



Case Report

Case of a completely absent facial artery

Published online April 10th, 2011 © <http://www.ijav.org>Hiromitsu EZURE^[1] †Ryoichi MORI^[2]Junji ITO^[3]Naruhito OTSUKA^[1]

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Received August 2nd, 2010; accepted January 12th, 2011

ABSTRACT

In a student course on gross anatomy dissection at Showa University School of Dentistry in 2005, we found a case of a unilateral absence of the facial artery in a 75-year-old Japanese male cadaver.

In this case, the left facial artery was completely absent, and it was compensated by the transverse facial artery which had a larger than normal diameter. In addition, the ascending palatine artery formed a common trunk with the lingual artery and the branch of the submandibular gland arose directly from the position where the normal facial artery would usually be in the external carotid artery. © IJAV. 2011; 4: 72–74.

Key words [facial artery] [transverse facial artery] [absence]

Introduction

The facial artery generally arises from the anterior portion of the external carotid artery at a point a little above the lingual artery, and then runs forward under cover of the body of the mandible, and then is lodged in a groove on the posterior surface of the submandibular gland. It then curves upward over the body of the mandible at the anterior-inferior angle of the masseter muscle. Furthermore, the facial artery passes forward and upward across the cheek to the angle of the mouth, then runs upward to the medial angle of the eye along the side of the nose. However, variations of the facial artery have been reported by Adachi [1], Araya [2], Hanai et al. [3] and Yamamoto [4]. Particularly, it is comparatively rare that the facial artery is completely absent and compensated by another artery such as the transverse facial artery [1–5].

On the other hand, the facial artery is often selected as the target artery for superselective intra-arterial chemotherapy of head and neck cancer by inserting a catheter from the superficial temporal artery [6], therefore, knowledge of the anatomical variations of the facial artery is very important in the clinical administration of superselective intra-arterial chemotherapy.

During a student course on gross anatomy dissection at Showa University School of Dentistry in 2005, we found a rare case of a completely absent left facial artery and such

an absence was compensated by the transverse facial artery, which was larger in diameter than usual, and the findings of this case are herein described.

Case Report

This case was an 75-year-old Japanese male cadaver who had died of neuroendocrine cancer. The left facial artery was completely absent, and its absence was compensated by the transverse facial artery, which had a larger than usual diameter (Figures 1, 2).

After the left common carotid artery divided into the external and internal carotid arteries, the left external carotid artery (diameter: about 8.0 mm) gave the superior thyroid artery (diameter: about 2.4 mm) from the anterior wall of vessel. After passing upward about 24.3 mm, a common trunk which is formed out of three arteries including the lingual artery (diameter: about 3.6 mm), the ascending palatine artery (diameter: about 1.6 mm) and the branch of submandibular gland (diameter: about 1.6 mm) arose from the anterior wall of the left external carotid artery. Then at a point about 2.5 mm upward from the origin of that common trunk, the ascending pharyngeal artery (diameter: about 1.6 mm) arose from the medial wall of the left external carotid artery, and the posterior auricular (diameter: about 3.2 mm) and occipital (diameter: about 3.6 mm) arteries arose

from the posterior wall of the left external carotid artery. After passing upward about 52.4 mm, the maxillary artery (diameter: about 3.2 mm) branched off from the anterior wall of the left external carotid artery. Furthermore, the transverse facial artery with a large diameter (diameter: about 3.5 mm) arose from the posterior wall of the external carotid artery at a point approximately 6.1 mm upward from the origin of the maxillary artery. The transverse facial artery ran parallel to the zygomatic branch of the facial nerve (Figure 2a), and then branched off into the buccinator muscle (diameter: about 1.7 mm) at a point 65.3 mm distal from the origin of the transverse facial artery. After passing distally approximately 8.6 mm, the transverse facial artery then divided into two terminal arteries, namely the angular (diameter: about 1.4 mm) and the superior labial arteries (diameter: about 1.4 mm) (Figure 2b).

Finally, the external carotid artery formed the superficial temporal artery (diameter: about 3.8 mm) as the terminal branch (Figures 1, 2b).

Discussion

We found a case of a completely absent left facial artery that was compensated by the transverse facial artery with a larger diameter than usual.

Variations of the facial artery have been previously reported [1–4]. The facial artery is frequently rudimentary [7], but case of a completely absent facial artery is relatively rare. Adachi reported an absence of the facial artery with compensation by the transverse facial artery to be observed on 1 of 292 sides in 146 Japanese cadavers [1]. Yamamoto classified such variations of the facial artery into 8 types based on evaluations of 150 sides of 75 Japanese cadavers [4]. Type 1, which corresponds to our present case, was observed on only 1 side in his report. Furthermore, in other reports according to the classification by Yamamoto [4], Type 1 was not observed in 100 sides of 50 Japanese cadavers [2], and was observed in only 4 cases from 522 sides of 261 Japanese cadavers [3]. The findings of these reports thus suggest that our present case is relatively rare.

There is still no ontogenic explanation for variations of the facial artery. However, Kodama dissected the branches of the external carotid artery including the facial artery in 420 sides from 210 Japanese cadavers, and analogized the ontogenic origin of the facial artery as follows: in most cases of the facial artery was arising from at higher position of the external carotid artery, the ascending palatine artery arose from original position of the facial artery, namely, the ascending palatine artery was the primary artery, and the facial artery was newly formed from the ascending palatine artery [8]. In our case it arose from the original position of the facial artery even though the ascending palatine artery had formed a common trunk with the lingual artery and the branch of the submandibular gland. We consider that the facial artery in this case thus formed from the ascending palatine artery either in the absence of the artery or due

to the disappearance of the artery during the ontogenesis stage.

We noted that the transverse facial artery had a larger diameter than usual in this case. Generally, the blood supply

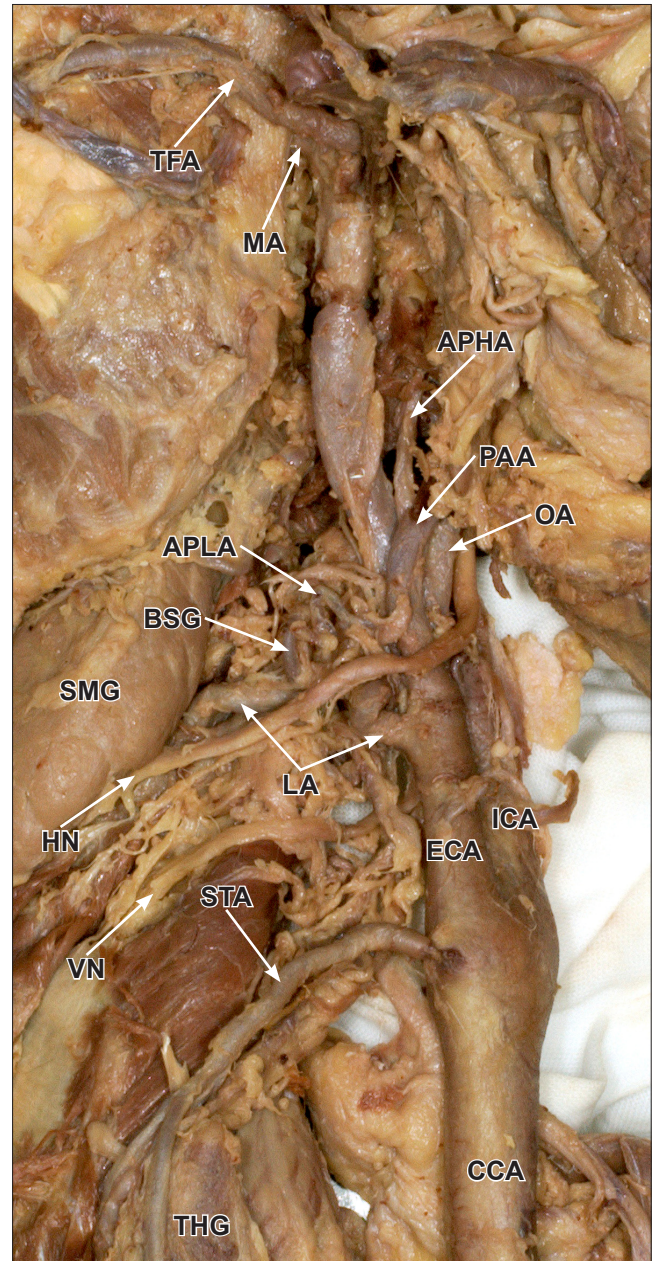


Figure 1. Photograph of the left external carotid artery and its branches in this case. (TFA: transverse facial artery; MA: maxillary artery; APHA: ascending pharyngeal artery; PAA: posterior auricular artery; OA: occipital artery; APLA: ascending palatine artery; BSG: branch to submandibular gland; LA: lingual artery; SMG: submandibular gland; HN: hypoglossal nerve; VN: vagus nerve; STA: superior thyroid artery; ECA: external carotid artery; ICA: internal carotid artery; CCA: common carotid artery; THG: thyroid gland)

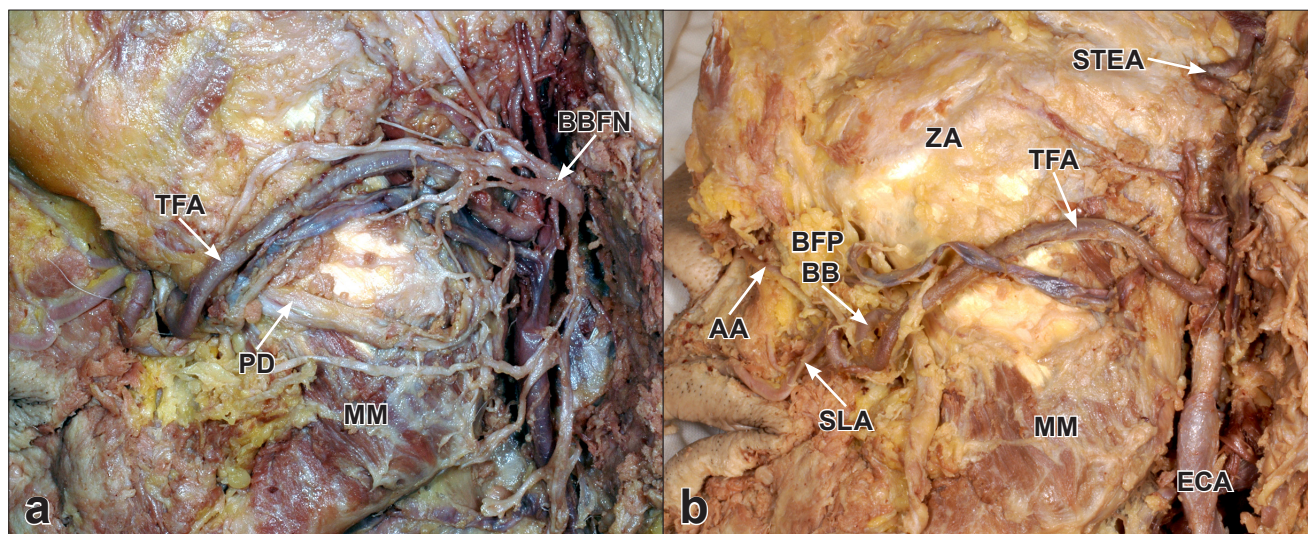


Figure 2. Photograph of the left transverse facial artery in this case. **a)** The parotid gland is removed. **b)** The parotid gland and facial nerve are removed. (*TFA*: transverse facial artery; *BBFN*: branch to buccinator muscle from facial nerve; *PD*: parotid duct; *MM*: masseter muscle; *STE*: superficial temporal artery; *ZA*: zygomatic arch; *BFP*: buccal fat-pad; *BB*: branch to buccinator muscle; *AA*: angular artery; *SLA*: superior labial artery; *ECA*: external carotid artery)

to the facial region is mainly provided by three arteries including the facial, the transverse facial and the infraorbital arteries. When the facial artery is hypoplastic, it tends to be mainly replaced by a strongly developed transverse facial artery [7,9]. In addition, Adachi [1], Hanai et al. [3] and Tubbs et al. [5] reported cases in which the facial artery was absent, and they explained that the facial artery had been replaced by the transverse facial artery. Our present case is compatible with these reports. We therefore think that the transverse facial artery with a larger diameter than usual is a compensation for the absent facial artery in this case.

On the other hand, during the treatment of some cancers of the head, the facial artery is usually selected as the

target artery for superselective intra-arterial chemotherapy [6]. Therefore, when inserting a catheter for superselective intra-arterial chemotherapy, the operator should therefore be aware of the possibility of an anatomically rare variation of the facial and the transverse facial arteries as observed in our above described case.

Acknowledgement

We are grateful to Dr. Takayoshi Miyaki (Associate Professor, Department of Anatomy, Tokyo Medical University) for his extremely valuable anatomical advice.

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