

## Case Report

# Duplicate Infraorbital Nerve - An Uncommon Anatomical Variation

Arash Bahrami<sup>1</sup>, MasoudSaman<sup>2</sup>, and Yadranko Ducic<sup>3\*</sup><sup>1</sup>Department of Otolaryngology-Head and Neck Surgery, Philadelphia College of Osteopathic Medicine, USA<sup>2</sup>Otolaryngology and Facial Plastic Surgery Associates, Saman Center for Facial Plastic Surgery, USA<sup>3</sup>Otolaryngology and Facial Plastic Surgery Associates, John Peter Smith Health Network, USA

## \*Corresponding author

Yadro Ducic, Otolaryngology and Facial Plastic Surgery Associates, John Peter Smith Health Network, 923, Pennsylvania Avenue, Suite 100, Fort Worth, TX 76104, USA, Tel: 817-920-0484; Fax: 817-920-0068; Email: yducic@sbcglobal.net

Submitted: 01 June 2016

Accepted: 13 June 2016

Published: 15 June 2016

## Copyright

© 2016 Ducic et al.

## OPEN ACCESS

## Keywords

- Duplicated infraorbital nerve
- Infraorbital nerve
- Infraorbital foramen
- Mid face surgeries
- Anterior maxillary wall fracture

## Abstract

Infraorbital nerve, a terminal branch of maxillary division of the trigeminal nerve, exits the infraorbital foramen or notch, providing sensory innervations to the skin and soft tissue of the mid face. Adequate knowledge of the location of the nerve and assessment of its function are important in mid face surgeries and reaching optimal local anesthesia. The location of the infraorbital foramen and incidence of accessory infraorbital foramen have been studied and reported in the literature. The duplication of infraorbital nerve, however, is an uncommon occurrence rarely described in the literature. The case presentation here is a patient with a duplicated infraorbital nerve discovered during an operative repair of mid-facial fracture with access gained through gingivo-buccal incision. Both infraorbital foramina were observed to have their own individual neurovascular bundle. The knowledge of this rare incident is imperative for the trauma surgeon to dissect the area carefully during mid facial surgeries in order to avoid iatrogenic injury to the duplicated Infraorbital nerve and also gain sufficient local anesthesia.

## ABBREVIATIONS

ION: Infraorbital Nerve; IOF: Infraorbital Foramen; CT: Computed Tomography

## INTRODUCTION

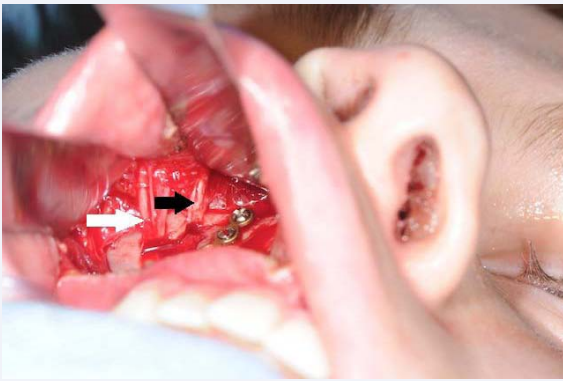
Infraorbital nerve is a terminal branch of the maxillary or second division of trigeminal nerve. Infraorbital nerve (ION), solely a sensory nerve, traverses the inferior orbital fissure into the inferior orbital canal and exits the infraorbital foramen (IOF) or notch providing sensory innervations to the mucous membrane and skin of the mid face such as skin of the upper cheek, maxillary sinus mucosa, the lateral aspect of the nose, and the skin and mucosa of the upper lid [1,2]. Knowledge of the precise location of the IOF and ION in the case of mid face surgery such trauma or orthognathic surgery and local nerve block is crucial to iatrogenic injury and achieve optimal anesthesia [2].

The anatomic location of the infraorbital foramen has been studied with measurements in average distances relative to the surrounding landmarks [3]. The location of the accessory infraorbital foramen has been reported with higher frequency to be either superomedial or medial to the infraorbital foramen

and less frequently inferomedial [4,5]. Reviewing the literature suggests mixed results as to laterality of accessory infraorbital foramen [4,5]. Gingivo-buccal approach to the mid face is commonly used by the facial surgeons. Inadequate knowledge of the surgical anatomy of ION may put this structure at risk of iatrogenic injury. Therefore preoperative assessment of infraorbital nerve function is imperative in the case of mid face surgeries.

## CASE PRESENTATION

A 20 year old male presented with right sided mid face fracture with appreciable depression sustained in altercation. Preoperatively the patient denied any loss of sensation over the distribution of ION. Preoperative imaging was consistent with right anterior maxillary wall non-comminuted minimally displaced fracture, with no other abnormalities noted. Patient was brought to the operating room for routine open reduction and internal fixation of the facial fracture. Access through gingivo-buccal incision provided excellent visualization of the right mid face. At this point two distinct infraorbital foramina each with an independent neurovascular bundle were observed (Figure 1). With great care, the surgical plane was carefully dissected



**Figure 1** This image taken intraoperatively, illustrates the duplicate infraorbital nerve exiting the accessory infraorbital foramen medial to infraorbital nerve exiting the infraorbital foramen. The white arrow points to infraorbital nerve and the black arrow points to duplicate infraorbital nerve.

around both the main and duplicate neurovascular structures to better visualize this uncommon variation and also to prevent any iatrogenic trauma to both structures. The anterior maxillary wall fracture was then carefully and successfully repaired with excellent cosmesis and patient did not complain of any immediate or latent postoperative loss of sensation over the distribution of infraorbital nerve.

## DISCUSSION

Adequate knowledge of neurovascular bundles during facial surgeries is crucial to allow the surgeon to properly dissect and avoid injuries to these structures. Infraorbital nerve has been extensively investigated regarding its location and duplication of its foramen [1,3]. Review of the literature has shown that the location, size, and course of the IOF and ION are variable [1,3]. Previous report of duplicated infraorbital nerve has been described by Kuvat et al., in their study [1]. Interestingly, besides our case report presented above, reviewing the literature shows the case reported by Kuvat et al. to be the only other reported duplication of this neurovasculature, and not only the infraorbital foramen. Therefore, it is unclear what percentage of population has the duplicate infraorbital neurovasculature or what the complications from injury, traumatic or iatrogenic, to this structure are. The presence of a duplicated ION has

important clinical and surgical implications. Prior to surgical intervention, proper review of the imaging such as Facial CT scans can demonstrate duplication of IOF which may carry duplicate infraorbital neurovasculature. Furthermore, inadequate ION block by local anesthesia may be attributed to this rare anatomic variation in some cases. As in our presentation any mid face access such gingivo-buccal, lower lid approach, etc. may put the duplicate ION in inadvertent iatrogenic injury. In cases of iatrogenic injury to the duplicate bundle, the main neurovascular bundle still provides sensory innervations to the mid face. However, if there is severe injury, traumatic or iatrogenic, to the main infraorbital neurovascular bundle and the duplicate bundle, then the patient is at increased risk of loss of sensation to mid face. Also as in any invasive procedure hemorrhage can be a risk well known to the operating surgeon. Knowledge of this duplication of this neurovascular bundle can give an edge to the operating surgeon to decrease risks of both intraoperative blood loss and postoperative bleeding and hematoma.

## ACKNOWLEDGEMENTS

Dr. Bahrami, Dr. Saman, and Dr. Ducic

## CONFLICT OF INTEREST

Dr. Bahrami, Dr. Ducic, Dr. Saman, have no relevant financial interests or any forms of conflict of interest in this publication.

## REFERENCES

1. Kuvat SV, Bozkurt M, Selçuk CT, Kapi E. A rare nerve variation: Duplication of infraorbital nerve. *J Craniofac Surg.* 2013; 24: 694-695.
2. Hu KS, Kwak J, Koh KS, Abe S, Fontaine C, Kim HJ. Topographic distribution area of the infraorbital nerve. *Surg Radiol Anat.* 2007; 29: 383-388.
3. Kazkayasi M, Ergin A, Ersoy M, Bengi O, Tekdemir I, Elhan A. Certain anatomical relations and the precise morphometry of the infraorbital foramen--canal and groove: An anatomical and cephalometric study. *Laryngoscope.* 2001; 111: 609-614.
4. Rai AR, Rai R, Vadgaonkar R, Madhyastha S, Rai RK, Alva D. Anatomical and morphometric analysis of accessory infraorbital foramen. *J Craniofac Surg.* 2013; 24: 2124-2126.
5. Hwang K, Lee SJ, Kim SY, Hwang SW. Frequency of existence, numbers, and location of the accessory infraorbital foramen. *J Craniofac Surg.* 2015; 26: 274-276.

### Cite this article

Wachinou AP, Affolabi D, Iroezindu MO, Agodokpessi G, Ade S, et al. (2016) Tuberculin Skin Test Response in Patients Newly Diagnosed with HIV in Cotonou, Benin: A Cross-Sectional Study. *JSM Trop Med Res* 1(1): 1001.