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The Fascial Planes Related to the Postnasal Space and the Spread of Postnasal Cancer

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Introduction

The French anatomists, in particular Cazalas, 1938, and Terracol Corone and Guerrier, 1949, have provided the most complete studies of the fascial planes related to the postnasal space, and did so by gross anatomical dissections. Their results showed that the fascial planes were well defined, and for this reason they could be important in localising and directing the spread of a postnasal cancer. Unfortunately, anatomical dissections are notoriously prone to the criticism of "Fascia splitting", and too much reliance should not be placed on the results of these earlier workers. For this reason the present authors have serially-sectioned this area, and as a result it has been possible to examine

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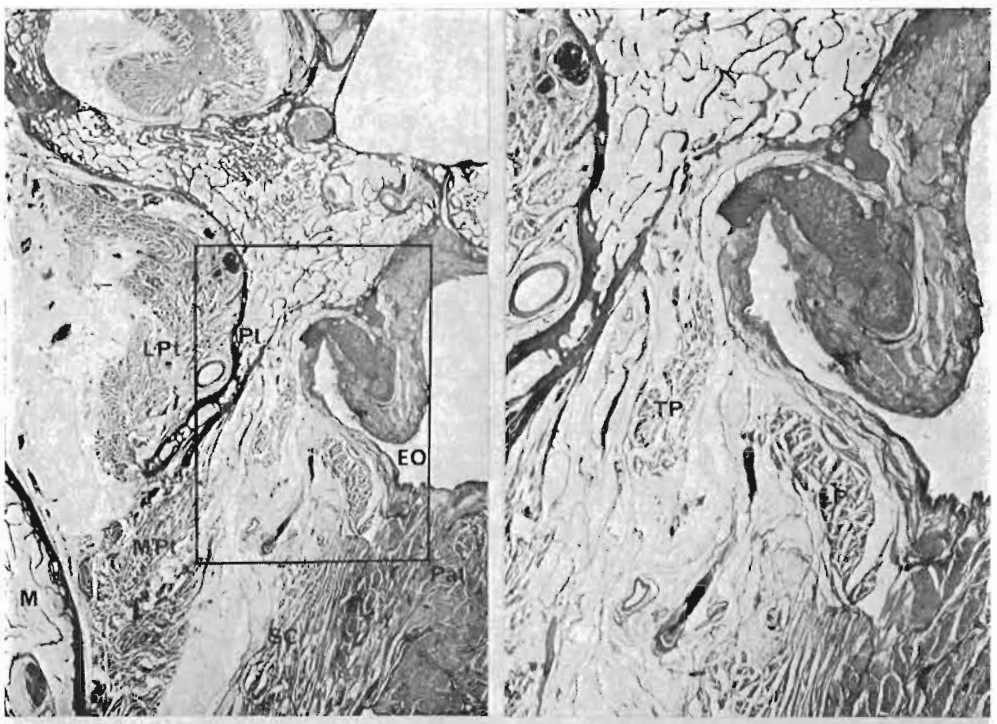

Fig.I

A section at the level of the opening of the Eustachian tube.

EO:	Eustachian tube opening	SC:	Superior constrictor
Pl:	Lateral pterygoid plate	Pal:	Soft palate
LPt:	Lateral pterygoid muscle	TP:	Tensor palati
MPt:	Medial pterygoid muscle	LP:	Levator palati
M:	Ramus of mandible		

the intact fascia without creating artificial planes by dissection.

Method

A frozen block of tissue was used which contained the posterior nasal cavity, the postnasal space, the anterior aspects of the cervical vertebrae, a portion of the base of the skull, and the related cervical soft tissue. It was decalcified in a solution of 5% trichloracetic acid until serial X-rays showed that decalcification was complete. It was dehydrated in a series of alcohols and embedded in paraffin. The block was serially-sectioned at a thickness of 30u, and every tenth section was stained with van Gieson's stain to show the fibrous tissue in the fascial planes.

Results

Representative coronal sections from the anterior, middle and posterior aspects of the postnasal space are shown in figures 1, 2 and 3.

Figure 1 is a section at the level of the opening of the Eustachian tube and shows the soft palate, the medial pterygoid plate, the lateral pterygoid muscle, the medial pterygoid muscle, the superior constrictor, and the levator and tensor palati muscles.

Figure 2 is a section more posteriorly at the level of the fossa of Rosenmuller and shows the sphenoid sinus, internal carotid artery and mandibular nerve.

Figure 3 is a section at the level of the posterior wall of the postnasal space and shows the cavernous sinus, middle cranial fossa, foramen lacerum and the internal carotid artery.

Discussion

In this study we have been particularly interested in the anatomy of the fascial relations of the postnasal space as this should enable us to understand the relations of these fascial planes, and explain the method of spread of a postnasal cancer. This should also make it easier to interpret the many clinical syndromes that are associated with a cancer in this area.

The pharyngeal fascia may be important in the spread of a postnasal cancer to involve the Eustachian tube, and its arrangement can

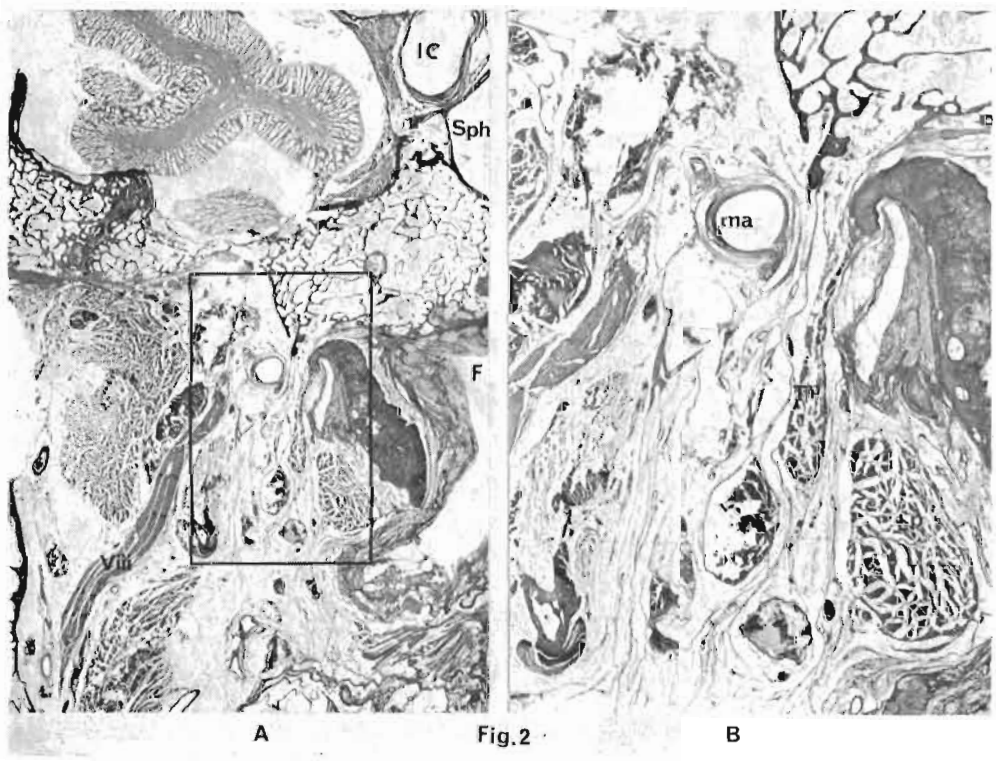

Fig. 2

A section at the level of the fossa of Rosenmuller.

F:	Fossa of Rosenmuller	ma:	Maxillary artery
Viii:	Mandibular division trigeminal nerve	LP:	Levator palati
Sph:	Sphenoid sinus	TP:	Tensor palati
IC:	Internal carotid artery in cavernous sinus		

be seen in Figure 4. This shows the pharyngeal fascia extending upwards from the upper border of the superior constrictor to split and embrace the tensor and levator palati muscles. The middle lamina called the fascia of Troltsch is attached to the lateral and inferior aspect of the Eustachian tube. The fascia of Troltsch and the medial lamina enclose the space around the levator palati muscle called la loge du peristaphylin interne. This space extends from the foramen lacerum and under-surface of the petrous temporal bone to the soft palate, and if it is invaded by a cancer of the postnasal space, spread can occur up to the petrous temporal bone and down to the soft palate.

Deafness due to invasion of the levator palati muscle is a likely symptom, and involvement of la loge du peristaphylin interne would account for two of the features of Trotter's triad; namely deafness and fixation of the soft palate.

The fascial compartments of the parapharyngeal space may also determine the spread of a postnasal cancer. These compartments (Figure 5) are the prestyloid, retrostyloid and retropharyngeal spaces. The fossa of Rosenmuller is the pouch marked FR in front of the retropharyngeal space. From this figure it can be seen that a cancer involving the fossa of Rosenmuller may spread anteriorly into the space called la loge du peristaphylin interne or laterally into the prestyloid space with involvement of the mandibular nerve. The cancer may also spread posterolaterally to the retrostyloid space and involve the glossopharyngeal, vagus, accessory and hypoglossal nerves. Posterior spread is to the retropharyngeal space.

All the previous studies of the fascial compartments in the region of the nasopharynx have been made by anatomical dissections, and run the risk of creating artificial planes. In the present study this problem has been avoided by serially-sectioning a block of tissue, staining the fascia with van Gieson's stain and following the fascial planes in serial sections.

The sections studied did not show the clearly defined fascial layers that have been described by anatomists. For example, in Figure 1 there is no clearly defined fascia

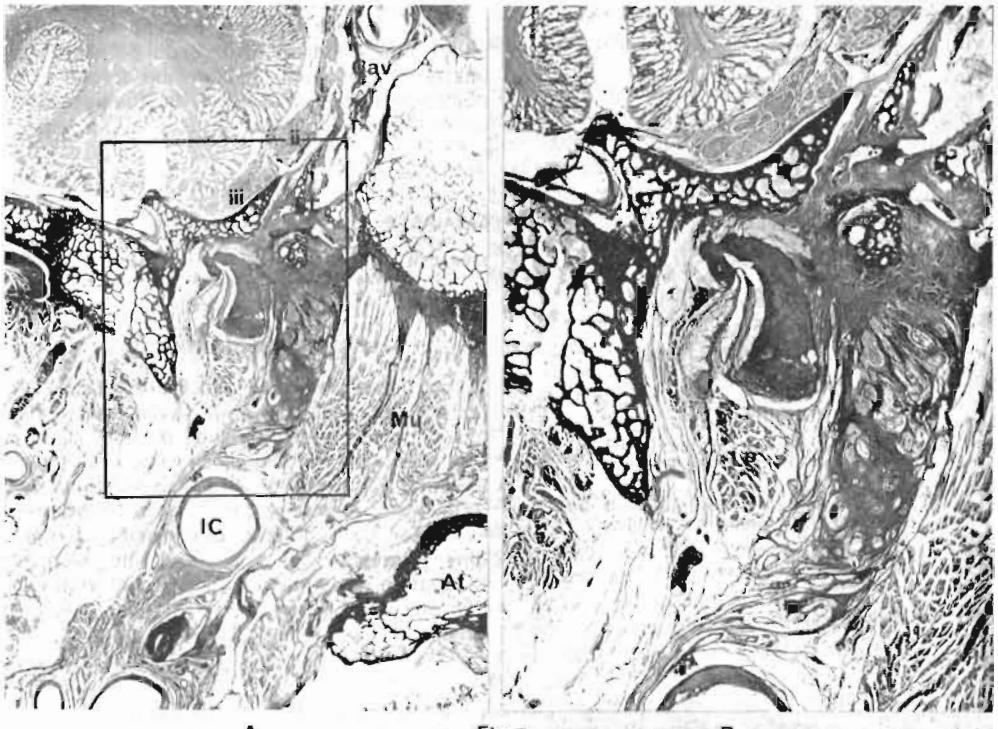

Fig.3

A section at the level of the posterior wall of the postnasal space.

Cav: Cavenous sinus
FL: Foramen lacerum
IC: Internal carotid artery
LP: Levator palati
At: Arch of atlas vertebra
Mu: Prevertebral muscles
i, ii, iii: Divisions of trigeminal nerve

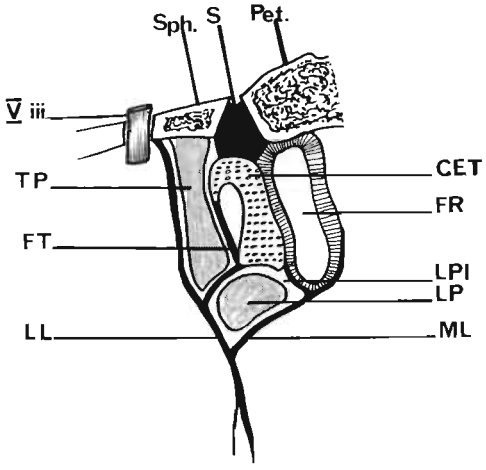

FIGURE 4

The pharyngeal fascia and its subdivisions related to the Eustachian tube. Diagram is in a vertical plane at right angles to axis of petrous bone, and just behind foramen lacerum.

ML:	Medial lamina
LL:	Lateral lamina
FT:	Fascia of Troltsch
TP:	Tensor palati
LP:	Levator palati (m. peristaphylin interne)
LPI:	Fascial space enclosing levator palati (la loge du peristaphylin interne)
FR:	Pharyngeal recess (fossa of Rosenmuller)
CET:	Cartilage of Eustachian tube
VIII:	Mandibular nerve passing in foramen ovale
Sph:	Sphenoid bone
Pet:	Apex of petrous temporal bone
S:	Suture, and suspensory ligament of CET

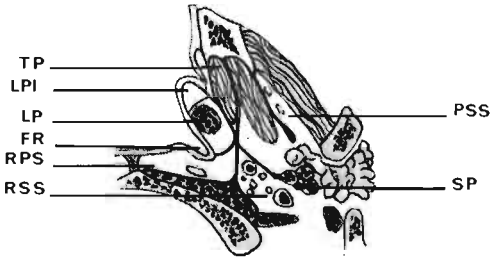

FIGURE 5

A horizontal plane diagram of the fascial planes related to the postnasal space.

TP:	Tensor palati
LPI:	Space about the levator palati (la loge du peristaphylin interne)
LP:	Levator palati
FR:	Fossa of Rosenmuller
RPS:	Retropharyngeal space
RSS:	Retrostyloid space
PSS:	Prestyloid space
SP:	Styloid process

passing upwards as the pharyngobasilar fascia. There is, however, a fascial sling around the levator palati and a potential space between this fascia and the muscle which is consistent with la loge du peristaphylin interne described by the French anatomists. There is very little fascia around the tensor palati muscle, and little to suggest that there is a distinct outer fascial layer.

In a more posterior section in Figure 2, the fascial layers are still not well developed although la loge du peristaphylin interne is prominent. This is also the situation in the most posterior section shown in Figure 3, although in this figure the medial lamina of the pharyngeal fascia is clearly defined.

Summary

In this study the fascial planes related to the postnasal space have been investigated by serially sectioning the block of tissue and staining the sections with van Gieson's, to show fibrous tissue.

The results of this study show that the fascial planes related to the postnasal space are not as clearly defined as they are in previous anatomical descriptions. There is, however, a distinct space around the levator palati muscle called la loge du peristaphylin interne which could facilitate the spread of a postnasal cancer and result in deafness and restriction of palatal movement.

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