CASE REPORT
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Double Facial Nerve Trunk Emerged from the Stylomastoid Foramen and Petrotympanic Fissure: A Case Report

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There are several studies concerning branches of the facial nerve, but we encountered less information about the trunk of the facial nerve in the literature. During the routine dissection of a 65-yr-old Caucasian male cadaver, double facial nerve trunk emerged from the stylomastoid foramen and petrotympanic fissure were encountered. Because of an extremely rare variation, we presented this case report. In addition this cadaver had two buccal plexuses. These plexuses and other branches were formed to structures like to polygon. These anatomic peculiarities were described, photographed and illustrated. Finally, magnetic resonance imaging was performed by using 1.5T scanner to this cadaver. The facial nerve trunk can be damaged during surgical procedures of the parotid gland tumours and submandibular region. Surgeons who are willing to operate on this area should be aware of the possible anatomical variations of the facial nerve trunk.

Key Words: Facial Nerve Trunk; Variation

INTRODUCTION

The facial nerve trunk exits through the stylomastoid foramen, and enters the parotid gland where it divides into the cervicofacial and temporofacial divisions. Then divides into five peripheral branches to supply the muscles of facial expression (1).

The branches arising from the rami form to parotid plexus in parotid gland. The superior buccal nerve arising from temporofacial ramus and the inferior buccal nerve arising from the cervicofacial ramus form to the buccal plexus without parotid gland (1).

The zygomatic (2), the marginal mandibular (3-5), the buccal (6), and the temporal branches (7) of the facial nerve were investigated by many researchers.

Different surgical approaches and landmarks to the trunk of the facial nerve have been reported (8-12). Many landmarks such as the mastoid process (8-10), the transverse process of the atlas (8) and axis (11), the temporomandibular joint, the angle of the mandible (9, 11), insertion of the sternocleidomastoid muscle, pointer cartilage of the ear (10), tragal pointer (11) and the marginal mandibular branch of the facial nerve (12) can be used to identify the trunk of the facial nerve. But identification of this trunk may be difficult because it is encompassed by dense connective tissue (13).

In this paper, we presented rare anatomical variations the trunk of the facial nerve.

CASE REPORT

The double facial nerve trunk emerged from the stylomastoid foramen and petrotympanic fissure was found in a 65-yr-old Caucasian male cadaver during a routine dissection course. Firstly, the skin and superficial fascia between the mastoid process and ramus of the mandible were reflected in all subjects. The platysma, sternocleidomastoid and posterior belly of the digastric muscles were retracted. Then, the dissection was continued medially to posterior belly of the digastric muscles. The anterior border of the parotid gland was carefully elevated and the rami of the nerves followed proximally up to the stylomastoid foramen under a stereomicroscope (Stemi 2000; Carl Zeiss, Jena, Germany). The entire trunk of the facial nerve was identified. Their anatomic peculiarity were described, photographed and illustrated. Finally, magnetic resonance (MR) imaging was performed by using 1.5T scanner to this cadaver. To be able to demonstrate the stylomastoid foramen and the petrotympanic fissure in same section, we obtained T1 and T2 weighted oblique sagittal scans.

In the present cadaver, difference with the exit point of the facial nerve was observed. In this specimen, a nerve exiting from petrotympanic fissure was present. In this side, although cervicofacial ramus of the facial nerve exited from the stylomastoid foramen, temporofacial ramus of the facial nerve exited from petrotympanic fissure (Fig. 1). This specimen had two buccal plexuses. The buccal branch dividing from temporal branch of

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Fig. 1. (**A**) The ramus of the facial nerve exited from different foramen in left side (lateral view). (**B**) The schematic drawing. The stylomastoid foramen (Sf); petrotympanic fissure (Pf); first buccal (Bp1) plexus; temporofacial (Tr) and cervicofacial (Cr) rami; temporal (T), zygomatic (Z), buccal (B), marginal mandibular (M) and cervical (C) branches of the facial nerve.

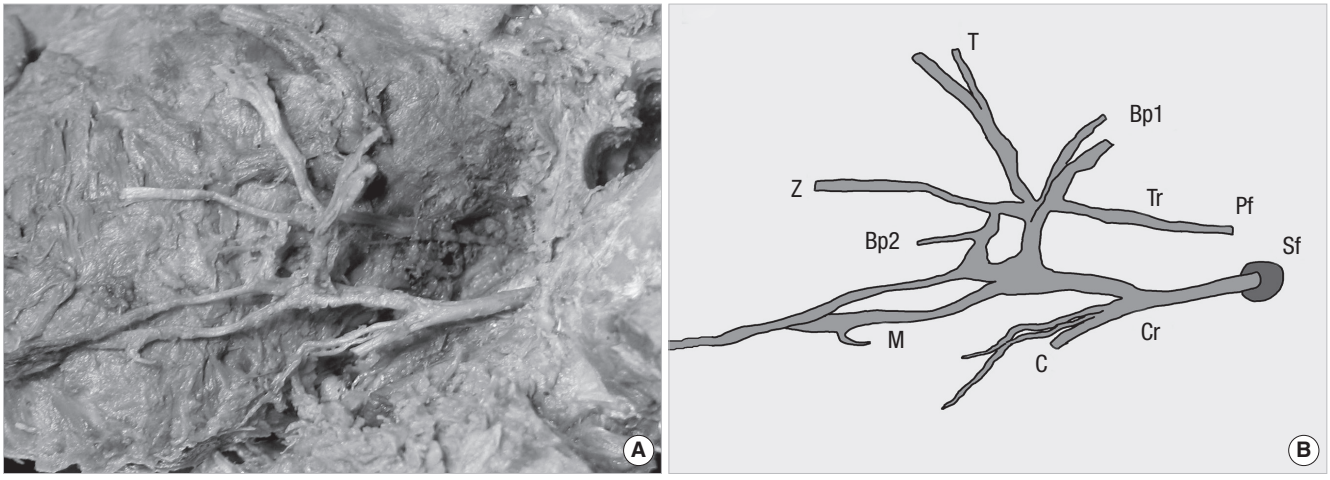

Fig. 2. (**A**) The two buccal plexuses fromed like to polygon in left side (lateral view). (**B**) The schematic drawing. The stylomastoid foramen (Sf); petrotympanic fissure (Pf); first (Bp1) and second buccal (Bp2) plexuses; temporofacial (Tr) and cervicofacial (Cr) rami; temporal (T), zygomatic (Z), buccal (B), marginal mandibular (M) and cervical (C) branches of the facial nerve.

temporofacial ramus and first buccal branch dividing from cervicofacial ramus formed to first buccal plexus. The buccal branch dividing from zygomatic branch of temporofacial ramus and second buccal branch dividing from cervicofacial ramus formed to second buccal plexus (Fig. 2). These two buccal plexuses and other branches formed to structures like to polygon (Fig. 2). The temporofacial ramus exiting from petrotympanic fissure was seen on magnetic resonance image (Fig. 3).

DISCUSSION

Several studies relating to the trunk of the facial nerve have been reported in the literature (14-19). Katz and Catalano (14) reported three cases (3%) presenting two main trunks, known as the major and minor trunks, with the latter joining the larger temporofacial division, the origin of the main buccal branch. The minor trunk of the facial nerve was noted in eight of 30 cases (26.7%) and, in all of them, the minor trunk entered the lower division of the facial nerve (15). Botman and Jongkees (16) reported that the facial nerve within the mastoid segment of the temporal bone can split into two or three branches, and each branch exits through a separate osseous foramen. In this study, a trunk of the facial nerve exiting from the petrotympanic fissure is present one case. In addition, Baker and Conley (17) reported the possibilities of trifurcation, quadrifurcation, or even a plexiform branching pattern of the trunk of the facial nerve. Salame et al. (18) identified one case of trifurcation out of 46 cases. Park and Lee (19) and Kwak et al. (15) reported prevalence of trifurcation to be 4.4% and 13.3%, respectively. But we did not identify any case of trifurcation, quadrifurcation or a plexiform branching pattern of the trunk.

The facial nerve can easily be injured by sharp or penetrating

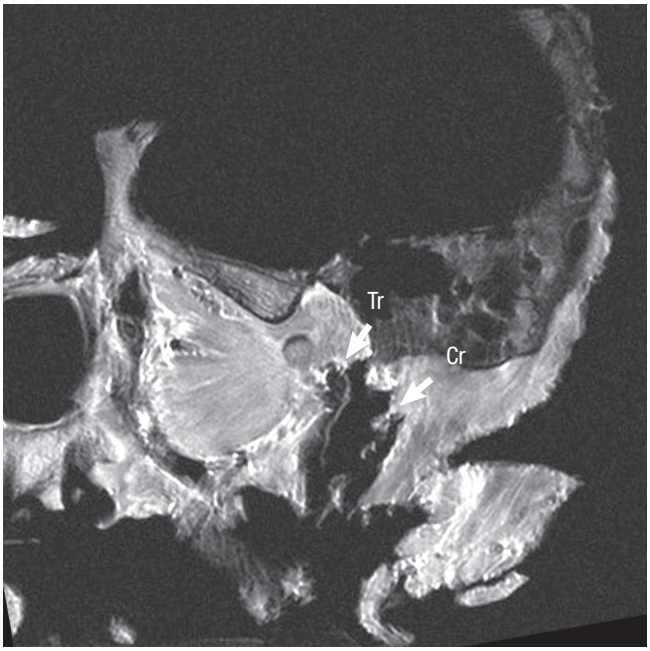

Fig. 3. An oblique sagittal T1-weighted magnetic resonance image shows temporofacial and cervicofacial rami of the facial nerve emerging through the petrotympanic fissure and stylomastoid foramen, respectively. The temporofacial (Tr) and cervicofacial (Cr) rami of the facial nerve.

trauma to the cheek. Knowledge of the trunk of the facial nerve is essential when treating these injuries.

There are number of studies concerning protection extracranial branches of the facial nerve during plastic surgery procedures and operations intended for the parotid gland, but relatively little care has been given exit point of the facial nerve. Knowledge of the trunk of the facial nerve is essential for preserving the nerve during surgical procedures of the mastoid process, parotid gland, the cranial base and the facial nerve (13, 17).

In this study, we exposed exit point of the trunk of the facial nerve through the cranium. Our results are consistent with study of Botman and Jongkees (17).

Surgeons should be aware of the possible anatomical variations of the trunk of the facial nerve, because a trunk of the facial nerve exiting from the petrotympanic fissure may also be present. In such cases, the facial nerve can be damaged during surgical procedures.

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