MÜNDƏRICAT
Table of Contents

ORIJINAL TƏDQIQAT • ORIGINAL RESEARCH

The Gold Standard Technique for Maxillary Sinus Lift Surgery

Elmar M. Aliyev

Department of Oral and Maxillofacial Surgery, Azerbaijan Medical University, Baku, Azerbaijan

Background. Maxillary sinus floor elevation is one of the most common reconstructive surgical procedures performed on the facial skeleton. This study evaluates an optimized technique for reconstructing the lateral sinus wall using an autogenous connective tissue graft (CTG) as a barrier membrane. **Objective.** To optimize the technique for reconstructing the lateral sinus wall during bone augmentation of the posterior alveolar ridge. **Methods.** Ten patients underwent open sinus floor elevation between 2015 and 2020, with retrospective radiographic analysis. **Results.** All ten procedures were successful, with favorable long-term clinical and radiographic outcomes. **Conclusion.** An autogenous CTG is confirmed as a reliable barrier membrane for bone-window closure in open sinus lift surgery.

Keywords: *maxillary sinus lift, connective tissue graft, barrier membrane, subantral augmentation, dental implant*

1. Background

Maxillary sinus floor elevation is one of the most common reconstructive surgical procedures performed on the facial skeleton. According to international statistics, partial or complete edentulism in the maxillary molar region affects approximately 20% of individuals aged 18 and older. Furthermore, in more than half of cases involving dental implant placement in the posterior maxilla, preliminary subantral augmentation is required [1]. In 1974, Dr. Hilt Tatum proposed the original technique for sinus floor elevation and localized bone grafting [2]. Modern surgical methods aimed at elevating the sinus floor to increase bone volume for implant placement are modifications of this pioneering technique.

One such modification in open sinus floor elevation involves the placement of a barrier membrane to isolate the augmented maxillary sinus from the overlying soft tissues. However, there are conflicting views in the literature regarding this approach. Several specialists consider the use of barrier membranes unnecessary provided that periosteal integrity is maintained. While the periosteum is known to positively influence bone regeneration, it fails to protect against pneumatic pressure within the maxillary sinus, which can potentially displace a portion of the augmented material from the cavity [3].

Consequently, numerous types of barrier membranes have been developed. Among the most widely used are bovine tendon-derived membranes (e.g., Cytoplast RTM Collagen), which are composed of connective tissue rich in collagen fibers. This material offers multiple advantages regarding tissue healing and stabilization. Collagen fibers activate osteoblasts, thereby stimulating osteogenesis. Nevertheless, the primary disadvantages of this material remain its xenogenic origin and high cost [4].

2. Objective

The aim of this study was to optimize the technique for reconstructing the lateral sinus wall during bone augmentation of the posterior alveolar ridge.

3. Materials and Methods

Between 2015 and 2020, maxillary sinus floor elevation procedures were performed, followed by retrospective analysis based on digital orthopantomograms. Prior to the surgery, all patients underwent professional dental cleaning and were instructed to use a preoperative oral rinse. Light intravenous sedation was administered. Following facial antisepsis, the surgical field was isolated using sterile drapes. Local anesthesia was achieved using articaine with epinephrine.

The incision line was placed palatally along the crest of the edentulous posterior alveolar ridge. A vertical releasing incision extending 0.5 cm onto the buccal side was added. In some cases, to improve access to the lateral wall of the maxillary sinus, the crestal incision was connected to a sulcular incision,

extending around the cervical areas of the premolars. A full-thickness mucoperiosteal flap was then elevated. A bone window was created in the lateral wall of the maxillary sinus, and the Schneiderian membrane was carefully elevated, followed by bone augmentation and dental implant placement. In the subsequent stage, the bone window was covered using an autogenous connective tissue graft (CTG) as a barrier membrane [5,6,7].

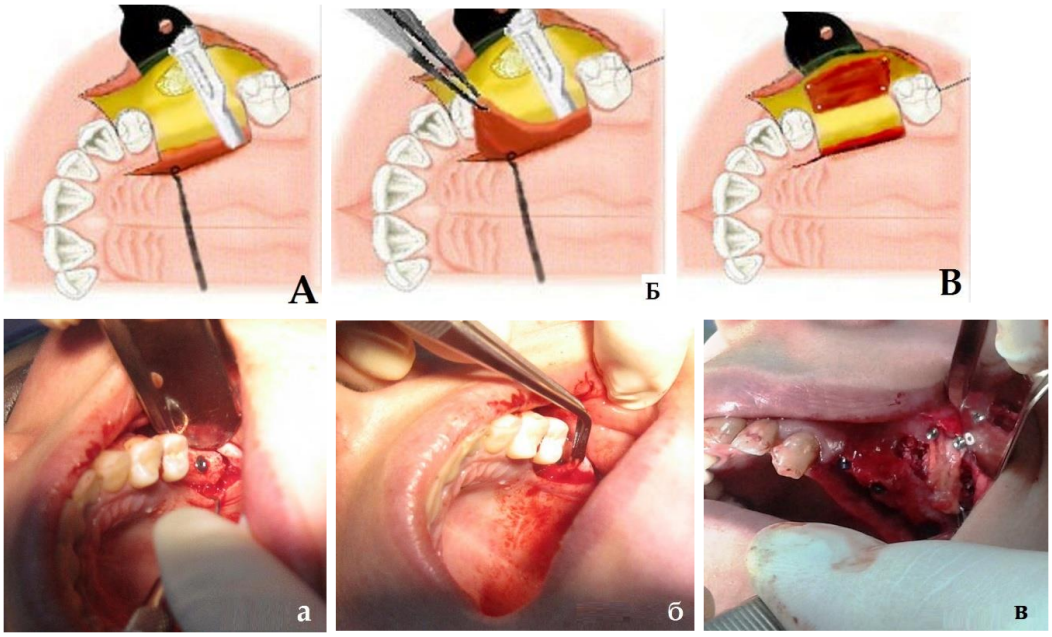


Figure 1. Application of an autogenous connective tissue graft (CTG) as a barrier membrane in open sinus floor elevation. (A, B, C) schematic stages of harvesting the autogenous CTG; (a, b, c) clinical photographs of the CTG placed to cover the bone window in the lateral maxillary sinus wall.

The bone window was measured preoperatively to determine the required size of the connective tissue graft (CTG). An incision was made from the previously incised palatal margin to split the epithelial layer from the underlying connective tissue. Subsequently, a CTG of the appropriate dimension was harvested. Following surgical processing of the CTG, it was fixed to cover the bone window. Stabilization was achieved using either titanium pins or 5-0 monofilament sutures (Monosyn/Monocryl), after preparing micro-holes in the lateral maxillary sinus wall adjacent to the created bone window. The mucoperiosteal flap was then repositioned and secured with a two-layer suturing technique.

4. Results

A total of 10 patients with a mean age of 45 years were operated on. All surgical procedures were performed under intravenous sedation. Digital orthopantomograms (OPGs) were obtained preoperatively and postoperatively. At 5 to 6 months post-surgery, a comparative analysis was conducted to evaluate the remodeling level of the augmented bone grafted with a mixture of xenogeneic and autogenous biomaterials.

Blending of the border between the augmented bone and the maxillary sinus floor was observed. Based on these favorable radiographic outcomes, definitive prosthetic treatment was successfully performed. A retrospective radiographic analysis covering a follow-up period from 2 to 8 years was also conducted. Clinically and radiographically, no regressive changes in soft or hard tissues were observed in any of the patients.

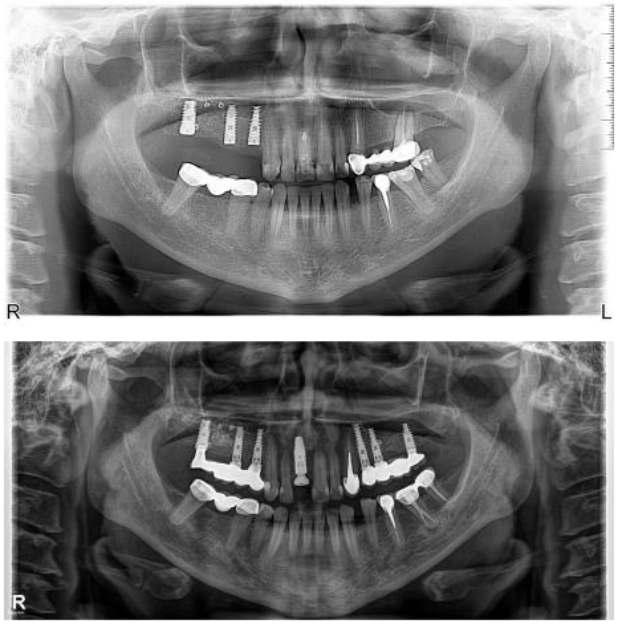


Figure 2. Immediate postoperative view (2015) and follow-up radiograph (2024) demonstrating stable augmented bone volume.

5. Conclusions

A total of ten surgeries were performed using this technique, all yielding successful outcomes. Clinical and radiographic evaluations demonstrated highly favorable long-term results. The proposed technique—involving the harvesting of an autogenous connective tissue graft (CTG) from the hard palate and its subsequent application as a barrier membrane to cover the lateral bone window during maxillary sinus floor elevation—proved to be highly effective. This efficacy is further supported by the data from the 6-month postoperative follow-up of patients treated with this method. In conclusion, the clinical utility of an autogenous CTG as a reliable barrier membrane for bone window closure in open sinus lift surgeries is fully confirmed.

References

1. Tatsumi et al. (2025). Changes in Maxillary Sinus Structure Due to Tooth Loss.
2. Tatum, H. Jr. Maxillary and sinus implant reconstructions. *Dental Clinics of North America*. 1986; 30(2).
3. Lyang M. *Sinus Lift. From Closed Sinus Lift to the Sinus-Implant Stabilizer.* Transl. ed. M.M. Ugrin. Lviv: GalDent; 2008.
4. Grudyanov A.I., Chupakhin P.V. *Guided Tissue Regeneration Technique. Grafting Materials.* Moscow: Medical Information Agency.
5. Edel A. Clinical evaluation of free connective tissue grafts used to increase the width of keratinised gingiva. *J Clin Periodontol.* 1974;1(4).
6. Sato N. *Periodontal Surgery. A Clinical Atlas.* Yuzawa, Japan; 2000. 834 p.
7. Langer B., Calagna L. The subepithelial connective tissue graft. *J Prosthet Dent.* 1980.

KLINIK HAL • CASE REPORT

Extra-Occlusal Correction in the Interdisciplinary Approach to the Treatment of Temporomandibular Joint Dysfunction

Eduard Tsymbalov, MD, PhD, DO; Alexander Kantsepolsky, MD, PhD, DO; Ahu Musayeva, DO

Dental Clinic "Harmony of Occlusion" (Russia); Israeli Osteopathic Medical Association (Israel); Center of Osteopathy and Azerbaijani Traditional Medicine (Azerbaijan)

The diagnosis and management of dysfunctional conditions of the temporomandibular joint (TMJ) represent a clinically relevant interdisciplinary challenge. This case report presents an interdisciplinary protocol in which extra-occlusal osteopathic correction combined with the Proprioceptive–Deep Tendon Reflex (P-DTR) method is applied prior to dental intervention, with objective assessment via computerized occlusal analysis, stabilometry, standardized photography, and the HADS questionnaire.

Keywords: *temporomandibular joint dysfunction, extra-occlusal correction, osteopathy, P-DTR, interdisciplinary approach*

6. Introduction

The diagnosis and management of dysfunctional conditions of the temporomandibular joint (TMJ) represent a clinically relevant interdisciplinary challenge. Traditionally, the most widely employed therapeutic modality for temporomandibular joint dysfunction (TMD) has been dental occlusal correction utilizing intraoral appliances (splints, occlusal guards, and orthotics). Indeed, suboptimal occlusion is well established as a causative factor in the impairment of the stomatognathic system as a whole [1,2]. Concurrently, extra-occlusal influences on the dental occlusion have been substantiated by numerous investigators, who have demonstrated the interrelationship between the stomatognathic system—comprising the TMJ, teeth, gums, masticatory musculature, and occlusion—and the condition of the musculoskeletal system [7], psychoemotional status, chronic stress, and dysregulation of adaptive mechanisms [8]. Studies have indicated that occlusal intervention performed without consideration of systemic processes may precipitate maladaptation [3–5].

In recent years, the interdisciplinary approach to TMD management has become standard practice. The Dental Clinic "Harmony of Occlusion" (Russia), the Clinic of Osteopathy and Rehabilitation "Kanpal-Ezramed" (Israel), and the Center of Osteopathy and Azerbaijani Traditional Medicine (Azerbaijan) have implemented a multidisciplinary protocol for the management of TMD. This protocol incorporates extra-occlusal correction prior to the initiation of dental intervention, with the objective of mitigating excessive strain on adaptive mechanisms. To enhance the adaptive capacity of the organism, we employ extra-occlusal osteopathic correction in combination with the Proprioceptive–Deep Tendon Reflex method (P-DTR). Individualized osteopathic correction is administered across all levels of identified somatic dysfunction (global, regional and local).

6.1 Assessment methods

The efficacy of extra-occlusal correction is assessed through analysis of the following parameters:

1. **Biomechanical (structural) component**, evaluated using: the T-SCAN NOVUS computerized occlusal analysis system (Tekscan, USA); the Stabilan-01-2 stabilometric platform with biofeedback (OKB RITM, Taganrog, Russia), assessing the ELLS parameter (mm^2, area of the stabilokinesiogram) during the Romberg test; and a standardized photographic protocol. Normative values for occlusal balance are within ±5%.
2. **Neurodynamic (psychoviscerosomatic) component**, evaluated using the Hospital Anxiety and Depression Scale (HADS): 0–7 points — normal; 8–10 — subsyndromal; 11–21 — clinically significant anxiety/depression.

Analysis is performed twice: at the initial consultation and following extra-occlusal correction.

7. Case Report

A 25-year-old male patient, Vladislav M., presented with chief complaints of a dull, aching pain in both TMJs elicited by any functional loading.

History of present illness. Two years prior, the patient developed intermittent clicking in the right TMJ during wide mouth opening and sneezing. Subsequent onset of pain in the right TMJ progressively intensified. Computed tomography revealed degenerative changes involving the condylar processes bilaterally. The patient was admitted to a rheumatology department and discharged with a diagnosis of juvenile rheumatoid arthritis of the TMJ.

Past medical and personal history. Head trauma from a stone impact at age 5. Surgical extraction of third molars. Fracture of the fourth metacarpal bone of the left hand; fracture of the left distal radius with displacement. Scar tissue on the index and ring fingers of the left hand, on the right lower leg, and on the anterior right thigh. In 2020, compressive head trauma during a basketball game.

7.1 Primary Diagnostic Assessment

Symptomatology. Cephalgia, vertigo, dental hypersensitivity, bilateral TMJ pain, facial pain, tinnitus, restricted mouth opening, masticatory dysfunction, positional postural disturbances, and thoracic kyphosis.

Objective examination. Forward head posture, facial asymmetry, convex facial profile, and pronounced mentolabial fold. Mouth opening restricted to 30 mm with rightward deflection. The right TMJ demonstrated hypomobility. Reduction in the vertical dimension of the lower facial third was noted.

Figure 1–2. Extraoral and intraoral photographic protocol at the diagnostic stage.

Figure 3–4. CBCT of the head and T-SCAN occlusal analysis.

Intraoral signs of occlusal disharmony. LVI index: reduction in interalveolar height of 8 mm; Class II Angle malocclusion on the right side in the sagittal plane; protrusion of the maxillary central incisors; mandibular incisor crowding with associated attrition; fracture of the incisal edges of the maxillary anterior teeth. Myodynamic imbalance included an infantile swallowing pattern, non-orthotropic tongue posture, impaired hyoid bone mobility, deformation of the Spee curve, and lingual inclination of the teeth.

Cone-Beam Computed Tomography. Rotation of C2, Kimmerle anomaly, degenerative changes of the TMJ, and ossification of the stylohyoid ligaments, predominantly on the left side.

Initial digital occlusal analysis. Premature occlusal contact upon intercuspation in the region of tooth 4.7. At maximum intercuspation, occlusal imbalance was detected with a left-sided predominance of 39.5% / 60.5%.

Initial stabilometric assessment. A 63% improvement in the ELLS parameter of the Romberg test was observed during the habitual dental occlusion trial (65.5 mm^2) compared to the mandibular physiological rest position trial (176.8 mm^2).

Table 1. Diagnostic ELLS values (Romberg test).

Trial	ELLS (mm^2)
Mandibular physiological rest position (1)	176.8
Habitual dental occlusion (1)	65.5

Initial HADS assessment. Anxiety subscale: 8 points (subclinical anxiety); depression subscale: 1 point (normal).

Rapid myofascial system screening. Global osteopathic listening revealed a posterior fascial pull. Neurodynamic manual muscle testing revealed hypertonia associated with an intra-articular dull pain receptor in the cervical region. Inhibition of the cervical region reduced TMJ pain, increased mouth opening amplitude, and altered habitual dental occlusion.

7.2 Clinical Diagnosis

K07.6 — Painful temporomandibular joint dysfunction syndrome. K07.2 — Anomalies of jaw position, distal occlusion (Class II malocclusion). M02.9 — Reactive arthropathy of the TMJ, bilateral. M99.0 — Global neurodynamic disorder.

7.3 Follow-up Diagnostic Assessment

Following extra-occlusal osteopathic correction combined with the P-DTR method, significant changes were observed. The patient reported complete resolution of pain and unrestricted mouth opening. Photographic protocol documented normalization of shoulder level symmetry, correction of head rotation and lateral tilt, and realignment of the abdominal midline.

Follow-up occlusal analysis. The premature occlusal contact shifted in both localization and laterality, now identified in the region of tooth 3.7. Occlusal balance normalized during maximum intercuspation (right 49.2% / left 50.8%).

Table 2. ELLS values before and after extra-occlusal correction.

Trial	ELLS (mm^2)
Rest position — baseline (1)	176.8
Habitual occlusion — baseline (1)	65.5
Rest position — post-correction (2)	138.2
Habitual occlusion — post-correction (2)	55.2

Follow-up HADS assessment. The anxiety subscale score decreased to 5 points (normal range); depression scores remained unchanged.

8. Conclusions

1. Clinical signs of TMD were resolved.
2. The laterality of the premature occlusal contact shifted following intervention.
3. Occlusal balance normalized during the maximum intercuspation trial.
4. Postural alignment and stabilometric parameters improved.
5. Psychoemotional status improved.

9. Discussion

Patients presenting with TMD characteristically exhibit both specific symptoms—restricted mouth opening, involuntary dental clenching, tooth hypersensitivity, and articular noise—and non-specific manifestations such as irritability, insomnia, pain syndromes, and reduced mobility of major joints remote from the TMJ. The formulation of an effective treatment strategy therefore necessitates a comprehensive evaluation of systemic processes. The majority of clinicians favor occlusal therapy—predominantly splint-based treatment—wherein the prognosis is determined only in the course of treatment itself. However, such a narrowly specialized approach is not consistently justified given the comorbid pathology frequently present in this population. In the present case, stabilometric evaluation, digital occlusal analysis, standardized photographic documentation, and the HADS questionnaire collectively enabled objective confirmation of the efficacy of the interdisciplinary approach.

10. Conclusion

Following extra-occlusal correction of somatic dysfunctions, improvements were observed in postural alignment and occlusal balance, normalization of psychoemotional status was achieved, and the specific TMD-associated complaints of pain and restricted mouth opening were resolved. The integration of osteopathic correction and the P-DTR method within an interdisciplinary approach yielded positive clinical outcomes prior to the initiation of orthodontic intervention.

References

1. Dzingutė A. et al. Evaluation of the relationship between the occlusion parameters and symptoms of the temporomandibular joint disorder. *Acta Medica Lituanica.* 2017;24(3):167–175.
2. Mishra S.K., Somkuwar S., Chowdhary R. Occlusion and Temporomandibular Joint Disorders. In: *Temporomandibular Joint Disorders.* Singapore: Springer; 2021. p. 133–143.
3. Kutsevlyak V.I., Bayan A.M. Systematization of etiopathogenetic factors of the development of musculoskeletal dysfunction of the TMJ. *ScienceRise: Medical Science.* 2018;(6):62–67.

4. Carlsson G.E. Dental occlusion: modern concepts and their application in implant prosthodontics. *Odontology.* 2009;97(1):8–17.
5. Mitrirattanakul S., Jariyasakulroj S. Dental treatment as perceived etiology of temporomandibular disorders. *CRANIO.* 2020;38(2):109–114.
6. Milutka Yu.A., Yushmanov I.G., Badmaeva A.N. Possibilities of osteopathic correction in complex therapy of temporomandibular joint dysfunction. *Russian Osteopathic Journal.* 2019;(1–2):43–50.
7. Greenbaum T., Dvir Z., Emodi-Perlman A., et al. Relationship between specific temporomandibular disorders and impaired upper neck performance. *European Journal of Oral Sciences.* 2020;128(4):292–298.
8. Sójka A., Stelcer B., Roy M., Mojs E., Pryliński M. Is there a relationship between psychological factors and TMD? *Brain and Behavior.* 2019;9(9):e01360.
9. Mokhov D.E., Belash V.O. *Methodology of Clinical Osteopathic Examination.* St. Petersburg: NWSMU named after I.I. Mechnikov; 2019. 80 p.
10. Gagey P.-M., Weber B. *Posturology: Regulation and Disorders of Human Body Balance.* St. Petersburg: SPbMAPO; 2008. 316 p.

İCMAL • REVIEW

Anatomical Basis of the Anterior Middle Superior Alveolar Nerves (AMSA)

Agil Huseynov, PhD; Nigar Qasimova, Assist.; Soufia Tavakkolian, Student

Department of Oral and Maxillofacial Surgery, Azerbaijan Medical University, Baku

The Anterior Middle Superior Alveolar (AMSA) injection is a maxillary anesthetic technique designed to provide pulpal anesthesia to multiple maxillary teeth through a single palatal injection. This review examines the anatomical basis of the technique—the trigeminal nerve and its maxillary division, the superior alveolar branches, the superior dental plexus, and palatal innervation—and summarizes the clinical development and application of the AMSA block.

Keywords: *AMSA injection, maxillary anesthesia, superior alveolar nerves, superior dental plexus, palatal innervation*

11. Introduction

The Anterior Middle Superior Alveolar (AMSA) nerve block was introduced in 1998 by Mark J. Friedman and Mark N. Hochman as part of the development of computer-controlled local anesthetic delivery systems in dentistry. The technique emerged during their work on a computer-assisted anesthesia device later commercialized as The Wand [1].

The AMSA injection is a maxillary anesthetic technique designed to provide pulpal anesthesia to multiple maxillary teeth through a single palatal injection. Unlike conventional supraperiosteal infiltrations, the AMSA technique relies on the anatomical relationships among the superior alveolar nerves, the superior dental plexus, and the porous nature of the palatal and maxillary bone [2]. A comprehensive understanding of AMSA anesthesia requires knowledge of the trigeminal nerve, particularly the maxillary division (V2), and its superior alveolar branches: the anterior superior alveolar (ASA), middle superior alveolar (MSA), and posterior superior alveolar (PSA) nerves.

12. The Trigeminal Nerve (Cranial Nerve V)

The trigeminal nerve is the fifth cranial nerve and the principal sensory nerve of the face and oral cavity. It divides into three branches: V1, V2, and V3. The maxillary division (V2) is the branch relevant to AMSA anesthesia because it supplies the maxillary teeth, palate, and surrounding structures [3].

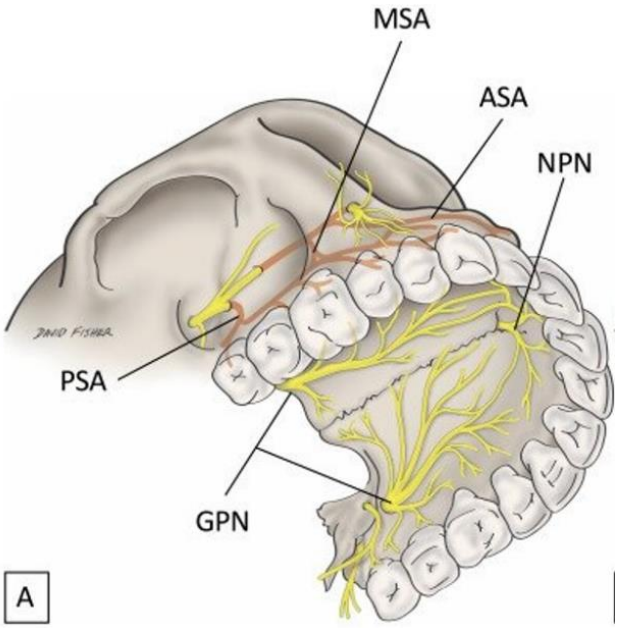


Figure 1. The maxillary division (V2) of the trigeminal nerve and its superior alveolar branches (ASA, MSA, PSA) forming the superior dental plexus.

12.1 The Maxillary Nerve (V2)

The maxillary nerve exits the skull through the foramen rotundum and enters the pterygopalatine fossa, where it gives rise to the posterior superior alveolar (PSA) nerve before continuing anteriorly as the infraorbital nerve. Within the infraorbital canal, the infraorbital nerve gives off the middle superior alveolar (MSA) nerve and the anterior superior alveolar (ASA) nerve [4]. These branches form the superior dental plexus supplying the maxillary dentition [2].

12.2 Middle Superior Alveolar Nerve (MSA)

The MSA nerve is anatomically variable and may be absent in a considerable percentage of individuals. When present, it originates from the infraorbital nerve within the infraorbital canal and descends within the lateral wall of the maxillary sinus toward the premolar region. The MSA commonly innervates the maxillary premolars, the mesiobuccal root of the first molar, associated buccal periodontal tissues, and adjacent sinus mucosa. When absent, its territory is usually supplied by overlapping fibers from the ASA and PSA nerves [2,3].

12.3 Anterior Superior Alveolar Nerve (ASA)

The ASA nerve arises from the infraorbital nerve near the anterior portion of the infraorbital canal and descends inferomedially through a bony canal in the anterior wall of the maxillary sinus. It provides sensory innervation to the maxillary incisors, canines, supporting periodontal structures, associated labial gingiva, and portions of the nasal cavity. Because of its extensive contribution to the superior dental plexus, the ASA nerve plays a central role in AMSA anesthesia [3,4].

13. The Superior Dental Plexus

The superior dental plexus is a network of neural communications formed by the superior alveolar nerves (ASA + MSA + PSA). It is located superior to the apices of the maxillary teeth within the cancellous bone of the maxilla. Through extensive neural overlap, the plexus allows communication among the ASA, MSA, and PSA branches. Clinically, this overlap explains why anesthetic solution deposited at one site may diffuse sufficiently to anesthetize several adjacent teeth. The superior dental plexus constitutes the principal anatomical target of the AMSA injection technique [2].

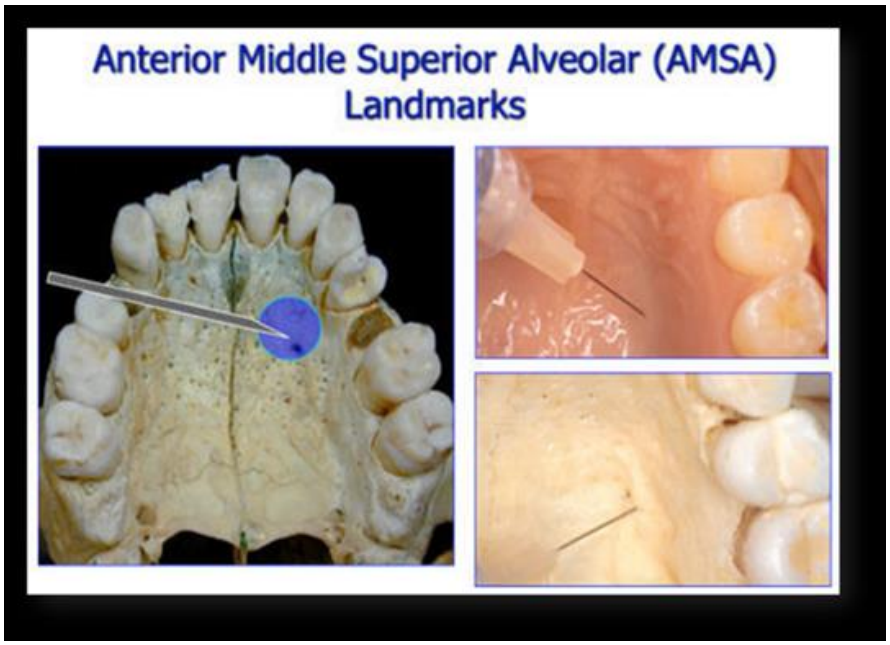


Figure 2. Anterior Middle Superior Alveolar (AMSA) landmarks and the neural overlap of the superior dental plexus within the cancellous bone of the maxilla.

14. Palatal Innervation Relevant to AMSA

The hard palate is primarily supplied by the greater palatine nerve posteriorly and the nasopalatine nerve anteriorly [4]. The greater palatine nerve emerges through the greater palatine foramen and courses anteriorly within the palatal mucosa and submucosa [3]. The AMSA injection site is generally located midway between the midpalatine raphe and the free gingival margin in the premolar region. At this location, the palatal bone contains nutrient canals and relatively porous cancellous bone that facilitate anesthetic diffusion toward the superior dental plexus [2].

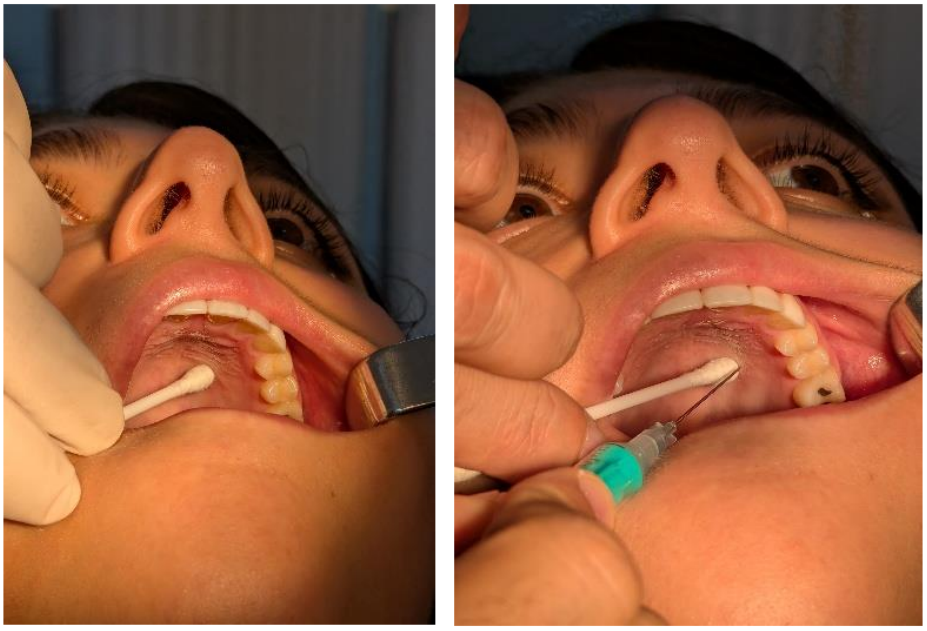


Figure 3. Palatal AMSA injection site — located midway between the midpalatine raphe and the free gingival margin in the premolar region — and its clinical application.

15. Materials and Methods

Friedman and Hochman sought to develop a technique capable of anesthetizing multiple maxillary teeth with a single injection while minimizing facial soft tissue anesthesia. Their investigations coincided with advances in computer-controlled local anesthetic delivery technology, which enabled anesthetic solution to be deposited at a very slow and constant rate. This represented a major departure from conventional syringe injections, especially in palatal tissues, where rapid administration had traditionally been associated with significant pain [1,5].

Through clinical experimentation, they observed that anesthetic deposited into the palatal tissues could diffuse through nutrient canals and porous palatal bone to reach the subneural dental plexus supplying the maxillary teeth [1,6]. The injection site was standardized at a point on the hard palate located approximately midway between the midpalatal suture and the free gingival margin, typically between the maxillary first and second premolars. From this location, anesthetic could diffuse to affect branches of both the ASA and MSA nerves, providing pulpal anesthesia to the maxillary incisors, canines, and premolars, along with associated palatal soft tissues [2,7].

16. Anatomical Basis of the AMSA Injection

The AMSA injection was developed to provide pulpal anesthesia to multiple maxillary teeth through a single palatal injection while minimizing collateral soft tissue anesthesia of the lips and facial muscles [1,8]. The technique relies on diffusion of local anesthetic through the porous palatal bone and nutrient canals into the cancellous bone surrounding the superior dental plexus [2,3,4]. Anesthetic solution is deposited slowly in the palatal mucosa between the maxillary premolars; from this point, it diffuses superiorly and laterally toward the subneural dental plexuses associated with the ASA and MSA nerves (AMSA = ASA + MSA) [2,5]. As a result, the AMSA injection may anesthetize maxillary incisors, canines, premolars, and occasionally the mesiobuccal root of the first molar [1,2]. The degree of anesthesia achieved depends on individual anatomical variations, especially the presence or absence of the MSA nerve and differences in maxillary bone density [2,4,6].

17. Discussion

Initially, the AMSA injection generated considerable discussion within the dental community. Some clinicians reported variable success rates and inconsistent pulpal anesthesia, partly because of anatomical variations in the presence and distribution of the MSA nerve. Some authors debated whether the AMSA should be classified as a true nerve block or as a field block based on anesthetic diffusion through the maxillary dental plexus. Despite these discussions, the technique gradually gained acceptance and became recognized as an important advancement in minimally traumatic and patient-centered dental anesthesia [2,5,6].

18. Results

The AMSA nerve block represented a significant innovation in dental local anesthesia because it introduced the concept of achieving multi-tooth maxillary anesthesia from a single palatal injection while avoiding extensive numbness of the lips and facial musculature. The preservation of facial muscle function was particularly advantageous in cosmetic dentistry, periodontal therapy, and restorative procedures requiring continuous evaluation of the patient's smile and facial esthetics. The technique was formally described in the late 1990s in association with the introduction of computer-controlled anesthetic delivery systems; subsequent developments also led to the description of related palatal injection techniques, including the Palatal Anterior Superior Alveolar (P-ASA) nerve block [1,8].

19. Conclusion

The anterior middle superior alveolar (AMSA) anesthesia technique represents a relatively novel approach to maxillary local anesthesia with encouraging preliminary clinical outcomes. Available evidence suggests that it may offer several advantages over conventional anesthetic techniques in appropriately selected cases, particularly with respect to anesthetic efficacy and patient comfort. Nevertheless, the current literature is limited, and further well-designed randomized controlled trials, larger sample sizes, and long-term clinical evaluations are required to validate its efficacy, safety, and reproducibility. Additionally, increased clinical experience and operator training will be essential for optimizing its application.

References

1. Friedman M.J., Hochman M.N. The AMSA injection: a new concept for local anesthesia of maxillary teeth using a computer-controlled injection system. *Quintessence International.* 1998;29(5):297–303.
2. Malamed S.F. *Handbook of Local Anesthesia.* 7th ed. Elsevier; 2020.
3. Standring S., editor. *Gray's Anatomy: The Anatomical Basis of Clinical Practice.* 42nd ed. Elsevier; 2020.
4. Moore K.L., Dalley A.F., Agur A.M.R. *Clinically Oriented Anatomy.* 8th ed. Wolters Kluwer; 2018.
5. Ahad A. et al. Current status of the anterior middle superior alveolar anesthetic injection for periodontal procedures in the maxilla. *J Dent Anesth Pain Med.* 2019;19(1):1–10.
6. Lee S. et al. Anesthetic efficacy of the anterior middle superior alveolar (AMSA) injection. *Anesthesia Progress.* 2004;51(3):80–89.
7. Velasco I., Soto R. Anterior and middle superior alveolar nerve block for anesthesia of maxillary teeth using conventional syringe. *Dental Research Journal.* 2012;9(5):535–540.
8. Friedman M.J., Hochman M.N. Using AMSA and P-ASA nerve blocks for esthetic restorative dentistry. *General Dentistry.* 2001;49(5):506–511.

ƏDƏBIYYAT İCMALI • LITERATURE REVIEW

Dodaq və Damaq Yarığı Olan Uşaqlarda İnkişaf Problemlərinin Çoxşaxəli Aspektləri: Ədəbiyyat İcmalı

Əhmədov E.T., Qurbanəliyeva Q.İ., Cəfərov M.Ə., Qasımova N.N., Əliyev B.Ş.

ATU-nun ağız və üz-çənə cərrahiyyəsi kafedrası, Bakı

Xülasə. Dodaq və damaq yarığı ən geniş yayılmış anadangəlmə kraniofasial anomaliyalardan biri olub, uşaqlarda müxtəlif funksional və psixososial problemlərə səbəb olur. Bu tədqiqat xarakterli icmalın məqsədi dodaq və damaq yarığı olan uşaqlarda inkişaf problemlərini fiziki, nitq-dil, eşitmə, psixoloji və sosial aspektlər üzrə sistemli şəkildə təhlil etməkdir. Araşdırmalar göstərir ki, erkən diaqnostika və multidissiplinar müdaxilə bu uşaqların inkişaf göstəricilərini əhəmiyyətli dərəcədə yaxşılaşdırır.

Açar sözlər: dodaq və damaq yarığı, inkişafın müxtəlif problemləri, multidissiplinar yanaşma.

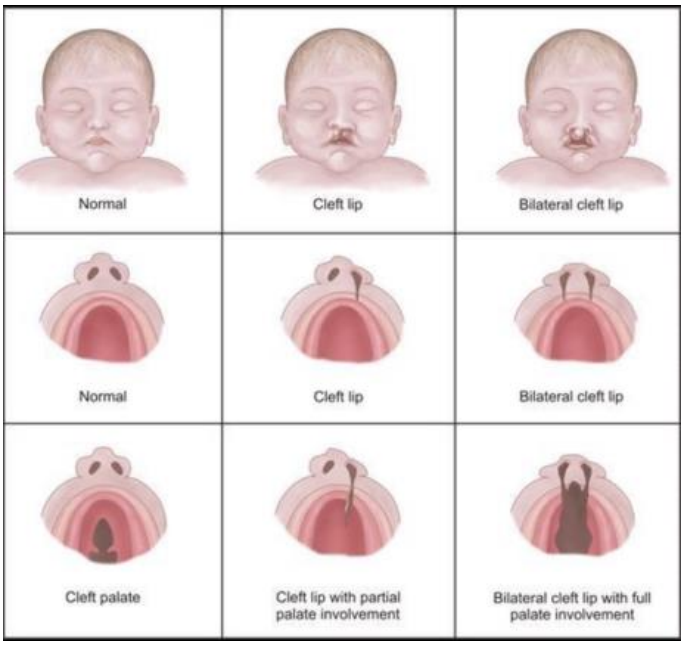
Abstract. Cleft lip and palate represent one of the most prevalent congenital craniofacial anomalies, often associated with a broad spectrum of functional impairments and psychosocial challenges in affected children. The present narrative review aims to systematically examine developmental outcomes across multiple domains, including physical growth, speech and language development, auditory function, psychological well-being, and social integration. Evidence indicates that early diagnosis combined with a coordinated multidisciplinary approach significantly enhances developmental trajectories and overall quality of life.

Keywords: cleft lip and palate, developmental outcomes, multidisciplinary management, pediatric craniofacial anomalies.

20. Giriş

Dodaq və damaq yarığı embrional inkişafın 4–12-ci həftələri arasında üz strukturlarının tam birləşməməsi nəticəsində yaranır (1). Bu anomaliya həm izolyasiya olunmuş, həm də sindrom formasında müşahidə edilə bilər. Qlobal epidemioloji məlumatlara əsasən, dodaq və damaq yarığı hər 700–1000 doğuşdan birində rast gəlinir (12).

Dodaq və damaq yarığı yalnız anatomik qüsur deyil, həm də uşağın ümumi inkişaf trayektoriyasına təsir edən kompleks vəziyyətdir. Bu səbəbdən problemin multidimensional yanaşma ilə öyrənilməsi zəruridir. Anadangəlmə dodaq və damaq yarığı antenatal patologiya strukturunda ikinci yer tutur və üz-çənə nahiyyəsində rast gəlinən xəstəliklər arasında birinci yerdədir. Belə uşaqlarda qidalanma, tənəffüs, nitq kimi həyati funksiyalar pozulur (11). (Şəkil 1)



Şəkil 1. Dodaq və damağ yarığının klinik tipləri və anatomik qüsurun səciyyələndirilməsi.

Anadangəlmə dodaq və damaq yarığı ilə doğulan uşaqların kompleks müalicəsi çətin və çoxmərhələlidir. Belə müalicə yalnız xüsusiləşdirilmiş mərkəzlərdə yüksək dərəcəli mütəxəssislər tərəfindən aparılmalıdır; əsas aparıcı mütəxəssis isə üz-çənə cərrahı olmalıdır. Bu patologiya ilə olan uşaqlar doğuşdan sonra mütləq doğum evlərində üz-çənə cərrahları tərəfindən konsultasiya olunmalıdır (2).

21. Fiziki və tibbi aspektlər

Dodaq və damaq yarığı olan uşaqlarda erkən dövrdə ən çox müşahidə olunan problem qidalanma çətinlikləridir. Damaq defekti səbəbilə oral vakuumun formalaşmaması effektiv əmizdirməni çətinləşdirir (3,11). Bundan əlavə, aşağıdakı tibbi problemlər geniş yayılmışdır:

- orta qulağın iltihabı və orta qulaqda maye yığılması;
- keçirici tip eşitmə itkisi;
- dentofasial anomaliyalar və malokluziyalar.

Cərrahi korreksiya adətən çoxmərhələli olur və uşağın yaşına uyğun planlaşdırılır.

22. Nitq və dil inkişafı

Nitq pozuntuları dodaq və damaq yarığı olan uşaqlarda ən xarakterik inkişaf problemlərindən biridir. Velofaringeal çatışmamazlıq səbəbilə hipernazallıq və artikulyasiya qüsurları müşahidə olunur (4). Dil inkişafındakı gecikmələr əsasən eşitmə problemləri, məhdud fonoloji təcrübə və erkən kommunikasiya çətinlikləri ilə əlaqələndirilir. Loqoped müdaxiləsi erkən yaşlardan başlanmalı və fərdiləşdirilmiş proqram əsasında aparılmalıdır (11). (Şəkil 2)

Şəkil 2. Nitq mexanizmi və velofaringeal funksiyanın sxematik təsviri.

23. Eşitmə və audioloji aspektlər

Dodaq və damaq yarığı olan uşaqlarda Eustachi borusunun disfunksiyası nəticəsində orta qulaq patologiyaları tez-tez rast gəlinir. Bu isə keçirici eşitmə itkisinə səbəb olur (10). Eşitmə itkisi nitq qavrayışına, dil inkişafına və akademik performansa mənfi təsir göstərir. Müntəzəm audioloji monitorinq və lazım gəldikdə timpanostomiya borularının tətbiqi tövsiyə olunur.

24. Psixoloji reabilitasiya və emosional aspektlər

Dodaq və damaq yarığı uşağın özünlüqavrayışına və emosional rifahına təsir göstərən mühüm faktordur. Araşdırmalar göstərir ki, bu uşaqlarda aşağı özünə qiymət, sosial narahatlıq və emosional həssaslıq daha yüksək səviyyədə müşahidə olunur (8). Xüsusilə məktəb dövründə sosial damğalanma-stiqma və bullinq halları psixoloji problemləri dərinləşdirə bilər. Reabilitasiya əməliyyatönü ortodontik, ortopedik və immunoloji hazırlığı birləşdirməli, psixoloji dəstək və uzunmüddətli mütəxəssis müalicəsi ilə təmin olunmalıdır (5,6,8).

Anadangəlmə dodaq və damaq yarığı olan uşaqların valideynlərinə göstərilən psixoterapevtik yardımın da xüsusi əhəmiyyəti vardır; belə yanaşma ailədə olan ümumi gərginliyi aradan qaldırır (7,9). Valideynlər uşaqlarını cəmiyyətdən gizlətmək əvəzinə, onları cəmiyyətin bir fərdi kimi qəbul edərək, çoxmərhələli müalicədə daha aktiv iştirak etməlidirlər.

25. Sosial və təhsil aspektləri

Dodaq və damaq yarığı olan uşaqların intellektual inkişafı adətən norma daxilindədir. Lakin nitq və eşitmə problemləri səbəbilə akademik nailiyyətlərdə geriləmə, oxu və yazı bacarıqlarında çətinlik və sosial inteqrasiyada problemlər müşahidə edilə bilər (6,8). Təhsil mühitində inklüziv yanaşma və fərdi dəstək proqramları bu problemlərin azaldılmasında effektivdir (9).

26. Multidissiplinar yanaşma

Dodaq və damaq yarığının tam müalicəsinin effektiv idarə olunması üçün multidissiplinar komanda yanaşması əsas prinsip hesab olunur. Bu komanda adətən aşağıdakı mütəxəssislərdən ibarət olmalıdır:

- üz-çənə cərrahı və ya plastik-rekonstruktiv cərrah;
- pediatr;
- loqoped;
- otorinolarinqoloq və ya audioloq;
- ortodont;
- psixoloq.

Hərtərəfli koordinasiyalı müdaxilə uşağın həm funksional, həm də psixososial inkişafını optimal-

laşdırır.

27. Nəticə

Dodaq və damaq yarığı uşaqlarda çoxşaxəli inkişaf problemlərinə səbəb olan kompleks vəziyyətdir. Bu problemlər fiziki, nitq-dil, eşitmə və psixososial sahələri əhatə edir. Erkən diaqnostika, vaxtında cərrahi müdaxilə və multidissiplinar reabilitasiya yanaşması uşağın cəmiyyətdə bir fərd kimi qəbul olunmasında və həyat keyfiyyətinin yaxşılaşdırılmasında həlledici rol oynayır.

Ədəbiyyat siyahısı / References

1. Dixon M.J., Marazita M.L., Beaty T.H., Murray J.C. (2011). Cleft lip and palate: Understanding genetic and environmental influences. *Nature Reviews Genetics*, 12(3), 167–178.
2. Sabbagh H.J., Mossey P.A., Innes N.P. (2012). Prevalence of orofacial clefts. *Journal of Craniofacial Surgery*, 23(3), 749–752.
3. Nopoulos P., Berg S., Van Demark D., Richman L., Canady J. (2010). Structural brain abnormalities in children with clefts. *Journal of Pediatrics*, 157(4), 598–604.
4. Collett B.R., Stott-Miller M., Kapp-Simon K.A., Cunningham M.L., Speltz M.L. (2010). Reading outcomes in children with clefts. *Pediatrics*, 126(3), e615–e621.
5. Wehby G.L., Collett B.R., Barron S., Romitti P.A. (2012). Academic achievement in children with oral clefts. *Pediatrics*, 129(3), e615–e622.
6. Bell J.C., Raynes-Greenow C., Turner R.M., Bower C., Nassar N. (2017). School performance in children with clefts. *Pediatrics*, 139(5), e20163401.
7. Stock N.M., Feragen K.B., Rumsey N. (2018). Psychological outcomes in adults with cleft lip and palate. *Journal of Plastic, Reconstructive & Aesthetic Surgery*, 71(6), 870–877.
8. Hunt O., Burden D., Hepper P., Johnston C. (2005). Psychosocial effects of cleft lip and palate: A systematic review. *European Journal of Orthodontics*, 27(3), 274–285.
9. Feragen K.B., Borge A.I., Rumsey N. (2010). Social anxiety in children with clefts. *Journal of Pediatric Psychology*, 35(5), 514–522.
10. Chapman K.L. (2011). Early speech development in children with cleft palate. *Clinical Linguistics & Phonetics*, 25(6–7), 531–543.
11. Kummer A.W. (2014). *Cleft Palate and Craniofacial Anomalies: Effects on Speech and Resonance.* 3rd ed. Cengage Learning.
12. World Health Organization. (2002). *Global Registry and Database on Craniofacial Anomalies.* WHO Press.

ORIJINAL TƏDQIQAT • ORIGINAL RESEARCH

Using Laser Therapy in Endo-Periodontal Lesions

Vusala Mirsahib Bayramova

Doctoral student, Department of Therapeutic Dentistry, Azerbaijan Medical University, Baku, Azerbaijan

The aim of the study was to analyze immune changes associated with the use of a treatment combination in patients with endodontic and periodontal lesions. The study was conducted from 2020 to 2023 at the Department of Therapeutic Dentistry of the Azerbaijan Medical University. Two groups were compared: Group 1 (main, n=20) received diode laser therapy (Picasso Lite, Italy) in addition to standard treatment, and Group 2 (control, n=21) received traditional treatment only. Twelve months after completing basic therapy, statistically significant differences were found in the proinflammatory cytokine TNF-α and immunoglobulin IgA depending on treatment method, with a more pronounced reduction in oral fluid levels in the main group.

Keywords: *endo-periodontal lesions, laser, TNF-α, IgA*

28. Introduction

Endo-perio lesions might be interdependent because of the vascular and anatomic connections between the pulp and the periodontium. Endo-periodontal lesions are complex conditions that involve both the dental pulp (endodontic) and the surrounding periodontal tissues, resulting from infections, trauma, or systemic conditions. Proper diagnosis and a well-coordinated treatment plan addressing both endodontic and periodontal components are essential; early detection and appropriate therapy can significantly improve prognosis, and multidisciplinary care often yields the best results.

The problem of endo-periodontal lesions is highly relevant in modern dentistry [1]. Endodontic and periodontal infections are difficult to distinguish and often share common clinical features, complicating diagnosis [2]. In this regard, laser medicine is considered a promising area. Lasers have become well integrated into clinical dentistry over the past two decades, providing clinical alternatives for the management of both soft and hard tissues [3]. The primary application of lasers in dentistry is periodontal treatment, which reduces inflammation and bleeding and promotes rapid tissue healing [4]. As a non-surgical adjuvant therapy, laser use offers hemostasis, sterilization of periodontal pockets, biostimulation, and reduced morbidity compared with surgical methods [5]. The aim of the study was to analyze immune changes when using a treatment complex in patients with endo-periodontal lesions.

The anatomical and functional commonality of the pulp and periodontium determines a high probability of their joint involvement in the pathological process. Communication routes between the dental pulp and periodontal tissues include dentinal tubules, lateral and additional canals, and the apical foramen [23]. Modern studies have shown that the permeability of intact dentin is insufficient for the exchange of inflammatory mediators between the pulp and periodontal tissues [24]. An important route for infection is the lateral and additional canals, as well as the apical foramen [25,26]: waste products of microorganisms and inflammatory mediators can enter the pulp from a deep periodontal pocket and cause retrograde pulpitis, and vice versa [27].

29. Materials and Methods

The study, conducted from 2020 to 2023 at the Department of Therapeutic Dentistry of the Azerbaijan Medical University, included clinical, instrumental and laboratory stages. Forty-one patients with endo-periodontal lesions, not burdened with somatic pathology, were examined. Radiation diagnostic methods (orthopantomography and intraoral targeted radiographs) were performed in all patients before therapy and 6 and 12 months after completion. The groups were comparable in gender and age composition ($p>0.05$).

Patients were divided into two groups: Group I (main, n=20) received, alongside standard treatment, decontamination of the root canal and laser curettage with a dental diode laser (Picasso Lite); Group II (control, n=21) received standard treatment only. Root canal treatment comprised mechanical expansion with endodontic instruments and antiseptic treatment with 3% sodium hypochlorite and 17% EDTA solution. In the control group, dental deposits were removed with scaling and Gracey

curettes and an ultrasound device (Piezon Master 600, EMS). Statistical analysis used the arithmetic mean (M), the Pearson χ^2 test, and applied statistics programs (Microsoft Excel, Statistica for Windows v. 7.0).

30. Results and Discussion

Before treatment, baseline immune parameters did not differ significantly between groups (p=0.7238). Six months after basic combination therapy, both groups showed positive dynamics, with statistically significant intergroup differences in salivary IgA: the main group decreased to 4.46 ± 0.111 g/L versus 4.82 ± 0.118 g/L in the control group (p=0.0312). At the 12-month final stage, IgA in the main group continued to decrease to 3.43 ± 0.127 g/L, while the control group remained significantly higher at 4.17 ± 0.142 g/L (p=0.0004).

Regarding TNF-α, the reduction was significant at all stages (p=0.0001). At 6 months, control-group values decreased to 15.81 ± 0.418 pg/mL, while the main group reached 12.21 ± 0.629 pg/mL. At 12 months, TNF-α in the study group was also statistically significantly lower than the control group (p=0.0001). A directly proportional relationship was revealed at all stages between the TNF-α and periodontal index (PI), reflecting the intensity of the inflammatory process. The most pronounced positive correlation was found in the study group 6 months after treatment (r=0.38, p=0.0975).

Analyzing the periodontal PMA index, initial values did not differ significantly (p=0.6009). At 12 months, values in the main group were significantly lower than the control group (21.9 ± 0.35 vs 18.6 ± 0.27; p=0.0001). Densitometry indicated a more pronounced favorable condition of the periapical tissues in the main group, with bone density improving from $37.1 \pm 1.77\%$ to $54.2 \pm 1.46\%$ (almost 17%), versus $42.2 \pm 2.48\%$ to $49.1 \pm 2.60\%$ (about 7%) in the control group.

Table 1. Densitometry data before and after treatment in the observation groups.

	Control (n=21)		Main (n=20)	
Parameter	Before, %	After, %	Before, %	After, %
M±m (min–max)	42.2±2.48 (27–69)	49.1±2.60 (33–76)	37.1±1.77 (20–55)	54.2±1.46 (39–64)
p (before vs after)	0.0000		0.0000	
t	8.23		8.24	

The results of the index evaluation showed pronounced anti-inflammatory and bone-tissue-stimulating properties of laser therapy, consistent with earlier clinical studies by Giannelli M. et al., which demonstrated improved periodontal tissue condition and stimulation of reparative processes using a diode laser [29].

31. Conclusion

The method of treatment of endo-periodontal complications with a diode laser significantly reduced the focus of bone tissue destruction in the periapical region and contributed to improved oral hygiene and periodontal tissue condition. The high efficiency of the proposed combined method allows us to recommend it for wide application in practical dentistry. Further studies may assess the effectiveness of a diode laser (Picasso Lite, Italy; wavelength 810 ± 10 nm; average power $\sim$1.2–1.4 W) in the treatment of severe forms of inflammatory-destructive periodontal disease and periapical periodontitis.

References

Redaktor qeydi: orijinal əlyəazmada istinad siyahısının bir hissəsi (epilepsiya, aleksitimiya və psixosomatik xəstəliklərə aid mənbələr) səhvən başqa işdən köçürülmüşdü; aşağıda yalnız mövzuya uyğun mənbələr saxlanılmışdır.

1. Moiseev D.A., Kopetsky I.S., Nikolskaya G.S., et al. The problem of primary infection in endo-periodontal lesions: a systematic review. Vol. 21(2):115–123.
2. Evans M. The endodontic-periodontal juncture: An overview of endo-perio lesions. *Special Issue: Endodontics.* 2023;68(1):56–65.
3. Tzanakakis E.C., Skoulas E., Pepelassi E., Koidis P., Tzoutzas I.G. The Use of Lasers in Dental Materials: A Review. *Materials (Basel).* 2021;14(12):3370.
4. Sachelarie L., Cristea R., Burlui E., Hurjui L.L. Laser Technology in Dentistry: From Clinical

Applications to Future Innovations. *Dent J (Basel).* 2024;12(12):420.

5. Lazăr A.-P., Dinulescu T., Dako T., et al. Laser in periodontology: A review of the fields of applicability and therapeutic effects. *Rom J Oral Rehabil.* 2022;14:108.
6. Caton J.G., Armitage G., Berglundh T., et al. A new classification scheme for periodontal and peri-implant diseases and conditions. *J Periodontol.* 2018;89(Suppl S1):S1–S8.
7. Gautam S., Galgali S.R., Sheethal H.S., Priya N.S. Pulpal changes associated with advanced periodontal disease: A histopathological study. *J Oral Maxillofac Pathol.* 2017;21(1):58–63.
8. Gopal K., Sangram P., Mirna G., et al. Possible Pathways of Disease Communication of the Endo-Perio Lesions and their Management. *Indian J Forens Med Toxicol.* 2020;14(4):8415–8419.
9. Kuoch P., Bonte E. Endoperiodontal Lesions and Chicago's New Classification of Periodontal and Peri-implant Diseases and Conditions. *J Contemp Dent Pract.* 2020;21(7):798–802.
10. Oktawati S., Siswanto H., Mardiana A., et al. Endodontic–periodontic lesion management: A systematic review. *Medicina Clínica Práctica.* 2020;3(1).
11. Tan B., Sun Q., Xiao J., Zhang L., Yan F. Pulp status of teeth in patients with chronic advanced periodontitis. *Int J Clin Exp Pathol.* 2020;13(4):635–641.
12. Aksel H., Serper A. A case series associated with different kinds of endoperio lesions. *J Clin Exp Dent.* 2014;6(1):e91–e95.
13. Dako T., Lazăr A.P., Bica C.I., Lazăr L. Endo-perio lesions: diagnosis and interdisciplinary treatment options. *Acta Stomatologica Marisiensis J.* 2020;3(1):257–261.
14. Ruetters M., Kim T.S., Krisam J., El-Sayed S., ElSayed N. Effect of endodontic treatment on periodontal healing of grade 3 endo-periodontal lesions without root damage. *Clin Oral Invest.* 2021;25:2373–2380.
15. Giannelli M., Formigli L., Bani D. Comparative evaluation of photoablative efficacy of Er:YAG and diode laser for the treatment of gingival hyperpigmentation. *J Periodontol.* 2014;85(4):554–561.

ORIJINAL TƏDQIQAT • ORIGINAL RESEARCH

Method for Optimizing the Restoration of Lower Eyelid Functions Limited by a Postoperative Subciliary Scar

N.N. Gasimova, A.A. Huseynov, G.İ. Gurbanaliyeva, Sh.R. Yusubova

Oral and Maxillofacial Surgery Department, AMU Educational Surgical Clinic

The prevention and correction of postoperative cicatricial deformities and contractures remain challenging problems in plastic and reconstructive surgery. The purpose of this study was to analyze the effectiveness of treatment using Kenalog, various ointments, and myogymnastics of the inferior eyelid muscles in order to improve the outcomes of treatment of fractures of the zygomatic-orbital region performed through a subciliary incision. The study included 87 patients. The method consisted of injecting Kenalog into the scar tissue; findings suggest that Kenalog is effective in restoring inferior eyelid function limited by scar formation and may improve cosmetic and functional outcomes.

Keywords: *subciliary incision, postoperative scar, Kenalog, lower eyelid, zygomatic-orbital fracture*

32. Introduction

Prevention of postoperative scar deformities and contractures, as well as their subsequent correction, is a complex problem in plastic and reconstructive surgery. In the face and neck region, where scars occur most frequently—in 87% of the total number of observations—they cause not only functional but also pronounced aesthetic defects. This leads to psychological disturbances in the patient. Rehabilitation of patients with scar deformities and contractures must solve two tasks: elimination of the contracture and restoration of a full skin covering.

In recent years, a significant increase has been noted in the frequency of fractures of the facial bones and, in particular, of the zygomatic-orbital complex, largely due to increases in road-traffic, occupational, domestic, and sports injuries. When providing first aid, the surgeon must perform primary wound treatment, apply plastic sutures, and ensure that the soft tissues of the zygomatic-orbital region and the lower eyelid assume an anatomically correct position, which prevents the formation of a scar band. Data on the frequency of zygomatic bone fractures are contradictory; these injuries account for 4.3% to 25% of all facial bone fractures and 67–71% of fractures of the middle facial zone [1].

In most cases, the subciliary approach is used, which provides a good view of the defect area and allows adequate fixation of bone fragments. When a subciliary incision is made, the skin, thin subcutaneous tissue, and muscle tissue are dissected; layer-by-layer suturing with appropriate suture sizes and avoidance of linear incisions are important. Normotrophic scars form during uncomplicated healing—inconspicuous, soft-elastic formations that do not cause functional or aesthetic defects. However, quite often, as a complication, a scar band forms that limits movement of the lower eyelid [7,8].

Objective. To improve the results of treatment of fractures of the zygomatic-orbital region through a subciliary incision by reducing the time required to restore lower eyelid function during treatment of a postoperative subciliary scar using Kenalog, various ointments, and myogymnastics of the lower eyelid muscles.

33. Materials and Methods

The studies were conducted in 87 patients who presented with fractures of the zygomatic-orbital complex (68 men and 19 women), aged 20 to 50 years. The method is based on acting on scar tissues in the operative field for early restoration of eyelid function. For this purpose, we propose injecting Kenalog into the scar tissues, beginning three weeks after suture removal.

The Kenalog injection procedure is performed under aseptic and antiseptic conditions. The intervention area is treated 2–3 times with 96% alcohol or furacilin. Because Kenalog is a crystalline suspension, the ampoule must be shaken thoroughly before opening; the contents should be close to body temperature to reduce pain. Kenalog is administered at a dose of 1 mg of active substance diluted with 2% novocaine solution or 1% lidocaine (or physiological saline in cases of anesthetic

intolerance). Injections are performed with an insulin syringe; 3–4 punctures are made along the scar line, and the solution is injected slowly. Uniform blanching of the scar indicates sufficient infiltration. Depending on drug effectiveness, the course includes one to three injections at intervals of 3–4 weeks, with simultaneous myogymnastics. Follow-up examinations were performed at 6 months and 1 year, including clinical, photometric, radiological, computed tomography, myographic, and anthropometric methods.

Fig. 1–2. Clinical documentation of the postoperative subciliary scar and restoration of lower eyelid function.

34. Results and Discussion

The quality of scarring processes is influenced by the thoroughness of approximation of the wound edges. The steroid drug Kenalog has a pronounced anti-inflammatory and antiallergic effect and activates collagenase activity, thereby slowing the formation of collagen fibers. If only ointments and myogymnastics are used, the treatment period is about 6–8 months. With Kenalog, partial restoration of functions occurs 1 month after the start of treatment, and full restoration occurs after 2–3 months. These data were confirmed by myographic studies.

The best-known current methods for treating pathological scars include local use of lidase (injections, electrophoresis or phonophoresis); pyrogenal injections; Contractubex ointment; terrilytin electrophoresis; Bucky rays; mechanical crushing of scars; cryodestruction; phosphorus applications; and curiosin. Such a variety of conservative methods, used separately or in combination, does not lead to complete disappearance of pathological conditions of the integumentary tissues.

In 2005, E.V. Chuguy used a complex of therapeutic cryoexposure technologies with porous titanium nickelide applicators, showing that cryoexposure on a forming scar from the second week up to 1 year promotes replacement of destroyed tissue with delicate connective tissue and helps avoid pathological scars [2]. In 2008, S.V. Bondarev used collagenase preparations, finding that administration into skin scars destroys excess collagen [3]. In 2009, T.N. Karpova performed electro- and ultraphonophoresis of Fermencol, concluding that it causes scars to transition from hypertrophic to normotrophic [4]. In 2005, Saray Y. and Güleç A.T. studied intralesional bleomycin for keloid and hypertrophic scars (14 patients, 15 scars): complete flattening occurred in 73.3% of cases with no recurrence [6]. In 2006, Stewart C.E. 4th and Kim J.Y. proposed a combined method of surgical excision with subsequent mitomycin-C administration (10 patients with head/neck keloids), reporting treatment success in 90% of patients [5].

35. Conclusions

The conducted study allows us to recommend the use of Kenalog for the restoration of eyelid functions limited by a postoperative subciliary scar, in order to improve the cosmetic and functional results of operations performed using a subciliary incision.

References

1. Monstrey S., Middelkoop E., Vranckx J.J., et al. Updated Scar Management Practical Guidelines: Non-invasive and invasive measures. *J Plast Reconstr Aesthet Surg.* 2014;67:1017–1025.
2. Chugui E.V. *Cryotherapy of Skin Scars.* PhD abstract, Moscow; 2005.

3. Toro D., Dedhia R., Tollefson T.T. Advances in scar management. *Curr Opin Otolaryngol Head Neck Surg.* 2016;24:322–329.

4. Karpova T.N. *Electro- and Ultraphonophoresis of Fermencol in the Correction of Skin Scars.* PhD abstract, St. Petersburg; 2009.

5. Stewart C.E. 4th, Kim J.Y. Application of mitomycin-C for head and neck keloids. *Otolaryngol Head Neck Surg.* 2006;135(6):946–950.

6. Saray Y., Güleç A.T. Treatment of keloids and hypertrophic scars with dermojet injections of bleomycin: a preliminary study. *Int J Dermatol.* 2005;44(9):777–784.

7. Gold M.H., McGuire M., Mustoe T.A., et al. Updated international clinical recommendations on scar management: Part 2. *Dermatol Surg.* 2014;40:825–831.

8. Jiang Z., Liao X.C., Liu M.Z., et al. Efficacy and Safety of Intralesional Triamcinolone Versus Combination of Triamcinolone with 5-Fluorouracil in the Treatment of Keloids and Hypertrophic Scars: A Systematic Review and Meta-analysis. *Aesthetic Plast Surg.* 2020;44:1859–1868.

İCMAL • REVIEW

The Roles of Suture Materials and Suturing Techniques in Periodontal Surgery

Agil Huseynov, PhD; Nigar Gasimova, Assist.; Gizxanim Qurbanaliyeva, Assist.

Department of Oral and Maxillofacial Surgery / Periodontology

In periodontal surgery, the ultimate goal of any soft-tissue manipulation is to achieve stable, tension-free wound closure. Because dental surgeons must adapt highly delicate, vascularized soft tissue onto varying hard surfaces, the choice of suturing materials and techniques directly dictates the success of primary-intention healing. This review summarizes essential periodontal suturing techniques, suture materials (absorbable and non-absorbable), sizing and needle selection, and the fundamental rules for flap apposition.

Keywords: *periodontal surgery, suturing techniques, suture materials, flap apposition, wound closure*

36. Introduction

In periodontal surgery, the ultimate goal of any soft-tissue manipulation is to achieve stable, tension-free wound closure (Davis, 2023). Because dental surgeons must adapt and stabilize highly delicate, vascularized soft tissue onto varying hard surfaces—such as bone, cementum, and titanium implants—the choice of suturing materials and techniques directly dictates the success of primary-intention healing (Davis, 2023; Silverstein, n.d.). Inadequate flap management or incorrect suture choice allows blood and serum to pool beneath the tissue, creating dead spaces that separate the flap from the underlying bone, delaying healing and increasing the risk of infection or bone loss.

Periodontal surgery corrects anatomical, traumatic, or developmental defects in the periodontal area (alveolar bone, gingiva) and comprises several sophisticated procedures, including frenectomy, soft-tissue grafting, mucogingival surgery, and osseous surgery. Surgical methods are among the modalities for treating periodontal disease; after surgical treatment of periodontal tissues and alveolar bone, it is necessary to close the surgical field or reposition the formed flap. The selection of a suturing technique depends on whether the surgical flaps must be repositioned to their original height, displaced apically or coronally, or stabilized across multiple teeth.

37. Essential Periodontal Suturing Techniques

37.1 Interrupted Sutures

The simple interrupted suture is the baseline standard for closing isolated, clean incisions. Each stitch is placed and tied independently. While highly dependable—because the failure of one knot will not compromise the entire surgical line—placing multiple individual knots is time-consuming and can unevenly distribute tension across a long incision.

37.2 Continuous Sling Sutures

When surgical flaps span multiple teeth, a continuous sling technique utilizes the stable necks of the teeth as anchor points to pull and adapt the soft tissue tightly against the bone. *Advantages:* it minimizes the total number of knots, distributes forces evenly, and permits independent tension adjustment of the buccal and lingual flaps. *Disadvantages:* it requires a high degree of clinician dexterity, and if the suture thread snaps or a knot unravels at any point, the entire flap can lose stability.

37.3 Mattress Sutures (Horizontal and Vertical)

Mattress techniques are highly specialized for structural tension management and eversion. The *horizontal mattress* spans a wide horizontal area, ideal for adapting flaps tightly against interproximal spaces or resisting heavy muscle pull. The *vertical mattress* penetrates the tissue at two different depths, acting as a powerful tool for lifting or coronally advancing a tissue flap while ensuring precise edge-to-edge alignment of the outermost margins.

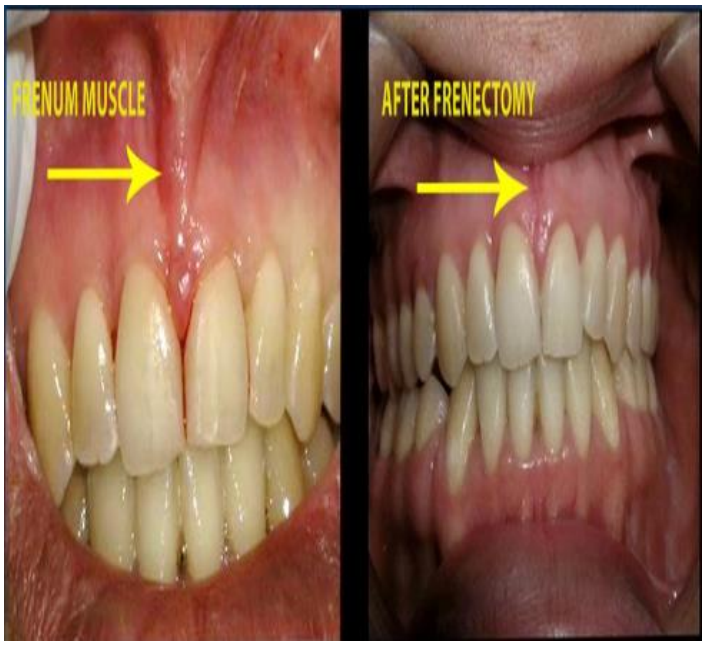


Figure 1. Interrupted and continuous sling suturing techniques used to adapt periodontal flaps against the underlying bone.

Figure 2. Horizontal and vertical mattress sutures for structural tension management and tissue eversion.

38. Suture Materials

38.1 Absorbable Sutures

Absorbable sutures are indicated for rapidly healing intraoral tissues or when postoperative removal would stress a delicate site. *Natural absorbables* (plain and chromic gut), derived from sheep or beef intestines, are broken down by proteolytic enzyme digestion; plain gut loses tensile strength within 24–48 hours, while chromic gut extends it to 5–7 days, though natural origin causes notable tissue reactivity and stiff handling. *Synthetic absorbables* (PGA and Polyglactin 910/Vicryl) degrade via predictable hydrolysis, independent of intraoral pH, and resist muscle pull over 14–28 days; being braided, they offer excellent handling and knot security but can exhibit a wicking effect.

38.2 Non-Absorbable Suture Materials

Non-absorbable sutures are constructed from inert materials and must be manually removed, typically 7–10 days post-surgery. *Surgical silk*, historically the gold standard due to its low cost and knot security, has a braided structure that acts as a capillary wick for saliva, plaque, and bacteria. *Synthetic monofilaments* (nylon and polypropylene) eliminate the wicking effect and provide high tensile strength with minimal tissue reaction, but have high memory, requiring extra throws. *Expanded polytetrafluoroethylene (e-PTFE)* is an inert monofilament widely preferred in guided tissue regeneration, bone grafting, and implant therapy; it causes virtually zero tissue irritation but has a higher cost and lower knot security than silk.

Figure 3. Suture materials, needle curvature (3/8 circle) and correct flap apposition for tension-free wound closure.

39. Suture Sizing and Needle Selection

The United States Pharmacopeia (USP) system measures suture thickness, where adding zeros indicates a progressively smaller diameter. **3-0:** thick, heavy-gauge thread for high-tension areas or initial mattress anchors over broad edentulous areas. **4-0:** the general workhorse diameter for standard periodontal mucoperiosteal flaps and routine implant closures. **5-0 to 6-0:** ultra-fine diameters for periodontal plastic surgery, mucogingival esthetic procedures, and micro-surgical free grafts. Periodontal needles are manufactured from corrosion-resistant stainless steel alloys containing at least 12% chromium; a 3/8 circle curvature is standard, offering optimal rotational clearance in the limited access of the oral cavity.

40. Materials and Methods: Fundamental Rules for Flap Apposition

The biological key to predictable healing is maintaining macro-stability without choking the micro-circulation of the soft tissue.

1. **Perpendicular penetration.** Always drive the needle into the soft tissue at a strict 90-degree angle to the surface; oblique passes create a thin, compromised margin that tears under tension.
2. **Symmetrical suture bites.** The distance from the entrance to the incision line must equal the distance from the incision line to the exit; bite depth should ideally measure 1.5 times the tissue thickness.
3. **Layer-to-layer alignment.** Adapt periosteum to periosteum and epithelial margins to epithelial margins; misaligning layers leads to secondary-intention healing and heavier scarring.
4. **Tension-free knotting.** Pull the thread just tightly enough for passive adaptation; the tissue must never blanch, as excessive tension causes ischemia, marginal necrosis, and flap failure.

Suture properties. *Tension strength* is the weight required to break the thread and must be evaluated in wet sutures. For absorbable threads, *biological strength* is the period during which the thread retains 10–20% of its original strength in the body. *Knot strength*—the least reliable component—requires at least three throws with 3 mm ends, and additional throws for smoother monofilaments. *Capillarity* (fluid distribution along the length) is absent in monofilaments but variable in multifilaments; coating braided sutures with Teflon, silicone, or paraffin can reduce it. *Elasticity* allows the material to stretch with swelling and return to its original length. *Tissue reaction*: as a foreign body, suture material may interfere with healing; polyglecaprone-25 shows positive effects on wound healing compared with silk, which elicits a more intense inflammatory response.

41. Results

Suturing techniques are related to flap design. In regenerative surgeries, a monofilament, 5-0 diameter suture on a reverse-cutting, 3/8 circle needle was preferred; the same was favored for mucogingival surgery. Four important properties common to all suture materials are: (1) the intensity of the inflammatory response evoked; (2) behavior in the presence of infection; (3) durability; and (4) handling ability. During wound healing, leukocyte migration causes tissue swelling; therefore the final knot should not be tied too tightly, leaving free space so the sutures do not cut through the swelling tissue.

42. Conclusion

In regenerative surgeries, a monofilament, 5-0 diameter suture on a reverse-cutting, 3/8 circle needle was preferred, as it was for mucogingival surgery. Polypropylene (PP) showed the highest mechanical properties compared with polyglactin (PG) and silk (SL); within the limitations of this study, PP is the best suture material for wound closure after oral and periodontal surgical procedures, followed by PG and SL respectively. Tissue reactions to suture materials may vary depending on the surface properties and bacterial adherence of the material.

References

1. Davis B. (2023). *Oral surgery suturing.* StatPearls.
2. Koyuncuoglu C.Z., Metin S., Varyola A. (2019). Preference of suture specifications in selected periodontal and implant surgeries in Turkey. *Journal of Indian Society of Periodontology.*
3. periobasics.com. (2020). *Sutures and suturing techniques.*
4. Pocket Dentistry. (2022). *Suturing techniques.*
5. Silverstein L.H. (n.d.). *A review of dental suturing for optimal soft-tissue management.*

ORIJINAL TƏDQIQAT • ORIGINAL RESEARCH

Açıq Sinus Liftinq Proseduru: Cərrahi Texnika, Klinik Nəticələr və Fəsadların Qiymətləndirilməsi

Dos. F.İ. Həsənov, E.M. Abbasov

Azərbaycan Tıbb Universiteti, Stomatologiya fakültəsi, Ağız və Üz-çənə Cərrahiyyəsi kafedrası; ATU Tədris Cərrahiyyə Klinikası — Tədqiqat bazası: "Red Dental" Klinikası

Giriş: Üst çənədə posterior nahiyədə sümük atrofiyası (dişlər çəkildikdən sonra) və haymor boşluğunun pnevmatizasiyası dental implantasiya üçün əsas maneədir. **Obyektiv:** Tədqiqatın məqsədi açıq sinus liftinq əməliyyatlarının bir və iki mərhələli yanaşmalarda klinik effektivliyini müqayisəli təhlil etməkdir. **Metodlar:** Tədqiqatda 72 xəstə iştirak etmiş və lateral pəncərə (PIEZO cərrahi alətləri) vasitəsilə sinus membranı qaldırılmışdır. **Nəticələr:** Bir mərhələli yanaşmada 96%, iki mərhələli yanaşmada isə 95.2% implant uğuru qeydə alınmışdır. **Yekun:** Müasir cərrahi metodlar posterior maksillada sinus əməliyyatlarının rahat aparılması üçün yüksək proqnozlaşdırıla bilən nəticələr verir.

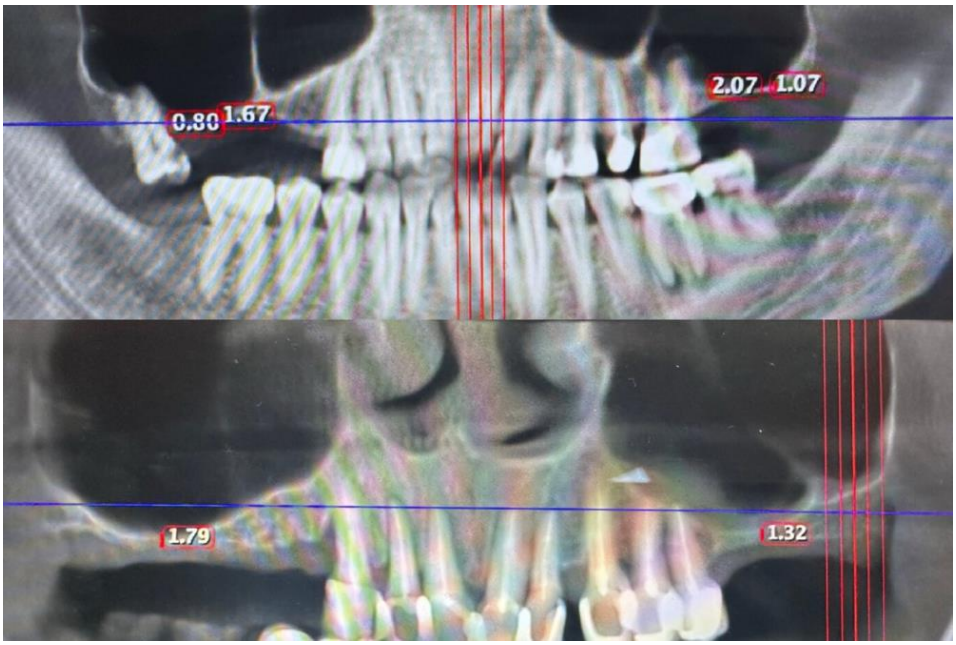
Keywords: *açıq sinus liftinq, dental implantasiya, lateral pəncərə, ksenoqreft, PRF membran*

43. Giriş (Introduction)

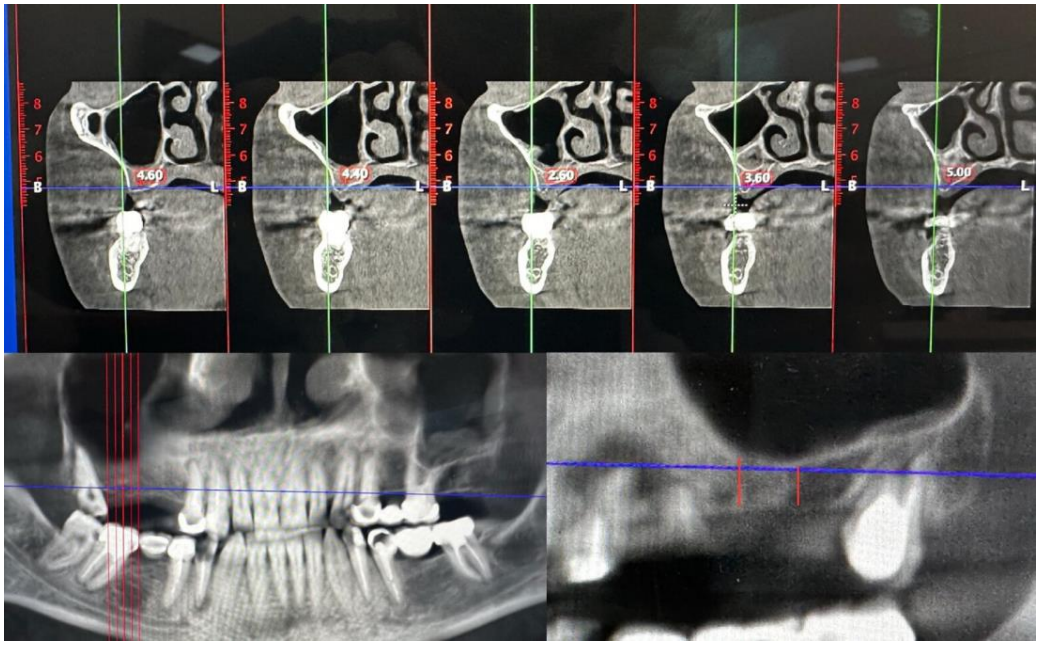
Diş implantasiyası müasir stomatologiyanın ən geniş yayılan prosedurlarından biridir. Lakin yuxarı çənədə sümük toxumasının həcmi müxtəlif səbəblərdən azala bilər — haymor boşluğunun quruluşu və dişlərin çəkilməsindən sonra yaranan sümük atrofiyası buna misaldır; bu zaman implantasiya üçün çətinlik yaranır. Belə hallarda sinus liftinq (sinus qaldırma) əməliyyatı tətbiq olunur — az sümük itkisində qapalı, daha çox sümük itkisində açıq sinus qaldırma üsulu istifadə edilir. Bizim tədqiqatımız açıq sinus liftinq metodunu öyrənməyə həsr olunmuşdur.

Sinus liftinq prosedurunda xəstədən əldə edilən autoqreft və ya sümük biomateriallarından istifadə olunur. Xüsusilə heyvan mənşəli (ksenoqreft) sümük qreftləri təbii sümük toxumasının regenerasiyasını dəstəkləmək üçün geniş tətbiq edilir. Həmçinin xəstələrdən əldə edilən qan plazmasından PRF membran kimi istifadə olunmuş, bəzən həkimin qərarından asılı olaraq süni kollagen membranlar və ksenoqreft sümük qrefti istifadə edilmişdir.

Açıq sinus liftinq metodunun bir mərhələli və iki mərhələli yanaşmalarla icrası mümkündür. Seçilən yanaşma xəstənin sümük qalınlığından və ümumi sağlamlıq göstəricilərindən asılı olaraq dəyişir. Bir mərhələli prosedurda, əgər 2–5 mm sümük qalınlığı olarsa, implantlar sinus liftinqlə eyni əməliyyat çərçivəsində yerləşdirilir. 1–2 mm sümük qalınlığı olduqda isə iki mərhələli prosedurda sinus qaldırma əməliyyatı tamamlandıqdan sonra müəyyən bərpa müddəti (6–8 ay) keçərək implantlar yerləşdirilir.



Şəkil 1. Preoperativ sümük qalınlığının CBCT üzrə ölçülməsi.



Şəkil 2. Müxtəlif kəsiklərdə aparılan CBCT analizi.

44. Material və Metodlar (Materials and Methods)

44.1 Tədqiqatın strukturlaşdırılması

Tədqiqat 2023–2026-cı illər ərzində həyata keçirilmiş prospektiv klinik araşdırmadır. Tədqiqat qrupuna 28–70 yaş aralığında olan, müxtəlif dərəcəli sümük atrofiyasından əziyyət çəkən 72 pasiyent daxil edilmişdir. Pasiyentlərin 40-ı qadın, 32-si isə kişidir.

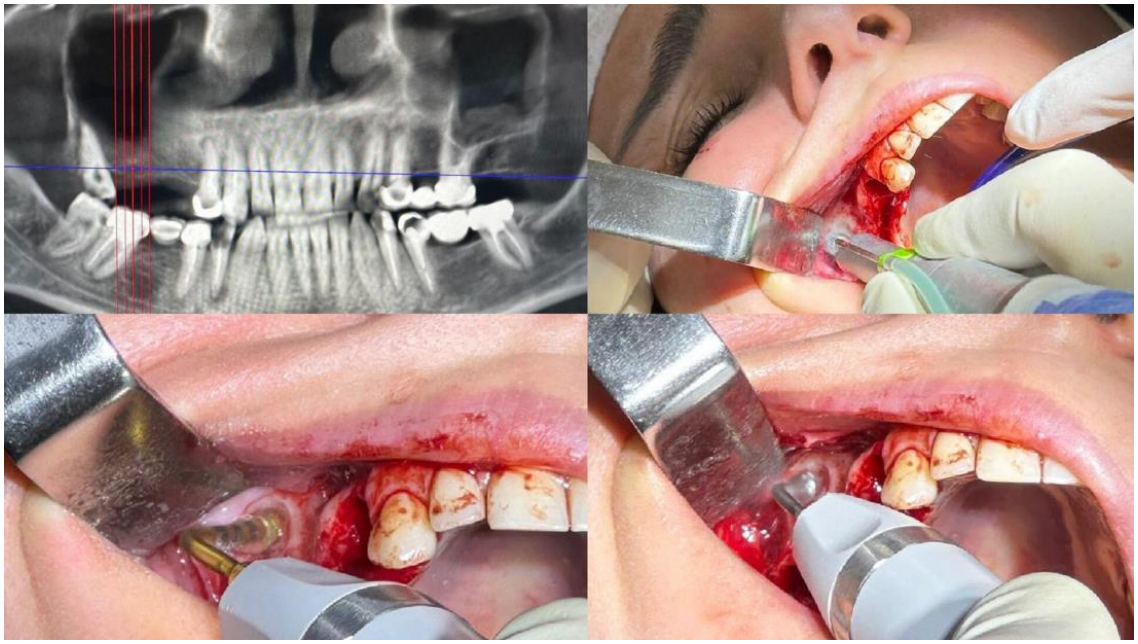
44.2 Diaqnostik protokol və planlama

Hər bir klinik hal üçün preoperativ mərhələdə Konus Şüalı Kompüter Tomoqrafiyası (CBCT) tətbiq olunmuşdur. CBCT vasitəsilə qalıq sümük hündürlüyü, Şneyder membranının qalınlığı və sinus daxili arakəsmələrin (septaların) lokalizasiyası dəqiq müəyyən edilmişdir.

44.3 Cərrahi texnika və materiallar

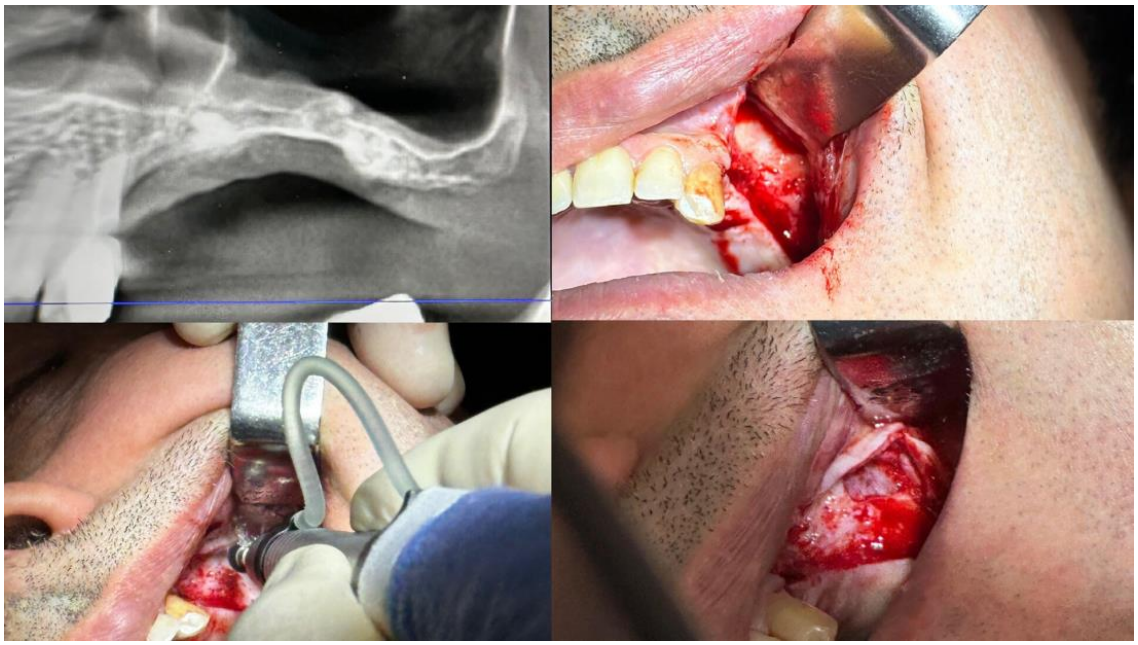
Əməliyyatlar standart steril şəraitdə, lokal anesteziya altında icra edilmişdir. Mukoperiostal qapaq ayrıldıqdan sonra sinusun ön-yan divarında sümük pəncərəsi (lateral window) yaradılmışdır. Şneyder membranı xüsusi sinus-lift küretləri vasitəsilə ehtiyatla elevasiya edilərək yuxarıya doğru qaldırılmışdır.

Sümük materialı olaraq boşluğa yüksək osteokonduktiv xüsusiyyətə malik Bio-Oss (ksenoqreft) və alloqreft kombinasiyası yerləşdirilmişdir. Bariyer olaraq lateral pəncərənin bağlanması üçün OsteoBiol kollagen membranlar, biostimulyasiya məqsədilə isə PRF (Platelet-Rich Fibrin) tətbiq olunmuşdur. Bir mərhələli əməliyyatlarda sinus qaldırma və implantasiya eyni anda, iki mərhələli əməliyyatlarda isə ilk öncə sinus qaldırma, 6–8 ay sonra dental implantasiya aparılmışdır.

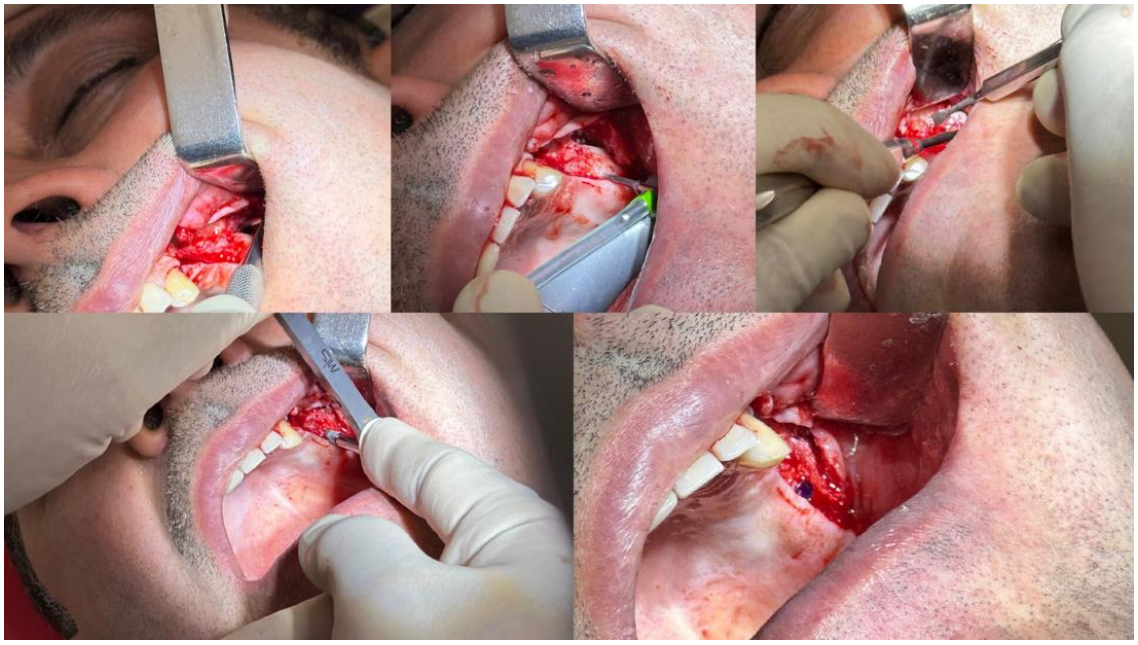


Şəkil 3. Bir mərhələli əməliyyatlardan klinik görüntülər.

Şəkil 4. Bir mərhələli əməliyyatlarda implantın yerləşdirilməsi.



Şəkil 5. İki mərhələli əməliyyatlardan klinik görüntülər.



Şəkil 6. İki mərhələli əməliyyatlarda sinus qaldırma mərhələsi.

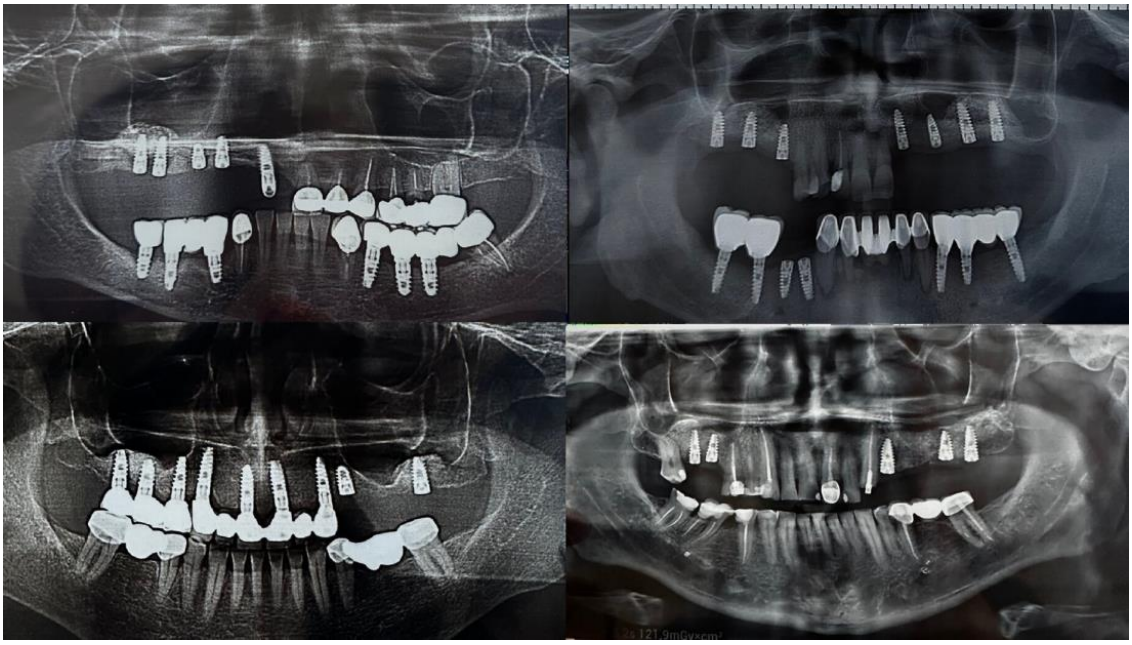
45. Nəticələr (Results)

2023–2026-cı illər üzrə əldə edilən nəticələrin təhlili aşağıdakı göstəriciləri üzə çıxarmışdır:

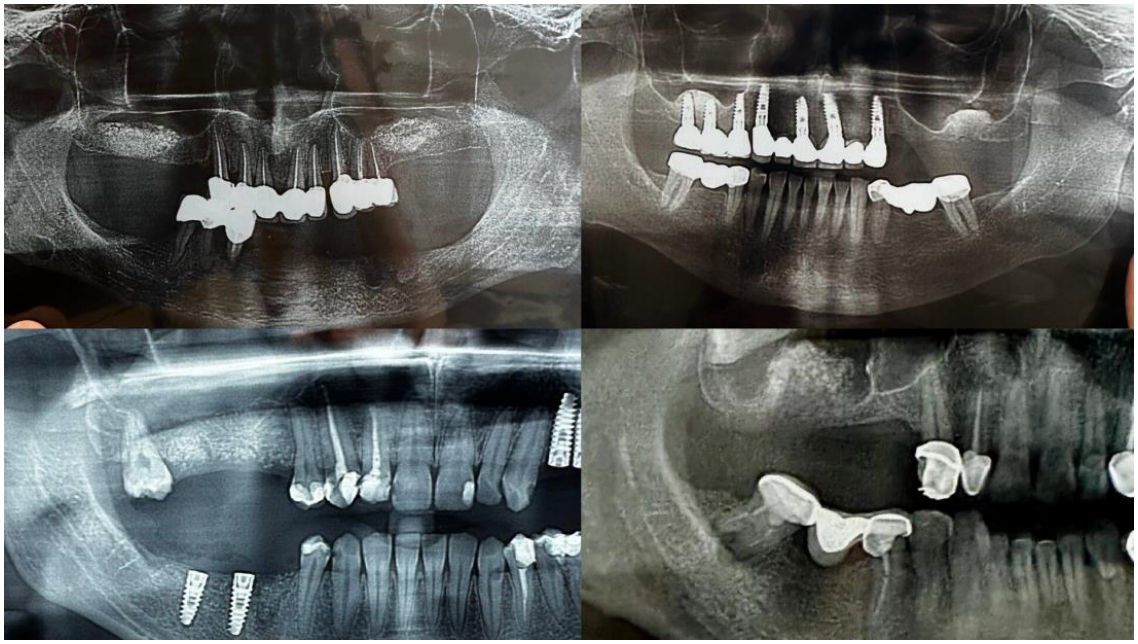
- **İmplantasiya və uğur faizləri:** cəmi 138 implant (MIS və Medentika) yerləşdirilmişdir. Bir mərhələli (simultan) yanaşmada 75 implantdan 4-ü (96% uğur), iki mərhələli (gecikmiş) yanaşmada isə 63 implantdan 3-ü (95.2% uğur) stabilizasiya pozğunluğu və ya iltihabi proses səbəbindən itirilmişdir.
- **Radioloji dinamika:** 6–8 aylıq sağalma periodundan sonra aparılan CBCT müayinələri qreft materialının yeni formalaşan sümük toxuması ilə əvəzləndiyini göstərmişdir. Orta hesabla sümük hündürlüyü 9.8 mm səviyyəsində artmışdır.
- **Fəsadlar:** əməliyyatların təxminən 8%-ində membran perforasiyası qeydə alınsa da, bu hallar dərhal kollagen membranlarla “sandviç” texnikası vasitəsilə idarə edilmişdir. Heç bir halda sinusit

və ya materialın kütləvi itkisi müşahidə edilməmişdir.

- **Funksional bərpa:** bütün uğurlu implantlar ortopedik yüklənməyə (daimi qapaqlar) məruz qalmış və xəstələrin çeynəmə funksiyası 100% bərpa olunmuşdur.



Şəkil 7. İki mərhələli əməliyyatların 6 ay sonrakı OPG görüntüləri.



Şəkil 8. Bir mərhələli əməliyyatların 6 ay sonrakı OPG görüntüləri.

46. Müzakirə (Discussion)

Bu tədqiqatın nəticələri təsdiqləyir ki, açıq sinus liftinq proqnozlaşdırıla bilən və aşağı riskli bir proseduradur. Ksenoqreftlərin (Bio-Oss) istifadəsi sümük həcminin uzunmüddətli saxlanılmasını təmin edərkən, alloqreftlərin əlavə edilməsi regenerasiya sürətini artırır. “Red Dental” və ATU Tədris Cərrahiyyə Klinikasında tətbiq olunan yanaşma beynəlxalq ədəbiyyatdakı (məsələn, Wallace və Testori) yüksək uğur statistikası ilə tam üst-üstə düşür.

47. Yekun (Conclusion)

Açıq sinus liftinq, üst çənənin posterior nahiyəsində sümük qıtlığı olan xəstələr üçün ən effektiv həll yoludur. 2023–2026-cı illər üzrə prospektiv izləmə nəticələri göstərir ki, düzgün diaqnostika (CBCT) və müasir materialların (Bio-Oss, kollagen membran) tətbiqi 95.6% ortalama uğur dərəcəsi ilə implant reabilitasiyasını mümkün edir.

Referanslar / References

1. Boyne P.J., James R.A. Grafting of the maxillary sinus floor with autogenous marrow and bone. *J Oral Surg.* 1980.
2. Tatum H. Maxillary and sinus implant reconstructions. *Dent Clin North Am.* 1986.
3. Wallace S.S., Froum S.J. Effect of maxillary sinus augmentation on implant survival: a systematic review. *Ann Periodontol.* 2003.
4. Pjetursson B.E., et al. A systematic review of the survival and complication rates of sinus floor elevation procedures. *J Clin Periodontol.* 2008.
5. Testori T., et al. Sinus augmentation techniques in implant dentistry: the lateral window approach. *Periodontol 2000.* 2019.
6. Valentini P., Abensur D. Maxillary sinus floor elevation for implant placement with demineralized freeze-dried bone and bovine bone (Bio-Oss). *Int J Periodontics Restorative Dent.* 2003.

Əlaqə / Correspondence: Emin Abbasov • +994 51 433 08 18 • eminabbasov2004@icloud.com