

***Biology 223***

***Human Anatomy and Physiology***

***Week 10; Lecture 2; Wednesday***

***Dr. Stuart S. Sumida***

# **Tissues of the Head – Part II Detail on Mastication**

# **“True” Muscles of mastication**

**All V3 innervation**

**1. Temporalis m.**

**2. Masseter m.**

**3. Medial pterygoid**

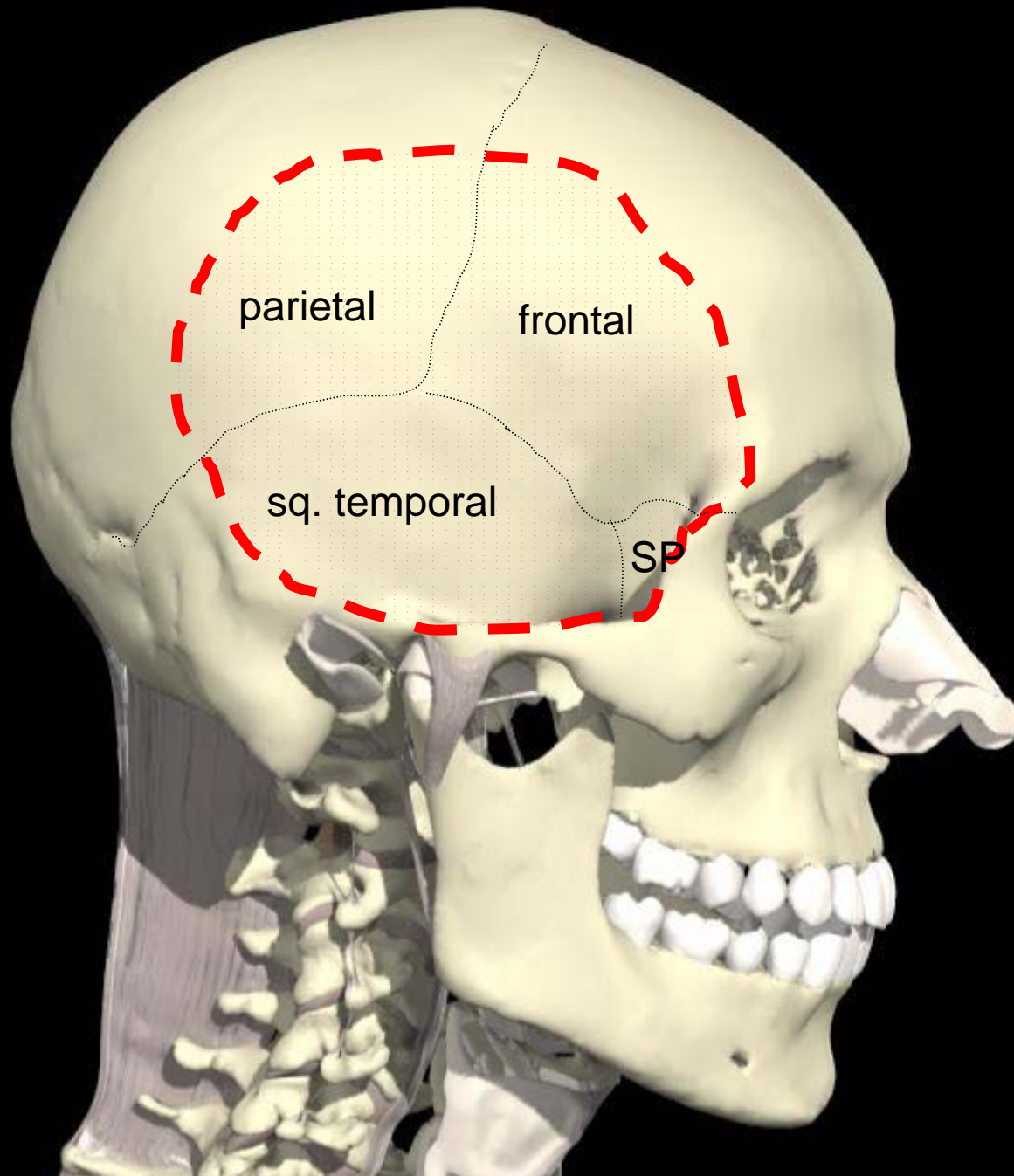
**4. Lateral pterygoid**  
upper head: to articular disc  
lower head: to neck of mandibular condyle

## **“Accessory” Muscles of mastication**

**Vital for normal chewing, but not mandibular adductors/protractors**

- **Buccinator VII**
- **Digastric V3 & VII**
- **Tongue XII**

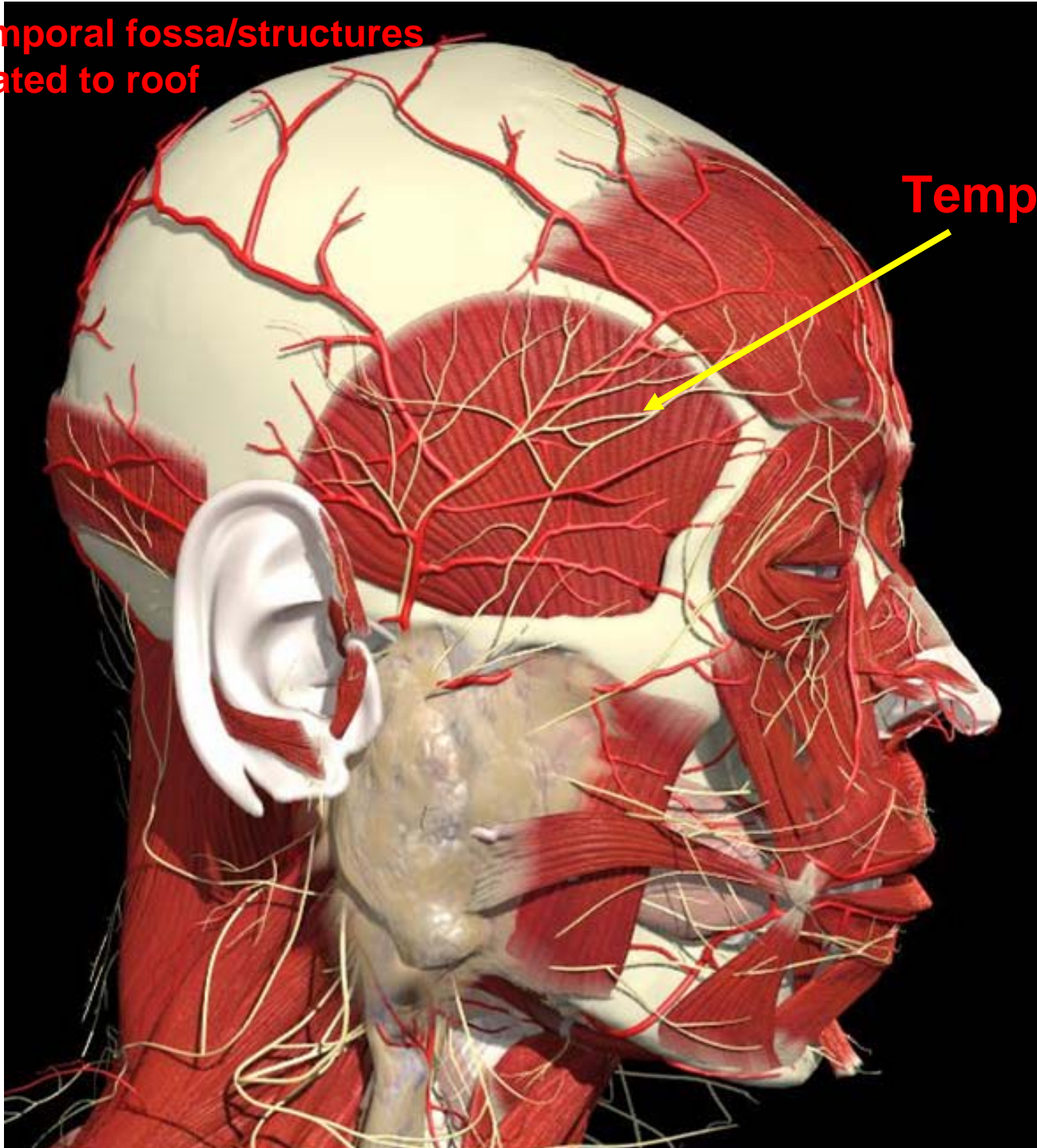
## Temporal fossa/floor



r:

**Temporal fossa/structures  
related to roof**

**Temporalis m.**

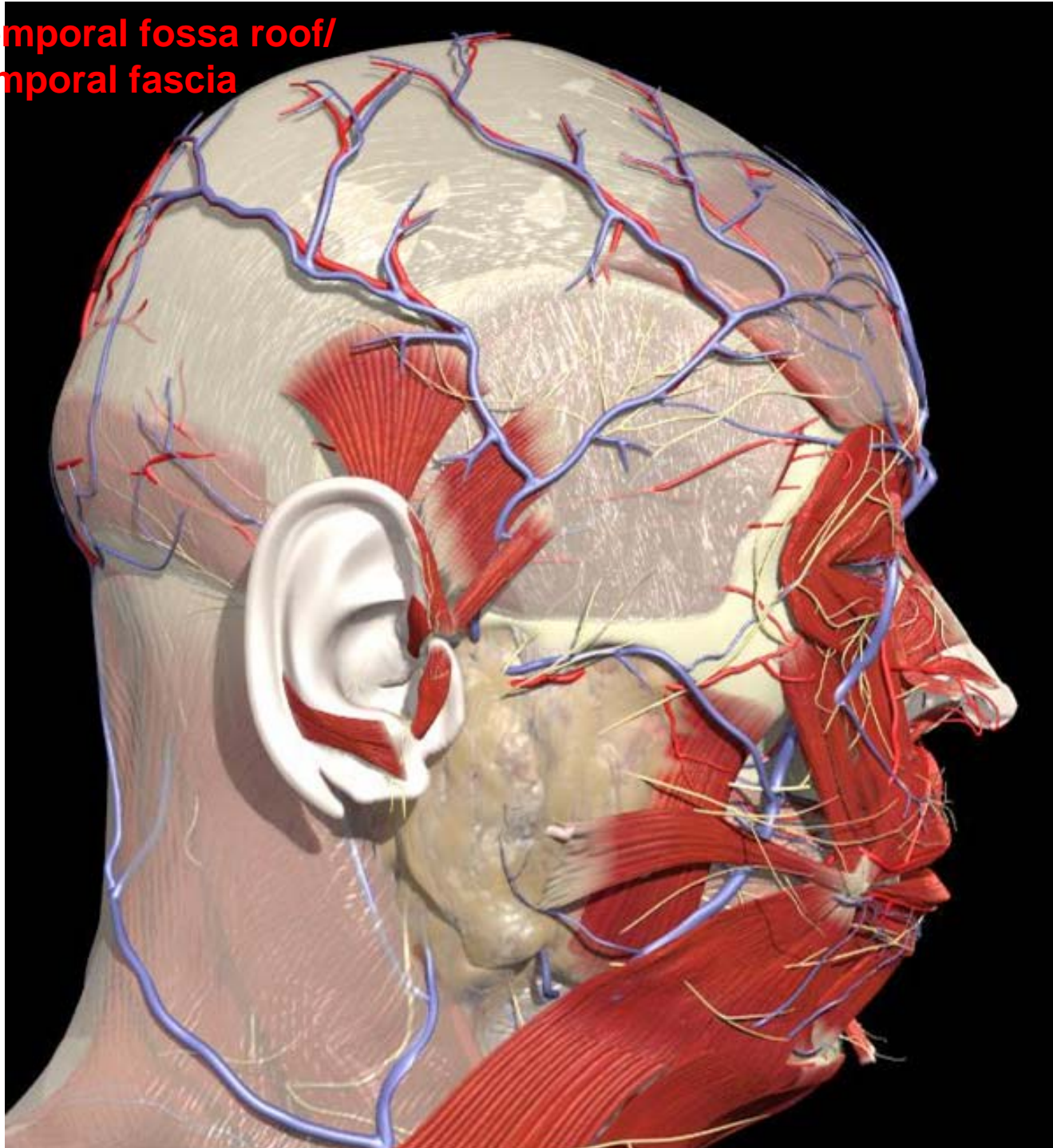




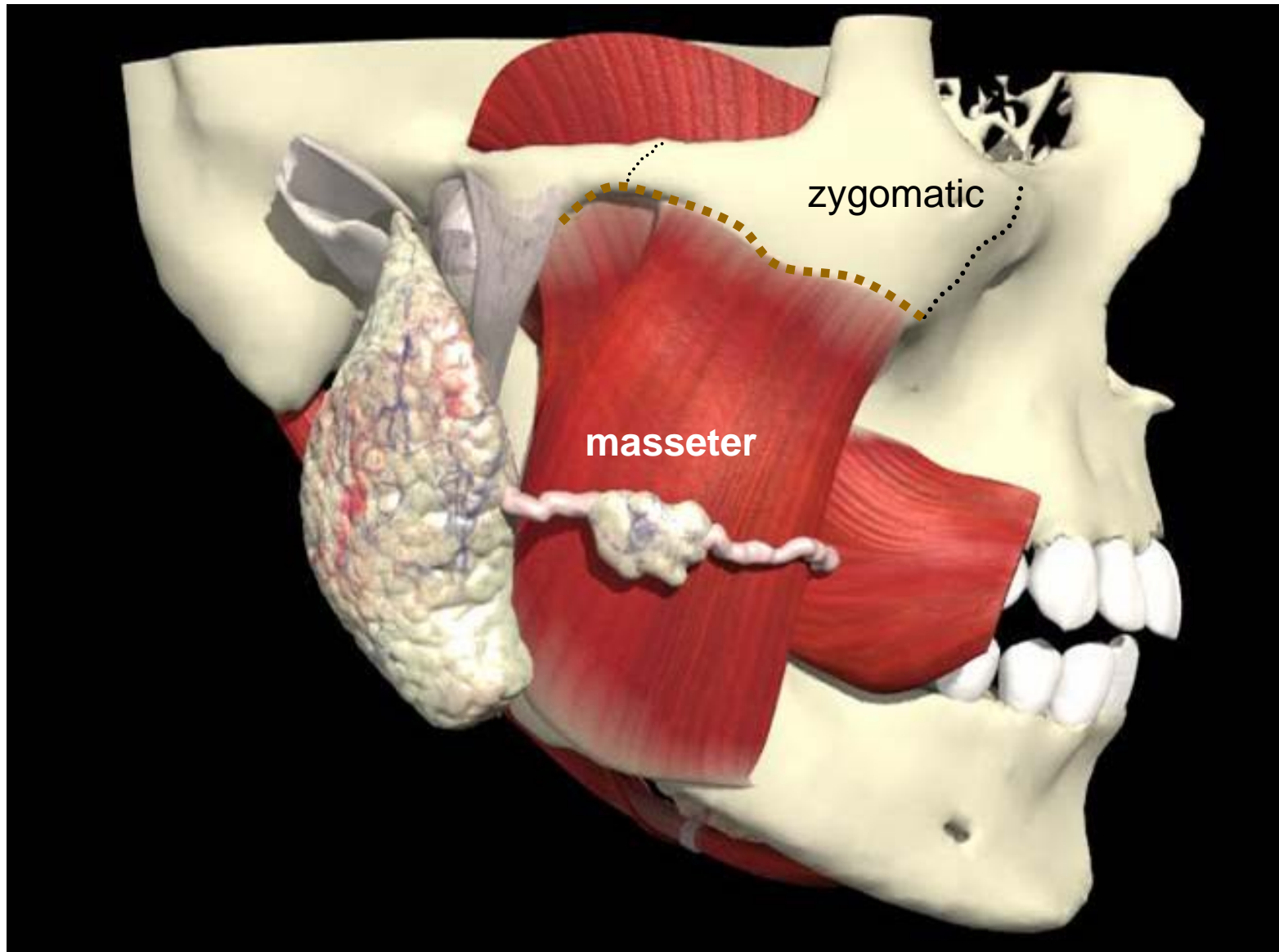


**KNM ER 460 *Australopithecus boisei***

**Temporal fossa roof/  
temporal fascia**

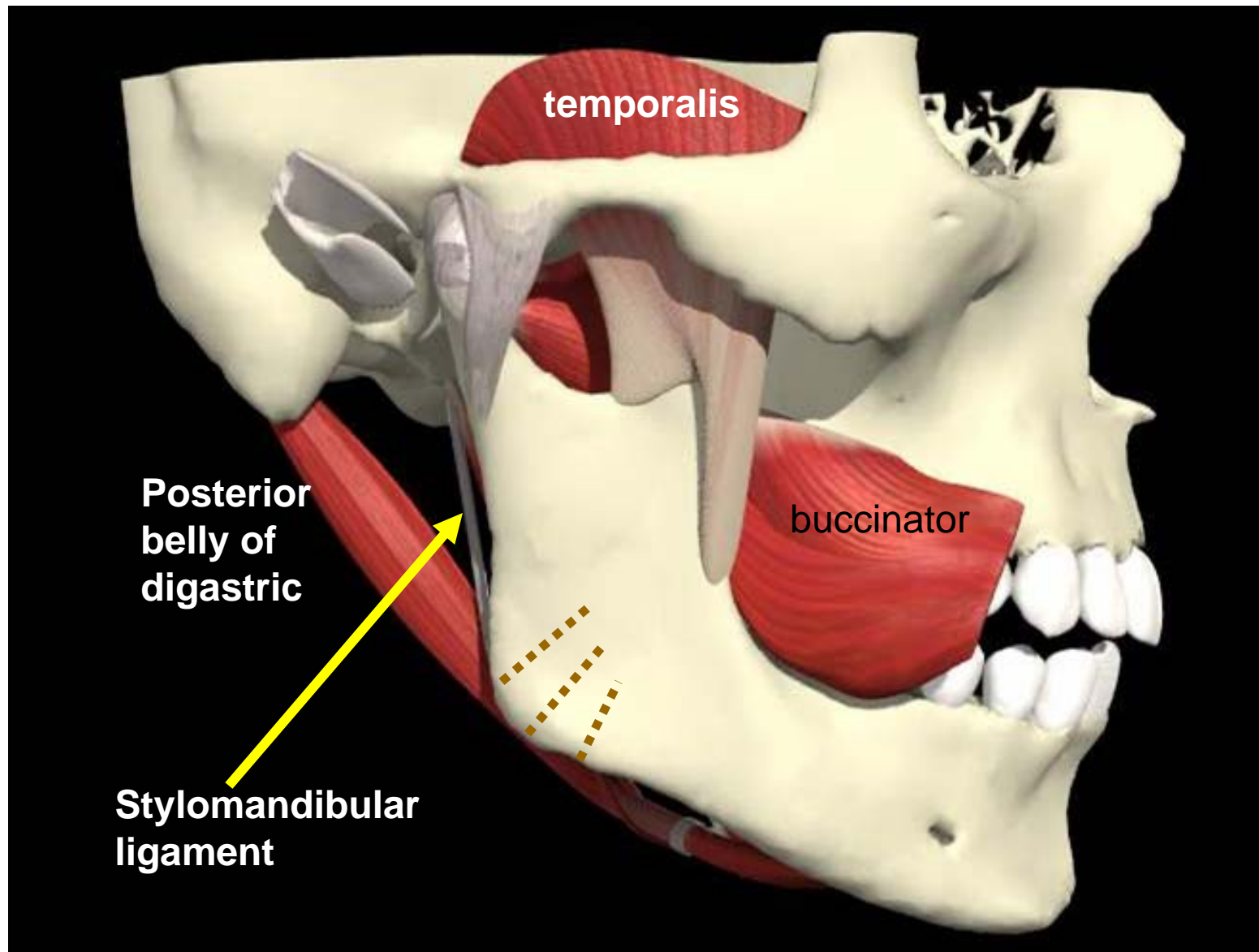




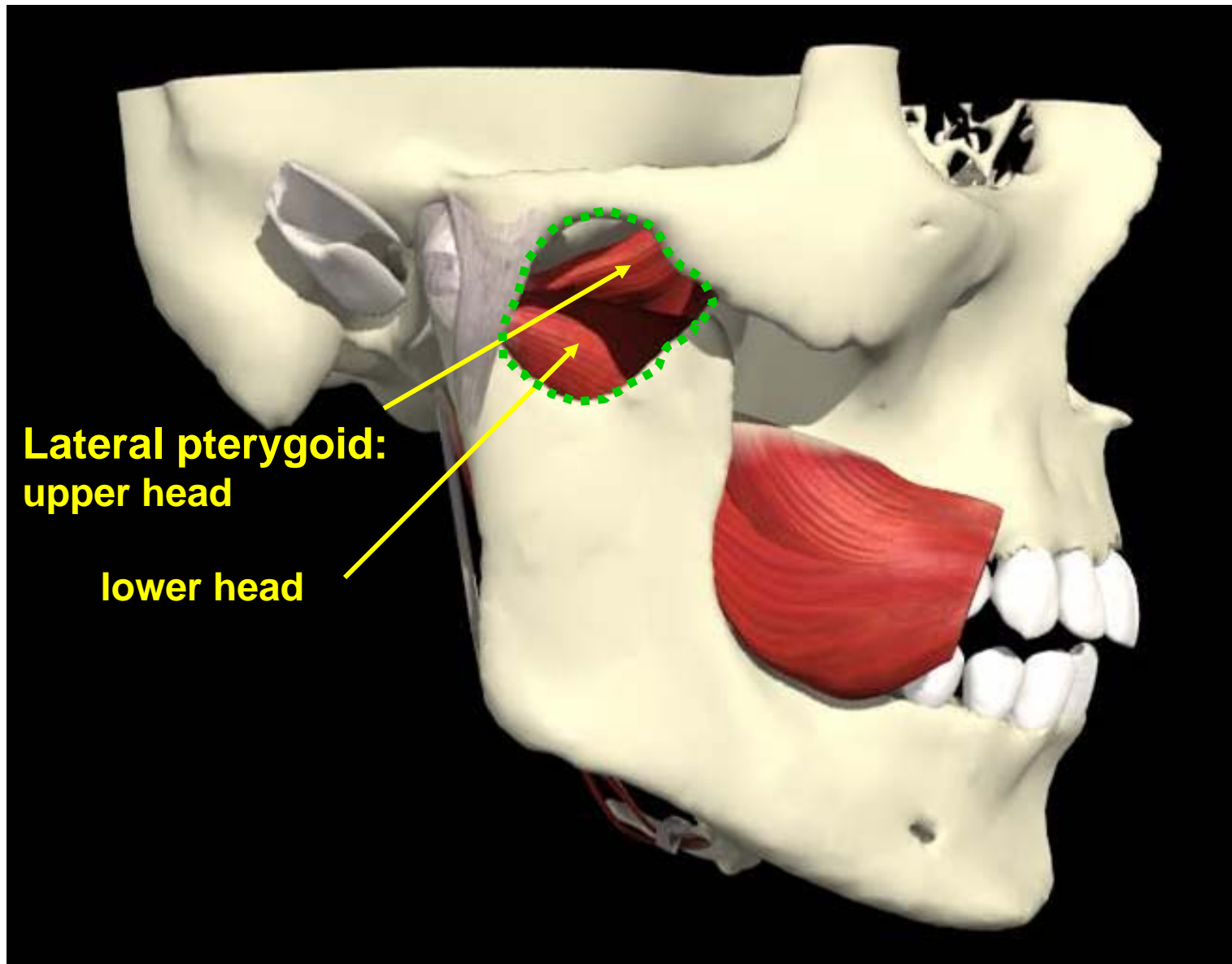


**Three layers:**

**Superficial, middle and deep with slightly different fiber orientations; important in recruitment for chewing**







## INFRATEMPORAL FOSSA

### borders:

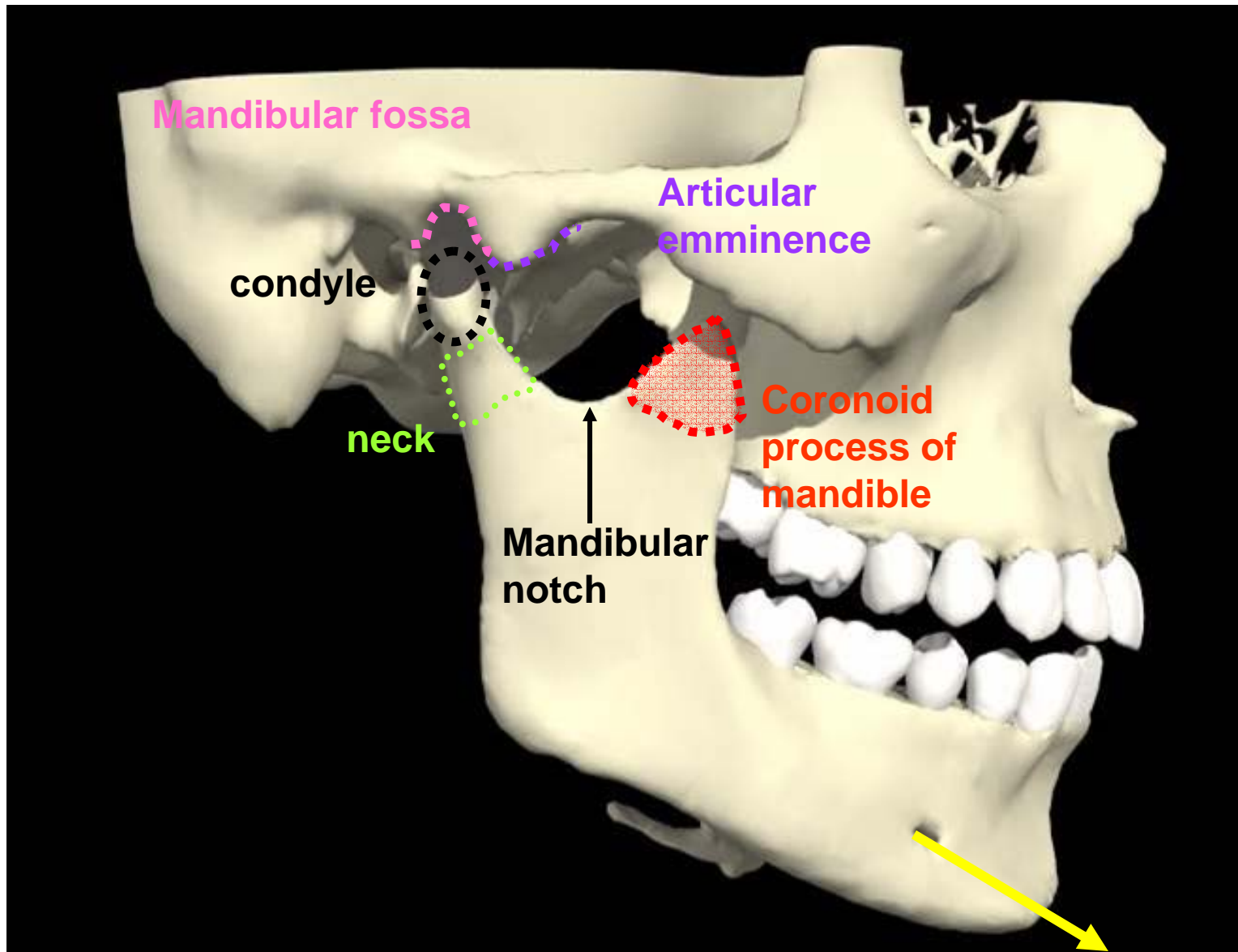
**Lateral:** ramus of mandible

**Medial:** lateral pterygoid plate

**Roof:** greater wing of sphenoid, adj. maxilla & palatine bones

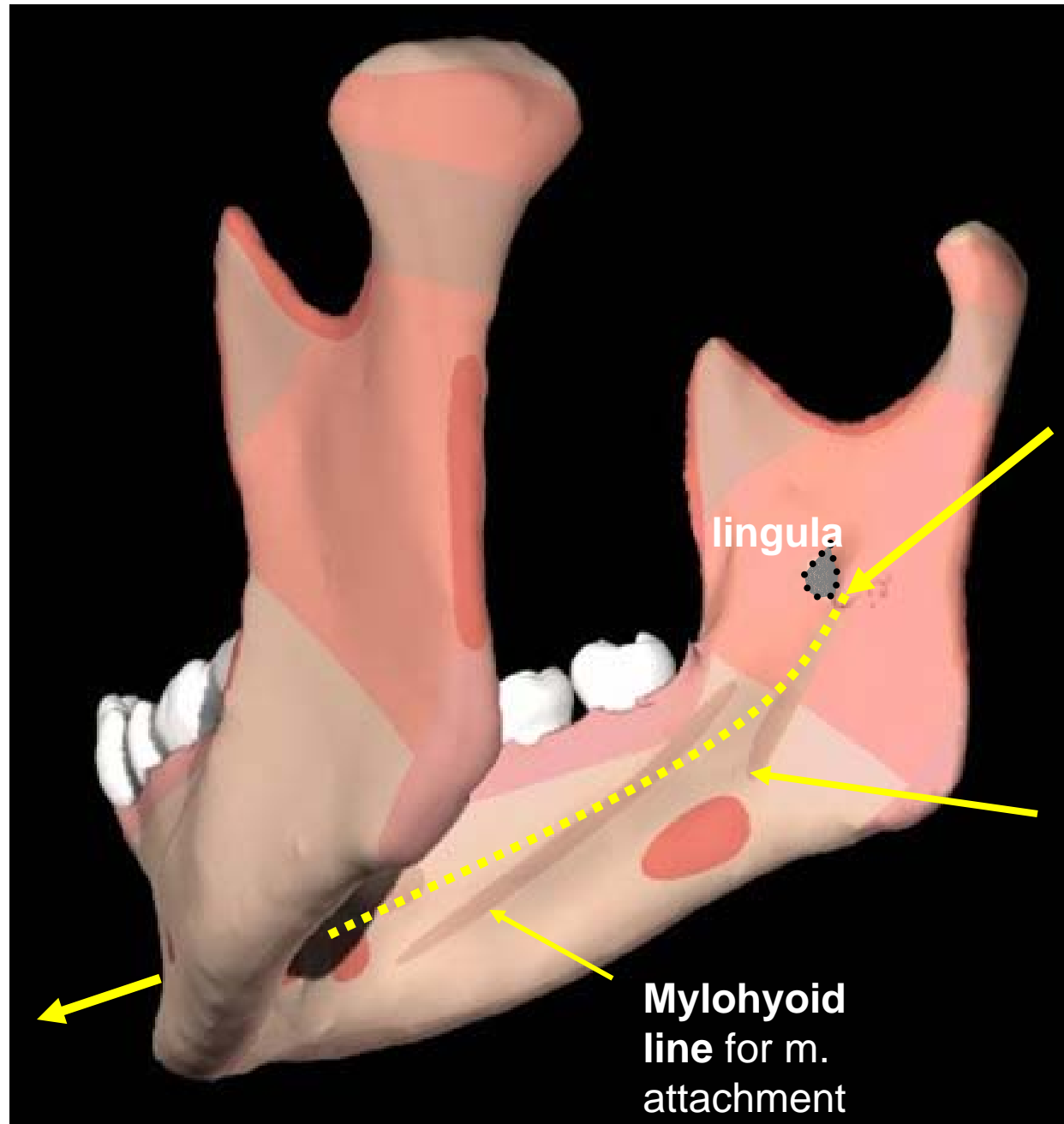
**Inferior:** continuous with deep cervical fascia

Line of action of lateral pterygoids is from anterior to posterior in horizontal plane. They PROTRACT or pull the mandible forward.



**Mental foramen for  
V3 sensory branch**

**Injectons to numb the lower teeth also numb chin and lower lip but not uppers**

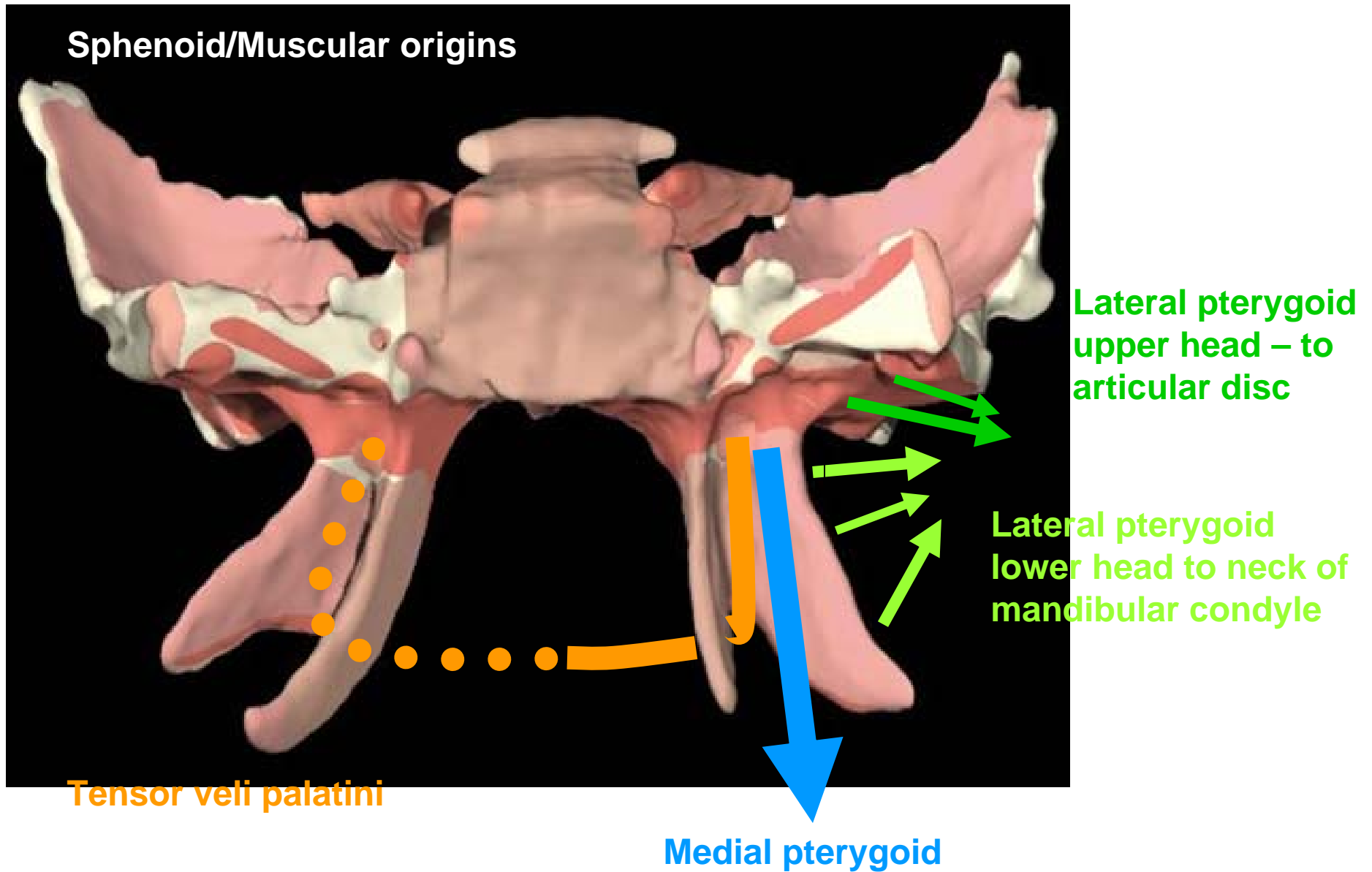


**Mandibular foramen** for inferior alveolar branch of V3, vv.

**Mylohyoid groove** for V3 branch to mylohyoid

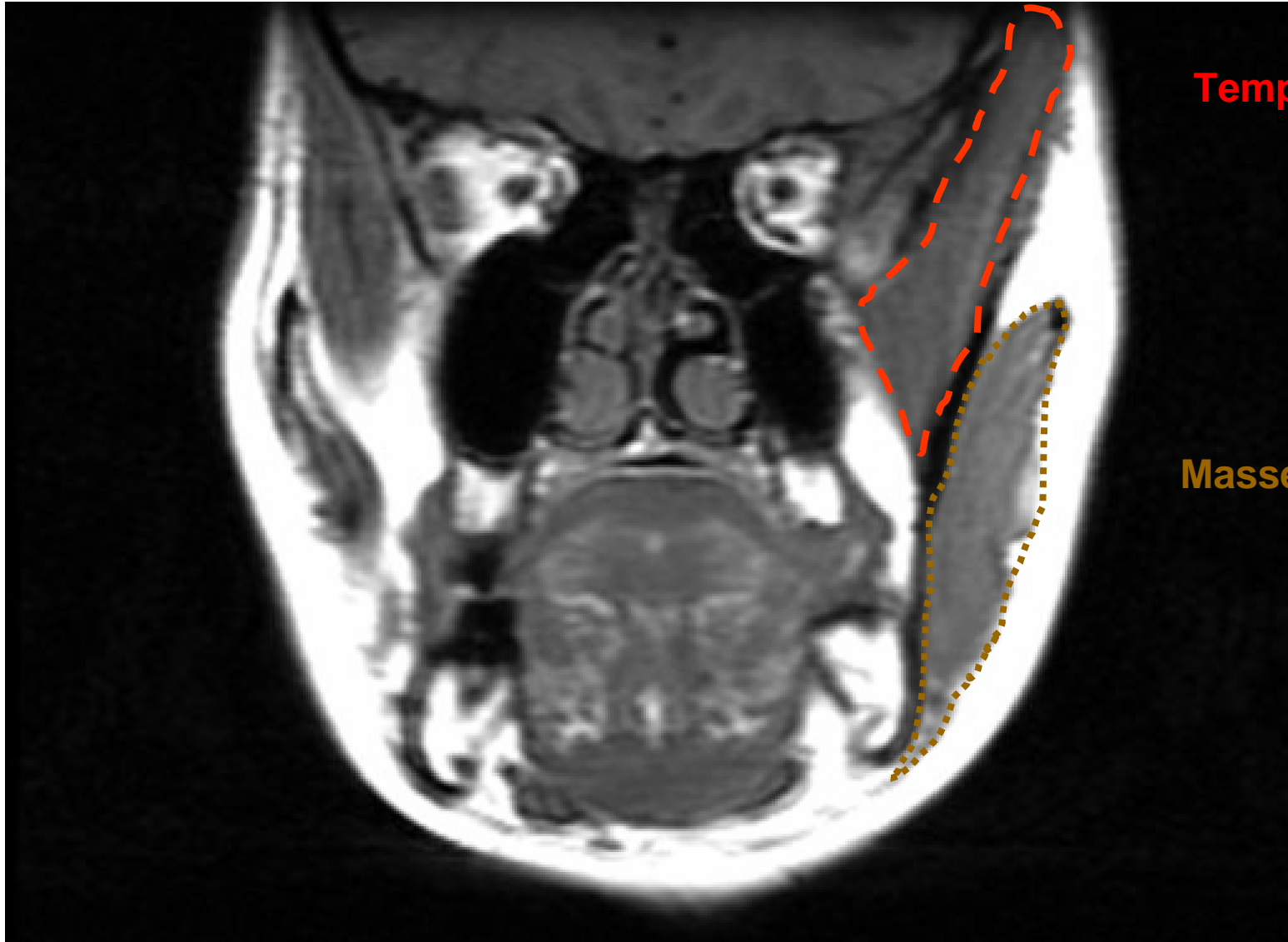
**Mylohyoid line** for m. attachment

## Sphenoid/Muscular origins



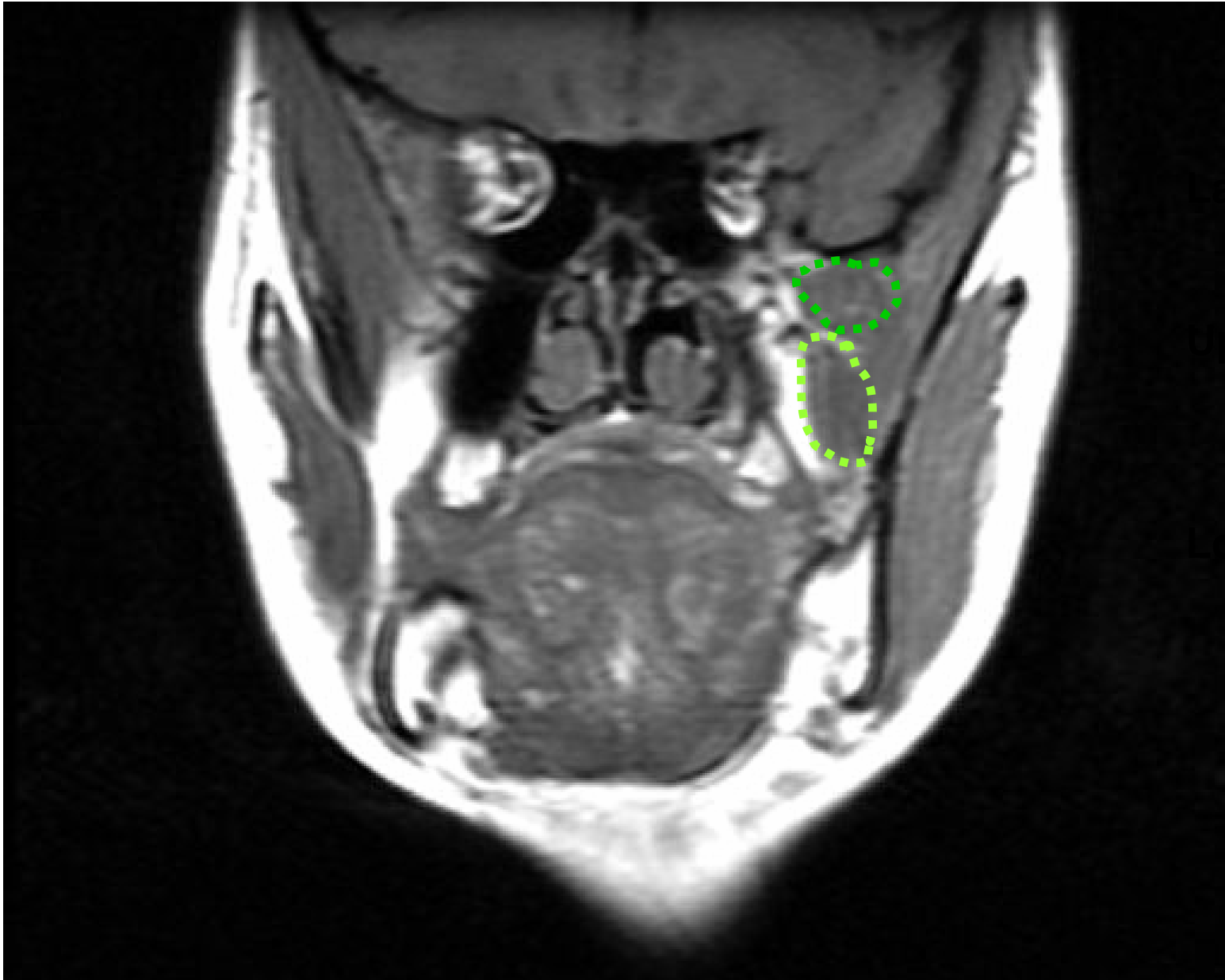
“Pterygoid” means “talon-like”





**Temporalis m.**

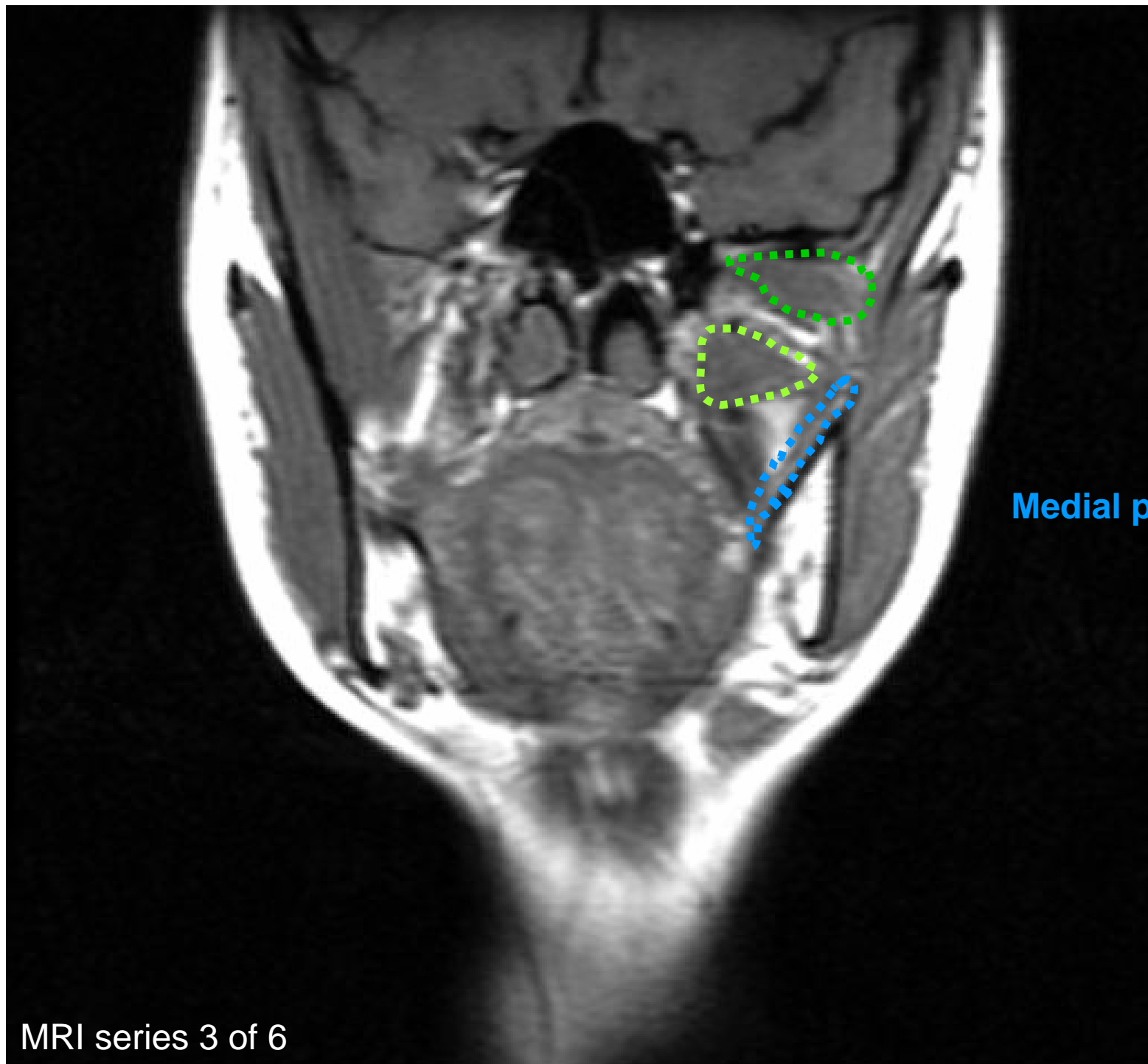
**Masseter m.**



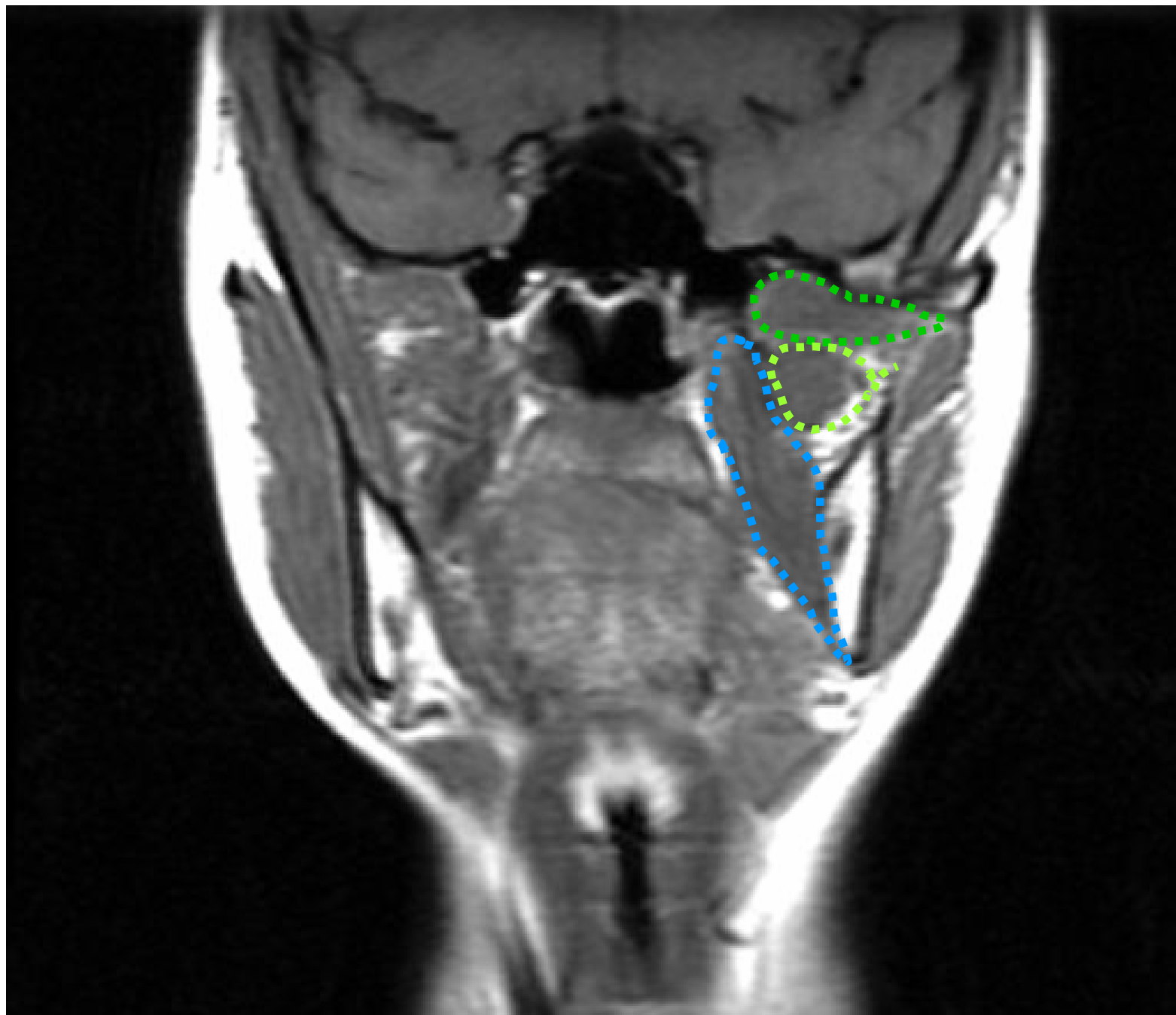
**lateral  
pterygoid**

**Upper head: to  
articular  
disc**

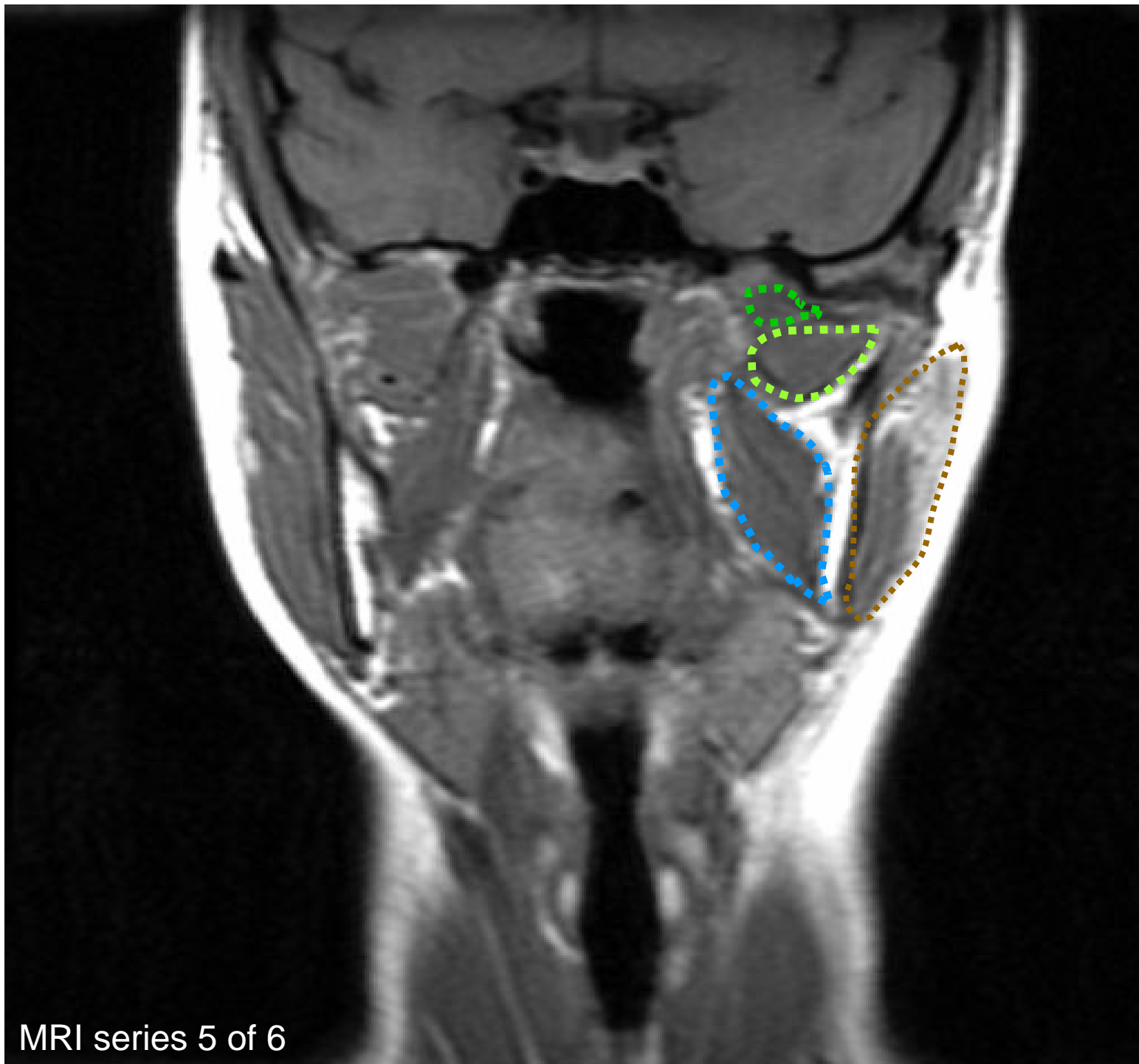
**Lower head:  
to neck of  
mandibular  
condyle**



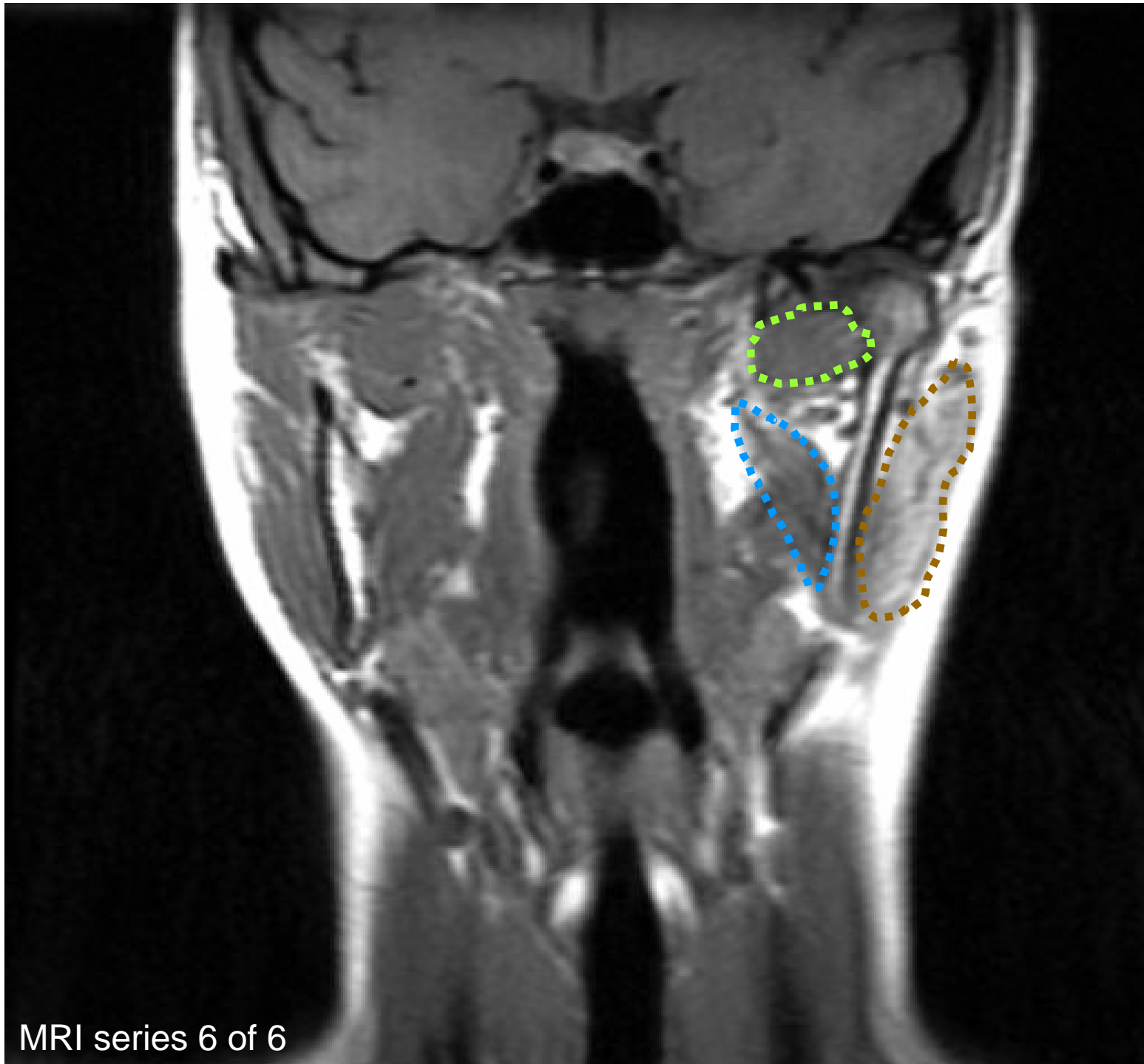
Medial pterygoid







MRI series 5 of 6



MRI series 6 of 6

**Mastication** = process in which food is bitten, held and chewed within the oral cavity

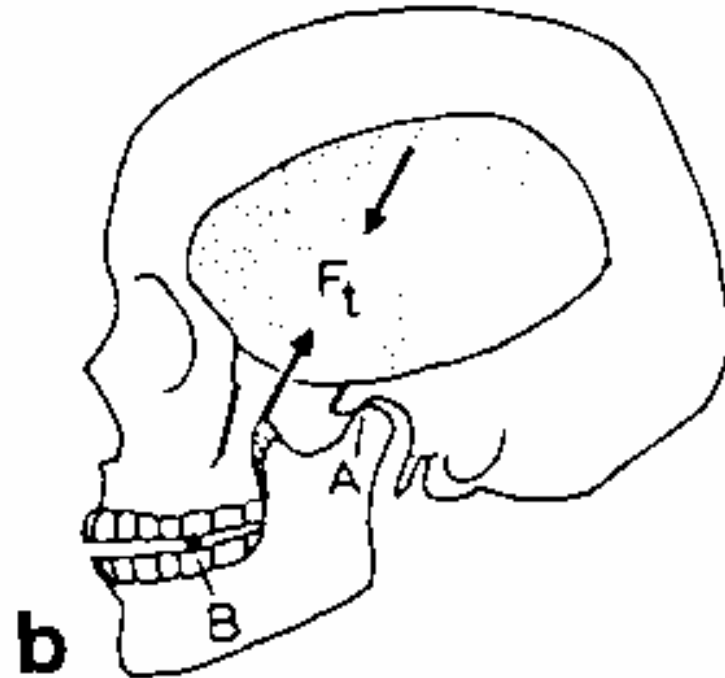
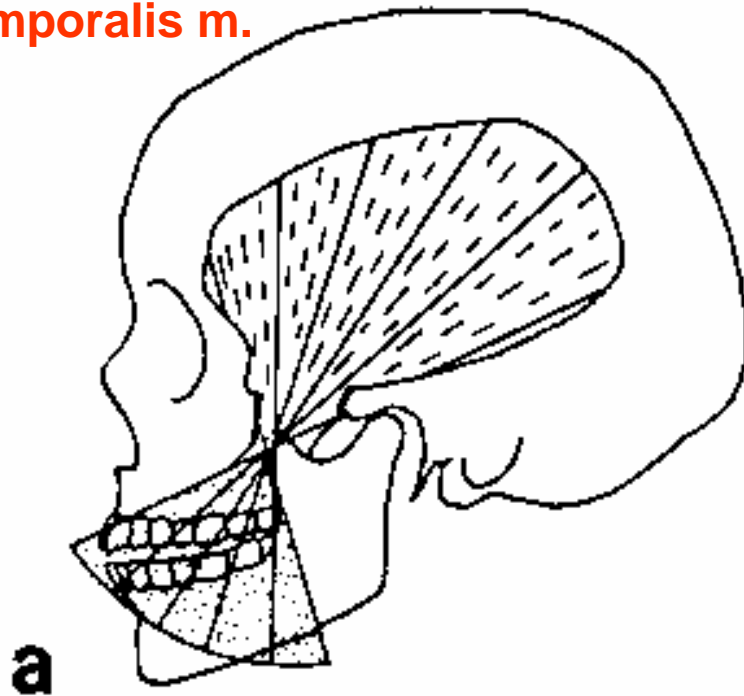
- Incisors = nipping and cutting (shear)
- Molars = crushing, with shear generated as cusps occlude

**Occlusion** = close-packing of teeth in functionally appropriate position

**Mal-occlusion** can lead to abnormal stresses on TMJ, and therefore arthritis

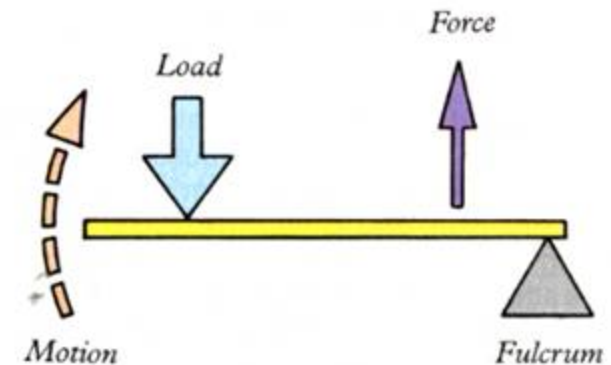
## Chewing movements and mechanics

**NOTE different vectors of temporalis m.**



Generally acts as 2<sup>nd</sup> order lever system = compression at TMJ

Turning moment generated along mandibular corpus and ramus = sheer at TMJ





# **Chewing in mammals (and therefore humans) is asymmetric and unilateral**

## **WORKING SIDE:**

- GREATEST ADDUCTOR FORCE,
- but articular eminence is less substantially loaded

## **BALANCING SIDE:**

- LESS ADDUCTOR FORCE
- articular eminence is substantially loaded
- INITIAL ACTION CONTRACTION OF INFERIOR HEAD OF LATERAL PTERYGOID MUSCLE TO INITIATE MANDIBULAR DEVIATION TO WORKING SIDE