely balanced with risk and burdens



# GLOSSOPHARYNGEAL NEURALGIA

- DESCRIPTION:
  - A DISORDER CHARACTERIZED BY UNILATERAL BRIEF STABBING PAIN, ABRUPT IN ONSET AND TERMINATION, IN THE DISTRIBUTIONS NOT ONLY OF THE GLOSSOPHARYNGEAL NERVE BUT ALSO OF THE AURICULAR AND PHARYNGEAL BRANCHES OF THE VAGUS NERVE. PAIN IS EXPERIENCED IN THE EAR, BASE OF THE TONGUE, TONSILLAR FOSSA AND/OR BENEATH THE ANGLE OF THE JAW. IT IS COMMONLY PROVOKED BY SWALLOWING, TALKING OR COUGHING AND MAY REMIT AND RELAPSE IN THE FASHION OF TRIGEMINAL NEURALGIA.
- DIAGNOSTIC CRITERIA:
  - RECURRING PAROXYSMAL ATTACKS OF UNILATERAL PAIN IN THE DISTRIBUTION OF THE GLOSSOPHARYNGEAL NERVE<sup>1</sup> AND FULFILLING CRITERION B
  - PAIN HAS ALL OF THE FOLLOWING CHARACTERISTICS:
    - LASTING FROM A FEW SECONDS TO 2 MINUTES
    - SEVERE INTENSITY
    - ELECTRIC SHOCK-LIKE, SHOOTING, STABBING OR SHARP IN QUALITY
    - PRECIPITATED BY SWALLOWING, COUGHING, TALKING OR YAWNING
- NOT BETTER ACCOUNTED FOR BY ANOTHER ICHD-3 DIAGNOSIS.



# GLOSSOPHARYNGEAL NEURALGIA

- CLASSICAL GLOSSOPHARYNGEAL NEURALGIA

- DESCRIPTION:

- GLOSSOPHARYNGEAL NEURALGIA DEVELOPING WITHOUT APPARENT CAUSE OTHER THAN NEUROVASCULAR COMPRESSION.

- SECONDARY GLOSSOPHARYNGEAL NEURALGIA

- DESCRIPTION:

- GLOSSOPHARYNGEAL NEURALGIA CAUSED BY AN UNDERLYING DISEASE.

- IDIOPATHIC GLOSSOPHARYNGEAL NEURALGIA

- DESCRIPTION:

- GLOSSOPHARYNGEAL NEURALGIA WITH NO EVIDENCE EITHER OF NEUROVASCULAR COMPRESSION OR OF CAUSATIVE UNDERLYING DISEASE.





# GLOSSOPHARYNGEAL NERVE

- GLOSSOPHARYNGEAL NERVE
  - RECEIVES SENSORY INFORMATION FROM THE POSTERIOR THIRD OF THE TONGUE, SOFT PALATE, TONSILS, PHARYNX, AND THE AUDITORY CANAL.
  - INNERVATES THE STYLOPHARYNGEUS MUSCLE



# GLOSSOPHARYNGEAL NERVE

- GLOSSOPHARYNGEAL NERVE
  - ARISES FROM THE MEDULLA AND RUNS ANTERIORLY UNDER THE PETROUS PORTION OF THE TEMPORAL BONE.
  - EXITS THE SKULL VIA THE JUGULAR FORAMEN AND RUNS BETWEEN THE INTERNAL CAROTID ARTERY AND THE INTERNAL JUGULAR VEIN POSTERIOR TO THE STYLOID PROCESS.

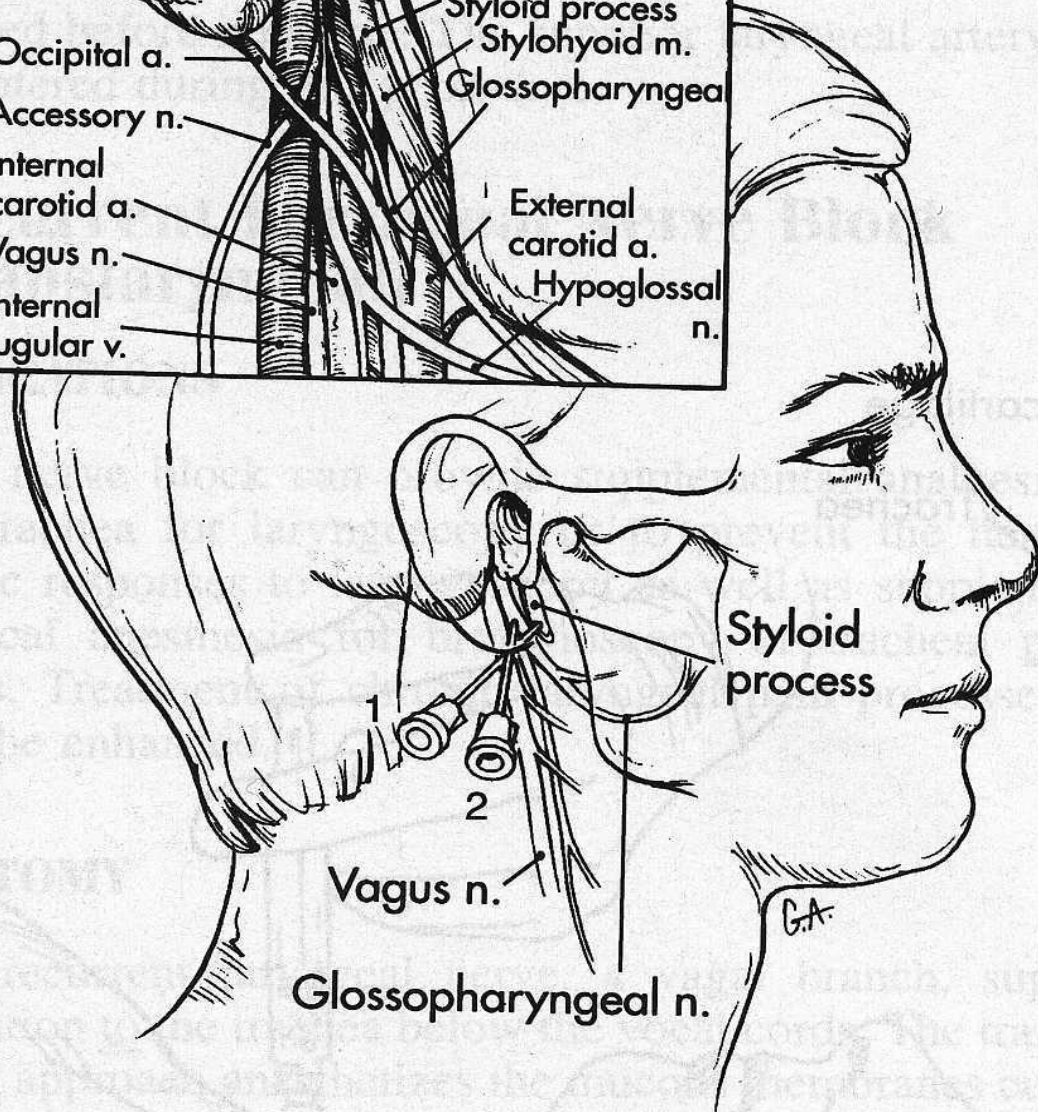
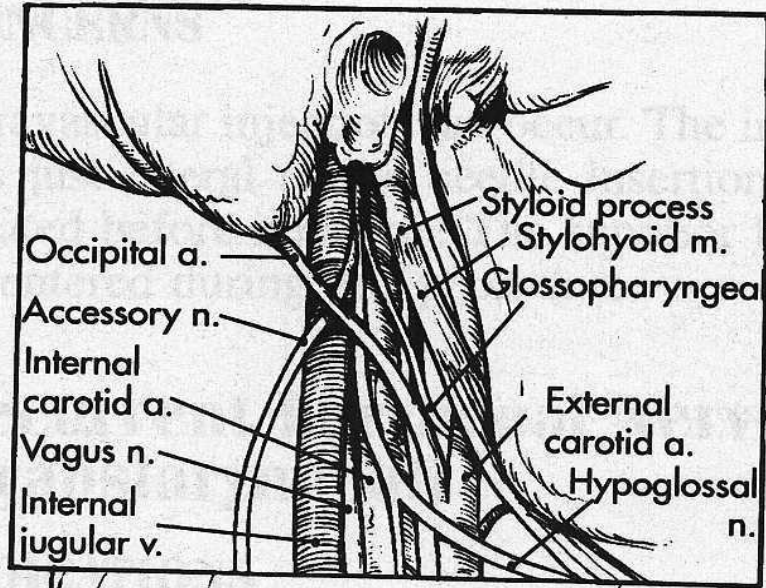


# GLOSSOPHARYNGEAL NERVE BLOCK

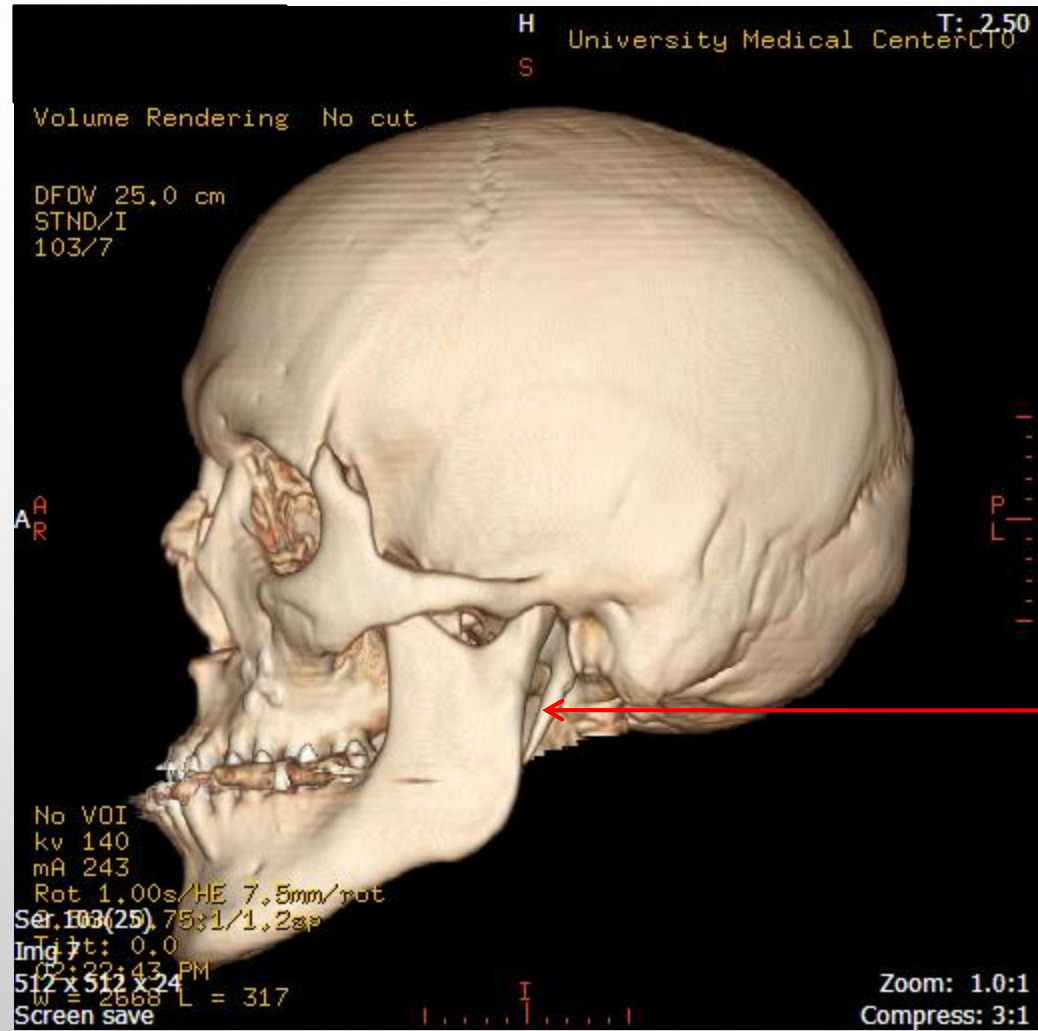
- INDICATIONS
  - GLOSSOPHARYNGEAL NEURALGIA
  - PERSISTENT IDIOPATHIC FACIAL PAIN
  - PAIN SECONDARY PHARYNGEAL CANCER
- DIAGNOSTIC BLOCK WITH LOCAL ANESTHETIC
- DEFINITIVE TREATMENT WITH RF/PULSED RF OR CRYONEUROLYSIS











Styloid process



CHEST/PACER

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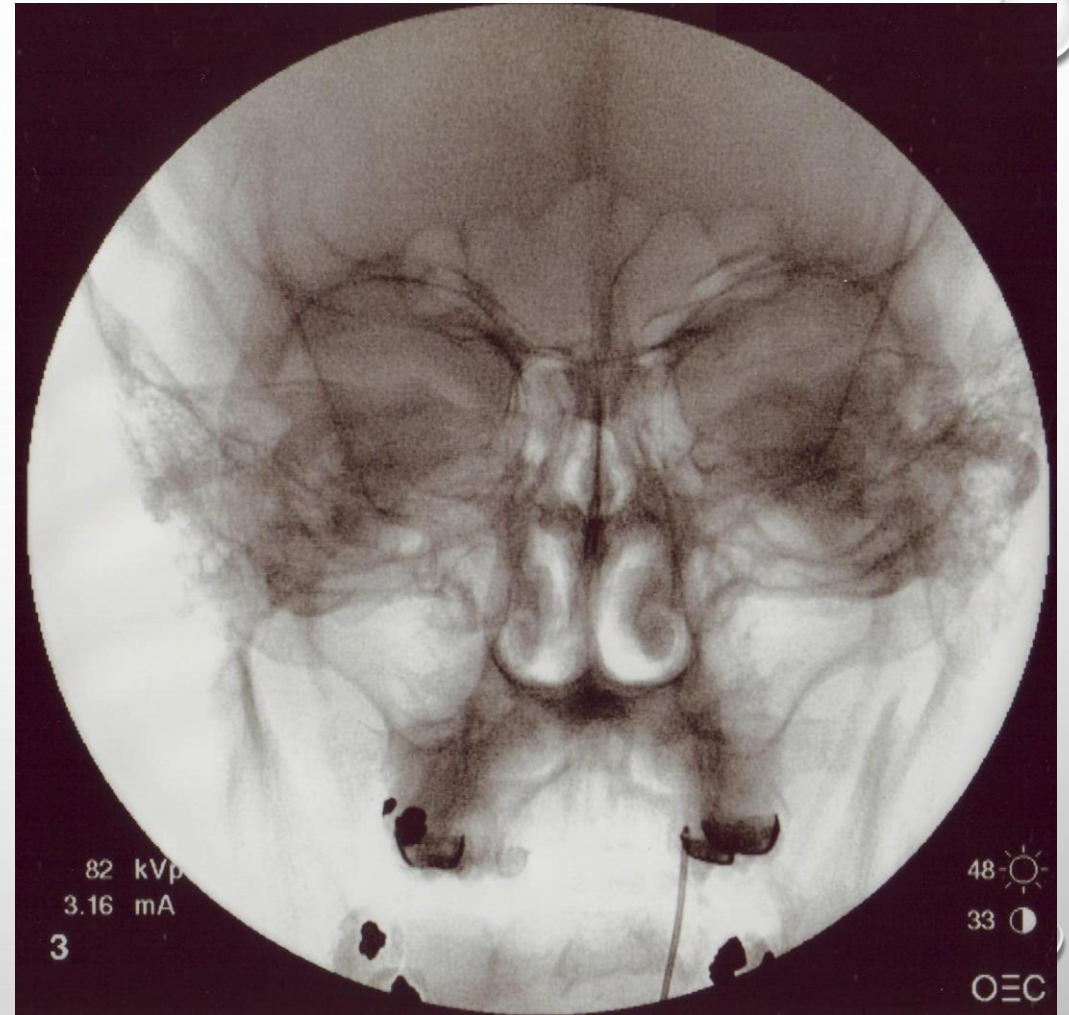
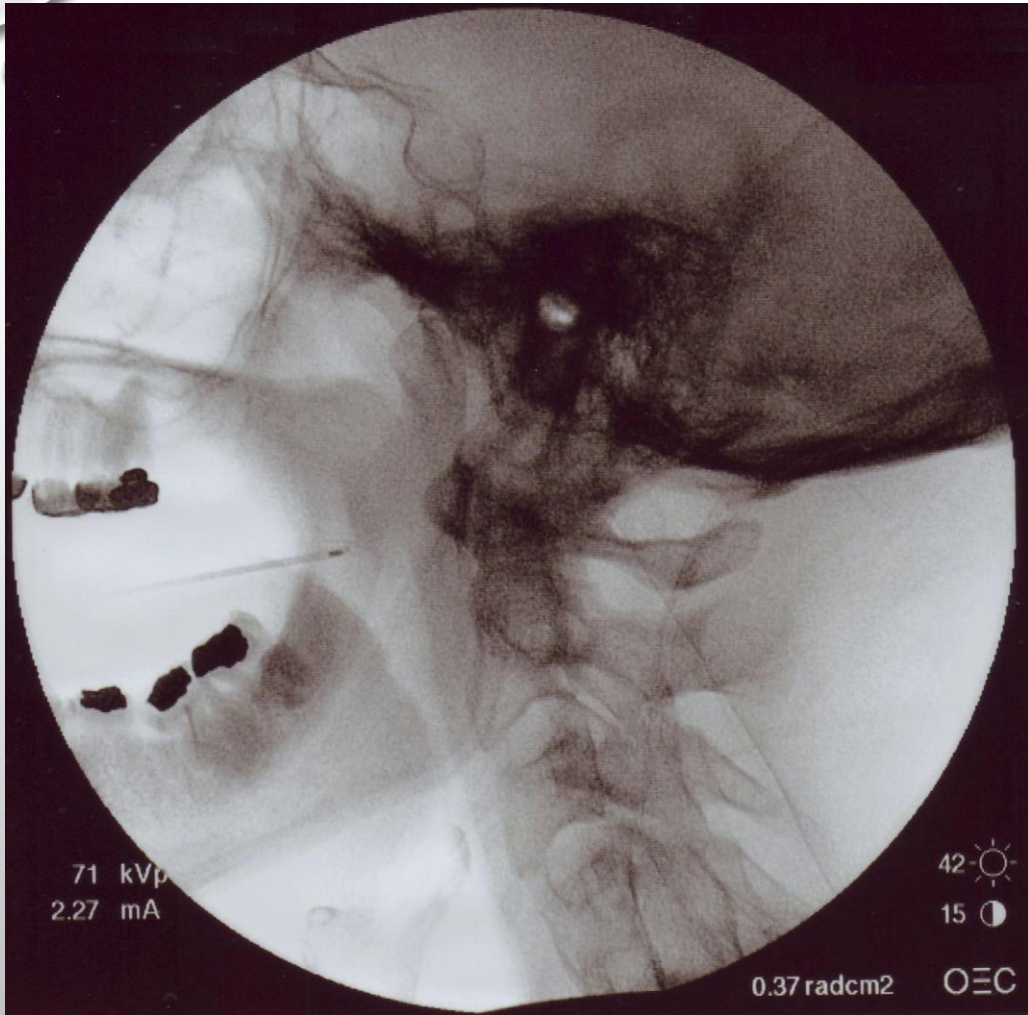
Styloid Process

0cGy cm<sup>2</sup>

SIEMENS







# GLOSSOPHARYNGEAL NERVE BLOCK

- COMPLICATIONS
  - INTRAVASCULAR INJECTION
  - UNINTENTIONAL BLOCKADE OF OTHER CRANIAL NERVES
  - DIFFICULTIES SWALLOWING AND HOARSENESS SECONDARY TO CN IX AND CN X BLOCKADE, RESPECTIVELY.
  - TACHYCARDIA AND HYPERTENSION SECONDARY TO BLOCKADE OF PARASYMPATHETIC OUTFLOW





**Table 1 The main characteristics of the most common chronic non dental pains and their management**

	Post traumatic trigeminal neuropathy	Buring mouth syndrome	Temporomandibular disorders	Trigeminal neuralgia	Persistent idiopathic facial pain	Trigeminal post herpetic neuralgia
Epidemiology	becoming increasingly common	rare	common	rare	rare	rare
Onset	3-6 months of traumatic event	slow	sometimes starts abruptly	memorable, sudden	slow	slow post herpes zoster
Duration	continuous with minor fluctuations, some have intermittent episodes	continuous	often constant	intermittent seconds to minutes	constant	constant
Periodicity	constant	can vary throughout the day	fluctuations often worse am/evening	refractory periods, many attacks a day periods of complete remission weeks, months	varies, can have periods of no pain	may be exacerbations
Site	distribution of a nerve branch, tooth or tooth bearing area	tongue, lips, palate	masseter, temporalis, around TMJ,ear, retromolar area	V2, V3 most common intraoral and extra oral	non anatomical, gradually gets larger	anatomic distribution, most common ophthalmic branch
Radiation	nil	all parts of the oral mucosa	may radiate to neck	only within trigeminal distribution	can spread over whole face, head, intra oral	little
Character	dull, burning, tingling, pins and needles at times sharp	burning, stinging, sore	aching,heavy, deep, can be sharp	sharp, shooting, lightening, may be a dull ache, burning after pain	dull, nagging, can be sharp	burning,, pins and needles
Severity	moderate to severe	mild to severe	variable moderate to severe	moderate to severe	moderate to severe	moderat to severe
Aggravating factors	touch	sometimes certain food,	prolonged chewing, opening wide, jaw movements	light touch, eating, some attacks are spontaneous	fatigue, stress	light touch,
Associated factors	may be altered sensation, reduced quality of life, history of trauma or dental procedure	altered taste, dry mouth, depression, anxiety, poor quality of life	clenching, bruxism, may have clicking of TMJ, locking, reduced opening, headaches, migraines	very rare autonomic features, fear of pain return, depression, poor quality of life	often other chronic pain, significant life events, vulnerable personalities,	may be altered sensation, skin changes
Examination	allodynia, hypoesthesia	nil, sometimes geographic tongue	palpation of muscles/joint induces same pain, unassisted reduced opening, clicking, intraorally evidence of frictional keratosis in cheeks, attrition of teeth	may trigger attack on touch, very rarely sensory changes	nil	allodynia, hypoaesthesia, hyperaesthesia
Management	drugs for neuropathic pain many benefit from CBT	neuropathic drugs, clonazepam, CBT	education, physiotherapy, psychology, anti- inflammatory drugs	carbamazepine/oxcarbazepine, neurosurgical procedures	CBT, antidepressant drugs	nortryptiline, pregablin, gabapentin, lidocaine patches

CBT cognitive behaviour therapy.



# QUESTIONS