



## ANATOMY OF FACIAL SPACES IN HEAD AND NECK - A REVIEW ARTICLE

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### ABSTRACT

Fascial spaces are defined as fascia lined areas that can be eroded or distended by purulent exudate. These are potential spaces that do not exist in healthy individuals but become filled during infection. Some contain neurovascular structures and are known as compartments, others filled with loose areolar connective tissue are known as clefts. In the present article, a review of the facial spaces in head and neck region is been presented with emphasis on their surgical anatomy.

**Keywords:** Facial Spaces, Anatomy, Head and Neck, Clefts, Buccal Space.

### INTRODUCTION

Fascial spaces can be understood as a division of Two major complexes: Masticatory complex & Peripharyngeal complex. Based on the mode of involvement: *Direct involvement*: - primary spaces a) maxillary spaces & b) mandibular spaces. *Indirect involvement* - secondary spaces. Based on clinical significance - Buccal, Canine, Masticatory, Parotid, Suprahyoid, Sublingual, Submandibular (Submaxillary, Submental), Pharyngomaxillary (Lateral Pharyngeal), Peritonsillar, Infrahyoid (Pretracheal) etc. Spaces of total neck- Retropharyngeal space of carotid sheath.

### MAXILLARY SPACES: (See Fig: 1)

#### Canine space:

**Boundaries:** Superiorly levatorlabii superioris, Inferiorly caninus muscle, Anteriorly orbicularis oris, Posteriorly buccinators, Medially antero-lateral surface of maxilla. The canine space is a thin, potential space between the levatorangulioris and levatorlabii superioris muscle. When the space is infected there is swelling of the anterior face that obliterates the nasolabial fold [1].

#### Buccal space

**Boundaries:** Anteromedially buccinators, Posteromedially masseter overlying the anterior border of the ramus, Laterally by forward extension of deep fascia from the capsule of parotid gland and by platysma muscle, Inferiorly limited by the attachment of deep fascia to mandible and by depressor angulioris, Superiorly zygomatic process of maxilla and zygomaticus major and minor muscles.

**Contents:** Buccal pad of fat, submandibular duct, facial artery. The buccal space is involved when maxillary teeth infection erodes through the bone superior to the attachment of buccinator muscle. The swelling lies below the zygomatic arch and above the inferior border of the mandible.

#### Infratemporal space

Also called 'retrozygomatic space' by Sicher as it is partially situated behind the zygomatic bone.

**Boundaries:** Laterally by the ramus of the mandible,

temporalis muscle and its tendon. Medially medial pterygoid muscle, lower part of temporal fossa of the skull and lateral wall of pharynx, Superiorly by infratemporal surface of greater wing of sphenoid, zygomatic arch, Inferiorly lateral pterygoid muscle forms the floor, its lower head marks the border between pterygomandibular and infratemporal spaces, Anteriorly by the infratemporal surface of maxilla, Posteriorly by the parotid gland [2-3].

**Contents:** Origin of medial pterygoid and lateral pterygoid muscles, pterygoid venous plexus of veins. It is traversed by maxillary artery, mandibular nerve and middle meningeal artery. The infratemporal space is rarely infected, when it is the cause is an usually an infection of maxillary third molar.

## MANDIBULAR SPACES

### Submental space

**Boundaries:** Laterally lower border of mandible and anterior belly of digastrics, Superiorly mylohyoid muscle, Inferiorly by suprahyoid portion of the investing layer of deep cervical fascia, which in turn is covered by platysma, superficial fascia and skin.

**Contents:** Submental lymph nodes, anterior jugular vein. The lymph nodes lie embedded in adipose tissue therefore submental abscess tend to remain well circumscribed.

### Submandibular space

The submandibular spaces are considered to be the anterior extension of parapharyngeal space.

**Boundaries:** Antero-medially, the floor formed by mylohyoid muscle, which is covered by loose areolar tissue and fat, Postero-medially, the floor formed by hyoglossus muscle, Supero-laterally, medial surface of mandible below the mylohyoid ridge, Antero-superiorly, anterior belly of digastrics, Postero-superiorly, posterior belly of digastric, stylohyoid and stylo-pharyngeous muscle, Laterally by platysma and skin [4].

**Contents:** Superficial lobe of salivary gland and submandibular lymph nodes, facial artery and vein.

### Sublingual space

It is a 'v' shaped trough lying lateral to the muscles of tongue, including hyoglossus, genioglossus and geniohyoid.

**Boundaries:** Covered superiorly by the mucosa of floor of the mouth, inferiorly by mylohyoid muscle, Laterally by medial side of mandible, above by the mylohyoid muscle, Medially hyoglossus, genioglossus and geniohyoid muscles, Posteriorly hyoid bone. Its posterior border is open, therefore freely communicates with the sub-mandibular space and the spaces of the mandible to the posterior aspect. Clinically there is little or no extra

oral swelling in an infection of the sublingual space but much intraoral swelling of the floor of the mouth on the infected side. Bilateral involvement is usually seen. When bilateral submandibular, sublingual and submandibular spaces become involved with an infection it is known as Ludwig's Angina [7].

## SECONDARY FACIAL SPACES

These spaces are surrounded by connective tissue fascia and have poor blood supply. Infection involving these spaces are difficult to treat without surgical intervention to drain the purulent exudate. Poor treatment of the primary space infection may lead to the extension of the infection to involve secondary facial spaces [5-6].

### Temporal space

**Surgical Anatomy:** Temporal pouches are facial spaces in relation to the temporalis muscle. They are two in number. Superficial temporal space & deep temporal space. The superficial temporal space lies between the temporal fascia and temporalis muscle. Deep temporal pouch lies deep to the temporalis muscle and skull. Below the level of zygomatic arch superficial and deep temporal pouches can communicate directly with the infratemporal and pterygopalatine fossa. The temporal spaces are rarely involved and usually only in severe infection the swelling is evident in the temporal area, superior to the zygomatic arch and posterior to the lateral orbital rim.

### Parotid space

**Boundaries:** The space is formed by splitting of the superficial layer of the deep fascia surrounding the parotid gland and lies posterior to the masticator space. Inferiorly stylomandibular ligament, which separates parotid space from mandibular space.

**Contents:** Parotid gland and parotid lymph nodes, facial nerve, retromandibular vein and external carotid artery.

### Submasseteric space

Three layers of masseter are fused anteriorly but can be easily separated posteriorly. There is a potential space in the substance of the muscle between middle and deep heads, the intermediate fibres have a loose attachment. It is possible for these fibers to be separated from bone relatively easily by accumulation of pus at this site.

**Boundaries:** Anteriorly anterior border of masseter and buccinators, Posteriorly parotid gland, posterior part of masseter, Inferiorly attachment of masseter to the lower border of mandible, Medially lateral surface of ramus of mandible, Laterally medial surface of masseter muscle.

**Contents:** Masseteric nerve, superficial temporal artery and transverse facial artery.

### Ptergomandibular space

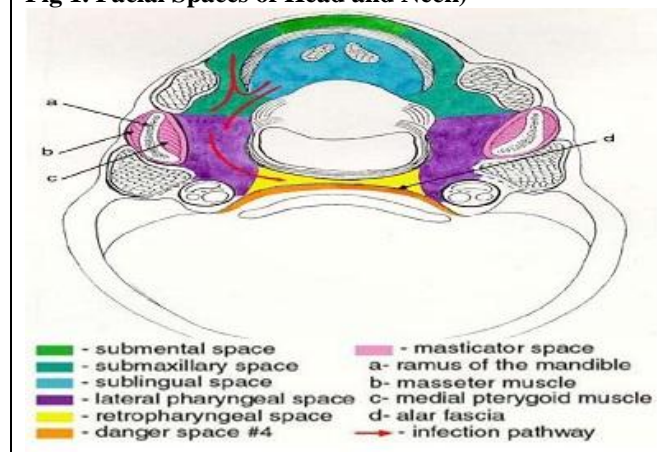
**Boundaries:** Laterally medial surface of ramus, Medially lateral surface of medial pterygoid muscle, Posteriorly parotid gland, Anteriorly ptergomandibular raphae, Superiorly lateral pterygoid muscle forms the roof. The space just below the lateral pterygoid muscle can communicate with the pharyngeal spaces [8].

**Contents:** Lingual nerve, mandibular nerve, inferior alveolar artery, mylohyoid nerve and vessels, loose areolar connective tissue.

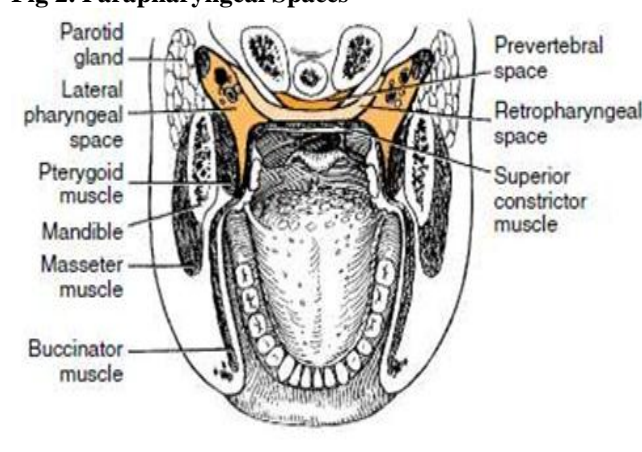
### Parapharyngeal space

They include lateral pharyngeal and retropharyngeal spaces. These are major pathways for spread of head and neck infections. These spaces form a 'ring' around the pharynx and together form a pathway for spread of orofacial infections in neck and mediastinum. The parapharyngeal space communicates directly with both submandibular space anteroinferiorly and retromandibular space posteriorly. (See Fig. 2).

**Fig 1. Facial Spaces of Head and Neck)**



**Fig 2. Parapharyngeal Spaces**



### CONCLUSION

- Understanding anatomical boundaries can help clinician's manage head and neck infections by predicting

their spread.

- Mortality has decreased significantly in the post-antibiotic era.

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