

Treatment of Trigeminal Neuralgia:

## **Percutaneous Block including Botox**

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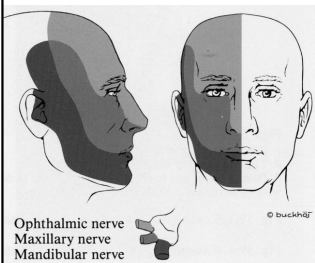
### **Introduction**

#### **Therapeutic modalities for trigeminal neuralgia**

- Pharmacological treatment
- Lesioning procedures
  - RF rhizotomy
  - Retrogasserian glycerol injection
  - Balloon compression
- Percutaneous block
  - Botox injection
  - Alcohol injection
- Microvascular decompression
- Radiosurgery
- Others

## Anatomy of trigeminal nerve

- The largest cranial nerve
- Sensory (touch, temperature and proprioception) and motor
- Trigeminal ganglion
- Three branches of V
  - Ophthalmic (superior orbital fissure)
  - Maxillary (foramen Rotundum)
  - Mandibular (foramen Ovale)



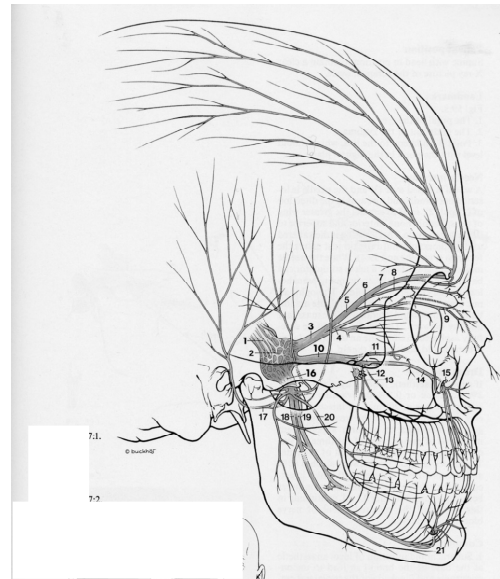
Ophthalmic nerve  
Maxillary nerve  
Mandibular nerve

1. Trigeminal n
2. Trigeminal ganglion
3. Ophthalmic n
4. Nasociliary n
5. Superior orbital n

6. Lacrimal n
7. Frontal n
8. Supratrochlear n
9. Infratrochlear n
10. Maxillary n

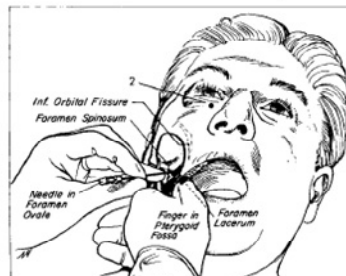
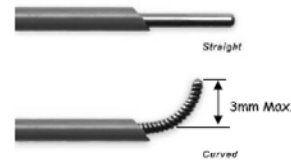
11. Zygomatic n
12. Middle superior alveolar n
13. Posterior superior alveolar n
14. Anterior superior alveolar n
15. Infraorbital n

16. Mandibular n
17. Auriculotemporal n
18. Inferior alveolar n
19. Lingual n
20. Buccal n
21. Mental n



## Lesioning procedure in Pain – Trigeminal neuralgia

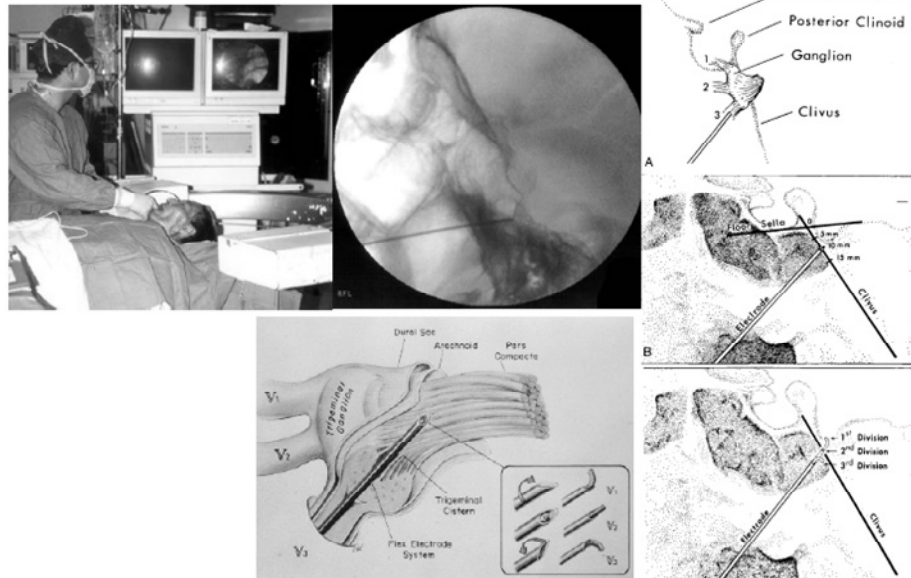
- Thermal rhizotomy
  - Premed. with 0.4mg atropine IM in supine neutral position
  - Portable imaging unit for lateral view of skull
  - Anesthesia with 30~50mg of IC methohexital or propofol
  - Needle puncture with 21G spinal needle (at Pt's right side)
  - RF electrode (Radionics) Tew kit
- Entry point
  - 2.5cm lateral to the angle of the lip
  - 3cm anterior to the EAC
  - Just below the medial aspect of the pupil



## Lesioning procedure in Pain – Trigeminal neuralgia

### • Thermal rhizotomy

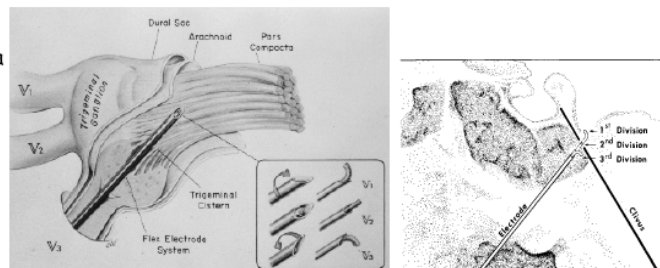
- Puncture of F ovale, (pt's wince with brief bradycardia, muscle contraction)



## Lesioning procedure in Pain - Trigeminal neuralgia

### • Thermal rhizotomy

- At awakened (Sweet method), stimulation with 0.1~0.4V (at 50~75 Hz and a 1 msec pulse duration) to identify the site where the lesion is to be located.
- At anesthetized,
  - lesion are made a min interval at 60°C (initial lesion)
  - Awakened and sensation is evaluated
  - 60~90sec, increasing the temperature by 5°C with each lesion (additional lesion)
- Patient can still determine that a safety pin feels sharp, but the degree of sharpness is considerably reduced.
- The goal of lesioning is 'dense hypalgesia', not analgesia
- Results
  - 23% dysesthesia
  - 25% recurrence
  - 99% pain relief



## Lesioning procedure in Pain – Trigeminal neuralgia

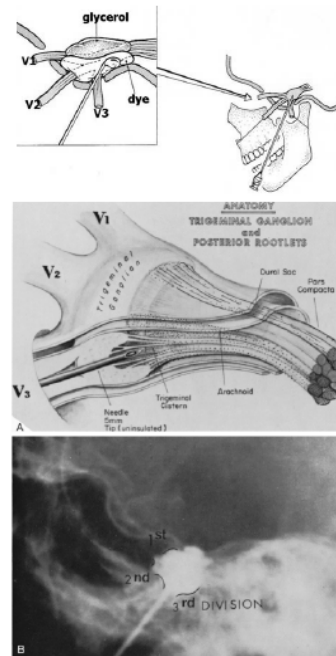
### • Glycerol rhizotomy

#### - Technique

- Water soluble radio-opaque dye injection (22G needle) into trigeminal cistern to measure cisternal capacity
- Glycerol injection (variable amount, ~0.3ml)
- Sitting with neck flexion for 1 hr
- Fluoroscopic-guided removal of glycerol

#### - Results (191 pts, over 7 yr F/U)

- Technical failure rate : 15%
  - Passage fail in 6%
  - No CSF obtained in 9%
- Immediate pain relief in successful cases 65%
- Pain relief occurred within 6 days ; 28%
- Overall failure rate : 7%
- Overall recurrence rate : 23% (interval 31 mo)



## Lesioning procedure in Pain – Trigeminal neuralgia

### • Balloon compression

#### - Technique

- Under G/A, although IV anesthesia combined with local anesthesia at the ganglion level (transcutaneous pacemaker to block brief bradycardia in 2/3 pts) in supine position
- 14G cannula puncture and balloon catheter - inflation (~1.5 min)



#### - Results (183 pts, Jeffrey)



- Initial pain relief in 93%
- Dysesthesia in 23%
- Longterm recur in 25%

## Technique of percutaneous nerve block

- Trigeminal nerve
- supra-orbital and supra-trochlear nerve
- maxillary nerve and Pterygo-palatine ganglion
- Infra-orbital nerve
- mandibular nerve and Otic ganglion
- Mental nerve
- Inferior alveolar nerve

## Botulinum toxin treatment

- **Seven serotype of Botulinum toxin**
  - Only type A (BOTOX®, Dysport® and XEOMIN®) and type B (Myobloc®) approved for clinical use
- **Dosage Limitations**
  - Type A (Botox): cumulative dosage not exceed 600 units/90 days
  - Type B (Myobloc); 10,000 units/12 weeks (84 days).

Botulinum toxin	Type A	Type B
		
Commercially available form	Botox, Dysport, Xeomin	Myobloc
Duration of action	Longer (x2)	Shorter
Action start	Delayed response	Slightly quicker
Injection related	Little discomfort	Quite painful

## Block with Botox for TN

- Botox (type A)
- Still an experimental trial in pts with TN
- Action mechanism in TN
  - not well understood.
  - Direct inhibition of secretion of acetylcholine in nerve endings, causing relaxation of muscles and finally relief of pain
  - It stops secretion of some nociceptive neuropeptides in addition to acetylcholine, which may help to prevent pain sensation
- Reduce the frequency and severity of facial pains.
  - Short-term control of trigeminal pain (2 to 3 months)
  - Effects continued up to 5 months
- A report (Zúñiga C. et al Arq Neuropsiquiatr. 2008)
  - Type A injections in 12 pts with intractable TN
  - 20~50 units of botox A in trigger zones.
  - Significant benefit in 10/12 pts (reduction or even disappearance of pain)
  - Remained pain free for as long as 60 days

## Alcohol Block

- Introduced as a **palliative** treatment method for TN
- Deep injection: effect maintained for **9 months (up to 2~3 yrs)**
  - **No** requirement of hospitalization
  - Neither morbidity nor mortality of the procedure
  - Local anesthetics trial before alcohol injection (3 cc of 95% alcohol)
  - Most successful in pts with only one division involvement
  - Possible to inject repeatedly in a few days
- Superficial injection
  - Local anesthetics trial (1 cc of 95% alcohol)
  - slighter relief than deep injection
- Severe pain attack during alcohol injection (good sign)
- **Repeat injection**
  - **Possible, but less effective** (difficult penetration into tissue)
  - No more than 3 times of injection?

Crich WA. Can Med Assoc J 1938

## Conclusions

- Although peripheral nerve block is not the best option for the patient with trigeminal neuralgia, percutaneous nerve block using absolute alcohol and Botulinum toxin can be useful in limited patients who are refractory to pharmacological treatment, the elderly, medically compromised patients, unwilling to undergo neurosurgical procedures and in whom surgery is delayed for any reason.