Usefulness of simultaneous use of anatomical landmarks in identification of facial nerve in parotid gland dissection.

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Abstract

Introduction

Identification of Facial nerve trunk is important in parotid surgery to avoid an iatrogenic injury. The objective of our study was to assess consistent and reliable landmarks for identification of the main trunk of facial nerve during parotid surgery.

Methods

This prospective study was carried out in the department of Anatomy, faculty of Medicine, Ragama from 2022 to 2023. Our study included 35 fresh cadavers (70 parotid regions). The anatomical landmarks of tragal pointer (TP), tympanomastoid suture (TMS), and superior border of posterior belly of digastric (PBD) muscle to the facial nerve trunk was measured. The shortest distances were taken from the facial trunk by using a slide calliper.

Results

The age of subjects of the cadavers ranged from 42 to 64 years with a mean of 54.4 years. The mean distance between the TP and the facial nerve trunk was 9.15 mm (8.1–11.7 mm). The mean distance between PBD and the facial nerve trunk was 8.6 mm (7.2–9.8 mm). The mean distance between the TMS and the facial nerve trunk was 6.5 mm (5.2–7.5 mm).

Conclusion

Our study showed that the tympanomastoid suture line is the closest to the facial nerve trunk, followed by the posterior belly of digastric muscle and the tragal pointer respectively. Further clinical studies are needed to assess these landmarks through various parameters to determine their usefulness in surgical practice.

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Introduction

Identification of Facial nerve trunk is paramount in parotid surgery to avoid an iatrogenic injury to the nerve leading to facial muscle paralysis which can results in difficulties in speech, swallowing, eye closure, facial expressions and quality of life.[1-3] There are many anatomical landmarks described in literature such as tragal pointer, posterior belly of digastric muscle, tympanomastoid suture, stylomastoid artery, styloid process, ramus of mandible and transverse process of axis.[1-6] This implies that the use of multiple landmarks to identify the facial nerve trunk that there is less evidence on the consistence and safety of these landmarks in respect of avoiding an iatrogenic facial nerve injury during parotid surgery. The objective of this study is to assess consistent landmarks for identification of the main trunk of facial nerve during parotid surgery.

Methods

This prospective study was carried out identify the main trunk of the facial never in the department of Anatomy, faculty of Medicine, Ragama from 2022 to 2023. Our study included 35 fresh cadavers (70 parotid regions). The tragal pointer, tympanomastoid suture, and superior border of posterior belly of digastric muscle were taken as anatomical land marks. The shortest distance from the facial trunk to each land mark was measured. The ethical clearance was granted. No conflict of interest.

Dissection method

A Modified Blair's incision was used in our study. The skin flaps ere elevated and, the dissection was carried out in between the pinna and the parotid gland and the tragal pointer. Following that, the sternocleidomastoid muscle and the posterior belly of digastric muscle was exposed by dissecting the lower part of the parotid. Once the above dissections were completed, the tympanomastoid suture was identified in between the tragal pointer and superior border of PBD. The facial nerve trunk was found adjacent to these landmarks and the measurements were taken accordingly.

Statistical Analysis

Social Science Statistical Package (SPSS Inc., Chicago, IL,
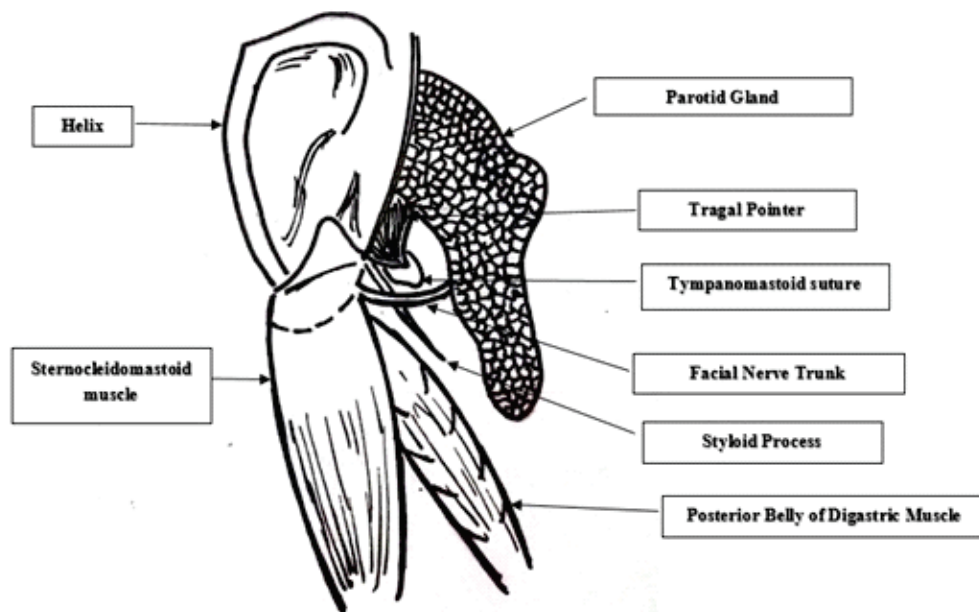
Figure 1. Diagrammatic representation of Facial Nerve Trunk

USA) computer software was used for the statistical analysis. The descriptive data were presented as mean, standard deviation and range.

Results

We found that in 100% of cases we could identify the main trunk of facial nerve without much difficulty by using these three landmarks. The age of subjects of the cadavers ranged from 42 to 64 years with a mean of 54.4 years. The mean distance between the TP and the facial nerve trunk was 9.15 mm (8.1–11.7 mm). The mean distance between the PBD and the facial nerve trunk was 8.6 mm (7.2–9.8 mm). The mean distance between the tympanomastoid suture (TMS) and the facial nerve trunk was 6.5 mm (5.2–7.5 mm).

Discussion

According to literature the tragal pointer is commonly used landmark for the identification of Facial nerve trunk during surgery. The literature revealed that the facial nerve lies around 1 cm deep and inferior to the pointer.[1] This was comparable with our study findings as well. However, it is possible that variable directions of the cartilaginous tip may give a false direction towards the main trunk of the facial nerve.

The available literature showed that the Facial nerve trunk was found to lie within 4.8–12.8 mm of posterior belly of digastric [4]. In our study, the range of distance of the facial nerve trunk from the PBD was like as it was in literature. Using a landmark, the PBD has advantages, such as it is being easily identifiable, and it lies superficial to the plane of facial nerve trunk. Furthermore, the tragal pointer and the PBD lie at

a same and superficial plane to the facial nerve trunk hence dissection at this plane is safe.

The literature revealed that the facial nerve trunk from TMS was in the range of 3.79 ± 2.92 mm [1-4]. In our study, the distance of TMS to the main trunk of facial nerve was longer than the available literature. The advantage of TMS is due to the bony nature, it is less variable than the other landmarks. Because of the consistent position, the tragal pointer and tympanomastoid suture were taken mostly to locate the main trunk of the facial nerve in some literature [5,6].

Even though some of the literature describes the use of stylomastoid artery as a landmark for the identification of the facial nerve trunk we did not make any attempts due to its inconsistent presence and anatomical variations and the possibility of artery spirals closely around the facial nerve trunk which could result in iatrogenic nerve injury during disection. Similarly, the literature has described the styloid process as another landmark, but we felt that since it lies medial to the facial nerve trunk, the possibility of iatrogenic injury is more. [3-8]

In our study the simultaneous use of these three landmarks facilitates the identification of the main trunk of facial nerve. We observed that the tympanomastoid suture was the closest landmark, followed by the posterior belly of digastric muscle to the facial nerve trunk. This method may facilitate the dissection and reduce the total operating time. We would like to propose the simultaneous use of these landmarks for identification of facial nerve trunk easily.
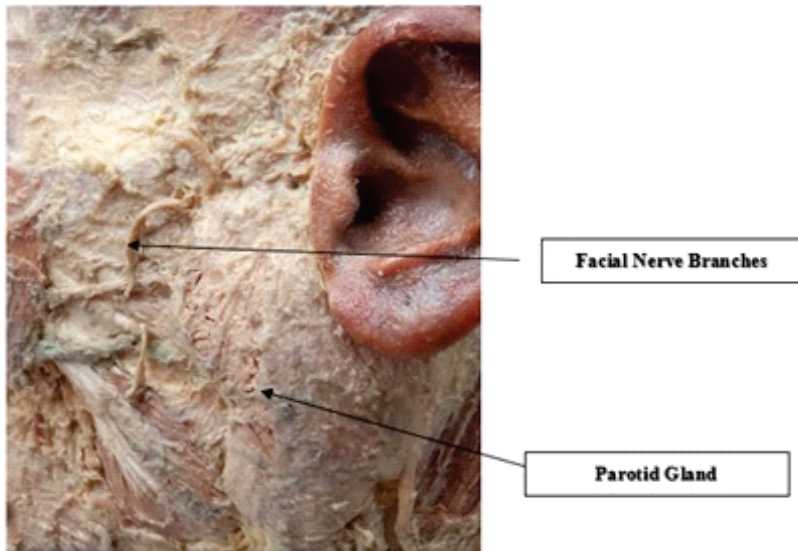
Figure 2. Exposure of parotid gland in anatomical study

Figure 3. Exposure of Tragal pointer and tympanomastoid suture
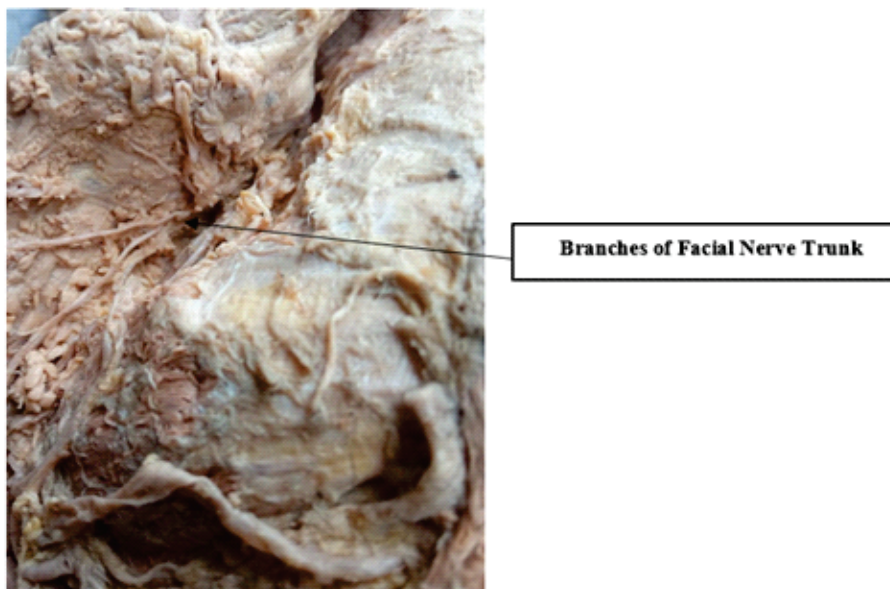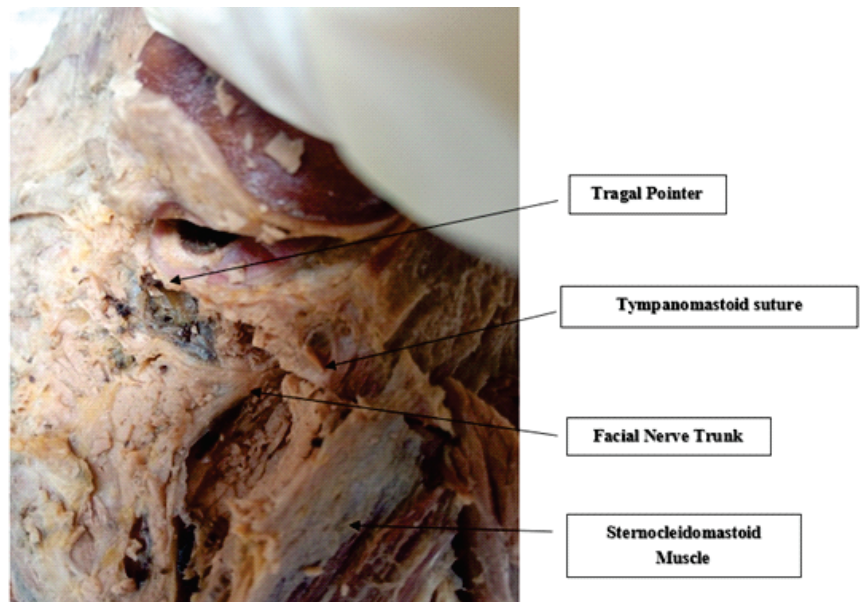

Figure 4. Exposure of facial nerve branches in cadaver dissection

Conclusion

Our study showed that the tympanomastoid suture line is the closest to the facial nerve trunk, followed by the posterior belly of digastric muscle and the tragal pointer respectively. Further clinical studies are needed to assess these landmarks through various parameters to determine their usefulness in surgical practice.

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