The Styloid process, infratemporal fossa and mandible

RIGHT STYLOID PROCESS
MUSCLE AND LIGAMENT ATTACHMENTS
LATERAL VIEW

Styloglossus
From lower anterior
1/3 into tongue
Hypoglossal nerve (XII)

Stylohyoid ligament
From tip to lesser cornu

Stylohyoid
(Retracted)
From upper posterolateral
1/3
Facial Nerve (VII)

Stylopharyngeus
From upper postero-medial 1/3 to posterior
thyroid lamina
Glossopharyngeal nerve (IX)

Digastric
From mastoid
to mandible
Anterior Vc
Posterior VII

Hyoid bone

Mandible and infratemporal fossa
LIGAMENTS ASSOCIATED WITH MANDIBLE AND HYOID BONES

SPHENOMANDIBULAR LIGAMENT
Spine of sphenoid to lingula of mandible (1st arch remnant) Is axis of rotation for opening of mouth

PTERYGOMANDIBULAR RAPHE
Tendinous muscle fibres from pterygoid hamulus to posterior end of mylohyoid line. Medially lies bucal mucosa. Superior constrictor arises posteriorly & buccinator anteriorly from it. Buccinator also extends onto the pterygomaxillary ligament to reach the maxilla

STYLOMANDIBULAR LIGAMENT
Specialised band of deep cervical fascia. Styloid process to angle of mandible. Is the postero-inferior aspect of the parotid fascia

STYLOHYOID LIGAMENT
Styloid process to lesser cornu of hyoid. 2nd arch remnant. Styloglossus from its upper end & middle constrictor from its lower end

Cut ramus of mandible
Styloglossus From lower anterior 1/3 of ligament
Middle constrictor
Stylohyoid ligament From tip to lesser cornu
Hyoid bone
TEMPORAL FOSSA

RIGHT

Medial to temporalis - attached inferior to inferior temporal line (A)
Roof: Temporalis fascia
Posterior: Supramastoid crest (B)
Floor: Skull - pterion (C)
Anterior: Zygoma (D), zygomatic process of frontal bone (E) & zygomatic process of maxilla (F)
Inferior: Zygomatic arch & zygomatic process of temporal bone (G)

Contains: Temporalis, deep temporal arteries (maxillary), deep temporal nerves (Vc), Superficial temporal artery (external carotid).
Auriculotemporal nerve (H) from Vc
Other structures shown: temporal bone (J), greater wing of sphenoid (K), Temporal branch of VII (L) zygomatic branch of VII (M)
INFRATEMPORAL FOSSA - BOUNDARIES

- Base of skull
- Between pharynx & ramus of mandible

**LATERAL WALL**
- Ramus of mandible
- Coronoid process
- Superior constrictor
- Pterygomandibular raphe
- Sublingual gland
- Genioglossus
- Geniohyoid
- Digastric
- Temporalis
- Sphenomandibular ligament
- Lateral pterygoid
- Parotid gland
- Stylomandibular ligament
- Medial pterygoid
- Groove for nerve to mylohyoid

**ROOF**
- Infratemporal crest (greater wing of sphenoid)
- Squamous temporal

**MEDIAL WALL**
- Tensor palati
- Levator palati
- Superior constrictor
- Lateral pterygoid plate
- Pterygomaxillary fissure
- Maxilla

**POSTERIOR WALL**
- Carotid sheath

**ANTERIOR WALL**
- Posterior maxilla
- Inferior orbital fissure
INFRATEMPORAL FOSSA - CONTENTS

CONTENTS
- Pterygoid muscles
- Fat
- Insertion of temporalis
- Chorda tympani
- Posterior superior alveolar branches of V_{b} (maxillary branch of trigeminal)
- Pterygoid venous plexus
- Mandibular nerve & branches
- Otic ganglion
- Maxillary artery & branches

Deep temporal arteries & nerves
Auriculotemporal nerve
Superficial temporal artery
Maxillary artery
External carotid artery
Nerve to mylohyoid

Maxillary nerve (V_{b})
Posterior superior alveolar nerves & arteries
Parotid duct
Buccinator
Buccal nerve

Lingual nerve
Inferior alveolar nerve & artery

SUPERCISED DISSECTION
LP = lateral pterygoid
MP = medial pterygoid
INFRATEMPORAL FOSSA - DEEP DISSECTION

- Middle & accessory meningeal a
- Auriculotemporal n
- Chorda tympani
- Maxillary a
- Superficial temporal a
- External carotid a
- Inferior alveolar n & n to mylohyoid
- Temporalis
- Deep temporal ns
- Infra-orbital a & n
- Posterior superior alveolar ns & a
- Greater palatine a
- Buccal n
- Lingual n

* N to lateral pterygoid & just to its left is the otic ganglion
MUSCLES OF MASTICATION

- Temporalis
- Masseter
- Medial pterygoid
- Lateral pterygoid

All supplied by:
- Mandibular division of Trigeminal (Vc)
- All derived from 1st pharyngeal arch

LATERAL PTERYGOID

Arises: 2 heads
- Upper: infratemporal surface sphenoid
- Lower: lateral surface of lateral pterygoid plate

Inserts: pterygoid fossa below head of mandible, disc, and capsule of temporomandibular joint

Action: protrudes jaw and opens mouth

MEDIAL PTERYGOID

Arises: 2 heads
- Deep: medial side of lateral pterygoid plate and fossa between plates
- Superficial: smaller. Tuberosity of maxilla and pyramidal process of palatine bone

Inserts: Medial ramus of mandible

Action: pulls mandible upwards, forwards and medially (closes mouth and chews)

Pterygoid muscles contain venousplexuses that connect with veins both inside (cavernous sinus) and outside the skull (facial veins)
MANDIBULAR DIVISION OF TRIGEMINAL NERVE (Vc), EMERGING FROM FORAMEN OVALE DEEP IN INFRATEMPORAL FOSSA

Lesser petrosal (foramen ovale)
Chorda tympani (petrotympanic fissure)
Medial pterygoid
Tensors tympani & palati
Auriculotemporal & parasympathetic in parotid branch
Middle meningeal artery
Nerve to mylohyoid

Nervus spinosus (meningeal: foramen ovale or spinosum)
Anterior & posterior deep temporal
Masseteric
Lateral pterygoid
Buccal
Lingual (joined by chorda tympani)
Inferior alveolar (inferior alveolar foramen)

* Otic ganglion. Parasympathetics from lesser petrosal nerve synapse within it and post-ganglionic fibres are taken to the parotid gland by the auriculotemporal nerve
INFRATEMPORAL FOSSA - DEEP DISSECTION

N to masseter

Deep temporal ns

Infra-orbital a & n

Posterior superior alveolar ns & a

Greater palatine a

Buccal n

Lingual n

Middle & accessory meningeal a

Auriculotemporal n

Chorda tympani

Maxillary a

Superficial temporal a

External carotid a

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Upper & lower heads of lateral pterygoid
Deep & superficial heads of medial pterygoid
Inferior alveolar nerve
Lingual nerve
Buccinator arising from pterygomandibular raphé
Superior constrictor arising from pterygomandibular raphé
TEMPOROMANDIBULAR JOINT

- Synovial
- Condyloid
- Hemicylindrical
- Atypical (fibrocartilage on surfaces)
- Fibrocartilaginous disc
- Synovial membrane lines capsule
- Nerve supply: Auriculotemporal & nerve to masseter

**BETWEEN** mandible & mandibular fossa of squamous temporal bone

**DISC** attached anteriorly to head of mandible, thus moves forward with it. Also at lateral pterygoid plate and capsule

**CAPSULE** attached to neck of mandible at articular margin. Anterior - at articular tubercle. Posterior - at squamotympanic fissure. Strong but lax at rest

**LATERAL TEMPOROMANDIBULAR LIGAMENT** from zygomatic arch to posterior neck & ramus of mandible. Fuses with capsule, lax at rest, tightens with any movement

**MOVEMENT** in upper compartment is protraction (lateral pterygoids), retraction (posterior temporalis) & gliding side to side. In lower compartment is opening (lateral pterygoids & digastrics & closing (masseters, medial pterygoids & temporalis)
Points A & B represent the 2 ends of the sphenomandibular ligament (spine of sphenoid to lingula of mandible). Distance between them must remain constant at all positions of the joint. Axis for opening must pass through lingula (B) on each side.

First few degrees of opening: Rotation only in lower cavity. Mostly gravity.

Majority of opening: Further rotation in lower joint cavity. Major degree of anterior displacement of head of mandible onto articular tubercle achieved by lateral pterygoid & occurring in upper joint cavity.

Last few degrees of opening: Further rotation in lower joint cavity only.