Revista MedEs
Revista Científica Estudiantil de Matanzas
MedEst. 2024; Vol.4 No.3 ISSN: 2789-7567 RNPS: 2524

REVIEW ARTICLE

Surgical techniques for closure of orosinusal communication: literature review

Técnicas quirúrgicas para el cierre de comunicación bucosinusal: revisión de la literatura

Juan Antonio Rodríguez Alonso [1*], https://orcid.org/0000-0003-4273-1859

Ardyn Concepción González Morales [2], https://orcid.org/0009-0005-6966-2023

[1] Matanzas University of Medical Sciences. Dr. Juan Guiteras Gener Faculty of Medical Sciences. Matanzas, Cuba.

*** Corresponding author:** j02rodriguezlonso@gmail.com

Received: 03/01/2024

Accepted: 21/07/2024

How to cite this article: Rodríguez-Alonso JA, González-Morales AC. Surgical techniques for the closure of oro-sinusal communication: a literature review. Med. Es. [Internet]. 2024 [cited access date]; 4(3):e272. Available in: https://revmedest.sld.cu/index.php/medest/article/view/272

ABSTRACT

Introduction: orosinusal communication is a pathological condition that occurs due to the existence of a solution of continuity between the oral cavity and the maxillary sinus, which may be due to the loss of soft tissues of both the oral mucosa and the sinus mucosa. and loss of teeth or jaw bone.

Objective: to describe the main surgical techniques used in the closure of oro-sinus communications.

MedEst. 2024; Vol.4 No.3
ISSN: 2789-7567 RNPS: 2524

Methodological design: the Google Academic, Infomed, SciELO and Pubmed search engine was used and a search strategy of keywords: Oral Surgery, Oral Sinus Communication, Maxillary, Surgical Procedure was applied. A total of 20 bibliographies were consulted.

Development: the treatment of these communications may be deferred and this will depend on the size of the communication, the presence of a previous sinus infection or the requirement for general anesthesia. As for treatments, there are different types with precise indications.

Conclusions: for the closure of oro-sinus communications, several surgical techniques stand out, among them the vestibular flap is valued for its simplicity and effectiveness, while the rotational palatal flap is useful for primary closures. The connective tissue flap promotes healing by first intention, and the pedicled flap with buccal adipose tissue provides good support and healing. The choice of technique depends on the size of the communication, the anatomical location and the patient's conditions, being crucial to minimize complications and ensure optimal recovery.

Keywords: Maxilla; Oral Surgery; Oral-sinus communication; Surgical procedure

RESUMEN

Introducción: la comunicación bucosinusal es una condición patológica que se da por la existencia de una solución de continuidad, entre la cavidad bucal y el seno maxilar, mismo que puede deberse a la pérdida de tejidos blandos tanto de la mucosa bucal como de la mucosa sinusal y la pérdida de dientes o del hueso maxilar.

Objetivo: describir las principales técnicas quirúrgicas utilizadas en el cierre de las comunicaciones bucosinusales.

Diseño Metodológico: se utilizó el buscador de Google Académico, Infomed, SciELO y Pubmed. Se aplicó una estrategia de búsqueda de palabras clave: Cirugía Oral, Comunicación buco sinusal, Maxilar, Procedimiento quirúrgico. Se consultaron un total de 20 bibliografías.

Desarrollo: el tratamiento de estas comunicaciones puede ser diferido y esto dependerá del tamaño de la comunicación, la presencia de una infección sinusal previa o el requerimiento de anestesia general. En cuanto a los tratamientos, hay diferentes tipos con indicaciones precisas.

MedEst. 2024; Vol.4 No.3
ISSN: 2789-7567 RNPS: 2524

Conclusiones: para el cierre de comunicaciones bucosinusales, se destacan varias técnicas quirúrgicas entre ellas el colgajo vestibular es valorado por su simplicidad y efectividad, mientras que el colgajo palatino rotacional es útil para cierres primarios. El colgajo de tejido conectivo favorece la cicatrización por primera intención, y el colgajo pediculado con tejido adiposo bucal proporciona buen soporte y cicatrización. La elección de la técnica depende del tamaño de la comunicación, la localización anatómica y las condiciones del paciente, siendo crucial para minimizar complicaciones y asegurar una recuperación óptima.

Palabras clave: Cirugía Oral; Comunicación buco sinusal; Maxilar, Procedimiento quirúrgico

INTRODUCTION

The maxillary sinus, also known as Higmore's antrum, is the largest paranasal sinus and is located in the maxilla, occupying most of the space within it. [1,2]

Oro-sinusal communication (OSC) is a pathological condition that occurs due to the existence of a gap between the oral cavity and the maxillary sinus. This can be due to the loss of soft tissue in both the oral mucosa and the sinus mucosa, and the loss of teeth or maxillary bone. [3-5]

The most common cause of OSC is the extraction of maxillary molars or premolars. This is due to the close relationship that often exists between the roots of these teeth and the maxillary sinus. [1,6] At least 15 % of maxillary sinus infections originate in the teeth. [4]

According to the literature, it has been reported that a communication between the mouth and the maxillary sinus occurs approximately 55 % of the time after the extraction of the maxillary first molar, while it is 28 % for the second molar and 8 % for the third molar. [7]

This is due to the short distance between the roots of the teeth and the maxillary sinus cavity, which varies between 1 and 7 mm, or to the protrusion of the roots into the maxillary sinus floor due to the high degree of pneumatization of the sinus. [8, 9]

Several factors can cause a rupture in the maxillary sinus membrane and lead to CBS, such as trauma, additional tooth extractions, implant surgery,

MedEst. 2024; Vol.4 No.3
ISSN: 2789-7567 RNPS: 2524

enucleation of cysts related to the maxillary sinus, or improper handling of dental instruments. [4, 8]

Oroantral or buccosinusal communication is a rare condition in the maxillofacial area. Although its prevalence is low, when this condition does not heal spontaneously, surgical intervention is required to close it. This entails high economic costs, discomfort, and pain for patients. [10]

For this reason, a review was conducted to describe the main surgical techniques used to close oro-sinusal communications.

MATERIALS AND METHODS

A bibliographic review was conducted on the topic, collecting information between May and June 2024. Search engines such as Google Scholar, Infomed, and the SciELO and Pubmed databases were used, applying a search strategy using keywords such as Oral Surgery, Oral-sinus communication, Maxilla, Surgical procedure, and their English equivalents: Maxilla, Oral Surgery, Oral-sinus communication, Surgical procedure. An analysis of the quality, reliability, and methodological validity of the selected articles was performed. A total of 20 bibliographic sources were selected based on their relevance as a selection criterion. In addition, the study was enriched by exchanging information with specialists and professors on the subject.

DEVELOPMENT

When a sinus-oral communication is recent, edematous and swollen edges may be observed, and there may be mild associated pain. In some cases, the communication may close spontaneously or heal by primary intention. However, if this does not occur, the communication may widen, and the patient may notice the entry of fluids or solid debris into the nasal cavity when eating and drinking. Once the communication is established due to an infectious process, severe pain, swelling, chewing difficulties, and discomfort may occur. [8, 11]

The diagnosis of sinus-oral communication can be made by observing epistaxis in the nostril on the side of the tooth extraction or by the bubbling of blood in the alveolus. The Valsalva maneuver can help confirm the diagnosis. Since the size of the communication is difficult to clinically determine, immediate surgical closure or closure within the first 24 to 48 hours is preferred, as this minimizes the risk of maxillary sinusitis and orosinusal fistula formation. [12, 13]

MedEst. 2024; Vol.4 No.3
ISSN: 2789-7567 RNPS: 2524

Insertion of the Bowman tube, which has blunt edges, is another valid method for diagnosing orosinusal communications in the maxillary sinus floor. (8)

Treatment of the maxillary sinus can follow a conservative approach, including the use of antibiotics, nasal decongestants, and lavage, or a surgical approach, depending on the situation. Immediate treatment, within the first 24 to 48 hours, of individuals with orosinusal communications has been established to have a 95 % success rate, while closure after this period has a 67,5 % success rate. (14)

During treatment, it is recommended to perform a generous lavage of the alveolus and perform punctual suctioning of the alveolar fundus to look for possible small root debris or bone fragments. Radiographs should also be used to evaluate the presence of tooth fragments in the alveolar fundus or in the maxillary sinus lumen. If fragments are found, the alveolus is sutured, and the patient is referred to a specialist. (14)

If the Valsalva test is positive and no tooth apices are found in the maxillary sinus, an absorbable sponge is placed in the alveolus, and the patient is immediately referred to an oral and maxillofacial surgeon with a prior prescription of antibiotics. (14)

It is recommended to avoid sneezing, physical exertion, and swimming, and it is advisable not to blow the nose vigorously. In addition, periapical and/or extraoral radiographic examinations should be performed to evaluate the maxillary sinuses, using radiographs such as the Waters radiograph. Surgical closure is the preferred treatment for oroantral communications.(12)

Treatment of these communications may be delayed depending on the size of the communication, the presence of a previous sinus infection, or the need for general anesthesia. There are different types of treatment with specific indications.(6)

It is important to note that before performing any procedure to close oroantral communications, the maxillary sinus must be completely clean and healthy.(3)

Vestibular flap technique

This technique is preferred for immediate closure of small (less than 3 mm) BSCs. (6,17) This flap is developed by making two diverging vertical buccal incisions that extend toward the vestibule from the extraction socket or from the margins of the communicating orifice. The trapezoidal buccal flap is

MedEst. 2024; Vol.4 No.3
ISSN: 2789-7567 RNPS: 2524

elevated, traverses the defect, and is sutured to the palatal margins of the defect. In this procedure, a wide-based trapezoidal mucoperiosteal flap is created and sutured over the defect. Its wide base ensures adequate blood supply. [4,17] Flap coverage is improved by horizontal periosteal incisions. [17]

Palatal Rotation Flap Technique

The palatal flap is an example of a defined vascular pedicle flap, where the flap length can be greater than its width without fear of distal flap necrosis, as long as the palatine artery is not injured during the dissection. It is indicated for communications larger than 5 mm in diameter and is typically used in close-up. [6]

For the palatal flap technique, a template of the bone defect is outlined, and a finger-shaped flap is designed on the palate ipsilateral to the communication. Two parallel incisions are then made, extending posteroanteriorly from the junction of the hard and soft palates to the area of the rugae. The full-thickness mucoperiosteal flap is then elevated, starting anteriorly and advancing posteriorly until the greater palatine neurovascular bundle is visible emerging from its foramen. [17]

When the island flap is sectioned from the posterior flap, a mucoperiosteal bridge is prepared between the defect and the lateral flap incision. The island flap, with its intact neurovascular bundle, is rotated and tunneled beneath this bridge of alveolar tissue, adapting it and suturing it circumferentially to the edge of the communication without tension. The posterior flap is then returned and sutured to its original location, and the defect in the anterior palatal donor area is covered. If the flap fails to complete closure of the communication, a buccal flap is used to complete the closure. [11]

Bichat Fat Ball Flap Technique

The Bichat fat ball flap was described in 1977 by Egyedi. [6] This technique is used when palatal flaps are unlikely to be used. The Bichat bubbles, located on the inside of the cheeks, are exposed and mobilized by releasing tissue from the periosteum. The flap is moved to the location of the communication entrance and sutured. [11] No grafts are necessary, and epithelialization is completed one month after surgery. [17] Its large blood supply helps it epithelialize itself quickly. This technique requires very careful manipulation of the flap. [3]

Temporal muscle flap technique

MedEst. 2024; Vol.4 No.3
ISSN: 2789-7567 RNPS: 2524

The temporalis muscle flap was described in 1895 by Lentz. The temporalis muscle is supplied by the anterior and posterior deep temporal arteries, branches of the internal maxillary artery, and the middle deep temporal artery, a collateral of the superficial temporal artery. (6) The temporalis flap is an effective technique for closing both oroantral and oronasal communications of large size. This is due to the volume and excellent vascularization of the temporalis muscle. It is generally used for reconstruction after ablative surgeries. (15)

One of the main consequences is the significant abnormal aesthetics of the temporal fossa, especially when the majority of the muscle is utilized. (16) Another significant limitation is that temporalis muscle flap reconstruction precludes any form of osseointegrated dental devices. (15, 16)

Dorsum-Lingual Flap Technique

The anterior-based dorsum-lingual flap was introduced by Guerrero-Santos and Altamirano in 1966 for the closure of a palatal fistula. (6) This method is performed as an alternative when buccal or palatal flaps have failed. (11) It is recommended to create a close-up of the palatal mucosa and then carve and position the lingual flap. After three weeks, if no complications occur, the pedicle can be cut, restoring normal lingual function. (6)

Comparison of success rates and complications

The buccal flap is the most commonly used and oldest, with an 87.2% success rate in procedures performed. It should be noted that after closure of the oroantral communication, antibiotics such as amoxicillin and clavulanic acid or clindamycin should be administered for at least seven days. General considerations for the patient should also be given, such as maintaining strict oral hygiene, avoiding nose blowing, and maintaining a soft diet. (13)

The flap may also result in a very shallow buccal groove, which can interfere with prosthodontic rehabilitation and the maintenance of oral hygiene. Regarding its advantages, it provides good blood flow, and buccal flaps require careful handling. (17)

On the other hand, in a persistent oroantral fistula, it must be excised before surgical closure, eliminating any sinus pathology, sinus infection, degenerated mucosa, and diseased bone. The most commonly used flap for this complication and other defects is the Bichat fat pad flap. (13)

MedEst. 2024; Vol.4 No.3
ISSN: 2789-7567 RNPS: 2524

The palatal flap technique has the advantage of achieving a hermetic closure of the communication, because the vestibular flap is repositioned in a site distant from the communication, resting on healthy bone and being contained by the palatal fibromucosa, reducing the possibility of reopening a sinus-oral communication. (18)

One of the main disadvantages of using a palatal flap to close a BSC is that there may be a risk of tissue necrosis if excessive rotation is performed. (21)

This technique is chosen due to the ease of flap rotation, its abundant blood supply, consistent characteristics, low donor site morbidity, low complication rate, low risk of infection, and rapid surgical technique. (2) This method is simple, durable, highly convenient, and reliable for closing orosinusal defects. (3)

Complications arising from oral interventions using the Bichat fat pad are minimal or virtually nonexistent, as it is highly effective. (19) However, in certain cases, postoperative trismus, facial nerve injuries, hematomas, temporary weakness of the buccinator muscle, and, in some cases, cosmetic deformity of the cheek are observed. (2)

Failure to address orosinusal defects will always lead to medical problems that can even affect the patient's life. Hence, the importance of ongoing dialogue between healthcare personnel with the goal of intervening early and not negatively impacting the patient's life. (20)

CONCLUSIONS

For the closure of oromucosal defects, several surgical techniques stand out. The vestibular flap is valued for its simplicity and effectiveness, while the palatal rotational flap is useful for primary closures. The connective tissue flap promotes healing by primary intention, and the pedicled flap with buccal adipose tissue provides good support and healing. The choice of technique depends on the size of the defect, the anatomical location, and the patient's condition, and is crucial to minimize complications and ensure optimal recovery.

BIBLIOGRAPHIC REFERENCES

1. Mosca CO, Miguelez SE, Bavaro J, Crocetta C, Rey E. Comunicación buco sinusal a causa de un quiste odontogénico residual. Revista de la Fundación

MedEst. 2024; Vol.4 No.3
ISSN: 2789-7567 RNPS: 2524

Juan José Carraro [Internet]. 2021. [cited 06/06/2024]. Available in: https://pesquisa.bvsalud.org/odontologia/resource/espt/biblio-1223346

2. Aynaguano Aynaguano JB. Manejo de las comunicaciones oroantrales en el ámbito de la Odontología General. [Internet]. 2024. [cited 06/06/2024]. Available in: http://dspace.unach.edu.ec/handle/51000/12945

3. Veloz Vaicilla Gs. Comunicación Bucosinusal De Origen Odontogénico. Presentación De Caso Clínico. [Internet]. 2021. [cited 06/06/2024]. Available in: https://dspace.uniandes.edu.ec/handle/123456789/13407

4. Sullca Solano JD. Nivel de conocimiento de comunicación bucosinusal en estudiantes de una universidad privada Huancayo. [Internet]. 2021 [cited 06/06/2024]. Available in: https://repositorio.upla.edu.pe/bitstream/handle/20.500.12848/2376/TESIS%20FINAL.pdf?sequence=1&isAllowed=y

5. Pal S, Rao K, Sanjenbam N, Thounaojam N, Geeta R, Bagde H. A double barrier technique in surgical closure of oroantral communication. Cureus. [Internet]. 2022. [cited 06/06/2024]; 14(11): E31671. Available in: https://doi.org/10.7759/cureus.31671

6. Funes Pivetta GN, Ailen Cores B, Noemi Soler C, Beltran Bedogni L, Arienza F. Tratamiento de comunicaciones bucosinusales y buconasales. Reporte de cinco casos de diferente etiología. Rev Asoc Odont Arg [Internet]. 2023. [cited 06/06/2024]; 111(2). Available in: http://www.SciELO.org.ar/SciELO.php?script=sci_abstract&pid=S2683-72262023000200833&lng=es&nrm=iso

7. Gonzales Alarcon JS. Frecuencia de complicaciones postexodoncia en cirugías de terceros molares en una clínica odontológica de Chiclayo, 2015-2019. [Internet]. 2023. [cited 06/06/2024]. Available in: http://repositorio.uss.edu.pe/handle/20.500.12802/11613

8. del Rey Santamaría M, Valmaseda Castellón E, Berini Aytés L, Gay Escoda C. Incidencia de comunicación bucosinusal tras la extracción de 389 terceros molares superiores. Med Oral Patol Oral Cir Bucal [Internet]. 2006 [cited 06/06/2024]; 11: E334-8. Available in: http://SciELO.isciii.es/SciELO.php?script=sci_arttext&pid=S1698-69462006000400008

MedEst. 2024; Vol.4 No.3
ISSN: 2789-7567 RNPS: 2524

9. Antezana Méndez R. Uso del plasma rico en fibrina(PRF) para la resolución de comunicaciones orosinusales. [Internet]. 2023 [cited 06/06/2024]. Available in: https://repositorio.umsa.bo/bitstream/handle/123456789/34998/TE-113.pdf?sequence=1&isAllowed=y

10. Corderch Fonseca CF. Revisión sistemática del uso de fibrina rica en plaquetas para el cierre de comunicaciones y fístulas oroantrales. [Internet]. 2022. [cited 06/06/2024]. Available in: https://repositorio.uchile.cl/bitstream/handle/2250/196221/Revision-sistematica-del-uso-de-fibrina-rica-en-plaquetas.pdf?sequence=1&isAllowed=y

11. Gamboa Gamboa BG, Bernal Vesga E. Técnicas de diagnóstico y tratamiento más usadas en el manejo de la Comunicación Oroantral por cirujanos orales y maxilofaciales de Santander. [Internet] 2020. [cited 06/06/2024]. Available in: https://repository.usta.edu.co/bitstream/handle/11634/30749/2020GamboaGabriela.pdf?sequence=1&isAllowed=y

12. Surco Soncco II. Nivel De Conocimiento Sobre Complicaciones Intra Operatorio y Post Operatorio De Exodoncias En Alumnos Del Séptimo y Noveno Semestre De La Clínica Odontológica De La Universidad Católica De Santa María, Arequipa 2022. [Internet] 2022. [cited 06/06/2024]. Available in: https://repositorio.ucsm.edu.pe/bitstreams/d956ec2b-7a36-4a45-b33d-51b736f6a062/download

13. Fung Mejía V, Vargas Cornejo HM. Nivel de conocimiento sobre el manejo de complicaciones locales post exodoncias simples en los estudiantes de estomatología de una universidad privada Piura, 2021. [Internet]. 2021. [cited 06/06/2024]. Available in: https://repositorio.ucv.edu.pe/bitstream/handle/20.500.12692/81300/Fung_MV-Vargas_CHM-SD.pdf?sequence=1&isAllowed=y

14. Batista Vila M, Hernández Pedroso L, González Ramos RM, Batista Bochs MM. Comportamiento de la comunicación bucosinusal post exodoncia atendidas a nivel hospitalario. Revista de Ciencias Médcias La Habana [Internet]. 2015. [cited 06/06/2024]; 21(3):566-574. Available in: https://revcmhabana.sld.cu/index.php/rcmh/article/download/862/pdf_73

15. Vásquez-Villafane A, Arias-Lucano J, Seminario-Amez M, Guevara-Canales J, Morales-Vadillo R, Cava- Vergiu C, Alberca Ramos E. Comunicación

bucosinusal: Revisión de la literatura. KIRU [Internet]. 2017. [cited 06/06/2024]; 14(1):91–97. Available in: http://doi.org/10.24265/kiru.2017.v17n1.13.

16. Lehner J, Gellée T, Levy-Bohbot A, Pomes B, Goudot P, Bertolus C. Cirugía de las comunicaciones buconasosinusales. EMC - Cirugía Otorrinolaringológica y Cervicofacial [Internet]. 2024. [cited 06/06/2024]; 25(1):1–14. Available in: https://doi.org/10.1016/s1635-2505(24)49034-8

17. Sáenz Rosado L. Complicación quirúrgica en la exodoncia de canino incluido en bóveda palatina. [Internet]. 2021. [cited 06/06/2024] Available in: https://idus.us.es/bitstream/handle/11441/134805/TFG%20518-S%c3%81ENZ%20ROSADO.pdf?sequence=1&isAllowed=y

18. Corominas O, Emiliano P, Sebastián F, Lucio M. Cuerpo extraño en el seno maxilar. Cierre quirúrgico por la técnica de bolsillo palatino. Revista Facultad Odontología (UNC). [Internet]. 2021. [cited 06/06/2024]; 31(2):20-24. Available in: https://doi.org/10.25014/revfacodont271.2020.31.2.20

19. García Vergara JG. Uso de la bola adiposa de Bichat en cirugía oral. [Internet]. 2022. [citado 06/06/2024]. Available in: https://dspace.uniandes.edu.ec/bitstream/123456789/14751/1/UA-ODO-EAC-009-2022.pdf

20. Ramírez Almeida JR, Parise Vasco JM, Castro JA, Armas Vega A. Uso de bolsa adiposa de Bichat pediculada como recurso para el cierre de comunicaciones y fístulas bucoantrales: informe de caso. Odontología Vital [Internet]. 2020 [cited 06/06/2024]; (33):7-14. Available in: http://www.scielo.sa.cr/scielo.php?script=sci_arttext&pid=S1659-07752020000200007&lng=en

STATEMENT OF AUTHORSHIP

JARA: conceptualization, research, methodology, project administration, validation, writing of the original draft, review, editing.

ACGM: conceptualization, research, methodology, project administration, validation, writing of the original draft, review, editing.

CONFLICT OF INTEREST

MedEst. 2024; Vol.4 No.3
ISSN: 2789-7567 RNPS: 2524

The authors declare that there are no conflicts of interest.

SOURCES OF FINANCING

The authors did not receive funding for the development of this article.