The Pharma Innovation Journal 2018; 7(6): 219-222

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2018; 7(6): 219-222

www.thepharmajournal.com
Received: 07-04-2018
Accepted: 09-05-2018

O Ya Mokryk
Danylo Halytsky Lviv National Medical University, Oblast, Ukraine

Correspondence
O Ya Mokryk
Danylo Halytsky Lviv National Medical University, Oblast, Ukraine

Improvement of local anesthesia of the buccal region with taking into account the individual anatomical variability of its innervation

O Ya Mokryk

Abstract
The purpose of the study was improvement of local anesthesia of the buccal region, taking into account the individual anatomical features of its innervation, to evaluate its effectiveness in clinical conditions. In clinical observations, 18 planned stationary surgical stomatological patients were implicated, with planned surgical interventions on the cheek area. For the successful local anesthesia of the buccal area, it is necessary to take into account the anatomical variability of the branch on the face of the buccal and zygomaticofacial nerves in patients with different types of skull structure and face shape. Application in clinical conditions of the technique of conductive anesthesia of the zygomaticofacial nerve, developed by us, in combination with the classical method of local anesthesia of the buccal nerve provides painless surgical interventions on the lateral area of the face.

Keywords: The buccal nerve, the zygomaticofacial nerve, the buccal area, the anatomical variability on the face, the local anesthesia

Introduction

Actuality of theme. As you know, sensory innervations of the maxillofacial area (MFA) are quite complicated. In the soft tissues of the face branching the sensory branches of the trigeminal nerve, as well as the cervical superficial nerve plexus (Fig. 1.) [1, 2].

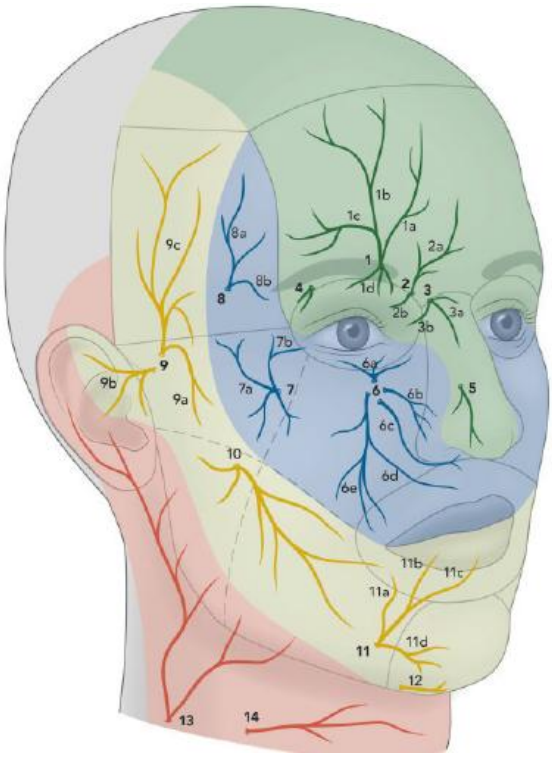

Fig 1: Illustration of the cutaneous, sensory nerves of the face (according to the data of a literary source of Thomas von Arx, *et al*., 2017).

1 - supraorbital nerve, 2 - supratrochlear nerve, 3 - infratrochlear nerve, 4 - palpebral branches of lacrimal nerve, 5 - external nasal branch of anterior ethmoidal nerve, 6 - infraorbital nerve, 7 - zygomaticofacial nerve, 8 - zygomaticotemporal nerve, 9 - auriculotemporal nerve, 10 - long buccal nerve, 11 - mental nerve, 12 - mental branch of mylohyoid nerve, 13 - great auricular nerve, 14 - transverse cervical nerve.

In adjacent anatomical sites, these nerves are anastomosed with each other. The trigeminal nerve with branching on the face has an individual anatomical variability. There are two of its types [3]. In the first type, when the innervation of the face is dominated by the superficial branches of the maxillary nerve, when its branches (zygomaticofacial and infraorbital nerves) are involved in sensitive innervation of the cheek area. The second type on the face is dominated by superficial sensory branches of the mandibular nerve, when its branches (buccal and mental nerves) are involved in sensitive innervation of the cheek area [4]. Here, buccal nerve forms a plexus with the facial nerve, infra-orbital nerve and mental nerve [5 - 7] (Fig. 2.).

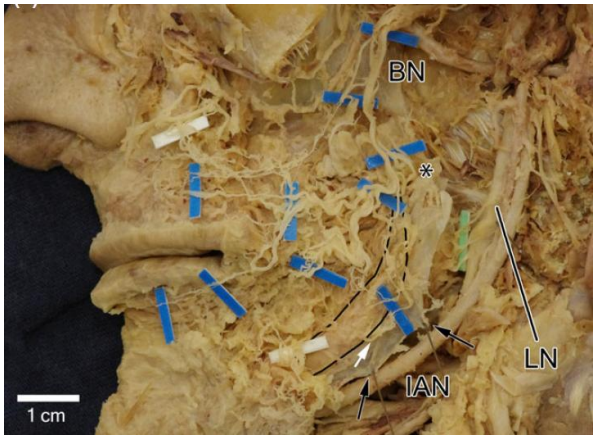

Fig 2: Dissection of the lateral aspect of the cheek and lips in a sample of hemi-head human adult cadavers (according to the data of a literary source of K. Takezawa, *et al*., 2018).

The branches of the buccal nerve (BN - highlighted by blue strips) anastomose with the infraorbital nerve (highlighted by the upper white strip) and with branches of the mental nerve (highlighted by the lower white strip).

The individual variability of innervations of soft tissues of the maxillofacial area should be taken into account in their local anesthesia. In order to anesthetize the of the cheek area, besides the conductive anesthesia of the buccal nerve, we performed a blockade of the zygomaticofacial nerve in accordance with a well-known technique, when the anesthetic was injected at the lower outer edge of the eye orbit [8, 9], where the zygomaticofacial foramen are located, through which from the zygomatic bone go outside the branches of the same name nerve [10]. However, the cheek area were completely anesthetized in 74% of cases. The absence of the necessary anesthetic effect in the remaining cases was, in our opinion, associated with the individual anatomical variability of the branching of the buccal and zygomaticofacial nerves on the face.

As a result of craniometric studies, we detected anatomical variability of the structure of the skull. There is a certain feature of the localization of the zygomaticofacial foramen on the lateral (facial) surface of the zygomatic bone, depending on the type of structure of the skull. In people tha have mesaticephalic zygomaticofacial foramen in most cases are located "chain", congruent to the lower - outer edge of the eye orbit, away from this anatomical formation at 8.2 ± 2.3 mm. In the brachycephalic skulls - most of the zygomaticofacial foramen are centered near the lower - outer edge of the eye orbit, and were at a distance of 9.3 ± 2.7 mm. However, in 33.3% of cases, they were shifted from the eye orbit to the zygomaticotemporal suture and were located at a distance - 14.2 ± 2.3 mm to it (Fig. 3).

Fig 3: The brachycephalic skull. Most of the zygomaticofacial foramen are centered near the lower - outer edge of the eye orbit. One of the zygomaticofacial foramen was shifted from the eye orbit to the zygomaticotemporal suture (results of own research).

Taking into account the results of craniometric studies, we have developed the technique of conductive anesthesia of the branches of the zygomaticofacial nerve, and taking into consideration individual topographic and anatomical features of its branching in people with different types of skull structure.

The purpose of the study: improvement of local anesthesia of the buccal region, taking into account the individual anatomical features of its innervation, to evaluate its effectiveness in clinical conditions.

Methods: In clinical observations, 18 planned stationary surgical stomatological patients were implicated, with planned surgical interventions on the cheek area. For the detection of individual anatomical features of the facial section of the head in patients, the facial index was determined by the Garson`s formula. The cheek area was divided into four quadrants: the upper - front, upper - back, lower - front, lower – back by imaginary, mutually perpendicular lines, carried through its center. Tactile sensitivity was investigated using nylon monofilaments. Pain sensitivity was determined by injection of needle into the epidermis. The assessment of tactile and pain sensitivity was performed on a four-point scale in each quadrant: 0 points - no sensitivity, 1 point - sensitivity is sharply reduced, 2 points - sensitivity is moderately reduced, 3 points - tactile and pain sensitivity completely preserved. In case the localization of pathological processes (benign tumors, keloid scars, fistulas of migrating granulomas) in the buccal region surgical interventions were conducted under local conduction anesthesia of buccal, zygomaticofacial, mental nerves and facial branches of transverse cervical nerve (if necessary). The conductive anesthesia of the buccal nerve was carried out through the skin according to the method of P.M. Yegorov [11] - anesthetic was injected at the anterior edge of the base of the

coronary process of the mandible, where the buccal nerve passes (Fig.3).

Fig 4: Blockade of the buccal nerve according to the method of P. Yegorov

The facial surface of the zygomatic bone resembles an scalene quadrangle, which differs in the form of each person, depending on its type of structure of the skull. Therefore, anatomical landmark point for injection of the needle and anesthetic injection is determined individually in each patient. It is at the intersection of two imaginary lines, which connect the opposite corners of the quadrangle: a vertical, drawn from the zygomaticofrontal suture to the lower corner of the zygomatic bone and the horizontal, made from the zygomaticotemporal suture to the zygomaticomaxillary suture. Zygomaticofacial foramen are within the imaginary ellipse, the center of which is the place of the needle injection (Fig. 5). In people with mesaticephalic and dolichocephalic skulls, a local anesthetic (1.0 ml) is injected after the needle is inserted into a definite anatomical landmark. In brachycephalic skulls (broad-leaved), to block the branches of the zygomaticofacial nerve in the place where they reach the surface of the zygomatic bone, the needle should be directed horizontally 1.0-1.5 cm towards the zygomaticotemporal suture. Anesthesia of facial branches of transverse cervical nerve was conducted along the inferior border of mandible [12].

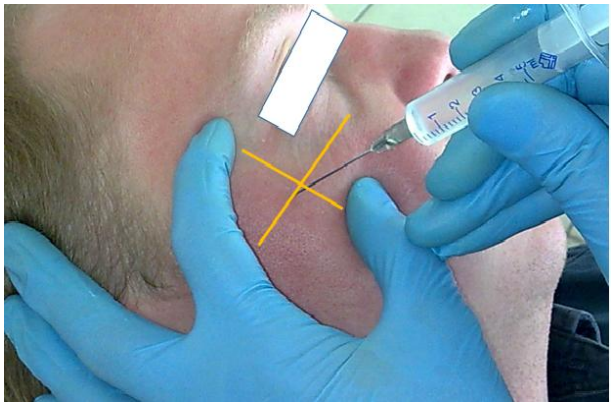

Fig 5: Blockade of the zygomaticofacial nerve according to the method of O. Mokryk

Results of the research

It is established that pathological processes did not influence the sensory function (tactile and pain sensitivity) of the buccal regions in patients before the planned surgical interventions on the lateral facial region.

After the blockade of the buccal nerve in 18 patients, it was found that in 10 patients (in 55.6% of cases), complete buccal anesthesia occurred. In these cases, there was a scattered type of buccal nerve ramifying was found on the face in patients prevailing in leptoprosops. In the 44.4% of cases, of the cheek area were anesthetized only partially (tactile and pain sensitivity - 2,0 ± 0,5 points). After an additional blockade of the branches of the zygomaticofacial nerve, according to the technique developed by us, a complete anesthesia of the above-mentioned topographic anatomical site occurred (tactile sensitivity 0 - 1 points, pain sensitivity - 0 points). In three patients transverse cervical nerve took part in the buccal region innervation. In all cases they were individuals with euriprosopic face shape.

The loss of tactile and pain sensitivity on the skin cover of the buccal region absolutely confirmed the effectiveness of the developed methods of local conduction anesthesia. During surgical treatment the effectiveness of the local anesthetic methods was evaluated as good - it was observed a stable anesthesia, without psychosomatic peculiarities as well as local and general complications, in patients; sometimes weakly expressed affective reactions took place, but they didn't influence the course of the operation.

Conclusion

For the successful local anesthesia of the buccal area, it is necessary to take into account the anatomical variability of the branch on the face of the buccal and zygomaticofacial nerves in patients with different types of skull structure and face shape. Application in clinical conditions of the technique of conductive anesthesia of the zygomaticofacial nerve, developed by us, in combination with the classical method of local anesthesia of the buccal nerve provides painless surgical interventions on the lateral area of the face.

References

1. Siemionow M, Gharb BB, Rampazzo A. The face as a sensory organ. Plast Reconstr Surg. 2011; 127(2):652-662.
2. Thomas von Arx, Ahmed Abdelkarim Z, Scott Lozanoff. The Face-A Neurosensory Perspective. A literature review. Swiss Dental Journal SSO. 2017; 127(5):1066-1075.
3. Zolotareva TV, Toporov GN. Khirurgicheskaya anatomiya golovy. Moskva: Meditsina, 1968, 224.
4. Alves N. Study of descendent course of buccal nerve in adults individuals. Int. J Morphol. 2009: 27(2):295-8.
5. Wongsirichat N, Pairuchvej V, Arunakul S. Area extent anaesthesia from buccal nerve block. Int J Oral Maxillofac Surg. 2011; 40(6):601-4.
6. Yang HM, Won SY, Lee JG, Han SH, Kim HJ, Hu KS. Sihler-stain study of buccal nerve distribution and its clinical implications. Oral Surg Oral Med Oral Pathol Oral Radiol. 2012; 113(7):334-9.
7. Takezawa K, Ghabriel M, Townsend G. The course and distribution of the buccal nerve: clinical relevance in dentistry. Australian Dental Journal. 2018; 63(12):66-71.
8. Joe Niamtu. Cosmetic Facial Surgery. 25th ed. Louis: Mosby, 2010, 784.

9. Gómez-Mayordomo V, Gutiérrez-Viedma Á, Porta-Etessam J, Rubio-Rodríguez C, Cuadrado ML. Zygomaticofacial Neuralgia: A New Cause of Facial Pain. Headache. 2018; 58(3):455-7.
10. Senthil Kumar S, Kesavi D. Incidence and location of zygomaticofacial foramen in adult human skulls. International Journal of Medical Research & Health Sciences. 2014; 3(1):80-83.
11. Yegorov PM. Mestnoye obezbolevaniye v stomatologii. Moskva: Meditsina, 1985, 169.
12. Lin K, Uzbelger Feldman D, Barbe MF. Transverse Cervical Nerve: Implications for Dental Anesthesia. Clinical Anatomy. 2013; 6(8):688-92.