



My Jaw Hurts! What do I do?  
An Overview of Orofacial  
Pain and Temporomandibular  
Joint Disorders, Pain  
Mechanisms, and Diagnosis

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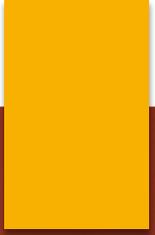
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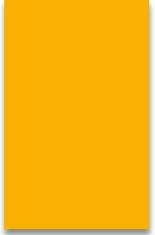
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DIPLOMATE, AMERICAN BOARD OF ORAL MEDICINE

DIPLOMATE, AMERICAN BOARD OF OROFACIAL PAIN



What types of conditions are orofacial pain disorders?



The American Academy of Oral Medicine  
INTEGRATING MEDICINE AND DENTISTRY



TEMPOROMANDIBULAR JOINT  
DISORDERS

MASTICATORY  
MUSCULOSKELETAL PAIN

CERVICAL MUSCULOSKELETAL  
PAIN

NEUROVASCULAR PAIN

NEUROPATHIC PAIN

SLEEP DISORDERS RELATED TO  
OROFACIAL PAIN

OROFACIAL DYSTONIAS

HEADACHES

INTRAORAL, INTRACRANIAL,  
EXTRACRANIAL, AND  
SYSTEMIC DISORDERS THAT  
CAUSE OROFACIAL PAIN



# Course objectives

- ▶ 1) How to recognize and screen patients with orofacial pain and dysfunction, including temporomandibular joint disorders.
- ▶ 2) The underlying pain mechanisms and dysfunction of the orofacial structures.
- ▶ 3) How to make common orofacial pain diagnoses.
- ▶ 4) The relationships between orofacial pain disorders, headaches, and cervical pain.

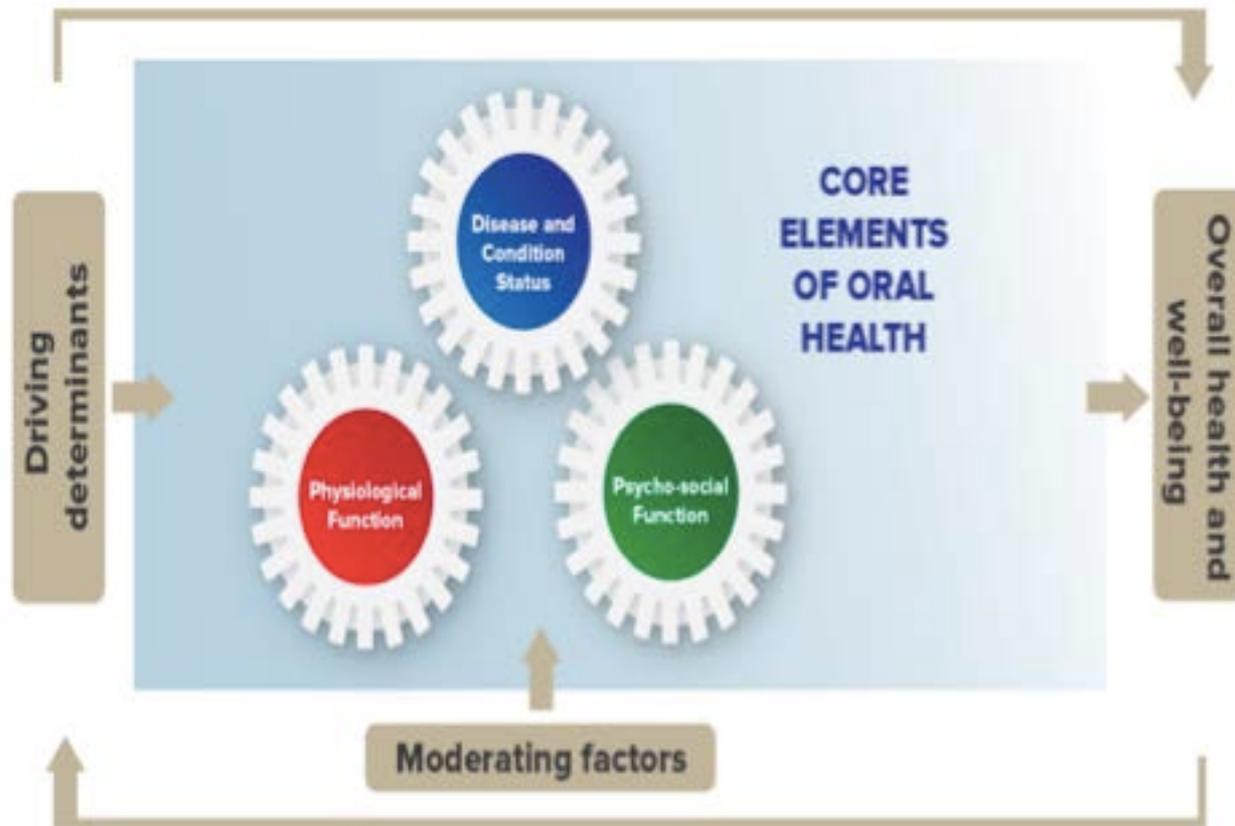
# Course Outline

- ▶ 1) Terminology and pain mechanisms
- ▶ 2) Internal derangements
- ▶ 3) Arthrogeogenous Disorders
- ▶ 4) Myogenous Disorders

# What is oral health?

*“Oral health is multi-faceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort and disease of the craniofacial complex.”*

# Framework for the definition of oral health



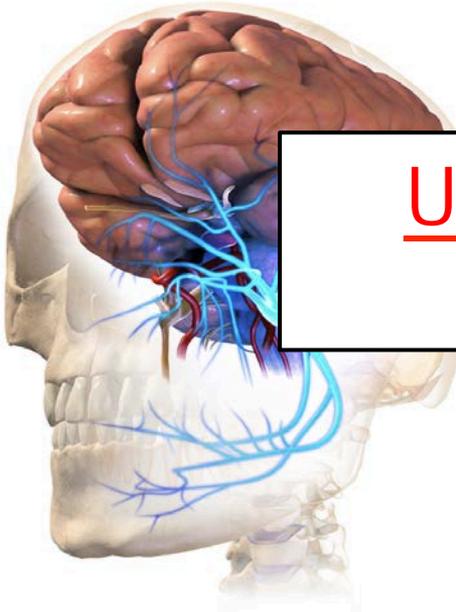
# Orofacial pain

Musculoskeletal

UNDERSTAND FIRST,  
TREAT SECOND

Neuropathic

Neurovascular



# Definitions...



True or False...

Temporomandibular Disorder (TMD) is an appropriate diagnosis.

What are the common symptoms associated with "TMD"?

Common complaints: jaw pain, ear ache, headache, facial pain, bruxism

# 1) 57 yo female: "My ears hurt and feel full"

- ▶ 1) Ear pain and fullness
- ▶ 2) Ear ringing
- ▶ 3) Headaches
- ▶ 4) Jaw pain
- ▶ 5) Ear fullness
- ▶ 6) Facial pain
  
- ▶ Prior consultations:
  - ▶ ENT, Dentist, Endodontist, PCP



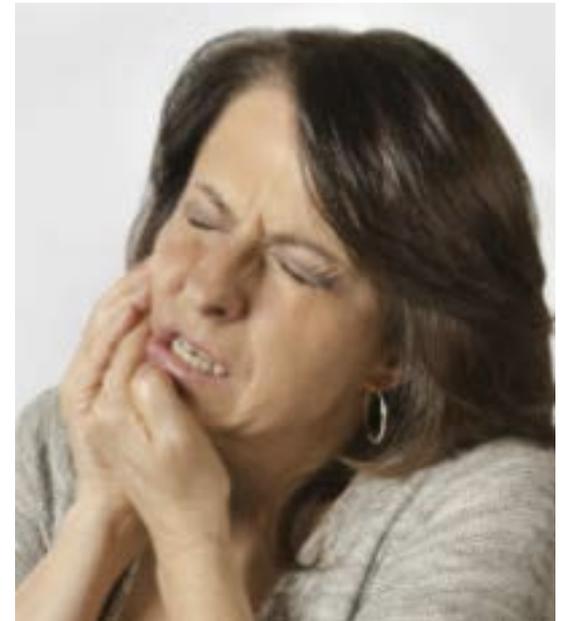
## 2) 80 yo female with a persistent toothache

- ▶ 1) #31 aching pain since the last 6 months
    - ▶ Sharp when biting down
  - ▶ 2) Headache
  - ▶ 3) Neck pain
  - ▶ 4) Ear fullness and ringing
  - ▶ 5) Facial pain
  - ▶ 6) Tingling of the tip of the tongue
- 
- ▶ Prior consultations: Dentist, Endodontist, Periodontist, PCP

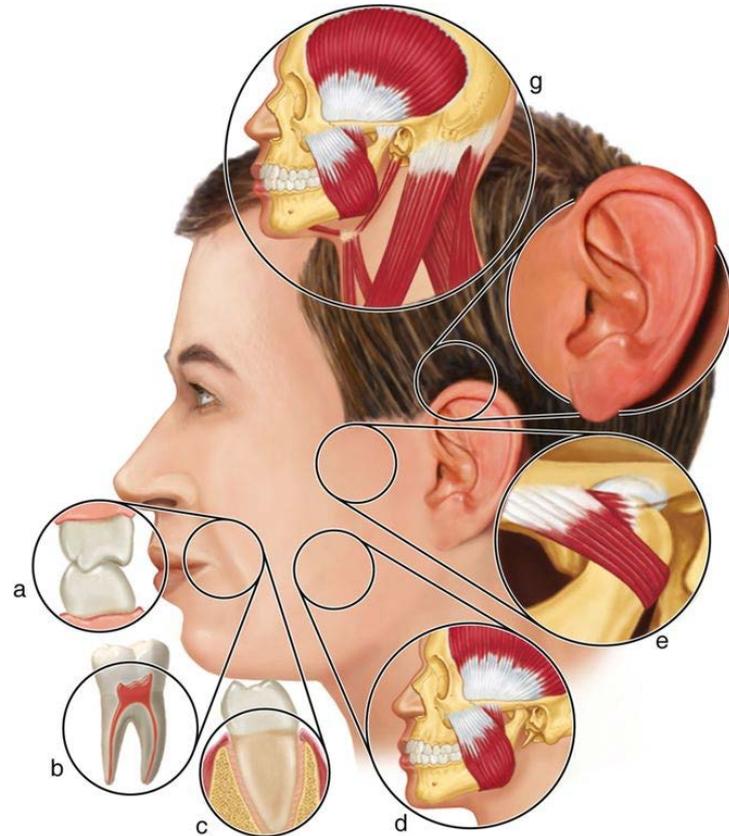


### 3) 65 yo female with severe pain on the upper right and lower right teeth

- ▶ Pain began 6 months prior to initial visit
- ▶ Poorly localized pain on the right side
- ▶ Feels sharp and achy
- ▶ Has severe pain on the TMJs and masticatory muscles

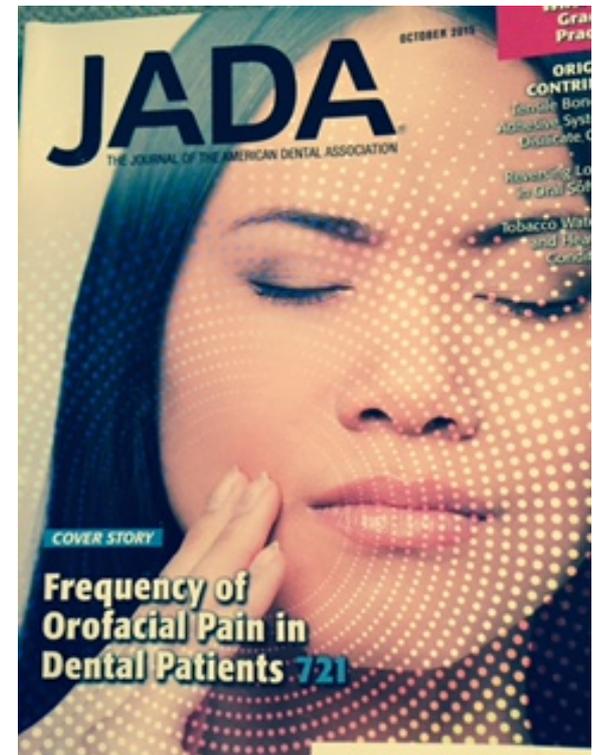


# General symptoms of "TMD"



# So what does this all mean?

- ▶ 1 in 6 patients visiting a general dentist experienced orofacial pain
- ▶ Dentoalveolar and musculoligamentous were the most prevalent types of pain



# Costen syndrome

- ▶ Suggested changes in the dental condition caused ear symptoms
- ▶ His theories have now been disproved
- ▶ Initiated the dental community's interest in understanding the orofacial system



# Terminology and classification

1934: Costen Syndrome

1959: Temporomandibular dysfunction syndrome (Shore)

1969: Myofascial pain dysfunction syndrome (Laskin)

1971: Functional temporomandibular joint disturbances (Ramfjord and Ash)

1982: Temporomandibular disorders (Bell)

1988: IHS-11<sup>th</sup> category: headache of facial pain attributed to disorder of cranium, neck, eyes, ears, nose, sinuses, teeth, mouth, or other facial or cranial structures

1992: Research diagnostic criteria for TMD (Dworkin & LeResche)

1996: AAOP provided diagnostic criteria and subcategories

# Temporomandibular Disorders

According to the RDC/TMD, temporomandibular disorders are classified into 3 categories: muscle disorders, disc displacements, and arthralgia/arthritis/arthrosis

Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. *J Craniomand Disord*, 1992; 6:301-355.

# 2014: Diagnostic Criteria for TMD

- ▶ 12 common diagnoses identified:
- ▶ Arthralgia
- ▶ Myalgia, local myalgia, myofascial pain, myofascial pain with referral
- ▶ 4 disc displacement disorders
- ▶ Degenerative joint disease
- ▶ Subluxation
- ▶ Headache attributed to TMD

Schiffman E et al. Diagnostic criteria for Temporomandibular disorders (DC/TMD) for clinical and research applications: recommendations of the International RDC/TMD Consortium Network\* and Orofacial Pain Special Interest Group. J Oral Facial Pain Headache. 2014; 28(1): 6-27.

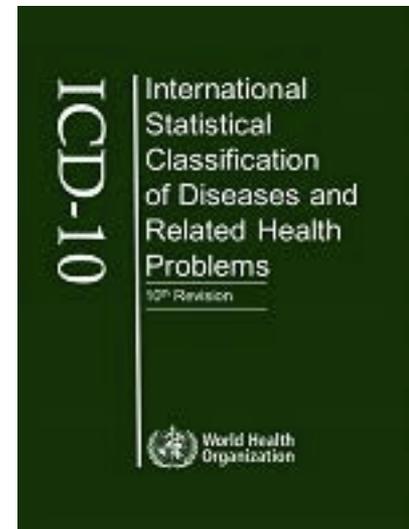
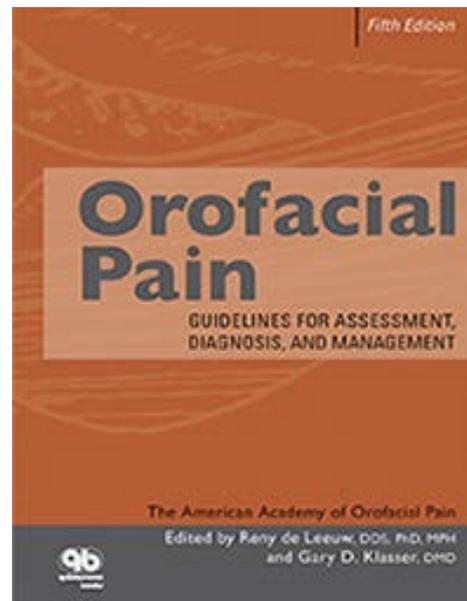


## International RDC-TMD Consortium

A Designated Network of the International Association for Dental Research

# Classification

- ▶ ICD-10: medical classification list developed by the WHO
  - ▶ Diagnostic classification standard
  - ▶ <http://www.icd10data.com/>
- ▶ SNOMED-CT: Systematized Nomenclature of Medicine - Clinical Terms.





ADA American Dental Association®

America's leading advocate for oral health

- ▶ “Initially the dentist should select the least invasive and most reversible therapy that may ameliorate the patient's pain and/or functional impairment.”
- ▶ “Before restorative and/or occlusal therapy is performed, the dentist should attempt to reduce, through the use of reversible modalities, the neuromuscular, myofascial and temporomandibular joint symptoms.”

# TMD-PAIN Screener

1. In the last 30 days, how long did any pain last in your jaw or temple area on either side?

- a. No pain
- b. Pain comes and goes
- c. Pain is always present

2. In the last 30 days, have you had pain or stiffness in your jaw on awakening?

- a. No
- b. Yes

# TMD PAIN Screener

3. In the last 30 days, did the following activities change any pain (that is, make it better or make it worse) in your jaw or temple area on either side?

A. Chewing hard or tough food: a. No, b. Yes

B. Opening your mouth or moving your jaw forward or to the side: a. No, b. Yes

C. Jaw habits such as holding teeth together, clenching, grinding, or chewing gum: a. No, b. Yes

D. Other jaw activities such as talking, kissing or yawning: a. No, b. Yes

# Screening Form

## ▶ Part A:

- ▶ Current jaw muscle or joint pain, painful jaw popping, locking?
- ▶ Current persistent tooth pain after having multiple dental treatments?
- ▶ Current burning tongue/mouth syndrome, trigeminal neuralgia, trigeminal neuropathy?

## ▶ Part B:

- ▶ Recent (within two years) history of pain in the jaw muscles and/or TMJs
- ▶ Any history of treatment for TMD (TMJ)
- ▶ Clenching/grinding of the teeth
- ▶ TMJ crepitation (grating noise) or popping
- ▶ Frequent unexplained headaches, migraines, and/or neck pain
- ▶ Ear pain, ear ringing, stuffiness in the ear

# Screening Form

- ▶ Part C:
  - ▶ Palpate the masseter and anterior temporalis muscles.
  - ▶ Palpate the lateral and dorsal condyles of the TMJs.

# Screening Form

- ▶ Part D
- ▶ Range of Motion in mm (inter-incisal)
- ▶ 1) Comfortable opening \_\_\_\_mm
- ▶ 2) Maximum passive stretch (Doctor stretches the patient) \_\_mm

Document the presence or absence of pain as well as the location

# Screening Form

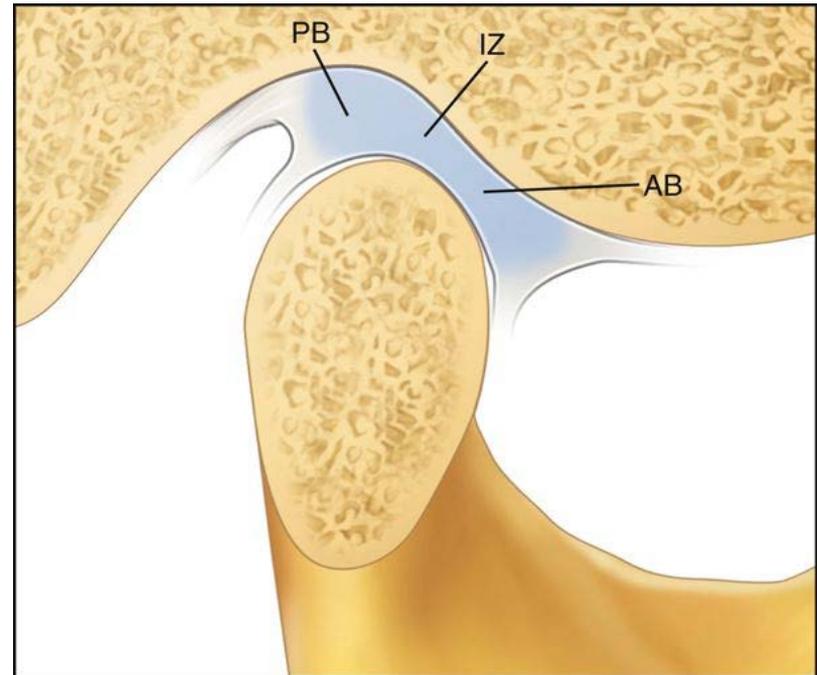
- ▶ Always consider addressing the orofacial pain complaint if you:
  - ▶ Checked any box in part A
  - ▶ Found any palpation pain in part C of level 2 or 3
  - ▶ Checked any box in part B AND had any palpation pain in part C of level 1, 2 or 3
- ▶ Find any of the following in Part D
  - ▶ Less than 30 mm comfort opening
  - ▶ Less than 35mm passive stretch
  - ▶ Jaw pain with over 35 mm of any opening

Anatomy



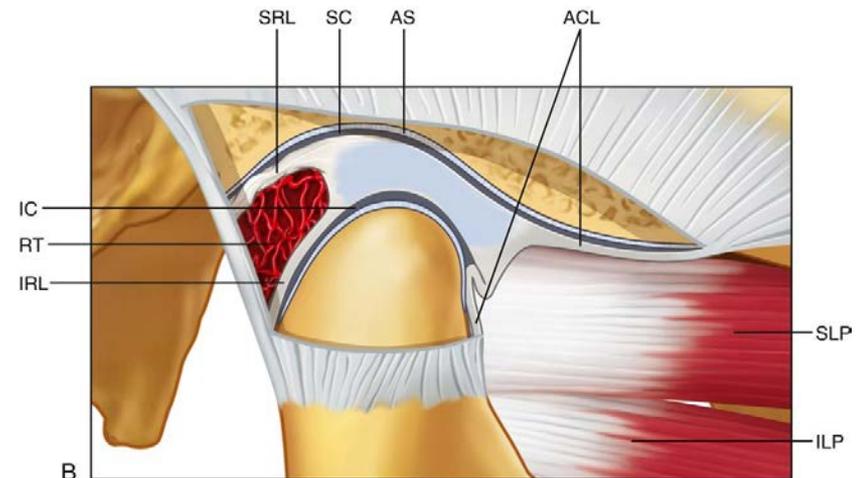
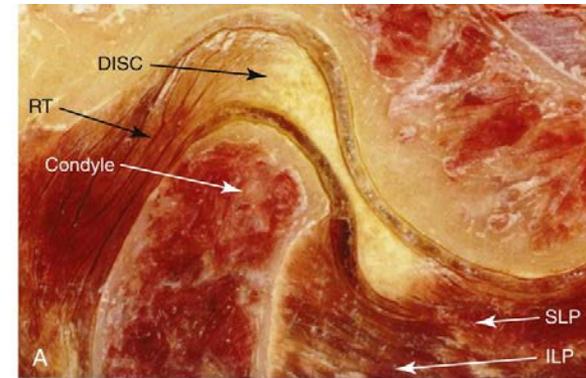
# Temporomandibular joint

- ▶ Formed by the mandibular condyle and the mandibular fossa of the temporal bone
- ▶ Ginglymoarthrodial joint
- ▶ Articular disc
  - ▶ Dense fibrous connective tissue



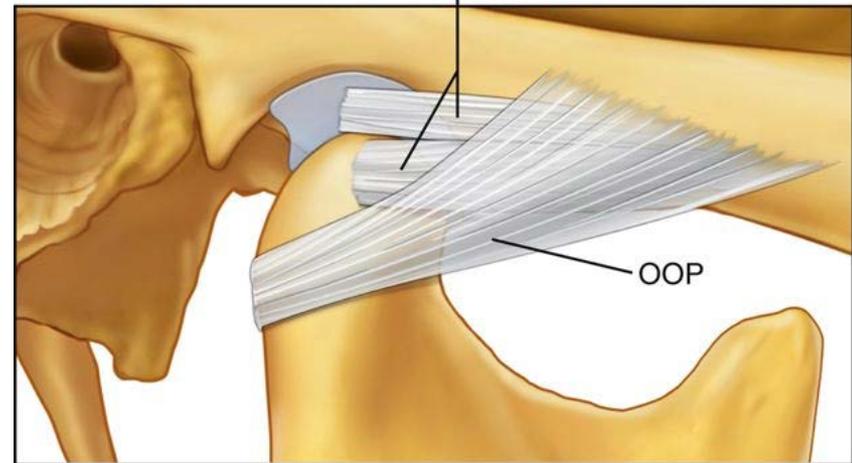
# Temporomandibular Joint

- ▶ Retrodiscal tissue
- ▶ Superior and inferior cavities
- ▶ Synovial fluid
  - ▶ Metabolic requirements to tissue
  - ▶ Lubricates the joint



# Ligaments

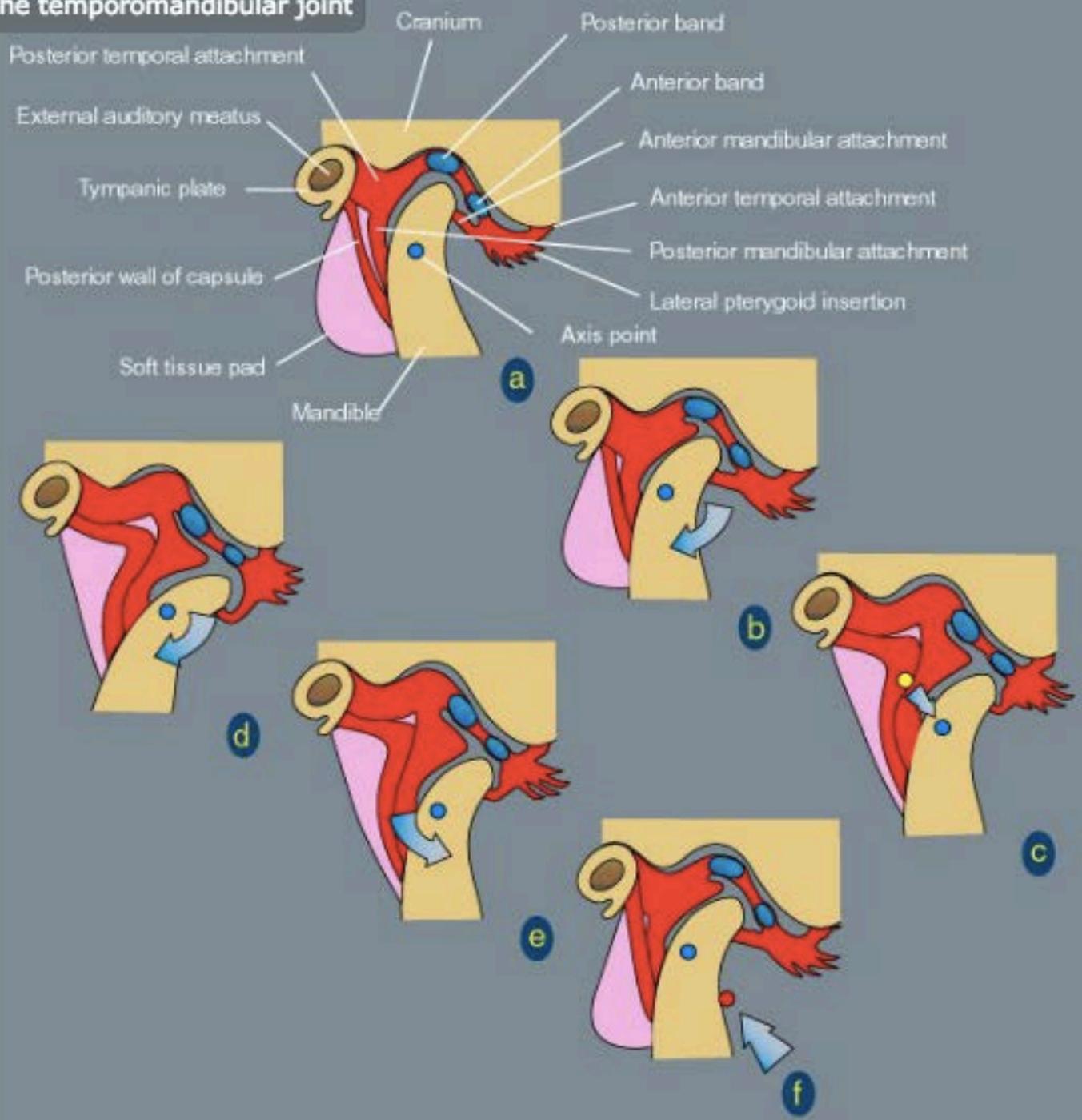
- ▶ 1. Collateral ligaments
- ▶ 2. Capsular ligaments
- ▶ 3. Temporomandibular ligament
- ▶ 4. Sphenomandibular ligament (accessory)
- ▶ 5. Stylomandibular ligament (accessory)



# Innervation and vascularization

- ▶ Trigeminal nerve, V3
  - ▶ Auriculotemporal nerve
  - ▶ Deep temporal nerve
  - ▶ Masseteric nerve
- ▶ Superficial temporal artery (posterior aspect)
- ▶ Middle meningeal artery (anterior aspect)
- ▶ Internal maxillary artery (inferior aspect)
- ▶ Inferior alveolar artery (condyle)

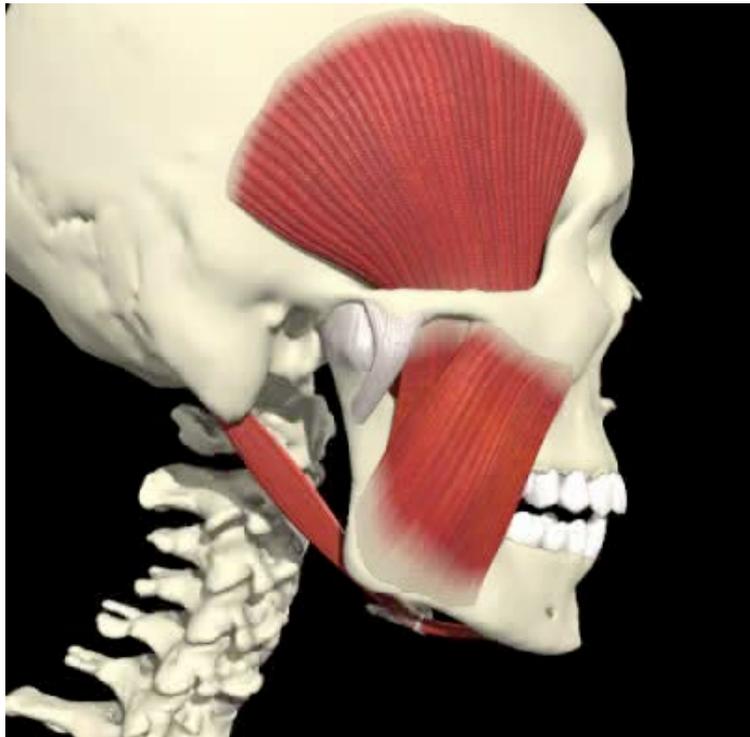
# The temporomandibular joint



# Muscles of Mastication

- ▶ Masseter
- ▶ Temporalis
- ▶ Medial Pterygoid
- ▶ Lateral Pterygoid
- ▶ Digastic

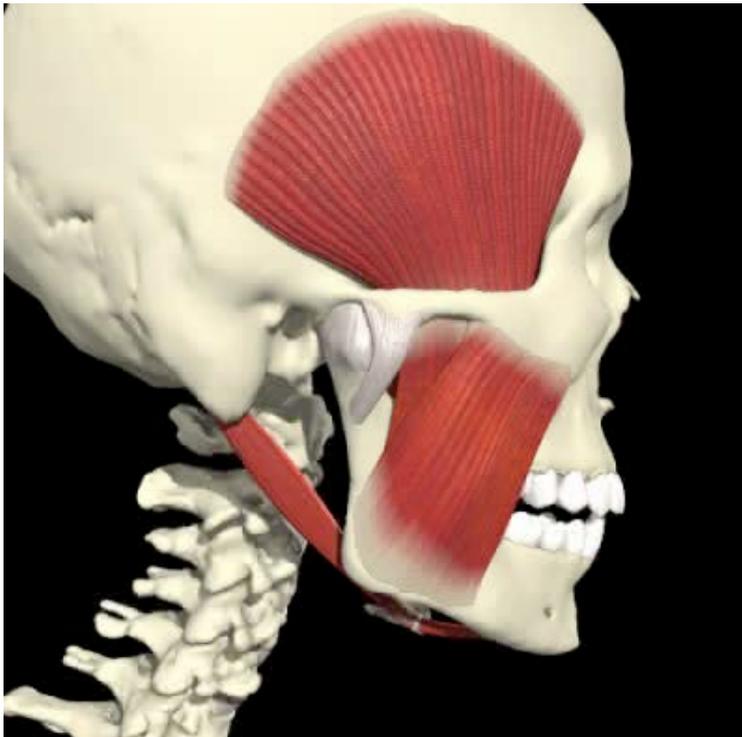
# Masseter



Masseter: superficial and deep portions

- Elevation of mandible
- Superficial portion aids in protrusion

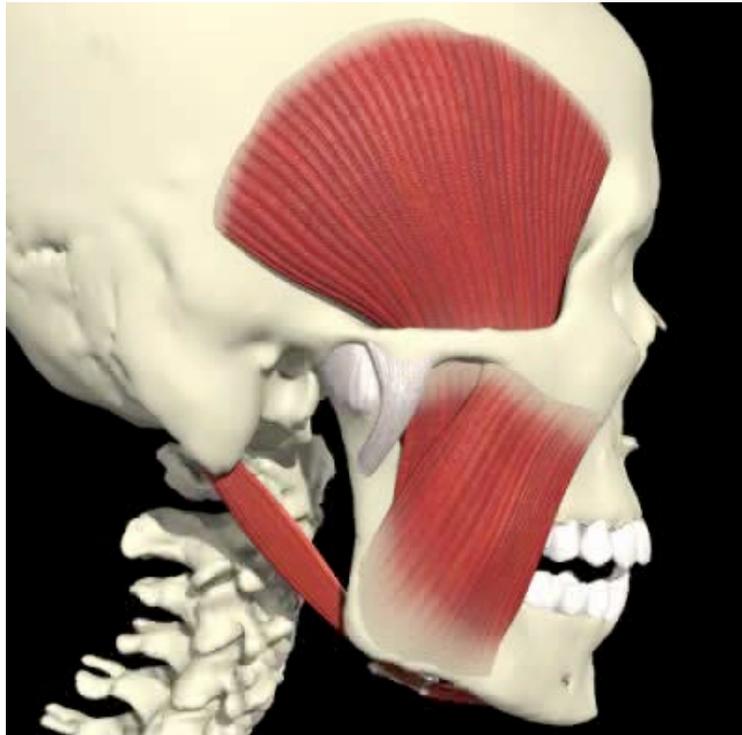
# Temporalis



Temporalis: anterior, middle, and posterior

- Anterior: elevation of mandible
- Middle: elevation and retrusion of mandible
- Posterior: elevation and slight retrusion of mandible

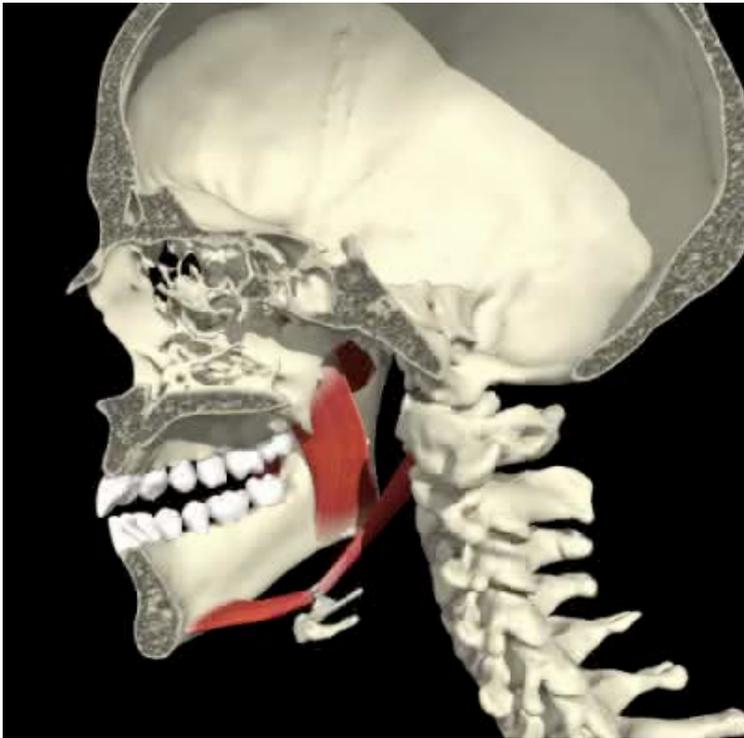
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# Medial Pterygoid



## Medial pterygoid

- Elevation and protrusion
- Mediotrusive movement with unilateral contraction

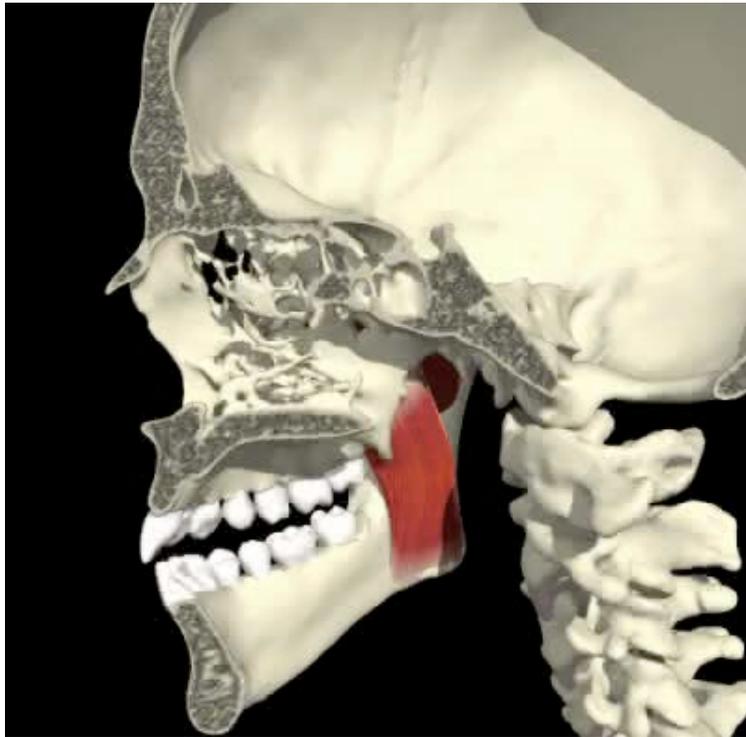
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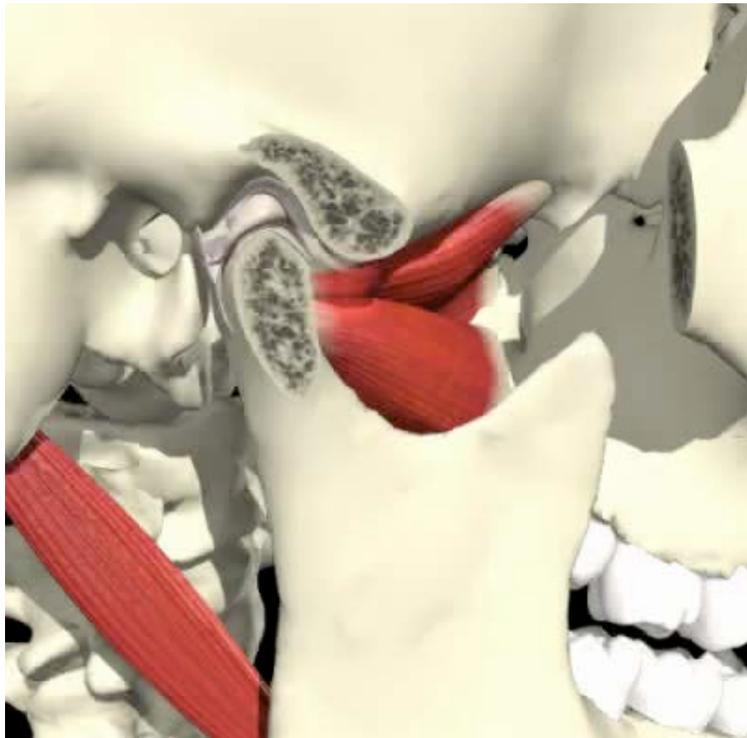
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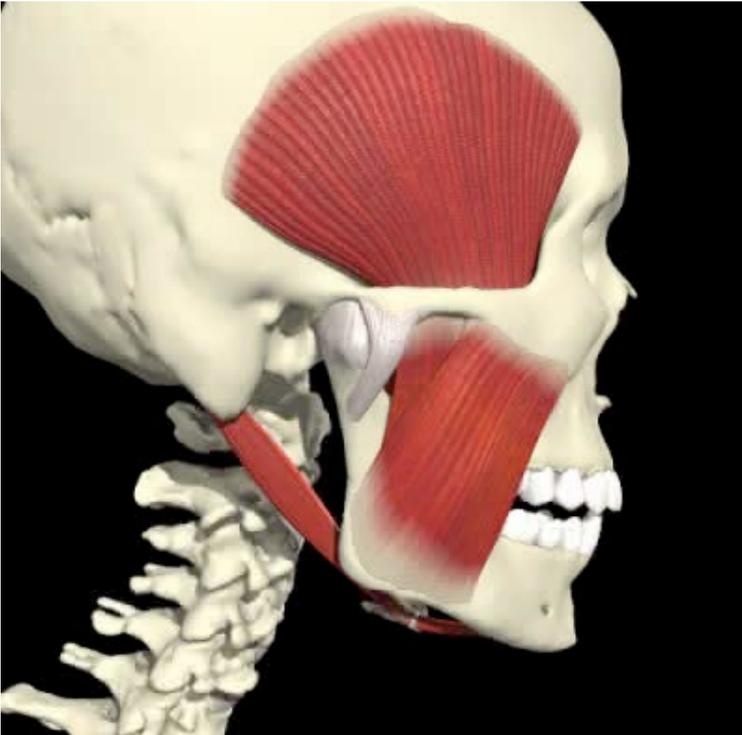
# Lateral Pterygoid



Lateral pterygoid: inferior and superior bellies

- Inferior lateral pterygoid: opening and protrusion (simultaneous contraction); mediotrusive movement (unilateral contraction)
- Superior lateral pterygoid: elevation of mandible; stabilizes the condyle and disc during mandibular loading (unilateral chewing)

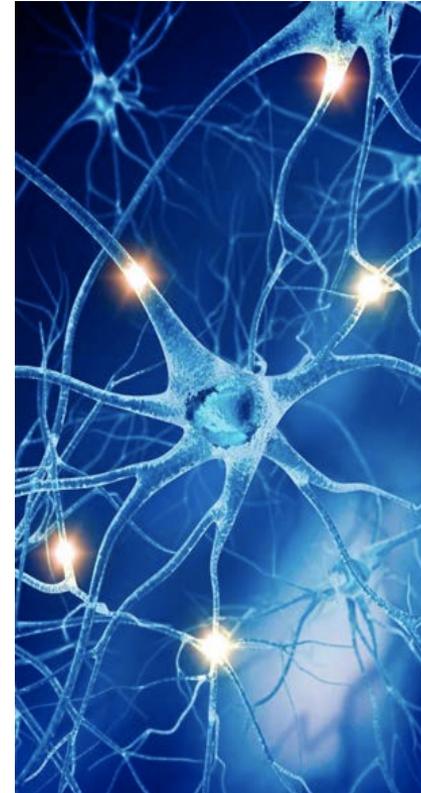
# Digastric: Anterior and Posterior



Digastric: anterior and posterior bellies

- Depression of mandible
- Elevation of hyoid bone

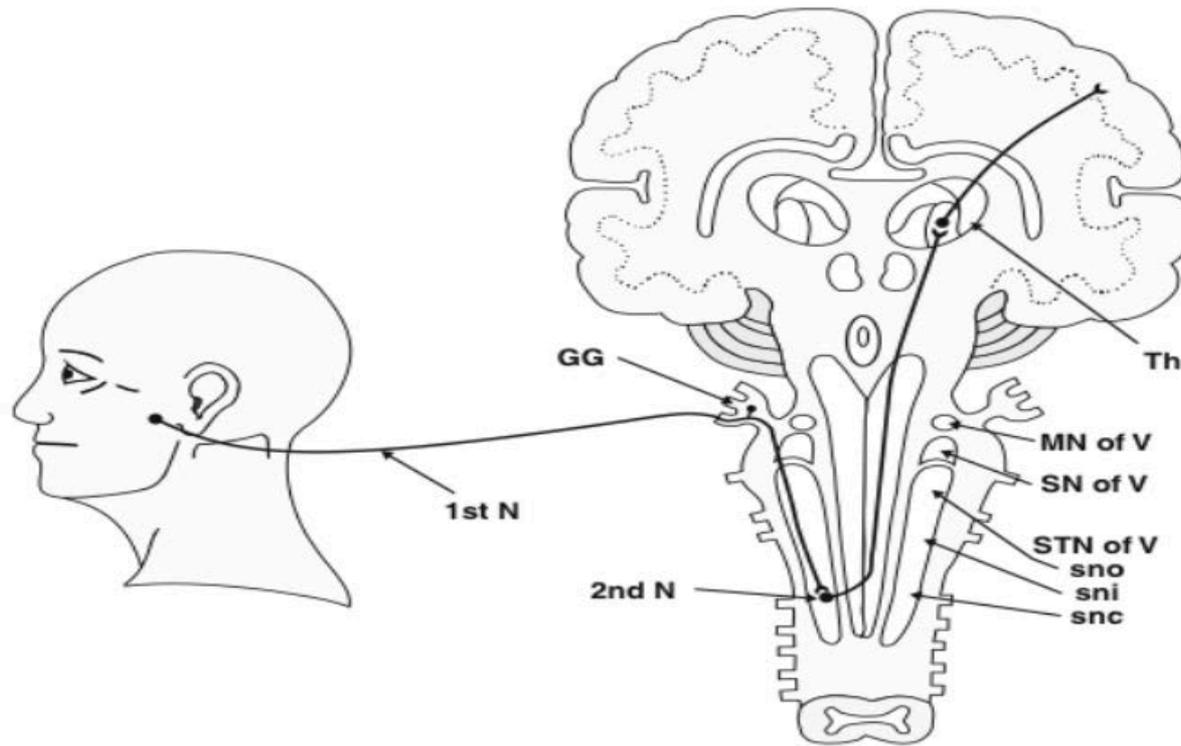
# Pain mechanisms



# Terminology

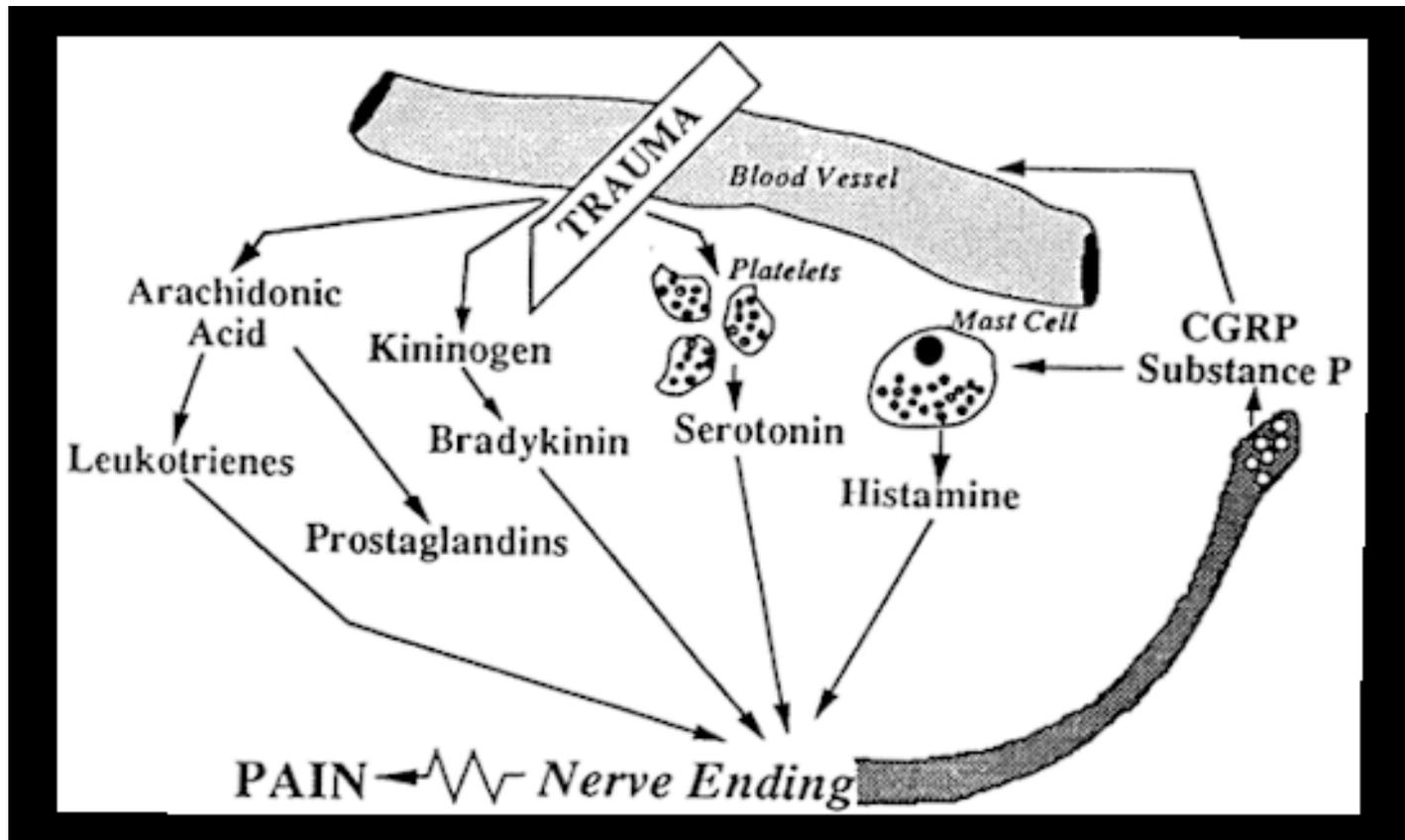
- ▶ Afferent nerve fibers:
  - ▶ I: A-alpha
  - ▶ II: A-beta
  - ▶ III: A-delta
  - ▶ IV: C fibers
- ▶ Nociception
- ▶ Pain
- ▶ Suffering
- ▶ Pain behavior

# Nociception

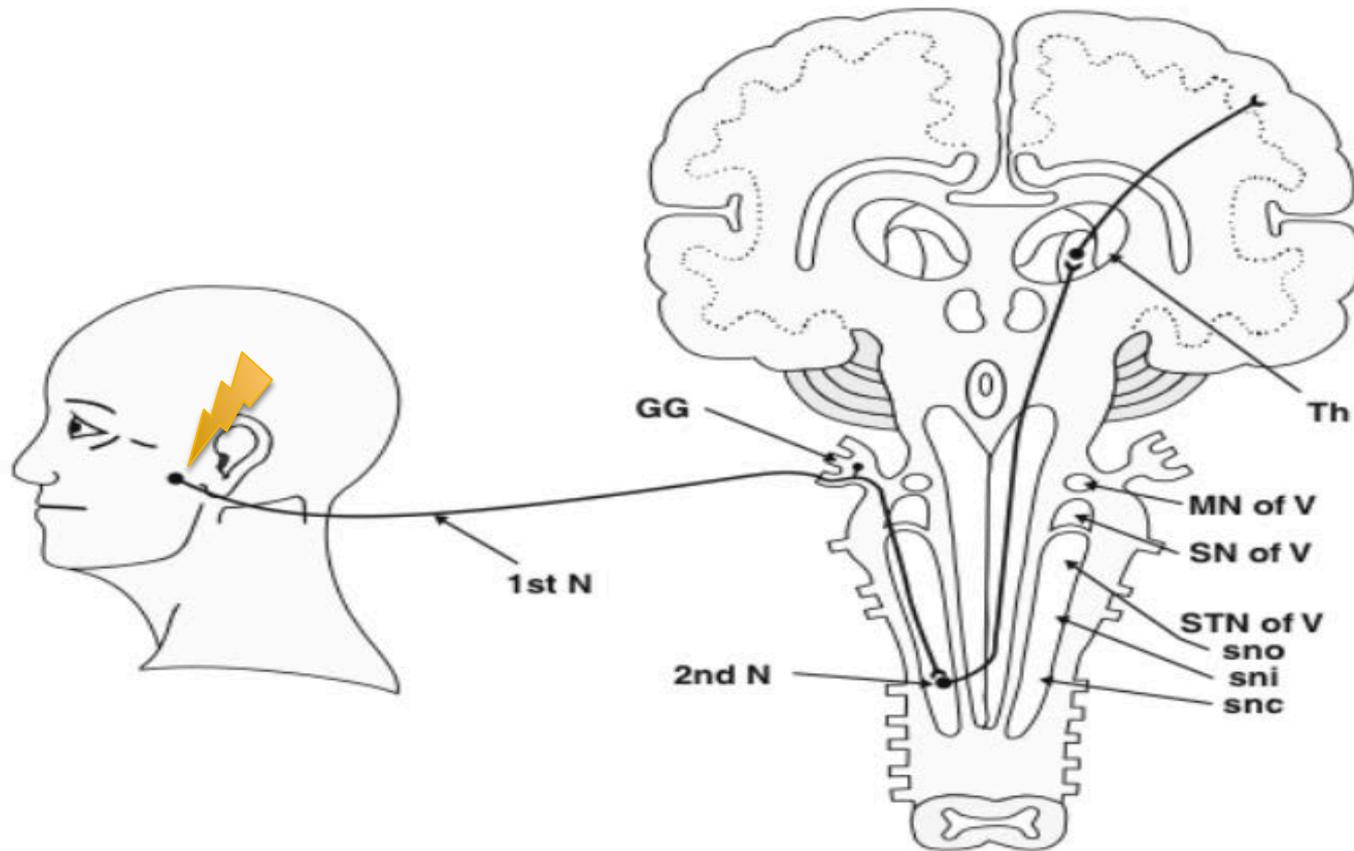


Merrill RL. Central mechanisms of orofacial pain. Dent Clin North Am. 2007;51(1):45-59.

# The Inflammatory "Soup"

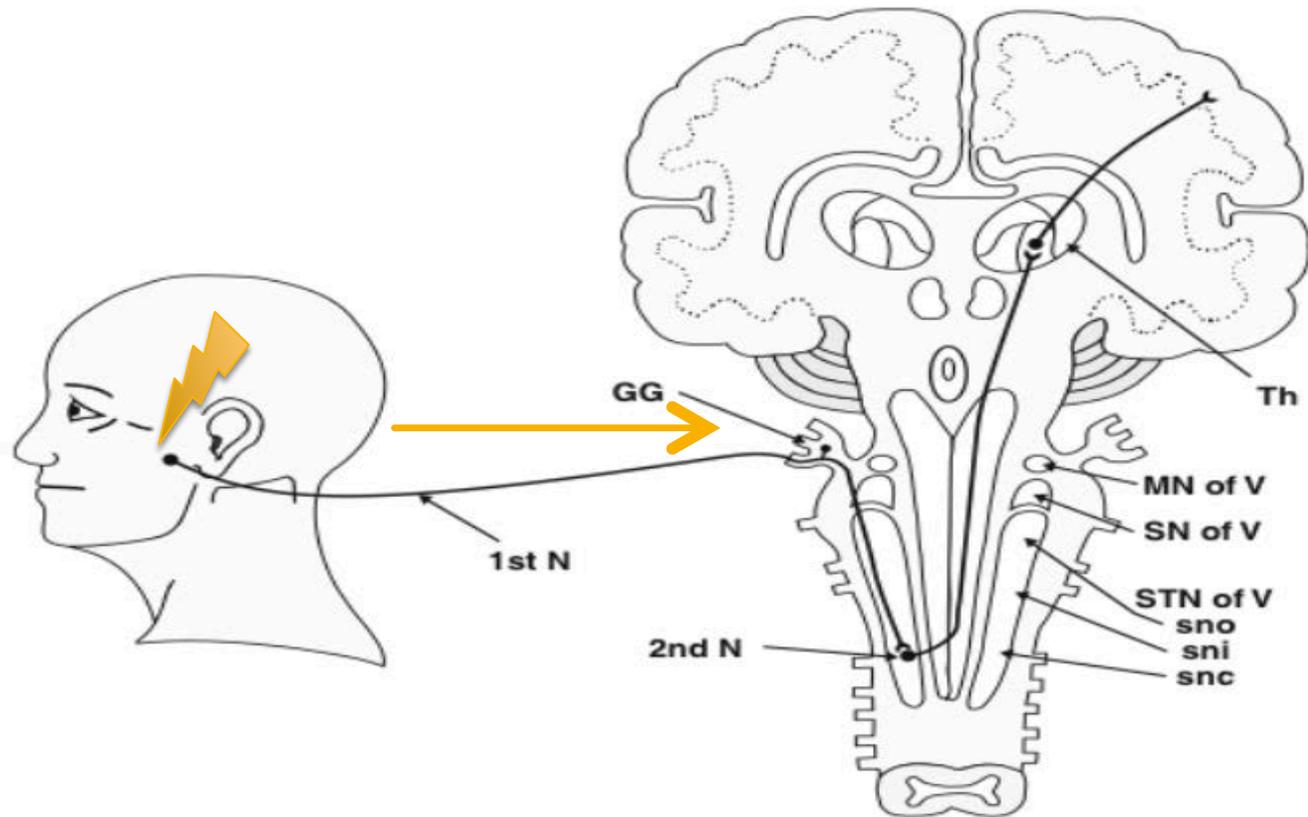


# Nociception



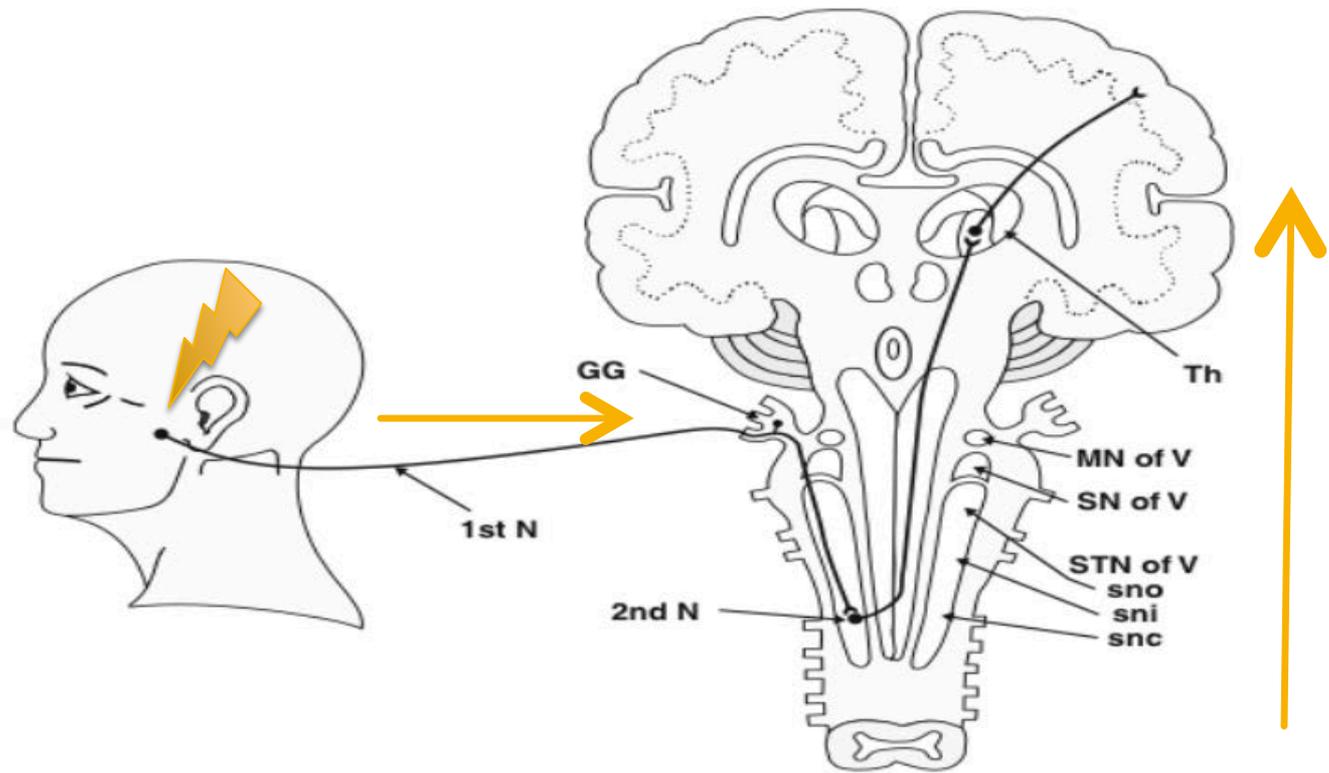
Transduction

# Nociception



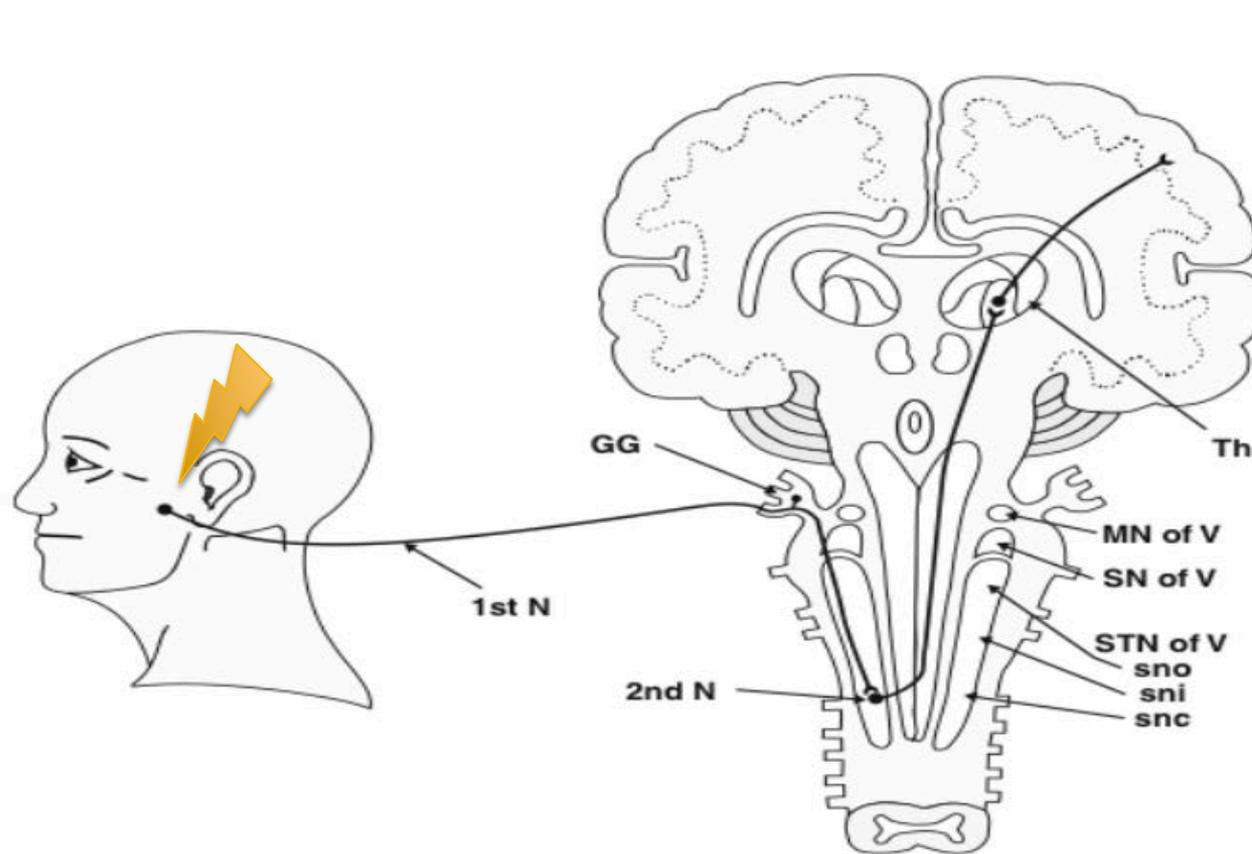
Transmission: 1<sup>st</sup> order neurons

# Nociception



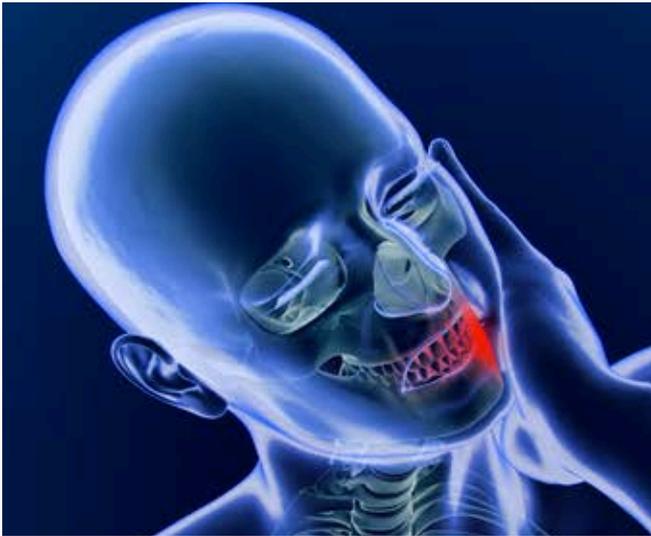
Transmission: 2<sup>nd</sup> order neurons

# Nociception



Modulation

# Nociception



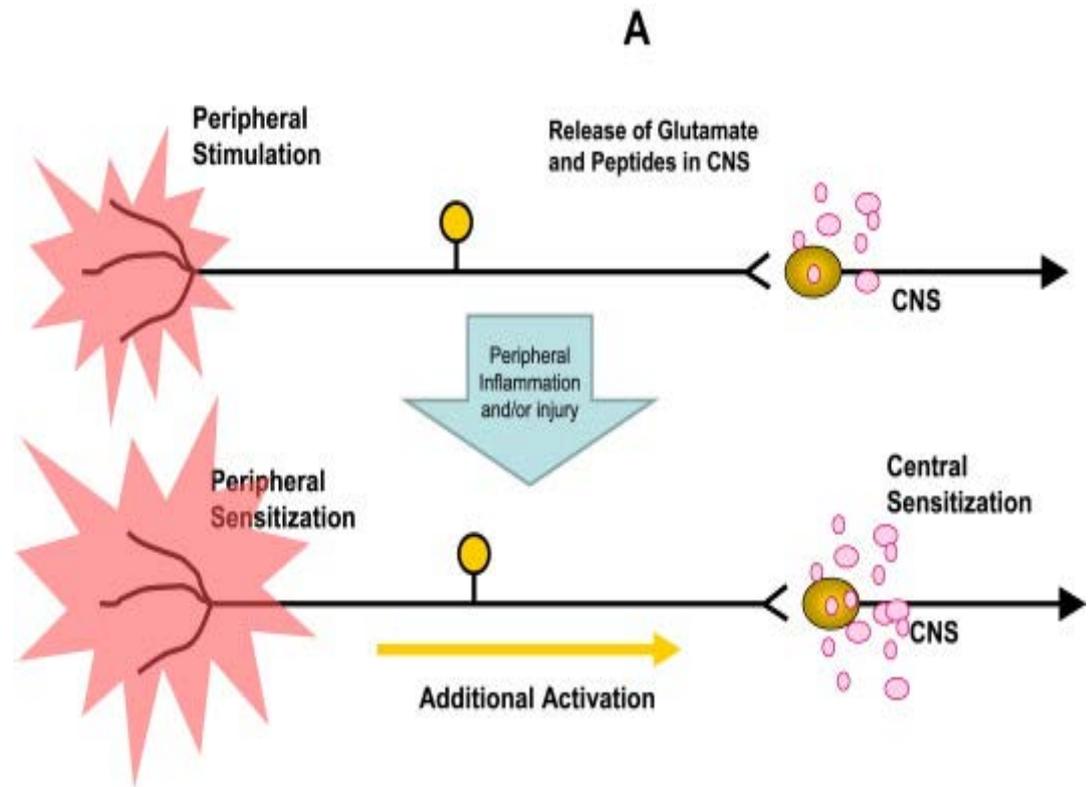
Perception

# Pain terminology continued

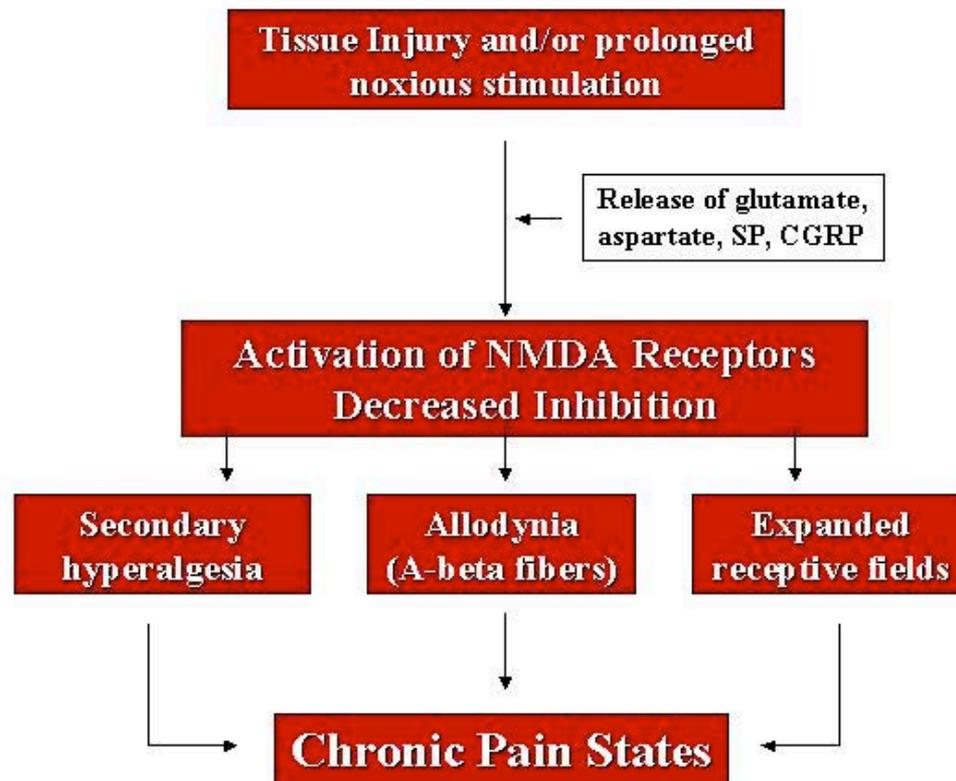
1. PERIPHERAL  
SENSITIZATION
2. CENTRAL  
SENSITIZATION

# Peripheral Sensitization

Allodynia  
Hyperalgesia



# Central Sensitization



Let's recap



Thank you!

