

Perioperative Medications In Management Of Oro-Antral Communication And Fistula A Systematic Review

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Abstract :

Background oroantral communication (oac) is a surgical complication that occurs when an opening is created between the maxillary sinus and the oral cavity. If left untreated, an oac can lead to further complications, such as the formation of an oroantral fistula (oaf) or an infection of the maxillary sinus. The aim of this study was to provide a well-established protocol for perioperative medication of acute oroantral communication and fistula.

Materials and methods: a thorough literature review was done by the following databases: pubmed, scopus and cochrane for english language articles published from january 2000 till december 2022 , this review followed the preferred reporting items for systematic reviews and meta-analyses (prisma- p) guidelines .

Results : among the retrived 16 articles, 5 articles were case series studies (31.25% of all the studies), 3 were retrospective cohort (18.7%), 3 were clinical studies (18.7%) , 3 were prospective studies (18.7) ,and 2 were randomized clinical trials (12.5%). Literatures review showed that along with surgical intervention and various irrigation substances for the fistula

Antibiotic therapy for odontogenic maxillary sinusitis should initially be given targeting aerobe and anaerobe bacteria. For this reason, amoxicillin combined with clavulanate, which is a beta lactamase inhibitor, is preferred.as well as nasal decongestant for reduction in hyperaemia, the sinusoids shrink and the mucosa swelling is reduced, decreasing resistance to airflow and producing decongestion. ^[1]

Conclusions: literatures review showed that along with surgical intervention and various irrigation substances for the fistula: amoxicillin/clavulanic acid with nasal and/or systemic decongestant was prescribed for patients with acute or chronic maxillary sinusitis preoperatively and continued postoperatively for most of patients., most of the patients received decongestant perioperatively. Nasal drops decongestant only was the most common compared to both systemic and nasal drops decongestant together. (chlorhexidine gluconate mouthwash) was prescribed to the most of the patient.

Keyword: ("oroantral communication" or "oroantral fistula" or "oroantral communication and oroantral fistula" or "maxillary sinus membrane perforation" or "odontogenic maxillary sinusitis" or (oac)) or (oaf)) or "oac and oaf")

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I. Introduction

Oroantral communication (OAC) is a surgical complication that occurs when an opening is created between the maxillary sinus and the oral cavity. If left untreated, an OAC can lead to further complications, such as the formation of an oroantral fistula (OAF) or an infection of the maxillary sinus.^[2] There are a variety of factors that may cause or lead to an OAC, including trauma, tumors, cysts and other pathological entities.

Nevertheless, the most frequent cause of OACs is the extraction of maxillary posterior teeth, which can be the result of a close association of maxillary premolars and molars root apices to the maxillary sinus floor ^[2-3].

Management of OACs is predominantly dependent on the size of the communication between the maxillary sinus and the oral cavity, the time of diagnosis, the presence of sinus infection, the amount and condition of tissue available for repair, the future restorative treatment plan at the site of defect as well as the overall health status of the patient.

Maxillary sinusitis should be treated either medically or surgically first before the communication is repaired to avoid impaired drainage. Antibiotic therapy for Odontogenic Maxillary Sinusitis should initially be given targeting aerobe and anaerobe bacteria. nasal and systemic decongestant for reduction of hyperaemia , as constriction of the venous sinusoids will decrease mucosal engorgement leading to the relief of nasal congestion.

By offering a comprehensive overview of medications used along with surgical intervention perioperatively , this review seeks to assist surgeons in making informed choices grounded in scientific evidence.

II. Materials And Methods:

Data source:

A thorough literature review was done by the following databases: PubMed, Scopus and Cochrane for English language articles published from January 2000 till December 2022 , This review followed the preferred reporting items for Systematic reviews and Meta-Analyses (PRISMA- P) guidelines .

Search Strategy:

A thorough literature review was done by the following databases: PubMed, Scopus and Cochrane. Core Collection electronic databases using the following keywords ("oroantral communication" OR "oroantral fistula" OR "oroantral communication and oroantral fistula" OR "maxillary sinus membrane perforation" OR "odontogenic maxillary sinusitis" OR (OAC)) OR (OAF)) OR "OAC and OAF"). Reference list of the included publications were also reviewed for additional studies.

Study selection

Inclusion criteria:

- A. English language.
- B. Journal articles published from January 2000 till December 2022.
- C. Studies evaluating any intervention for treating oroantral communication or oroantral fistula due to dental procedures using the following electronic databases PubMed, SciVerse Scopus, Cochrane.
- D. Studies that mention in details the prescribed medications.
- E. Success rate of closure of the defect 100%.
- F. Follow up not less than 3 weeks.

Exclusion criteria:

- A-Patients with any systemic disease affect bone healing.
- B-Smoking habits.
- C-Previous sinus disease.
- D-Case reports, letters or commentaries were excluded, as well as, studies that did not meet the inclusion criteria.

Screening process:

- First, title and abstract screening was done by two independent reviewers (M.E, K.T.), all of the screening depended on inclusion criteria and any disagreement was resolved by discussion.
- Then their evaluations and analyzed differences through comparing the manuscripts and consulting a third experienced senior independent reviewer (M.Y) when a consensus could not be reached.
- Last, articles full text screening by one reviewer (M.E) and their references were searched for any relevant articles.

Quality assessment

The quality of each study was assessed by two assessment scales developed by two independent authors (M.E, M.M): the first scale for appraisal of potential risk of bias using the methodological index for non randomized studies (MINORS) tool^[4,5] ; the second scale was Jadad scale (the Oxford quality scoring system) for assessment of randomized clinical trials (RCT)

III. Results:

Study selection:

The study selection process adhered to the PRISMA flowchart. The initial search strategy in the three electronic databases resulted in 2488 articles. Following the screening procedure, 642 duplicated articles were excluded. Subsequently, 1591 articles were excluded based on screening of title and abstract. Application of the selection criteria in title and abstract screening stage yielded 255 articles. In the full text screening stage 239 articles were excluded according to exclusion criteria, to result in 16 included articles.

Study design:

Among the retrived 16 articles, 5 articles were case series studies (31.25% of all the studies), 3 were retrospective cohort (18.7%), 3 were clinical studies (18.7%) , 3 were prospective studies (18.7) ,and 2 were randomized clinical trials (12.5%).

Study participants:

The total number of patients extracted from the 16 studies included in the review was 372 patients with total number of 202 acute oroantral communication and 173 oroantral fistula.

All included articles reported Number of patients , Age range ,Male to female ratio ,Number of acute OAC / OAF ,Technique of closure,size of defect, Type of antibiotic, dose ,Type of analgesics , Type of decongestant ,Type of mouth wash , Success rate , Follow up period.

Quality assessment:

Quality assessment were performed for non-randomized clinical studies and RCT as showing in table 9 and 10.

A-Oroantral Fistula Results:

The total number of patients extracted from the 11 studies included in the review was 173 oroantral fistula with the following results:

Table1. Oroantral Fistula Results.

Study	Number of OAF	Type of Antibiotic	Analgesic	Nasal decongestant	Mouthwash
Georg Watzak 2005 ⁽⁶⁾	21	amoxicillin/ clavulanic acid -clindamycin	not mentioned	Otrivin 0.05%;	not mentioned
Yakir Anavi 2008 ⁷	10	amoxicillin/ Clavulanic acid or cefazolin	not mentioned	not mentioned	not mentioned
Mamdouh S. Ahmed 2011 ⁸	8	amoxicillin/ sulbactam	NSAID: ibuprofen	nasal decongestant (Otrivin 0.05%) and systemic decongestant (Triludan; Merrel UK)	no
M.K. Jain, C 2012 ⁹	15	amoxicillin/ clavulanic acid	yes, but did not mention the type	yes but did not mention the type	yes but did not mention the type
S. Nezafati 2012 ¹⁰	20	Amoxicillin / Clavulanic acid	NSAID: ibuprofen	nasal decongestant (Otrivin 0.05%) and systemic decongestant (Triludan; Merrel UK)	no
Wael Mohamed Said 2015 ¹¹	10	Amoxicillin / Clavulanic acid or clindamycin	NSAID: diclofenac potassium	oxymetazoline HCL (Afrin) 4 times daily	
Emad T. Daif 2016 ¹²	25	2 % chlorhexidine 3 times daily	Post, but did not mention the type	yes, nasal drops for 7 days preoperatively and postoperatively but did not mention the type	
Umut Demetoglu 2018 ¹³	1	no	NSAID: Dexketoprofen Trometamol and/or paracetamol	not mentioned	0.2% chlorhexidine digluconate
K. Blal 2020 ¹⁴	20	amoxicillin	not mentioned	oxymetazoline nasal spray for 5 days	chlorhexidine gluconate mouthwash for a week
Kumar Niles 2020 ¹⁵	27	amoxicillin/ clavulanic acid	NSAID: diclofenac sodium	xylometazoline nasal spray 7days	chlorhexidine oral rinse
Jiao Xia 2020 ¹⁶	16	amoxicillin	not mentioned	not mentioned	not mentioned

Table 2. Percentage of time of prescription.

Time of prescription	Percentage
Peri-operative	72.8
Post-operative	21.4%
Pre-operative	5.8 %

Table3. Percentage of type of antibiotic.

Type of Antibiotic	Percentage
Amoxicillin /clavulanic acid	64.7%
Amoxicillin with metronidazole	14.4%
Amoxicillin alone	20.8%

Table 4 . Percentage of usage of decongestant.

Usage of decongestant	Percentage
Total percentage of patients who were prescribed decongestant	84.3%
Peri-operative	55.4%

Post-operative	44.6%
Nasal drops decongestant	78.6%
Systemic & nasal drops decongestant	21.4%

Table 5. Percentage of mouthwash.

Mouthwash	Percentage
Total percentage of patients who were prescribed mouthwash	42.1%
chlorhexidine gluconate mouthwash	

B-Acute oroantral communication results:

The total number of patients extracted from 7 studies included in the review was 202 acute oroantral communication.

Table 6. Acute Oroantral Communication Results.

Study	Number of OAC	Type of Antibiotic	Analgesic	Nasal decongestant	Mouthwash
Paul A Fugazzott 2003 ⁽¹⁷⁾	19	amoxicillin or enteric-coated erythromycin	NSAID: etodolac	not used	chlorhexidine rinses# twice a day for 21 days
Federico Hernández 2008 ⁽¹⁸⁾	104	amoxicillin	post, but did not mention	not used	no
Asher Ah Tong Lim 2012 ⁽¹⁹⁾	6	erythromycin and metronidazole	none	no	no
Dan Holtzclaw 2015 ⁽²⁰⁾	9	amoxicillin	yes but did not mention the type	oxymetazoline nasal spray 2-3 sprays per nostril systemic: and pseudoephedrine 120mg (1 Tab two times daily x 7 days)	not used
Nükhet Kütük 2017 ⁽²¹⁾	20	amoxicillin / clavulanic acid	NSAID : flurbiprofen	not used	clorhexidine mouthwash
Umut Demetoğlu 2018 ⁽¹³⁾	20	amoxicillin/ clavulanic acid	NSAID: Dexketoprofen Trometamol and/or paracetamol	not mentioned	0.2% chlorhexidine digluconate
H.A.A.B. 2018 ⁽²²⁾	24	penicillin	not mentioned	Otrivin 0.05%;	not mentioned

Table 7. Percentage of type of antibiotic.

Type of antibiotic	Percentage
Amoxicillin /clavulanic acid	19.8%
Amoxicillin alone	65.3%
Penicillin	11.8%
Erythromycin and metronidazole	2.9%

Table 8. Percentage of nasal decongestant.

Nasal decongestant was prescribed for 16.3 % of patients	
Nasal and systemic decongestant	28%
Nasal decongestant drops only	72%

Table 9. Assessment for appraisal of potential risk of bias using the methodological index for non-randomized studies (MINORS) tool.

Study	Type of study	MINORS Score	Risk of bias
Georg Watzak et al ⁽⁶⁾ 2003	Case series	6/16	Low
Yakir Anavi et al ⁽⁷⁾ 2008	Case series	21/24	Low
Federico Hernández et al ⁽²⁰⁾ 2008	Retrospective cohort	21/24	Low
Mamdouh S. Ahmed et al ⁽⁸⁾ 2001	Case series	20/24	low
M. K. Jain et al ⁽⁹⁾ 2012	Clinical study	10/16	Moderate

Dan Holtzclaw ^[18] 2015	Retrospective cohort	14/16	Low
Wael Mohamed Said ^[11] 2015	Clinical study	12/16	Moderate
Emad T. Daif ^[12] 2016	Prospective cohort	12/16	Moderate
Nükhet Küçük et al ^[21] 2017	Retrospective cohort	16/24	Moderate
Demetoglu U et al ^[13] 2018	Case series	12/16	Moderate
de Oliveira HAAB et al ^[22] 2018	Clinical study	6/10	Moderate
Jiao Xia et al ^[16] 2019	Case series	17/20	Low
Blal K et al ^[14] 2020	Prospective cohort	12/16	Moderate
Paul A Fugazzotto et al ^[17] 2003	Case series	12/16	Moderate

Table 10. Assessment of risk of bias for RCT using Jadad scale.

Study	Type of study	JADAD Score	Quality
S. Nezafati et al ^[10] 2012	RCT	3/5	Moderate
Kumar Nilesh ^[15] 2020	RCT	3/5	Moderate

IV. Discussion:

Oroantral communication Is a surgical complication that occurs when an opening is created between the maxillary sinus and the oral cavity. If left untreated, an OAC can lead to further complications, such as the formation of an oroantral fistula (OAF) or an infection of the maxillary sinus. ^[23]

Decisions on how to treat an OAC/OAF are based on the size of the defect, the time of diagnosis, the presence of sinus infection, the amount and condition of tissue available for repair, as well as the future restorative treatment plan at the site of defect ^[46].

Along with surgical intervention the perioperative medication during the management of this complication there is no established protocol, therefore we focused in this study on the role of perioperative medication.

By offering a comprehensive overview of medications used along with surgical intervention perioperatively, this review seeks to assist surgeons in making informed choices grounded in scientific evidence.

Regarding the results of oroantral fistula With total number of 173 patients in the pre mentioned in 11 studies for oroantral fistulas' management, 72.8 % of patients were prescribed medications peri-operatively.

-21.4 % of patients received medications post-operatively with no mentioning of preoperative medications.

-5.8 % of patients received medications preoperatively without mentioning of postoperative medications.

-Amoxicillin /clavulanic acid were prescribed for 64.7% of patients.

-Amoxicillin with metronidazole were prescribed for 14.4% of patients.

-Amoxicillin alone were 20.8% of patients.

-Clindamycin were prescribed in all cases in case of sensitivity for amoxicillin.

-84.3% of patients received decongestant.

-55.4% of these patients were prescribed decongestant perioperatively.

-44.5% of these patients were prescribed decongestant postoperatively.

-It was 78.6% as only nasal drops decongestant compared to 21.3% systemic and nasal drops decongestant.

-42.1% of patients was mentioned to been prescribed mouthwash (chlorhexidine gluconate mouthwash)

Regarding the results of acute oroantral communication, The total number of patients extracted from 7 studies included in the review was 202 acute oroantral communication.

-amoxicillin was prescribed for 65.3 % of patients.

-amoxicillin/clavulanic acid as prescribed for 19.8 % of patients.

-penicillin was prescribed for 11.8 % of patients.

-erythromycin and metronidazole was prescribed for 2.9 % of patients.

-Nasal decongestant was prescribed for 16.3 % of patients:

-28% of these patients were prescribed both nasal and systemic decongestant.

-While nasal decongestant drops were for 72% of patients.

-Other studies did not mention if nasal decongestant was prescribed or not.

The quality of a systematic review comes from the individual studies included, therefore, the quality assessment of each article is mandatory to confirm an overall consistent review. In the current review quality assessment was done using two tools with two independent reviewers; the first was MINORS tool for assessment of non-randomized, comparative and non-comparative studies ^[24] and the second tool was Jadad scale for assessment of RCT ^[25]

V. Conclusions

1- Medication for oroantral fistula:

Literatures review showed that along with surgical intervention and various irrigation substances for the fistula:

- a- Amoxicillin/clavulanic acid with nasal and/or systemic decongestant was prescribed for patients with acute or chronic maxillary sinusitis preoperatively and continued postoperatively for most of patients.
- b- Most of the patients received decongestant perioperatively. Nasal drops decongestant only was the most common compared to both systemic and nasal drops decongestant together.
- d- (chlorhexidine gluconate mouthwash) was prescribed to the most of the patient.

2- Medication for acute oroantral communication:

- A- Amoxicillin was the most common to be prescribed for patients postoperative.
- B- Nasal drops decongestant was the most common to be prescribed.

VI. Recommendations

Based on the findings of the current review, to explore the accuracy and clinical application in future research and clinical practice regarding management of oroantral communication and oroantral fistula This study recommends the following:

- 1-Studying comparing effect of antibiotic after closure of acute oroantral communication versus placebo.
- 2-Culture sensitivity test should be included during the preoperative phase for the management of chronic oroantral fistula to identify the appropriate type of antibiotic.
- 3-Accurately mentioning prescribed medication after closure of the defect as hundreds of published studies ignoring mentioning the prescribed medications.

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Conflict Of Interest:

The authors declare no conflict of interes

References :

- [1] O'donnell Sr. Sympathomimetic Vasoconstrictors As Nasal Decongestants. Med J Aust. 1995 Mar 6;162(5):264-7. Doi: 10.5694/J.1326-5377.1995.Tb139882.X. Pmid: 7534374.
- [2] Mavrodi A, Paraskevas G. Evolution Of The Paranasal Sinuses' Anatomy Through The Ages. Anat Cell Biol. 2013 Dec;46(4):235-8. Doi: 10.5115/Acb.2013.46.4.235. Epub 2013 Dec 24. Pmid: 24386595; Pmcid: Pmc3875840.
- [3] Standring S. Gray's Anatomy: The Anatomical Basis Of Clinical Practice. 41st Ed. London: Elsevier Health Sciences; 2015.

- [4] Slim K, Nini E, Forestier D, Kwiatkowski F, Panis Y, Chipponi J. Methodological Index For Non-Randomized Studies (Minors): Development And Validation Of A New Instrument. *Anz J Surg.* 2003 Sep;73(9):712-6. Doi: 10.1046/J.1445-2197.2003.02748.X. Pmid: 12956787.
- [5] Slim K, Nini E, Forestier D, Kwiatkowski F, Panis Y, Chipponi J. Methodological Index For Non-Randomized Studies (Minors): Development And Validation Of A New Instrument. *Anz J Surg.* 2003 Sep;73(9):712-6. Doi: 10.1046/J.1445-2197.2003.02748.X. Pmid: 12956787
- [6] Slim K, Nini E, Forestier D, Kwiatkowski F, Panis Y, Chipponi J. Methodological Index For Non-Randomized Studies (Minors): Development And Validation Of A New Instrument. *Anz J Surg.* 2003 Sep;73(9):712-6. Doi: 10.1046/J.1445-2197.2003.02748.X. Pmid: 12956787
- [7] Slim K, Nini E, Forestier D, Kwiatkowski F, Panis Y, Chipponi J. Methodological Index For Non-Randomized Studies (Minors): Development And Validation Of A New Instrument. *Anz J Surg.* 2003 Sep;73(9):712-6. Doi: 10.1046/J.1445-2197.2003.02748.X. Pmid: 12956787
- [8] Ahmed Ms, Askar Na. Combined Bony Closure Of Oroantral Fistula And Sinus Lift With Mandibular Bone Grafts For Subsequent Dental Implant Placement. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2011 Apr;111(4):E8-14. Doi: 10.1016/J.Tripleo.2011.01.003. Pmid: 21420631.
- [9] Jain Mk, Ramesh C, Sankar K, Lokesh Babu Kt. Pedicled Buccal Fat Pad In The Management Of Oroantral Fistula: A Clinical Study Of 15 Cases. *Int J Oral Maxillofac Surg.* 2012 Aug;41(8):1025-9. Doi: 10.1016/J.Ijom.2012.02.014. Epub 2012 Mar 21. Pmid: 22440613.
- [10] Nezafati S, Vafaii A, Ghojzadeh M. Comparison Of Pedicled Buccal Fat Pad Flap With Buccal Flap For Closure Of Oro-Antral Communication. *Int J Oral Maxillofac Surg.* 2012 May;41(5):624-8. Doi: 10.1016/J.Ijom.2011.11.011. Epub 2011 Dec 20. Pmid: 22192386.
- [11] Ahmed Wm. Closure Of Oroantral Fistula Using Titanium Plate With Transalveolar Wiring. *J Maxillofac Oral Surg.* 2015 Mar;14(1):121-5. Doi: 10.1007/S12663-013-0584-6. Epub 2013 Sep 26. Pmid: 25729237; Pmcid: Pmc4339339.
- [12] Daif Et. Long-Term Effectiveness Of The Pedicled Buccal Fat Pad In The Closure Of A Large Oroantral Fistula. *J Oral Maxillofac Surg.* 2016 Sep;74(9):1718-22. Doi: 10.1016/J.Joms.2016.04.033. Epub 2016 May 14. Pmid: 27265647.
- [13] Demetoglu U, Ocak H, Bilge S. Closure Of Oroantral Communication With Plasma-Rich Fibrin Membrane. *J Craniofac Surg.* 2018 Jun;29(4):E367-E370. Doi: 10.1097/Scs.00000000000004360. Pmid: 29485557.
- [14] Blal K, Alterman M, Abu Tair J. A Pedicled Palatal Periosteal Flap For The Closure Of Oro-Antral Fistula. *Int J Oral Maxillofac Surg.* 2020 Aug;49(8):1087-1091. Doi: 10.1016/J.Ijom.2020.01.014. Epub 2020 Jan 28. Pmid: 32005570.
- [15] Kumar Nilesh. (2020). Management Of Oroantral Communication Using Double Layered Closure With Buccal Fat Pad And Buccal Advancement Flap: Prospective Randomized Clinical Study. *Medico Legal Update*, 20(3), 264–268. <https://doi.org/10.37506/Mlu.V20i3.1407>
- [16] Xia J, Ma Y, Tian H, Zhang R. Repair Of Oroantral Fistula Via Modified Endoscopic Medial Maxillectomy With Free Nasal Mucoperichondrial-Osteal Graft. *Acta Otolaryngol.* 2019 Aug;139(8):701-706. Doi: 10.1080/00016489.2019.1614221. Epub 2019 May 20. Pmid: 31107127.
- [17] Fugazzotto Pa, Vlassis J. A Simplified Classification And Repair System For Sinus Membrane Perforations. *J Periodontol.* 2003 Oct;74(10):1534-41. Doi: 10.1902/Jop.2003.74.10.1534. Pmid: 14653401.
- [18] Holtzclaw D. Maxillary Sinus Membrane Repair With Amnion-Chorion Barriers: A Retrospective Case Series. *J Periodontol.* 2015 Aug;86(8):936-40. Doi: 10.1902/Jop.2015.140087c. Epub 2015 May 12. Pmid: 25965118.
- [19] Lim Aa, Wong Cw, Allen Jc Jr. Maxillary Third Molar: Patterns Of Impaction And Their Relation To Oroantral Perforation. *J Oral Maxillofac Surg.* 2012 May;70(5):1035-9. Doi: 10.1016/J.Joms.2012.01.032. Epub 2012 Apr 10. Pmid: 22494509.
- [20] Hernández-Alfaro F, Torradeflot Mm, Marti C. Prevalence And Management Of Schneiderian Membrane Perforations During Sinus-Lift Procedures. *Clin Oral Implants Res.* 2008 Jan;19(1):91-8. Doi: 10.1111/J.1600-0501.2007.01372.X. Epub 2007 Oct 23. Pmid: 17961185.
- [21] Nonsurgical Closure Of Oroantral Communications Using Occlusal Splints *Cumhuriyet Dental Journal*: 2017; 20(3) Doi: 10.7126/Cumudj.369104
- [22] De Oliveira Haab, De Moraes Rpf, Limirio Phjo, Dechichi P. Repair Of A Perforated Sinus Membrane With An Autogenous Periosteal Graft: A Study In 24 Patients. *Br J Oral Maxillofac Surg.* 2018 May;56(4):299-303. Doi: 10.1016/J.Bjoms.2017.12.020. Epub 2018 Mar 14. Pmid: 29550260.
- [23] Khandelwal P, Hajira N. Management Of Oro-Antral Communication And Fistula: Various Surgical Options. *World J Plast Surg.* 2017 Jan;6(1):3-8. Pmid: 28289607; Pmcid: Pmc5339603.
- [24] Kim Mj, Jung Uw, Kim Cs, Kim Kd, Choi Sh, Kim Ck, Cho Ks. Maxillary Sinus Septa: Prevalence, Height, Location, And Morphology. A Reformatted Computed Tomography Scan Analysis. *J Periodontol.* 2006 May;77(5):903-8. Doi: 10.1902/Jop.2006.050247. Pmid: 16671885.
- [25] Krennmair G, Ulm Cw, Lugmayr H, Solar P. The Incidence, Location, And Height Of Maxillary Sinus Septa In The Edentulous And Dentate Maxilla. *J Oral Maxillofac Surg.* 1999 Jun;57(6):667-71; Discussion 671-2. Doi: 10.1016/S0278-2391(99)90427-5. Pmid: 10368090.