CASE REPORT

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Double infraorbital nerve as a variation: report of two cases

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Abstract In two cases of LeFort II fracture, exploration of the infraorbital area showed two distinct infraorbital foramina and correspondingly two separate infraorbital nerves. This variation of the infraorbital nerve was unilateral in one case, and bilateral in the other. Sensory evaluation one month following the surgery using a local anesthetic agent showed that the two nerves each have a different dermatome. The relevant literature was reviewed and the importance of the variation, especially in local infiltration anesthesia, e.g. for rhinoplasty, is emphasized.

Key words Double infraorbital nerves · Double infraorbital foramina

Introduction

The infraorbital foramen is of clinical significance since it represents a weak point in orbitozygomatic complex fractures and as a result can cause varying degrees of nerve damage. Sensory defects may not recover for as long as a year after fracture reduction [7]; however, progressive sensory improvement indicates the success of the fracture reduction. It has been reported that early repair with rigid fixation can lessen the sensory defect [9, 10]. Reports on anatomical variations of the infraorbital foramen (IF) and infraorbital nerve (IN) are very few in number and all were performed either on cadavers or on autopsy materials.

Two cases of IN variation are presented and discussed. Double IFs and INs were observed unilaterally in one case, and bilaterally in the other.

Case report

Case 1

A 19-year-old man was admitted following a motorcycle accident in which he sustained a LeFort II fracture and right-sided pneumothorax. Examination revealed hypoesthesia on IN dermatomes bilaterally with the other classical signs of a pyramidal fracture. Following correction of the respiratory insufficiency related to the pneumothorax, definitive repair of the fracture was performed via bilateral subciliary incisions and upper buccal sulcus incisions. During the exploration of the fracture lines, the infraorbital neurovascular bundles were found and protected. At the left side, just inferior to the medial side of the infraorbital rim, another distinct neurovascular bundle was seen and protected. The diameter of this second nerve seemed to be of a similar caliber to the first. It had a distinct foramen which was located approximately 12 mm medial and 5 mm superior to the first IF (Fig. 1). The fractures of the infraorbital rims and maxillary buttresses were reduced and stabilized using micro and miniplates.

At the first postoperative month, with the permission of the patient, the medial foramen was located by palpation of microplates. The subcutaneous tissue over the medial foramen was infiltrated with 0.5 ml of 1% prilocain solution. A neurologist (the third author) then performed the dermatome examination and found that only the left lower eyelid and nasal skin were anesthetized. Two hours later the same procedure was performed for the lateral IN and the lateral dermatome was anesthetized (Fig. 2).

Case 2

A 36-year-old man was admitted following an automobile accident. Examination revealed a LeFort II fracture and bilateral acetabular fractures. Using the incision described in Case 1, the infraorbital rims were explored. Bilateral accessory neurovascular bundles were found medial to each IF; the latter were located approximately 9 mm from the infraorbital margins on both sides. The accessory foramina were located approximately 10 mm medial to the IF and 5 mm from the infraorbital margins (Fig. 3). The fractures were reduced using the technique described in the first case. Polyamide suture loops which passed around the accessory nerve bundles were brought through the skin in order to illustrate the location of the pedicles.
At the first postoperative month, blocking of the accessory INs resulted in anesthesia of the classical IN dermatomes. Anesthetic block of the true INs resulted in anesthesia of the IN dermatomes except the alae nasae (Fig. 4). Thus alae nasae were anesthetized only by blocking the accessory INs. The location of the nerves was easily determined by the position of the sutures.

In an effort to further investigate the existence of the double IFs, 42 skulls with undefined gender were studied. An accessory IF was found 2.7% on the right and 21.4% on the left sides. Jordan [5] noted double IN in a female autopsy, besides the true IN running typically in its canal, there was an accessory IN emerging through a short additional canal. In that case additional IN supplied the lacrimal sac, the teeth, and the mucous membrane of the maxillary sinus. However, he did not relate this to the clinical situation. Cesnys [3] found accessory IN 18.59% of 0–10 year-old and 24.42% of 10–20 year-old Lithuanians. Arman and Korman [1] reported three cases with two IFs and two canals in 477 skulls. Leo et al. [8] presented a case of the IN bifurcating in the base of the orbit and subsequently passing through two infraorbital canals and exiting by two distinct foramina. The inferolateral of the two nerves sent twigs to the external nasal surface, the superior portion of the upper lip, and the superior branch sent branches to the external nasal surface. The authors suggested that a patient with such an anatomical

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**Discussion**

Local infiltration anesthesia of the IN is sometimes unsuccessful. The reason may well be the duplication of the IN, as seen in these two cases. A literature search revealed no clinical reports on this subject, there were, however, several reports on cadaver skulls and autopsy material. Gruber [4], in 1875, reported that the number of IF varies from one to five. Kadanoff [6], in 1970, found 9% doubled, 0.5% tripled, and 3% with greater than three IF in over 1400 skulls. Berry [2], in 1975, reported accessory IF in skulls from different geographical locations, most being found in Mexicans. As mentioned earlier, a study of 42 skulls stimulated by this clinical finding revealed 2.7% multiple foramina on the right side and 21.4% on the left side. Jordan [5] noted double IN in a female autopsy, besides the true IN running typically in its canal, there was an accessory IN emerging through a short additional canal. In that case additional IN supplied the lacrimal sac, the teeth, and the mucous membrane of the maxillary sinus. However, he did not relate this to the clinical situation. Cesnys [3] found accessory IN 18.59% of 0–10 year-old and 24.42% of 10–20 year-old Lithuanians. Arman and Korman [1] reported three cases with two IFs and two canals in 477 skulls. Leo et al. [8] presented a case of the IN bifurcating in the base of the orbit and subsequently passing through two infraorbital canals and exiting by two distinct foramina. The inferolateral of the two nerves sent twigs to the external nasal surface, the superior portion of the upper lip, and the superior branch sent branches to the external nasal surface. The authors suggested that a patient with such an anatomical