



كلية ابن سينا الأهلية
جامعة العصبية
IBN SINA NATIONAL COLLEGE
FOR MEDICAL STUDIES

GOOD MORNING

- Jaw movements and functions of TMJ



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OMFD -2
3rdYR 24-25



Functional and radiologic anatomy of TMJ

LLO	By the end of this session, students should be able to:
1	Discuss the hinge and gliding movements of the TMJ.
2	Describe the different jaw movements and importance of masticatory muscles.
3	Explain clinical considerations of TMJ.
4	Discuss the functions of TMJ

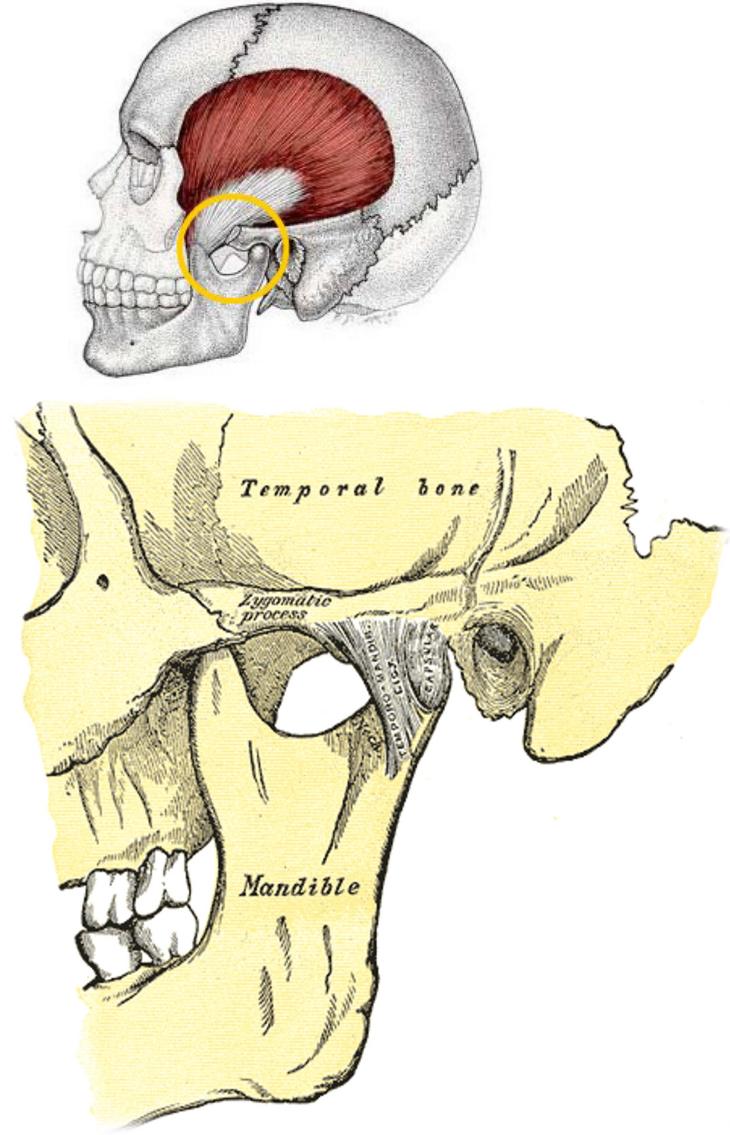
INTRODUCTION

- The **Temporomandibular joint** is one of the most complex joints in the body and is the area in which the mandible articulates with cranium (Temporal bone)
- It provides:

- hinging movement in one plane – as **GINGLYMOID** joint ,
- gliding movements- **ARTHROMOIDAL** joint .

Thus TMJ is technically considered as **GINGLYMODIARTHROIDAL** joint .

Temporomandibular joint is a **SYNOVIAL JOINT**

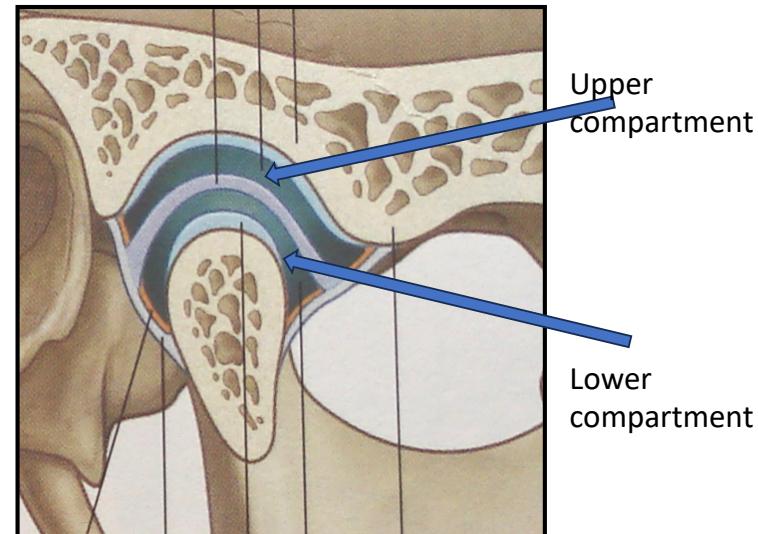
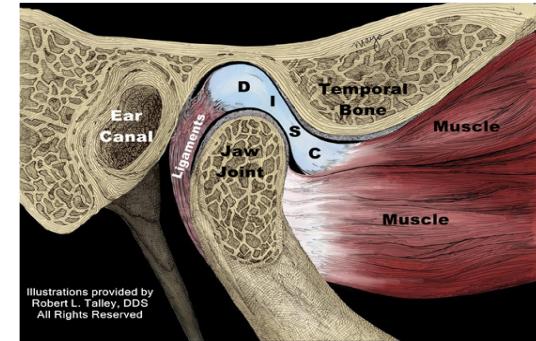


MOVEMENTS OF TEMPOROMANDIBULAR JOINT

Movements can be divided into-

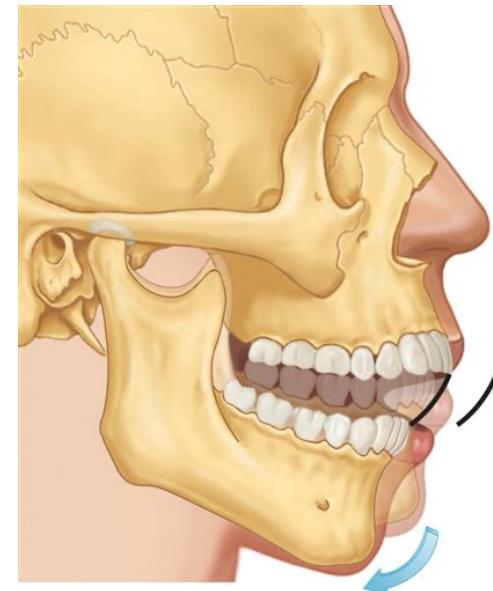
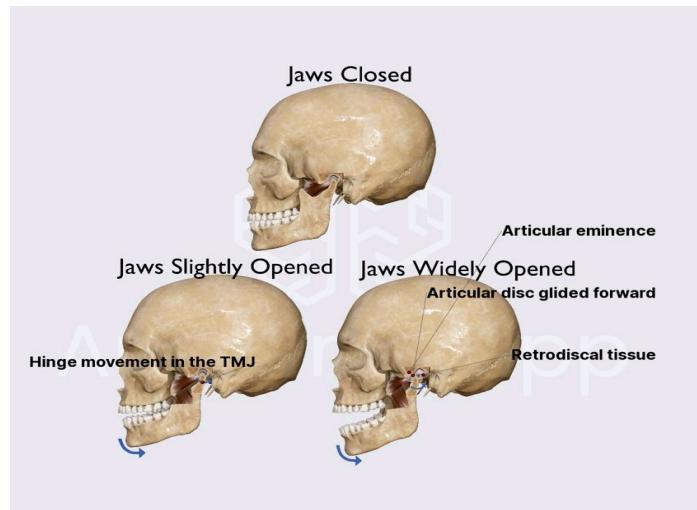
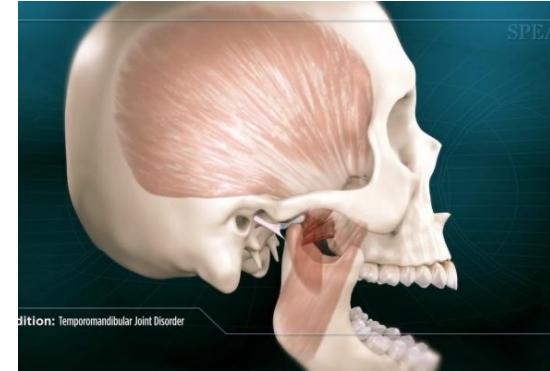
Between upper articular surface and articular disc that is ***meniscotemporal compartment***

Between the disc and head of the mandible that is ***meniscomandibular compartment***



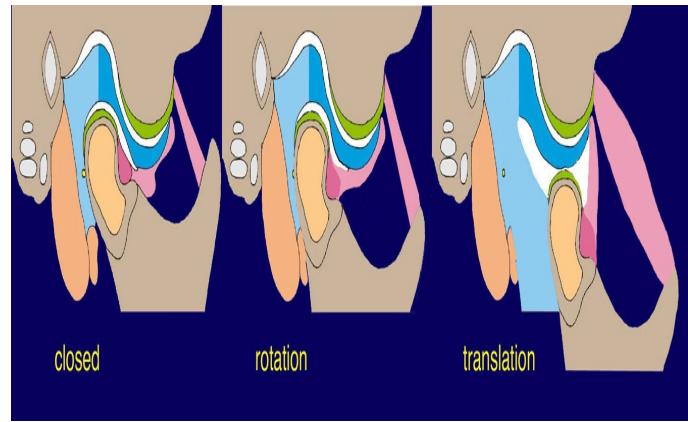
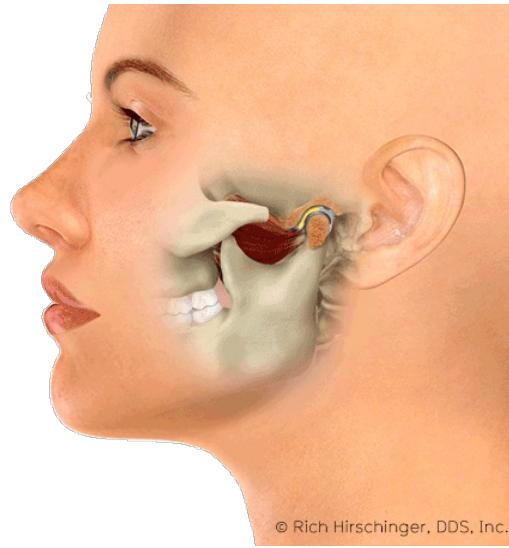
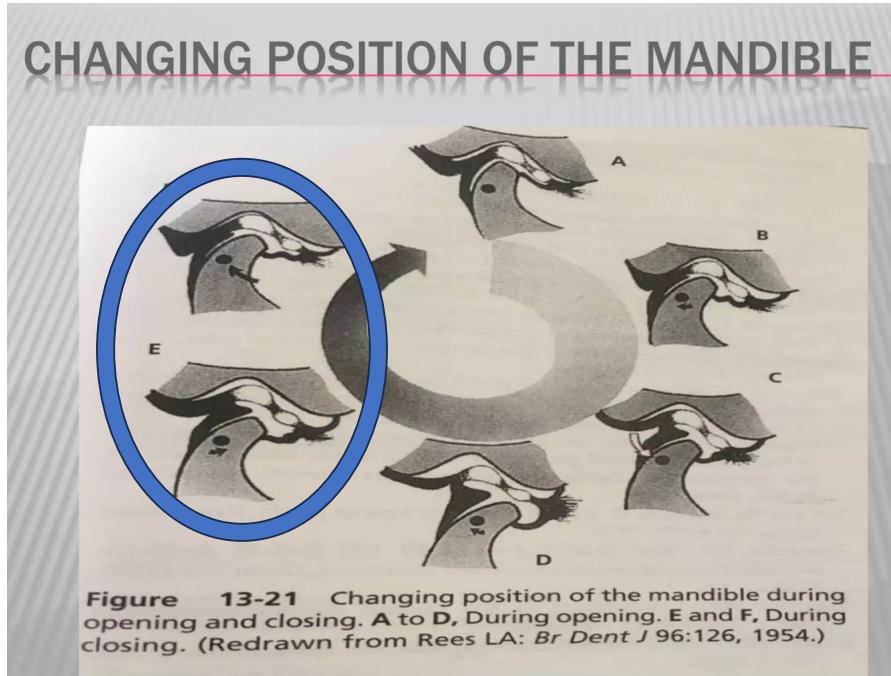
MOVEMENTS OF TMJ

- PROTRUSION (Forward movement)
- RETRACTION (backward movement)
- ELEVATION (Closing the mouth)
- DEPRESSION (Opening the mouth)
- LATERAL (Side to side-Chewing)

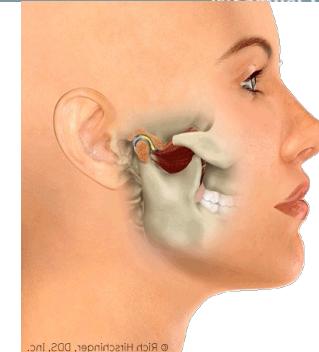
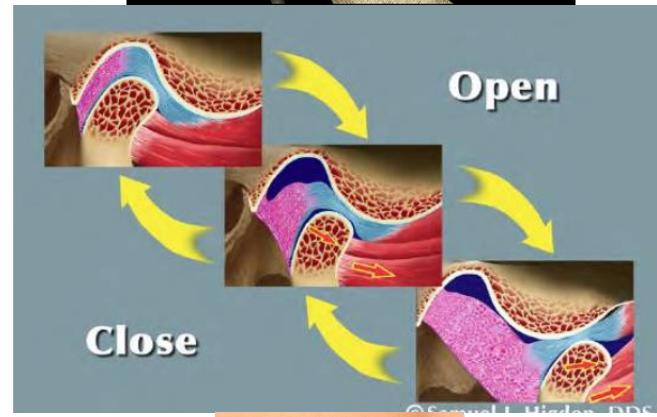
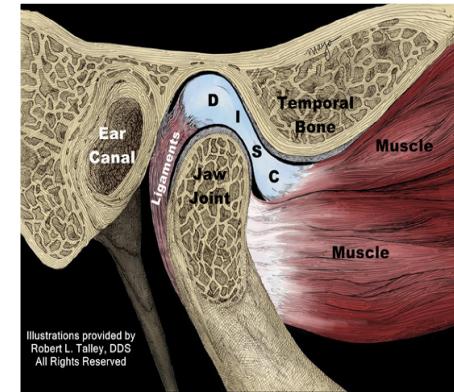


Initially- when mouth opened mildly-
Rotational movement occurs in first 20-25mm .

Translational movement occurs after that when
mouth is opened more wide

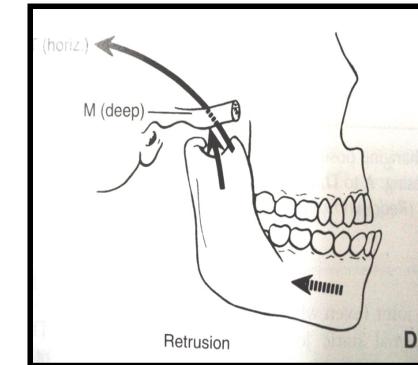
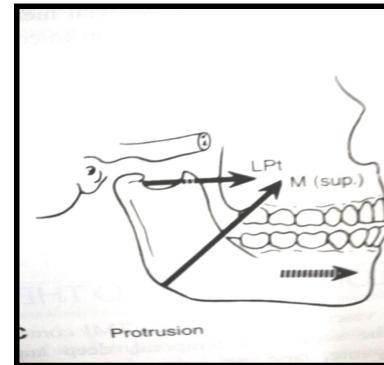
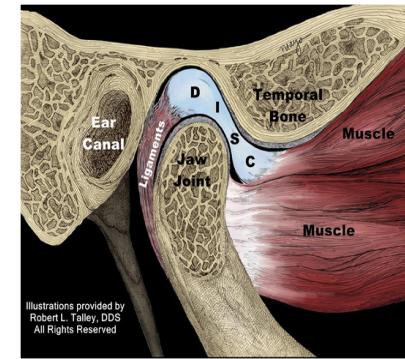


- The **opening of mouth** or the **depression** of the mandible-
 1. The head of mandible moves on undersurface of disc like a **hinge**.
 2. During wide opening of mouth-
 3. Hinge like movement is followed by gliding movement of disc and head of mandible.
 4. At the end head comes to lie under the articular tubercle.
- These are reversed in **closing (Elevation)of the mandible**.

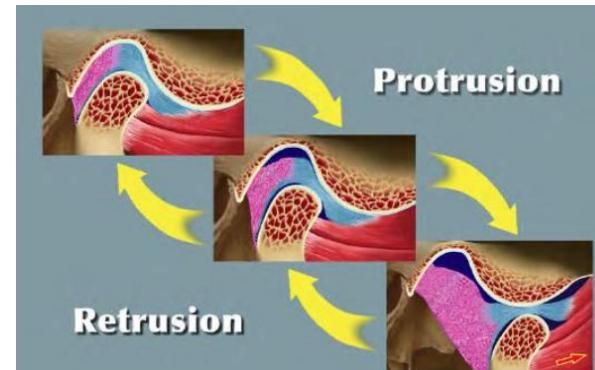


- In **forward movement or the Protraction** of the mandible-

1. Articular disc **glides** over upper articular surface
2. The head of mandible moves with it



- The reversal of this movement is called as **Retraction(Backward)**.



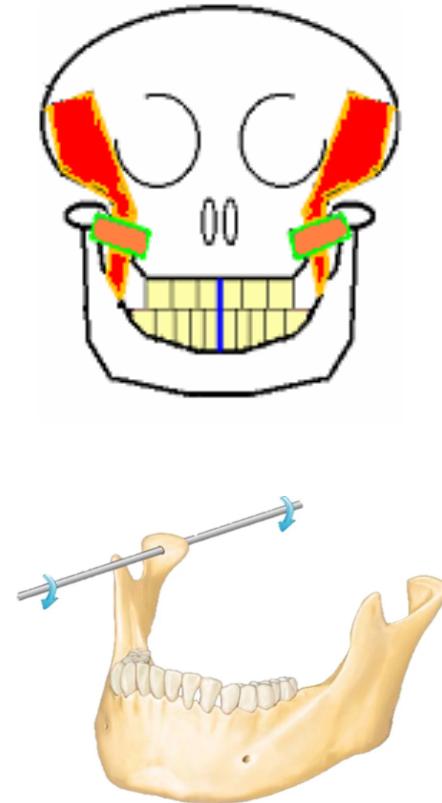
Chewing movements involve **side to side** movements of mandible.

Eg: If the **right side joint** (condyle) slides forward, the **left side joint** only **rotates in place**.

Because of this, the **chin shifts to the left side** (the side where no forward sliding happens).

Then the opposite happens: the **left side condyle slides forward** and the **right side condyle just rotates** → chin moves to the right.

By **alternating** these left-right movements, the jaw makes the **grinding (side-to-side) motion** needed for chewing.



Muscles Of Mastication

Primary Muscles Of Mastication:

- Masseter
- Temporalis
- Medial pterygoid and
- Lateral pterygoid

Secondary Muscles Of Mastication:

- Digastric
- Mylohyoid
- Geniohyoid

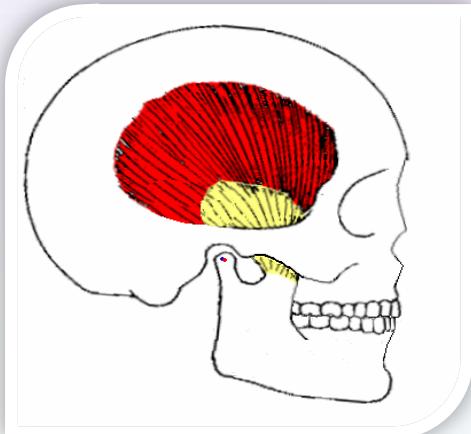
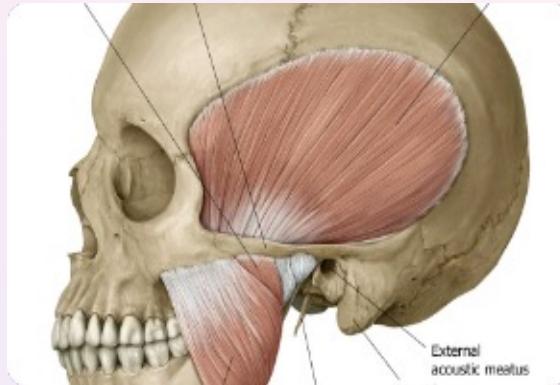
Muscles of Mastication

Temporalis Muscle

Origin: Temporal fossa

Insertion:

- Margins and deep surface of coronoid process.
- Ant. Border of ramus of mandible



- -Elevating the mandible
- Posterior fibres of temporalis –in retraction
- Helps in side to side grinding movements

EXAMINATION-

Temporalis muscle:



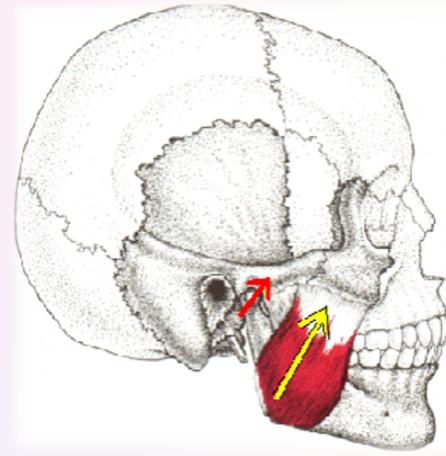
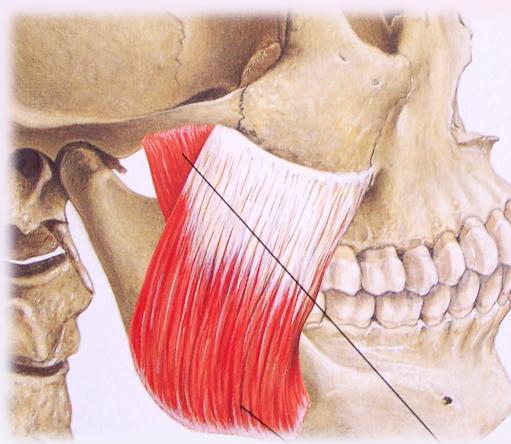
Masseter Muscle

The masseter muscle is a powerful chewing muscle that spans from the zygomatic arch to the angle of the mandible.

-Assisting in elevating the mandible

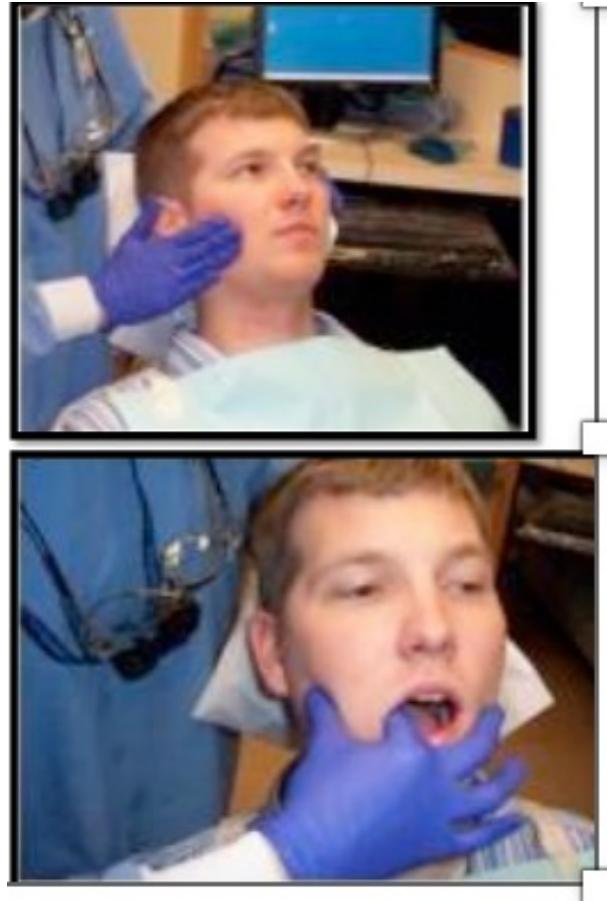
and

chewing motion.



II. EXAMINATION– Examination of Masticatory muscles

Masseter muscle :



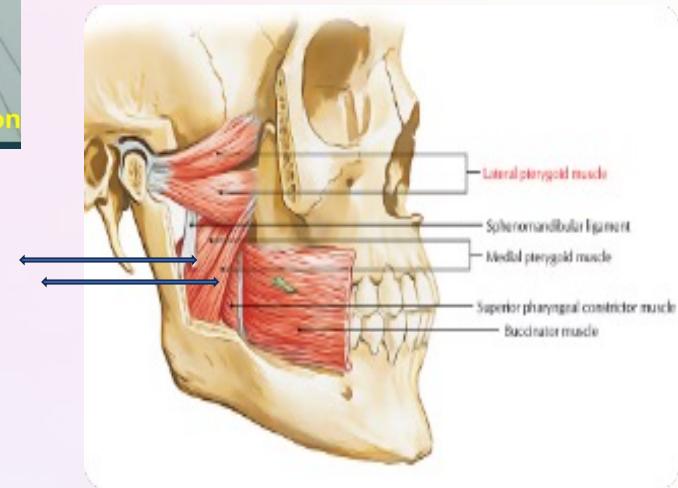
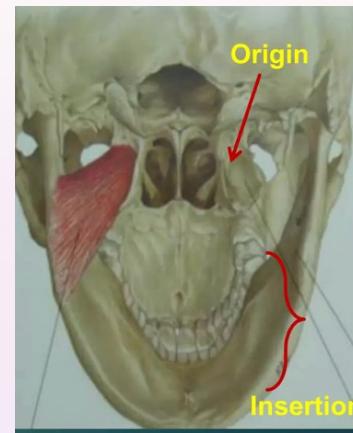
Medial Pterygoid Muscle

Medial pterygoid muscle consists of two heads

- a. Superficial
- b. Deep

a. Superficial head origin: from maxillary tuberosity

b. Deep head: medial surface of lateral pterygoid plate and part of palatine bone.



Insertion:

-Fibres run backwards ,downwards & laterally into medial surface of angle of mandible

- Elevating the mandible,
- chewing and grinding motions.

EXAMINATION

Medial Pterygoid muscle:



Lateral Pterygoid Muscle

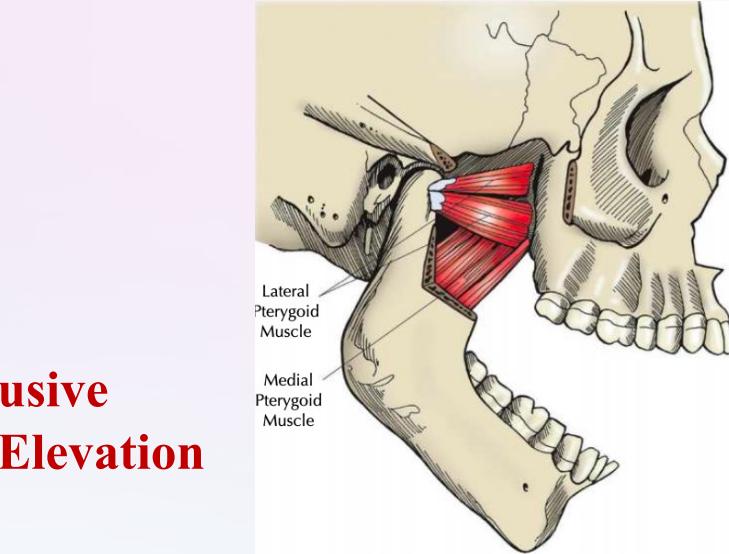
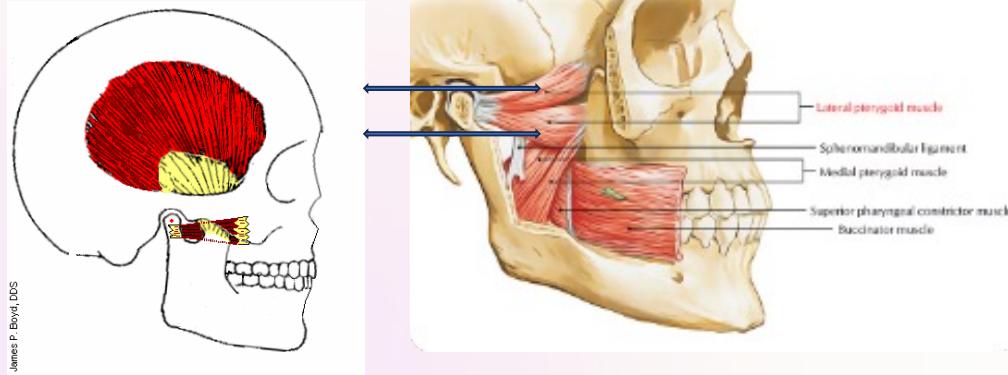
Origin:

Upper head (small) : from infra-temporal surface of greater wing of sphenoid bone

Lower head (larger): lateral surface of lateral pterygoid plate

•Insertion

Anterior surface of neck of mandible



The lateral pterygoid muscle is the main **protrusive**
I.e. Upper head of lateral pterygoid muscle- Elevation
and

Lower head of lateral pterygoid muscle: Depression (opening)muscle of the mandible.

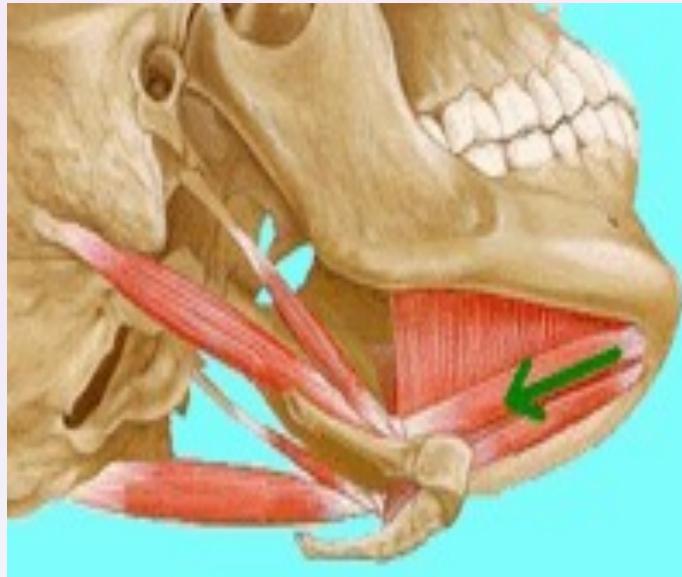
II. EXAMINATION– Examination of Masticatory muscles

Lateral Pterygoid muscle:



ACCESSORY MUSCLES

- Digastric
- Mylohyoid
- Geniohyoid

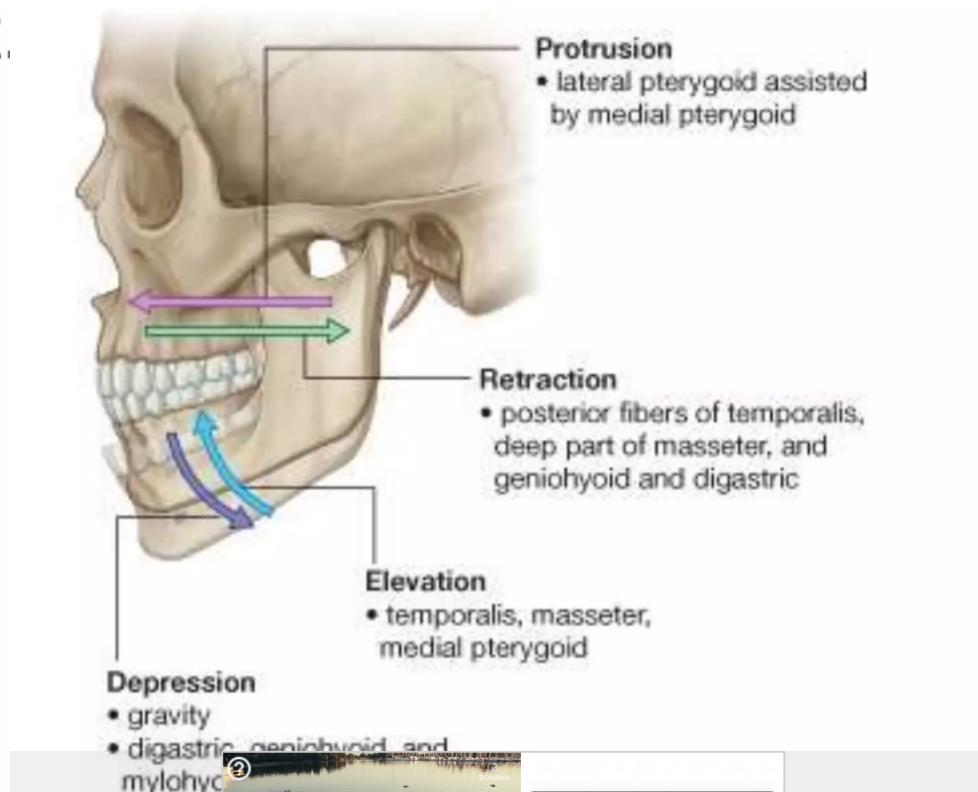


ANS

Depressor muscles-Digastric
:Mylohyoid
- Geniohyoid

Muscles involved in movement.

Depression	Lateral pterygoid, Digastric, Geniohyoid, Mylohyoid.
Elevation	Temporalis, Masseter, Medial pterygoid.
Protrusion	Medial pterygoid, lateral pterygoid.
Retraction	Posterior fibres of temporalis.



- **Lateral movement** is mainly produced by **contralateral pterygoids** (lateral + medial).
- **Controlled by ipsilateral temporalis & masseter.**
- **Restricted** by ligaments and joint surfaces to avoid over-movement

Functions of the Temporomandibular Joint (TMJ):

1. Mastication (Chewing):

1. Provides hinge and gliding movements of the mandible.
2. Allows crushing, grinding, and cutting of food.

2. Speech (Phonation):

3. Swallowing (Deglutition):

4. Respiration & Rest Position:

1. Maintains mandibular rest posture, keeping the airway patent.

5. Stress Absorption & Force Distribution:

1. Articular disc and synovial fluid help in shock absorption during heavy biting forces.

6. Coordination of Movements:

1. Both right and left TMJs work simultaneously to maintain occlusion and balanced jaw function.

EXAMINATION

Temporo-mandibular joint Examination

PRETRAGUS
AND
INTRA AURICULAR METHOD

Inspection: # Any swelling over the joint region
Symmetry , Clicking sound

Palpation: Pre-auricular and intra-auricular
Temperature of the overlying skin
Tenderness # Crepitus

Auscultation: Clicking



Fig. 7-20: Examination of TMJ with pretragus palpation method.



Fig. 7-21: Intraarticular palpation method showing finger inserted in the articular area.

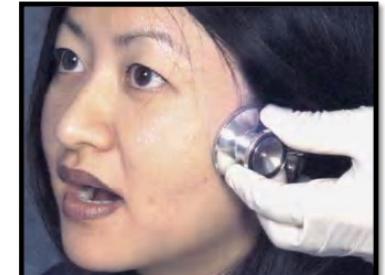
EXAMINATION

Temporo-mandibular joint Examination

Range of movements:

1. Vertical
2. Lateral – right, left

- § TMJ Tenderness [Pain]
- § Joint sounds: CLICKING , CREPITUS
- § Head / Neck pain



-Interincisal distance :- metal ruler/ Vernier callipers



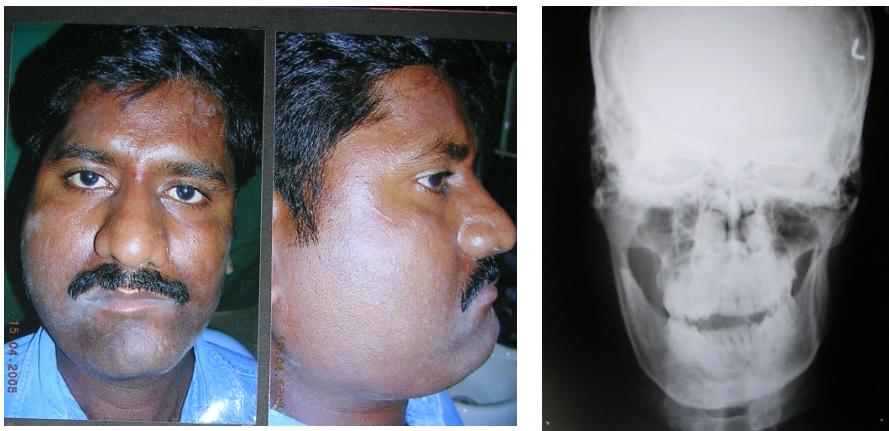
CLINICAL CONSIDERATIONS:

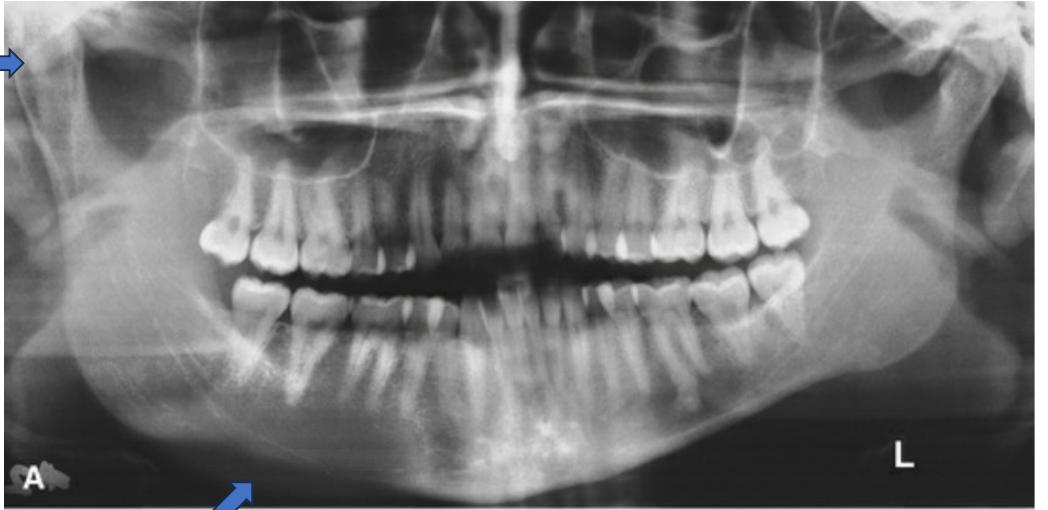
DEVELOPMENTAL:

CONDYLAR HYPERPLASIA

-Is a developmental abnormality that results in enlargement and occasionally deformity of the condylar head.

- ✓ Chin deviated to the **unaffected side**
- ✓ Posterior open bite on the affected side.





Radiographic features

✓ Condylar neck - elongated and thickened and may bend laterally when viewed in the coronal plane. –inverted "L SHAPE".



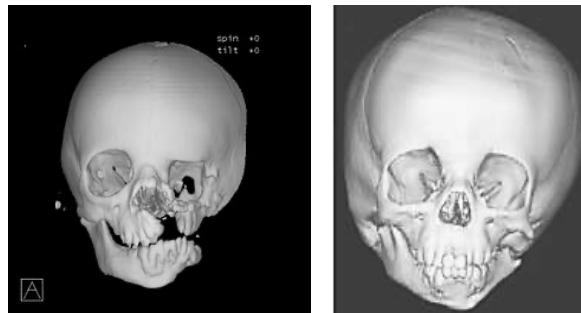
Condylar hypoplasia

Is failure of the condyle to attain normal size .



Radiographic features

The condyle may be normal in shape and structure but is **diminished in size**, and the mandibular fossa also is proportionally small.



The posterior border of the ramus and condylar neck may have a dorsal (posterior) inclination.



Bifid condyle

Frontal or sagittal plane -A bifid condyle has a vertical depression, notch, or deep cleft in the centre of the condylar head



Clinical features

- ✓ Incidental finding, asymptomatic.



Radiographic features

- ✓ A depression or notch is present on the superior condylar surface, giving the anteroposterior-a heart shape.



REFERENCES:

- The anatomical basis of clinical practice: gray's anatomy (39th edition)
- Burkett's oral medicine (13th edition) pg :350-355.
- White and pharoah –Text book of Oral radiology -7th edition1350-1356

Thank You