

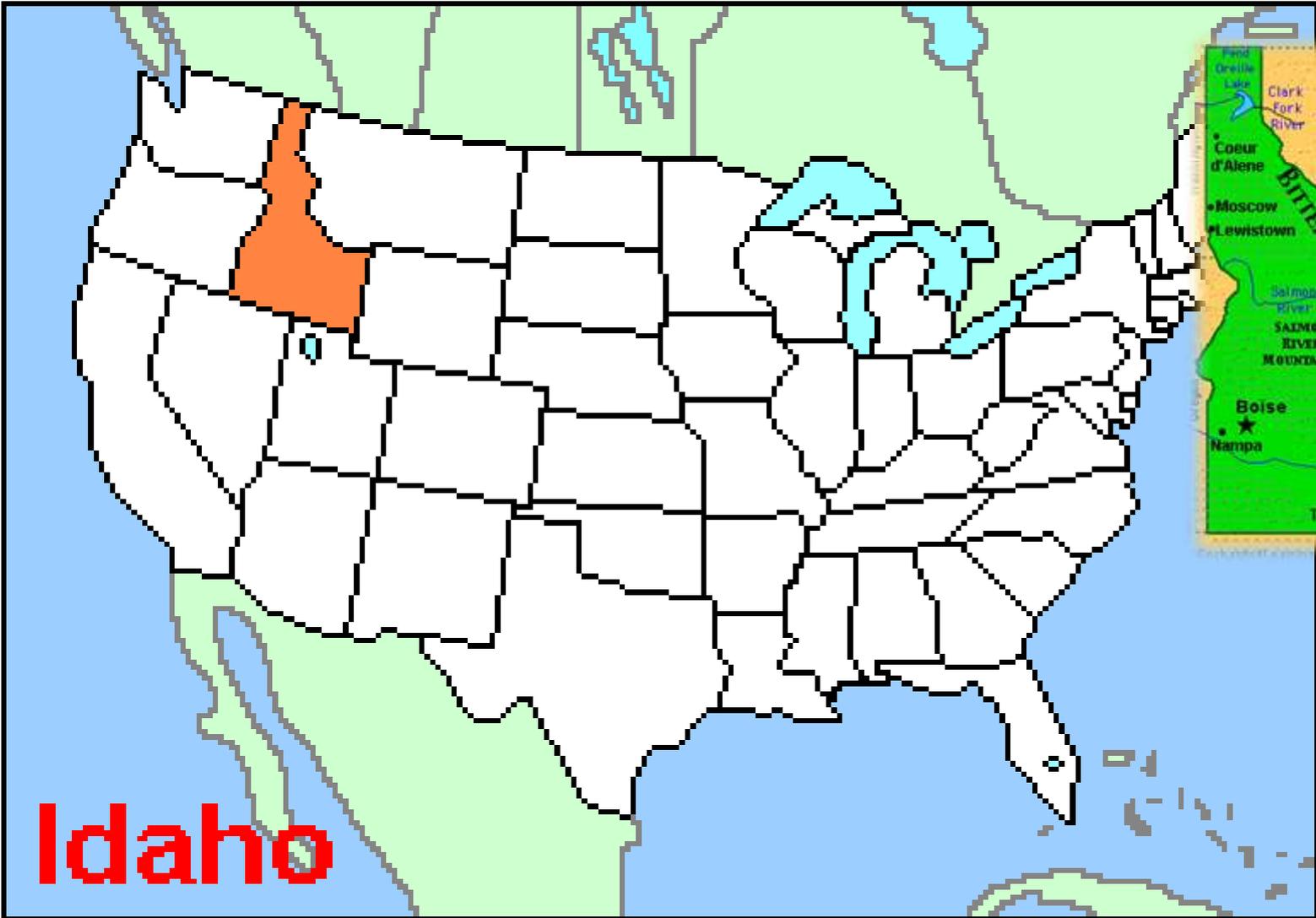
TMD Made Easy
Capsulitis, Trismus or
Non-Reducing Disc Displacement?
*Craniofacial Pain Disorders Common to the General
Dental Practice*

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Director, Craniofacial Pain Centers of Colorado and Idaho**



Idaho









Croft
Park
Center
TMJ DISORDERS
SLEEP
NON-SURGICAL

THE CENTER FOR
SLEEP APNEA &
TMJ

Idaho
facial
imaging

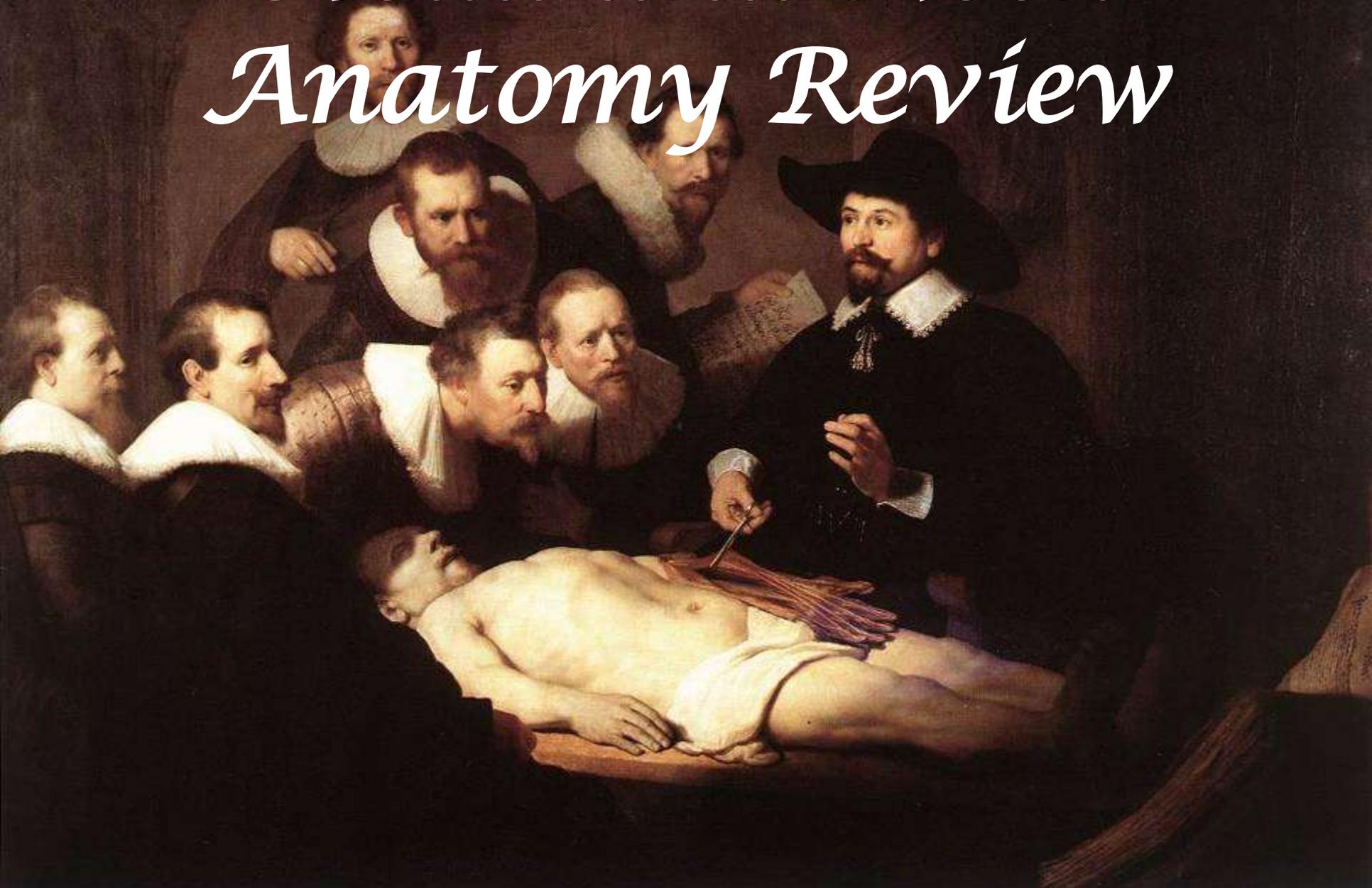
James R. Spence, D.D.S.
Orthodontic Center

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D.D.S.
ORTHODONTIC
CENTER



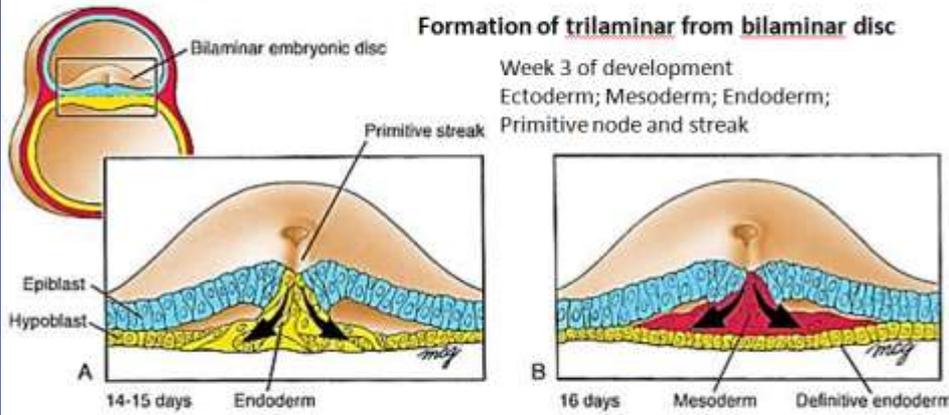


Head and Neck Anatomy Review



Embryology (Where it all began)

Gastrulation



Ectoderm: Epidermis and CNS

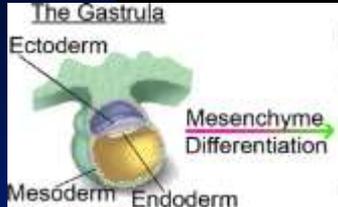
Mesoderm: Musculoskeletal; Cardiovascular and Urogenital systems

Endoderm: Lining of GIT and respiratory tract

The Gastrula



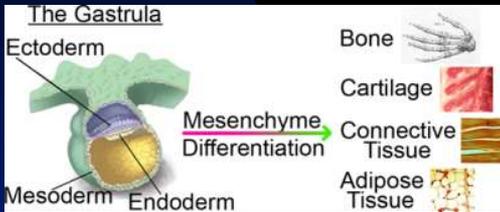
Embryology



■ Ectoderm

- ◆ Derived from Epiblast layer
- ◆ Nervous system
- ◆ Sensory epithelium of eye, ear, nose
- ◆ Epidermis, hair, nails
- ◆ Mammary and cutaneous glands
- ◆ Epithelium of sinuses, oral and nasal cavities, intraoral glands
- ◆ Tooth enamel

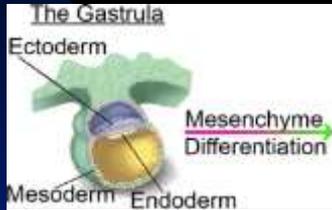
Embryology



■ Mesoderm

- ◆ Derived from Epiblast layer
- ◆ Muscles
- ◆ CT derivatives: bone, cartilage, blood, dentin, pulp, cementum, PDL

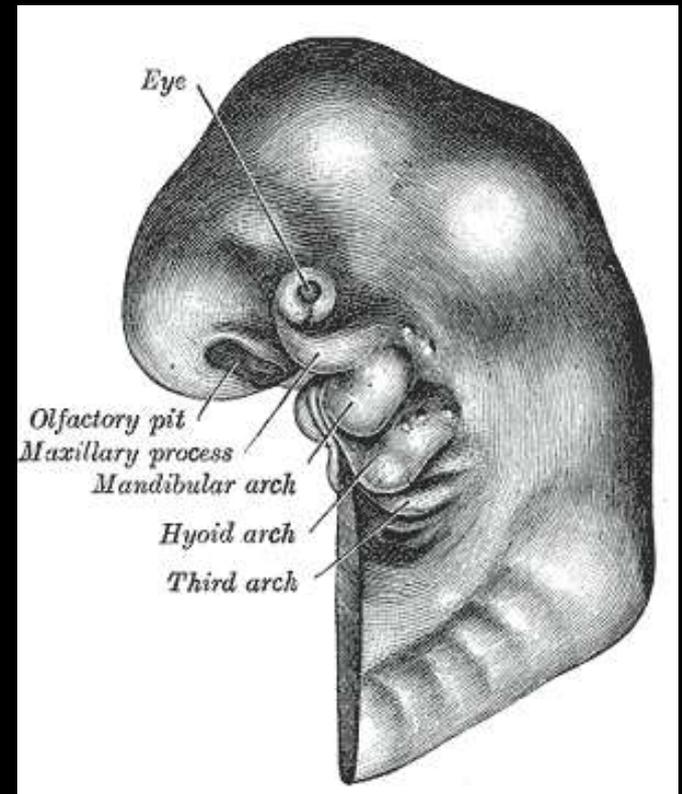
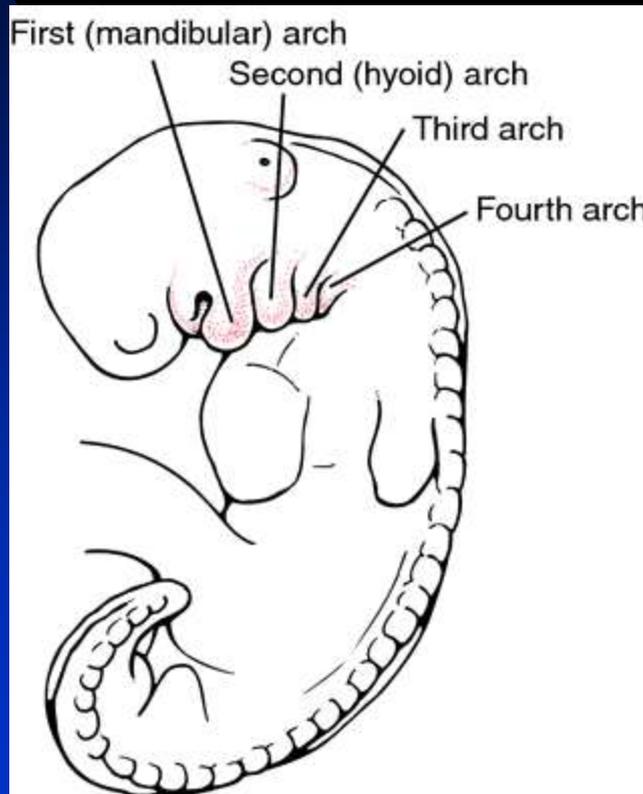
Embryology



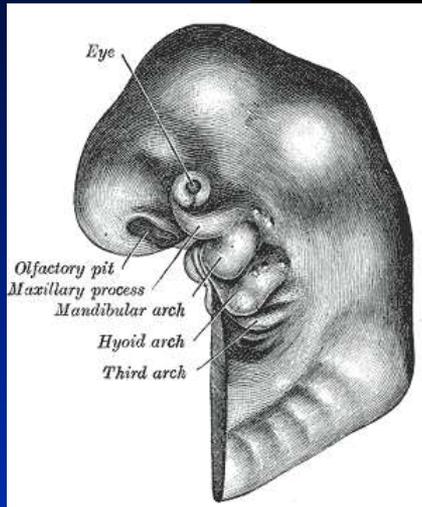
■ Endoderm

- ◆ Derived from Hypoblast layer
- ◆ GI tract epithelium and associated glands

Branchial Arches

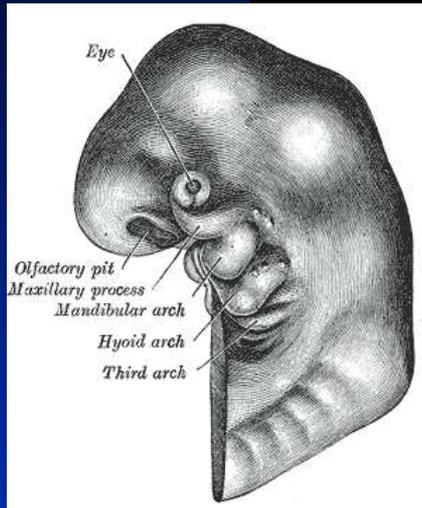


Mandibular (1st) Arch



- Forms
 - ◆ Trigeminal nerve
 - ◆ Muscles of mastication
 - ◆ Mylohyoid
 - ◆ Ant. belly of digastric
 - ◆ Tensor tympani
 - ◆ Tensor veli palatini

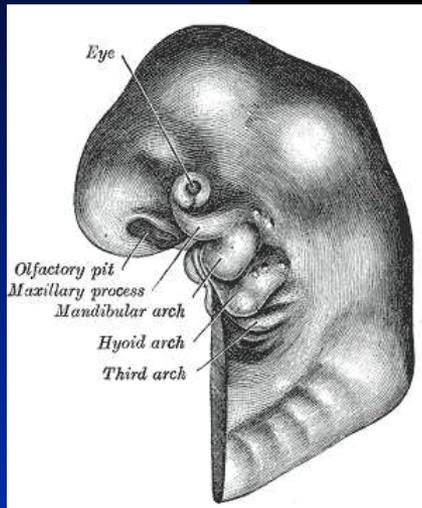
Mandibular (1st) Arch



- Forms (con't)
 - ◆ Malleus and incus
 - ◆ Ant. ligament of malleus
 - ◆ Sphenomandiular ligament
 - ◆ Portions of the sphenoid bone
 - ◆ Lower lip, lower face and mandible

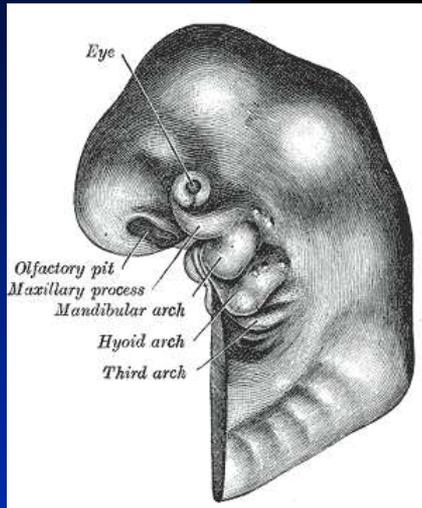
Associated with Meckel's cartilage

Second (hyoid) Arch



- Forms
 - ◆ Facial nerve
 - ◆ Stapedius muscle
 - ◆ Muscles of facial expression
 - ◆ Posterior belly of digastric
 - ◆ Stylohyoid

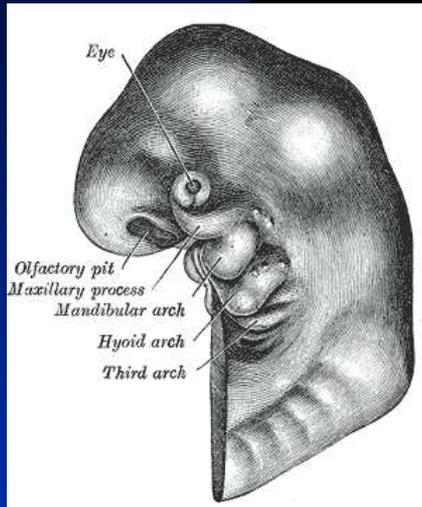
Second (hyoid) Arch



- Forms (con't)
 - ◆ Stapes and portions of malleus and incus
 - ◆ Stylohyoid ligament
 - ◆ Styloid process of temporal bone
 - ◆ Lesser cornu of the hyoid bone
 - ◆ Upper portion of body of the hyoid

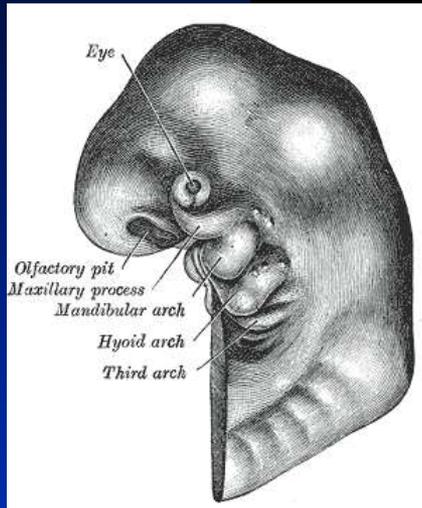
Associated with Reichert's cartilage

Third Arch



- Forms
 - ◆ Glossopharyngeal nerve
 - ◆ Stylopharyngeal muscle
 - ◆ Greater cornu of hyoid
 - ◆ Lower portion of body of hyoid

Fourth through Sixth

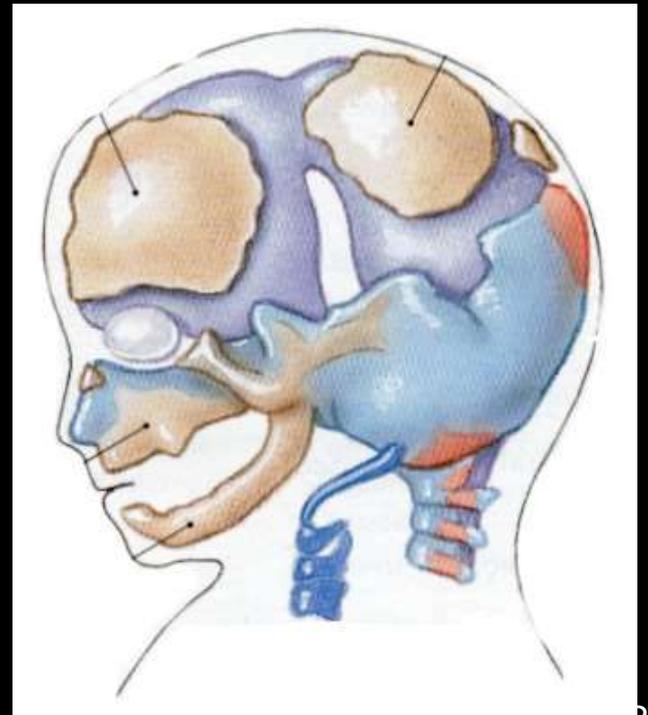
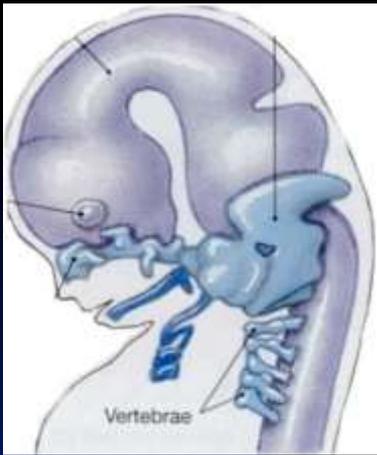


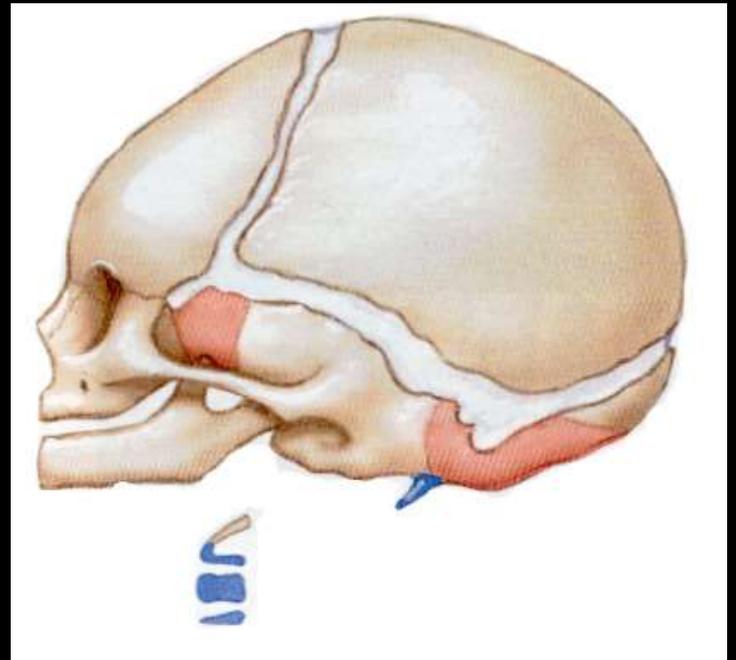
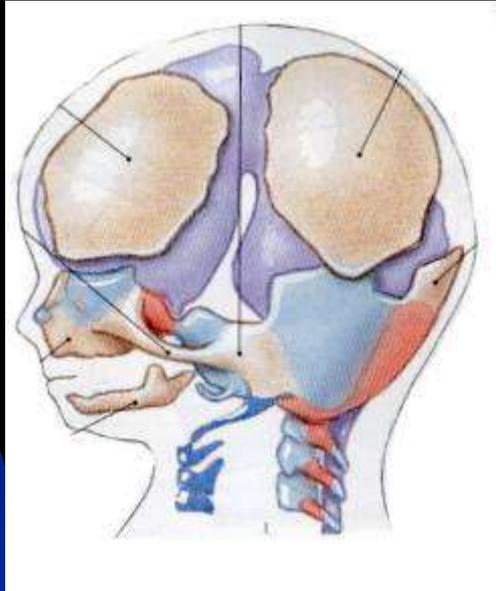
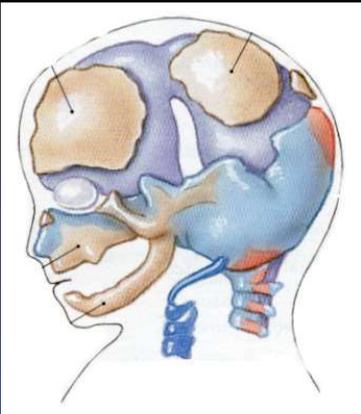
■ Forms

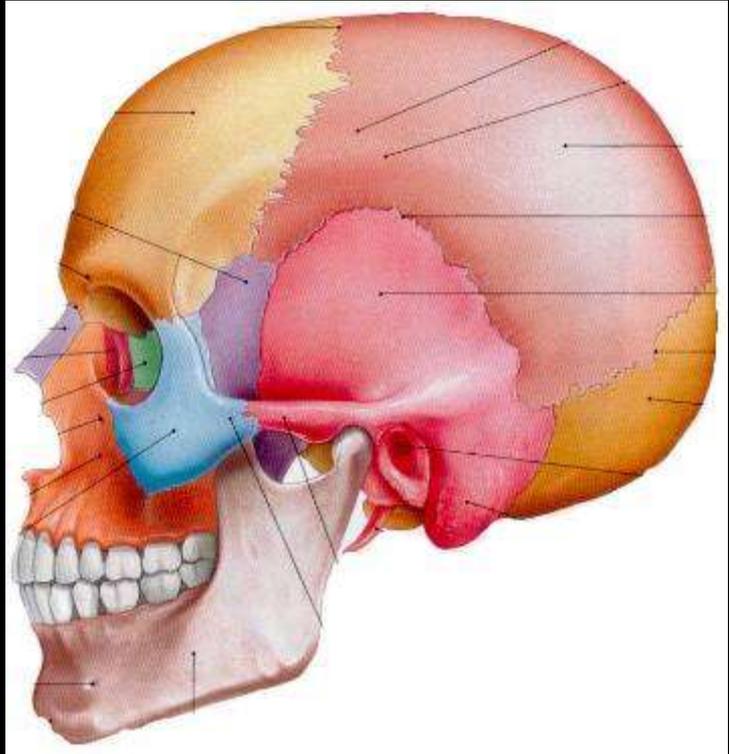
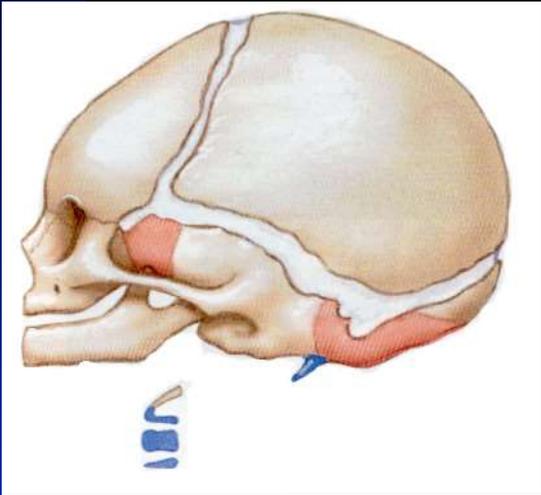
- ◆ Sup. laryngeal branch and recurrent laryngeal branch of vagus nerve
- ◆ Levator veli palatini
- ◆ Pharyngeal constrictors
- ◆ Intrinsic muscles of the larynx
- ◆ Laryngeal cartilages

Osteology Review

- Bones of the cranium and facial skeleton





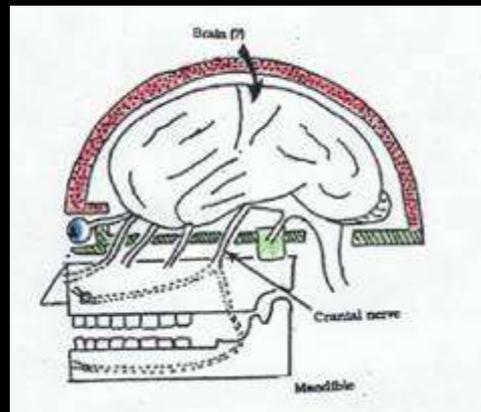
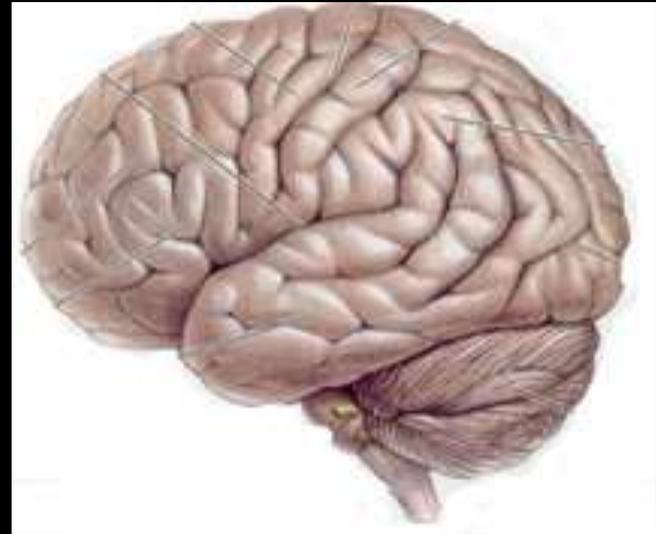
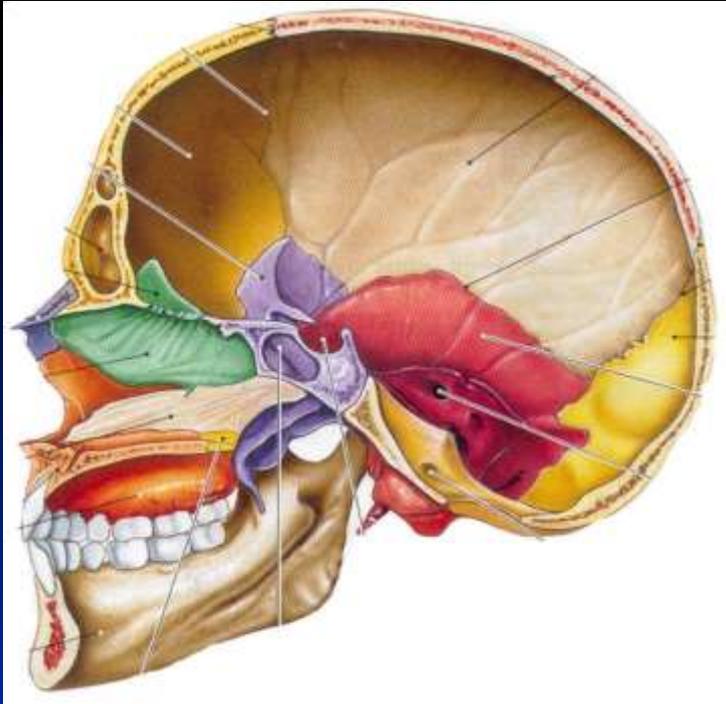


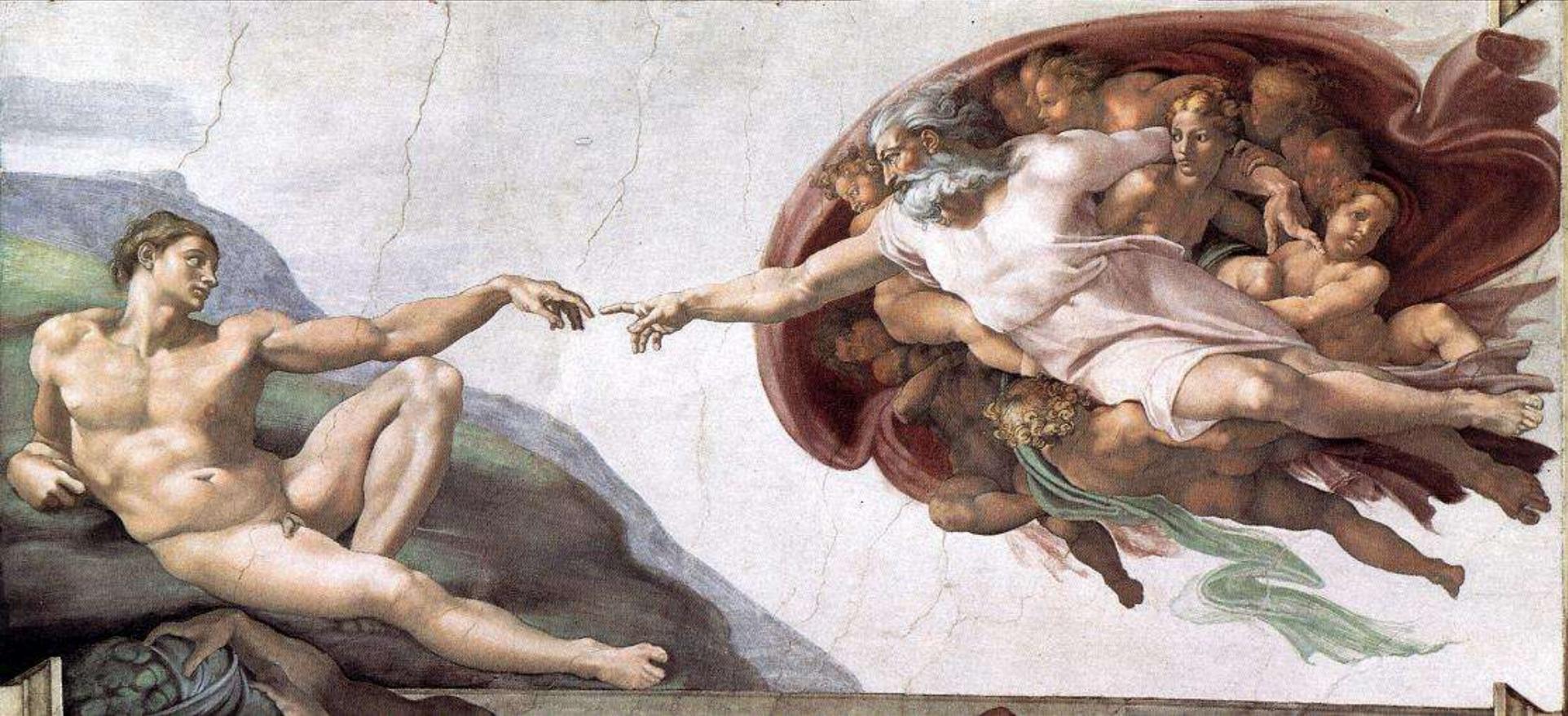
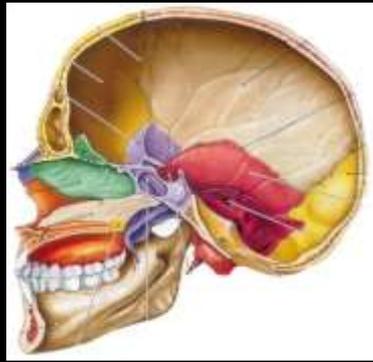
Cranial Bones

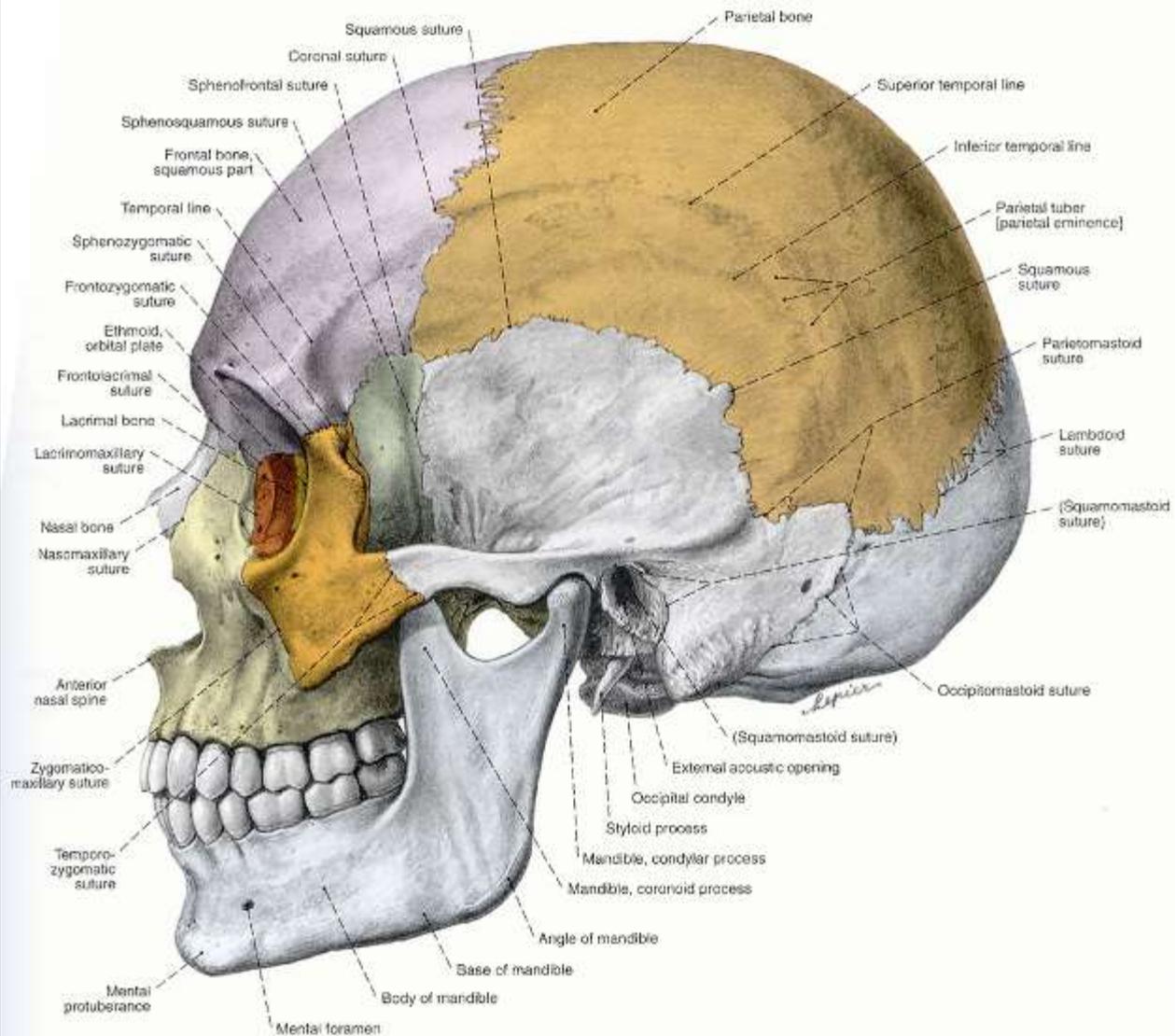
- Occipital bone
- Frontal bone
- Parietal bones
- Temporal bones
- Sphenoid bone
- Ethmoid bone

Facial Bones

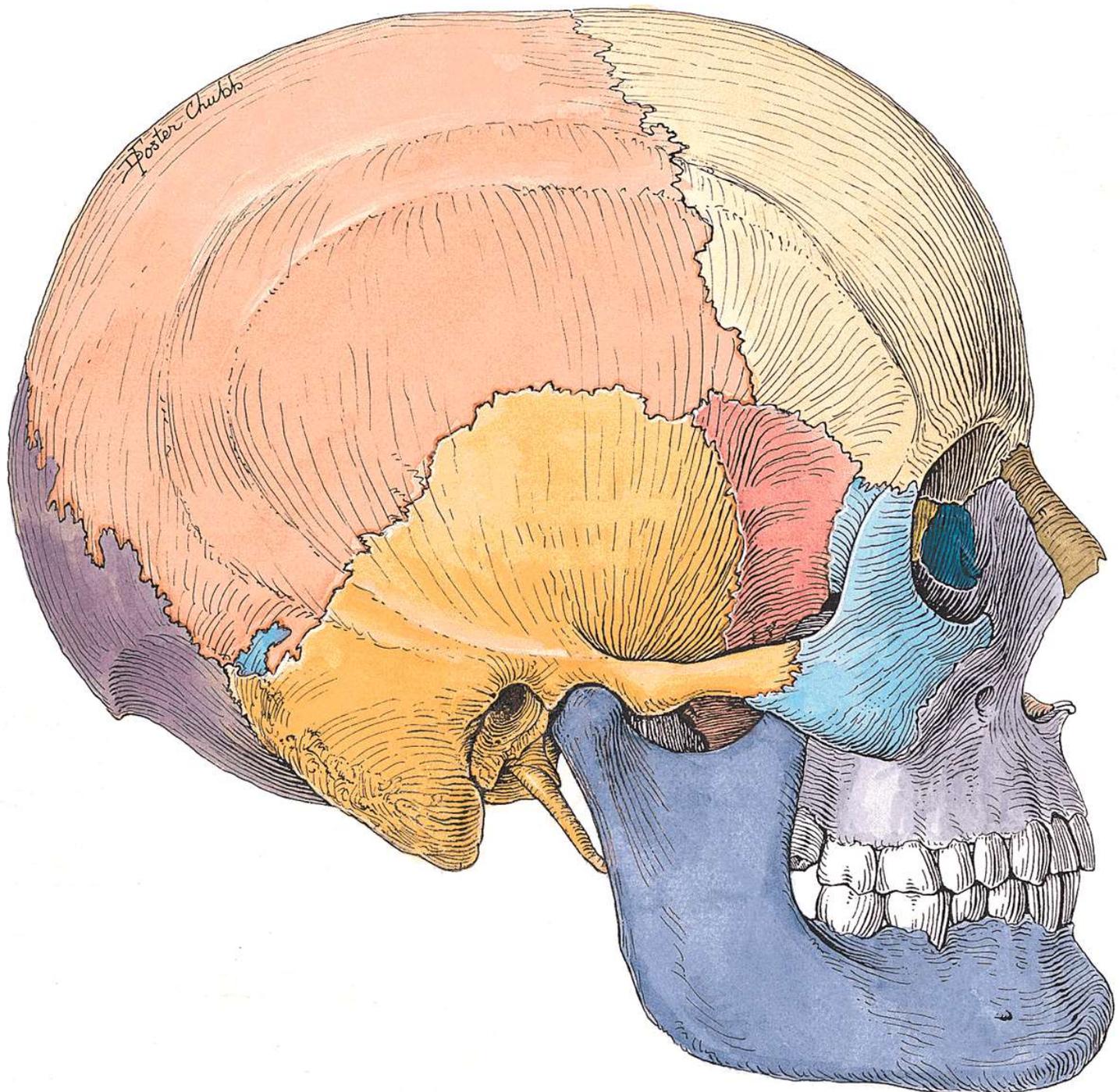
- Vomer
- Lacrimal bones
- Nasal bones
- Inferior nasal conchae
- Zygomatic bones
- Maxillary bones
- Mandible

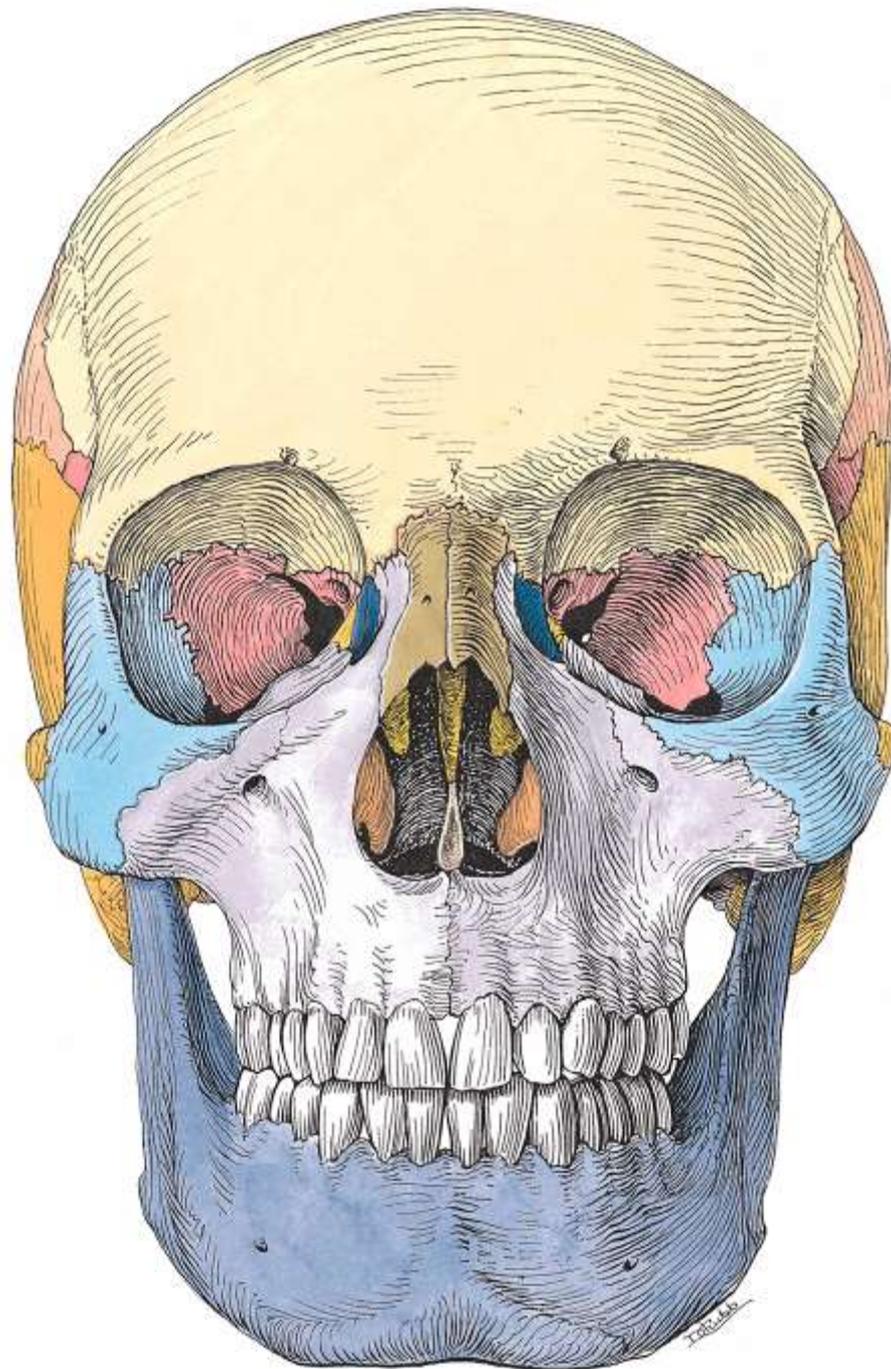


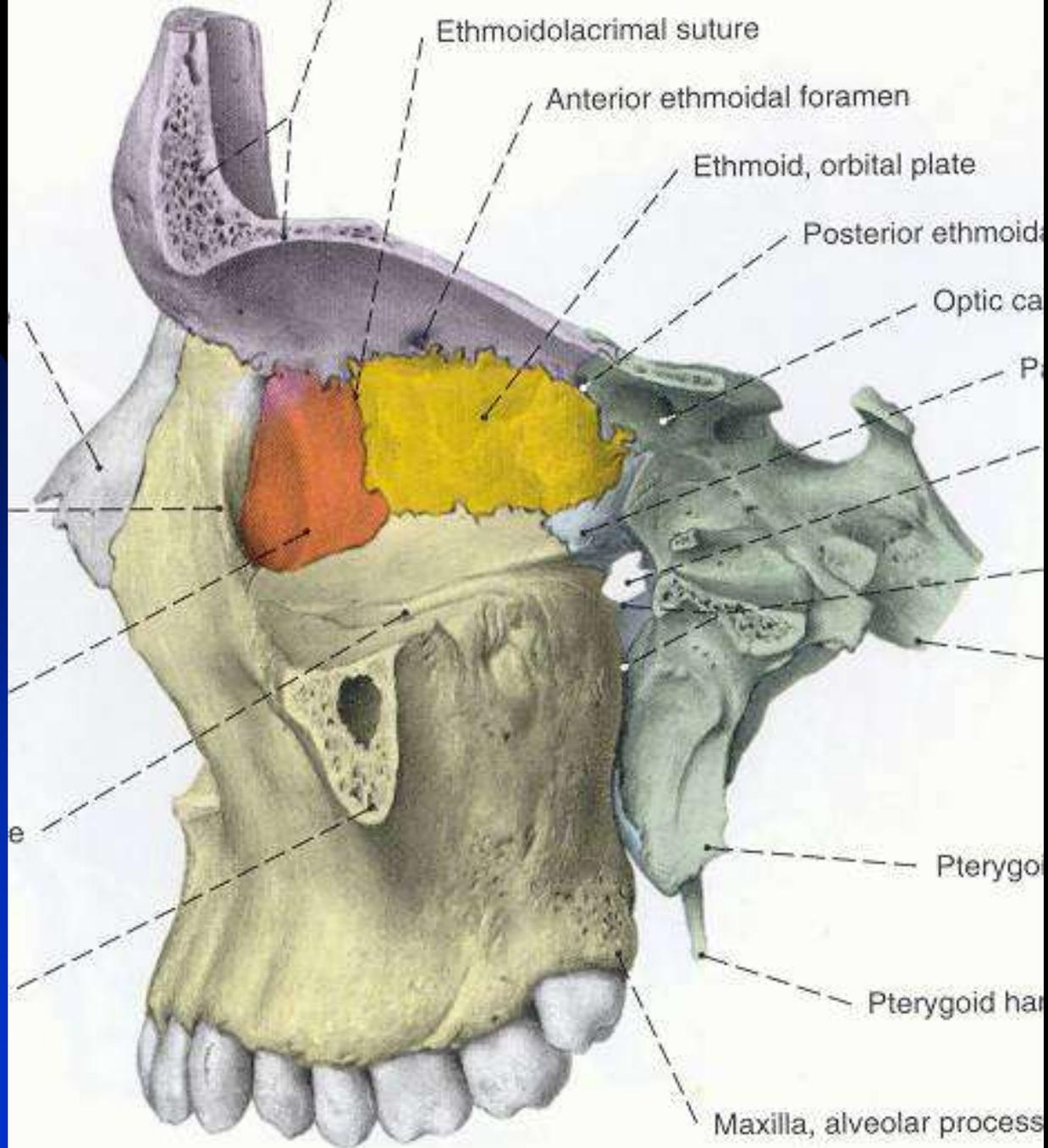




	Frontal bone		Lacrimal bone		Temporal bone
	Parietal bone		Zygomatic bone		Maxilla
	Occipital bone		Sphenoid [sphenoidal bone]		Mandible
	Nasal bone		Ethmoid [ethmoidal bone]		



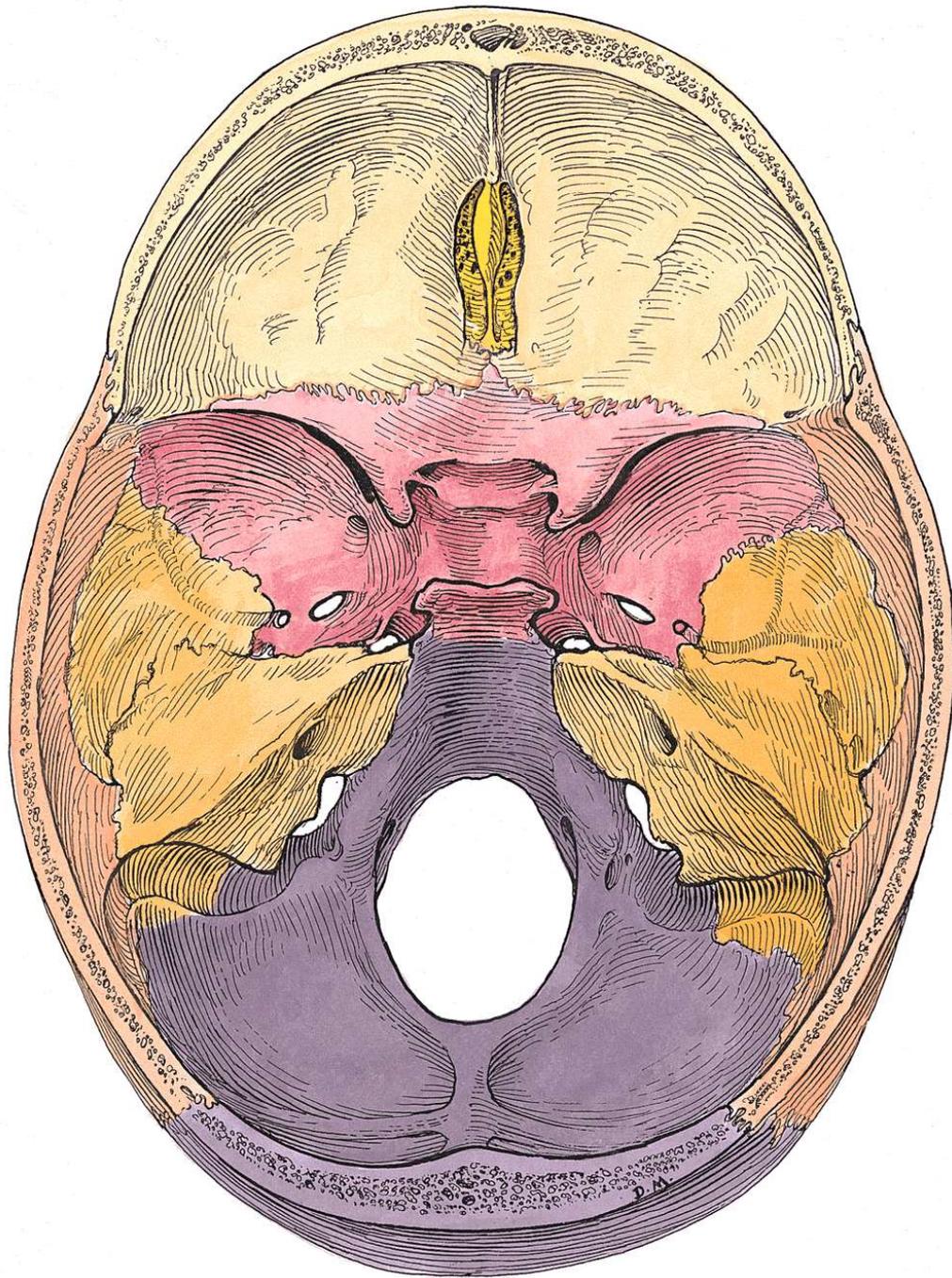


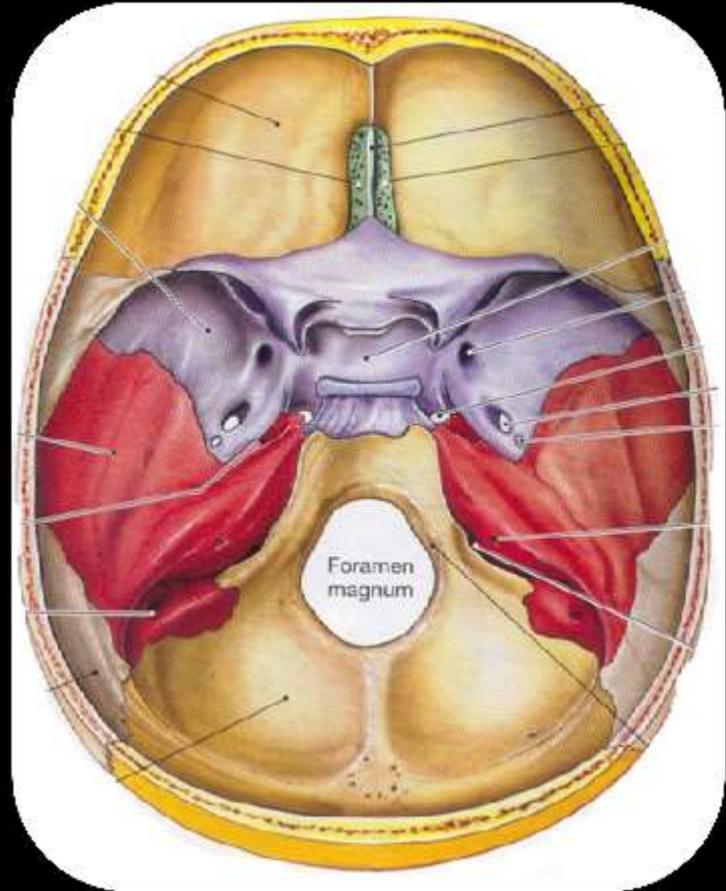
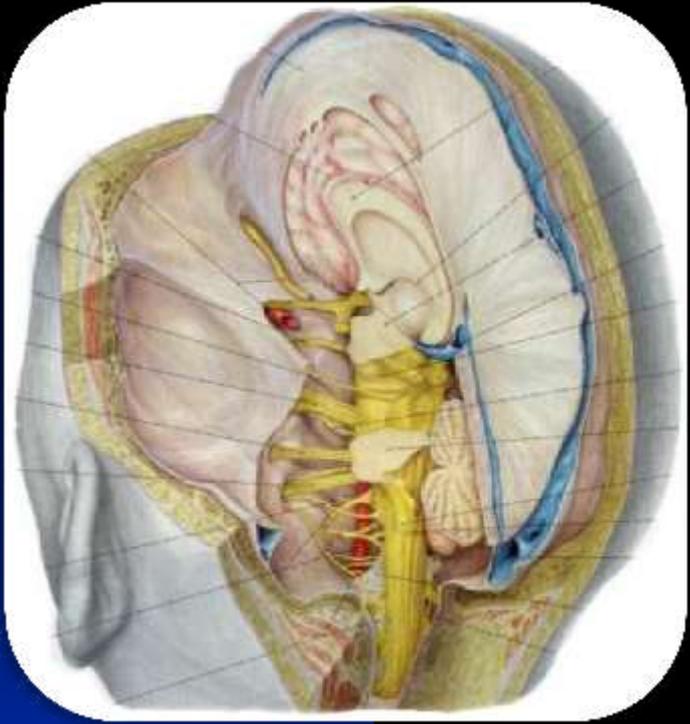


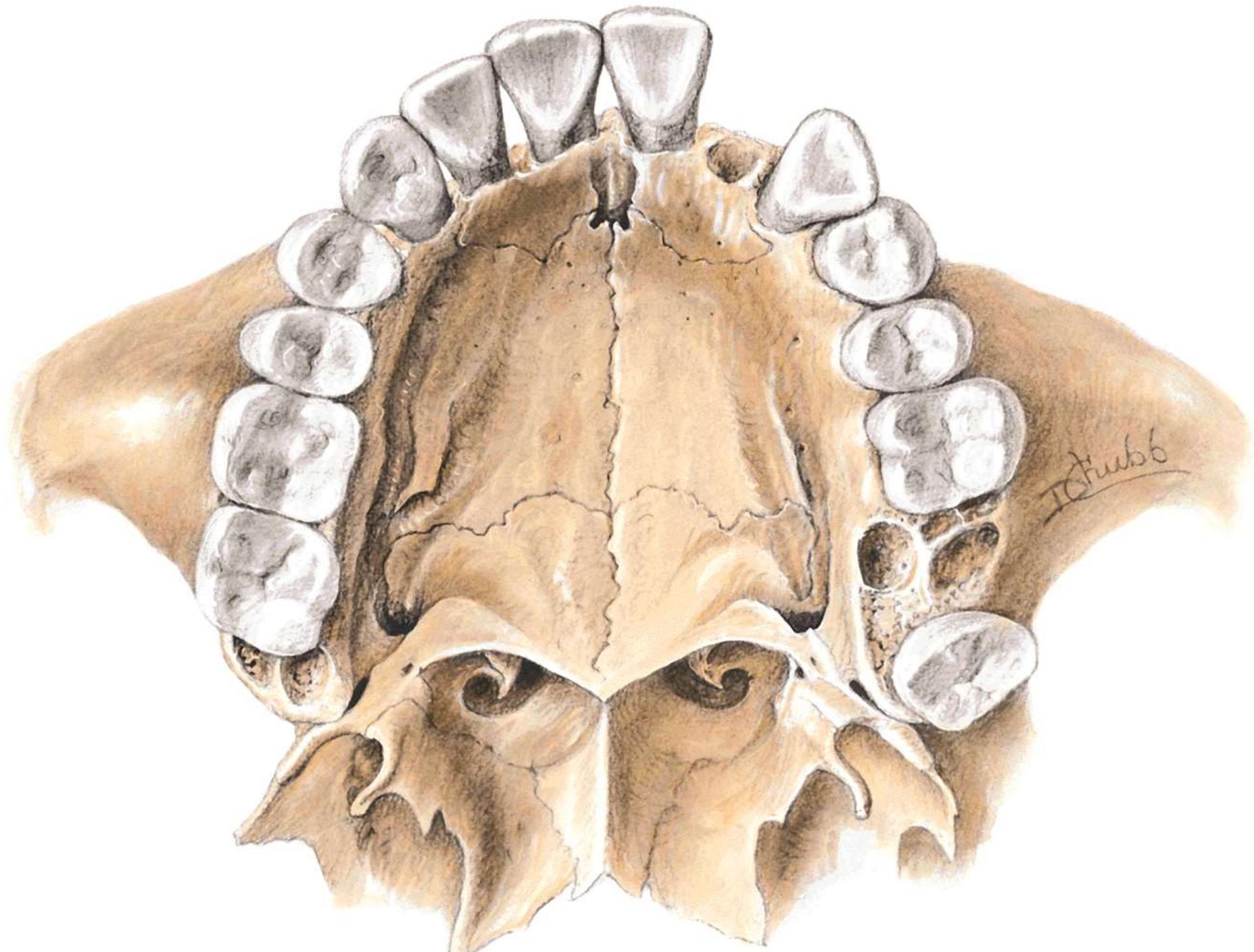
Bony Openings in the Skull

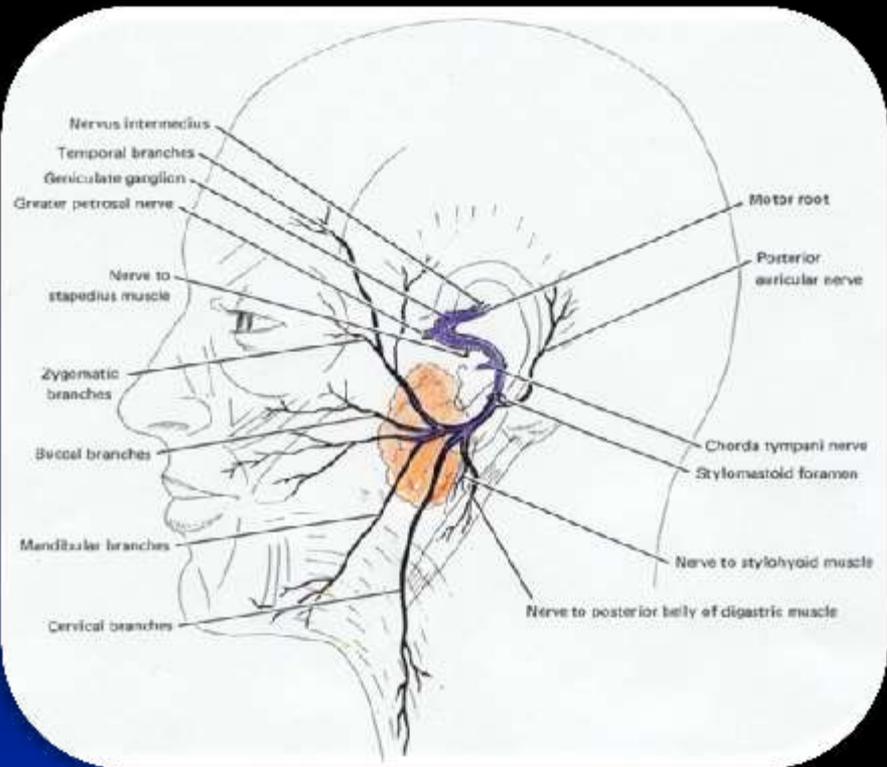
- Foramen cecum: emissary v.
- Cribriform plate: olfactory nerves
- Optic canal: optic n.,
- Sup. Orbital fissure: oculomotor nerve (III), trochlear nerve (IV), Ophthalmic division of Trigeminal nerve (V1), Abducens nerve (VI)
- Foramen rotundum: Maxillary division of Trigeminal nerve (V2)
- Foramen ovale: Mandibular division of Trigeminal nerve (V3),

- Foramen spinosum: Meningeal branch of V3
- Foramen lacerum: greater petrosal nerve
- Carotid canal: int. carotid artery
- Internal acoustic meatus: Facial nerve (VII), Vestibulocochlear nerve (VIII)
- Jugular foramen: Glossopharyngeal nerve (IX), Vagus nerve (X), Accessory nerve (XI)
- Hypoglossal canal: Hypoglossal nerve (XII)

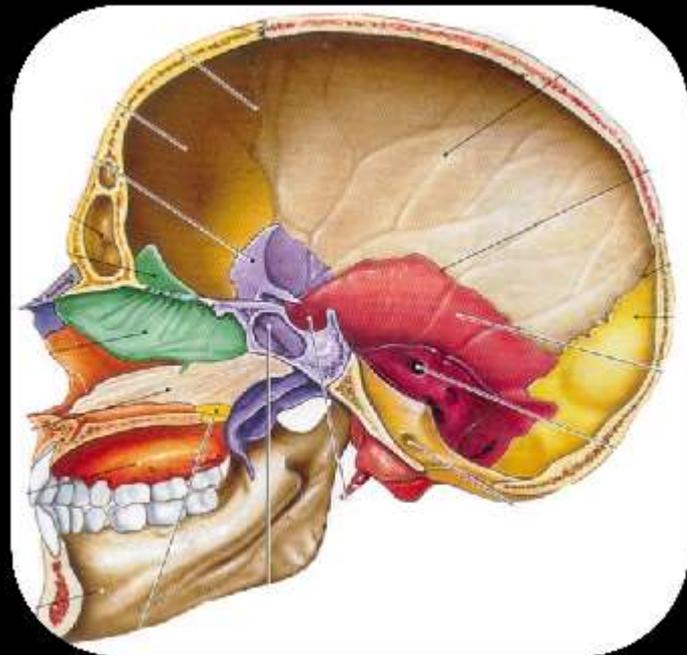


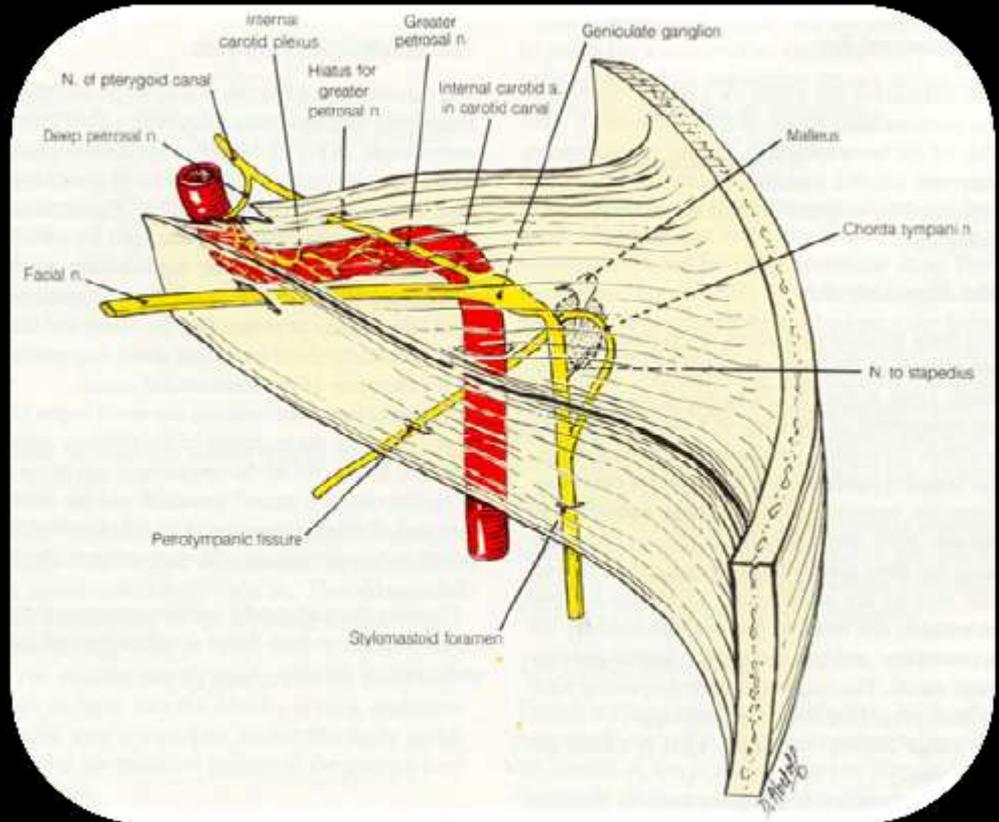
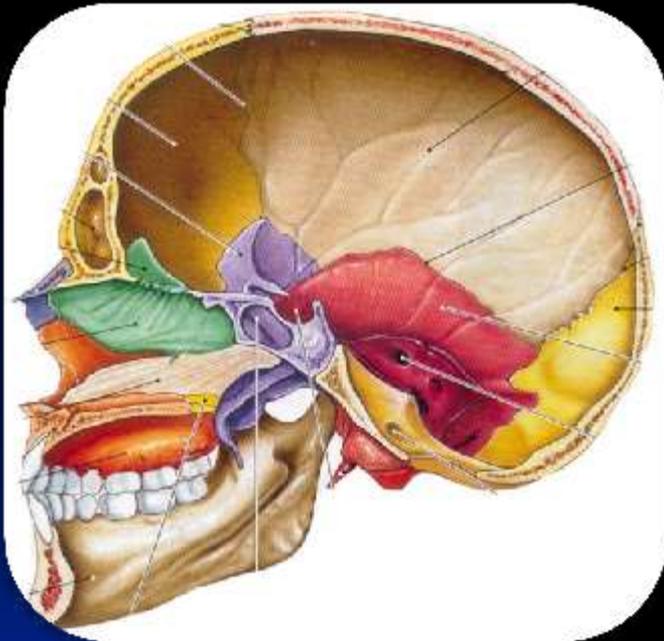


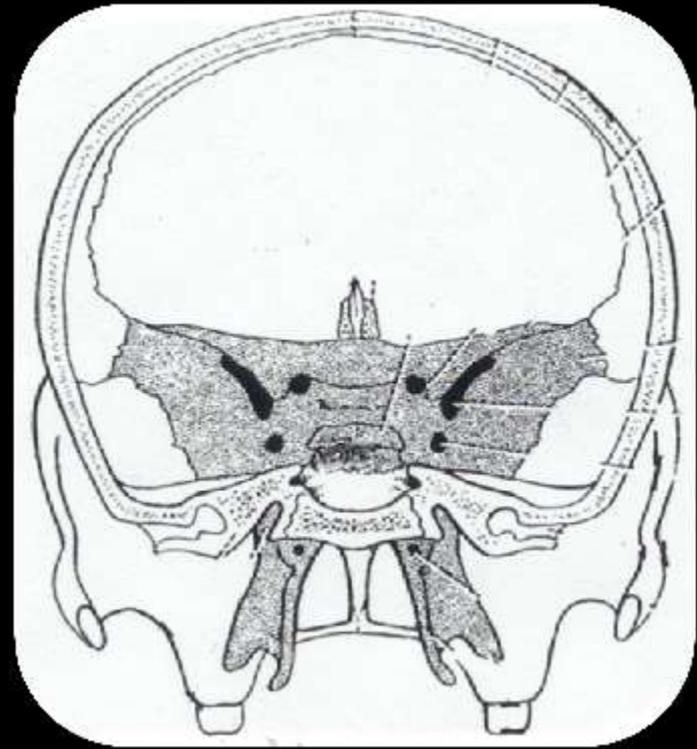
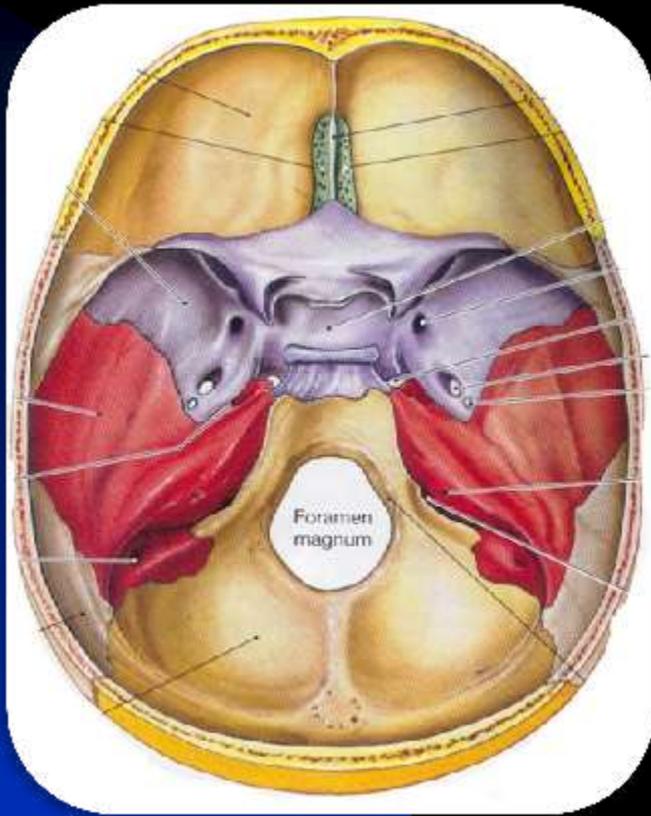




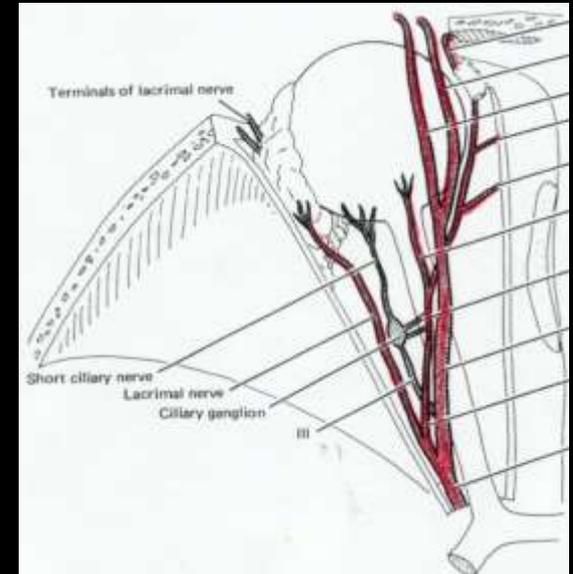
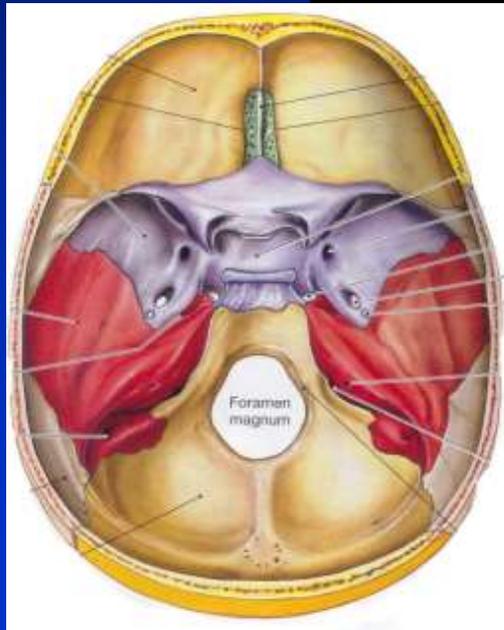
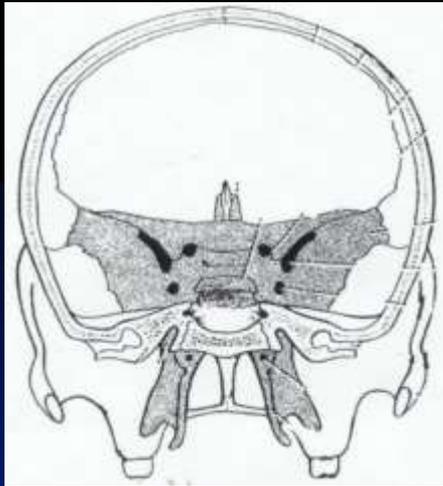
FACIAL NERVE, VII





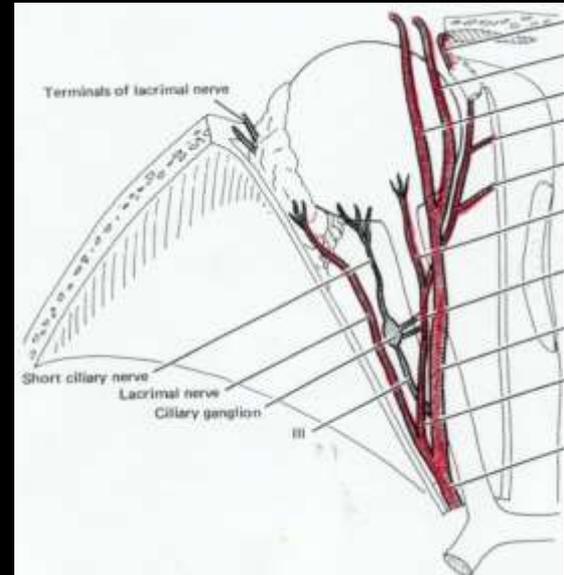
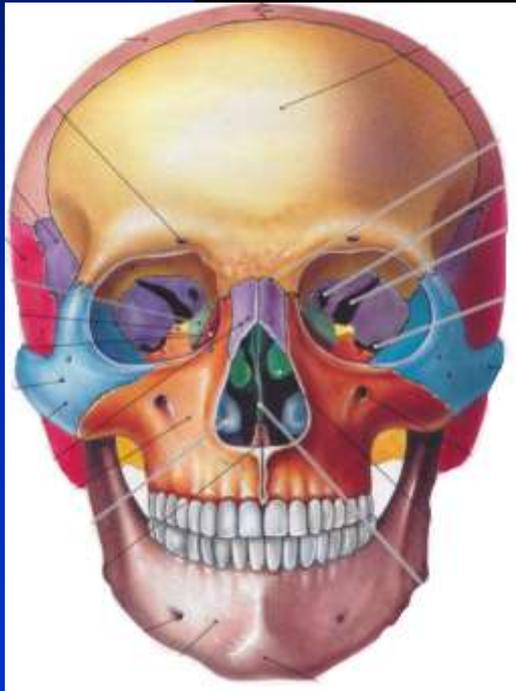
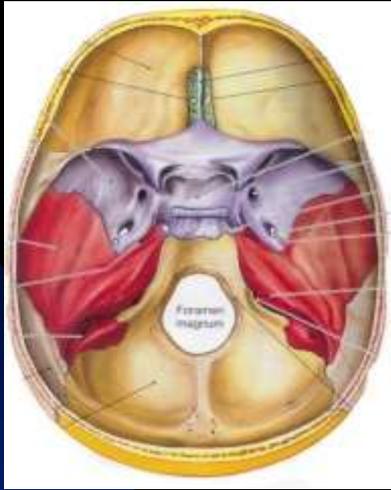


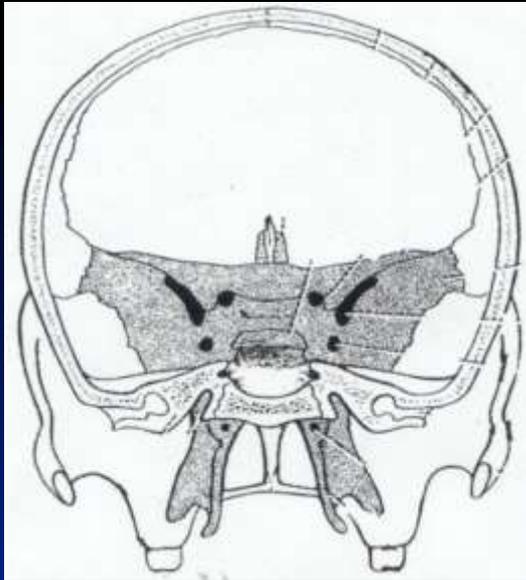
THE SPHENOID BONE IS FULL OF HOLES, AND MOST HAVE SOMETHING TO DO DIRECTLY WITH BRANCHES OF THE TRIGEMINAL NERVE



OPHTHALMIC DIVISION – TRIGEMINAL NERVE

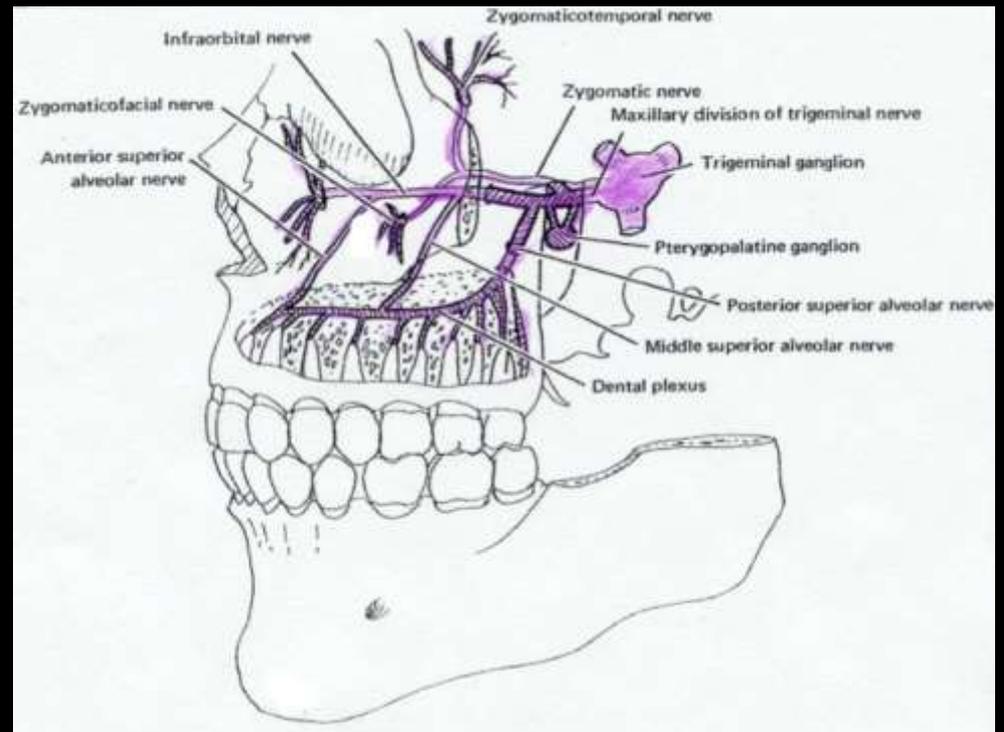
- superior orbital fissure
- supraorbital notch/foramen

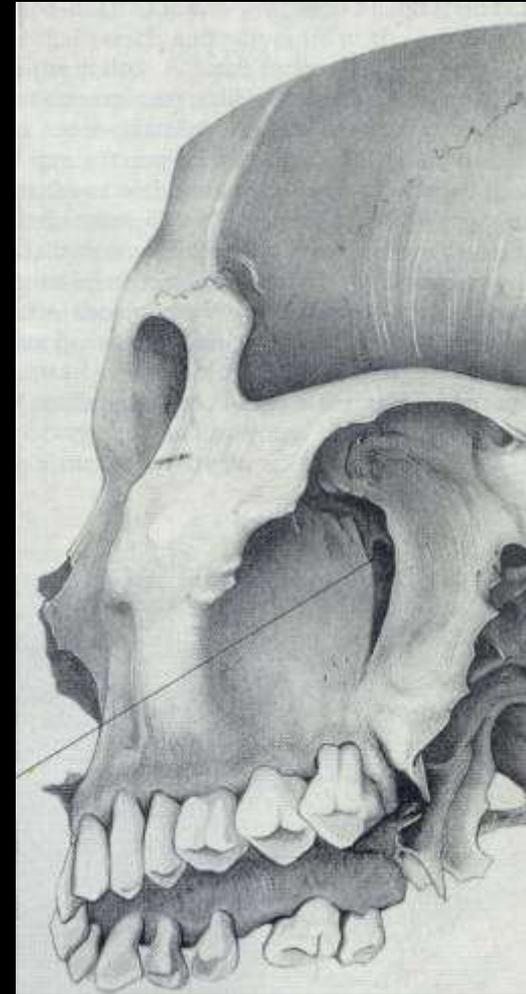
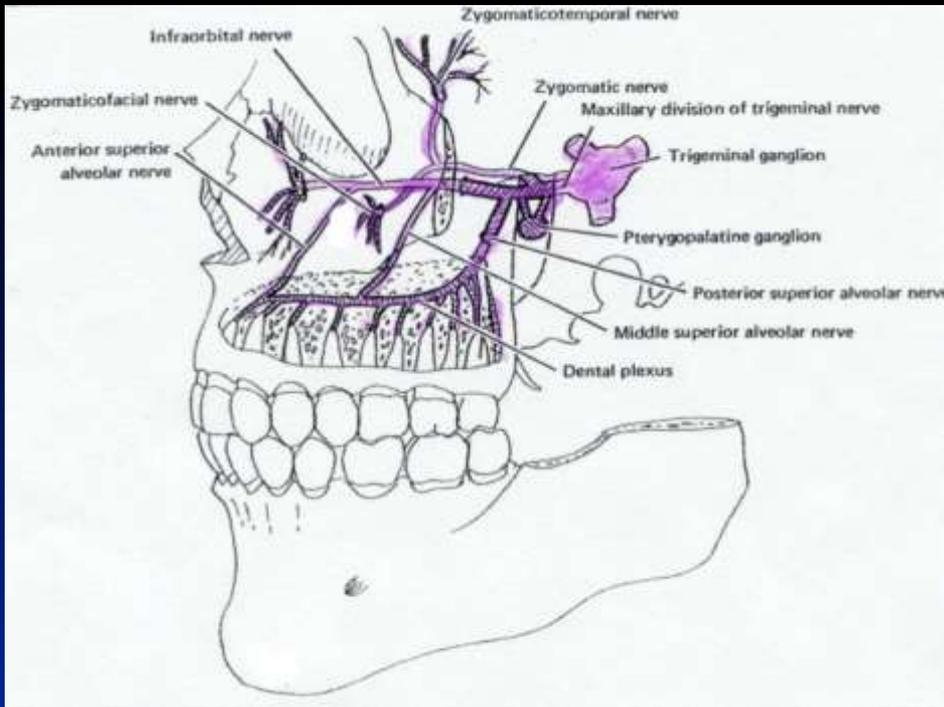




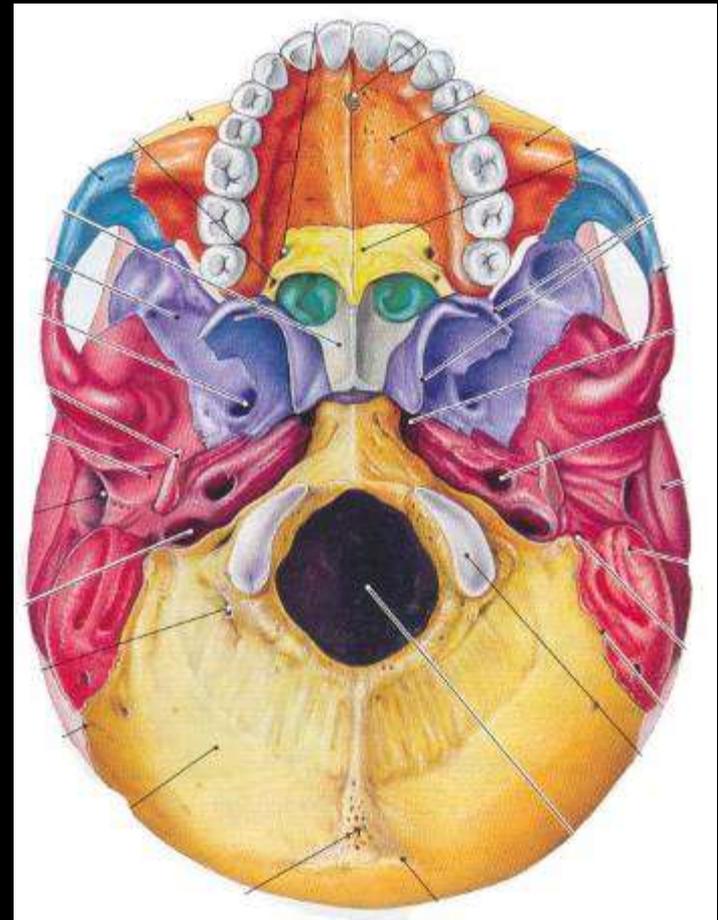
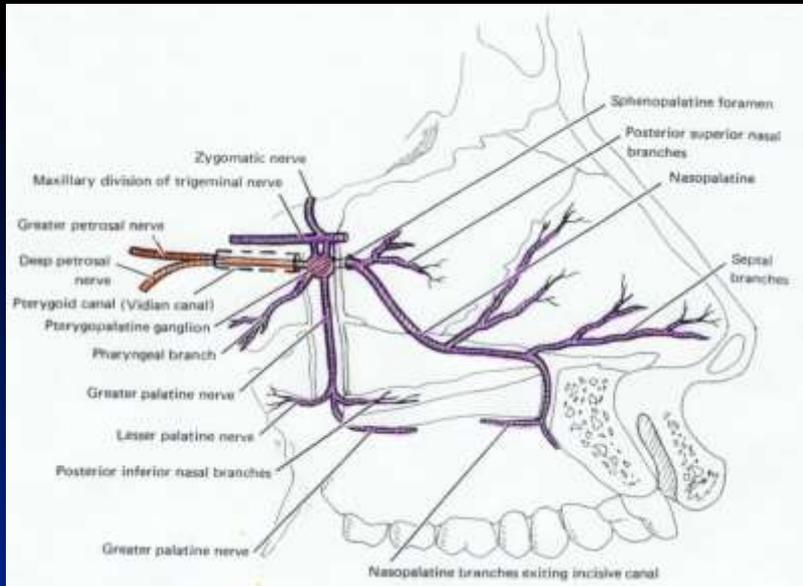
MAXILLARY DIVISION – TRIGEMINAL NERVE

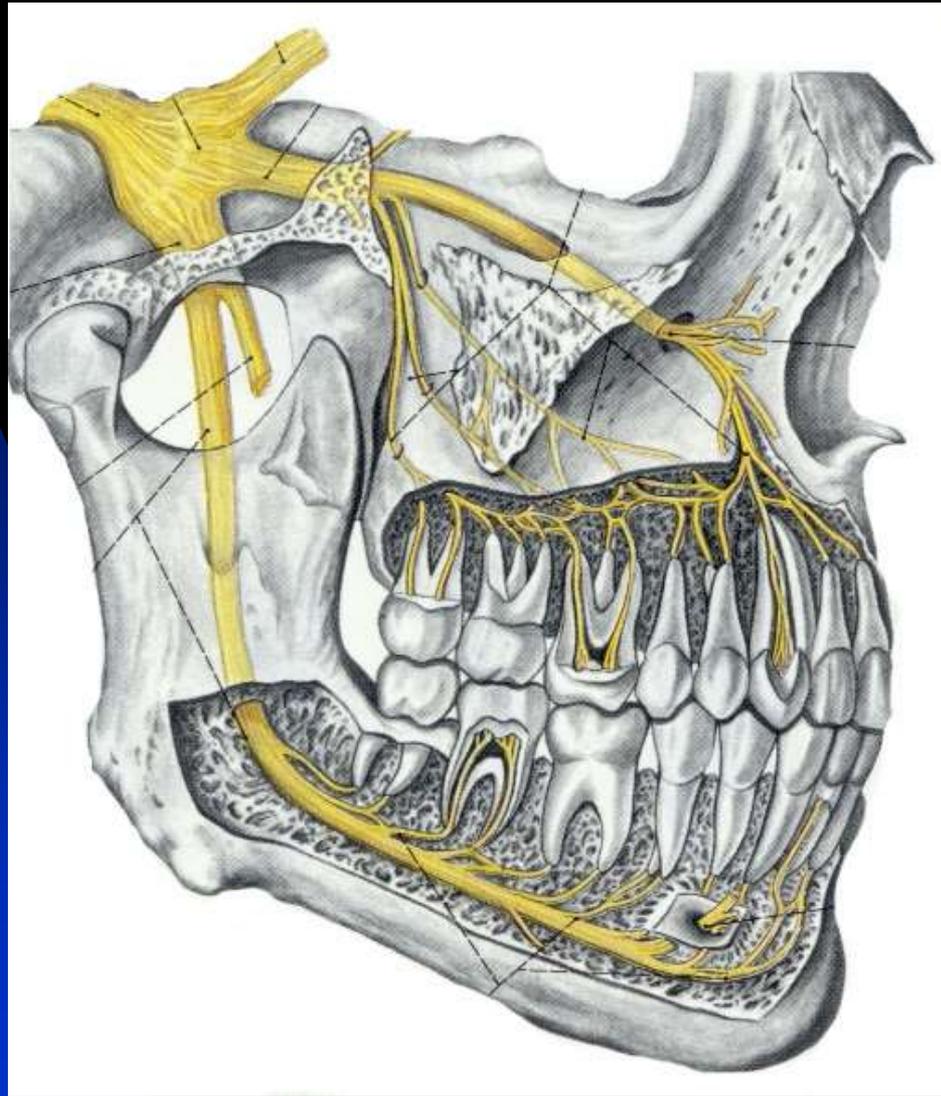
- foramen rotundum
- infraorbital foramen

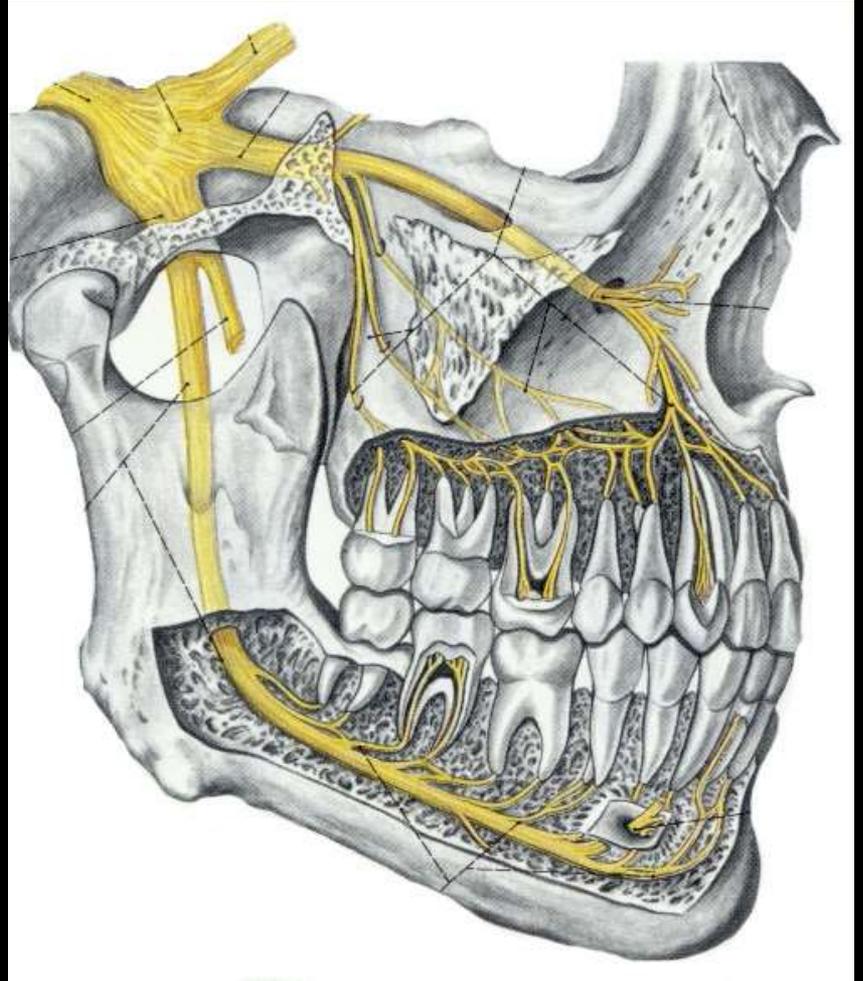
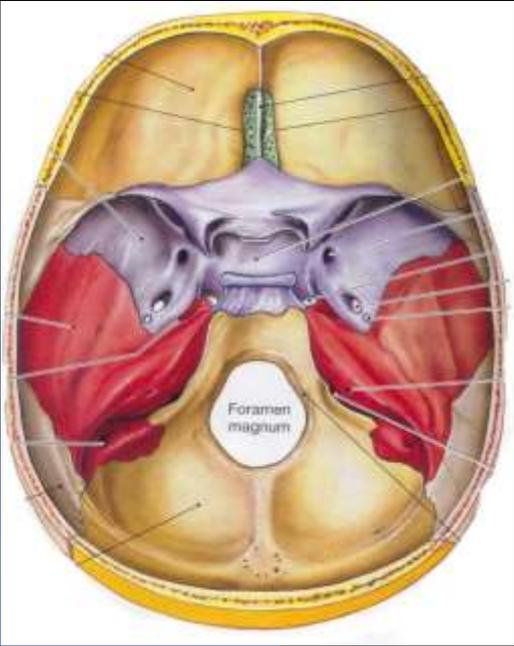




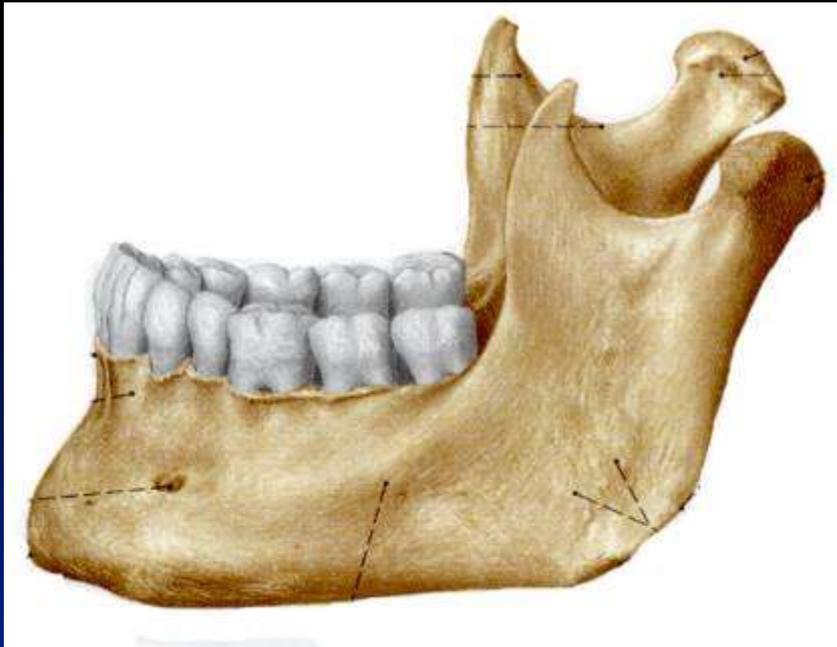
Pterygomaxillary fissure

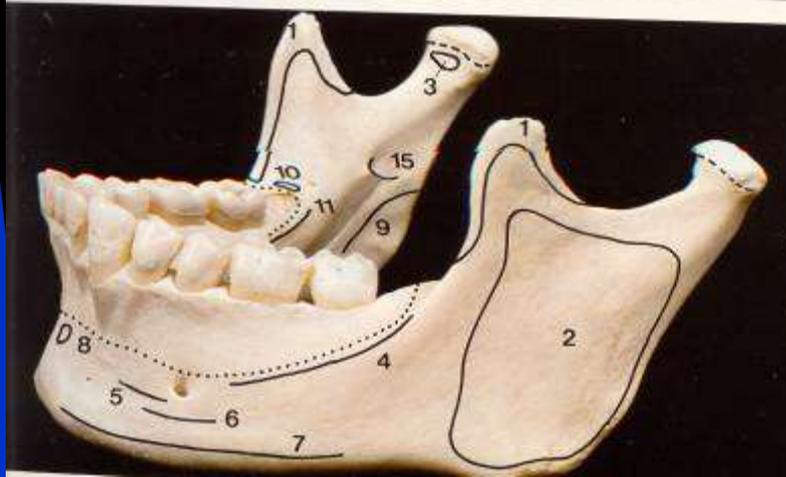
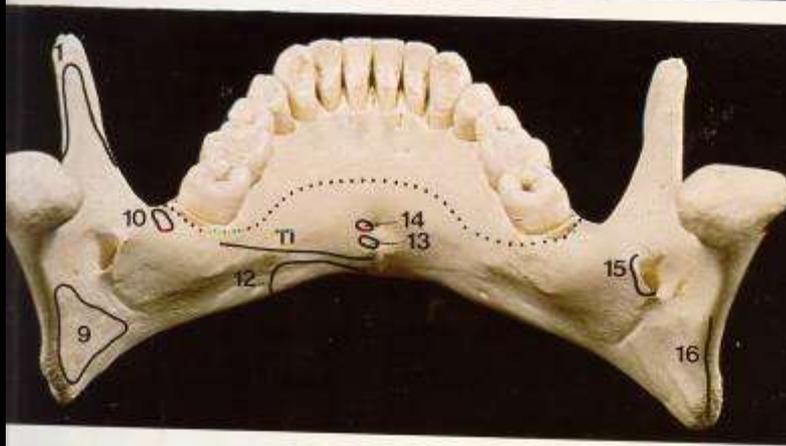
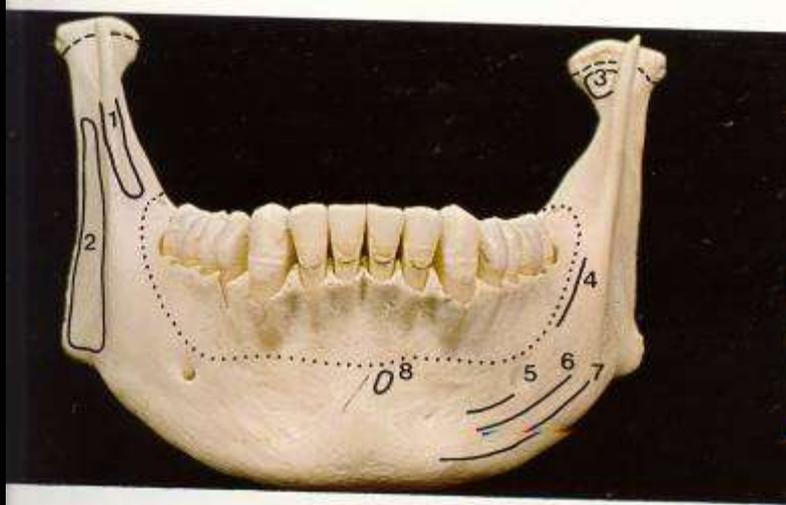






The Mandible





Muscles of the Head and Face

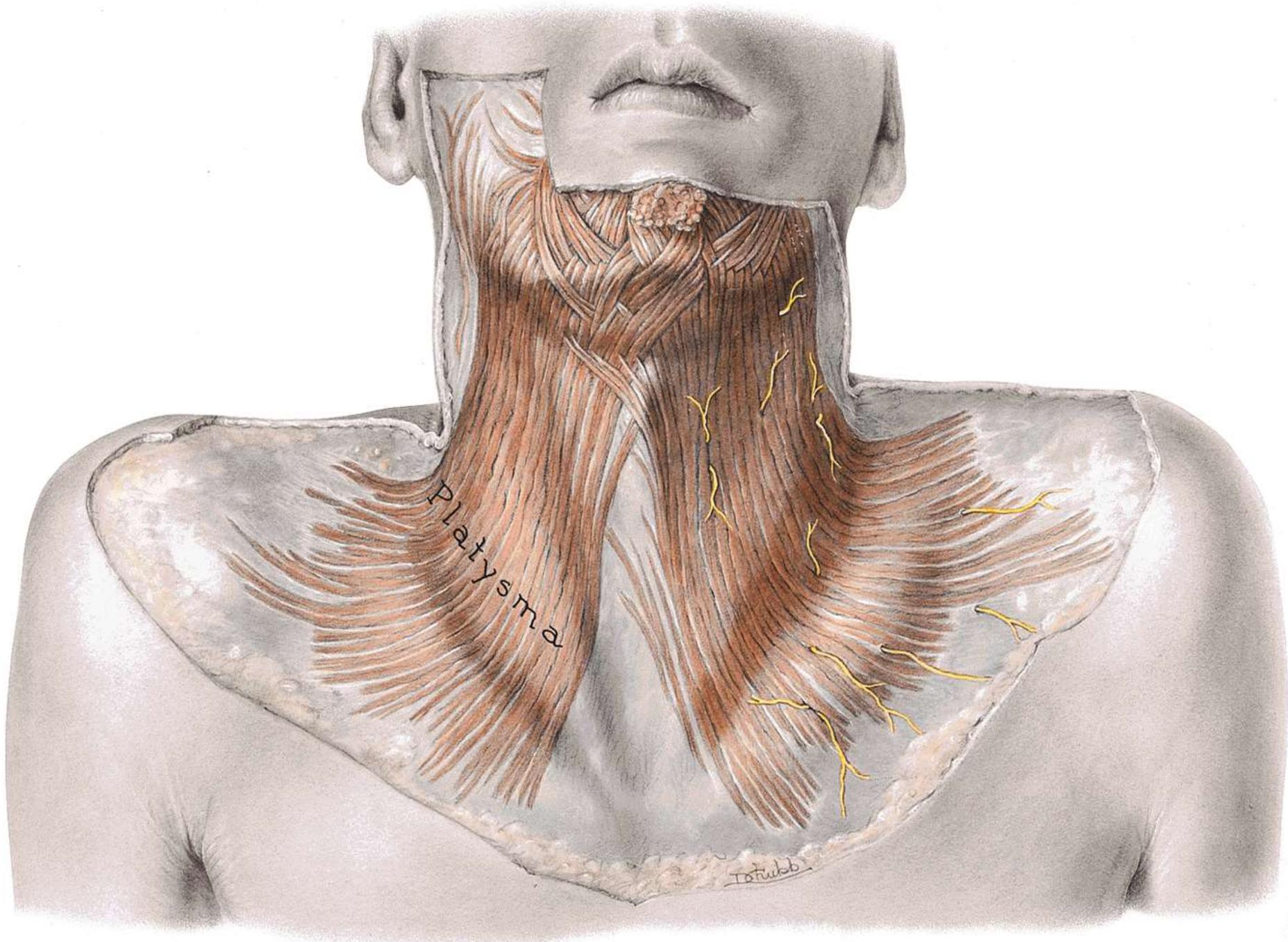
Muscles: Rules of Innervation

- The muscles of facial expression are all innervated by the facial nerve, which also supplies the stapedius, stylohyoid and the posterior belly of the digastric.

Muscles of Facial Expression

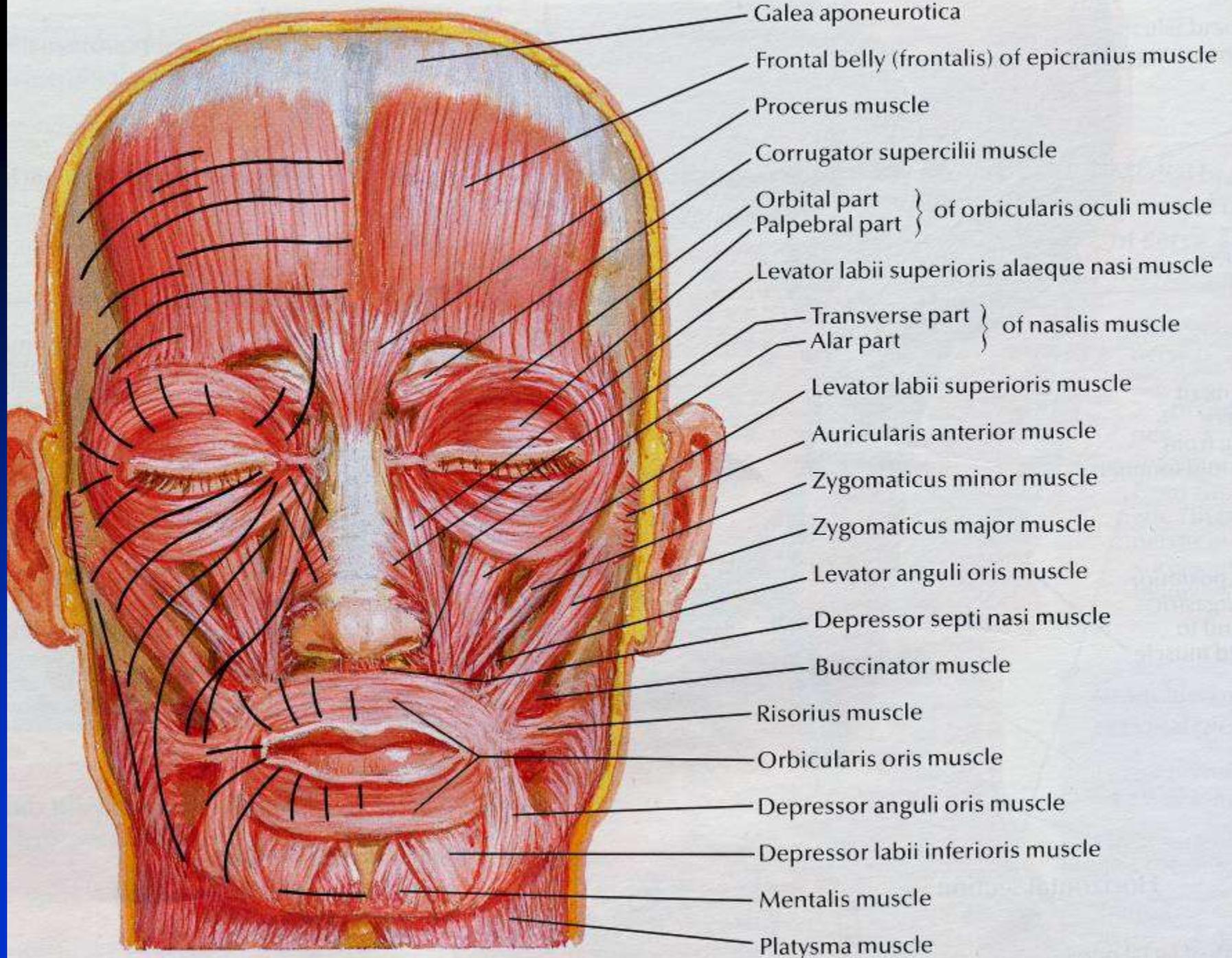
- Epicranial: Frontal and occipital bellies
- Orbicularis oculi
- Corrugator supercilii
- Orbicularis oris
- Buccinator
- Risorius
- Levator labii superioris

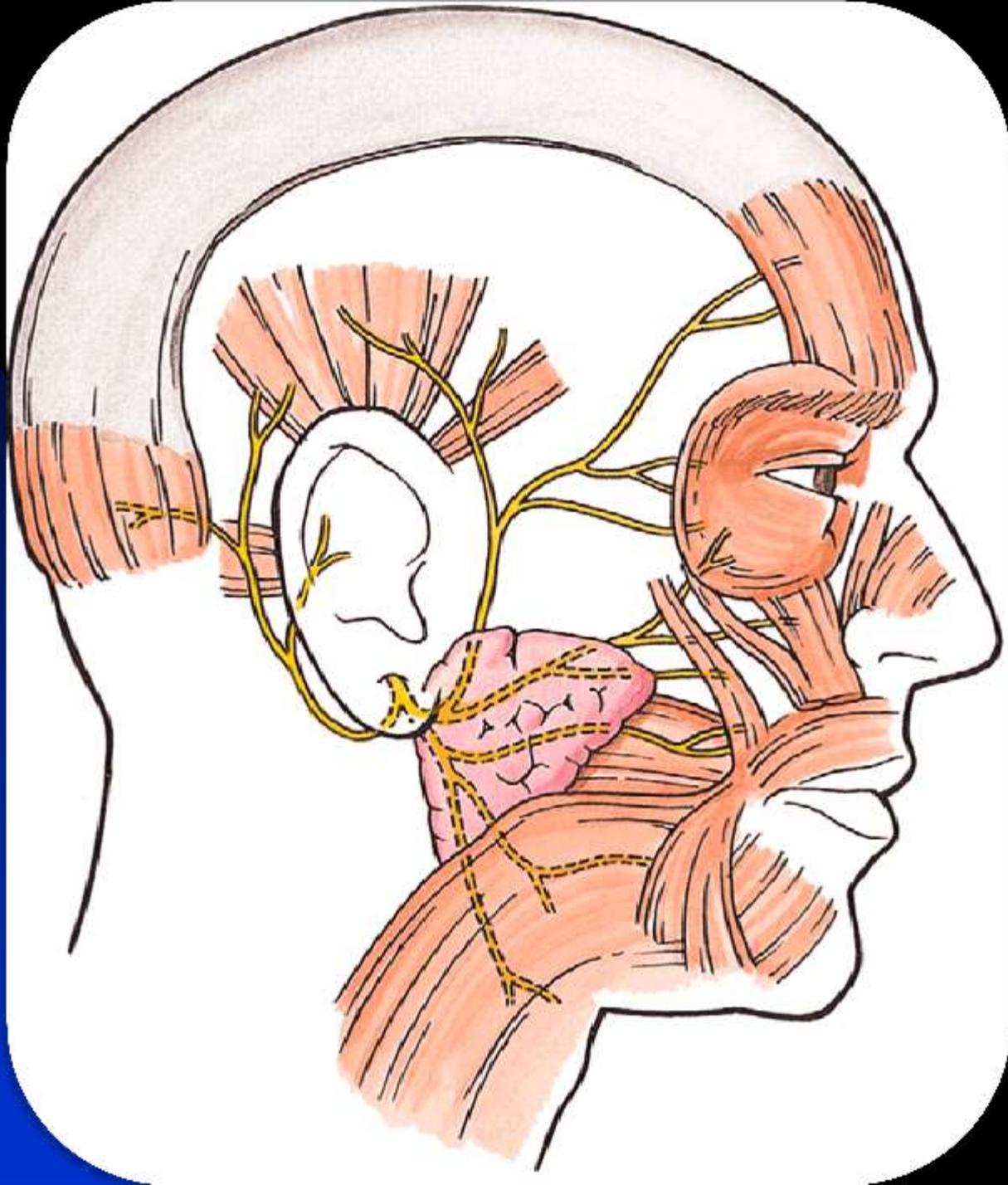
- Levator labii superioris alaeque nasi
- Zygomaticus major
- Zygomaticus minor
- Levator anguli oris
- Depressor anguli oris
- Depressor labii inferioris
- Mentalis
- Platysma

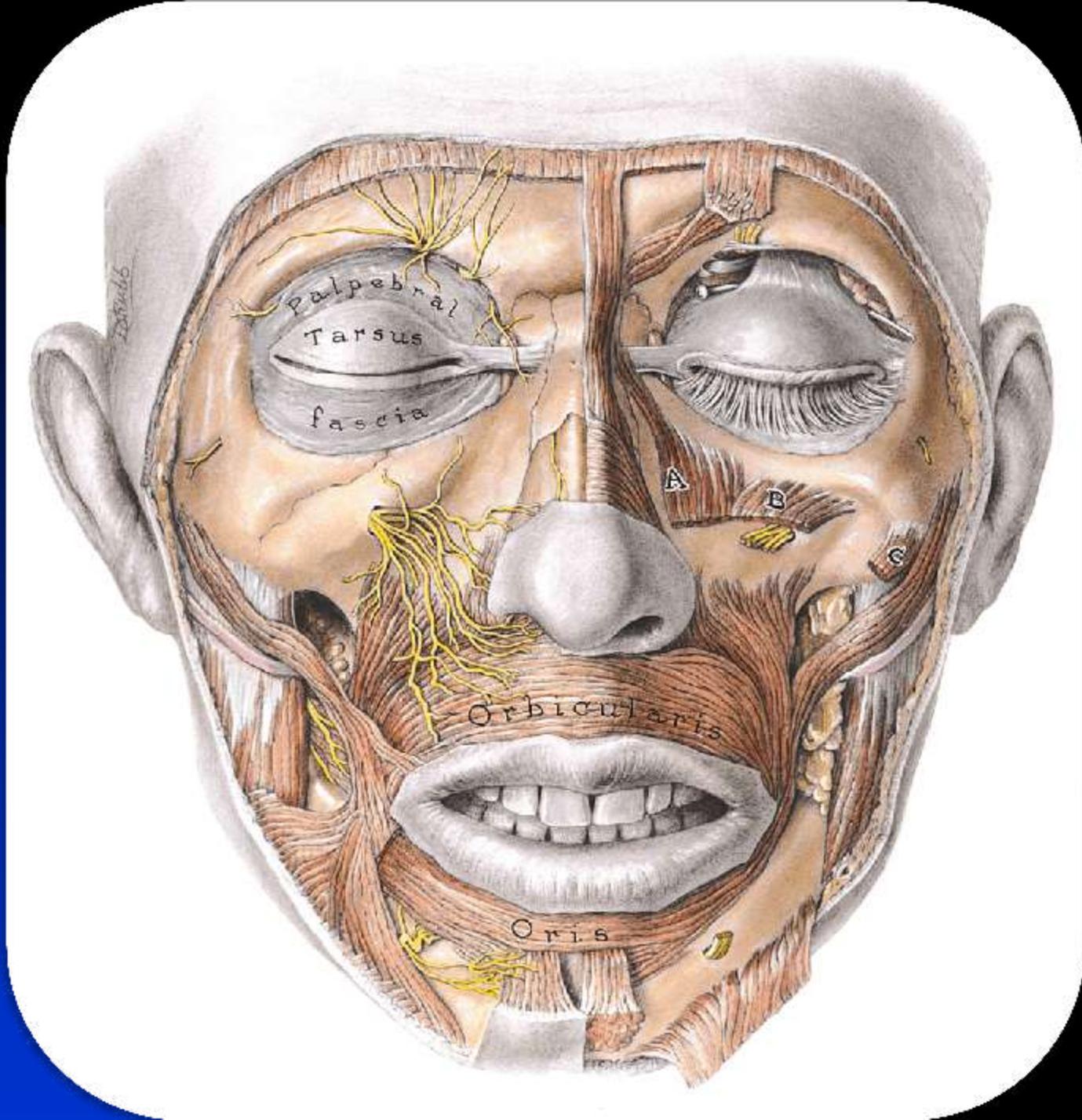


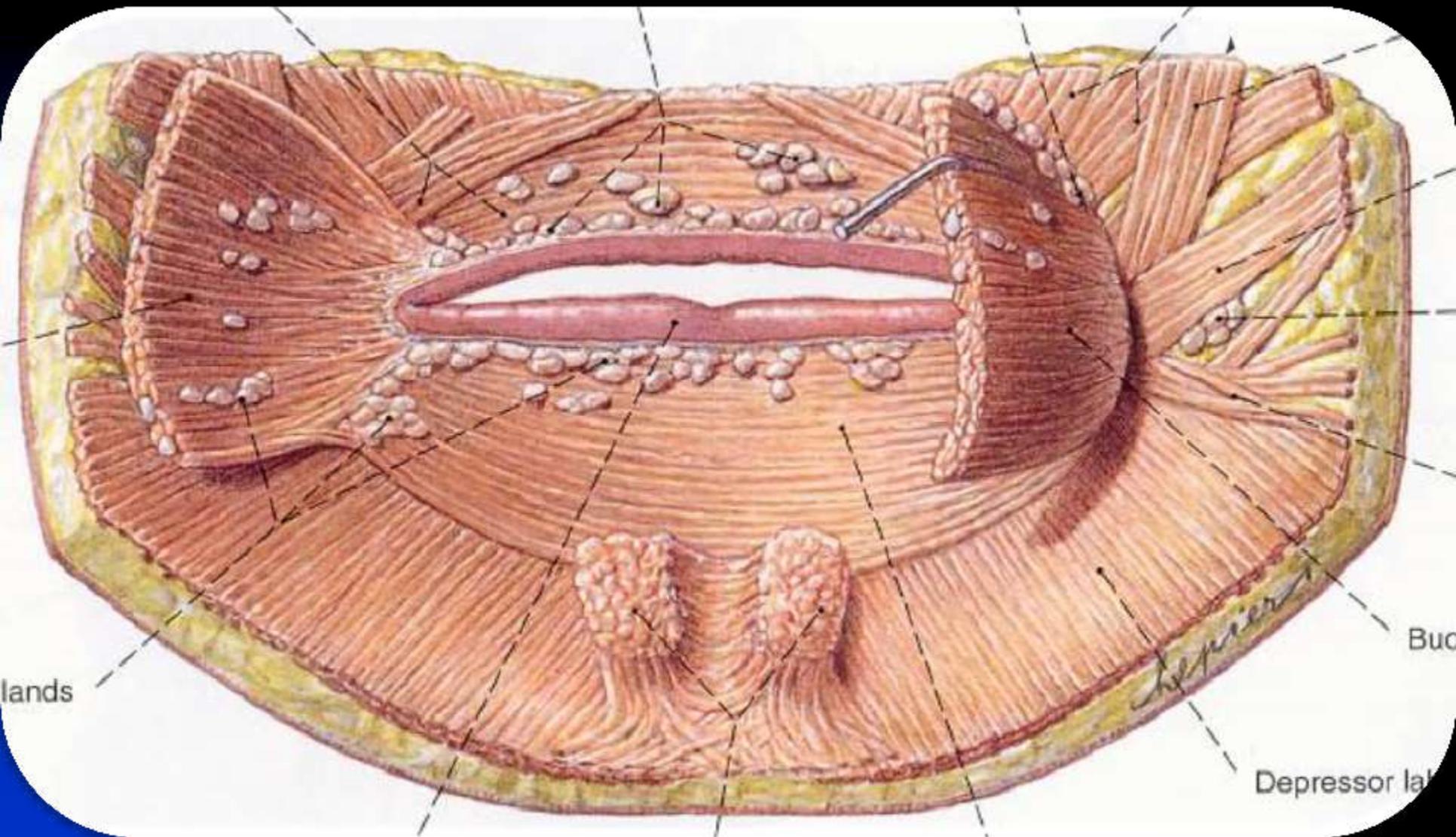
Platysma

Totubb









lands

Buc

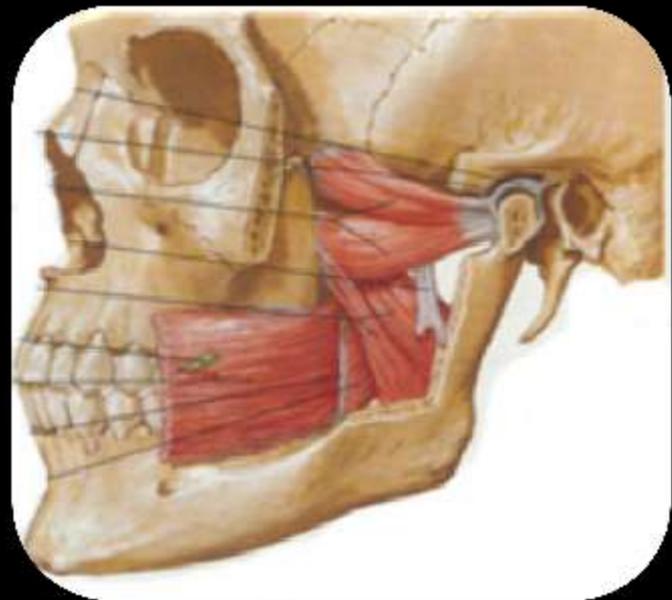
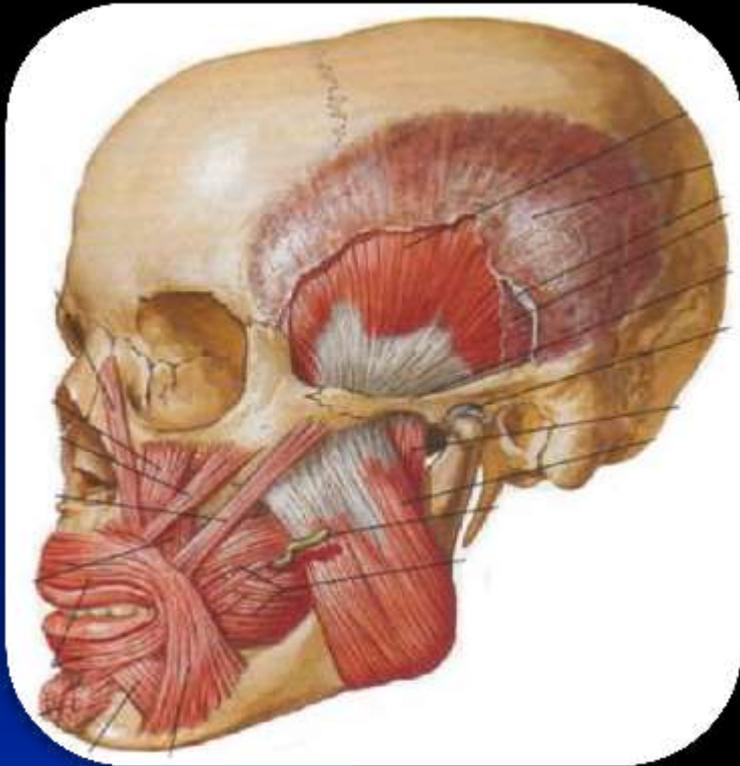
Depressor lab



Muscles of Mastication

Muscles: Rules of Innervation

- The muscles of mastication are all innervated by the trigeminal nerve, which also supplies the tensor veli palatini, tensor veli tympani, the mylohyoid and the anterior belly of the digastric.



Muscles of Mastication

■ **Masseter**

- ◆ Origin: Zygomatic Arch
- ◆ Insertion: Angle and Ramus
- ◆ Innervation: Masseteric n.
- ◆ Actions: Elevates the Mandible

Muscles of Mastication

- **Lateral Pterygoid: Inf. Belly**
 - ◆ Origin: Lateral surface of the lateral pterygoid plate
 - ◆ Insertion: Condylar neck; joint capsule; articular disc
 - ◆ Innervation: Lateral pterygoid n.
 - ◆ Action: Depresses mandible (translation)

Muscles of Mastication

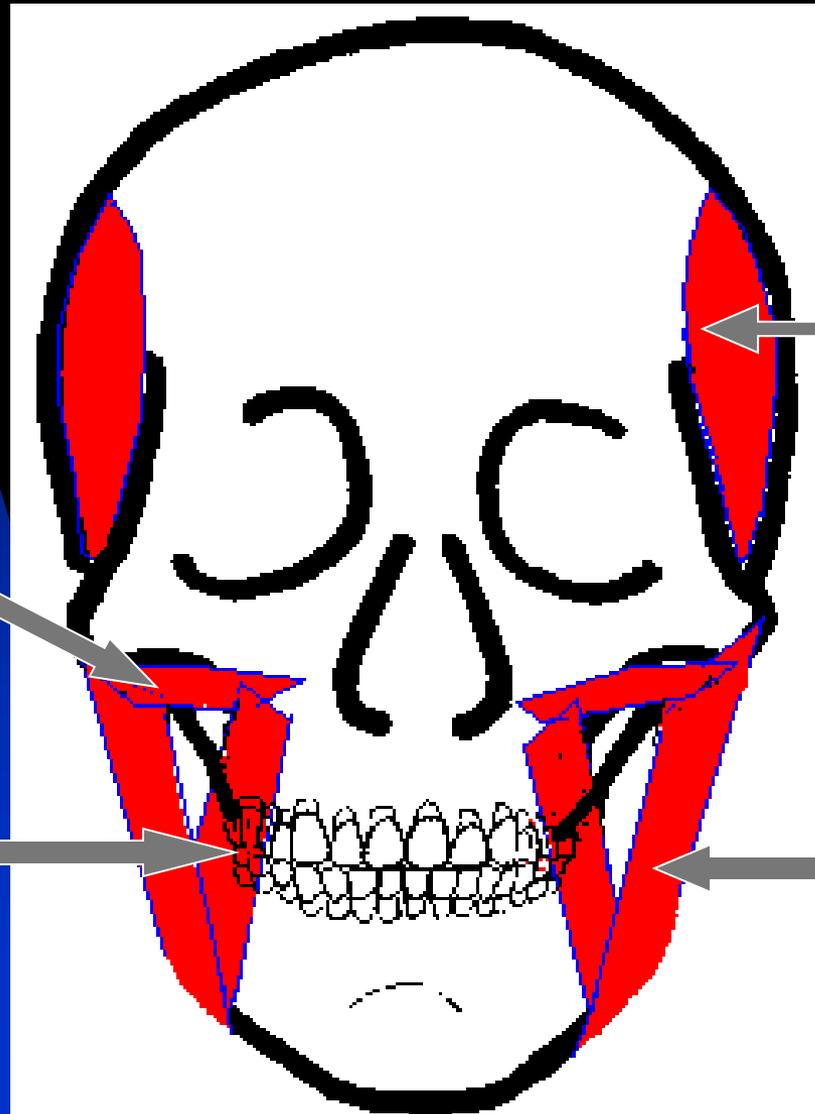
- **Lateral Pterygoid: Sup. Belly**
 - ◆ Origin: Inf. Surface of the greater wing of the sphenoid
 - ◆ Insertion: Articular disc; condylar head and joint capsule
 - ◆ Innervation: Lateral pterygoid n.
 - ◆ Actions: Maintains articular disc position during condylar rest and movement.

Muscles of Mastication

■ Medial Pterygoid

- ◆ Origin: Medial surface of the lateral pterygoid plate
- ◆ Insertion: Medial surface of the mandible
- ◆ Innervation: Medial pterygoid n.
- ◆ Actions: Protrudes the mandible, elevates the mandible

Muscles of Mastication



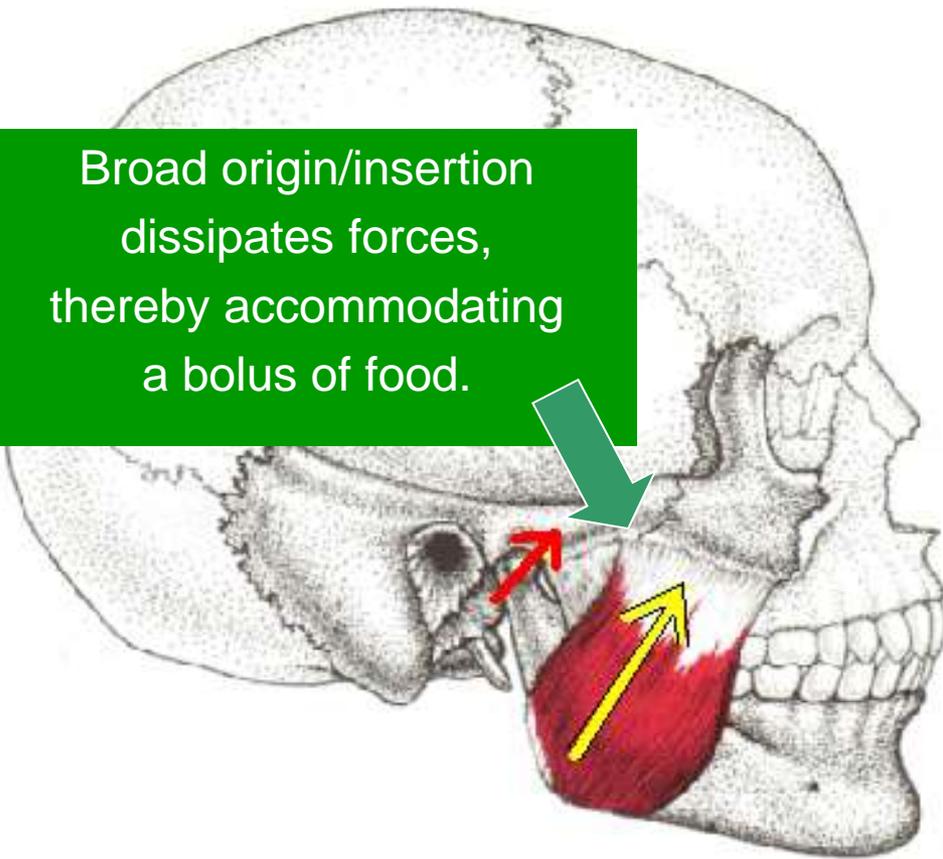
Temporalis

Lateral
Pterygoid

Medial
Pterygoid

Masseter

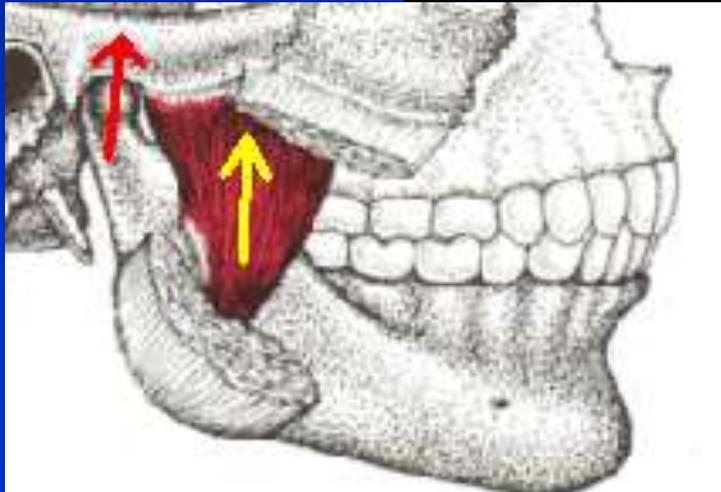
Broad origin/insertion
dissipates forces,
thereby accommodating
a bolus of food.



Masseter

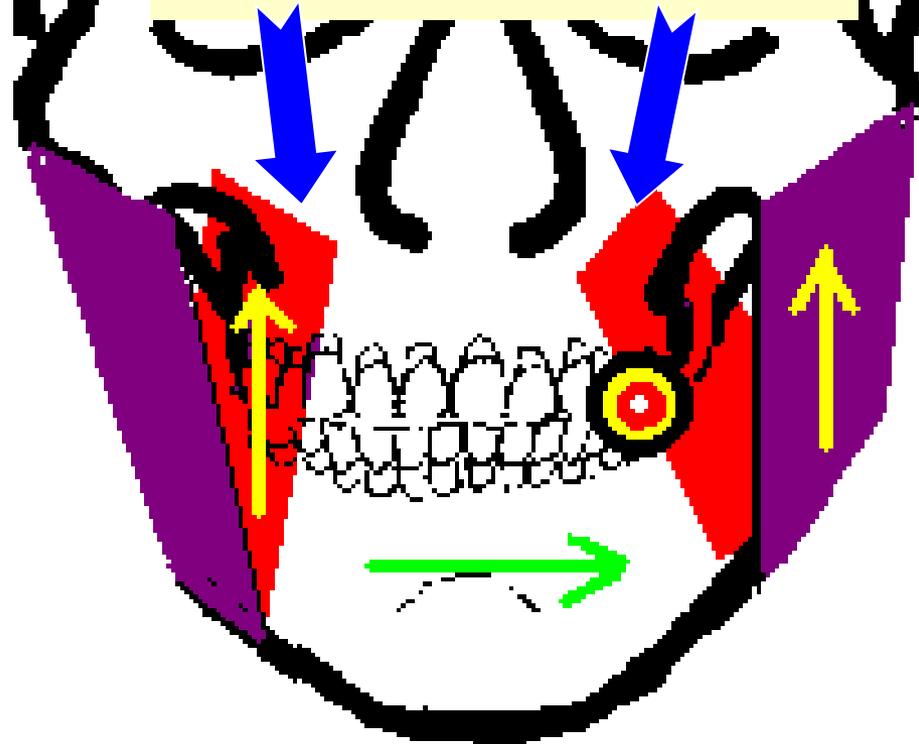
Elevates mandible
*in the direction
of its fibers*

Seats condyle
Anteriorly-Superiorly



One neuron innervates
600 fibrils
Strongest masticatory
muscle of the **Herbivores**

Medial Pterygoid
originates on the
medial side of the
pterygoid plate



The
opposite side
Medial Pterygoid
is most efficient
during function...

...and functions with
the masseter
to provide the
“working”
movement.
(the actual movement
is very slight)

LATERAL PTERYGOID

Attachments...

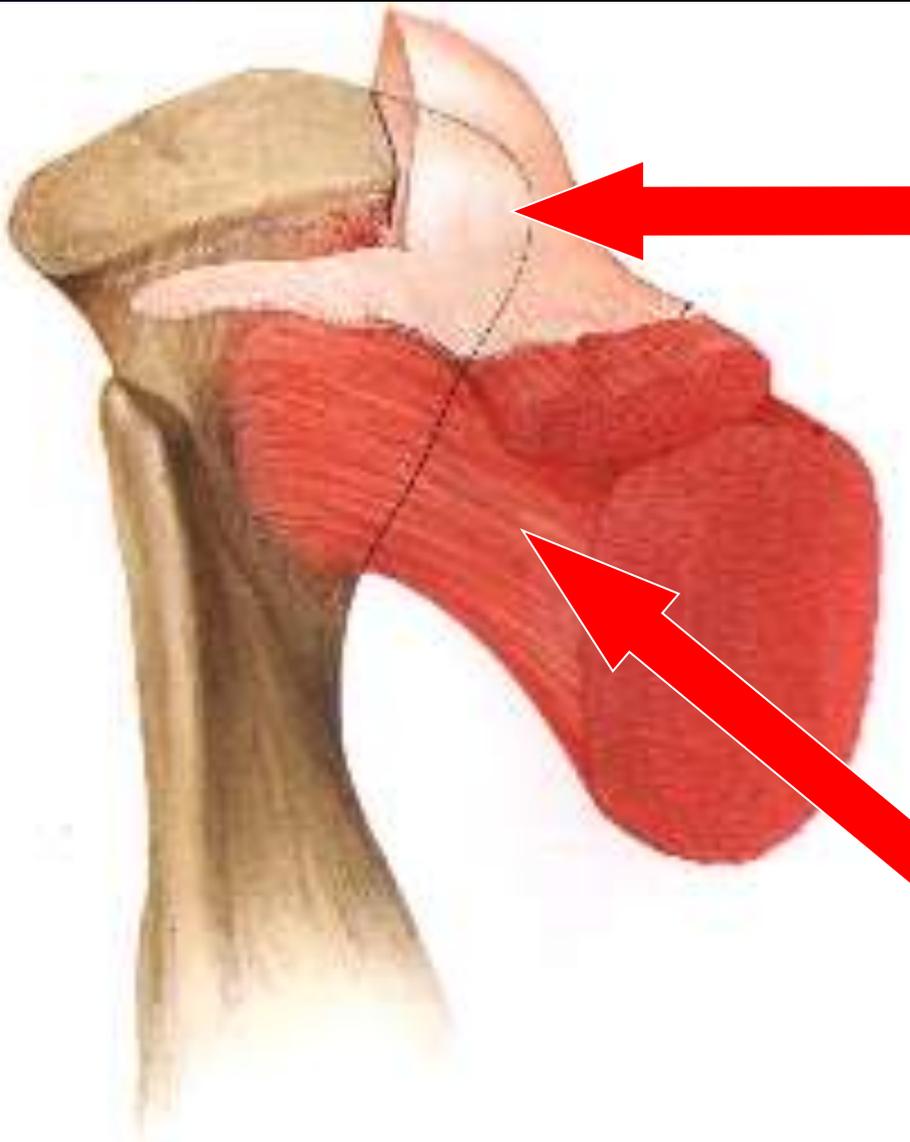
Superior Head:

“Becomes” the disc.
Tenses during closure,
stabilizing disk

Inferior Head:

**Attaches to
neck of condyle.**

**Pulls antero-medially,
translating condyle for
advancement and opening**





Look closely at the orientation of the Lateral Pterygoid's fibers... The Lateral Pterygoid, like any muscle, can only "get shorter", and by doing so, pulls the attachment closer to the origin. When the condyle is pulled anterior/medially, the eminence immediately provides translation of the condyle

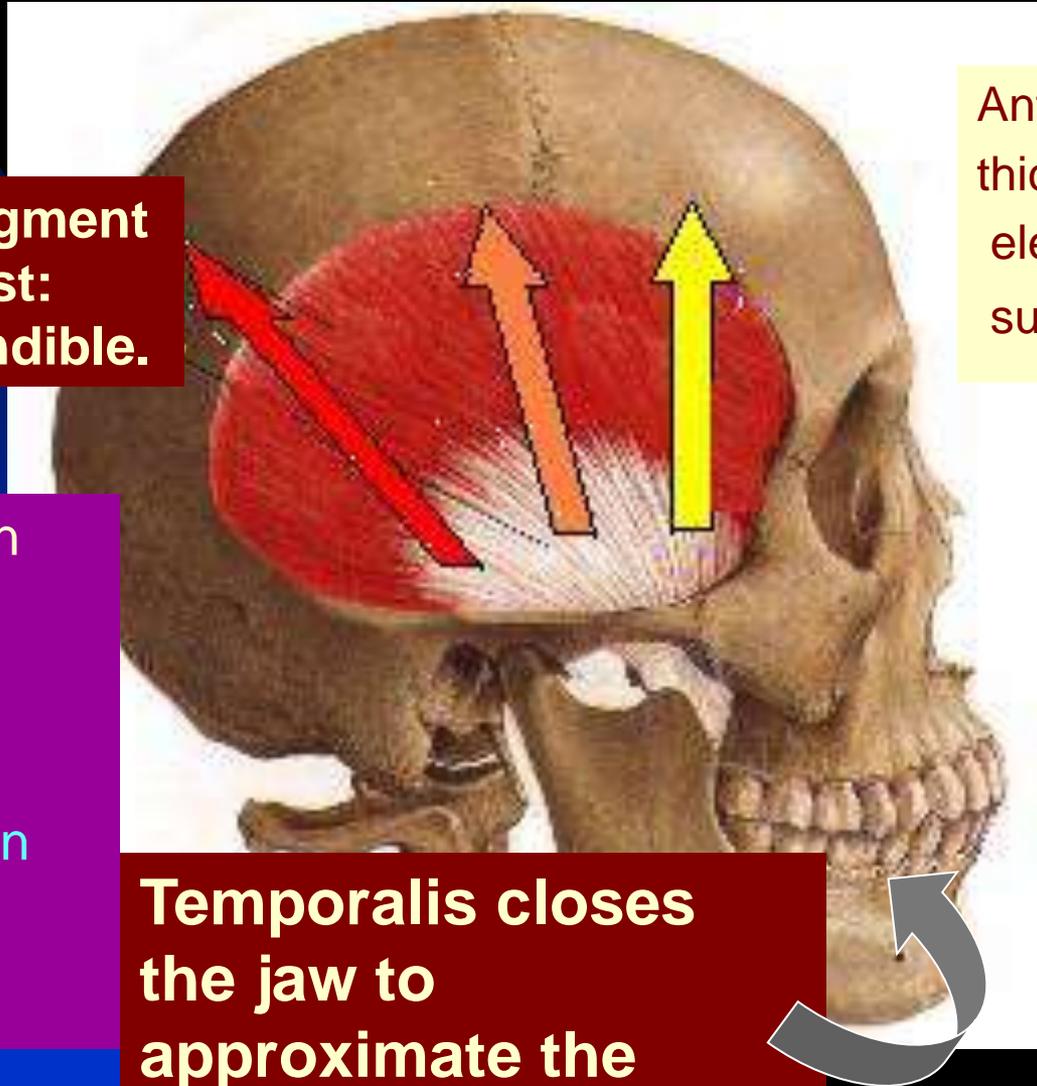
Temporalis

**Posterior Segment
is thinnest:
retrudes mandible.**

One neuron
recruits
900 fibrils;
50% more
efficient than
masseter

**Temporalis closes
the jaw to
approximate the
teeth**

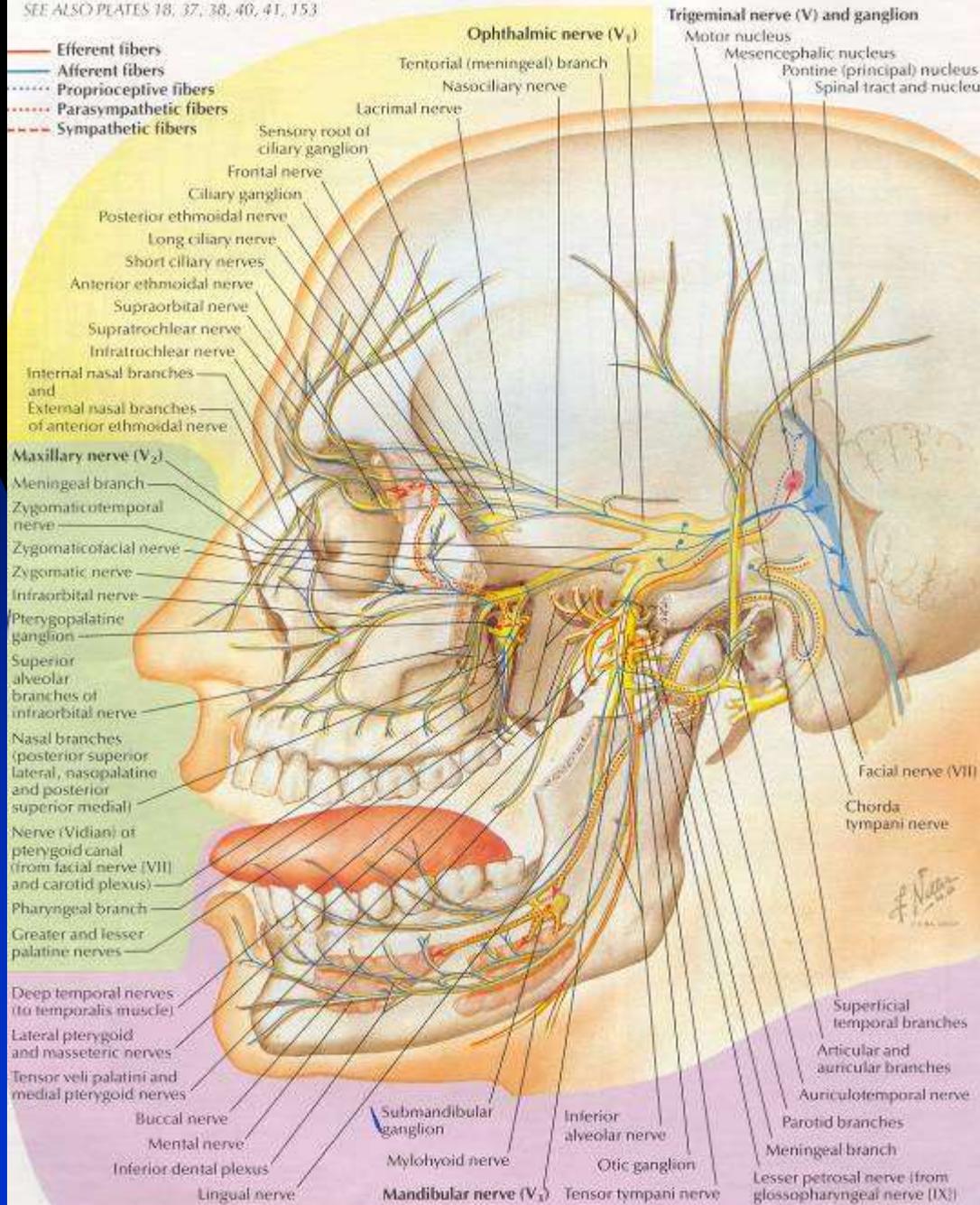
Anterior segment is
thickest & strongest
elevates mandible
superiorly



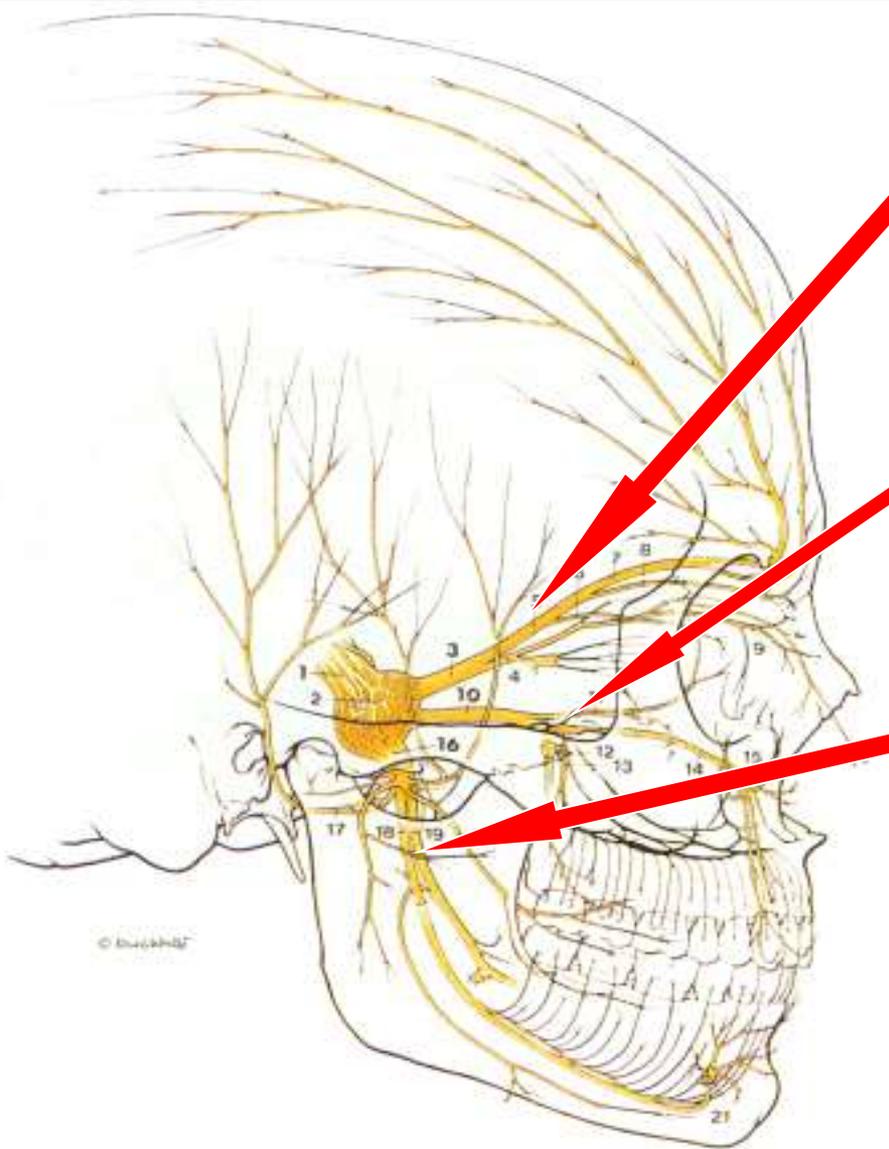
The Trigeminal Nerve

Trigeminal Nerve: Schema

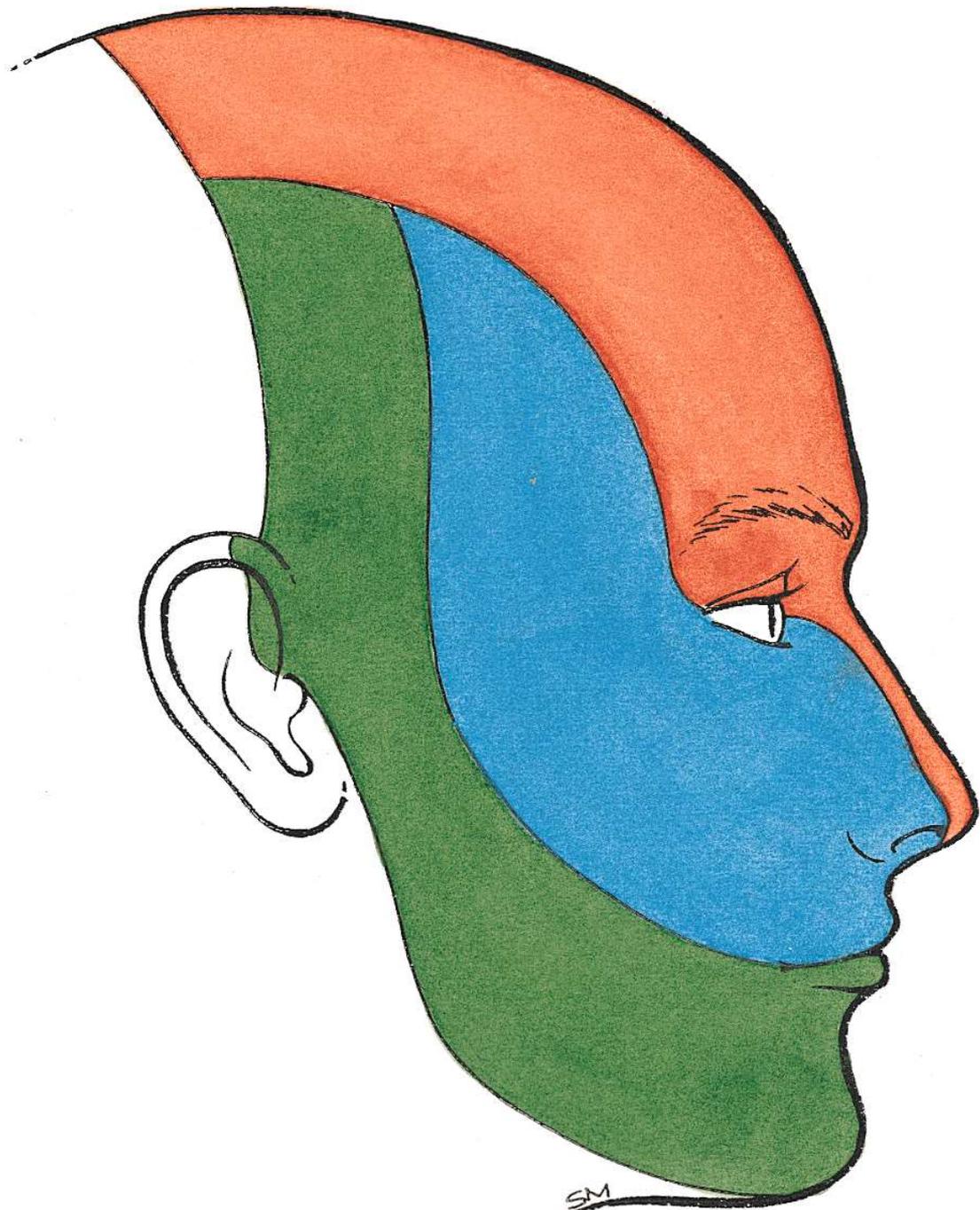
SEE ALSO PLATES 18, 37, 38, 40, 41, 153

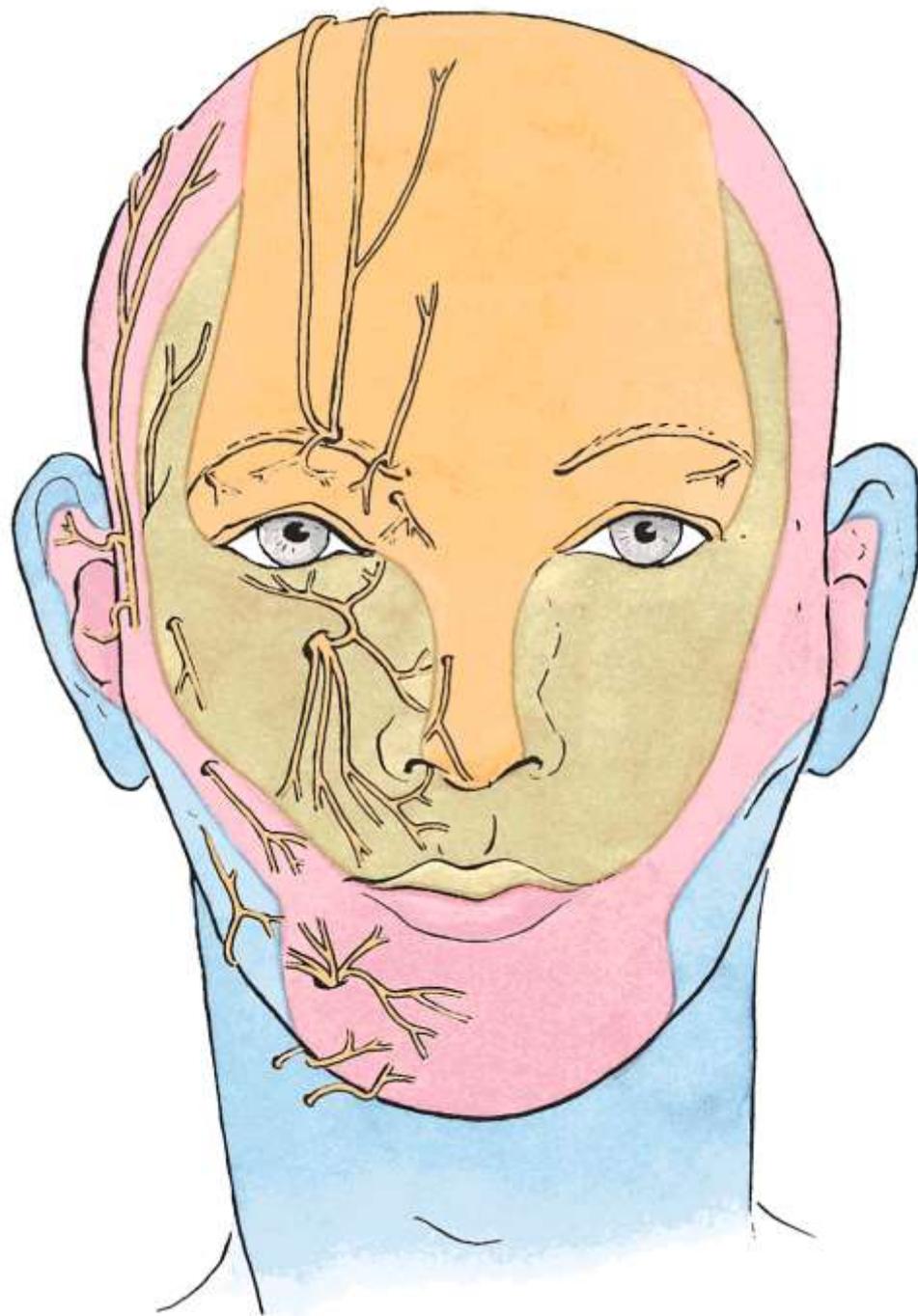


Muscles of mastication are innervated by the TRIGEMINAL NERVE



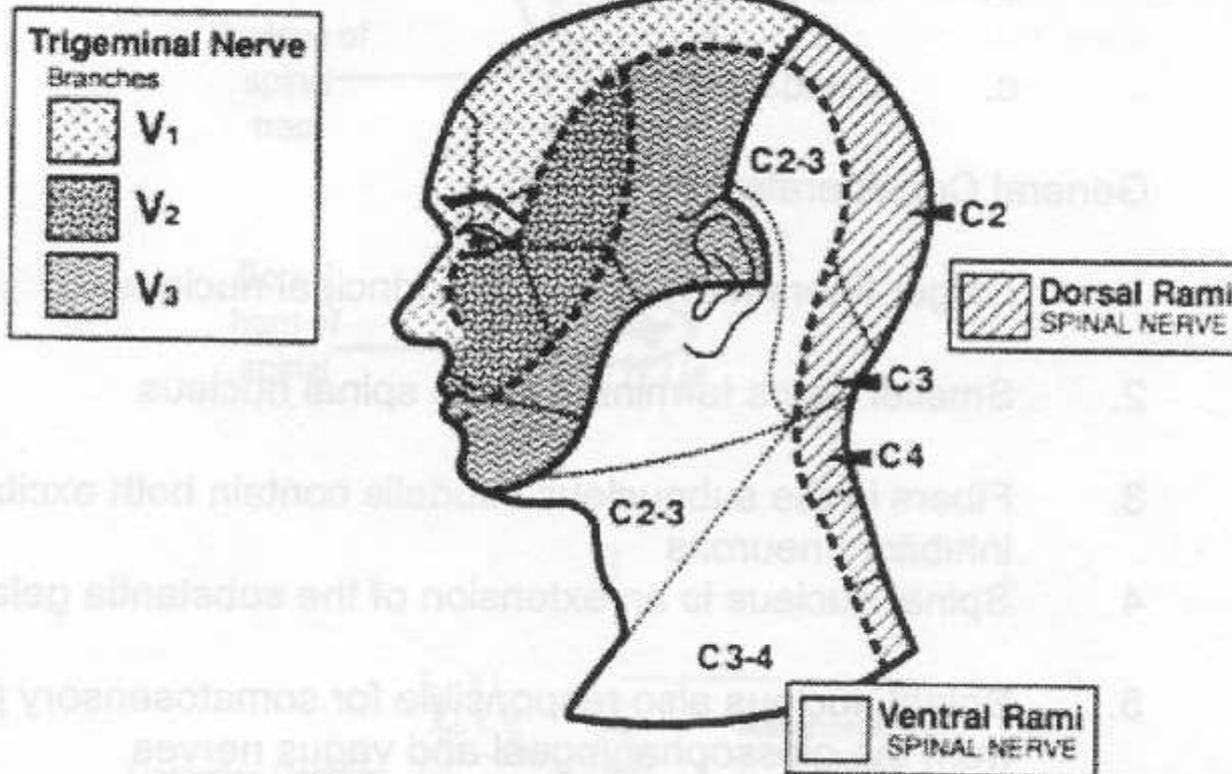
- Ophthalmic (V1)
Sensory
- Maxillary (V2)
Sensory, Autonomic
- Mandibular (V3)
Motor, Sensory,
Proprioceptive,
Parasympathetic





Cutaneous Nerves of the Head and Neck

Cutaneous Nerves to Head and Neck



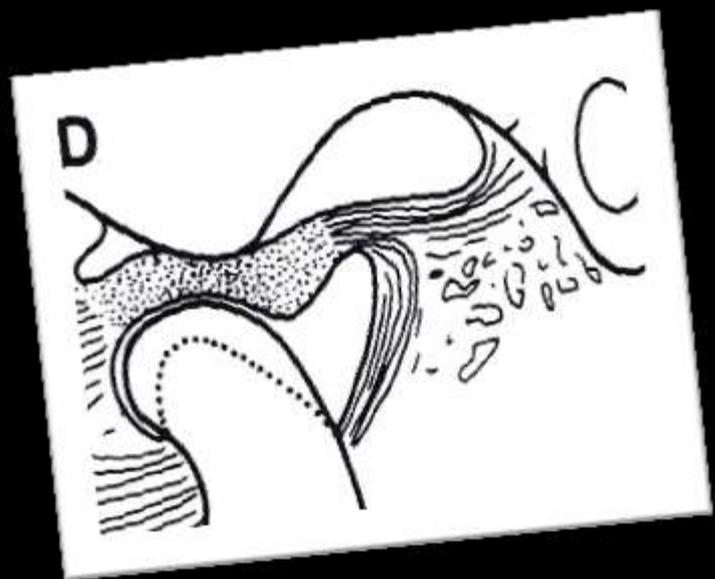
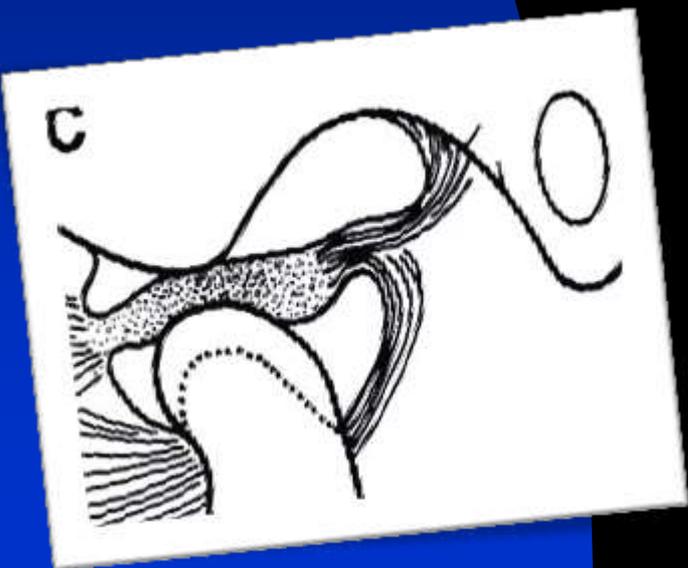
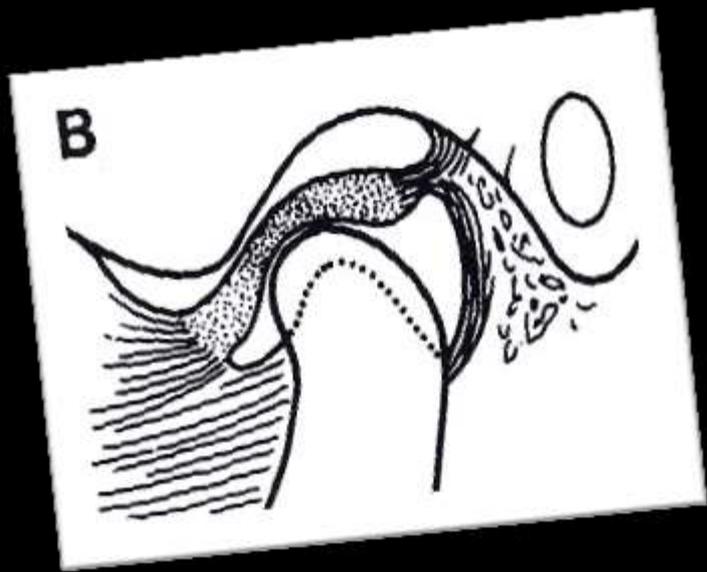
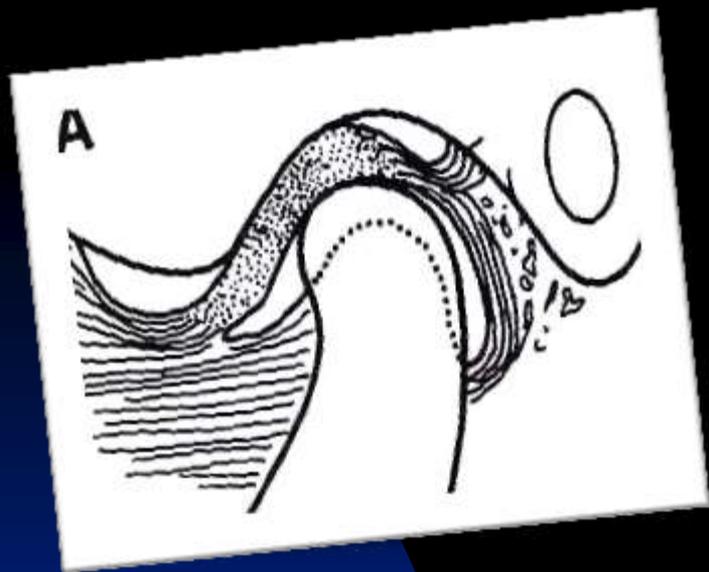
The Temporomandibular Joint

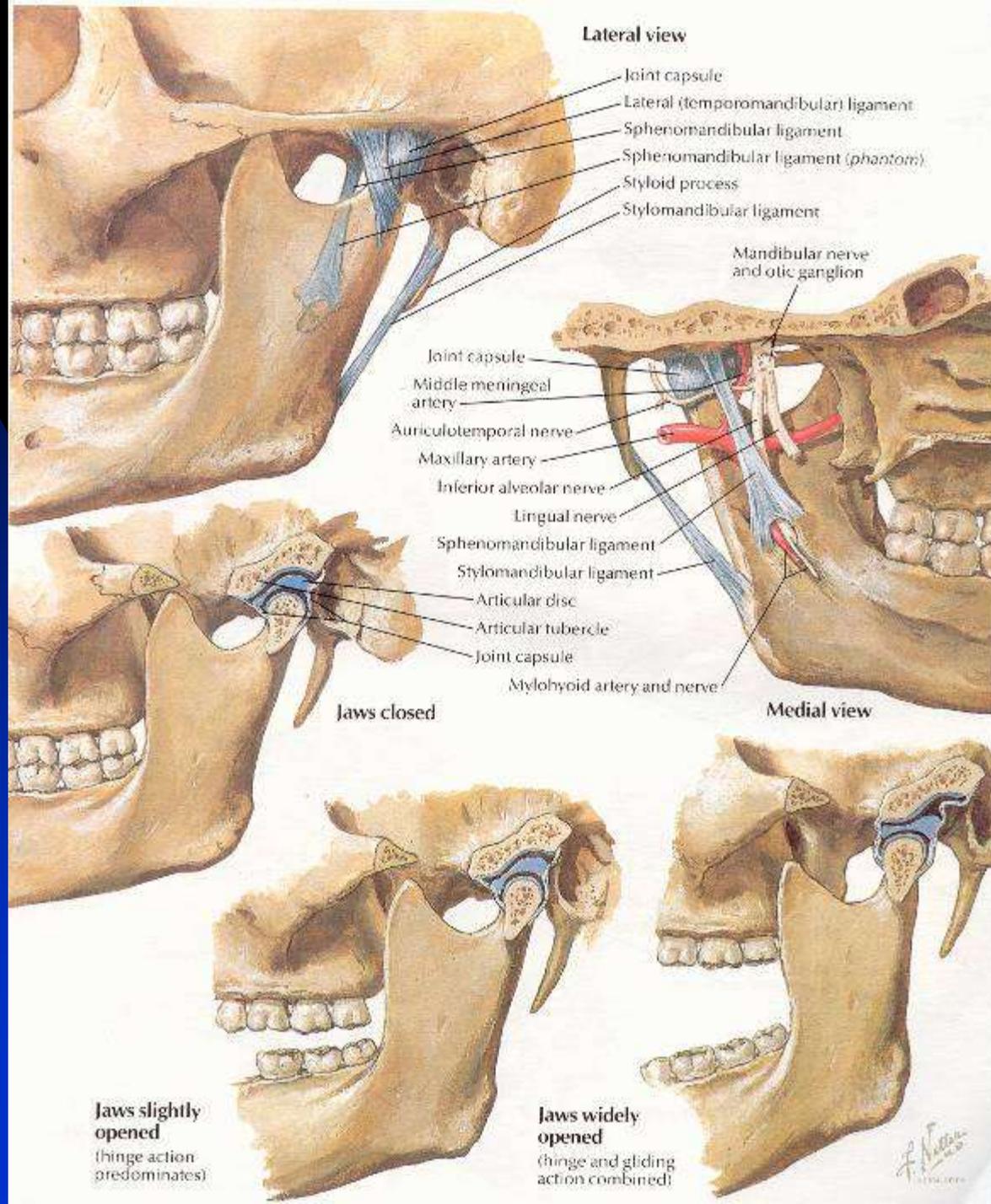
The Temporomandibular Joint

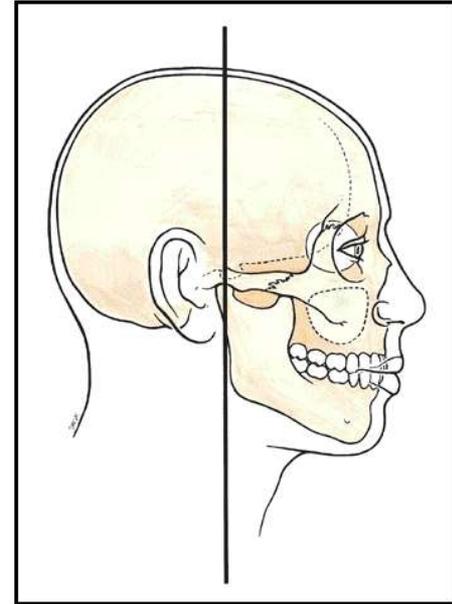
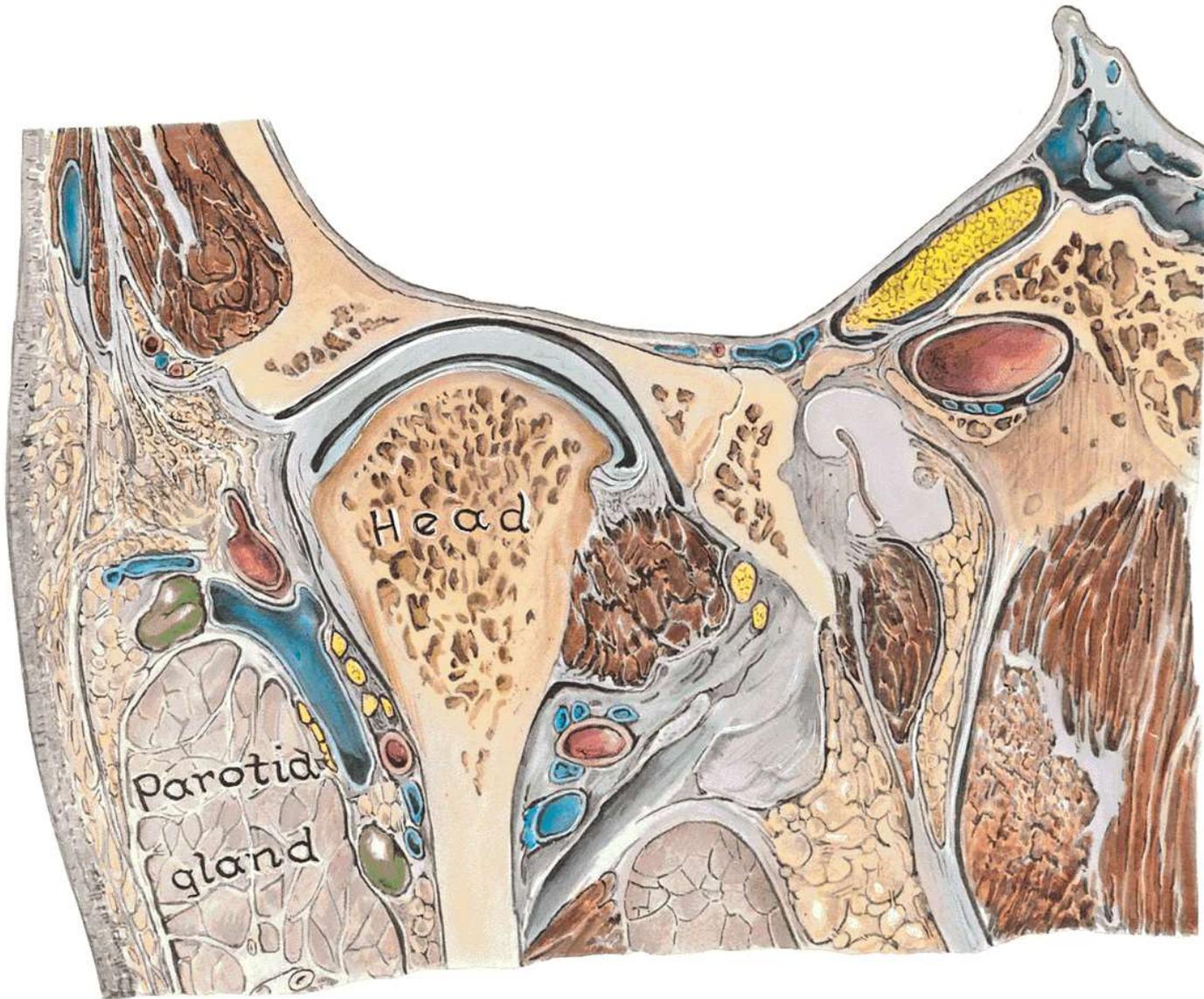
- An “arthroginglymoidal” joint
- Rotation occurs in the upper joint compartment (arthrodial)
- Translation occurs in the lower compartment (ginglymoid)

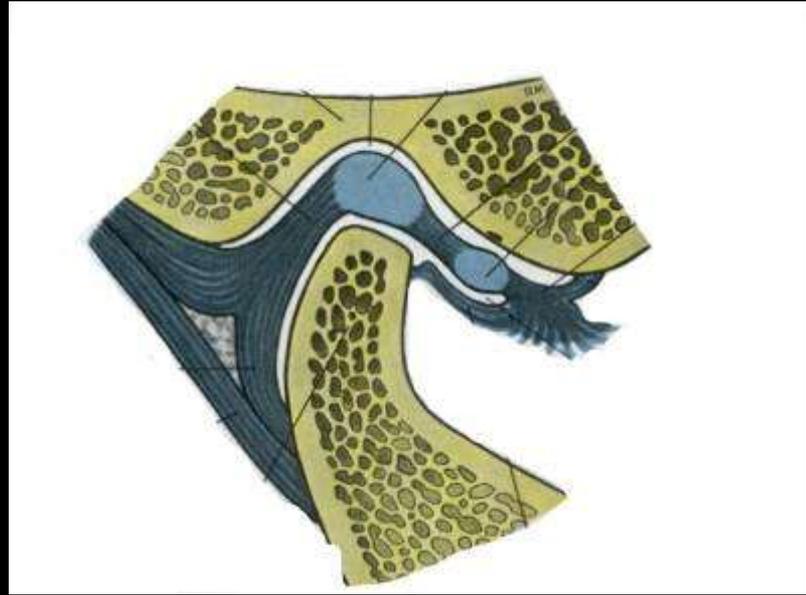
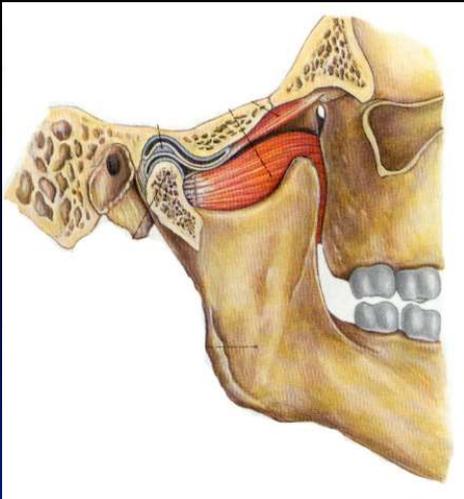
The Temporomandibular Joint

- Innervation:
 - ◆ Auricular branch of the auriculotemporal nerve (75%)
 - ◆ Posterior deep temporal nerves
 - ◆ Masseteric nerve





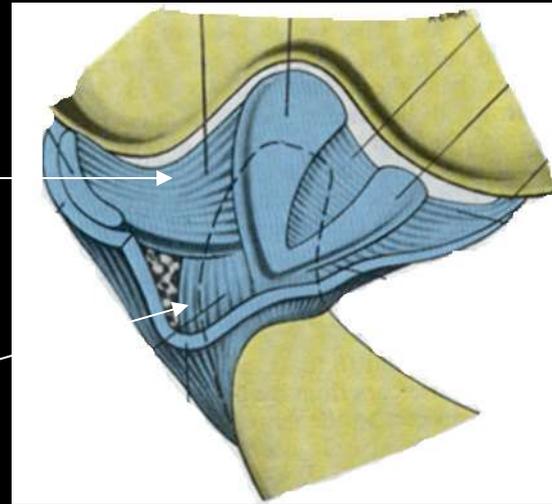


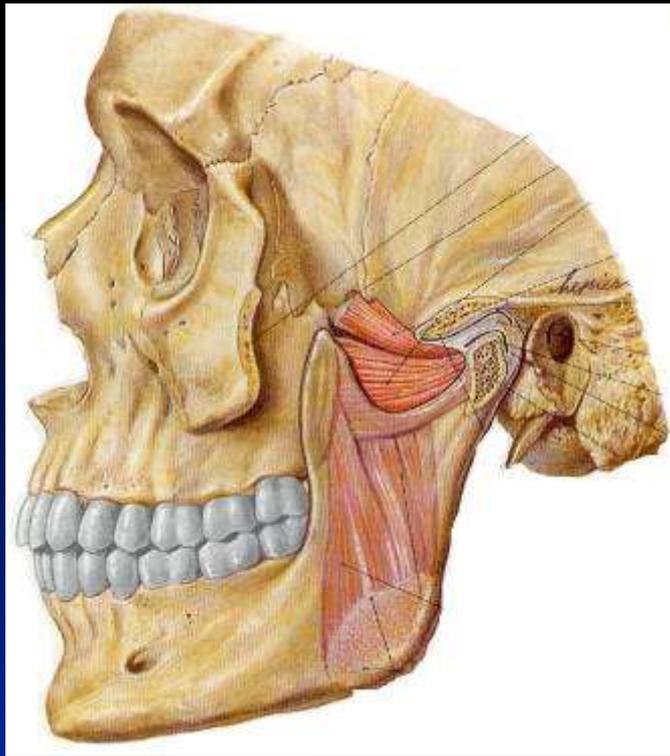


“RETRODISCAL PAD”

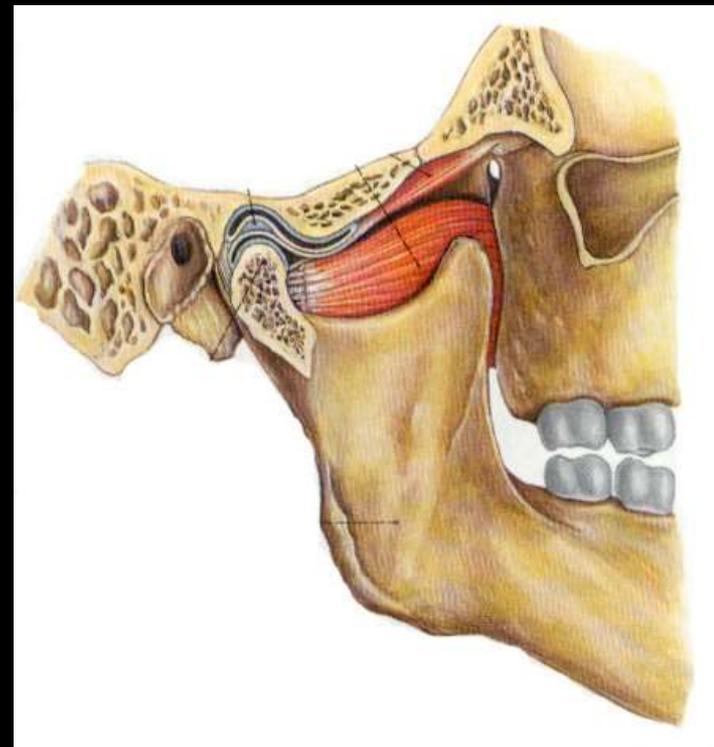
Posterior temporal
attachment or
“superior lamina”

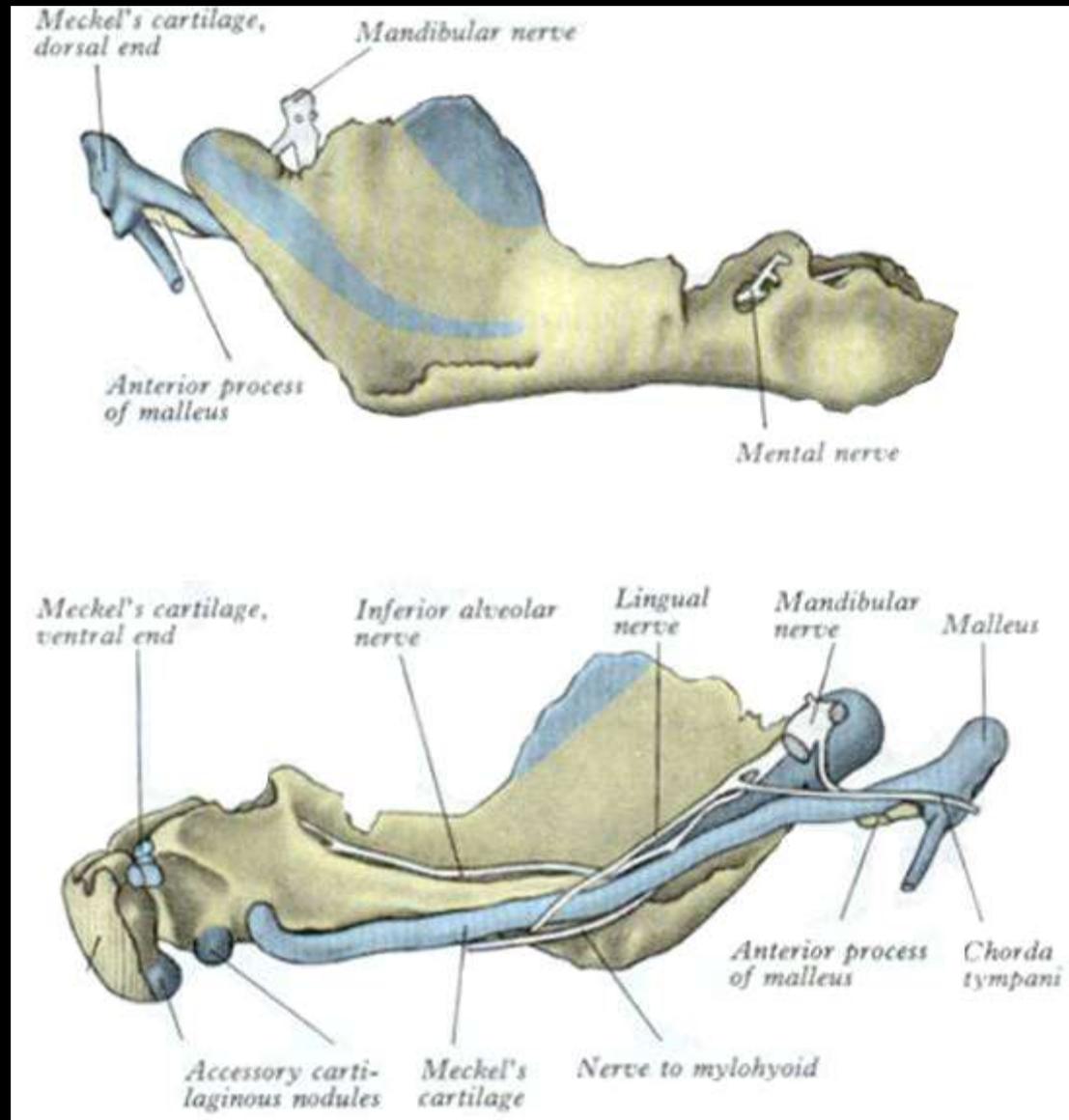
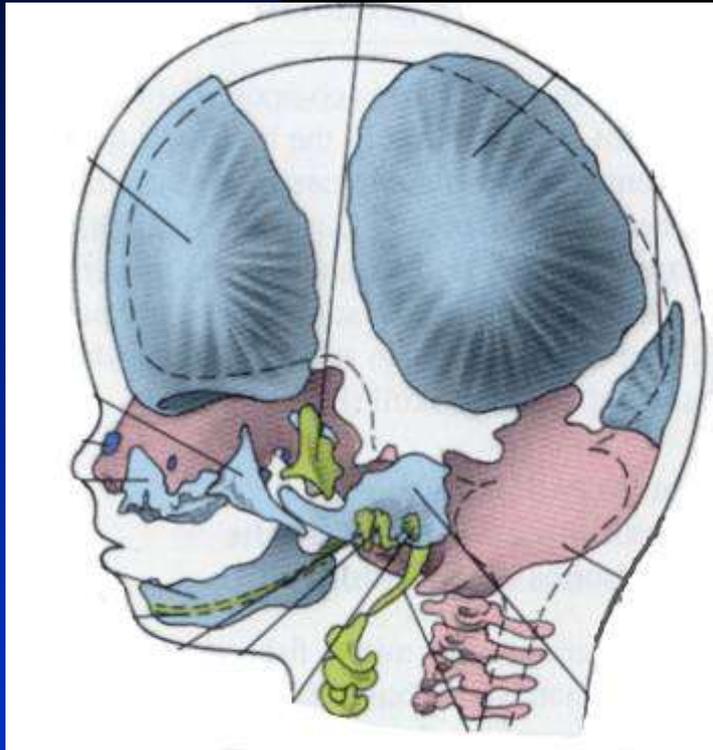
Posterior mandibular
attachment or
“inferior lamina”

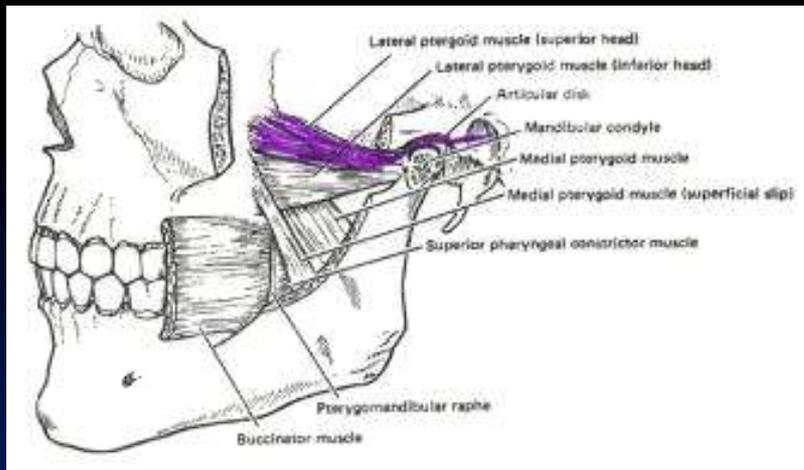




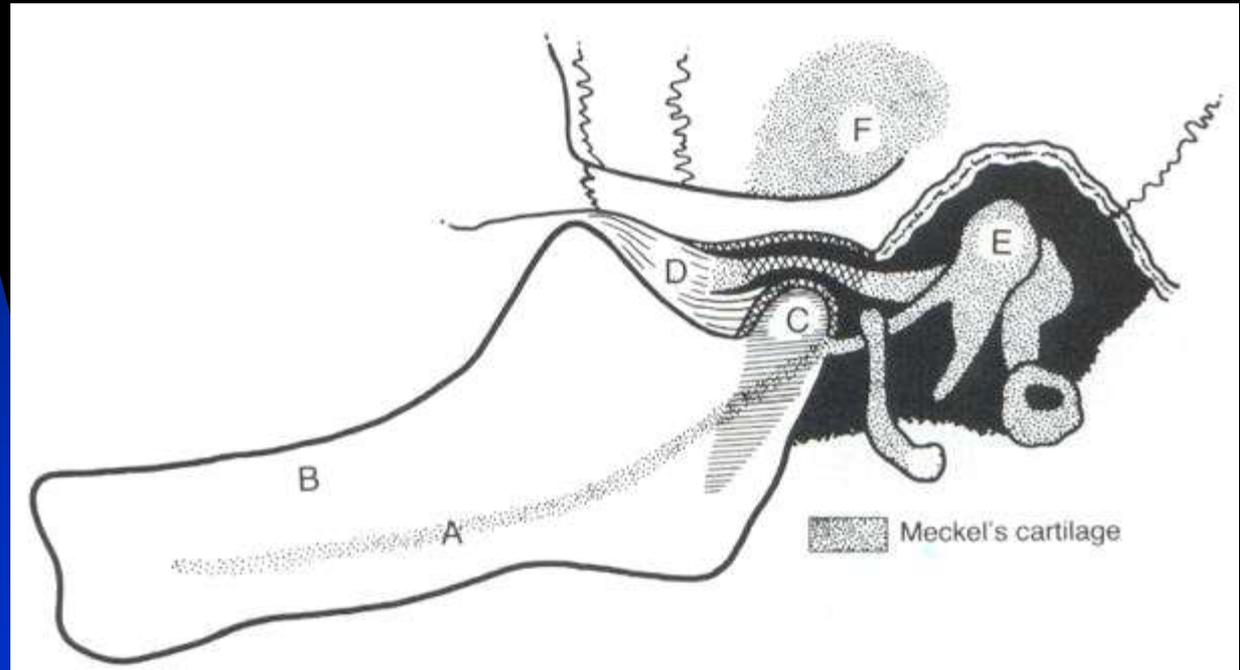
Fibers of the superior head of the lateral pterygoid muscle attach to the disc.

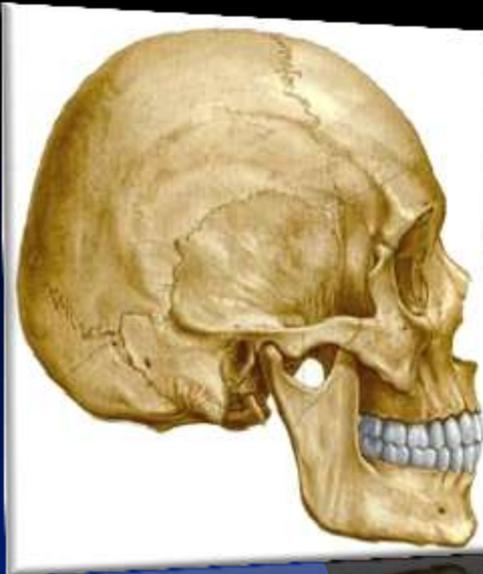






Pinto's ligament – malleomandibular ligament

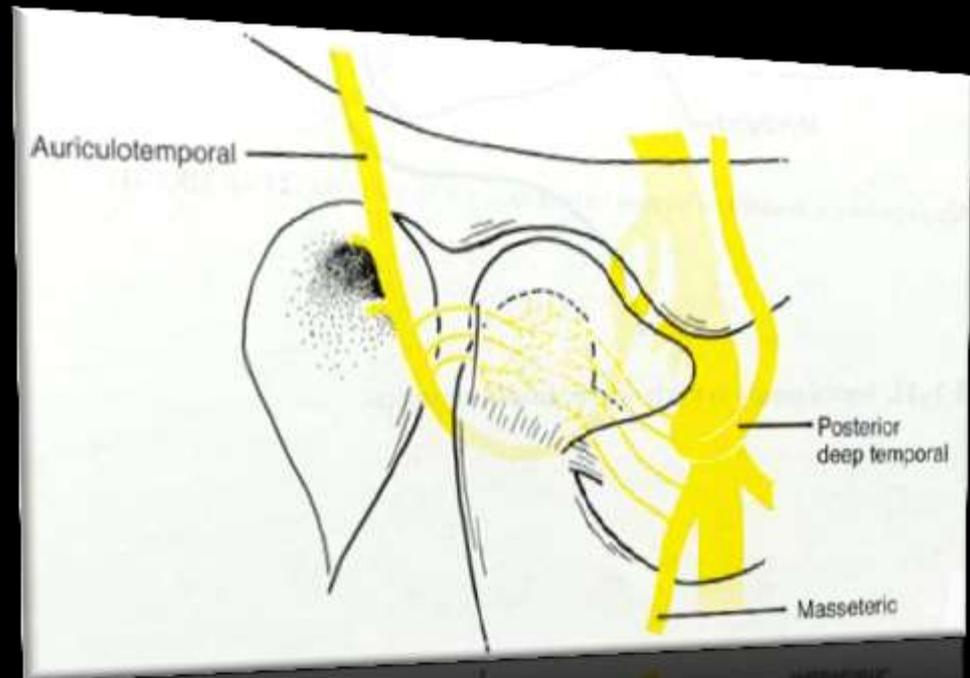




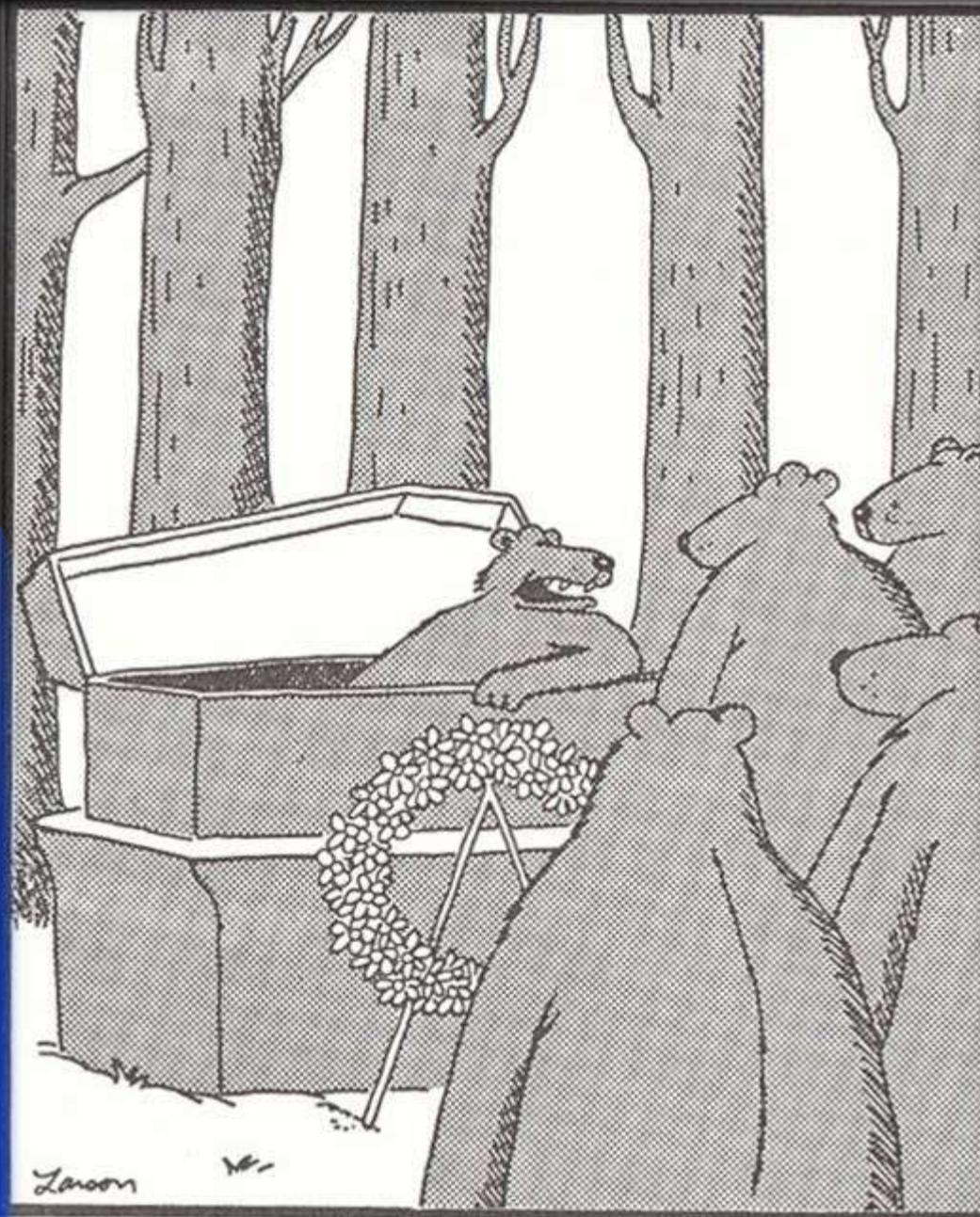
TMJ Innervation:

Mandibular division of the Trigeminal nerve (V)

- auriculotemporal
- deep temporal
- masseteric



Craniofacial Pain Examination



"For crying out loud, I was *hibernating!* ...
Don't you guys ever take a pulse?"

Proper diagnosis is the key to proper treatment.



Initial Evaluation / Screening

- Panoramic Radiograph
- Health History
- History of TMD
- Maximum opening
- Palpation for joint noises
- Spray and stretch procedure
- Initial diagnosis and TX plan

Initial Examination

- Panoramic Radiograph
 - ◆ To rule out dental pathology, fracture, etc
 - ◆ To evaluate overall periodontal support
 - ◆ To get a vague idea of TMJ morphology
 - ◆ To evaluate the condylar and coronoid processes
 - ◆ To evaluate signs of parafunction



JAMISON R. SPENCER, D.M.D.

TEMPOROMANDIBULAR DISORDERS

CRANIOFACIAL PAIN

SLEEP APNEA & SNORING

2030 N. Cole Road, Boise Idaho 83704

(208) 376-3600

HEAD, NECK AND FACIAL PAIN PATIENT QUESTIONNAIRE

This questionnaire was designed to provide important facts regarding the history of your pain or condition. The information you provide will assist in reaching a diagnosis and determining the source of your problem. Please take your time and answer each question as completely and honestly as possible. **Please sign each page.**

PATIENT INFORMATION

MR. MRS. MISS MS. DR. Today's Date: _____

NAME: _____

AGE: _____ FIRST _____ MIDDLE INITIAL _____ LAST _____

DATE OF BIRTH: ____/____/____ Male Female

ADDRESS: _____

CITY/STATE/ZIP: _____

HOW LONG AT CURRENT ADDRESS? _____ (If less than 3 years, please give previous address)

PREVIOUS ADDRESS: _____

EMPLOYED BY: _____

EMPLOYER'S ADDRESS: _____

SOCIAL SECURITY NUMBER: _____ - _____ - _____ REFERRED BY: _____

HOME PHONE: _____ BUSINESS PHONE: _____

RESPONSIBLE PARTY: _____

ADDRESS IF DIFFERENT FROM PATIENT: _____

FAMILY PHYSICIAN: _____ ADDRESS: _____

FAMILY DENTIST: _____ ADDRESS: _____

INSURANCE COMPANY: _____ POLICY/CLAIM # _____

WHAT ARE THE CHIEF COMPLAINTS FOR WHICH YOU ARE SEEKING TREATMENT?

Please order your chief complaints by number with #1 being most important.

_____ Back Pain	_____ Jaw Clicking	_____ Pain behind Eyes
_____ Dizziness	_____ Jaw Joint Noises	_____ Pain when chewing
_____ Ear Pain	_____ Jaw Locking	_____ Ringing in the Ears
_____ Ear/Sinus Congestion	_____ Jaw Pain	_____ Shoulder Pain
_____ Facial Pain	_____ Limited Mouth Opening	_____ Throat Pain
_____ Fatigue	_____ Muscle Twitching	_____ Headaches
_____ Neck Pain	_____ Visual Disturbances	
_____ Inability to Open Mouth	_____ Other: _____	

PLEASE LIST ANY MEDICATIONS YOU ARE CURRENTLY TAKING AND WHY: _____

PLEASE LIST MEDICATIONS THAT HAVE CAUSED YOU TO HAVE AN ALLERGIC REACTION: _____

WHEN DID YOUR CONDITION FIRST OCCUR? _____

WHAT DO YOU BELIEVE IS THE CAUSE OF YOUR PAIN OR CONDITION? _____

	DATE	DESCRIPTION OF INJURY
_____ Motor Vehicle Injury	_____	_____
_____ Workman's Comp Injury	_____	_____
_____ Accidental Injury	_____	_____
_____ Disease/Injury	_____	_____

Unknown Cause

Describe and give approximate dates of any other trauma to the head, neck or back; any accidents, sports injuries, or other injuries that could have effected the head and neck...even as a child.

What other information is important to your pain or condition?

BELOW PLEASE LIST: Physicians (Including ENT, Neurologists, orthopedists, psychiatrists, etc.), Dentists, Chiropractors, Osteopaths, Physical Therapists or other health care providers, that you have consulted with IN REGARDS TO YOUR CHIEF COMPLAINT(S).

Dr.: _____ MD/DDS Specialty: _____ City: _____
Diagnosis & Treatment: _____

Dr.: _____ MD/DDS Specialty: _____ City: _____
Diagnosis & Treatment: _____

Dr.: _____ MD/DDS Specialty: _____ City: _____
Diagnosis & Treatment: _____

LIST ANY OTHER HEALTH CARE PROVIDERS ON A SEPARATE PAGE AND ATTACH TO THIS FORM.

MEDICAL HISTORY

Please circle those conditions that you currently have or have had in the past.

Adenoids / Tonsils Removed	Depression	Gout
Anemia	Diabetes	Hay fever
Arteriosclerosis	Difficulty concentrating	Hearing impairment
Asthma	Dizziness	Heart murmur
Autoimmune disorders	Emphysema	Heart disorder
Bleeding easily	Epilepsy	Heart pacemaker
Blood pressure (HI) (LOW)	Excessive thirst	Heart palpitations
Bruising easily	Fluid retention	Heart valve replacement
Cancer	Frequent cough	Hemophilia
Chemotherapy	Frequent illnesses	Hepatitis
Chronic fatigue	Frequent stressful situations	Hypoglycemia
Cold hands & feet	General anesthesia	Immune system disorder
Current Pregnancy	Glaucoma	Injury to Face
Insomnia	Intestinal disorders	Injury to Mouth
Jaw joint surgery	Kidney problems	Injury to Neck
Liver disease	Meniere's disease	Injury to Teeth
Menstrual Cramps	Multiple sclerosis	Muscle aches
Muscle shaking (tremors)	Muscle spasms or cramps	Muscular dystrophy
Needing extra pillows to help Breathing at night	Nervous system irritability	Nervousness
Osteoporosis	Neuralgia	Osteoarthritis
Poor circulation	Ovarian cysts	Parkinson's disease
Radiation treatment	Prior orthodontic treatment	Psychiatric care
Scarlet fever	Rheumatic fever	Rheumatoid arthritis
Skin disorder	Shortness of breath	Sinus problems
Stroke	Slow healing sores	Speech difficulties
Tendency for ear infections	Swollen, stiff, or painful joints	Tendency for frequent colds
Tuberculosis	Tendency for sore throats	Tired Muscles
Wisdom Teeth (Third Molar) extraction	Tumors	Urinary Disorders

Patient Signature: _____ **Date:** _____

Office Use Only

Date of Initial Screening: ____ / ____ / ____ MO ____ RCD ____ S&S ____

Initial Examination

- Health history: what to look for
 - ◆ Current use of SSRI antidepressants
 - ◆ Trauma
 - ◆ Rheumatoid Arthritis/inflammatory diseases
 - ◆ Previous Treatment
 - ◆ Migraine headaches: temporalis headaches

SSRI Induced Bruxism

- ◆ J Clinical Psychiatry, December 1999, Bostwick, Jaffee
- Buspirone as an Antidote to SSRI Induced Bruxism in 4 Cases

Initial Examination

- Health history: what to look for
 - ◆ Current use of SSRI antidepressants
 - ◆ Trauma
 - ◆ Rheumatoid Arthritis/inflammatory diseases
 - ◆ Previous Treatment
 - ◆ Migraine headaches: temporalis headaches





Acetaminophen, Aspirin and Caffeine





Advil® Migraine

This is the most current labeling information and may differ from labels on product packaging. If there are any differences between this website labeling and product package labeling, this website labeling should be regarded as the most current.

Drug Facts

Active ingredient (in each brown oval capsule)	Purpose
Solubilized ibuprofen equal to 200 mg ibuprofen (NSAID)*	Pain reliever
(present as the free acid and potassium salt)	
*nonsteroidal anti-inflammatory drug	

Initial Examination

- History of TMD
 - ◆ WHAT is the chief complaint
 - ◆ WHERE does it hurt
 - ◆ WHEN did the symptoms start
- Maximum opening
 - ◆ Normal 48 to 52 mm without pain

Initial Examination

- Palpation of TM joints
 - ◆ RDD
 - ◆ Crepitus
 - ◆ Normal
 - ◆ Unilateral or bilateral
 - ◆ Able to capture with anterior positioning (RDD)
 - ◆ Patient perceives noise on the same side you detect it
 - ◆ Unable to detect noise the patient hears

Initial Examination

- Spray and Stretch Procedure
 - ◆ Ethyl chloride or Fluori-Methane
 - ◆ Spray over painful joint or muscle on stretch
 - ◆ Have the patient open and close a few times, measure their MO, and then have them relax
 - ◆ Ask the patient “does that make the discomfort worse, better or no change?”

Ethyl Chloride





Initial Examination

- Initial Diagnosis and Tx Plan
 - ◆ No Tx indicated
 - ◆ Initial trial of anti-inflammatories, home PT, and Aqualizer
 - ★ 600 mg ibuprofen q6h for 6 days
 - ★ Ice 10 minutes with gentle stretching followed by 10 minutes moist heat
 - ★ Aqualizer as much as possible and definitely at night

the AQUALIZER™



Float away tension, muscle pain and headaches.



- PRE-MADE, READY TO INSERT ORAL SPLINT
Fast, No Waiting, Boiling or Fitting
- INCREASE YOUR SUCCESS TREATING:
Headache, TMJ, Tinnitus, Neck and Shoulder Pain

The Aqualizer's water system perfectly balances and cushions the bite. Muscles relax, moving the jaw into the most comfortable position stopping the occlusal trigger of spasm and referred pain throughout the head, neck and shoulders.



Proven effective, over a million used
ORDER TODAY

1-800-HELP-TMD
(1-800-435-7863)

Initial Examination

- Initial Diagnosis and Tx Plan
 - ◆ Refer for Physical Therapy
 - ◆ Refer to another healthcare provider
 - ◆ Obtain further records
 - ★ Study models
 - ★ Radiographs
 - ★ MRI

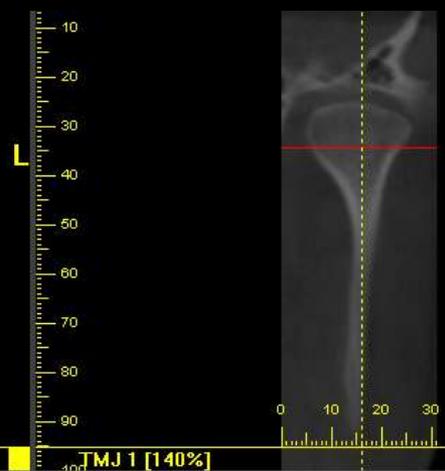
Imaging Records

- Computer Aided Tomography
- Magnetic Resonance Imaging

Imaging Records

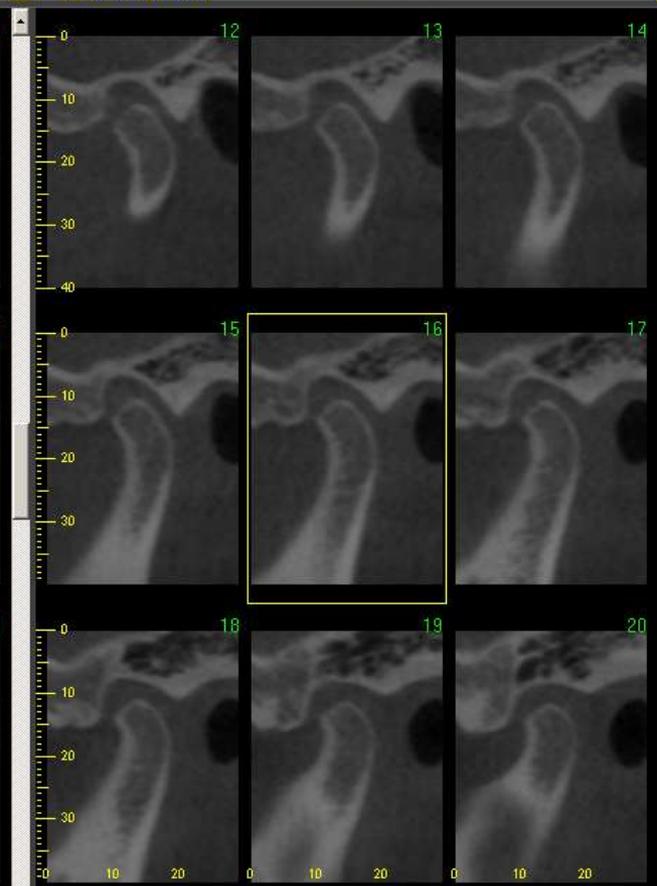
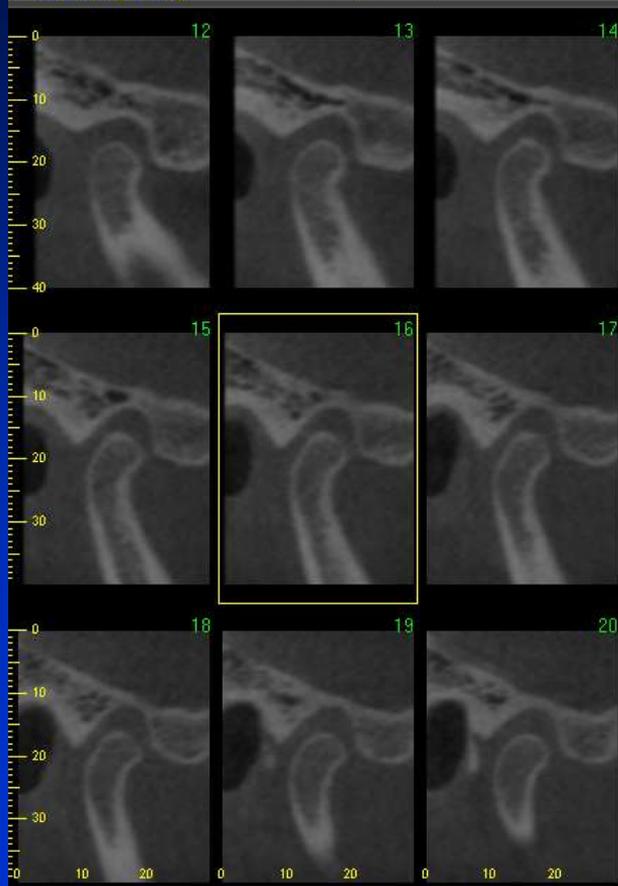
- Computed Aided Tomography
 - ◆ Excellent for evaluation of condylar position and arthritic changes
 - ◆ Due to the number of slices, may pick up something not shown on Tomos
 - ◆ Allow computerized 3D reconstruction-useful in surgery
 - ◆ Less expensive than MRI





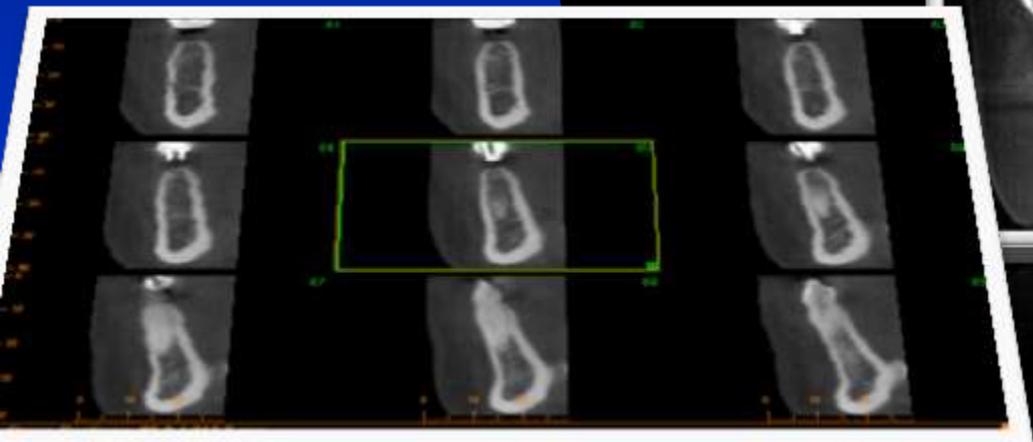
100% TMJ 1 [140%]

100% TMJ 1 [140%]



Cross Sections: 16.0 / 32.4 mm

Cross Sections: 16.0 / 31.2 mm



Imaging Records

- Magnetic Resonance Imaging
 - ◆ The Gold Standard for soft tissue evaluation
 - ◆ Not bad for hard tissue
 - ◆ Good for evaluation of disc position
 - ◆ Allows evaluation of inflammation, cysts, tumors, etc.
 - ◆ Relatively expensive
 - ◆ Magnetic field rather than X-Rays

The Comprehensive Exam (or refer)

- Thorough history review
- Palpation of all palpable muscles of the head and neck, TMJ, ligaments, etc.
- ROM measurements
- Cervical ROM
- Basic Neurological Exam
- Dental / Occlusal Exam
- Possible Diagnostic Injections

CRANIOFACIAL PAIN DISORDERS

EXTRACAPSULAR

MUSCLE DYSFUNCTIONS

- MUSCLE SPLINTING
- MUSCLE SPASM
- MYOFACIAL PAIN DYSFUNCTION
- MYOSITIS
- FIBROUS CONTRACTURE
- FIBROMYLGIA

CRANIOFACIAL PAIN SYNDROMES

- ATYPICAL TRIGEMINAL NEURALGIA
- CERVICOGENIC HEADACHE (CERVICAL SYNDROME)
- EAGLES SYNDROME
- ERNEST SYNDROME
- GREATER OCCIPITAL NEURALGIA
- HAMULAR BURSTITIS
- HYOID SYNDROME
- LESSER OCCIPITAL NEURALGIA
- NICO
- TEMPORAL TENDINITIS
- TYPICAL TRIGEMINAL NEURALGIA
- ATYPICAL TRIGEMINAL NEURALGIA

DENTAL/ALVEOLAR

- PULPAL
- PERIAPICAL
- PERIODONTAL

ISCHEMIC BONE DISEASES

INTRACAPSULAR

DISC INTERFERENCE DISORDERS

REDUCING DISC DISPLACEMENT

NON-REDUCING DISC DISPLACEMENT

DISEASES

- OSTEOCHONDROMATOSIS
- OSTEOCHONDROITIS
- CONDYLAR HYPO/HYPERPLASIA
- DJD
- REACTIVE ARTHRITIS
- TRAUMA
- SYNOVITIS
- SYNOVIAL CHONDROMATOSIS
- STERIOD NEUCROSIS
- RHEUMATOID ARTHRITIS
- PSORIATIC ARTHRITIS
- INFECTIONS

TMD: **Basic** Differential Diagnosis

- Or...Everyday,
Normal Dental Office,
Craniofacial Pain Disorders



**Capsulitis
Trismus
Disc Displacement**

Capsulitis

- Diagnosis
 - ◆ History of Trauma
 - ◆ Continuous TMJ Pain
 - ◆ Tenderness to Palpation
 - ◆ ROM not necessarily reduced
 - ◆ Acute malocclusion on injured side
 - ◆ Pain with Clenching
 - ◆ **No pain with clenching on a tongue depressor**

Capsulitis

- Treatment
 - ◆ Anti-inflammatories
 - ◆ Physical Therapy
 - ◆ Aqualizer or soft splint
 - ◆ Hard splint if necessary

Capsulitis Treatment

- Anti-inflammatories
 - ◆ 600 mg Ibuprofen q6h for 4-7 days
 - ◆ Medrol dose pack (methylprednisolone)

Capsulitis Treatment

- Iontophoresis
 - ◆ A non-invasive method of pushing medication transdermally using a charged pad.
- Phonophoreis
 - ◆ A non-invasive method of pushing medication transdermally using ultrasound.





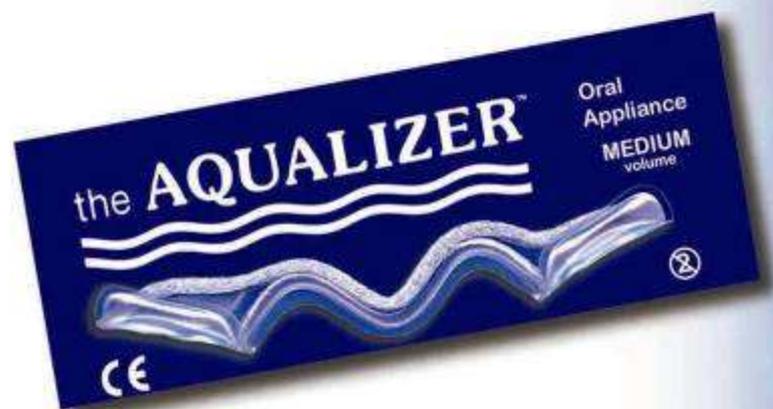
Capsulitis Treatment

- Splint therapy
 - ◆ Any splint for acute capsulitis should be temporary—for use until the inflammation is resolved.
 - ◆ The perfect splint for a capsulitis case would self adjust as the inflammation reduces...

the AQUALIZER™



Float away tension, muscle pain and headaches.



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Fast, No Waiting, Boiling or Fitting
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(1-800-435-7863)



Capsulitis Treatment

- Splint therapy
 - ◆ Once the initial capsulitis has resolved, a nightguard or daysplint (or both) may be indicated to reduce adverse joint loading.

Capsulitis Recap

- Pain in/around the TM joint
 - Posterior open bite
 - Pain on trying to occlude
 - No pain biting on a tongue blade on the affected side
-
- Anti-inflammatories and an Aqualizer

Trismus

10/31/80



“Just keep him calm for a couple of days. ...
He’s got lockbody.”

Trismus Defined

- **trismus** (triz mus)

Persistent contraction of the masseter muscles due to failure of central inhibition; often the initial manifestation of generalized tetanus. Syn: Ankylostoma 2, lockjaw, lock-jaw

[L. fr. G. *trismos*, a creaking, rasping]

★ Steadman's Medical Dictionary

Trismus

- Potential Causes
 - ◆ Trauma to the muscles of mastication
 - ◆ Trauma to the TM joints
 - ◆ Surgery
 - ◆ Radiation therapy
 - ◆ TMJ problems in general
 - ◆ Muscle damage
 - ◆ Joint damage
 - ◆ Rapid growth of connective tissue (i.e. scarring)

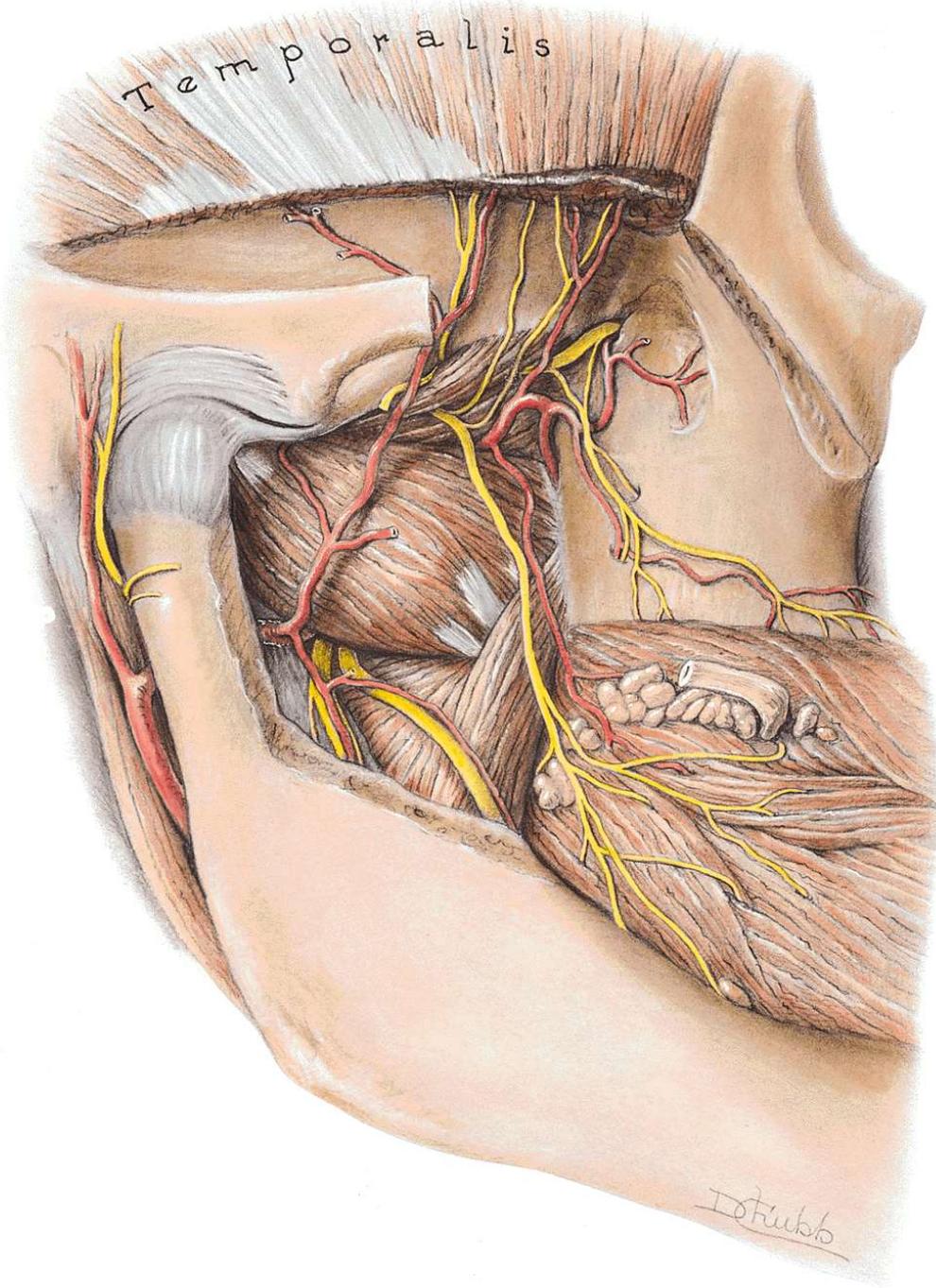
- Limitations in Range of Motion resulting from factors external to the joint include:
 - ◆ Neoplasms
 - ◆ Acute infection
 - ◆ Myositis
 - ◆ Systemic diseases (lupus, scleroderma, and others)
 - ◆ Pseudoankylosis
 - ◆ Burn injuries or other trauma to the musculature surrounding the joint

- Limitations in Range of Motion resulting from factors internal to the joint include:
 - ◆ Bony ankylosis
 - ◆ Fibrous ankylosis,
 - ◆ Arthritis,
 - ◆ Infections,
 - ◆ Gross trauma
 - ◆ Micro-trauma (bruxism)

- Limitation in Range of Motion due to Central Nervous System disorders:
 - ◆ Tetanus
 - ◆ Lesions that affect the trigeminal nerve
 - ◆ Drug toxicity

- Iatrogenic causes of Trismus
 - ◆ Third molar extraction (during which the muscles of mastication may be torn, or the joint hyperextended)
 - ◆ Direct trauma from injection into the medial pterygoid (**MOST COMMON**)
 - ◆ Hematomas secondary to dental injection
 - ◆ Post maxillo-mandibular fixation after mandibular fracture or other trauma.





Temporalis

Jofukko

Trismus

- Diagnosis
 - ◆ Extreme limitation of Range of Motion—usually under 20mm
 - ◆ History of trauma or recent IA nerve block
 - ◆ Spray and Stretch Procedure
 - ★ Over the masseter and TMJ
 - ★ ROM will increase significantly
 - ★ Patient may or may not report feeling better



Trismus

- Treatment
 - ◆ Early and Often
 - ◆ Passive stretching (tongue blade exercises)
 - ◆ Anti-inflammatories
 - ◆ Physical therapy (manual therapy, moist heat, modalities)



Trismus Recap

- Severe limitation of ROM
- Almost always after an IA

- Refer for immediate PT
- Medrol Dose Pack

Stretch Break!



Internal Derangements

What is that
CLICKING?

Normal



RDD



NRDD



Dr. Per-Lennart Westesson and Dr. Lars Eriksson University of Lund, Sweden.

Internal Derangements



DJD

Internal Derangements

- **A (Very) Simplistic Overview**
 - ◆ **Reducing Disc Displacement**
 - ◆ **Non-Reducing Disc Displacement**

The Normal TM Joint



Discal Dislocation with Reduction



A brief discussion of...

Centric Relation

GPT 5th Edition 1987

- “the maxillomandibular relationship in which the condyles articulate with the thinnest avascular portion of their respective disks with the complex in the anterior-superior position against the shapes of the articular eminencies.”

centric relation \se ˈn ˈtri ˌk ri ˈlā ˈshun\ **1:** the maxillomandibular relationship in which the condyles articulate with the thinnest avascular portion of their respective disks with the complex in the **anterior-superior** position against the shapes of the articular eminencies. This position is independent of tooth contact. This position is clinically discernible when the mandible is directed superior and anteriorly. It is restricted to a purely rotary movement about the transverse horizontal axis (GPT-5) **2:** the most retruded physiologic relation of the mandible to the maxillae to and from which the individual can make lateral movements. It is a condition that can exist at various degrees of jaw separation. It occurs around the terminal hinge axis (GPT-3) **3:** the most retruded relation of the mandible to the maxillae when the condyles are in the most posterior unstrained position in the glenoid fossae from which lateral movement can be made at any given degree of jaw separation (GPT-1) **4:** The most posterior relation of the lower to the upper jaw from which lateral movements can be made at a given vertical dimension (Boucher) **5:** a maxilla to mandible relationship in which the condyles and disks are thought to be in the midmost, uppermost position. The position has been difficult to define anatomically but is determined clinically by assessing when the jaw can hinge on a fixed terminal axis (up to 25 mm). It is a clinically determined relationship of the mandible to the maxilla when the condyle disk assemblies are positioned in their most superior position in the mandibular fossae and against the distal slope of the articular eminence (Ash) **6:** the relation of the mandible to the maxillae when the condyles are in the uppermost and rearmost position in the glenoid fossae. This position may not be able to be recorded in the presence of dysfunction of the masticatory system **7:** a clinically determined position of the mandible placing both condyles into their anterior uppermost position. This can be determined in patients without pain or derangement in the TMJ (Ramsford)

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Discal Dislocation without Reduction



Discal Dislocation without Reduction

- Diagnosis
 - ◆ Based on History
 - ◆ Based on History plus Imaging
 - ★ MRI
 - ★ Arthrogram

Discal Dislocation without Reduction Diagnosis

- Based on History
 - ◆ Maximum opening of approximately 26mm.
 - ◆ Typically deflection to the affected side.
 - ◆ History of reducing disc displacement.
 - ◆ Often, history of locking episodes.
 - ◆ History of a traumatic event (accident, injury, iatrogenic, etc.), or the patient will usually wake locked.

Macro Trauma



Micro Trauma



0.8 mm Airway!!!

Acq. Date: 03/20/2012
Pixel Size: 0.40 mm
kVp: 120.00
mAs: 11.91
W/L (Axial): 1926 / 16
W/L (Coronal): 1926 / 16
W/L (Sagittal): 1926 / 16



Discal Dislocation without Reduction

- Acute
 - ◆ Sudden onset with pain and swelling
 - ◆ Pain with forced maximum intercuspatation
 - ◆ Deflection to the affected side on opening
 - ◆ Maximum opening is usually around 26mm

Discal Dislocation without Reduction

- Chronic
 - ◆ History of joint clicking
 - ◆ History of reduced range of motion (usually in the 30's)
 - ◆ Usually no pain

Diagnostic Imaging

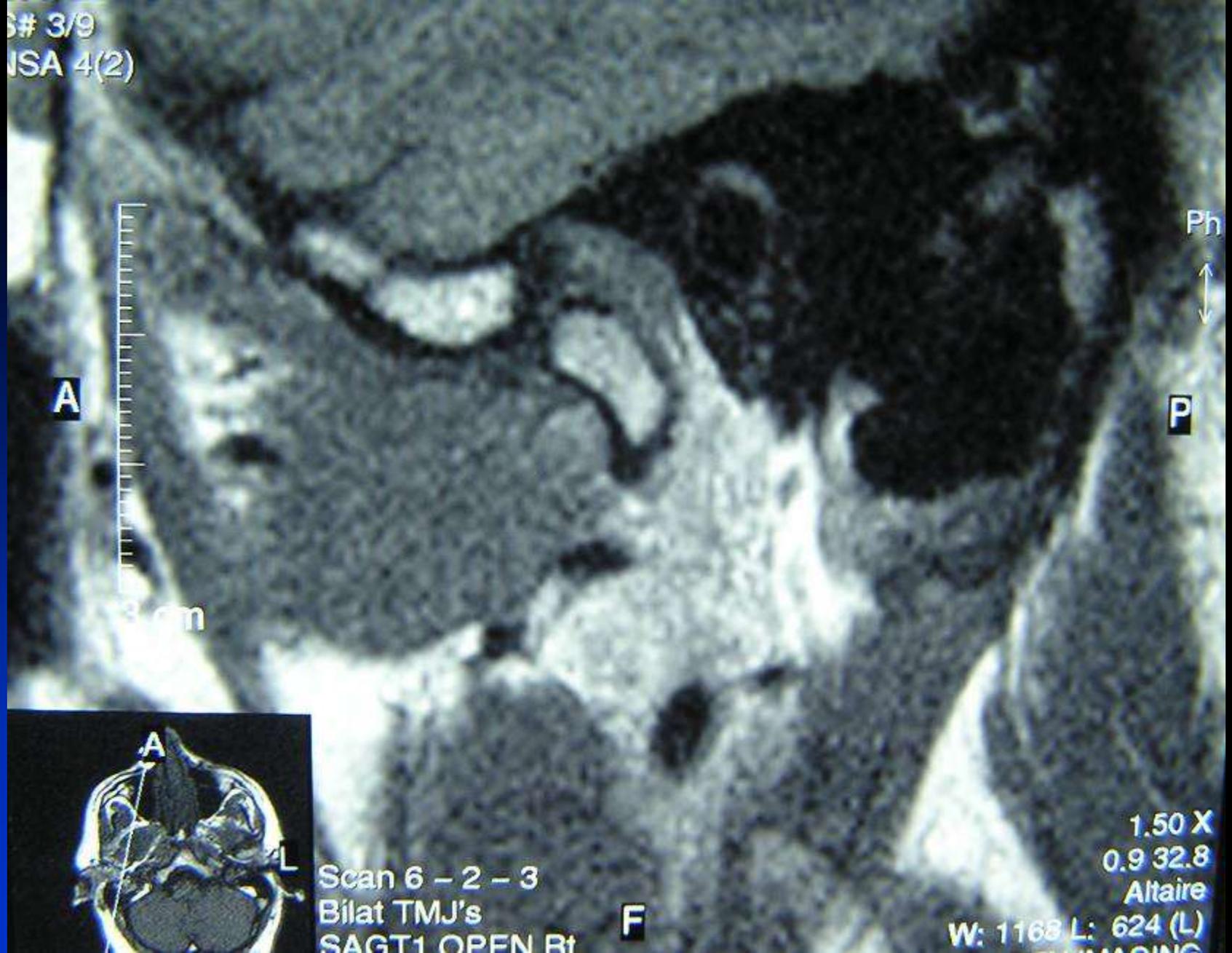
- MRI
 - ◆ Needed to absolutely confirm DDw/oR.
 - ◆ Critical to have the MRI taken correctly.
 - ★ Write the prescription for closed and wide open views.
 - ★ Provide a bite block for the open view.
 - ★ Read the film yourself and discuss with the radiologist if you disagree with the interpretation.

150 3.0 HFS
224 OSP
2/18
4(2)

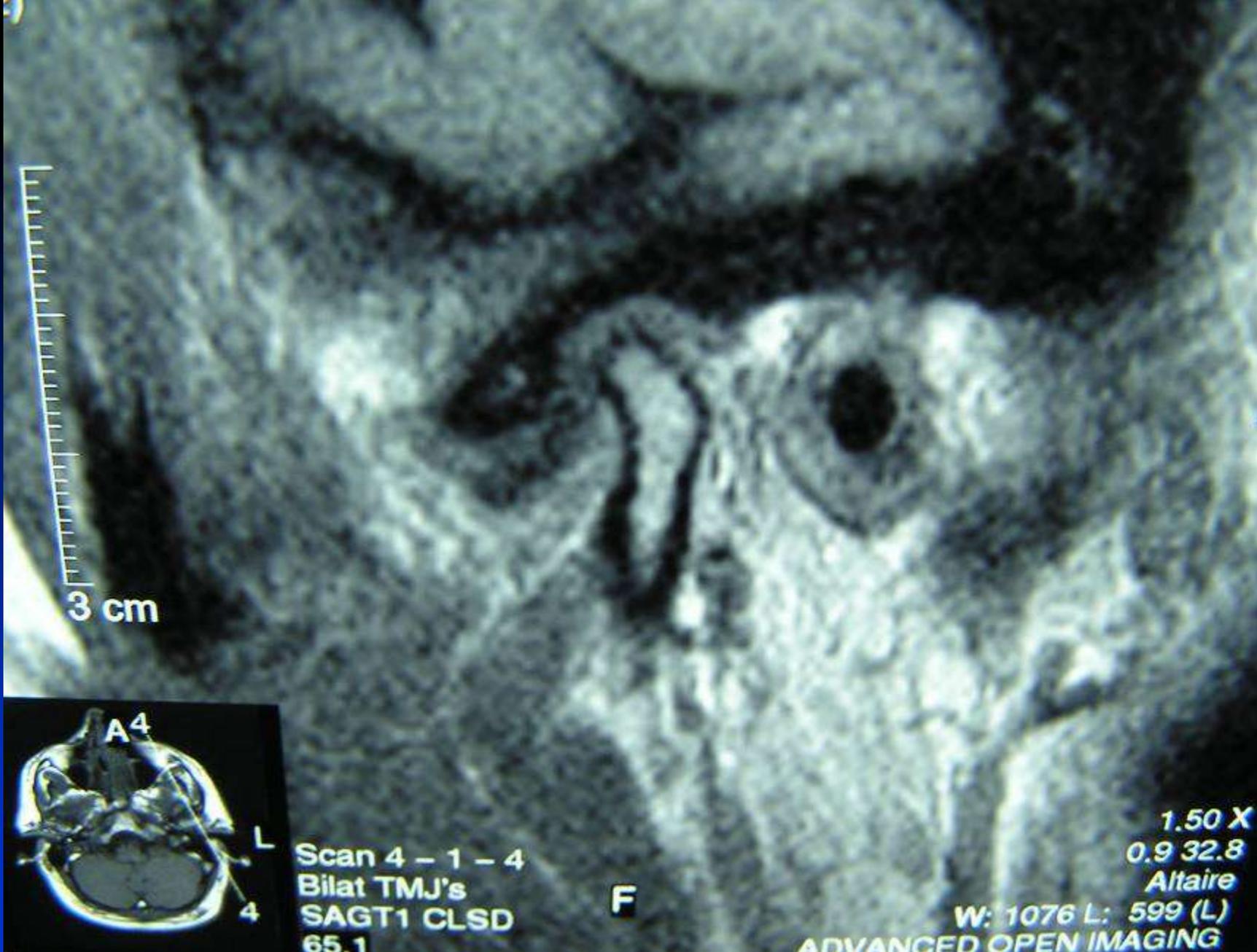


Right Closed

S# 3/9
ISA 4(2)



Right Open



Scan 4 - 1 - 4
Bilat TMJ's
SAGT1 CLSD
65.1

F

1.50 X
0.9 32.8
Altair
W: 1076 L: 599 (L)
ADVANCED OPEN IMAGING

Left Closed



Left Open

EX: 2007032110
SAGT1 CLSD
C: OFF
Se: 8/6
Im: 6/18
Sag: L47.1 (COI)

1985 Jun 13 F E:03/21/2007 18:30:26

vicenzi melissa
Acc:
2007 Mar 21
Acq Tm: 18:57:19.330

256 x 224

Mag: 2.4x

A_R

P_L

ET: 3
TR: 552.0
TE: 13.8
MA Head
3.0thk/0.0sp
Id:DCM / Lin:DCM / Id:ID

EX: 2007052110

Vicenzi Melissa

SAGT1 OPEN

1985 Jun 13 F E:03/21/2007 18:30:26

C: OFF

Acc:

Se: 21/6

2007 Mar 21

Im: 6/18

Acq Tm: 19:26:05.100

Sag: L47.1 (COI)

256 x 224

Mag: 2.4x

A_R

P_L

ET: 3

TR: 552.0

TE: 13.8

MA Head

3.0thk/0.0sp

Id:DCM / Lin:DCM / Id:ID

W:10235 L:5119

I_R

DFOV: 16.9 x 16.9cm

SAGT1 CLSD

1985 Jun 13 F E:03/21/2007 18:30:26

C: OFF

Acc:

Se: 8/6

2007 Mar 21

Im: 13/18

Acq Tm: 18:57:19.330

Sag: R48.4 (COI)

256 x 224

Mag: 2.4x

A_L

P_R

ET: 3

TR: 552.0

TE: 13.8

MA Head

3.0thk/0.0sp

Id:DCM / Lin:DCM / Id:ID

W:9945 L:4981

I_L

DFOV: 16.9 x 16.9cm

SAGT1 OPEN

1985 Jun 13 F E:03/21/2007 18:30:26

C: OFF

Acc:

Se: 21/6

2007 Mar 21

Im: 13/18

Acq Tm: 19:26:05.100

Sag: R51.3 (COI)

256 x 224

Mag: 2.4x

A_L

P_R

ET: 3

TR: 552.0

TE: 13.8

MA Head

3.0thk/0.0sp

Id:DCM / Lin:DCM / Id:ID

W:10235 L:5119

I_L

DFOV: 16.9 x 16.9cm

Discal Dislocation without Reduction

■ Treatment

◆ Acute

- ★ Attempt to Reduce (yourself or give the patient exercises)
- ★ Treat with splint, PT and meds

◆ Chronic

- ★ Attempt to Reduce?
- ★ No treatment
- ★ Palliative (meds, home PT, splint)

Discal Dislocation without Reduction

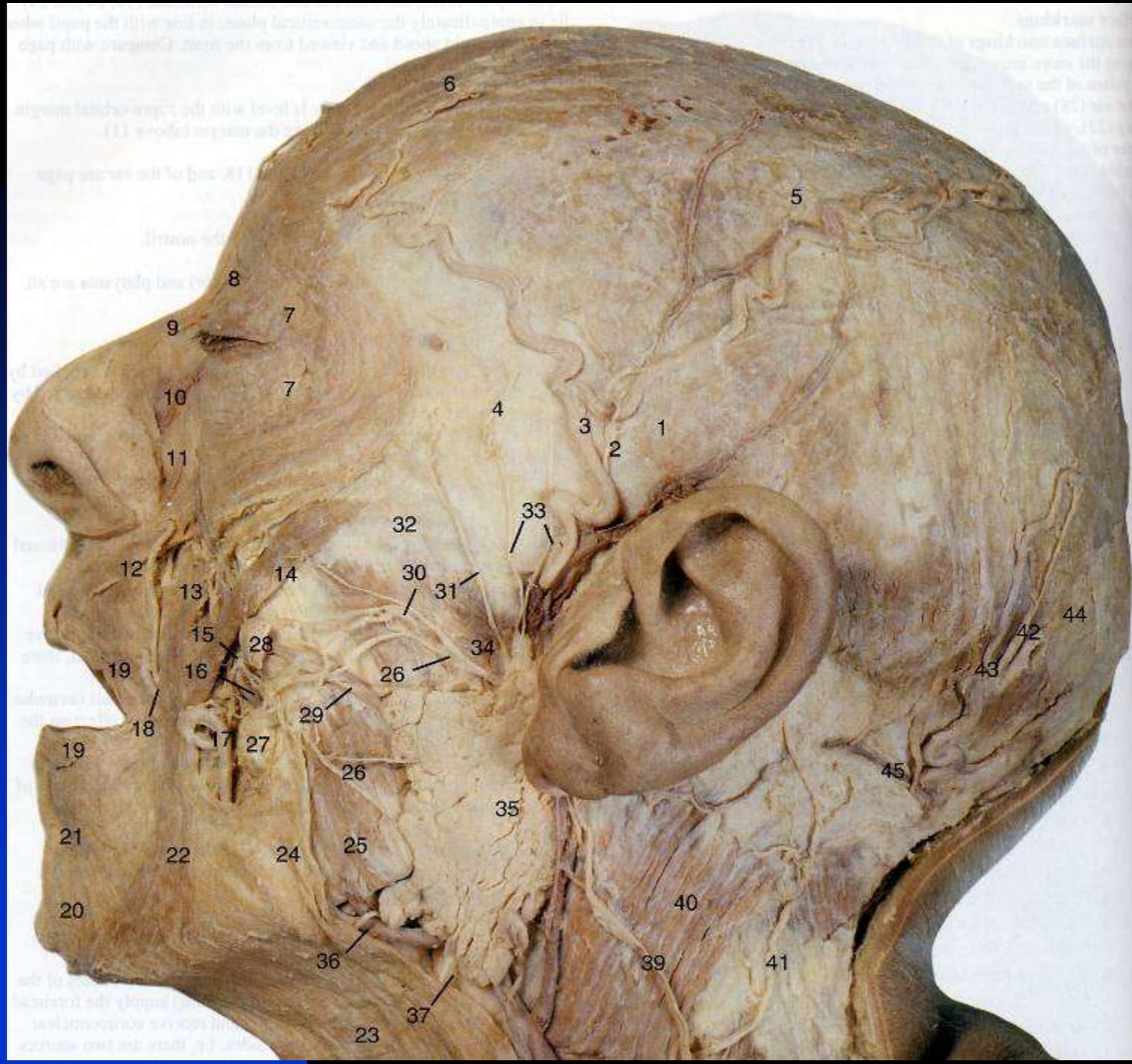
Reduction (“unlocking”) Technique

TM Joint Injection Technique

- **Posterior-Superior
Joint Capsule**





















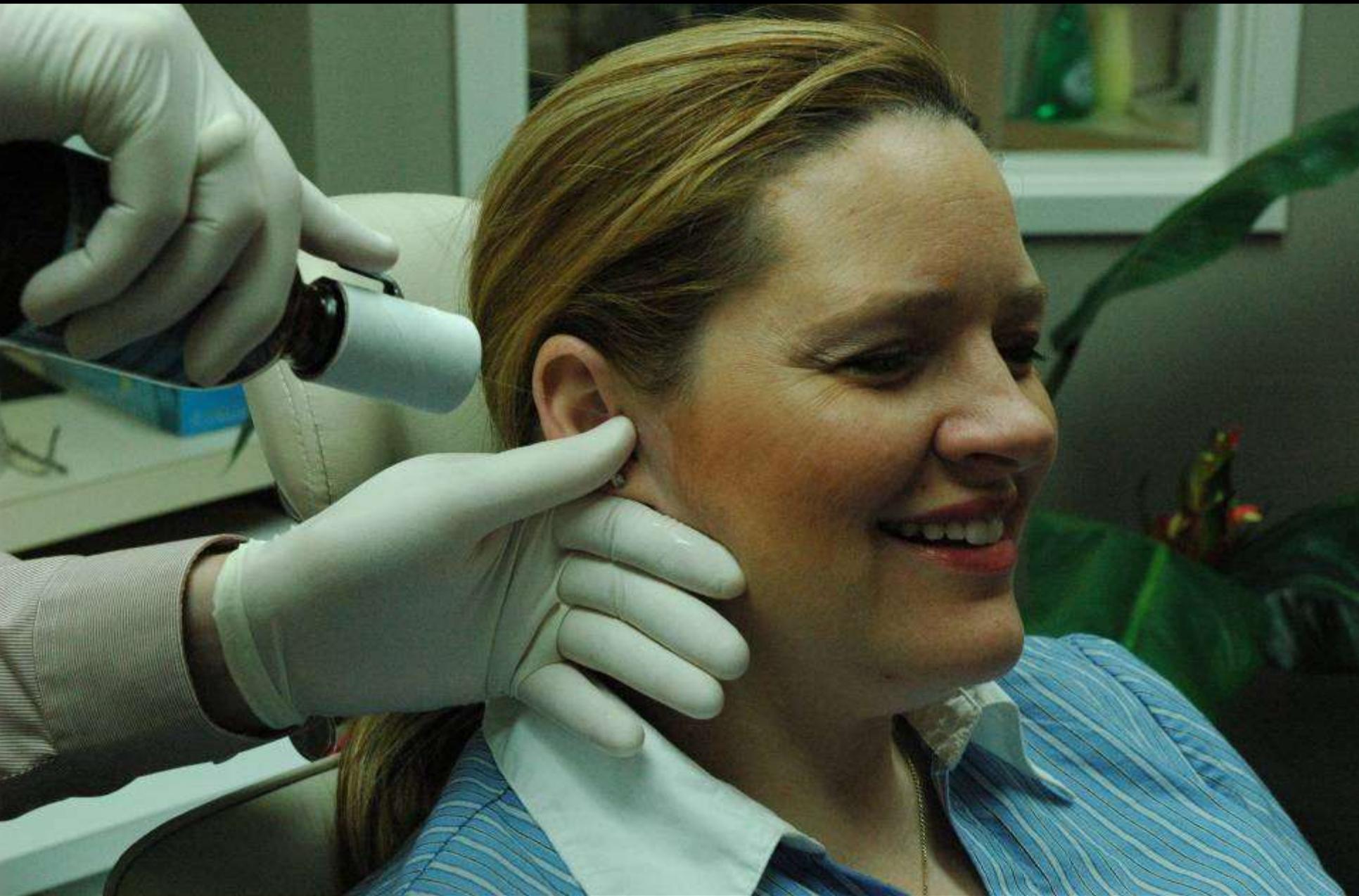






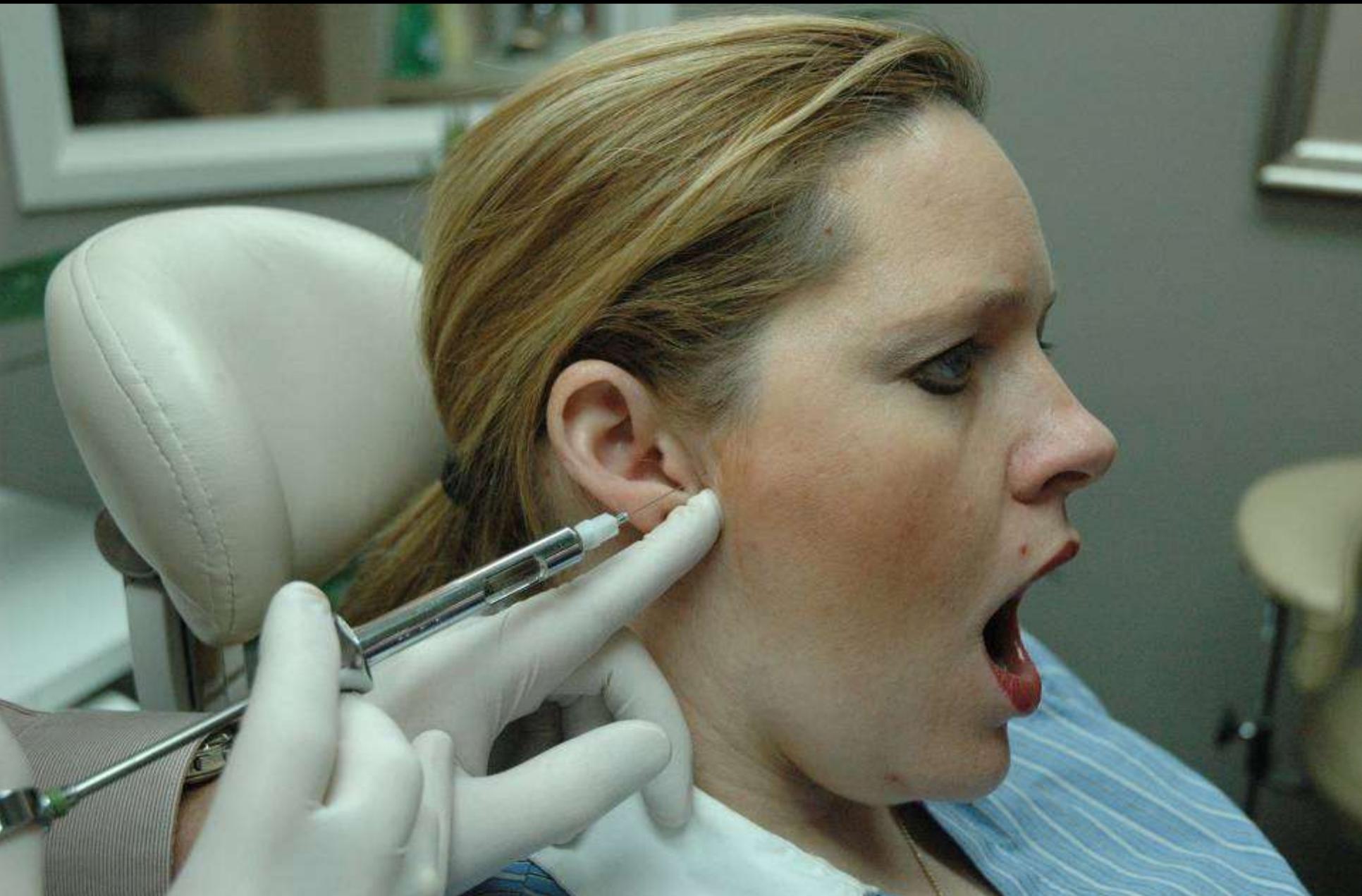






















After the Injection(s)

- **Ask the patient if their bite feels different (it should!).**
- **Ask the patient to move their jaw side to side and gently open wide (while you leave the room?).**
- **Approximately 50-70% of acute NRDD's will reduce at this point.**

If Not . . .

- **Gentle Manipulation Techniques**
 - ◆ **Classic “dental school” technique**
 - ◆ **Tongue blade/dowel technique**
 - ◆ **Assisted opening / Assisted lateral motion**













What if they don't unlock?

Dental School Answers:

- Because you suck as a dentist
- . . .and your margin is open

Real Answers

- Sometimes, they don't unlock
- Sometimes, they aren't locked in the first place

Next Step

- Give the patient some time and try again?
- MRI?
- Arthrocentesis?



**Be Prepared for
When it Pops!**

the AQUALIZER™



Float away tension, muscle pain and headaches.



- PRE-MADE, READY TO INSERT ORAL SPLINT
Fast, No Waiting, Boiling or Fitting
- INCREASE YOUR SUCCESS TREATING:
Headache, TMJ, Tinnitus, Neck and Shoulder Pain

The Aqualizer's water system perfectly balances and cushions the bite. Muscles relax, moving the jaw into the most comfortable position stopping the occlusal trigger of spasm and referred pain throughout the head, neck and shoulders.



Proven effective, over a million used
ORDER TODAY

1-800-HELP-TMD
(1-800-435-7863)

Temporary Splint

- Made out of a thermal plastic material (Dupont--tone polymer 767)
- Splint is made immediately, usually in an “end to end” dental relationship
- Position is tested to confirm stable reduction of the disc displacement
- Temporary splint is worn full time for 4 days.





**Spencer Bilaterally
Indexed Gnathological
Early Guidance Orthotic**



**Spencer
BIG EGO**

Patient Education

- It is **EXTREMELY** important to educate the patient to help them feel and know when they are locked and when they are unlocked.

Follow Up

- **The patient is to call the next morning**
- **The patient returns in one week for follow up**
- **The patient is educated as to the importance of nightguard therapy or daysplint therapy to stabilize the proper disc position (CR)**



Thermal Plastic Temporary Splint Fabrication







Mandibular Splint Fabrication



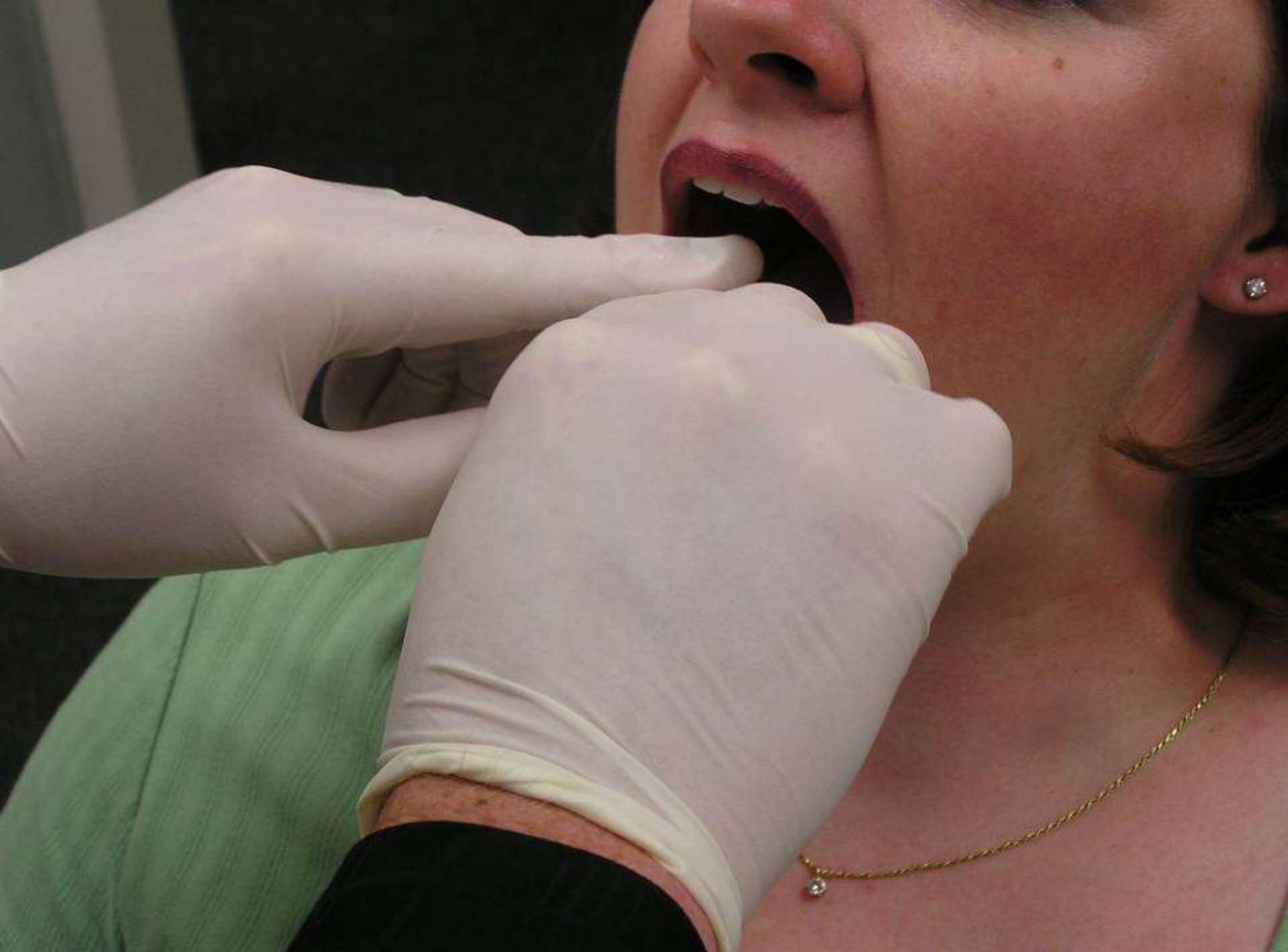














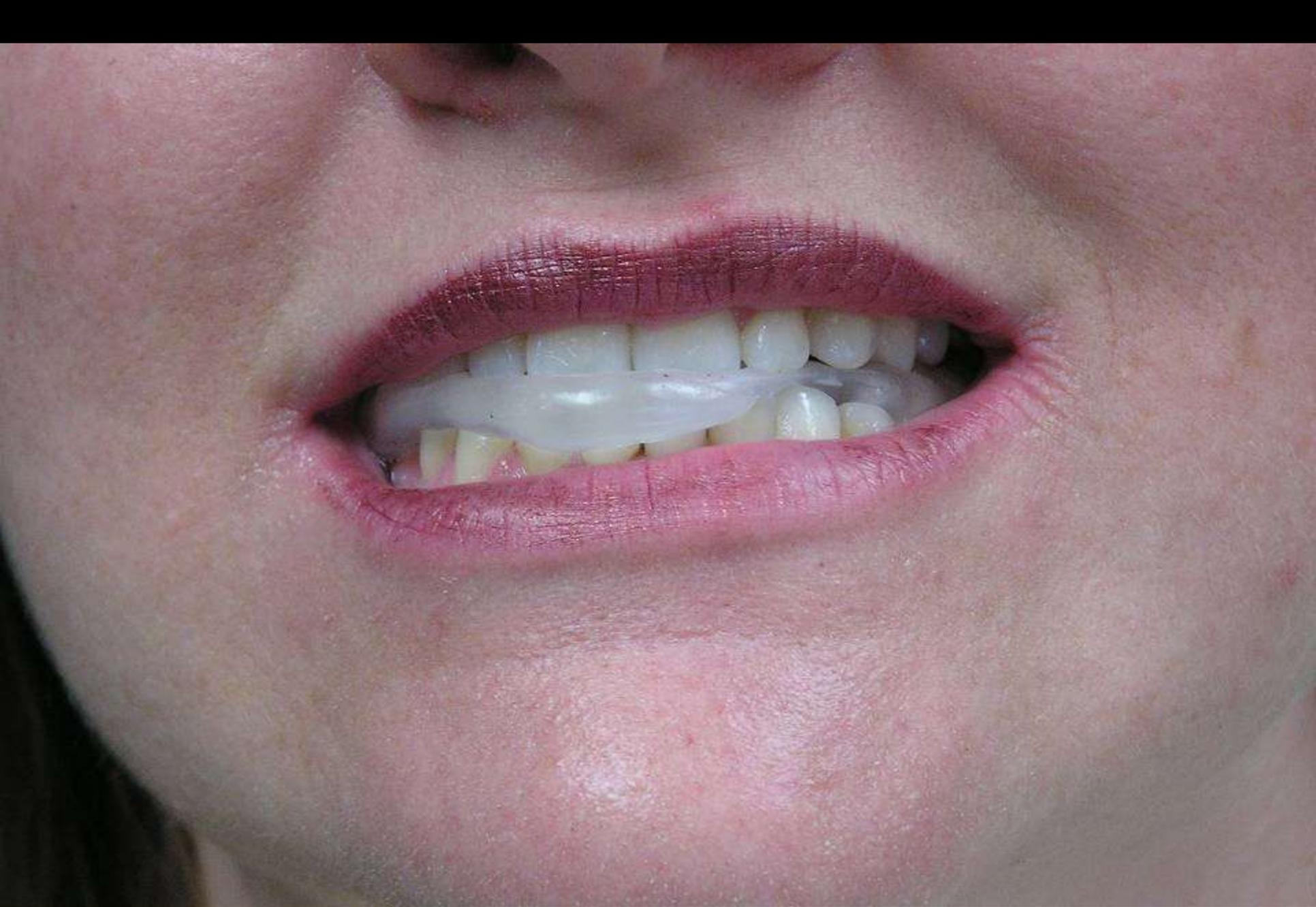






















BD Sharps Collector

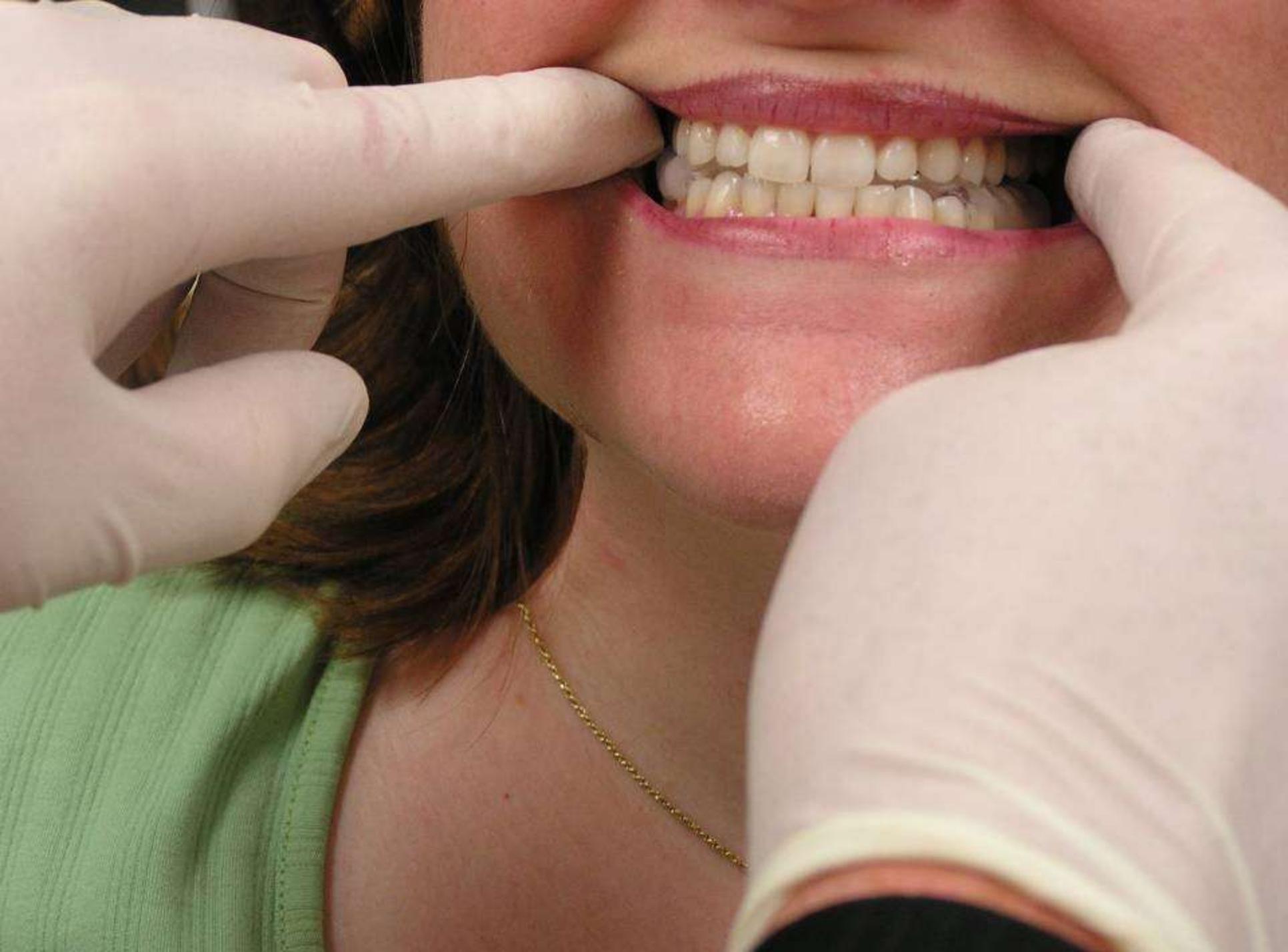
BIOHAZARD WARNING

SEIRIN



Low







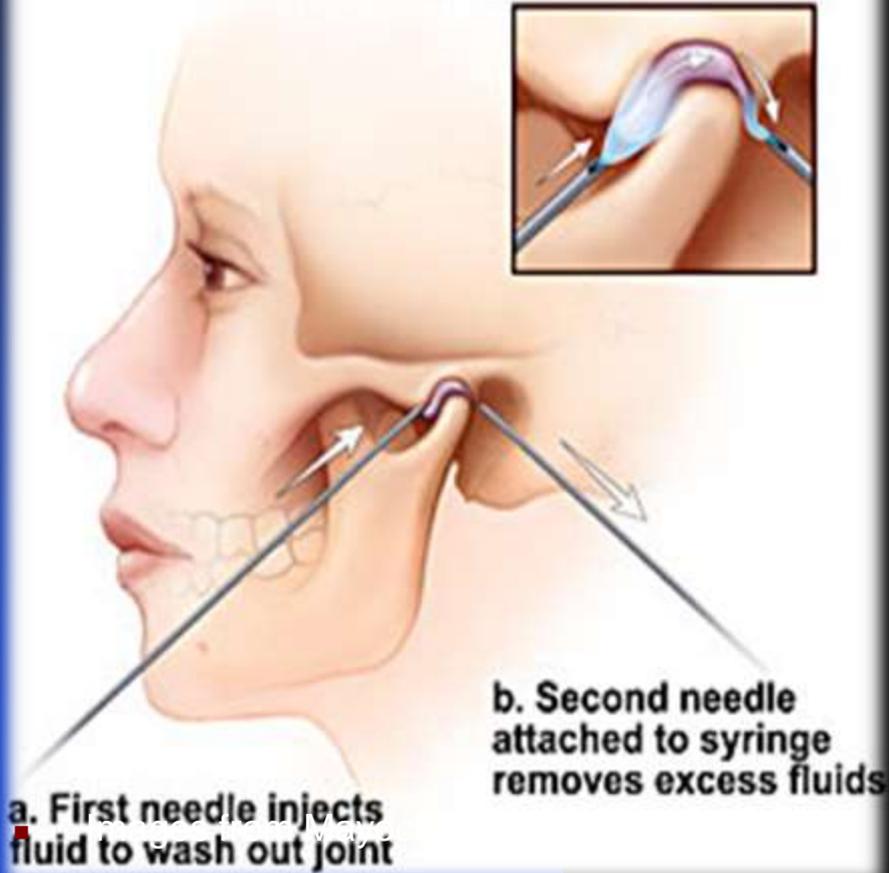






What about Arthrocentesis?

Arthrocentesis



- Ohnuki, T. Fukuda, M. Nakata, A. Nagai, H. Takahashi, T. Sasano, T. Miyamoto, Y.
 - ◆ Evaluation of the position, mobility, and morphology of the disc by MRI before and after four different treatments for temporomandibular joint disorders.
 - ★ Dento-Maxillo-Facial Radiology. 35(2):103-9, 2006 Mar.

METHODS: Eighty-five joints (85 patients) with unilateral internal derangement or osteoarthritis that were successfully treated were included in this study. The patients were divided into four groups as follows: splint therapy group, pumping manipulation group, arthrocentesis group, and arthroscopic surgery group. Changes in the disc position, mobility, and morphology before and after treatment were compared among the four groups using MRI.

- Ohnuki, T. Fukuda, M. Nakata, A. Nagai, H. Takahashi, T. Sasano, T. Miyamoto, Y.
 - ◆ Evaluation of the position, mobility, and morphology of the disc by MRI before and after four different treatments for temporomandibular joint disorders.
 - ★ Dento-Maxillo-Facial Radiology. 35(2):103-9, 2006 Mar.

RESULTS: All discs showed anterior disc displacement (ADD) without reduction before treatment. **Only 10% of the joints became ADD with reduction after treatment, and the other joints remained ADD without reduction in spite of treatment.** Discs treated by arthroscopic surgery were located more anteriorly compared with pre-treatment. The disc deformity advanced after arthrocentesis and arthroscopic surgery.

■ Magnetic resonance imaging findings of internal derangement, osteoarthritis, effusion, and bone marrow edema before and after performance of arthrocentesis and hydraulic distension of the temporomandibular joint

- ◆ Rüdiger Emshoff, MD, DMD, a Stefan Gerhard, MD, DMD, Thomas Ennemoser, MD, DMD, and Ansgar Rudisch, MD, Innsbruck, Austria

★ **Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2006;101:784–790**

Study design. The study comprised 28 patients with a clinical unilateral TMJ disorder of internal derangement type III and capsulitis/synovitis. Bilateral MRI was immediately performed preoperatively and at a 2-month follow-up.

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★ Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2006;101:784–790

Comparison of the pretreatment MRI findings with the 2-month follow-up data showed for the TMJ internal derangement type III and capsulitis/synovitis side a slight decrease in the diagnoses of internal derangement from 28 (100%) preoperatively to 25 (89.3%) postoperatively, and a slight increase in those of OA from 25 (89.3%) to 28 (100%).

NRDD Keys to Success

- Accurate Diagnosis
- Good Technique
- A Reducible Disc (i.e. patient hasn't been locked for 20 years)
- Immediate treatment to stabilize the reduced disc after a successful procedure
- Follow up with appropriate long term care

To Recap

- Capsulitis:
 - ◆ Tongue Blade Test
 - ◆ Aqualizer and Advil
- Trismus
 - ◆ Severely reduced range of motion after IA block
 - ◆ Medrol dose pack and Physical Therapy
- Non-Reducing Disc Displacement
 - ◆ 26mm of range of motion, without clicking, with a history of recent clicking
 - ◆ Unlocking procedure (or refer ASAP)

*Capsulitis, Trismus or
Non-Reducing Disc Displacement?*

Jamison R. Spencer, DMD, MS

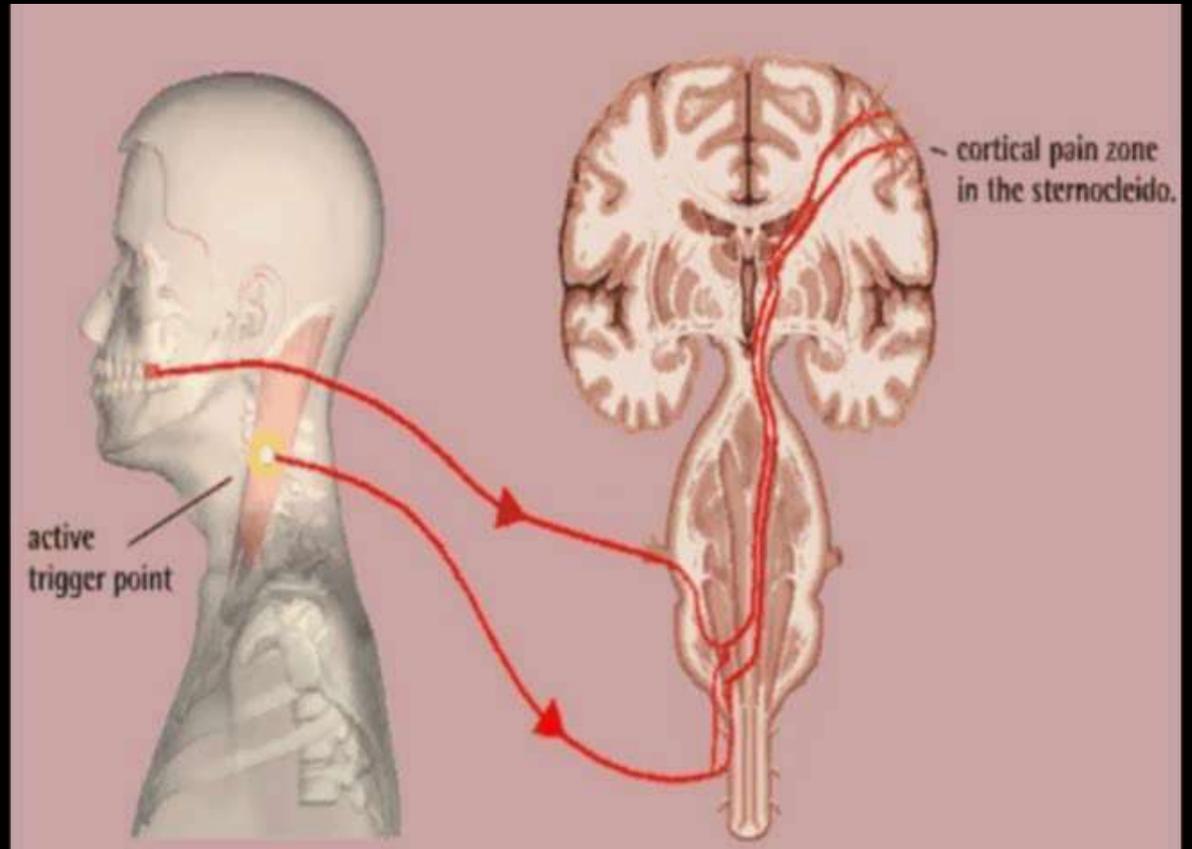
JamisonRSpencer@Gmail.com

MySilentSleep.com

AACFP.org

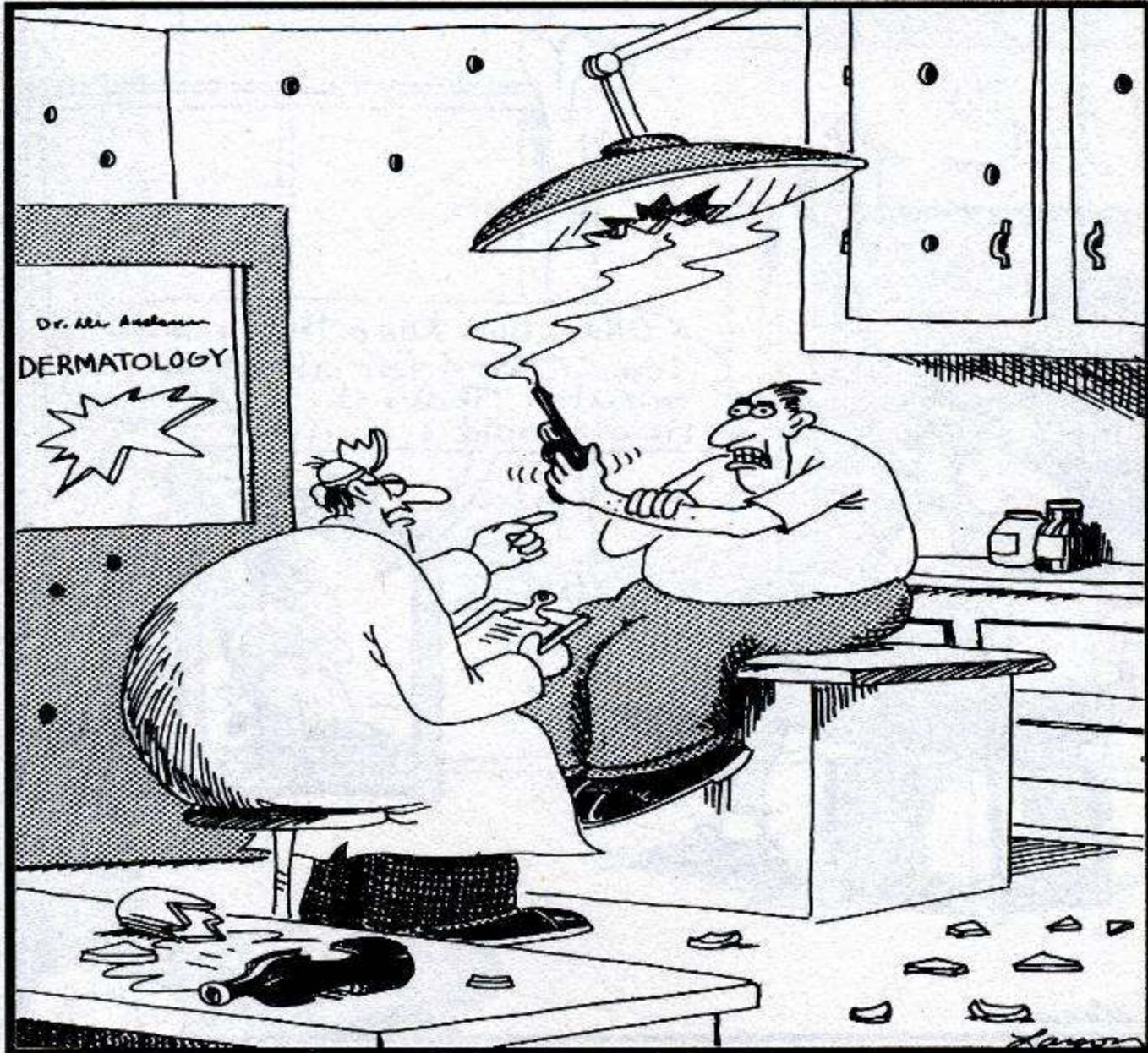
JamisonSpencer.com

Myofascial Pain Dysfunction



Myofascial Pain Dysfunction

- **Not specific to TMD**
- **Variable muscle pain**
- **Restricted ROM**
- **Trigger Points with referral patterns**



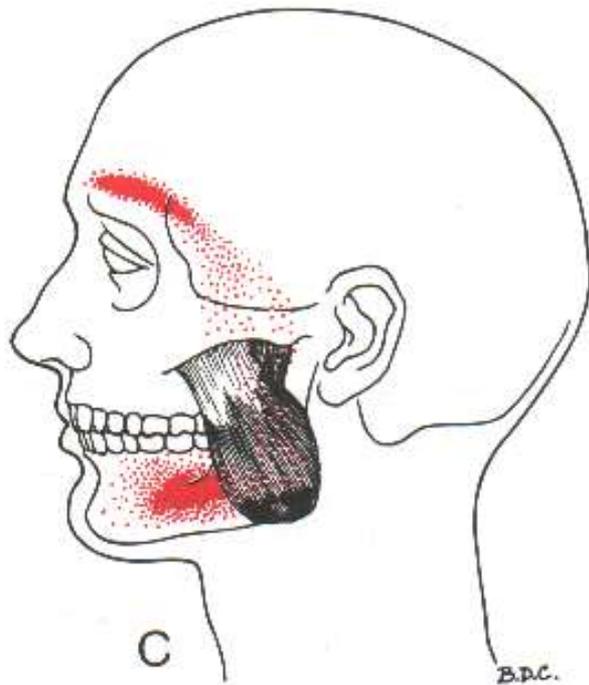
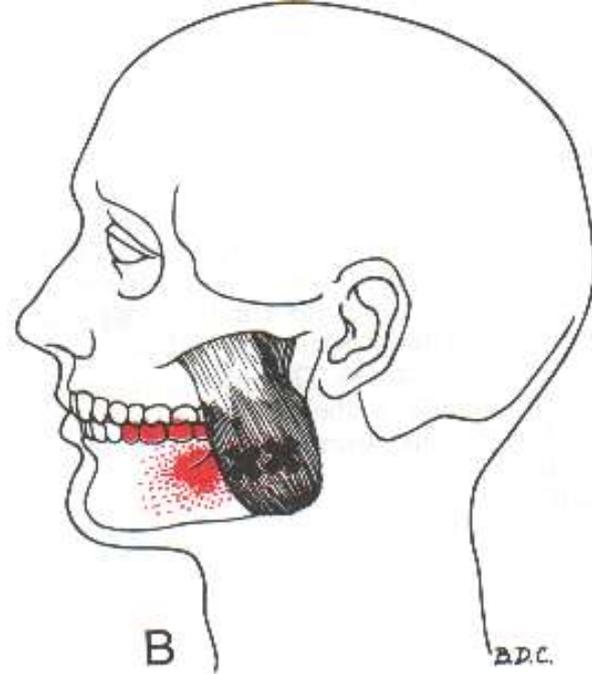
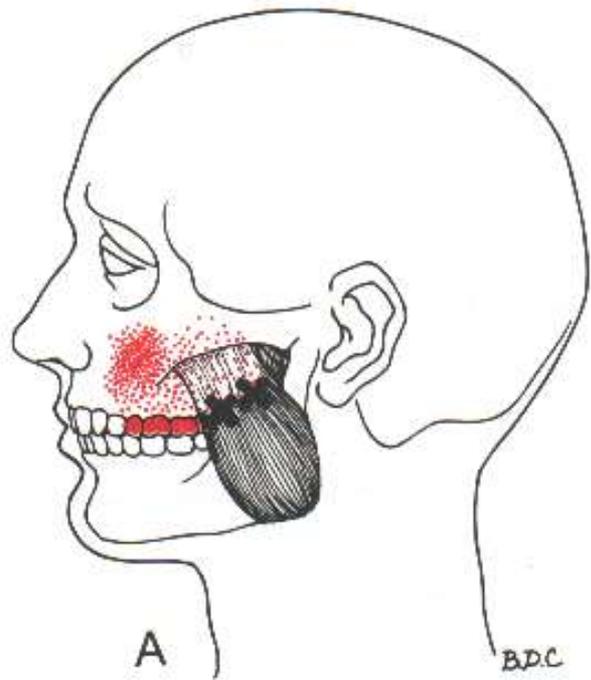
"First of all, Mr. Hawkins, let's put the gun down. ... I would guess it's an itchy trigger finger, but I want to take a closer look."

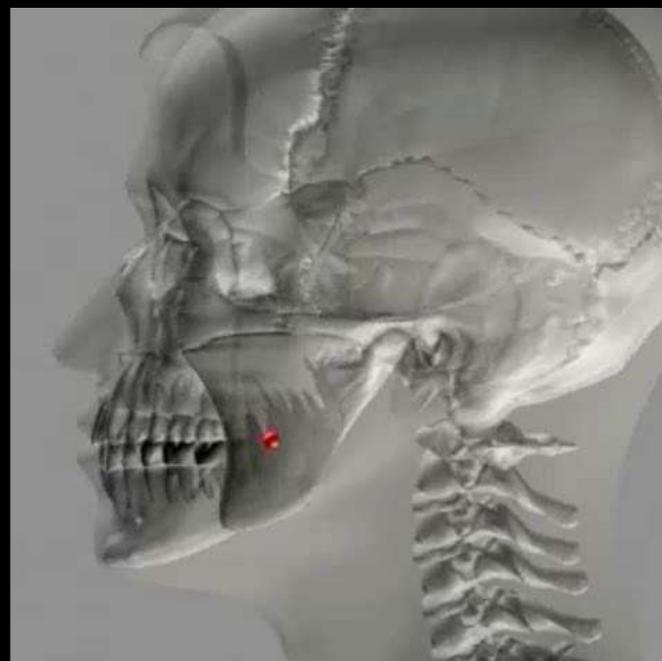
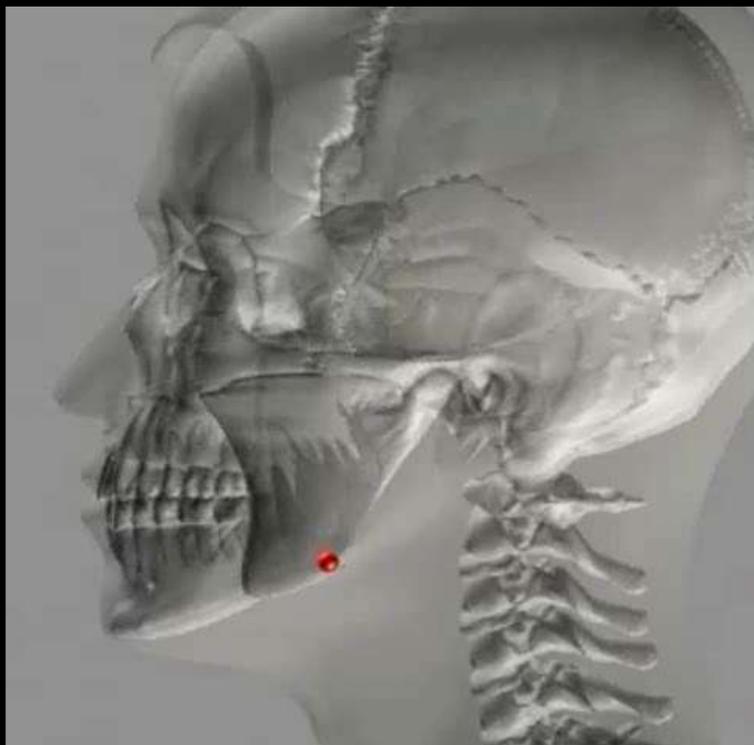
Trigger Points

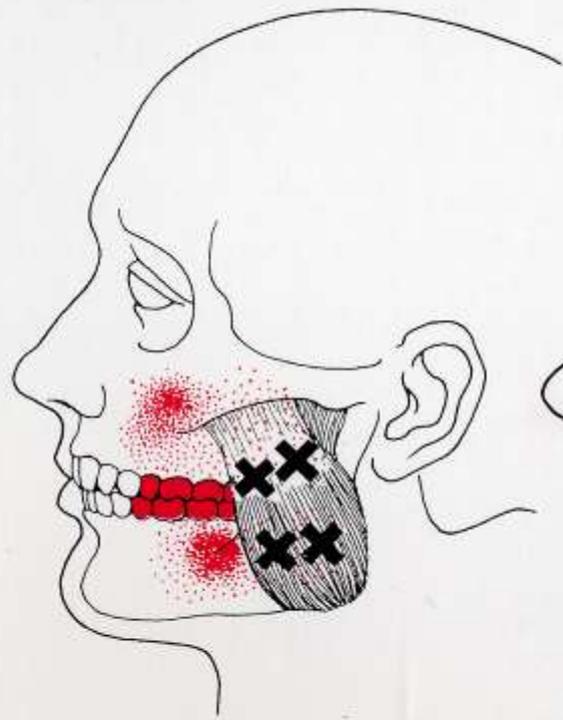
- Definition: A hyperirritable spot in skeletal muscle that is associated with a hypersensitive palpable nodule in a taut band. The spot is painful on compression and can give rise to characteristic referred pain, referred tenderness, motor dysfunction, and autonomic phenomena.
- Travell & Simons' Myofascial Pain and Dysfunction

- Types of myofascial trigger points include: **active, associated, attachment, central, key, latent, primary, and satellite**. Any myofascial trigger point is to be distinguished from cutaneous, ligamentous, periosteal, or any other nonmuscular trigger point.

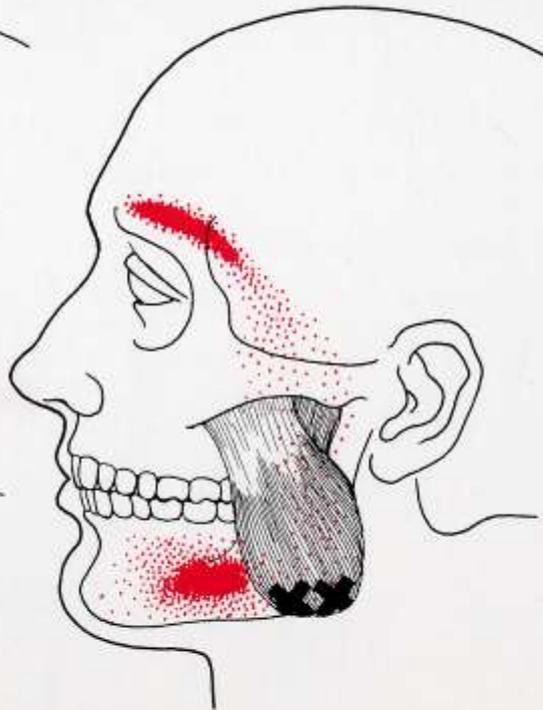
Travell & Simons' Myofascial Pain and Dysfunction





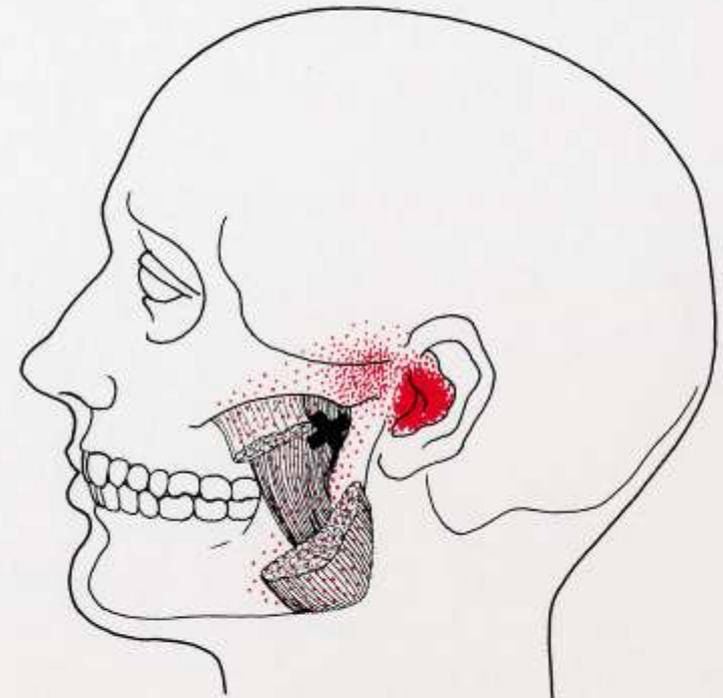


Superficial

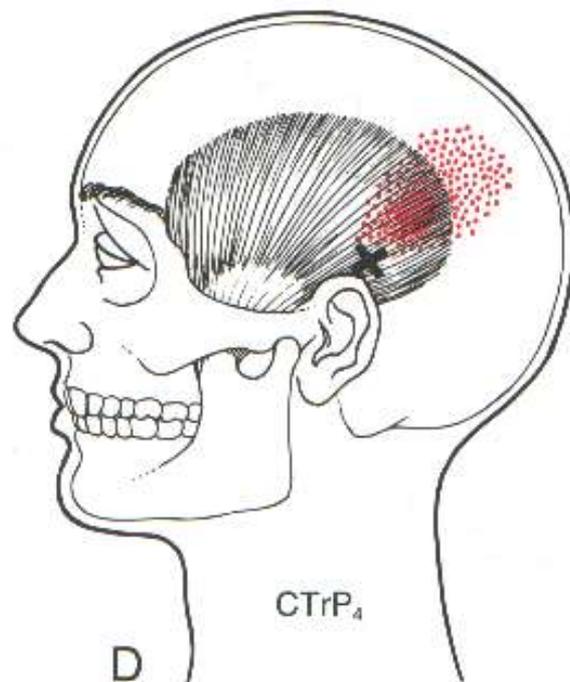
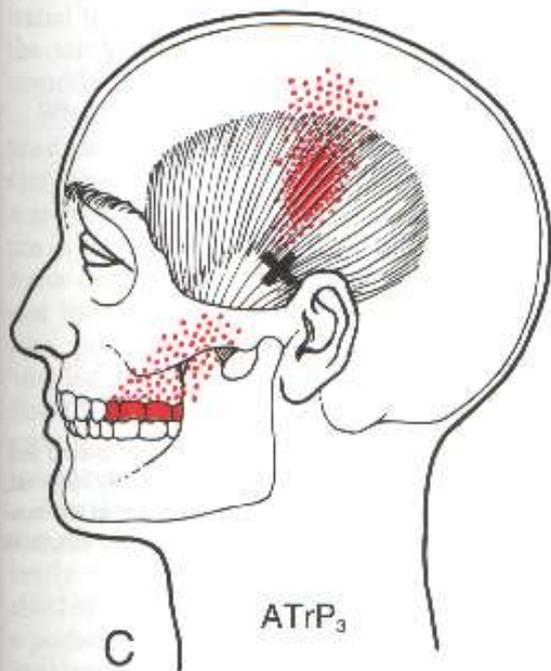
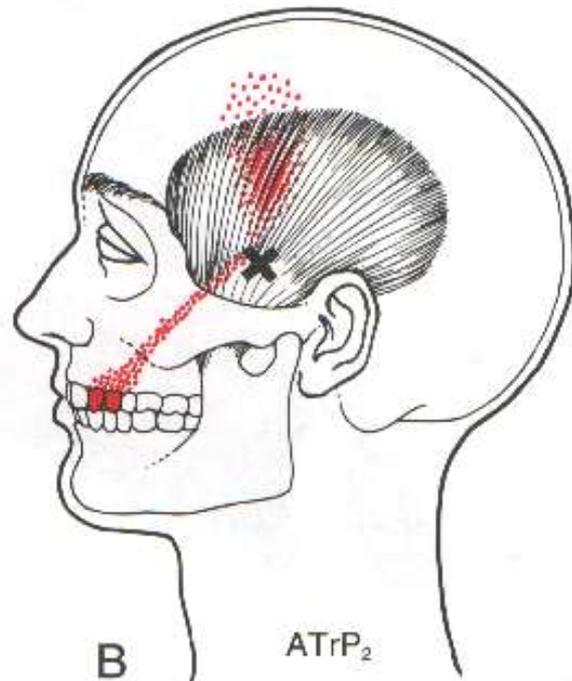
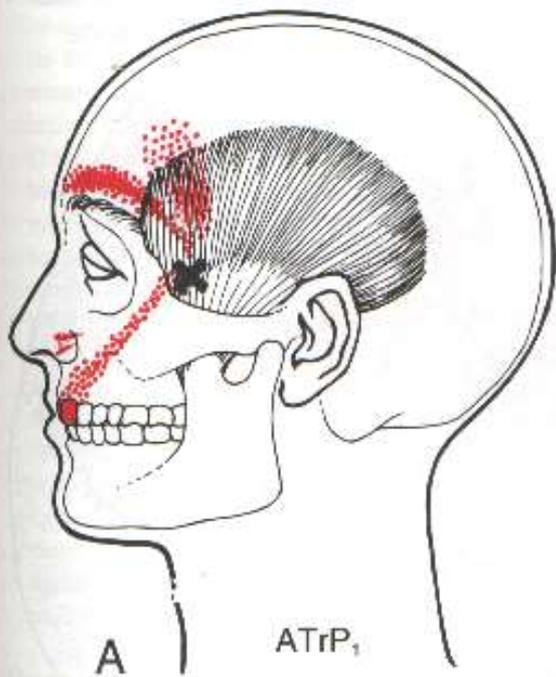


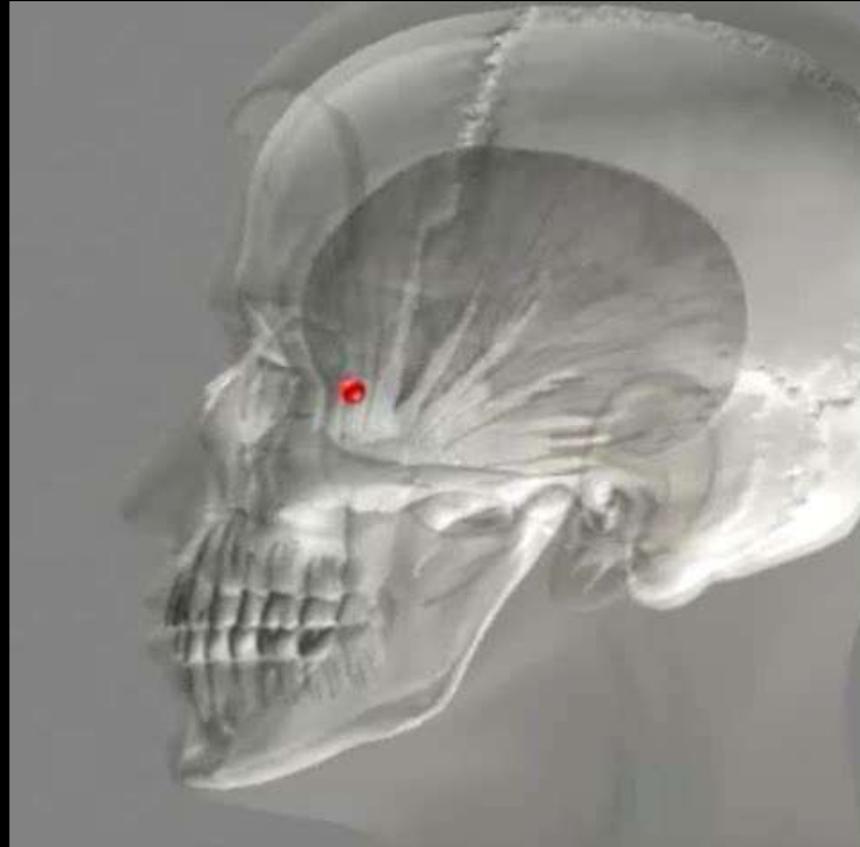
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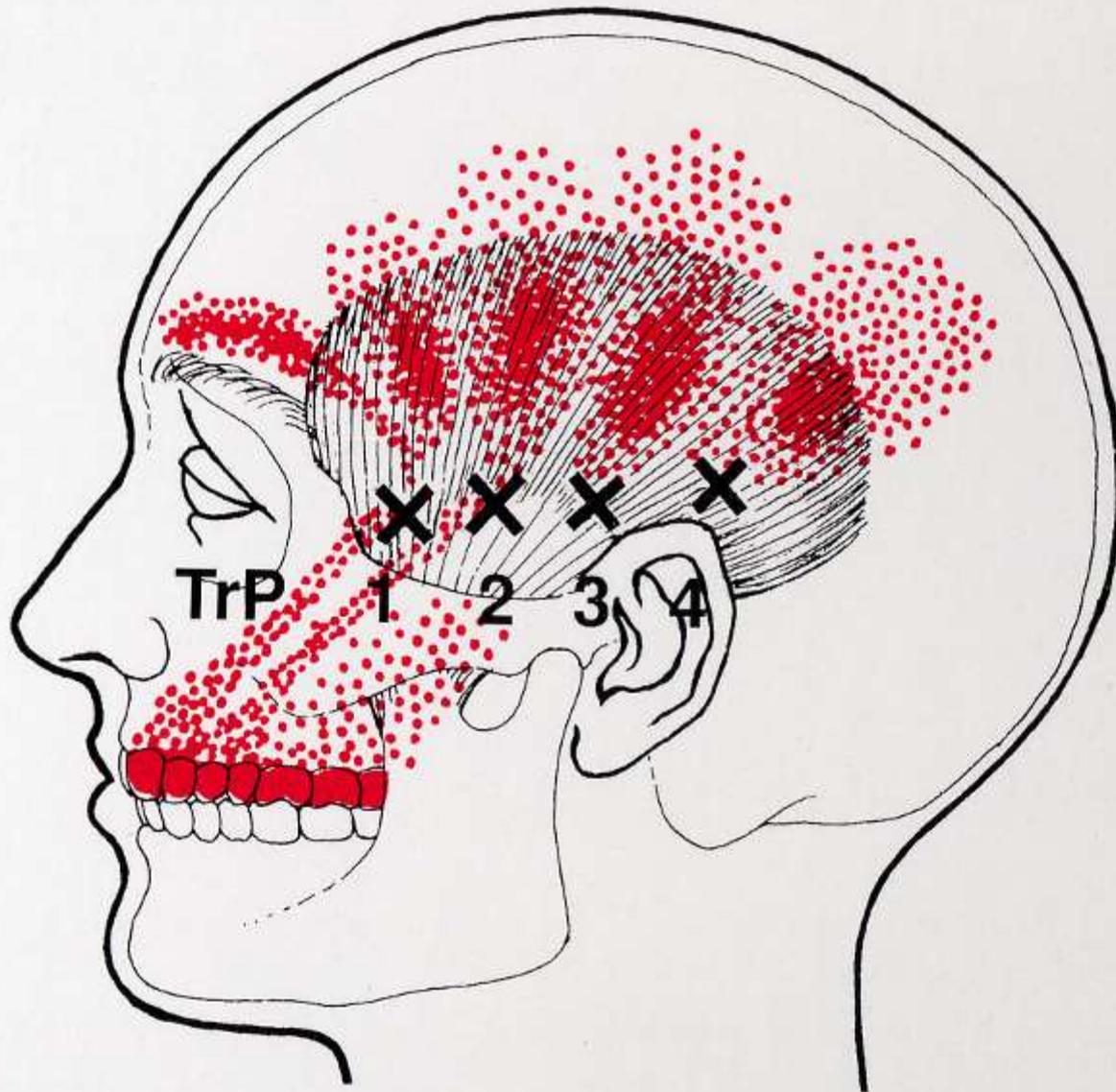
MASSETER



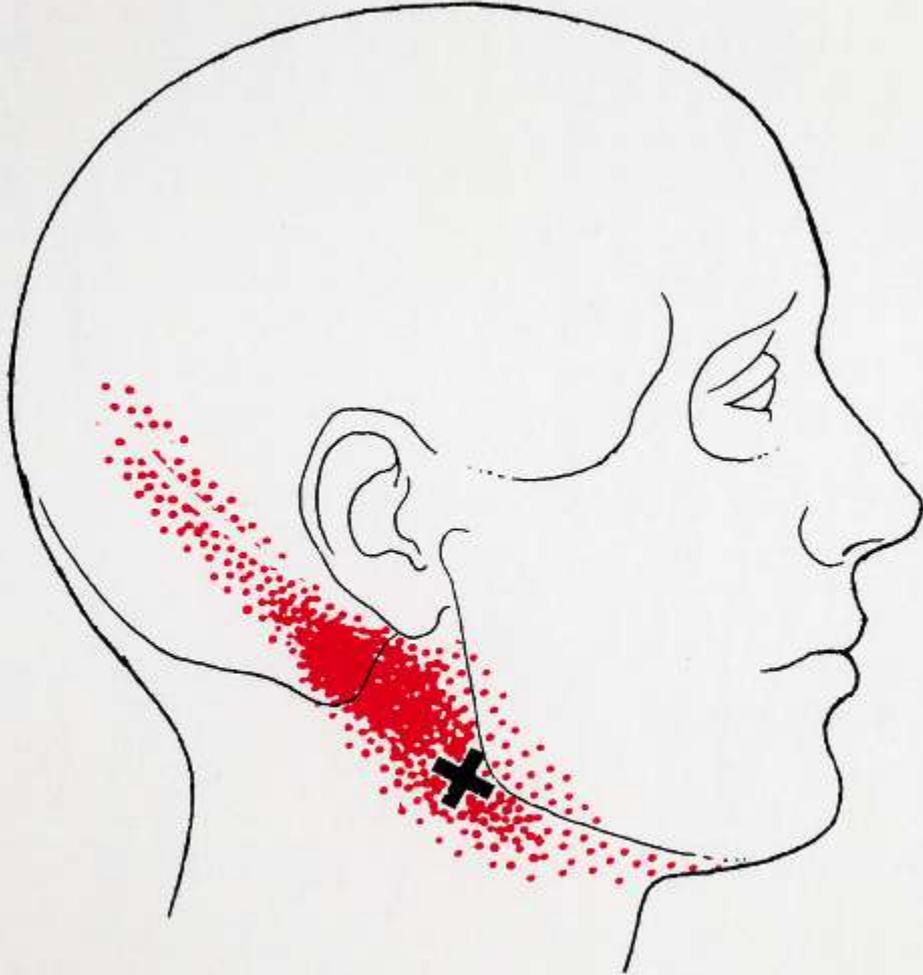
Deep



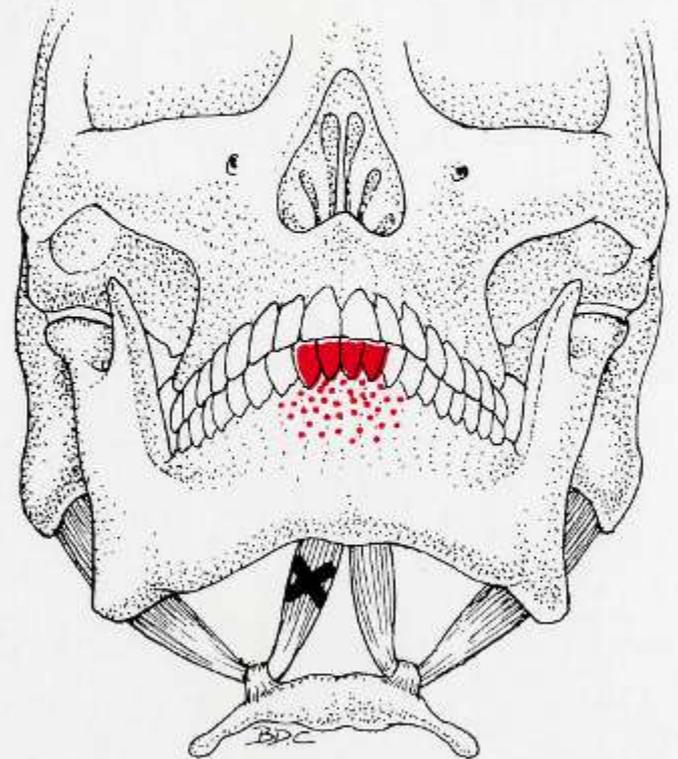




Temporalis



Posterior



Anterior

DIGASTRIC

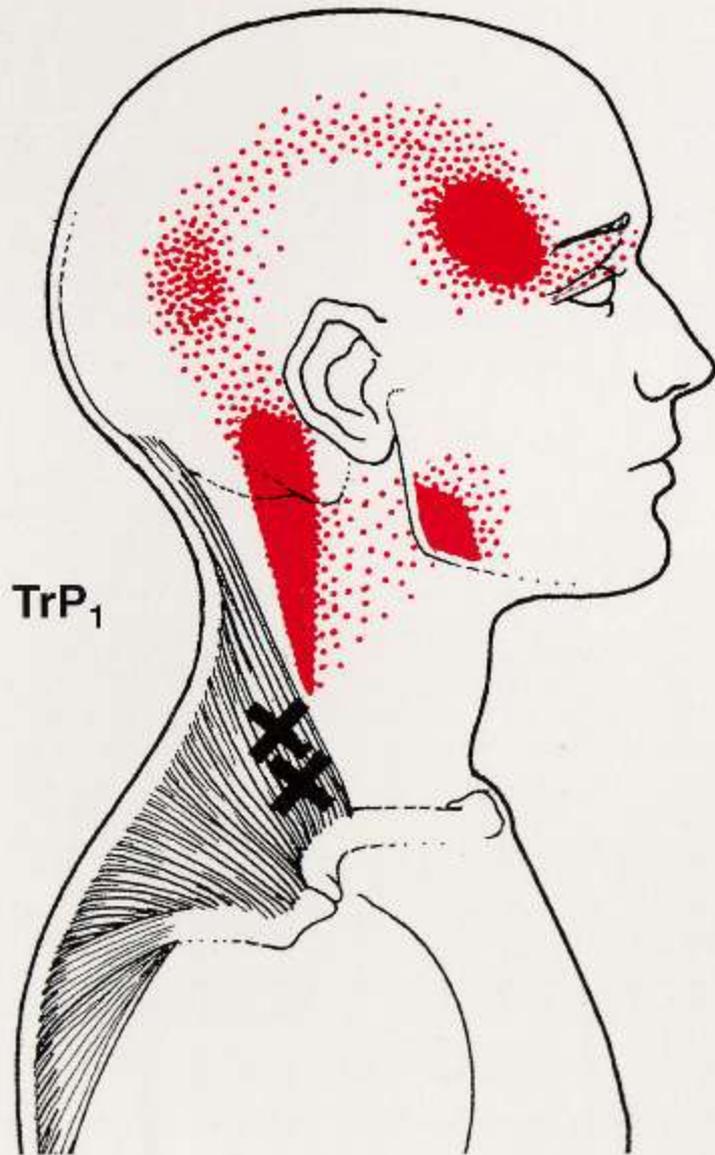


Sternal division



Clavicular division

STERNOCLEIDOMASTOID



TrP₁

Trapezius

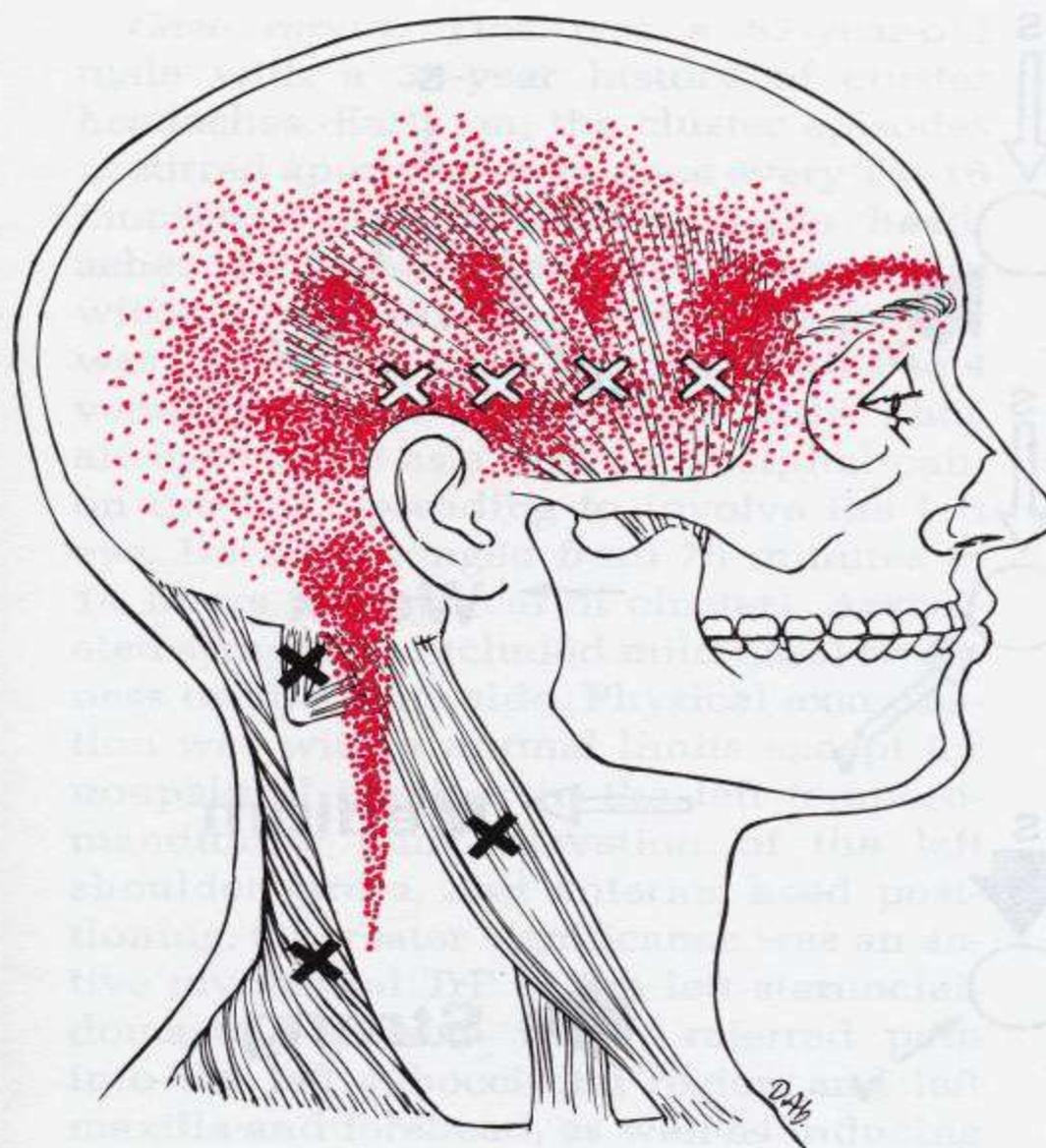


Figure 5.2. Overlapping pain referral patterns (*red*) from myofascial trigger points (**Xs**) in various masticatory and cervical muscles produce typical unilateral or bilateral migraine or tension-type headache pictures.

Myofascial Pain Dysfunction

- Treatment
 - ◆ Ethyl Chloride or Fluori-methane Spray and Stretch
 - ◆ Ice and moist heat
 - ◆ Trigger point injections
 - ◆ Acupuncture
 - ◆ Massage
 - ◆ Muscle relaxants
 - ◆ Splint therapy

Myofascial Pain Dysfunction

- Treatment (Continued)
 - ◆ Physical Therapy (with home program)
 - ◆ Stress management / biofeedback
 - ◆ Improved sleep (formal sleep study, melatonin, sleep program)

Trigger Point Injections

- Indications:
 - ◆ Trigger points that are unresponsive to manual therapies
 - ◆ Skilled manual therapy is not available
 - ◆ Limited time
 - ◆ Hyperuricemia and symptoms of gout (contraindication for massage)
 - ◆ The muscle cannot be stretched or shouldn't be stretched (hypermobility)

What to Inject?

- “Dry needling is as effective as injection of an anesthetic for relief of TrP symptoms, IF the needle elicits a local twitch response (LTR), which occurs when the needle encounters active loci of the TrP. **CONVERSELY**, if no LTR occurs, dry needling and injection of nontoxic anesthetics are equally ineffective.”

- “Postinjection soreness is more likely to occur, is more severe, and is of longer duration following dry needling.”

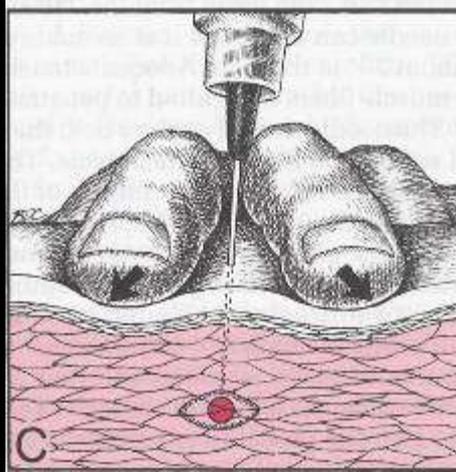
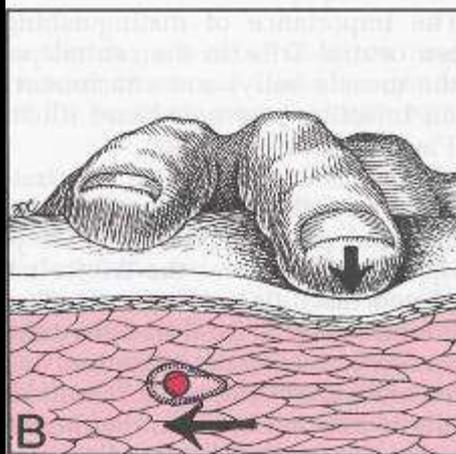
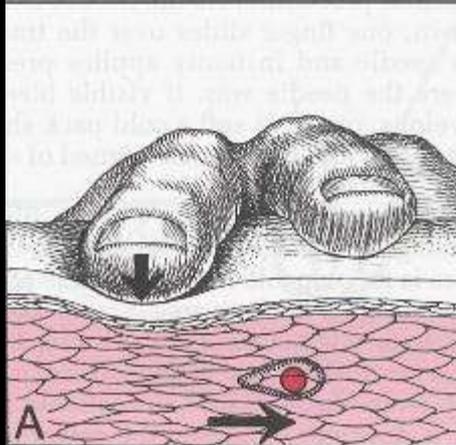
Travell & Simons' Myofascial Pain and Dysfunction

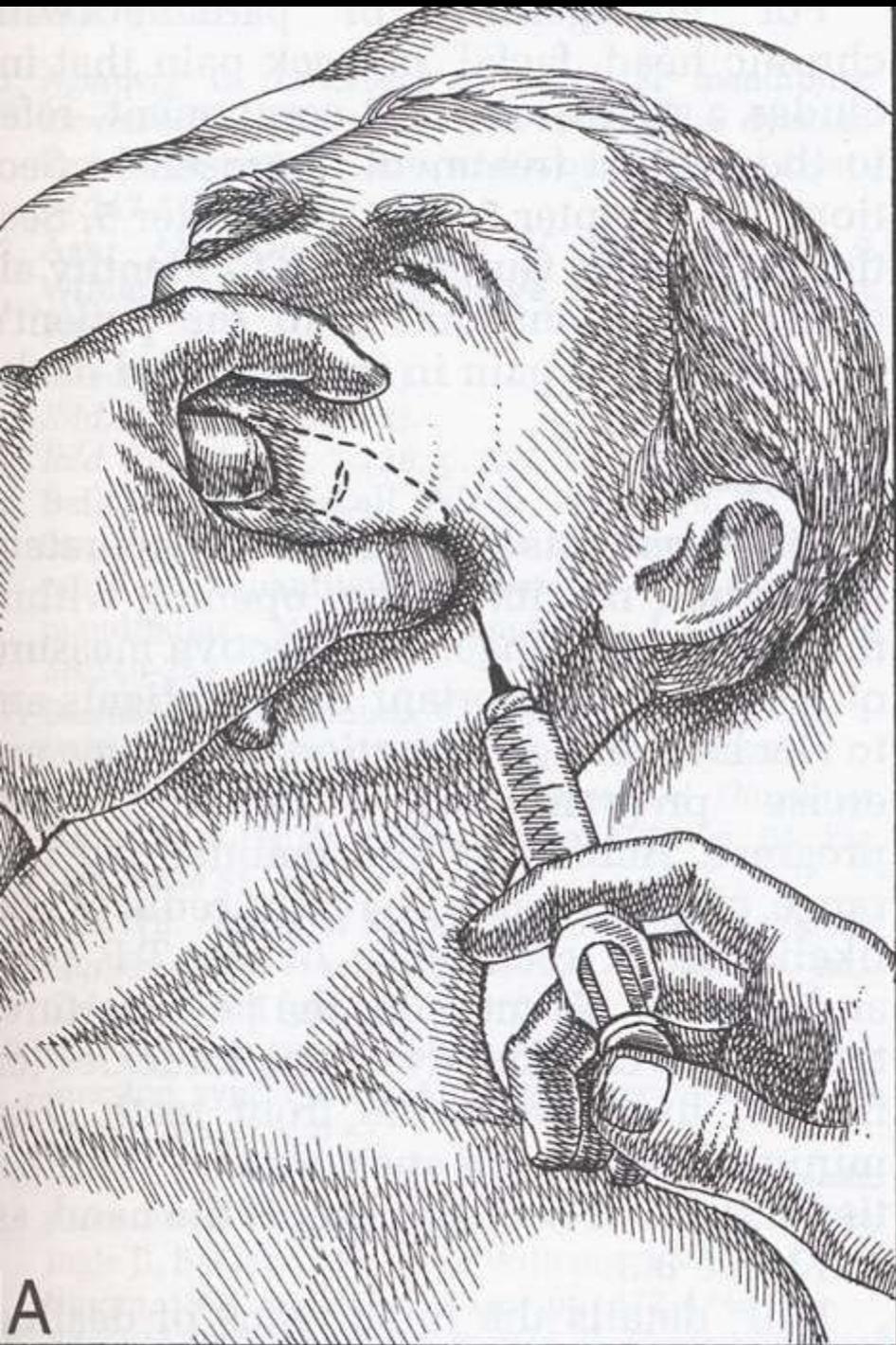
Trigger Point Injection Technique

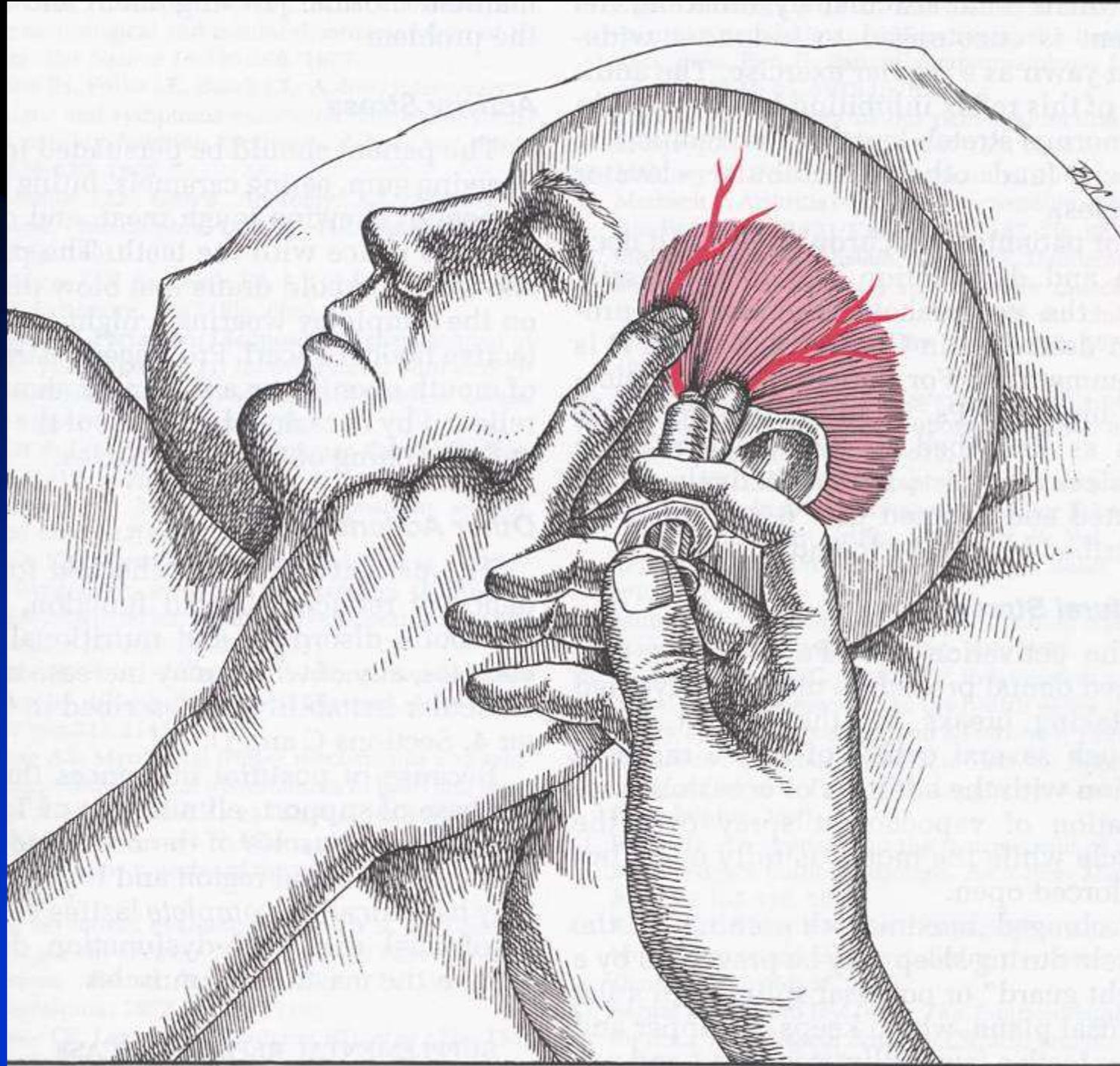
- Position patient in a recumbent position (appropriate for all injections).
- Select a needle that allows for proper depth and “touch” (25 and 27 gauge needles are recommended for the head and neck area).
- Palpate and fix the TrP.
- Attempt to find and inject the trigger point.

Trigger Point Injection Technique

- The trigger point is encountered and a LTR is elicited (important!)
- After the LTR, or a pain response/referral is noted by the patient, .1 to .2 ml of anesthetic is injected to minimize post injection soreness.
- The muscle should be stretched after injection



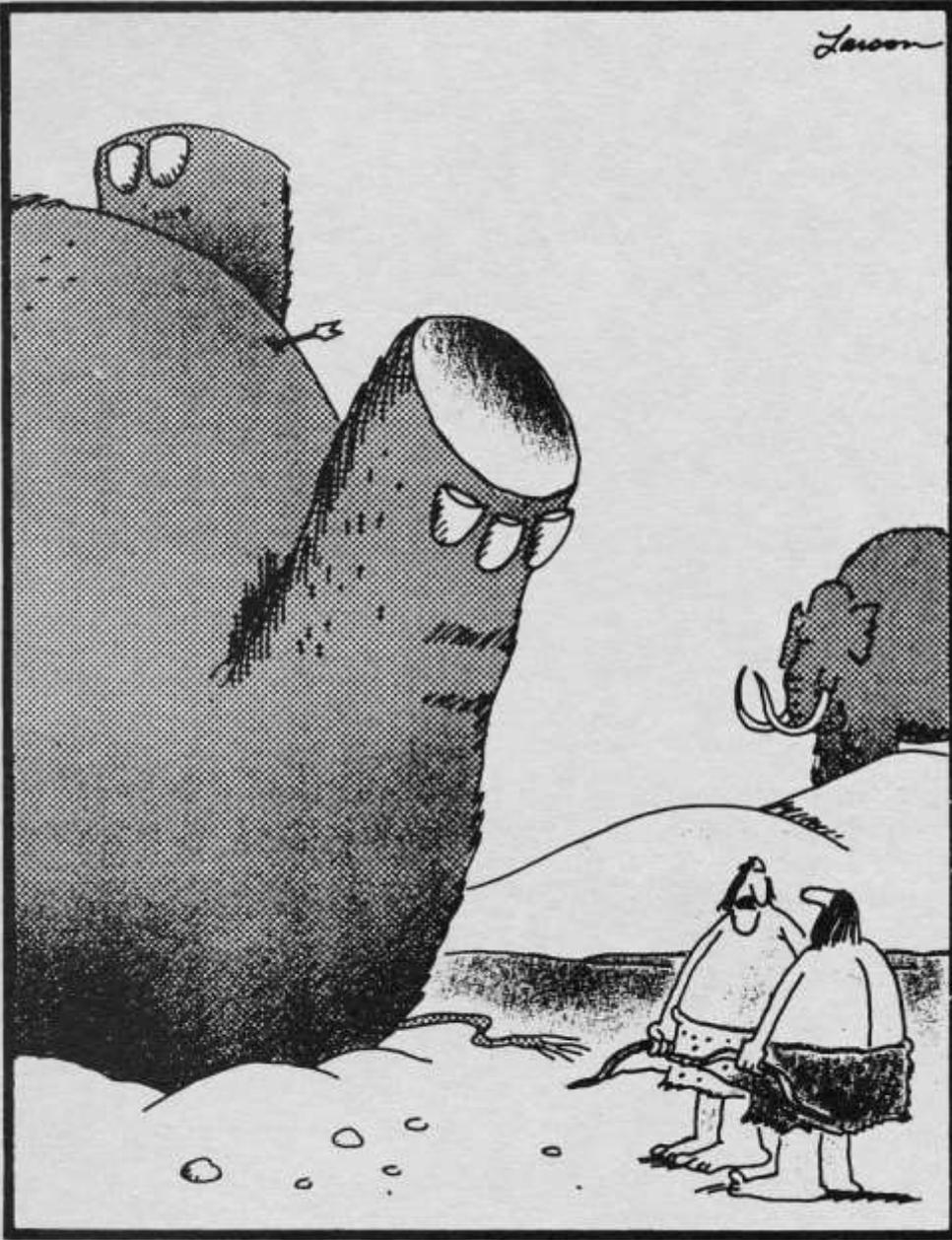






The Bottom Line

- It's all about the anatomy



"Maybe we should write that spot down."

Clarification of Chief Complaint

PQRST

- Provoked or Palliated
- Quality
- Region
- Scale
- Timing

Questions?



*Capsulitis, Trismus or
Non-Reducing Disc Displacement?*

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