Van Sag Bil Derg
2022;15(3):312-316

Vaka Raporu/Case Report

Total Exploration of Mandibular Nerve to Resolve Facial Asymmetry

Fasiyal Asimetride Mandibular Sinir Total Eksplorasyonu

Besime Ahu KAYNAK[1]*

[1] Toros University, School of Health Science, Department of Health Management, Mersin, TÜRKİYE.
* *Corresponding author*: Besime Ahu KAYNAK; E-mail: ahu.kaynak@toros.edu.tr.

Cited: Kaynak BA. Total exploration of mandibular nerve to resolve facial asymmetry. *Van Sag Bil Derg* **2022**, *15*,(3) 312-316. https://doi.org/10.52976/van-saglik.1030079.
Received date: 29/11/2021
Accepted date: 11/08/2022
Published date: 30/12/2022

ÖZET
Fasiyal asimetri etkilenen kraniyofasiyal yapılara bağlı olarak iskelete bağlı, dental ve fonksiyonel asimetri olarak sınıflandırılabilir. Bazı asimetrik bozukluklar estetik bir problem olmanın yanı sıra ağız-diş ve çene fonksiyonlarını da olumsuz etkileyebilir. Asimetrik yapıların tam lokalizasyonu ve asimetrinin nedeninin ve kapsamının belirlenmesi için çalışma modelleri, yüz yay transferi ve çeşitli görüntüleme prosedürleri gibi diğer teşhis yardımcılarının kullanılması yararlıdır. Nervus Alveolaris Inferior, özellikle ortodontik çene cerrahisinde alt çenenin arka bölgesinde operasyonlar yaparken hekimler için büyük önem taşımaktadır. Asimetrik yapıların tam lokalizasyonu ve asimetrinin nedeninin ve kapsamının belirlenmesi için çalışma modelleri, yüz yay transferi ve çeşitli görüntüleme prosedürleri gibi diğer teşhis yardımcılarının kullanılması yararlıdır.

Anahtar Kelimeler: Fasiyal asimetri, Cerrahi, Alveolar sinir.

ABSTRACT
Depending on the affected craniofacial structures, facial asymmetry can be divided into skeletal, dental and functional asymmetry. Some asymmetrical disorders can, besides being an aesthetic problem, negatively affect mouth-teeth and jaw functions. For the exact localization of the asymmetrical structures and to determine the cause and extent of the asymmetry, it is helpful to use other diagnostic aids such as study models, face bow transfer and various imaging procedures. The Nervus Alveolaris Inferior is of great importance for physicians, especially when performing operations in the posterior region of the lower jaw in orthognathic surgery. For the exact localization of the asymmetrical structures and to determine the cause and extent of the asymmetry, it is helpful to use other diagnostic aids such as study models, face bow transfer and various imaging procedures.

Keywords: Facial asymmetry, surgery, alveolar nerve.

INTRODUCTION

Facial asymmetries, in other words, asymmetries seen in the craniofacial region can adversely affect the psychology of patients (probably for centuries), especially depending on the location and degree of the asymmetry. For this reason, if there is a possible treatment for the current disorder, it is important for the health of the patients (in many respects) that this treatment is applied in the most favorable period. For, some asymmetrical disorders can, besides being an aesthetic problem, negatively affect mouth-teeth and jaw functions.

Depending on the affected craniofacial structures, facial asymmetry can be divided into skeletal, dental and functional asymmetry. Skeletal asymmetry can result from malformations of either one or more bones. Dental factors are mainly recognizable by premature loss of deciduous teeth, congenital missing teeth and certain habits that promote deformation. Functional asymmetry can arise due to deflection of the mandible (lower jaw) due to tooth interference.

For the exact localization of the asymmetrical structures and to determine the cause and extent of the asymmetry, it is helpful to use other diagnostic aids such as study models, face bow transfer and various imaging procedures. This kind of detailed diagnostic records are necessary to optimize a proper treatment plan. The imaging methods mentioned, include three-dimensional computed tomography and three-dimensional photography, which are more recent (Agrawal et al., 2015).

In cases of surgical treatment it is important to diagnose and evaluate all face sizes. Bimaxillary surgery, including Le Fort I osteotomy, bilateral sagittal split ramus osteotomy, and distraction osteogenesis are commonly used for optimal results. Orthognathic surgery can be used in combination with the methods of bone shaping, such as jaw angle reduction, jawline ostectomy, genioplasty and bone augmentation (Choi et al., 2010).

The Nervus Alveolaris Inferior (Ishizaki et al., 2010) is one of great importance for physicians, especially when performing operations in the posterior region of the lower jaw in orthognathic surgery. When planning treatment, the clinical intraoral and extraoral examination of the patient should first be performed with the eye and then with the palpation of the hand. Then, if necessary, radiographic examinations are applied using more than one method, depending on the case. The most preferred techniques are: Panoramic x-rays and CT scans, MR or periapical, occlusal and cephalometric films

In patients with insufficient alveolar bone level and severe mandibular atrophy, it is a preferred and advantageous method to protect and control the neurovascular bundle in the mandibular canal by elevating it laterally with the help of a hook, with the help of fenestration of the alveolar nerve from the buccal surface of the mandible.

Specific contraindications of this technique such as residual bone height - less than 3mm; venule nerve branch, together with thick buccal cortical bone; patients at risk of bleeding and infection; difficult reach to operation area; excessive cortical bone; lack of patient motivation and excessive lingual localization of the mandibular canal have been reported (Güven and Güneş, 2010).

In cases where the facial aesthetics are impaired as a result of skeletal asymmetry and there is no potential for growth and development, treatment is performed with a combination of orthodontic-surgical treatment. In cases of non-severe mandibular laterognathia, the surgical technique SSRO is advantageous as it offers a wider range of motion after osteotomy and a larger bone area during fixation of the segments (Şenişik and Tunçay, 2017).

Case Report

A 33-year-old patient who is non-syndromic and healthy applied to Oral and Maxillofacial (or Plastic surgery) Surgery Clinic because of facial asymmetry (Figure 1). In patient's intraoral examination, missing teeth and occlusion disorder were not observed. In an extraoral examination, facial asymmetry accompanying the lateral transversal destruction and the augmentation of patient's left posterior and lateral face height was observed. In the CBCT examination, 10 mm destruction causing transversal failure and 15-20 mm hypertrophy leading to vertical asymmetry was observed in the left mandibular corpus region in comparison with right mandibular basal corpus. Hypertrophic area in left mandibular corpus region extended from mid-symphyscal area to angle and it was determined that IAN passed through it. In surgery planning, according to the specified measurements, it was planned to fix facial asymmetry as a result of total exploration and protection of IAN from mental foramen to third molar posterior line, the ostectomy of the mandibular basal hypertrophic region and the reshaping of autogenetic block bone obtained from the ostectomy mentioned before and its utilization for lateral transversal augmentation in left mandibular lateral destructive corpus region (Figure 1).

Figure 1. Preoperative clinical image of the patient: (A) anterior side, (B) left side, (C) caudal side; patient has signed consent form and informed about figures

As initial part of procedure, patient has informed about surgery and requested to sign patient consent form. Before surgery, brackets were placed for intermaxillary fixation. Preoperative 1 mg Ceftriaxone

(Nevakson, Mustafa Nevzat AŞ, Turkey) was administered to the patient. In the anaesthetic induction 2microgram /kg fentanyl (Fentanyl Citrate, Abbott Lab. North Chicago, USA), 2,6 di-isopropyl phenol (Propofol 1% Fresenius, Fresenius Kabi, Australia GmbH) and 40 mg lidocaine HCl (Aritmal 2%, Biosel, Turkey), 0,1 mg/kg vecuronium (Norcuron, Organon, Oss. Holland) were administered. When muscle relaxation was observed, nasotracheal intubation of the patient was provided. The anaesthesia was sustained with 50% nitrous oxide, 50% oxygen and sevoflurane (Sevorane, Abbott Lab., North Chicago, USA) corresponding to 2 MAC (minimum alveolar concentration).

2 mg/kg tramadol (Contramal, Abdi İbrahim, Turkey), 10 mg metoclopramide (Metpamid, Sifar, İstanbul-Turkey), 80 mg methylprednisolone ampule (Prednol-L, Mustafa Nevzat, İstanbul-Turkey) were intraoperative-intravenously administered. The lower level of mandible, left ramus posterior limit, pterygomandibular raphe, mental foramen regions were extraorally and intraorally supported by local anaesthesia (4 cc) and (2% articaine with 1:100.000 epinephrine) including haemostatic adrenalin. Intraoral incision was administered from 3-4 mm inferior of keratinize gingiva and 1 cm posterior of 37th tooth level to 44th tooth level. Mucoperiostal flap that can reach to the basis and the lingual of basis between left angle mandible and parasymphyseal regions was removed. IAN was released from mental foramen to the posterior level of 37th tooth by decortication and was made released by being completely protected. During mental nerve dissection, retraction-related myelin sheath damage was observed in mental foramen level. However, nerve was completely protected. And then ostectomy in 15-20 mm height and 60 mm length was carried out in left mandibular basal hypertrophic region. The bleeding was brought under control through hypotensive anaesthesia and atraumatic micro neurosurgery. Block graft piece which was taken was reshaped and fixed to destructive region in left mandibular corpus lateral at 33rd-38th teeth levels for 8-10 mm transversal augmentation. A curvatured semi-round mental nerve pathway substituting for mental foramen in 34th region level was created in the inferolateral level of block bone. Mental nerve was hung by suture to the pathway of mental foramen which was created and it was also preserved. Ideal aesthetic features were provided by contouring the block graft. Thus, new passing line of IAN was transposed to the lower level of mandible. Total release of IAN, mandibular basal hypertrophic bone ostectomy and lateral transversal augmentation process which were carried out synchronously were very successful (Figure 2,3).

Figure 2. Image of bone taken from the lower jaw through ostectomy; patient has signed consent form and informed about figures

Figure 3: Postoperative clinical image of the patient: (A) anterior side, (B) left side, (C) caudal side; patient has signed consent form and informed about figures

Soft tissue surgery region was primarily closed by a 3.0 resorbed suture. After surgery, anaesthetic agent was discontinued and spontaneous respiration remained to come. When the spontaneous respiration came, neuromuscular blocking effect was antagonized and trachea was extubated. Before awakening the patient, the lower level of left mandible was swathed. IV infusion of diclofenac sodium (Dikloron, DEVA, İstanbul-Turkey, 2*1), 8 mg/2 mL dexamethasone (Dekort, Deva, İstanbul-Turkey, 2*1), ampi-

cillin-sulbactam (Ampisid, Mustafa Nevzat, İstanbul-Turkey, 2*1), B complex vitamin (Bemiks, Eczacıbaşı İlaç Sanayi, İstanbul-Turkey, 2*1) was postoperatively started. Dexpanthenol cream (Bepanthene, Roche) was applied to the mouth edge.

Nerve damage of the patient was evaluated through two point discrimination test. There was paraesthesia in postoperative first day control. The patient also had pain in operating area. In postoperative first week, the sutures were removed. Based upon the postoperative paraesthesia, the augmented bone in wound site became exposed as a result of gingival brush trauma. Wound was dressed and remained to be healed secondarily. The patient was seen for wound dressing every other day. Irrigation was made by physiological saline solution and rifamycin sv (Rifocin) during dressings and the region was treated by a pad absorbed 5-Nitro-2-furaldehydesemicarbazone (Furacin). Very rapid healing was observed on the postoperative 20th day and a paraesthesia line remained only in midline of lower lip. Laser biostimulation was started for intraoral osteonecrosis risk elimination. After the Laser Biostimulation therapy applied 5 times (1 stage every 4 days), an improvement in gingival secondary epithelisation was provided up to canine tooth level. On the postoperative 25th day, vascularization considerably increased by biostimulation and gingival migration was progressed.

The bone revascularization was attempted during 1-month control. Although the patient took psychological support as well, upon the patient's request, the augmented bone was removed by a second surgery without waiting the hard and soft tissue healing. At the same stage, wound site was sutured primarily. On the postoperative 7th day, laser therapy was applied in 1 stage. Wound site healing was properly carried out. IAN paraesthesia was completely solved after 4 months.

In conclusion, facial aesthetics was made pleasing without developing permanent paralysis by protecting the IAN.

DISCUSSION

Craniofacial asymmetries have a multifactorial aetiology. They can develop depending upon inheritance or environmental and functional reasons such as mouth breathing, abnormal habits, abnormal posture and pathologic formations. Craniofacial asymmetry may be seen in teeth, skeletal system or soft tissues such as muscles and may develop as a result of the co-exposure of some of these tissues (Rogers et al., 2007).

Ideal physical symmetry in all organisms is rare, if it exists at all. As a result, subtle asymmetries occur in all patients and are considered normal. The point at which the subtle facial asymmetry goes outside the normal range and becomes aberrant/divergent is not easy to pinpoint (Thiesen et al., 2015).

Many researches tried to define the relationship between asymmetrical facial structure and malocclusion (Celikoglu et al., 2010). Significant skeletal asymmetries require a combination of orthodontics, dentofacial orthopedics, and possible future post-growth orthognathic in adolescents. Infection, tumors, and trauma are examples of environmental or acquired etiologies of facial asymmetry. The growth of benign and malignant tumors can distort the dentofacial architecture and deform the dentoalveolar arches and jawbones, resulting in significant facial asymmetries (Thiesen et al., 2015).

Ishizaki et al. stated that there was a significant correlation between the inclination of the occlusion and the transposition of the mandible laterally and that the mandible allowed a functional adjustment by showing a deviation to the side on which the vertical height was lower. In the current case, as a result of the CT analysis, it was determined that the skeletal deformity was not caused by unilateral condyle elongation. Additionally, the occlusal slope was observed as normal. There was a slight rightward deviation in the patient's gonion (Ishizaki et al., 2010)

Although there have been many articles in the literature concerning the lateral exploration of IAN for implant placement, there has not been any publication

on a total exploration of IAN in facial asymmetry correction.

Although this is the first case in literature; after full research of IAN, its permanent protection and resolution of paraesthesia within 4 months, it can be assumed that performing these kinds of treatments for nerve regeneration and neurosensory changes will encourage both patients and operation team. Therefore, this is a rare case report.

CONCLUSION

The things such as providing oral hygiene after surgery and cleaning the oral cavity are important for fighting against infection. Patients should chemically and mechanically provide the operation area cleaning. Moreover, as paraesthesia may develop postoperatively, the fact that patient has low sense in the related region and brushes enough to expose the augmented bone after brushing trauma shows that the recommendations should be stricter and should also increase the number of controls. Routine controls and patient follow-ups are efficient for the success of result obtained.

In conclusion, if ostectomy is required for resolving the mandibular hypertrophy causing facial asymmetry and the fact that IAN passes within the limits of ostectomy is determined, IAN exploration can be easily carried out through post optimality analysis methods. Paraesthesia recovery of IAN can occur within a short time like 4 months. Having provided the ideal aesthetic features, the psychosocial condition of patient can improve to the highest degree.

Conflict of Interest: None to declare.

Funding disclosure: None to declare.

Ethical statement: Informed consent form was signed by the patient for all procedures and for sharing the case in the scientific environment.

REFERENCES

Agrawal M, Agrawal JA, Nanjannawar L, Fulari S, Kagi V. (2015). Dentofacial asymmetries: Challenging diagnosis and treatment planning. *Journal of International Oral Health*, 7(7), 128.

Celikoglu M, Akpinar S, Yavuz I. (2010). The pattern of malocclusion in a sample of orthodontic patients from Turkey. *Medicina Oral, Patología Oral y Cirugía Bucal,* 15(5):e791-796.

Choi JY, Choi JP, Lee YK, Baek SH. (2010). Simultaneous correction of hard-and soft-tissue facial asymmetry: combination of orthognathic surgery and face lift using a resorbable fixation device. *Journal of Craniofacial Surgery*, 21(2), 363-370.

Güven O, Güneş O. (2010). Dental implantolojide Nervus alveolaris inferior'un önemi. *Türkiye Klinikleri Diş Hekimliği Bilimleri Özel Dergisi*, 1(1), 16-22.

Ishizaki K, Suzuki K, Mito T, Tanaka EM, Sato S. (2010). Morphologic, functional, and occlusal characterization of mandibular lateral displacement malocclusion. *American Journal of Orthodontics and Dentofacial Orthopedics*, 137(4), 454.

Rogers GF, Greene AK, Oh AK, Robson C, Mulliken JB. (2007). Zygomaticotemporal synostosis: a rare cause of progressive facial asymmetry. *The Cleft Palate-Craniofacial Journal*, 44(1), 106-111.

Şenışık NEE, Tunçay SÖ. (2017). Fasiyal asimetrinin ortodontik-cerrahi tedavisi: Vaka raporu. *Selcuk Dental Journal*, 4(2), 94-100.

Thiesen G, Gribel BF, Freitas MPM. (2015). Facial asymmetry: a current review. *Dental Press Journal of Orthodontics*, 20, 110-125