

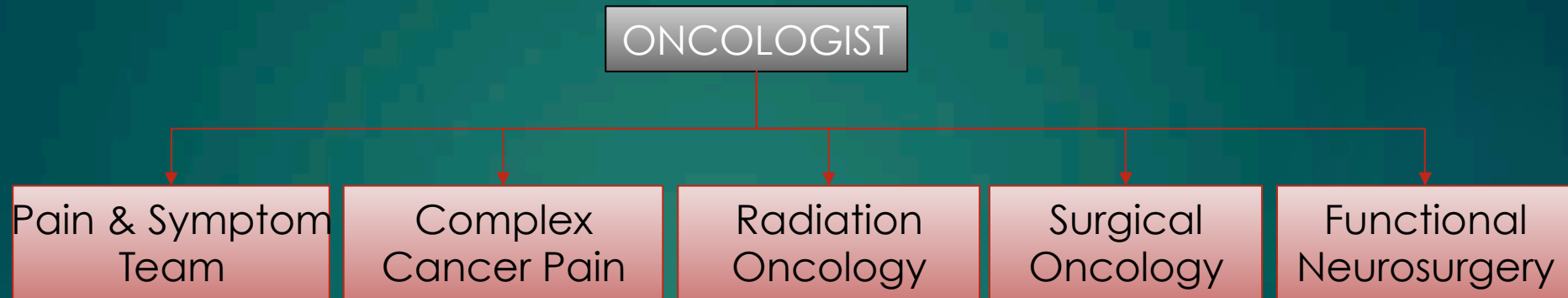
The Neurosurgeon's Role in Cancer Pain

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Disclosures

- ▶ None

comprehensive care



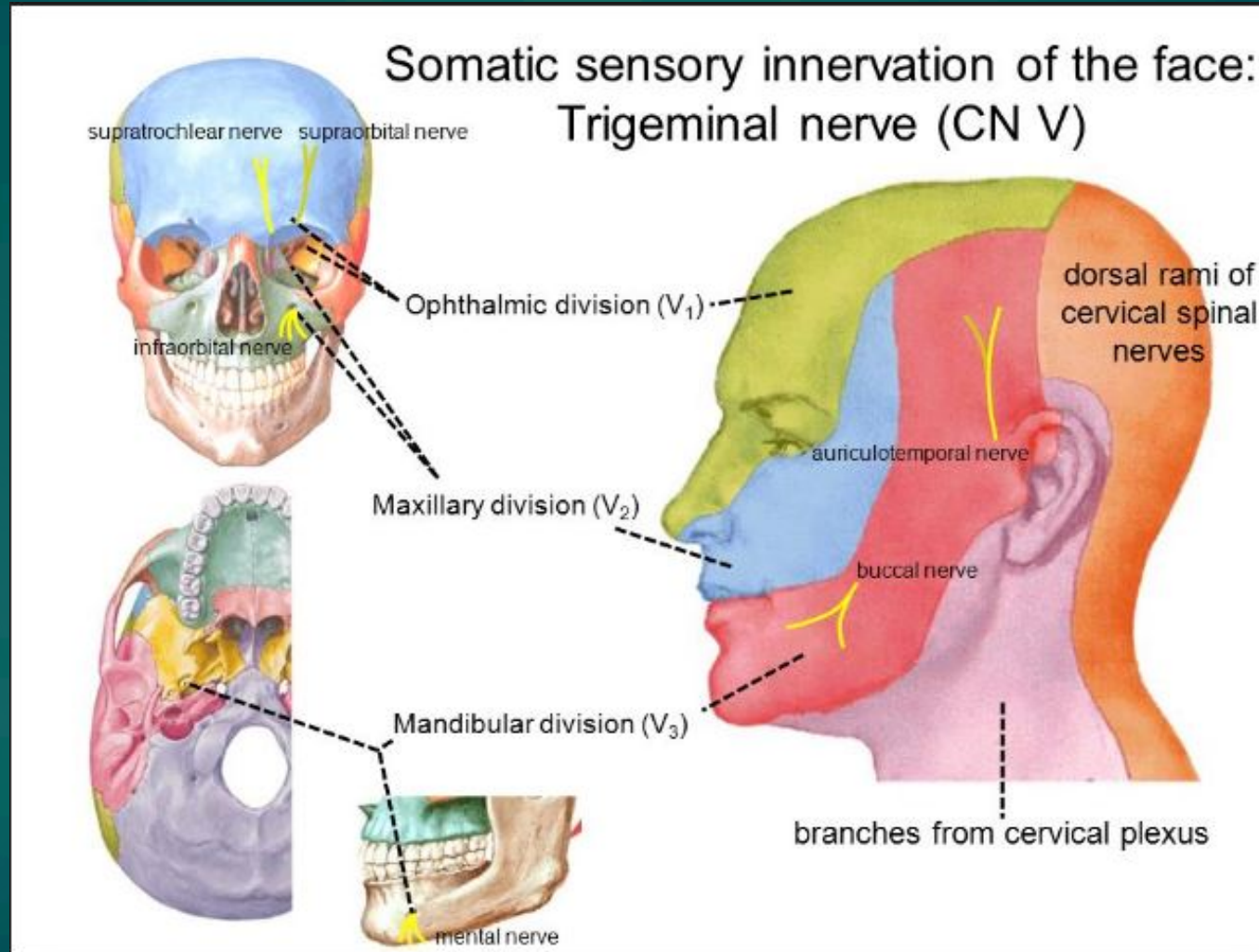
Defining Pain

- ▶ Afferent effectors
 - ▶ Somatic
 - ▶ visceral
- ▶ Location of pain
- ▶ Pain quality
 - ▶ Somatic typical pain
 - ▶ Neuropathic atypical pain

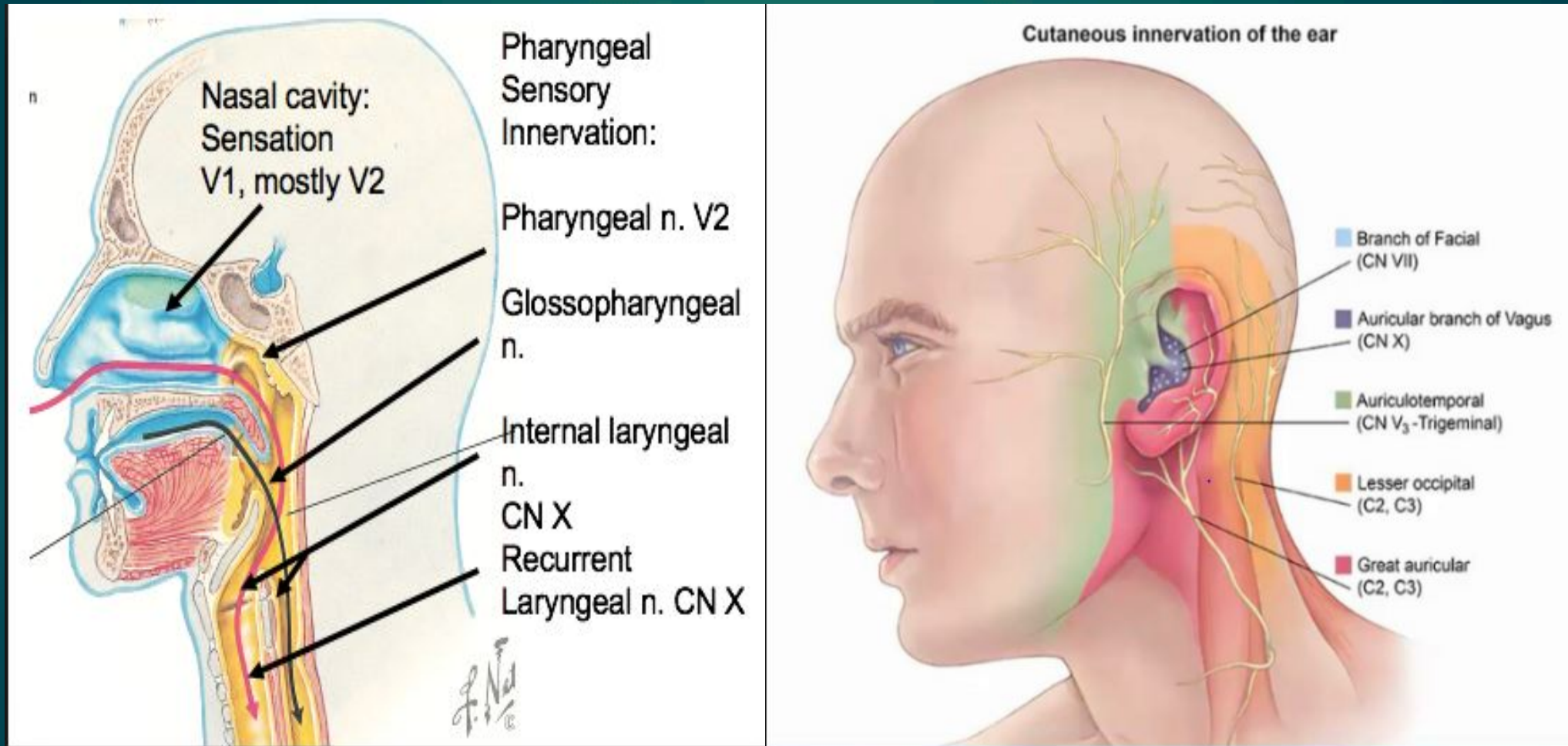
Physiologic Anatomy of Pain

- ▶ **Nociception**: Sensation mediated by neurons specialized to detect presence, location, quality, and intensity of tissue-damaging stimuli
- ▶ **Somatic pain**: Nociception mediated by somatic neurons to cognitive recognition through a 3 neuron chain (1st – 3rd order neurons)
- ▶ **Visceral pain**: Nociception mediated by visceral neurons to cognitive recognition through less specific paths (e.g. sympathetic / parasympathetic, propriospinal)

Location-Somatic



Location-Visceral



Surgical options:

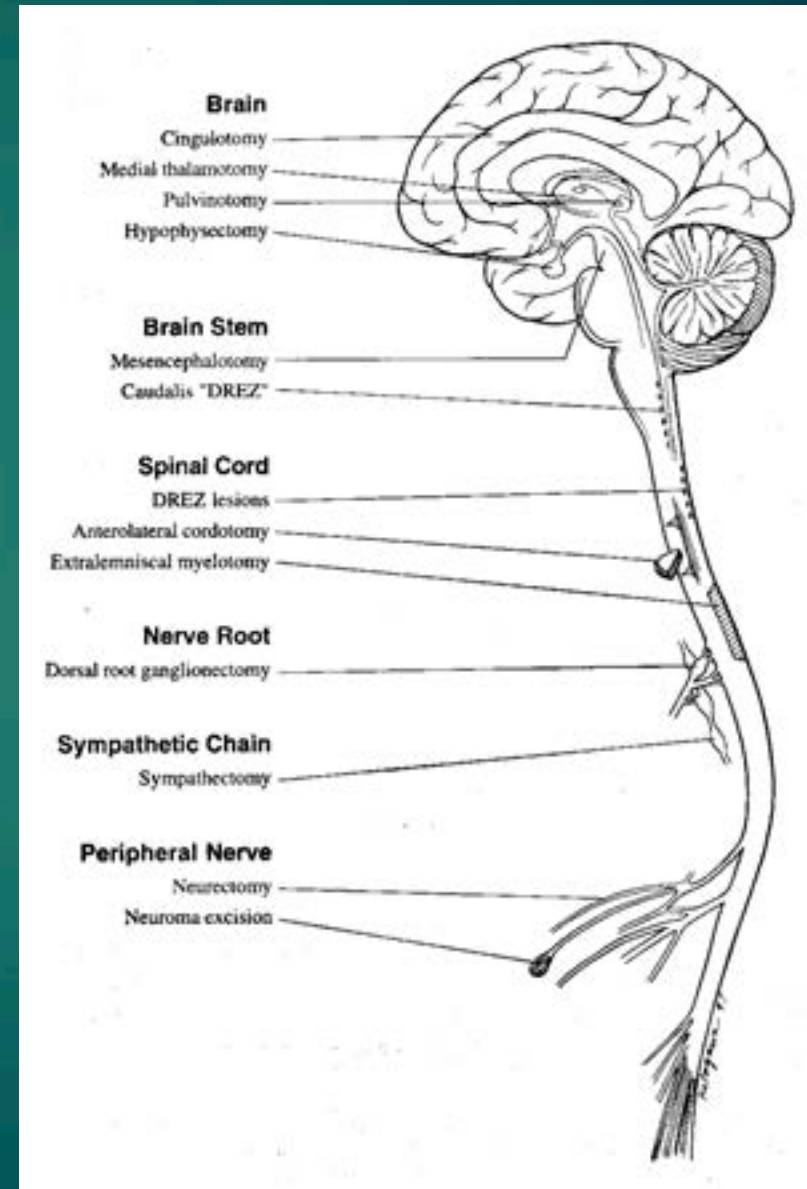
Lesion vs Modulation

Lesion	Modulation
Limited life expectancy	Long-term life expectancy
Easy access to pain generator or pathway mediating pain	Poor access or diffuse site for pain generator
Surgical risk typically more involved for 2 nd & 3 rd order pathways	Typically lower surgical risk

Surgical options:

Lesion methodology

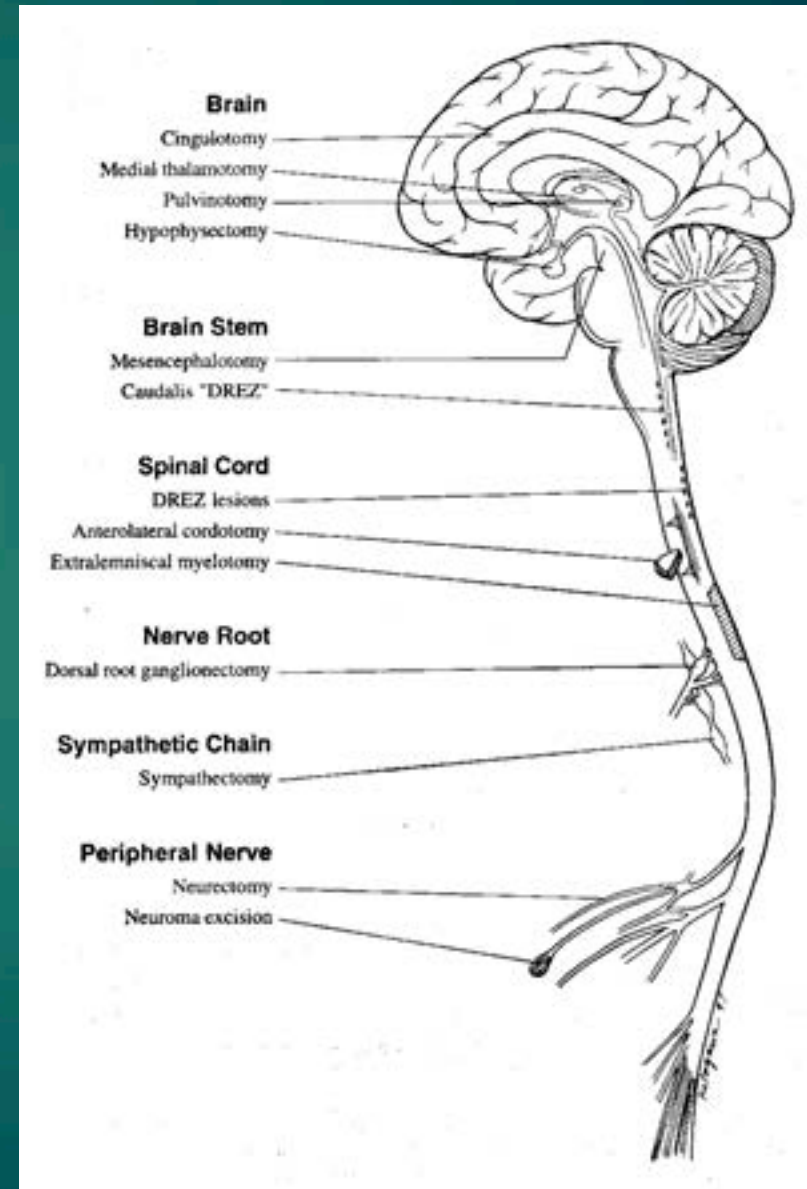
- ▶ Transection of pathway
- ▶ Destruction of neurons



Surgical options:

Lesion methodology

- ▶ Transection of pathway
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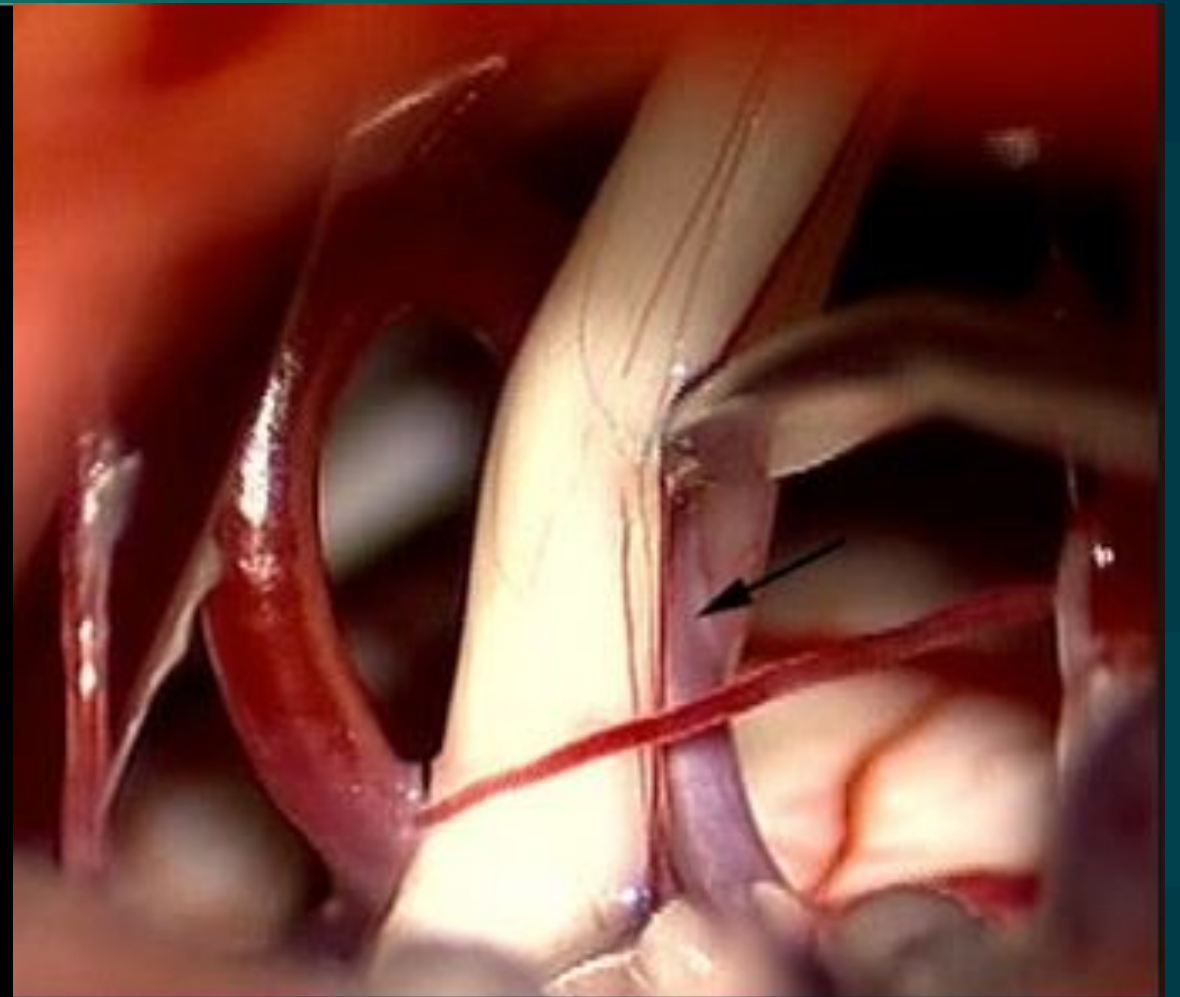
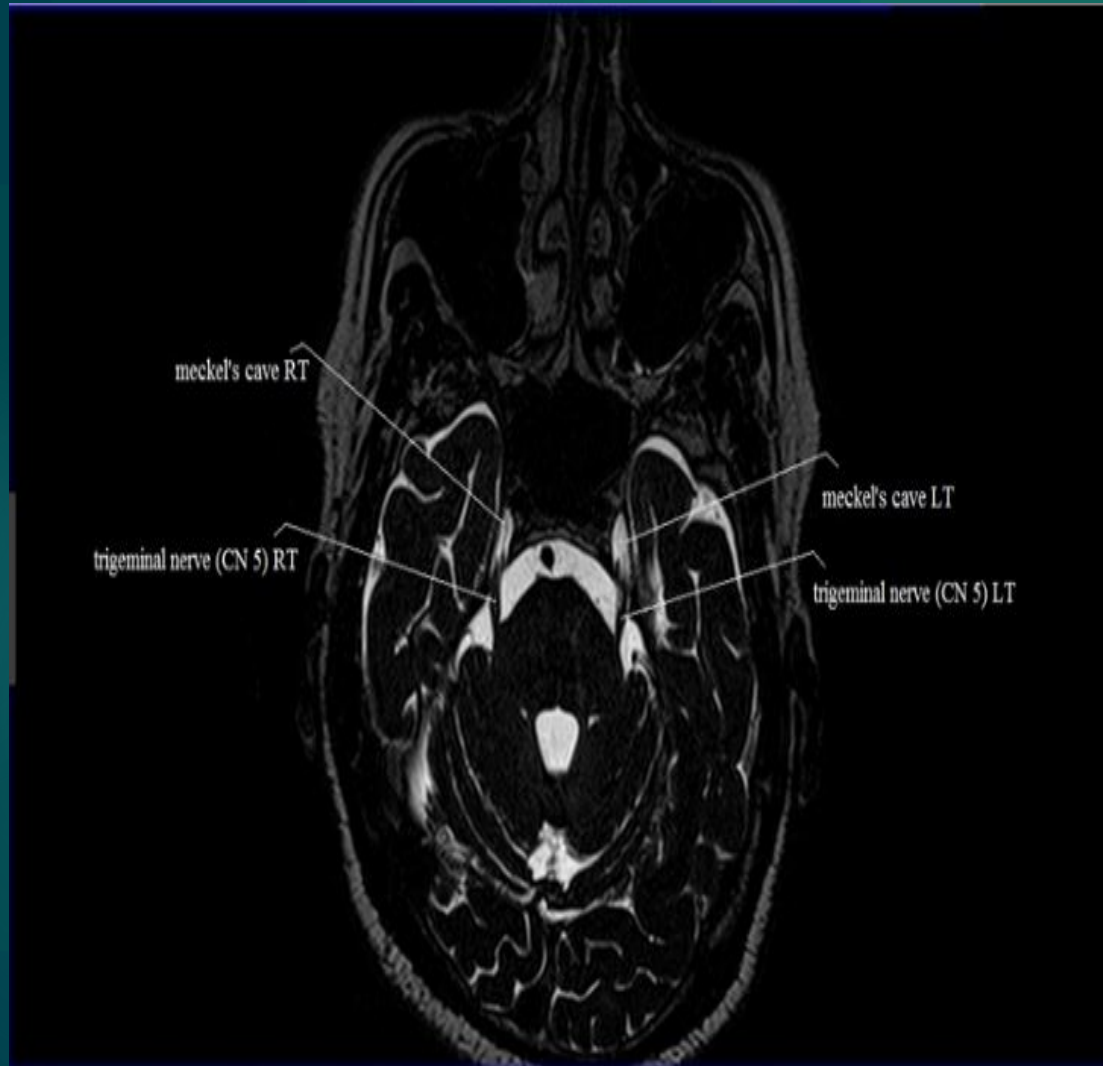
Lesioning

- Neurotomy
CN V or IX transection
posterior fossa
Meckel's Cave
- dorsal root entry zone
(DREZ) lesion
- Stereotactic
Mesencephalaotomy
- cingulotomy

Radiofrequency Ablation



Neurectomy



NC-DREZ

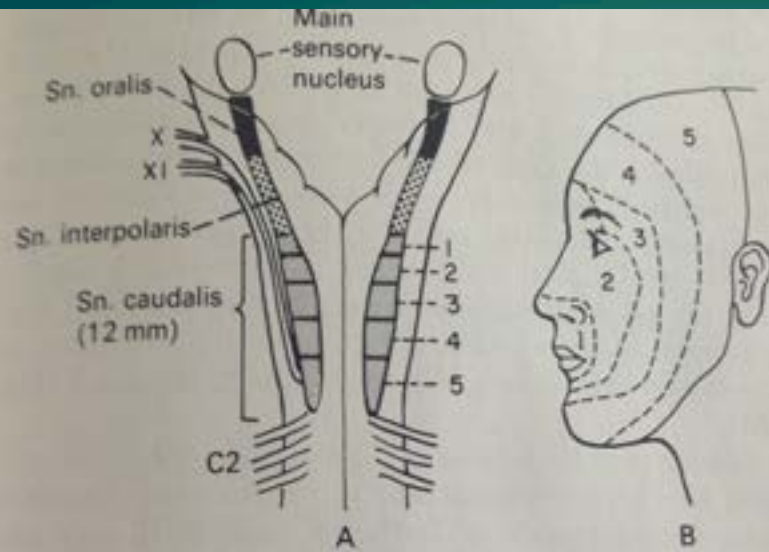
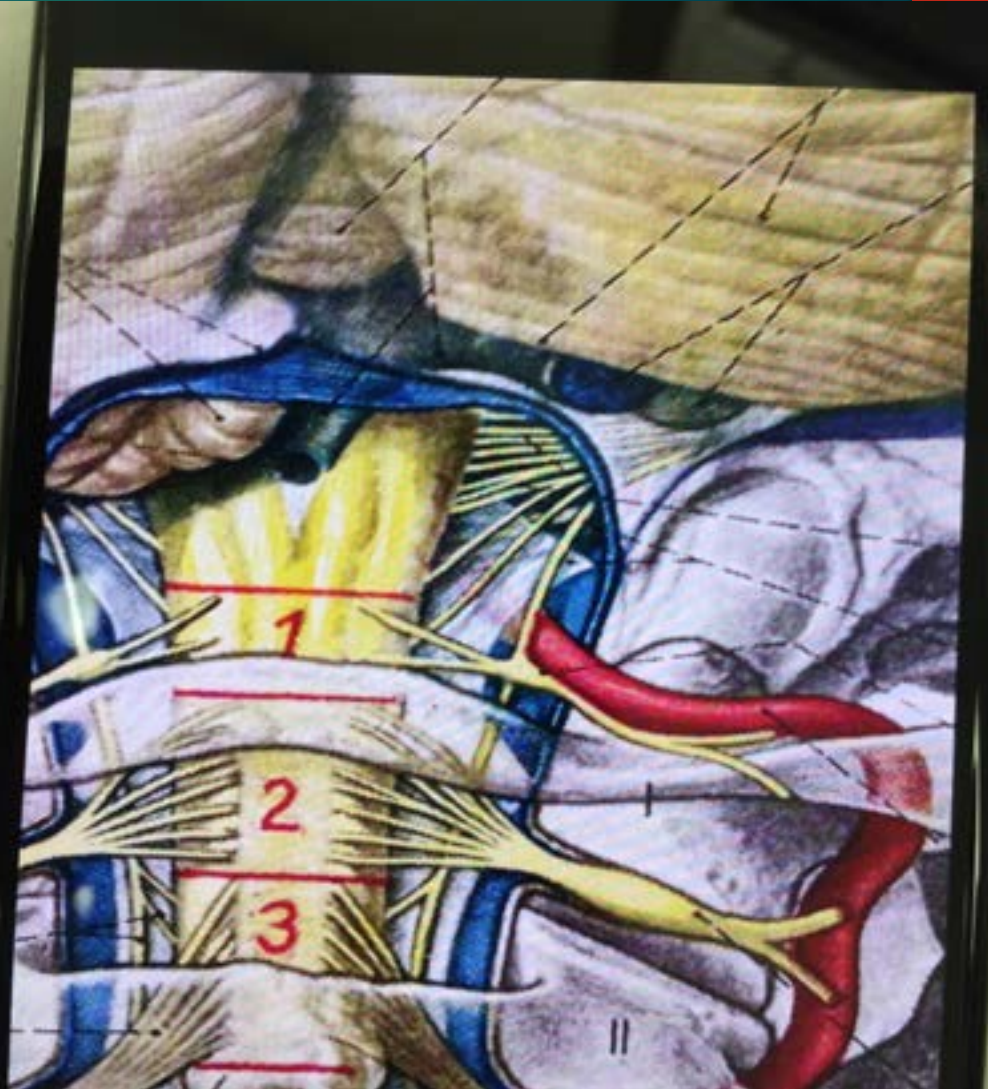
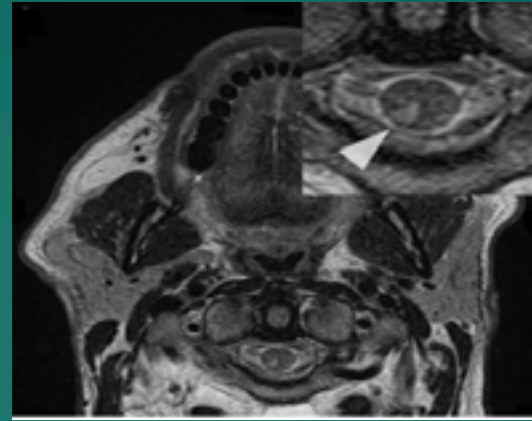
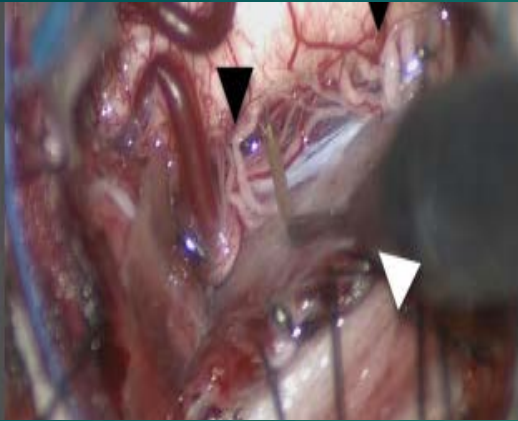


FIG. 3-47. **A.** The rostrocaudal somatotopic organization of the subnucleus caudalis. **B.** The relation of the subnucleus caudalis to input from primary afferents on the face. The fibers nearest to the lips and lower nose (area 1) terminate highest in the subnucleus caudalis; the innervation of successively more lateral regions of the face ends progressively in more caudal parts of the subnucleus caudalis. This rostrocaudal somatotopic organization applies to all three divisions of the trigeminal nerves and produces the "onion peel" pattern in the face. Modified from Kunc, Z.: Significance of fresh anatomic data on spinal trigeminal tract for possibility of selective tractotomies. *In Pain*. Edited by R.S. Knighton and P.R. Dumke. Boston, Little Brown, 1966, pp. 351-366.



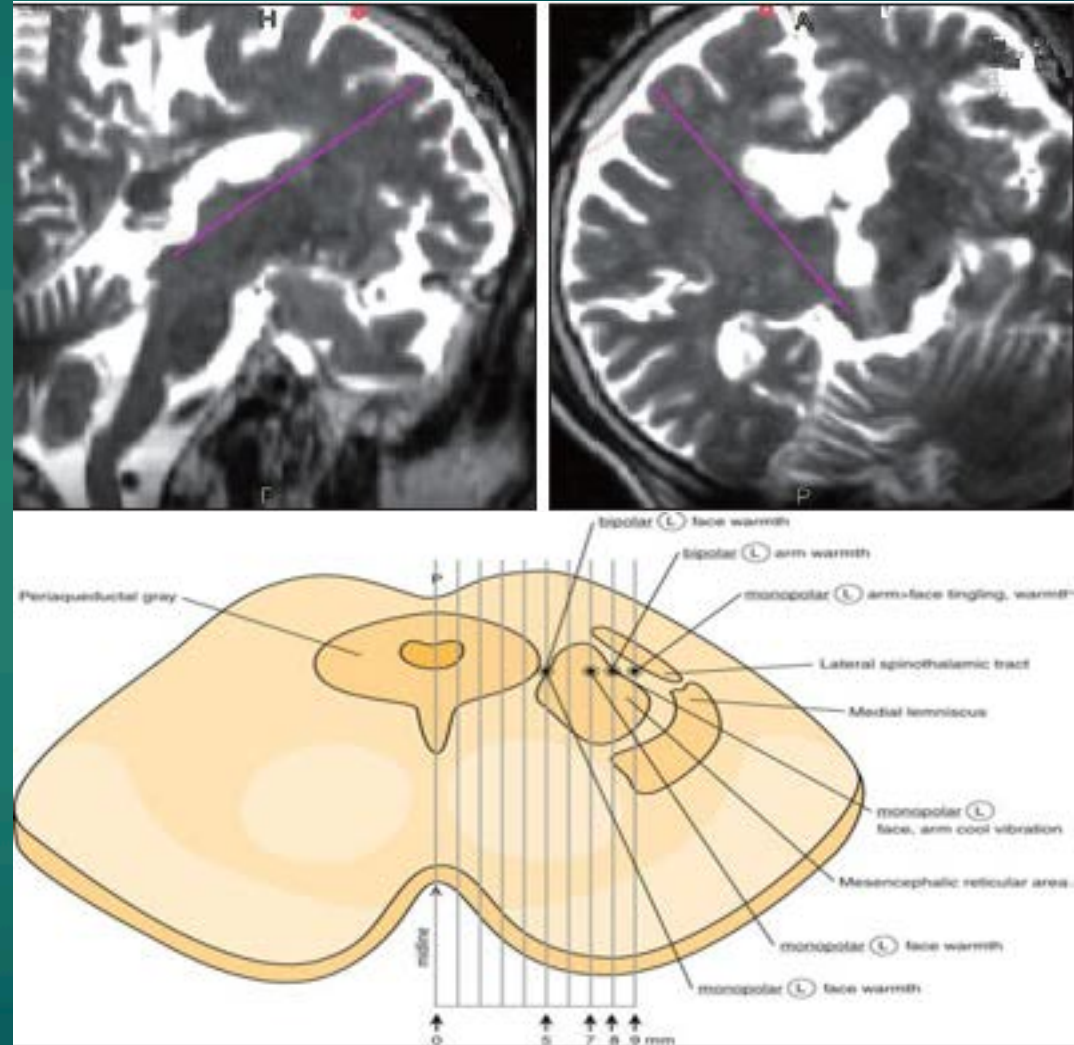
NC-DREZ



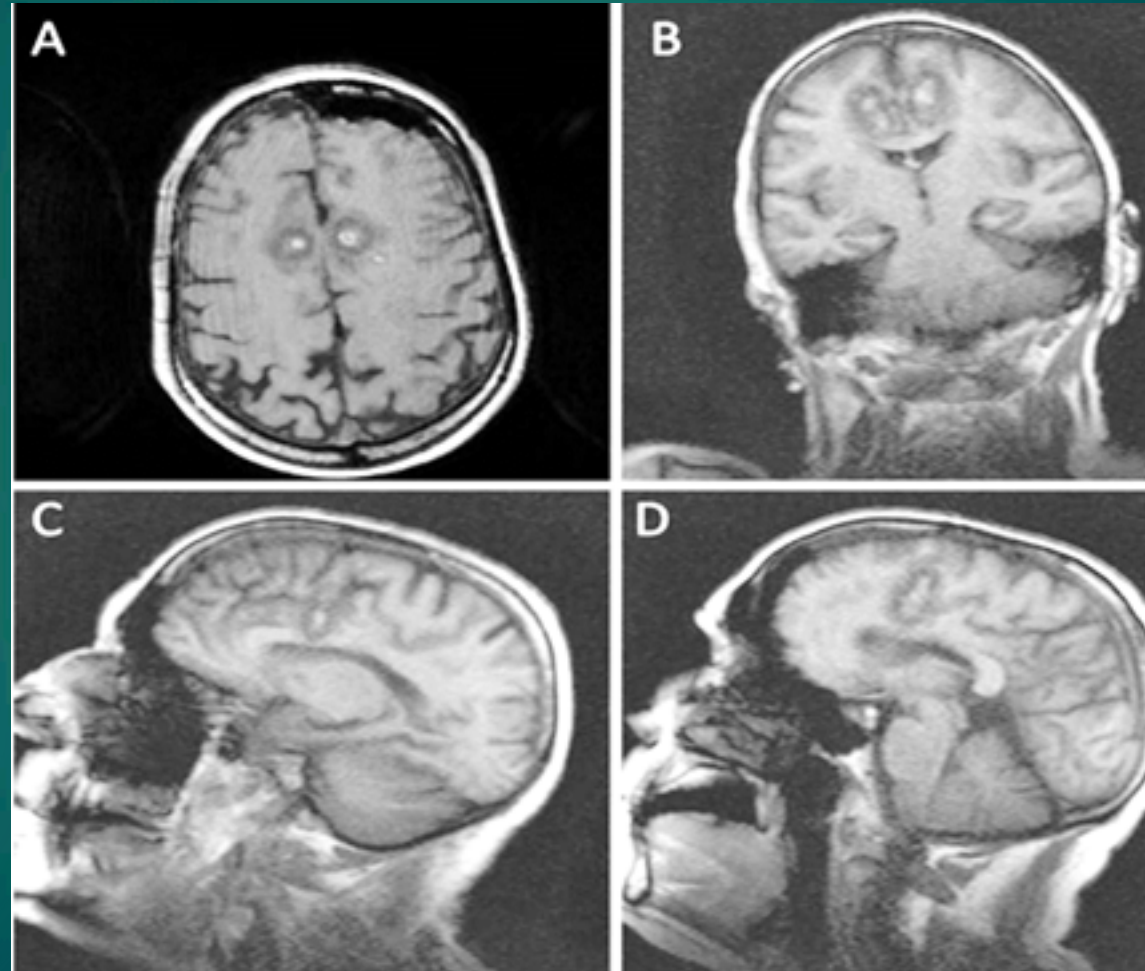
greater than 70% pain relief, transient complications, and very high patient satisfaction effective for postherpetic neuralgia, craniofacial pain conditions and has also been used for chronic cluster headache, vagal or glossopharyngeal neuralgias, and intractable pain syndromes secondary to cancer/craniofacial surgery/trauma

Mesencephalotomy

- ▶ Introduced in 1947
- ▶ Targets Lateral STT and trigeminothalamic tract in brainstem level of colliculosis
- ▶ Remarkable and durable reduction in pain

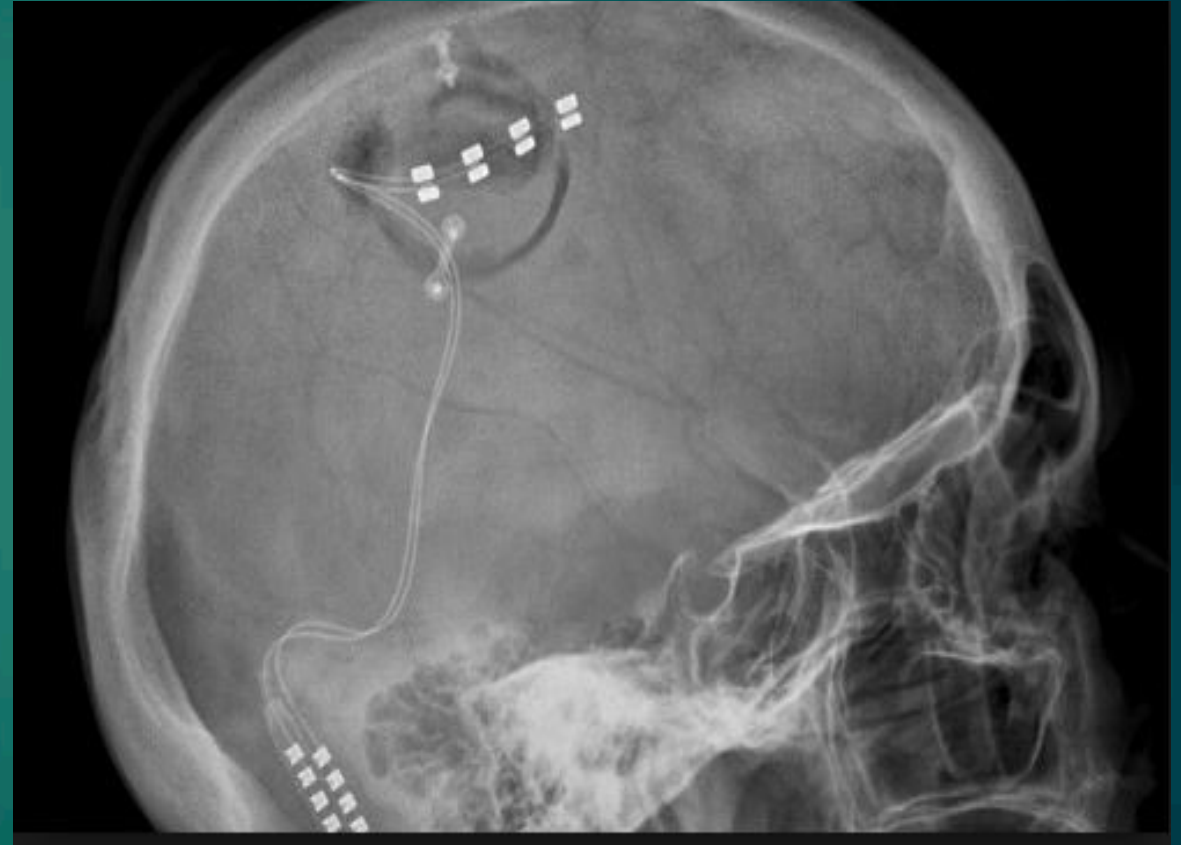


Cingulotomy



Non Lesioning

- ▶ Motor Cortex stimulation
 - ▶ Introduced in 1991
 - ▶ Epidural stimulation
 - ▶ Takes advantage of motor Homunculus
 - ▶ Thought to reorganize sensory transmission



Summary

- ▶ Several surgical approaches for difficult to manage cancer related pain
- ▶ Functional neurosurgery can be part of a multispecialty care team to optimize pain control