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## International Journal of Surgery Case Reports

journal homepage: [www.casereports.com](http://www.casereports.com)

# Anatomic variation of the relation between the facial nerve and the retromandibular vein during superficial parotidectomy: A rare case report



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## ARTICLE INFO

## Article history:

Received 28 July 2017

Received in revised form 1 October 2017

Accepted 1 October 2017

Available online 10 October 2017

## Keywords:

Facial nerve variation

Relation with retromandibular vein

Parotidectomy

## ABSTRACT

**INTRODUCTION:** Identification and preservation of the facial nerve (FN) is a major challenge when performing parotidectomy. Anatomic variations of the relation between the FN and the retromandibular vein (RMV) pose a high risk of nerve injury and bleeding during the operation.

**PRESENTATION OF CASE:** An unusual anatomic variation of the relation between the FN and the RMV was unexpectedly detected during superficial parotidectomy. The operation was uneventful. A meticulous review of the recent literature was conducted as well.

**DISCUSSION:** Variations of the relation between the FN and the RMV are mainly identified during the operation, since when performing parotidectomy, surgeons typically detect all the FN branches by locating the RMV. Such kind of variations, are not as rare as considered and their presence complicates parotid surgery and increases the potentiality of nerve injury and hemorrhage.

**CONCLUSION:** Surgeons' deep knowledge and perpetual awareness concerning the probable anatomic variations of the relation between the FN and the RMV combined with detailed exposure of the operative field and of the relationship between these adjacent anatomical structures lead to safe parotid surgery.

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## 1. Introduction

Identification and preservation of the facial nerve (FN) is crucial when performing parotidectomy [1,2]. The FN is an important cranial nerve that controls many different functions [3]. Surgeons typically identify the FN and its branches during parotidectomy by locating the retromandibular vein (RMV) [4]. However, variations in the relationship of the FN with the RMV, as in the presented case, complicate parotid surgery and increase the potentiality of nerve injury or bleeding [3–5]. The present manuscript that aims to highlight an anatomic variation and its severe implications for parotidectomy has been reported in line with the SCARE criteria [6].

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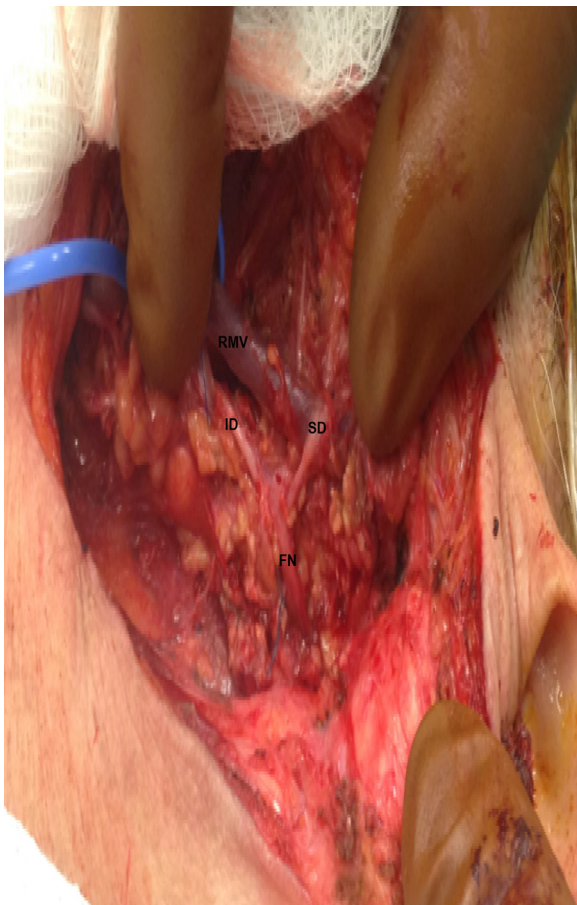
<https://doi.org/10.1016/j.ijscr.2017.10.006>

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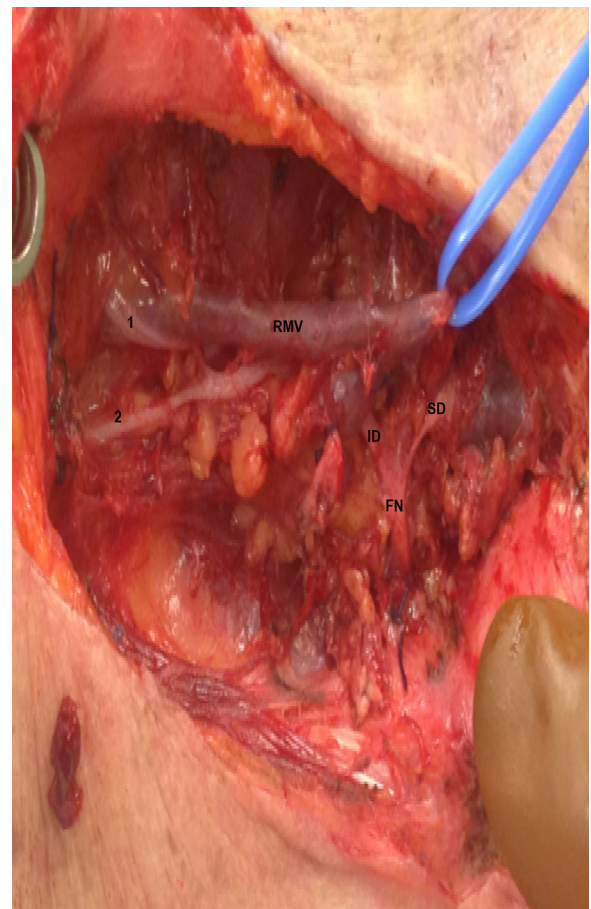
## 2. Case report

A 70-year-old male patient proceeded to our institution with a 6-month history of an enlarging ulcerated nodule of the skin that overlies the right parotid gland. The patient's medical history revealed ulceration and intense pain of the lesion the last 2 months. Clinical examination certified trophic alterations of the overlying skin and revealed palpable parotid lymph nodes, which were detected as static and painless masses of hard consistency. The initial diagnosis was squamous cell carcinoma of the skin. Subsequently, radiographic analysis was performed, including CT of the head that indicated metastasis to the parotid lymph nodes, and CT of the neck which was unremarkable. Following this, right superficial parotidectomy, elective parotid lymph node dissection and skin reconstruction with local flaps was scheduled.

The parotidectomy was initiated with a preauricular incision. The tragal pointer was used as a standard anatomic landmark for the identification of the FN trunk. When surgeons elevated the superficial lobe of the parotid gland and they exposed carefully the operative field, they observed that the FN bifurcated into the cervicofacial(inferior) division and the upper bigger temporofa-



**Fig. 1.** Exposure of the FN main trunk and its bifurcation in relation with the RMV.



**Fig. 2.** 1) mandibular/2) cervical nerve branches/RMV: retromandibular vein/FN: facial nerve trunk/SD: superior division/ID: inferior division.

cial division. (Fig. 1) The main trunk was carefully isolated in order to avoid nerve injury and subsequent severe morbidities. While performing descending dissection of the FN, they unexpectedly identified that the RMV passed superficially to both the mandibular and the cervical branch of the inferior division of the FN. (Fig. 2) The surgeons retracted the superficial RMV gently with a vessel loop for better exposure of the FN branches and for avoidance of accidental damage of the vein and bleeding. Apart from the previously mentioned anatomic variation, surgeons incidentally detected that a single buccal branch, originating from the temporofacial division of the FN, coursed deeper, rather than superficial to the RMV, although the temporal and zygomatic branch, overlaid the vein, as commonly (Figs. 3 and 4). After exposing and isolating meticulously all the FN branches the operation continued in the usual fashion. At the end of the parotidectomy, surgeons evaluated once again that all the FN branches remained intact. Then, a vacuum drainage was placed and it was finally removed the 1st postoperative day.

The patient was discharged the 5th postoperative day with instructions and he had no any postoperative complications. The histopathological report of the surgical specimen revealed squamous cell carcinoma of the skin.

### 3. Discussion

The FN is the most important anatomical structure that has to be identified and preserved during parotidectomy [1]. The FN is an essential cranial nerve (CN: VII) that transmits some sensory information from the anterior two-thirds of the tongue's tip and it innervates facial muscles, controlling how to contract and produce multiple facial expressions as well.

Nowadays, parotid surgery is a common surgical procedure. Hence, the cornerstone for a safe and adequate operation is giving emphasis to the exact, detailed description of the anatomy of the facial nerve and its branching pattern. There are several anatomic landmarks for the intraoperative identification of the FN, such as the stylomastoid foramen, the tympanomastoid fissure, the posterior belly of the digastric muscle, the tragal pointer and the retromandibular vein (RMV) [7,8].

Moreover, the relation between the FN and the RMV is of paramount clinical significance during the operation, for the identification and protection of all the FN branches [5]. The surgical step of the identification of the trunk of the FN and of the type of its bifurcation is of key importance in order to avoid injury of the nerve branches [9]. Indeed, the branching type of the FN may vary among individuals. Nevertheless, the FN most frequently bifurcates into the inferior cervicofacial and the superior temporofacial divisions, as in the presented case [7,9].

However, localizing the FN branches based on their relationship with the RMV is not as easy as described in the literature, since the classical relationship, in which the RMV lies deep to the FN, is not detected as usually as thought during parotid surgery [5]. In fact, anatomic variations of the relation between RMV and FN occur with a prevalence of 11.83% [5] and they pose a high risk of FN branches injury and bleeding [3,5,8]. Indeed, the reported incidence of FN palsy during parotid surgery is almost 21% and such a postoperative complication is even more probable when surgeons encounter anatomic variations of the relationship between FN and RMV [10].

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