

Abstract

Background: To perform a safe parotidectomy the facial nerve trunk and its branches must be carefully identified and preserved. Multiple standard anatomical landmarks have been used to help the surgeon identify the general area of the facial nerve trunk. To our knowledge, no studies in the ENT literature have evaluated the use of the parotid fascia that immediately overlies the trunk as a landmark to help identify the facial nerve trunk.

Methods: Dissection of the parotid fascia and identification of the facial nerve trunk was carried out on eight fresh cadaveric parotid glands. The attachments and arrangement of the parotid gland was evaluated with special attention to the fascia overlying the facial nerve trunk.

Results: The parotid fascia envelops the posterior aspect of the parotid gland in an open book fashion. Superiorly it attached to the root/arch of the zygoma. Posterosuperiorly it attached to the tragal pointer and the cartilaginous external auditory canal. The fascia was thinner in this region. Posteriorly the fascia was thicker with a dense attachment to the anterior and medial aspect of the mastoid tip as well as the tympanomastoid suture line. There was also a dense attachment to the space between the mastoid and tragal pointer. Directly medial to the fascia lies the facial nerve trunk.

Conclusion: The parotid fascia can be utilized as an additional landmark in conjunction with other commonly used standard anatomic landmarks to help identify the facial nerve trunk. It is useful as a landmark of depth to identify the facial nerve and can easily be palpated as a sling from the mastoid to the parotid gland.

Introduction

Safe identification and dissection of the facial nerve is critical in parotid surgery. There are a number of accepted anatomic landmarks that lead the surgeon to the location of the facial nerve. These include the tragal pointer, the tympanomastoid suture line, the attachment of the digastric muscle onto the mastoid tip, and the styloid process. Even with the use of these landmarks, locating the facial nerve can be challenging. The final step before identifying the facial nerve trunk is tedious dissection through the parotid gland fascia which refers to the investing layer or superficial layer of the deep cervical fascia (SLDF) of the neck that envelops the parotid gland. The SLDF divides posterior to the angle of the mandible and anterior to the sternocleidomastoid muscle to form a capsule around the parotid gland. In this way, the parotid gland fascia lends itself as a landmark of depth to identify the facial nerve trunk. The parotid gland fascia in the region overlying the facial nerve has not been well described in the literature. This purpose of this study was to investigate the attachments and anatomy of the parotid fascia in this area. We propose that it is a reliable landmark that can be use in conjunction with other well-known landmarks to identify the facial nerve trunk during parotidectomy.

Methods and Materials

Eight fresh frozen cadaveric parotid glands were dissected by an Otolaryngology resident. Sharp dissection was utilized to raise the subcutaneous/skin flap off of the parotid fascia. The parotid gland was separated from the sternocleidomastoid muscle posteriorly. It was raised off the lateral aspect of the mastoid tip. The landmarks of the tragal pointer, the tympanomastoid suture line, and the digastric attachment to the mastoid tip were also utilized to identify the general area of the facial nerve trunk. The attachments of the parotid fascia overlying the facial nerve trunk were left intact. The parotid fascia was lifted laterally and the facial nerve trunk was identified just medial to this fascia. The attachments of the posterior parotid fascia were assessed.

Results

In all specimens the facial nerve trunk was easily identified upon lifting the parotid gland fascia. The posterior aspect of the fascia enveloped the posterior aspect of the parotid gland in an open book fashion. Superiorly it attached to the root/arch of the zygoma. Posterosuperiorly it attached to the tragal pointer and the cartilaginous external auditory canal. The fascia was thinner in this region. Posteriorly the fascia was thicker with a dense attachment to the anterior and medial aspect of the mastoid tip as well as the tympanomastoid suture line. There was also a dense attachment to the space between the mastoid and tragal pointer. In all cases the posterior attachment of the parotid fascia could be palpated as a sling overlying the facial nerve and the trunk was found medial to this fascia.

Discussion

The goal of a successful parotid surgery is complete tumor removal and safe identification and preservation of the facial nerve. Multiple landmarks have been studied to help identify the facial nerve trunk, but they give little information about the depth of the trunk. There has been one other study that has evaluated the use of the parotid fascia to identify the facial nerve trunk. Ramsaroop et al described the parotid fascia as being thick in the upper two thirds of the parotid region and thinner in the lower one third as it blended with the platysma muscle. The fascia attached to the tip of the mastoid across the cartilaginous part of the external acoustic meatus to the lower border of the zygomatic process of the temporal bone. Superiorly it extended to the zygomatic arch and inferiorly it extended towards the upper cervical region. In our study we had similar findings. The parotid fascia overlying the nerve attached to the mastoid posteriorly, specifically to the anterior and medial aspect of the mastoid tip. This was a thick, dense attachment. Superiorly it attached to the space between the mastoid and tragal pointer, and again this was dense and adherent. Anterosuperiorly it attached to the tragal pointer more loosely. The dense bands of fascia attaching to the mastoid acted as a reliable landmark of depth in finding the facial nerve.

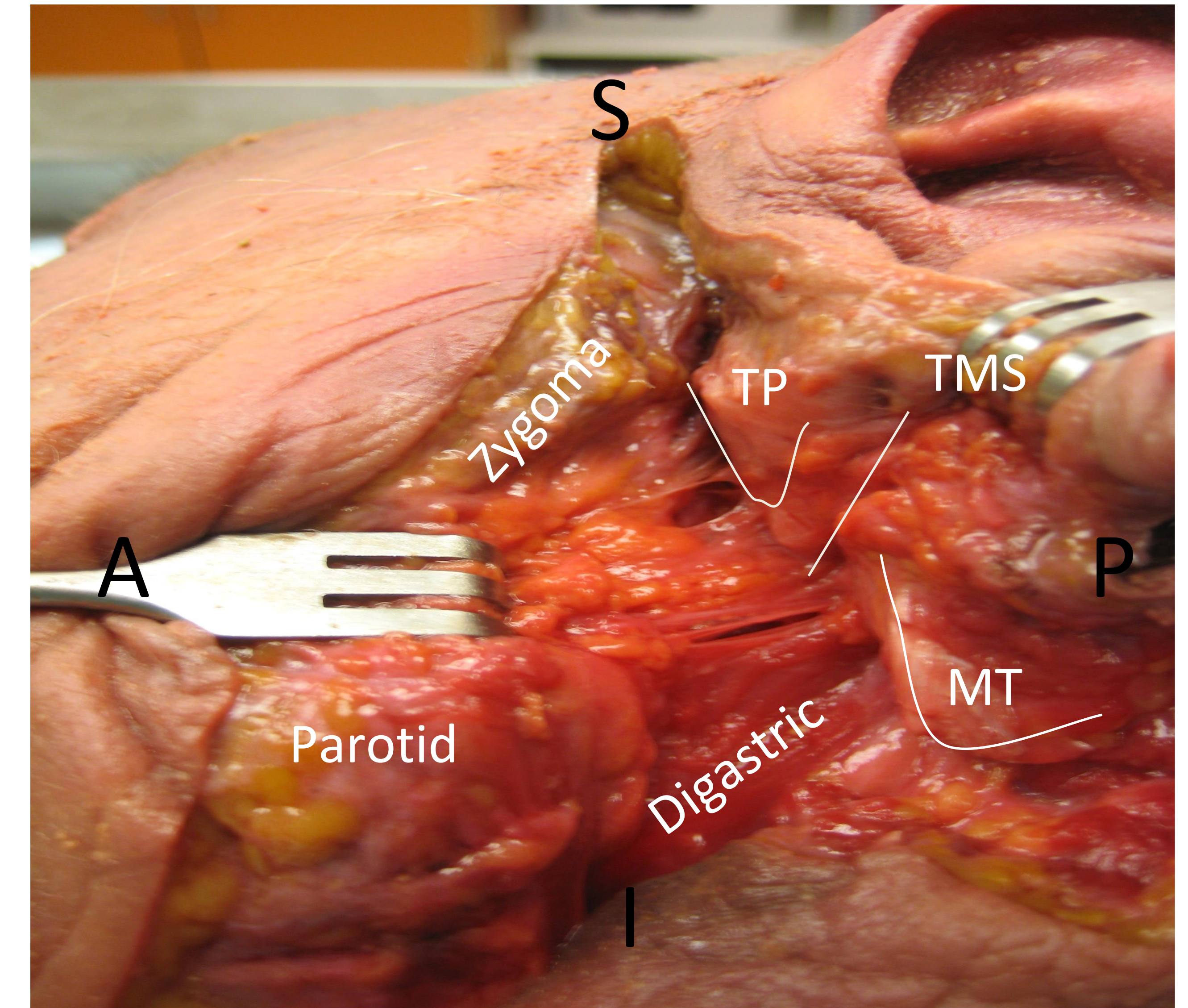


Figure 1. Attachments of the deep parotid fascia (parotid gland retracted anteriorly; TP = tragal pointer, TMS = tympanomastoid suture, MT = mastoid tip)

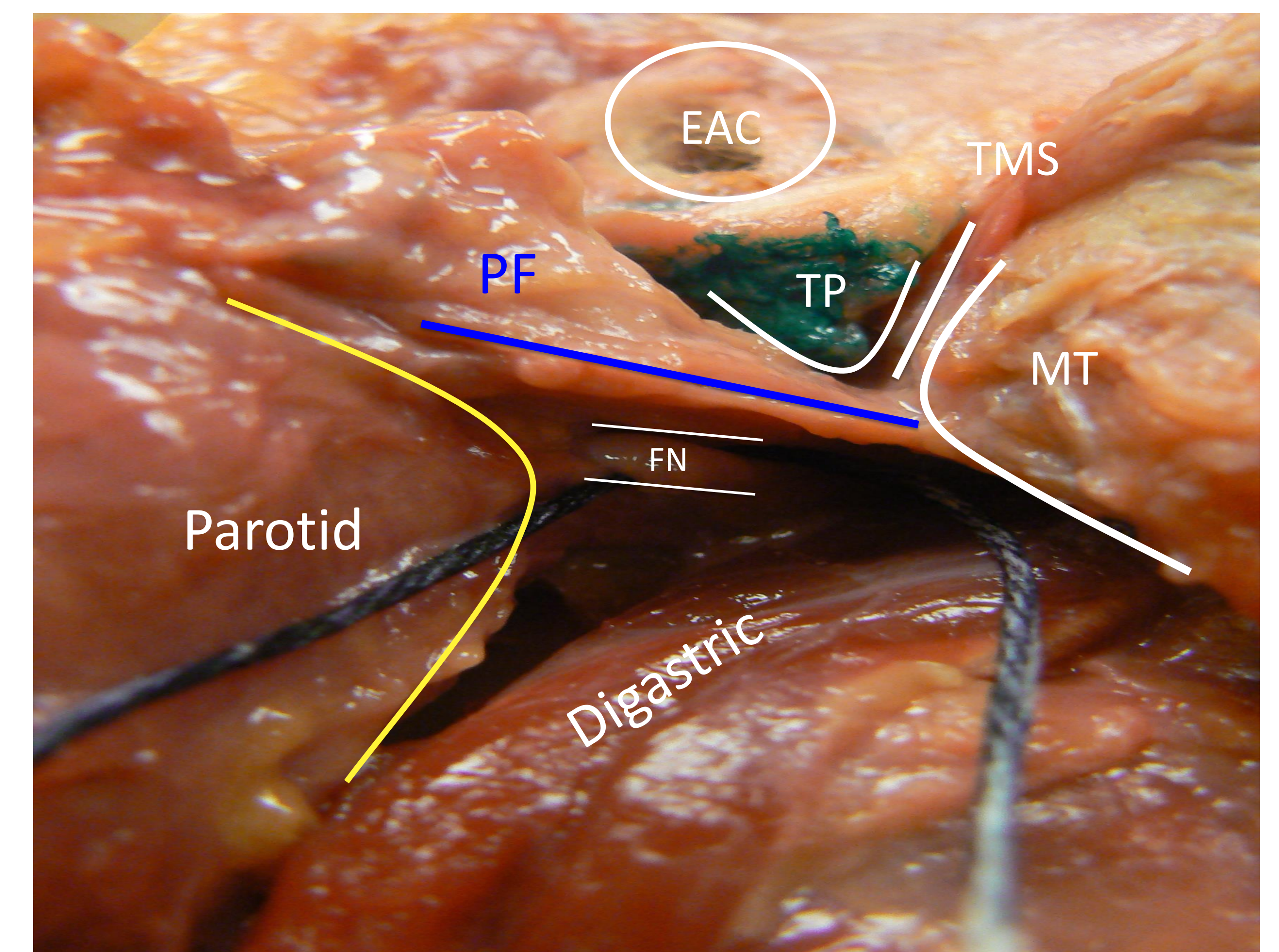


Figure 2. Common landmarks with the facial nerve trunk (EAC = external auditory canal, TP = tragal pointer, TMS = tympanomastoid suture, MT = mastoid tip, FN = facial nerve, PF = parotid fascia)

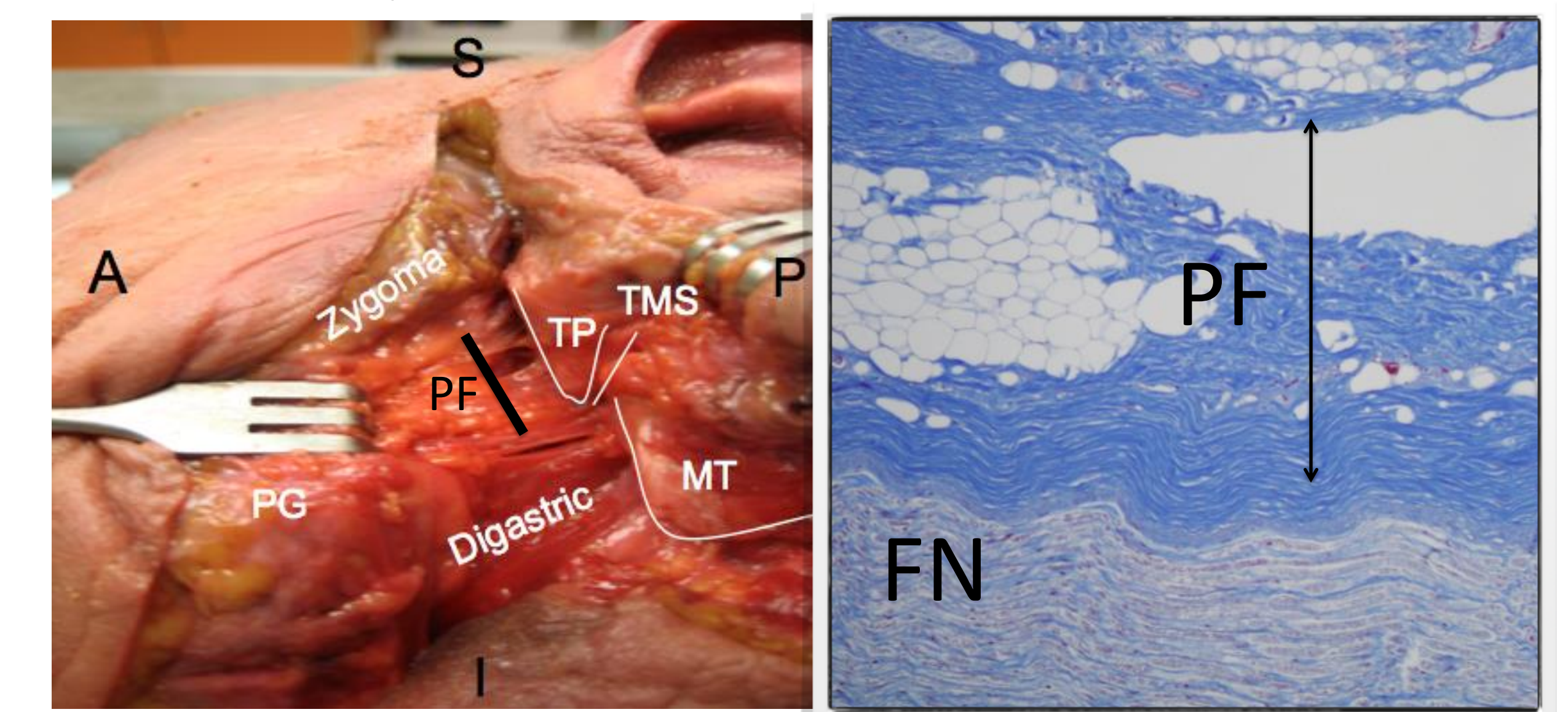


Figure 3. Coronal section of the parotid fascia (PF = parotid fascia, FN = facial nerve)

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References

- Gosain AK, Yousif NF. Surgical Anatomy of the SMAS: A Reinvestigation. *Plastic and Reconstructive Surgery* 1993;92:1254-1263.
- Ruess W, Owsley JD. The Anatomy of the Skin and Fascial Layers of the Face in Aesthetic Surgery. *Facial Aesthetic Surgery* 1987;14:677-682.
- Jost G, Levat Y. Parotid Fascia and Face Lifting: A Critical Evaluation of the SMAS Concept. *Plastic and Reconstructive Surgery* 1984;74:42-51.
- Janfaza F, Nadol JB. *Surgical Anatomy of the Head and Neck* 2001:677.
- Paff GH. *Anatomy of the Head and Neck* 1973:50.
- Ramsaroop L, Singh B. The Surgical Anatomy of the Parotid Fascia. *Surg Radiol Anat* 2006;28:33-37.
- Lathrop FD. Technic of Exposing the Facial Nerve as an Aid to Surgery of the Parotid Gland. *Surg Clin North Am* 1949;29:673-677.
- Eddley HH. Subtotal Parotidectomy for Mixed Salivary Tumour. *Aust NZ J Surg* 1951;21:13-19.
- Kratz RC, Hogg SP. Surgical Exposure of the Facial Nerve. *J Laryngol Otol* 1958;72:902-905.
- Mitz V, Peyronie M. The Superficial Musculo-Aponeurotic System (SMAS) in the Parotid and Cheek Area. *Plast Reconstr Surg* 58:80-88.
- Stuzin JM, Baker TJ. The Relationship of the Superficial and Deep Facial Fascias: Relevance to Rhytidectomy and Aging. *Plast Reconstr Surg* 1992;89:441.