



**ORIGINAL RESEARCH PAPER**

**Medical Science**

**REMOVAL OF RADICULAR FRAGMENT INCIDENTALLY INJURED INTO MAXILLARY SINUS AND ORAL SINUS COMMUNICATION CLOSURE WITH BICHAT ADIPOSEOUS BODY.**

**KEY WORDS:** Maxillary Sinus, Bucco-sinus Communication, Bichat Ball.

**George Borja de Freitas**

Jhonatan Thiago Lacerda Santos Paula Bernardon Fábio Bastos Gomes  
Alessandra de Freitas e Silva Luiz Roberto Coutinho Manhães Júnior

**ABSTRACT**

Oral sinus communication is a pathological communication between the oral cavity and the maxillary sinus with Schneiderian membrane rupture. The oroantral fistula is an anatomical, pathological, epithelial canal that develops when oral sinus communication does not close spontaneously in a period of 48-72 hours. This case report demonstrates a technique of root removal within the maxillary sinus by Mead incision with anterior maxillary sinus wall osteotomy by the Caldwell-Luc approach and closure of bucco-sinus communication with the application of the Bichat ball. Antibiotic and nasal decongestant were administered in the pre and postoperative. The adipose body of Bichat Ball presented as an effective surgical technique for the closure resolution of the bucco-sinus communications, presenting low postoperative morbidity to the patient and satisfactory amount of adipose tissue.

**Introduction**

Exodontia is routinely performed as a surgical procedure in dental offices, even though most cases are simple, complications may arise (Borgonovo, Rizza, Dudaite, Censi & Re, 2013). These complications range from dry alveolus to displacement of a tooth into the maxillary sinus, and the dental surgeon must be able to resolve such disorders (Venkateshwar, Padhye, Khosla & Kakkar, 2011) even if the resolution of the event is not possible at the moment of the occurrence, the case must be monitored and solved as soon as possible.

Oral-sinus communication (OSC) is one of the accidents that can occur during an exodontia (Abad-Gallegos, Figueiredo, Rodriguez-Baeza & Gay-Escoda, 2011; Agrawal, Singhal, Kumar, Singh & Bhagol, 2015; Alonso-González, Peñarrocha-Diago, Peñarrocha-Oltra, Aloy-Prósper, Camacho-Alonso & Peñarrocha-Diago, 2015; Kim, Han & Kim, 2017; Jee, 2017). OSC is a pathological communication between the oral cavity and the maxillary sinus (Abuabara, Cortez, Passeri, de Moraes, Moreira, 2006; Assad, Bitar & Alhajj, 2017; Dym & Wolf, 2012) with rupture of the Schneiderian membrane (Dym & Wolf, 2012), being caused in the majority of cases after the first and second maxillary molars extraction (Bitar & Alhajj, 2017; Dym & Wolf, 2012; Jee, 2017; Khandelwal & Hajira, 2017; Procacci et al., 2016; Ram et al., 2016). The oroantral fistula (OAF) is an anatomical, pathological, epithelial canal that develops when OSC does not close spontaneously in a period of 48-72 hours (Khandelwal & Hajira, 2017; Ram et al., 2016). Several treatments for communication closure are described in the literature, and surgical methods are the most used, among them the Rehrmann buccal flap, graft with hydroxyapatite crystals, atrial cartilage graft (Khandelwal & Hajira, 2017; Ram et al., 2016), in addition to the use of fibrin-rich plaque and the Bichat ball (Assad, Bitar & Alhajj, 2017; Bilginaylar, 2018; De Biasi, Maglione & Angerame, 2014).

Bichat Ball was first described in 1732 by Heister, but Bichat in 1801 (Bichat, 1801) was the first to describe it as a body consisting of fat and became commonly known as the "Bichat Ball" or "Adipose Body of the Mouth" (Tostevin & Ellis, 1995). The Bichat ball use for OSC closure was first described by Egyedi in 1977 (Alonso-González, Peñarrocha-Diago, Peñarrocha-Oltra, Aloy-Prósper, Camacho-Alonso & Peñarrocha-Diago, 2015; Egyedi, 1977; Kim, Han & Kim, 2017; Komatsu, Ikemura & Kimata, 2017). It is commonly carried out not only for the resolution of OSC but also for filling facial deformities (Kim, Han & Kim, 2017) and root coverage (Agarwal, Gayathri & Mehta, 2014). There is no significant variation in Bichat Ball size in relation to body weight and body fat distribution (Salehi-Nik, Rezai Rad, Kheiri, Nazeman, Nadjmi & Khojasteh, 2017), with a mean volume of 9.6 mL, ranging from 8.3 mL to 11.9 mL.

The present report aims to describe a clinical case about the oral sinus communication caused by a dental element intrusion and the

closure of it with Bichat's ball, as well as describe the surgical technique adopted.

**Report Case**

Patient ACBG female, 42 years old, melanoderma, sought the service of Oral Surgery, referenced by his dental surgeon after an unsuccessful attempt to the extraction of left maxillary first molar. Patient ASA II with Controlled Hypertension and under treatment for depression. The intraoral examination revealed absence and a fistulous path in the region of the extraction, suggestive of bucco-sinus communication. In the anamnesis, the patient reported face and sternum pain with a 21 days-duration and a clinical complaint that the ingested fluids were returning through the ipsilateral nasal cavity. A panoramic radiograph was requested and a Cone-Beam Computed Tomography (CBCT) examination was performed, where was possible to observe in the right maxillary sinus, a hyperdensal image measuring 15 mm, suggestive of a dental fragment located in the maxillary sinus floor and sinus veil.

Administration of amoxicillin 500 mg with potassium clavulanate 125 mg Clavulin®, GlaxoSmithKline Brasil Ltda., Rio de Janeiro, RJ, Brazil) every 8 hours for 15 days and nasal decongestant (Rinosoro® Farmasa, SP, Brazil) for 15 days was adopted as preoperative management. In the immediate preoperative period, 2 dexamethasone 4mg tablets (Teuto Brasileiro S / A, Anápolis, GO, Brazil) were given one hour before the procedure. Extraoral antisepsis was performed with 2% chlorhexidine digluconate (Riohex®, Rioquímica, São José do Rio Preto, SP, Brazil) and intraoral antisepsis with 0.1% chlorhexidine digluconate (Colgate-Palmolive®, São Bernardo do Campo, SP, Brazil). The surgical procedure was performed in the outpatient setting, under local anesthesia with Articaine Hydrochloride 4% with epinephrine 1: 100.000 (Articaine®, DFL Indústria e Comércio Ltda., Rio de Janeiro, RJ, Brazil).

The surgical technique adopted was the Mead incision with anterior maxillary sinus wall osteotomy by the Caldwell-Luc approach. After the incision, the mucoperiosteal detachment was performed, providing a good visualization of the anterior wall of the maxillary sinus. An osteotomy was performed with a cylindrical surgical drill No. 702 long rod (Angelus Prima Dental Ltda., Londrina, PR, Brazil), under heavy irrigation with sterile 0.9% sodium chloride saline. Then, a linear incision was made on the Schneiderian's membrane, immediately observing purulent exudate, and a vigorous curettage of the maxillary sinus was performed with curettes for maxillary sinus lift (Quinelato® Schobell Industrial Ltda. Rio Claro, SP, Brazil). The tooth was carefully moved to the anterior wall of the maxillary sinus to be removed through the surgical opening and removed with the aid of a Halsted Mosquito Curved Tweezers (Quinelato® Schobell Industrial Ltda. Rio Claro, SP, Brazil). After the tooth was removed, irrigation was performed in abundance at the site with sterile saline solution of 0.9% sodium chloride. A periosteal and cautious

incision and subsequent tissue division was performed to access the Bichat fat ball, after the grease ball was grasped with the curved Halsted Mosquito Tweezer (Quinelato® Schobell Industrial Ltda. Rio Claro, SP, Brazil) and traction it until total obliteration of the bucco-sinus communication. After the bichat ball traction test, suture was performed on the palatine mucosa using the Categute® 4-0 (Technofio, Brazil) resorbable suture yarn and the rest of the flap was repositioned on the access and sutured with silk 3.0 (Ethicon®, Johnson & Johnson, São José dos Campos, SP, Brazil).

The patient was verbally instructed about post-operative care, in addition to having been prescribed amoxicillin 500mg with clavulanate potassium 125mg (Clavulin®, GlaxoSmithKline Brasil Ltda., Rio de Janeiro, RJ, Brazil) every 8 for 15 days, decongestant nasal spray (Rinosoro® Farmasa, SP, Brazil) every 4 hours for a period of 15 days and tetramethol ketorolac (Toragesic®, Germed Pharmaceuticals Ltda., Hortolândia, SP, Brazil) every 8 hours in the first 48 hours for post-surgical pain symptomatology control. The region was washed with 0.1% chlorhexidine digluconate (Colgate-Palmolive®, São Bernardo do Campo, SP, Brazil) in a disposable 20ml Luer syringe, two times a day for a period of eight days, in order to control chemically the microbial biofilm. In the postoperative period, the patient presented no major interferences. Within 10 days the sutures were removed, without pain, without signs of infection or inflammation.

The patient was under routine clinical and radiographic control for 3 months, with no pathological sinus occurrences or symptom complaints.

### Discussion

Surgical complications can occur during dental extraction procedures, ranging from the most frequent such as dry socket and root fracture, to more unusual situations such as displacement of a root fragment to the maxillary sinus and oral-sinus communication (Venkateshwar, Padhye, Khosla & Kakkar, 2011). The OSC prognosis depends on its size, communications up to 2 mm can be closed spontaneously if the maxillary sinus does not present infection (Kim, Han & Kim, 2017; Procacci et al., 2016), while OSC larger than 2 mm surgical intervention is necessary (Abuabara, Cortez, Passeri, de Moraes & Moreira, 2006; Alonso-González, Peñarrocha-Diogo, Peñarrocha-Oltra, Aloy-Prósper, Camacho-Alonso & Peñarrocha-Diogo, 2015; Procacci, 2016). When the tomographic sections were analyzed, it was possible to measure the OSC diameter, which presented 11 mm, confirming for surgical intervention needing.

The communication closure is fundamental to prevent the microorganisms, food or saliva passage into the maxillary sinus (Khandelwal & Hajira, 2017; Procacci, 2016; Ram et al., 2016). It is recommended that any communication between the maxillary sinus and the oral cavity that lasts more than 3 weeks should be surgically closed in order to avoid sinus problems (Borgonovo, Berardinelli, Favale & Maiorana, 2012). The patient here reported, sought treatment after a period of 21 days, reporting abnormalities on the face. In a systematic review, it was verified that the symptoms of OSC are epistaxis, facial pain in the maxillary sinus region, passage of air and liquid from the mouth cavity through the nose, alteration in voice resonance, purulent nasal secretion, polyp development at the fistulous canal entrance (Kiran Kumar Krishanappa et al., 2016). In the present case, the observed symptoms were pain in the face, sternutation and clinical complaint that the liquids ingested were returning through the nasal cavity.

To confirm a OAF, the diagnosis can be made through several techniques, among them, the Valsalva maneuver, which consists in asking the patient to blow through the nostrils closing like nostrils, in this way a presence of air bubbles, blood or secretion, as well as a whistle issued when you drag it through the hole. Another form of testing may be the use of an odontoposto placing the same in the region of suspicion, observing if there will be the blurring of the mirror (Khandelwal & Hajira, 2017). Also reported is a use of a gutta-percha cone, with no tricks and an X-ray with the

cone in place, tracing the possible path of OAF (Agrawal, Singhal, Kumar, Singh & Bhagol, 2015; Assad, Bitar & Alhaji, 2017). A panoramic radiograph, even with its limitations, an estimate of OAF size, reveals a presence and location of dental roots or any other company that has been chosen for the sinus (Khandelwal & Hajira, 2017). When attending the specialized dental clinic, the conduction to the diagnostic closure by means of intra-oral examination and panoramic radiography. To accurately determine a location, size and a relationship of the tooth with adjacent structures, providing a better surgical planning a CBCT was performed.

In a study that reported eight cases for OSC closure with Bichat's Ball, it was possible to notice a greater predominance of OSC in female sex with 85.7% and an average age of 34.9 years (Abad-Gallegos, Figueiredo, Rodríguez-Baeza & Gay-Escoda, 2011), another study found that the age mean was 46 years old (Ram et al., 2016). The present report refers to a 42-year-old female patient, corroborating the results found in the literature. The predominance of females in cases of OAF can be explained due to the greater volume of the maxillary sinuses in women when compared to men (Lin, Bukachaevsky & Blake, 1991).

When observing the most frequent location of OSC, it is verified that there is distinct information as to the specificity of the dental element involved, a literary consensus is that the dental elements involved in the majority are the posterior teeth of the maxilla. In a study that verified the OAF formation after dental element surgical removal, a higher frequency was observed during the extraction of the first upper molars (Yalçın, Öncü, Emes, Atalay & Aktaş, 2011). In current studies described in the literature, for resolution of such condition, it was also possible to note a higher frequency during extraction of the first upper molars (Agrawal, Singhal, Kumar, Singh & Bhagol, 2015; Assad, Bitar & Alhaji, 2017; Bilginaylar, 2018; Dym & Wolf, 2012; Ram, 2016). An observational study in CBCT examinations found that the apex of the upper first molar palatine root occurs more frequently within the maxillary sinus (Amorim, Silva, Cunha, Souto, São Mateus & Souza, 2015) thus providing a greater predisposition for OSC. The case reported here concerns the OAF conduction caused by the unsuccessful attempt of the extraction of a first upper molar, according to previous studies.

FBS treatment is one of the major challenges in the field of oral surgery, whose decision of the surgical approach should consider some criteria, such as location and opening size, alveolar ridge height, vestibular depth, opening time and sinus inflammation or infection (Khandelwal & Hajira, 2017). Several surgical techniques have been described in the literature, among them the soft tissue flap (buccal mucosa, palatal mucosa, buccal mucosa and buccal adipose body), autogenous bone grafts, atrial cartilage graft and third molar transplantation (Ram, 2016). Therefore, the appropriate choice of surgical approach depends on the patient's conditions and the skill of the surgeon.

Bichat Ball is one of the treatment options for OAF, being widely used to resolve these cases (Abad-Gallegos, Figueiredo, Rodríguez-Baeza & Gay-Escoda, 2011; Abuabara, Cortez, Passeri, de Moraes & Moreira, 2006; Agrawal, Singhal, Kumar, Singh & Bhagol, 2015; Agarwal, Gayathri & Mehta, 2014; Alonso-González, Peñarrocha-Diogo, Peñarrocha-Oltra, Aloy-Prósper, Camacho-Alonso & Peñarrocha-Diogo, 2015; Egyedi, 1977; Jee, 2017; Kim, Han & Kim, 2017; Kiran Kumar Krishanappa, 2016). A study that verified the level of satisfaction of the patient after the resolution of OSC with Ball of Bichat, concluded that this technique was successful in closing 10 of the 11 cases and the patients submitted to the technique, were highly satisfied with the treatment, phonetics, aesthetics and chewing (Alonso-González, Peñarrocha-Diogo, Peñarrocha-Oltra, Aloy-Prósper, Camacho-Alonso & Peñarrocha-Diogo, 2015).

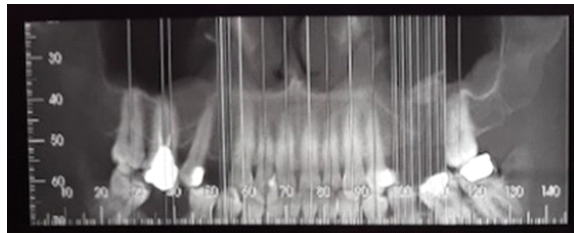
The most commonly used surgical techniques are the Rermahn flap and the Bichat ball (Bilginaylar, 2018; De Biasi, Maglione & Angerame, 2014; Procacci, 2016). A systematic review comparing both techniques for OSC and OAF treatment, found no difference

between the techniques (Kiran Kumar Krishanappa, 2016). However, the use of Bichat Ball for the communications closure is a feasible and reliable technique (Jee, 2017). The Bichat Ball is an accessible reserve of stem cells, rich in blood supply (Jee, 2017; Salehi-Nik, Rezai Rad, Kheiri, Nazeman, Nadjmi, Khojasteh, 2017) which can be obtained through the oral cavity without external injury to the body of the individual (Salehi-Nik, Rezai Rad, Kheiri, Nazeman, Nadjmi & Khojasteh, 2017) consequently stimulating the tissue new formation, for this reason was adopted this technique for the resolution of the present report.

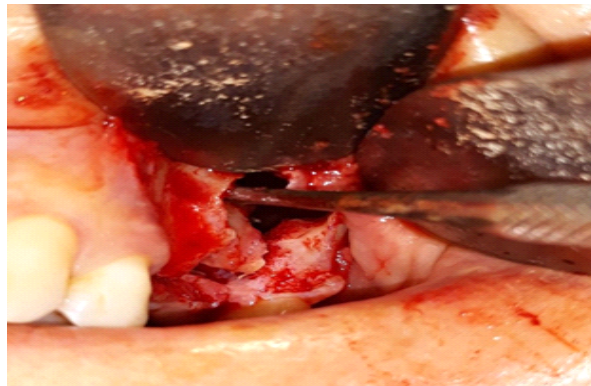
**Conclusion**

In view of the above, it is confirmed that the adipose body of Bichat presented as an effective surgical technique for the closure resolution of the bucco-sinus communications, presenting low postoperative morbidity to the patient and satisfactory amount of adipose tissue.

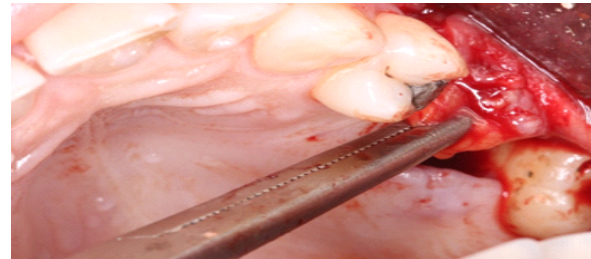
**Figure 1: Panoramic tomographic reconstruction, demonstrating hyperdense image inside the left maxillary sinus suggestive of a dental fragment.**



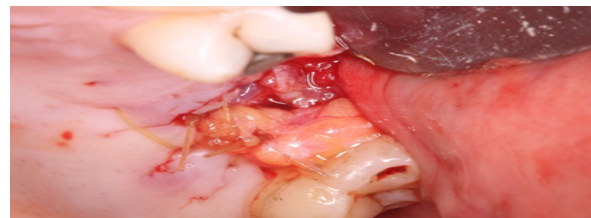
**Figure 2: Access of the anterior wall of the maxillary sinus and removal of the dental fragment.**



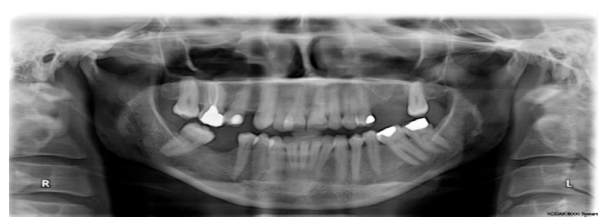
**Figure 3: Bichat ball traction for closure of bucco-sinusal communication**



**Figure 4: Stabilization and fixation of Bichat Ball using suture.**



**Figure 5: Panoramic radiography of control after 3 months.**



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