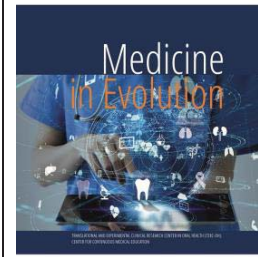


Correlation of the treatment method according to the time elapsed since the occurrence of oro-sinusal communication



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Abstract

Aim and objectives: Taking into account the age of oro-antral communication, patients, as well as the diameter of the opening, the aim is to develop a surgical therapeutic guide. The main points of interest are the closure of oro-antral communication, as well as the preservation of soft tissues and pain.

Material and methods: Radiographs of 7 patients up to 35 years of age and over 35 were investigated.

The obtained results confirmed that there was a connection between the age of the oro-antral communication, the age of the patients and the diameter of the oro-antral opening.

Results: The obtained results confirmed that there was a connection between the age of the oro-antral communication, the age of the patients and the diameter of the oro-antral opening.

Conclusions: Therapeutic behaviour in case of oro-antral communication and the prognosis of its healing are influenced by the patient's age and the age of oro-antral communication.

Keywords: communication, sinusitis, plastic surgery, rehabilitation, prophylaxis, flap

INTRODUCTION

Oro-sinus communication is a solution of continuity between the oral cavity and the maxillary sinus. Oro-antral communication occurs (pathogenesis) by the dissolution of osteomucosal structures (maxillary sinus mucosa, bone wall of the alveolo-sinus septum, mucosa of the oral cavity) that anatomically separates the two cavities (sinus and oral) [1]. The most common cause of oro-sinus communication is the extraction of lateral teeth in the upper jaw. There are many methods and techniques for closing oro-sinus communication. In the current study, the traditional method was used by creating mucoperiosteal flaps in order to heal the wound depending on the time elapsed since it's production. We chose this topical topic to present the importance of the surgical therapeutic guide in dentistry and the healing results obtained depending on the patients age correlated with the time since the oro-antral opening occurred.

The anatomical characteristics of the maxillary sinus, of the teeth, as well as the ratios between these two components represent one of the primary causes of the appearance of oro-antral communication (COA) following the surgical interventions at the level of the superior alveolar process.

The morphological research carried out by Troškova, elucidated the fact that more than 6 hours after the appearance of oro-antral communication, the installation of reactive edema of the sinus mucosa takes place [2]. More than 48 hours after the appearance of oro-antral communication, signs of septic inflammation appear and the jaw sinusitis of infectious etiology or in other words perforative sinusitis develops [2].

Oro-antral communication can determine local and general symptoms, the intensity of which depends on the causal factor, the general condition of the body. The characteristics of oro-antral communication depend on the time elapsed since the appearance of communication, the presence or absence of foreign bodies in the maxillary sinus.

The causes that can lead to the appearance of oro-antral communication can be traumatic as well as infectious. From an anatomical-clinical point of view, the ratio between the dental apexes and the maxillary sinus must be taken into account; the teeth with sinus ratio after N. Gănuță are, in descending order: molar I, molar II, premolar II, molar III, premolar I and less often canine [29]. Odontogenic cysts led to the appearance of oro-antral communication in 10% of cases according to data from the COMF Clinic. In most situations, oro-antral communication is created by the upper molars and premolars (50%), tumors (18.5%), bone infections such as osteomyelitis (11%), operations with access to the sinus (7.5%), trauma (7.5%), dentigen cyst (3.7%), septal corrections (3.7%) [2].

The diagnosis of oro-antral communication must be established immediately after the accident. Preventive diagnosis of oro-antral communication includes: accusations, history of the disease and local clinical examination.

If the mucosa is not damaged, but the bone tissue is missing, the sinus opening is small below 2 mm, after tooth extraction it is necessary for the alveolus to be filled with clot, so it will be protected from infection. At the average sinus opening of 2-6 mm, the suture of the mucosa is applied.

Odontogenic sinusitis can usually be clinically differentiated from rhinogenic sinusitis, primarily by the unilaterality of sinus involvement. Along with the clinical signs (local pain, cacosmia, purulent discharge through the respective nostril, general septic condition), complementary examinations (anterior rhinoscopy, diaphanoscopy, puncture) and first of all the radiological examination provides pathognomonic elements for diagnosis. The pathological process has an acute character (sinus empyema, catarrhal sinusitis, acute suppurative sinusitis) or chronic, being maintained by the dental outbreak with decreased virulence [2].

Aim and objectives

The aim of this study was to develop a surgical therapeutic guide depending on the time elapsed from the oro-sinusal communication. The objective is to identify if there is a significant difference in the healing process of oro-sinusal communication in correlation with the age of the patient, the time elapsed since the occurrence of the oro-antral communication compared to the therapeutic guide. It is followed whether the size of the opening plays a major role in the therapeutic conduct. A defining therapeutic role will be given by the size of the oro-antral opening, which will influence the treatment steps.

MATERIAL AND METHODS

A number of seven patients were selected for complicated dental extractions with the formation of oro-sinusal communication. The age of the patients as well as the age of the opening of the oro-antral communication were the factors that were the basis of the selection. Thus, the patients were grouped into two samples consisting of people up to 35 years of age, respectively patients over 35 years of age. The sex of the patients was not taken into account in the study, but was specified. Patients with systemic diseases were excluded. Sinus perforations larger than 2 mm in diameter were chosen. Subjects being systemically healthy without clinical or radiological signs. Smokers were excluded. Informed agreements were signed by all patients participating in the study. Each patient received a specific code to keep their identity and also to be easier to identify. Detailed radiological and clinical data of each patient were recorded. Oro-sinus communications were determined, diagnosed and confirmed by clinical and radiological evaluation. Clinical visibility at inspection was confirmed. Non-absorbable sutures were used. Radical sinus treatment was performed with antiseptic solution, Metronidazole. The root length of the extracted tooth was measured. If the root no longer existed, the depth of the cavity was measured. The Valsalva maneuver was also performed to confirm the oro-sinusal communication, the diameter being measured with the help of modified button probes, having different dimensions. The cavity was irrigated and carefully cured to remove debris or granulation tissue if it was present. The inter-root bone was partially removed and any other sharp bony protrusions were smoothed. The sutures were made without tension. The Wassmund-Rehrmann method was used, which consists in creating a trapezoidal mucoperiosteal vestibular flap, with a large base in the bottom of the vestibular sac. The operating field is processed and the related anesthesia is performed. A trapezoidal flap is made, through two divergent oblique incisions, distal and mesial of the dental alveolus that caused the oro-antral communication, parallel or below about 10 degrees with the tooth axis from the gum to the transition envelope with the bilateral extension of the horizontal incision on the envelope transition to the tooth level. The closure was carried out on the same day or as soon as possible. Routine standard postoperative indications were given to each patient. Patients were trained in proper hygiene, recommending antiseptic solutions for home therapy, as well as medication consisting of antibiotics, anti-inflammatory and analgesic. Also, the patients were monitored, called for the suppression of the wires after 7-10 days and the evaluation of the healing stage.

The treatment will start with a radiological examination. CT is the best method of visualizing the paranasal sinuses. Radiological exploration of the facial sinuses, mastoids and temporal rocks gives us information on pneumatization, configuration and stretching of cavities, but also on pathological processes that translate either radiologically by changing the transparency, contents of the sinus cavity or their bone contour [2]. Radiographic examination provides the following data: presence or absence of root debris, their topography, presence or absence of bone defect and its size, condition of the bone adjacent to the alveolus, condition of the mucosa, presence or absence of foreign bodies (obturator material, broken instruments at the apex dental, implant, bone augmentation material, cysts, granulomas) fractures of the alveolar process.

Intravenous sedation was used as anesthesia. This is an additional technique to local anesthesia in which intravenous drugs are used. The benefits of this technique include superior control over the duration and depth of sedation. The indications for intravenous sedation are: anxious, agitated patients, difficult and long interventions, patients with mental disorders, uncooperative children. The mechanism of action is by inhibiting neurotransmission [3]. The substances used in intravenous sedation are: 1. Axiolytic agents (sedatives) -Benzodiazepines with short action, Midazolam (Dormicum) 1 mg / 2 min, Diazepam (Valium) 1mg / min.

2. Analgesics: NSAIDs (non-steroidal anti-inflammatory drugs), morphine derivatives (Fentanyl, Ultiva), Antidote-Anxiety, Alternative-Propofol (rapid elimination) [3].

RESULTS

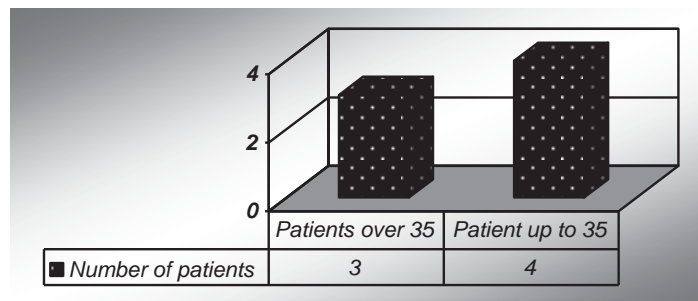


Figure 1. Age group

The diagram shows the number of patients who included in the study, 4 patients up to 35 years of age and 3 patients over 35 years old.

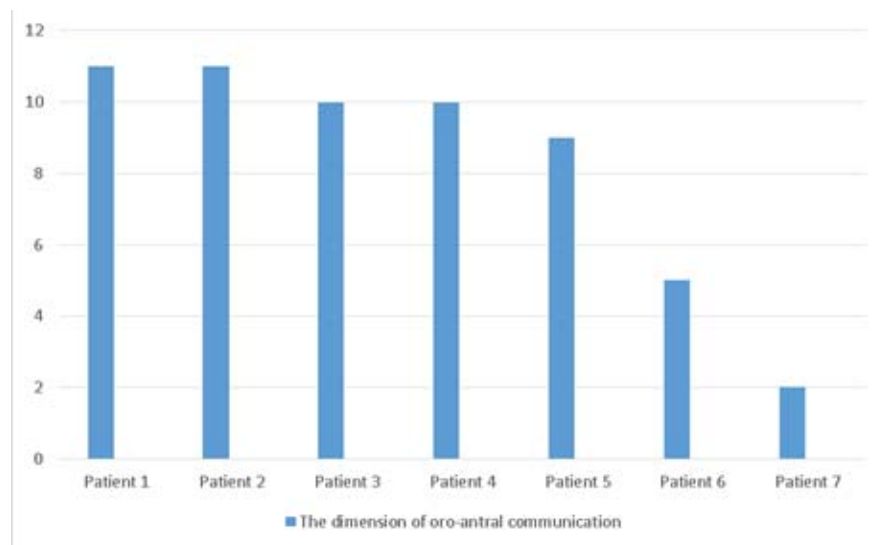


Figure 2. Dimension of the oro-antral communication

The largest opening was 11mm, present in two of the subjects. The 10 mm size was present in 2 of the patients. One patient present a size of 9 mm and another one a size of 5 mm. The smallest size was 2mm.

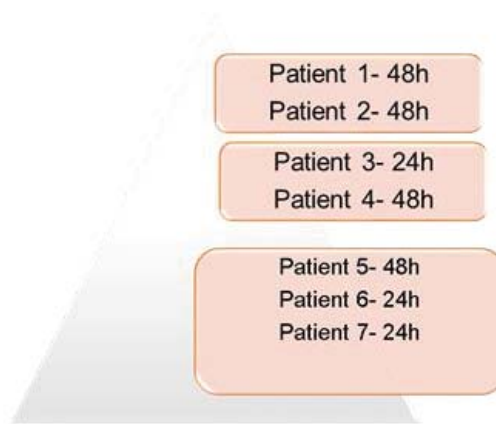


Figure 3. Time elapsed vs treatment start

The image shows the time elapsed from the production of oro-antral communication to the start of treatment for each patient. In most cases, the time elapsed since the production of the oro-antral opening was 48 hours, but there were also cases in which the opening occurred 24 hours ago.

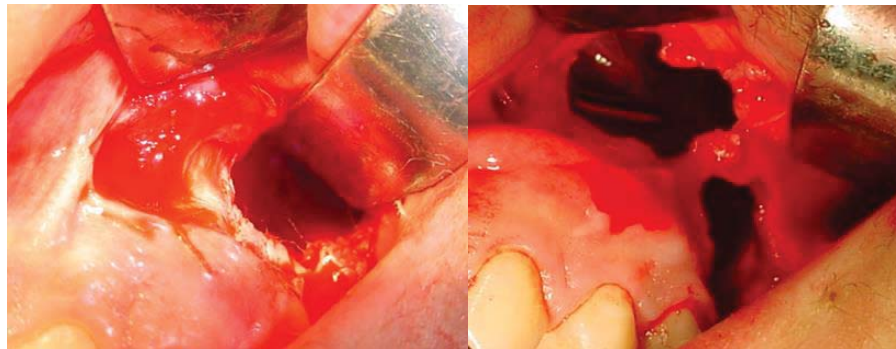


Figure 4. Oro-sinusal communication defect

The first figure highlights the oro-antral communication of a patient. The size of the defect was 11 mm and the time elapsed since the production of oro-antral communication was over 48h.



Figure 5. Radiographic image of the maxillary sinuses

X-ray of the anterior sinuses (Waters) confirms the existence of the pathology at the level of the left maxillary sinus.

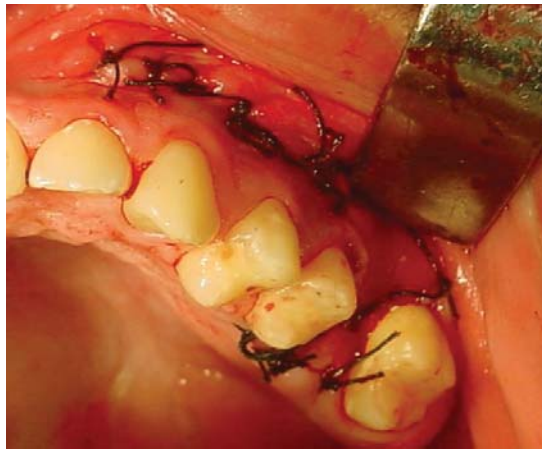


Figure 6. Surgical closure of the oro-antral communication

A trapezoidal mucoperiosteal vestibular flap (Wassmund-Rehrmann Method) was made with a large base in the bottom of the vestibular sac. Mobilization (periosteum) of the flap performed through an incision in the upper part of the flap (at its base). The operative wound is processed, but also the maxillary sinus with antiseptics. Non-resorbable sutures were used, the suture being made without tension. Along with the defect plasty, the radical sinus cure was performed.

The patient received medication for 7 days consisting of antibiotics, antifungals, analgesics.



Figure 7. Endooral exam first step



Figure 8. Endooral exam second step

In these images is presented another patient who has an oro-sinus communication of 11 mm. The time elapsed since the production of the oro-antral communication was over 24h.

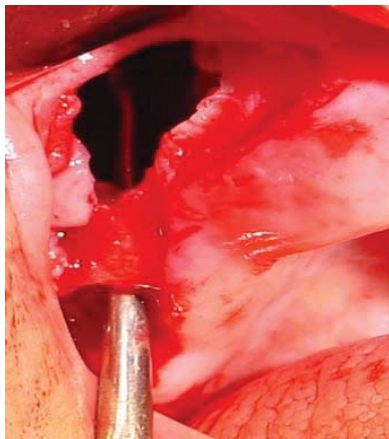


Figure 9. The defect

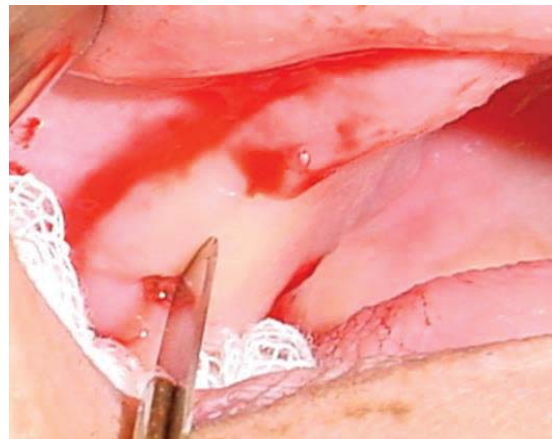


Figure 10. Surgical approach

The two images show the defect and incision in the edentulous alveolar ridge. A trapezoidal mucoperiosteal vestibular flap was made (Wassmund-Rehrmann Method) with a large base in the bottom of the vestibular sac (Fig.9;10). The operative wound is processed, but also the maxillary sinus with antiseptics. (Fig.11.). Non-resorbable sutures were used, the suture being made without tension.

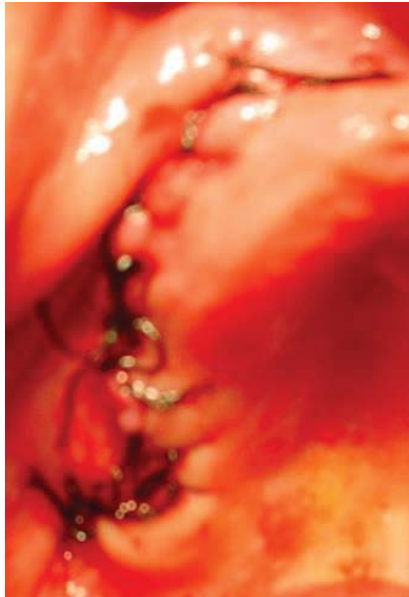


Figure 11. Suture of the flap

The objectives of this study were fully achieved, demonstrating that there is a significant difference in the healing process of oro-sinusal communication in correlation with age of the patients, age of opening of oro-antral communication compared to the therapeutic guide.

DISCUSSIONS

According to the literature, existing studies have shown the importance of using different treatment methods in the case of oro-sinusal communication.

It is necessary to mention that the frequency of oro-antral communication according to several cited authors indicates a different percentage depending on: country, standard of living, culture. Ippolitov and co-authors mention that the perforation of the maxillary sinus that will not lead to the appearance of perforating sinusitis is recorded in only 7.14% of cases of patients with tooth extractions from the upper arch. Kitagawa conducted a study in Japan in 2038 of dental extractions, oro-antral communication was recorded in 77 cases which accounted for 3.8% of patients examined and treated. Bojan Gacic from Serbia, concerned about the treatment of COA with absorbable materials indicates a frequency ranging from 0.31% to 4.7%. Studies by Susan H. Vissxber on COA plastics with synthetic bioabsorbable materials indicate COA in 5%. Oro-antral communication occurs (pathogenesis) by the destruction of osteomucosal structures (maxillary sinus mucosa, bony wall of the alveolo-sinusal septum, oral mucosa) that anatomically separates the two cavities (sinus and oral) [4, 5, 6].

The new methods come to complete the arsenal of oral surgery possibilities and to solve the shortcomings of the old ones. Namely the disadvantages of the proposed methods are the promoter of studies and the emergence of other surgical techniques. Moreover, the clinical situations are not standard, having the solution with a single method of treatment. In

each clinical case, the most optimal treatment method for the individual case was applied. The optimal method of treatment is a concern of researchers of all times. It would mean: short duration of treatment, early rehabilitation, low cost, minimal manipulation, as little tissue trauma as possible [1,7,8,9].

According to some authors YU.I. Bernadskiy, TSMuhametzânova the presence of oro-antral communication occupies the leading place in the etiology of odontogenic sinusitis between 41.2% and 77.2%, and the decreasing tendency of the number of oro-antral and its complications, is not attested [7]. V. Cabac and co-authors report that the most common form of maxillary sinusitis is chronic form with 42.22% [20]. Specialists in otorhinolaryngology report that the odontogenic etiology prevails over the rhinogenic one. A problematic aspect is presented by the surgical treatment of oro-antral communication. Statistical data show that recurrence of plastic surgery V. P. Yppolytov and co-authors, mention that the perforation of the maxillary sinus that will not lead to perforative sinusitis occurs in only 7.14% of patients with dental extractions on the upper arch [19]. Kitagawa conducted a study in Japan in 2038 of dental extractions, oro-antral communication was recorded in 77 cases which accounted for 3.8% of patients examined and treated. Bojan Gacic from Serbia, concerned with the treatment of oro-antral communication with absorbable materials indicates a frequency ranging from 0.31% to 4.7% [16]. Studies conducted by Susan H. Vissxber on plasticity methods of oro-antral communication with synthetic bioabsorbable materials, indicate oro-sinus communication in 5% [7].

Amărescu M. tells us that tooth 6 is involved in 55.12% and the left maxillary sinus is also affected in the same percentage. Hernando J. and co-authors, mention that the extraction of the upper molar in 80% of cases leads to the opening of the maxillary sinus, maxillary cysts 10-15%, benign and malignant tumors in 5-10% and trauma in 2-5% [8].

CONCLUSIONS

In the case of the presence of oro-sinus communication in the patient, the main task is not only to close the communication, but also to preserve the soft and hard tissues. Extraction of the infected tooth by establishing oro-antral communication and treating it as a perforating sinusitis. Informing the patient about oro-antral communication. The plastic method of oro-antral communication needs to be adjusted to the specific clinical case. It was found that the patient's age is an important factor in wound healing, and the size of the opening plays a key role in therapeutic conduct.

REFERENCES

1. Hițu I. Comunicarea oro-antrală, Teza de licență, 2014; 1- 37.
2. <https://www.academia.edu/35207017/13-Explorarea-in-sinuzita-maxilara-odontogena.docx>.
3. Ianes E. Anestezia loco-regională și generală în medicina dentară curs pentru anul III-Medicină Dentară. 2010; 110-112.
4. Killey HC, Kay LW. Observations based on surgical closure of 362 oroantral fistulas. *Int Surg.* 1972; 57:545.
5. Von Wovern N. Closure of oroantral fistula with buccal flap: Rehrmann versus Moczar. *Int J Oral Maxillofac Surg.* 1982; 11:156.
6. Egyedi P. Utilization of the buccal fat pad for closure of oroantral and/or oro-nasal communications. *J Maxillofac Surg.* 1977; 5:241.
7. Hițu D. Tratatamentul sinusitei odontogene. *Medicina stomatologică.* 2008; 2(16): 243-247.
8. Bucur A. Compendiu de chirurgie oro-maxilo-faciala. Ed. Bucuresti. 2009; 1-303.
9. Lee JJ, Kok SH, Chang HH, et al. Repair of oroantral communications in the third molar region by random palatal flap. *Int J.*

10. Punwutikorn J, Waikakul A, Pairuchvej V. Clinically significant oroantral communications – A study of incidence and site. *Int J Oral Maxillofac Surg.* 1994; 23:1-19.
11. del Rey-Santamaria M, Eduard Valmaseda CE, Berini AL, Cosme Gay Escoda. Incidence of oral sinus communications in 389 upper third molar extraction. *Med Oral Patol Oral Cir Bucal.* 2006; 11:E334.
12. Bodner L, Gatot A, Bar-Ziv J. Technical note: Oroantral fistula: Improved imaging with a dental computed tomography software program. *Br J Radiol.* 1995; 68:1249.
13. Guven O. A clinical study on oroantral fistulae. *J Craniomaxillofac Surg.* 1998; 26:267-71.
14. Lin, P. Z, R. Bukachevsky, 34. Blake. Management of odontogenic sinusitis with persistent oroantral fistula. *Ear Nose Throat.* 1991; 70:488-490.
15. Hanazawa, Y, L Koshuke, T. Mabashi, K, Sato L Closure of oroantral communications using a pedicled buccal fat pad graft. *J. Oral Maxillofac. Surg.* 1995; 53:771-775.
16. von Wowern N. Correlation between the development of an oroantral fistula and the size of the corresponding bony defect. *J Oral Surg.* 1973; 31:98.
17. L azow SK. Surgical management of the oroantral fistula: Flap procedures. *Oper Tech Otolaryngol Head Neck Surg.* 1999; 10:148.
18. A shley RE. A method of closing antroalveolar fistulae. *Ann Otol Rhinol Laryngol.* 1939; 48:632.
19. Guerrero- Santos J, Altamirano JT. The use of lingual flaps in repair of fistulas of the hard palate. *Plast Reconstr Surg.* 1966; 38:123.
20. Oroantral Açıklıkların Okluzal Splintler ile Cerrahisiz Kapatılması Nükhet KÜTÜK1, Ahmet Emin DEMİRBAŞ2, Canay YILMAZ ASAN2, Burcu BAŞ3, Alper ALKAN1. NONSURGICAL CLOSURE OF OROANTRAL COMMUNICATIONS USING OCCLUSAL SPLINTS
21. Ababii I., V. Popa, M. Maniuc, I. Antohii, A. Sandu, V. Cabac. *Otorinolaringologie. Centrul Editorial Poligrafic de Medicină al USMF. Chişinău, 2000, 1-340.*
22. Albu, S. *Chirurgia funcțională a foselor nazale. Cluj-Napoca, 2001; 45-58.*
23. Burlibaşa, C. *Chirurgie orală și maxilofacială. Bucureşti: Editura medical. 2003; 356 -379.*
24. Hițu D. *Diagnosticul sinusitei odontogene. Medicina stomatologică. 2007; 2:30-35.*
25. Gacic B, Todorovic L, Kokovic V, Danilovic V, Stojcev- Stajcic L, Drazic R, Markovic A. The closure of oroantral communications with resorbable PLGA-coated beta- TCP root analogs, hemostatic gauze, or buccal flaps: a prospective study. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2009; 108(6):844-850.
26. Visscher SH, Van Minnen B, Bos RR. Feasibility of conical biodegradable polyurethane foam for closure of oroantral communications. *J Oral Maxillofac Surg.* 2011; 69(2):390-395.
27. Visscher SH, van Minnen B, Bos RR. Closure of oroantral communications: a review of the literature. *J Oral Maxillofac Surg.* 2010; 68(6):1384-1391.
28. Toshihiro Y, Nariai Y, Takamura Y, Yoshimura H, Tobita T, Yoshino A, et al. Applicability of buccal fat pad grafting for oral reconstruction. *Int J Oral Maxillofac Surg.* 2013;42:604--10.
29. Steiner M, Gould AR, Madion DC, Abraham MS, Loeser JG. Metal plates and foils for closure of oroantral fistulae. *Journal of Oral and Maxillofacial Surgery.* 2008; 66(7):1551-5.
30. Schünemann H J, Oxman AD, Vist GE, Higgins JPT, Deeks JJ, Glasziou P. Interpreting results drawing conclusions. In: Higgins JPT, Green S(editors). *Cochrane Handbook for Systematic Reviews of Intervention.* 2011; 12:1-155.
31. Stieber C, Gănuță N, Nițescu M. General considerations on the action of antibiotics and changes in general and local reactivity under the effect of antibiotics]. *Stomatologia (Bucur).* 1970;17(2):137-41.