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Diagnosis, Management, and Prevention of Oroantral Communication as a Complication Following Extraction of Permanent Maxillary Teeth, Implications to Physical Activity and Sport - Narrative Review

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Abstract

Background:

Oroantral Communication (OAC) is a pathological connection between the oral cavity and the maxillary sinus. It is most frequently created as a complication during the extraction of posterior maxillary teeth, with an incidence ranging from 0,31 to 4,8%. If the OAC is not managed and closed within 48-72 hours, the tract of connection undergoes epithelialization and progresses to an oroantral fistula (OAF). This leads to chronic sinusitis, causing headaches, passage of fluids, and a significant reduction in the patient's quality of life.

Aim:

The aim of this systematic review is to assess diagnostic possibilities, preventive strategies, and therapeutic techniques, and to compare modern and traditional methods for managing the OAC.

Material and methods:

This paper searched the literature on electronic databases, including PubMed, using the keywords: "Oroantral Communication", "Oroantral Fistula", "Extraction Complications", and "CBCT". Articles include randomized controlled trials, meta-analyses, and systematic reviews from 2007 to the present year.

Results:

Research shows that CBCT is the gold standard for assessing the risk of OAC. It provides a three-dimensional evaluation of the root apex position and orientation, allowing precise procedure planning and minimizing iatrogenic risk. When it comes to treatment, surgical closure has an over 90% success rate. Evidence shows that the buccal fat pad is the most efficient technique when the OAC size exceeds 5 mm. For smaller communications, up to 5 mm, the use of PRF and collagen membranes (GTR) allows for effective closure without reducing vestibular depth. The flapless techniques are also better tolerated by patients, reducing postoperative complaints by nearly 50%.

Conclusions:

Oroantral communication is a relatively frequent complication; its early management is key to preventing chronic sinusitis. The treatment plan must be chosen individually; it depends on the size of the communication track, the patient's health condition, and further treatment plans.

Key words:

Oroantral communication, complication, extraction, CBCT, dental surgery

1. Introduction

Oroantral communication, a pathological connection between the oral cavity and maxillary sinus, is a tooth extraction complication because of the anatomical closeness of the sinus and the upper teeth's root apices. (1,2) Those structures can be as close as 1 mm apart. (3,4) In many patients, the root apices of maxillary posterior teeth are separated from the Schneiderian membrane, lining the maxillary sinus by only a thin osseous layer, and in some cases may be in direct contact with the membrane. (5–7) AOC is created mostly during the extraction of the upper premolars or molars, which are responsible for 48% to 92,6% of these complications. (5,8) Most frequently by the extraction of the first (27%) and the second upper molar (45%), but can also be caused by the extraction of the upper wisdom teeth (25% in impacted teeth). (7,9) Other than that, the Oroantral Communication can be caused by a craniofacial trauma, cyst or tumor resection, sinus lifts, but also chronic periapical inflammation or periodontological conditions. (7,9–11) If the OAC is not successfully managed within 48-72 hours, migration of the oral epithelium along the communication tract occurs, creating a persistent oroantral fistula (OAF). (12,13) The OAF cannot heal spontaneously because the connection tract is fully lined by the epithelium, which prevents the organization of a stable blood clot necessary for secondary intention healing. (5,14,15) It is especially dangerous as it allows the passage of microorganisms, food debris, and fluids from the oral cavity into the maxillary sinus, resulting in sinusitis in approximately 50% of patients within 48 hours and up to 90% within two weeks. (14,16–18) Untreated OAC and OAF with chronic sinusitis result in purulent discharge, voice changes, halitosis, and persistent headaches, which significantly lower the quality of the patient's life. (5,19,20) Furthermore, chronic sinusitis, with all its

consequences, makes prosthetic and implantological rehabilitation much more difficult. (2,12,21) For these reasons, Oroantral Communication should be treated immediately, usually by surgical closure. This is a key to preventing chronic sinus conditions. (1,22) As there are numerous techniques for OAC treatment, the choice of the fitting one needs to be made individually and guided by an accurate radiological assessment. (4,23)

2. Diagnosis and risk assessment

2.1. Clinical Examination and Diagnostic Evaluation

Early diagnosis of Oroantral communication is essential for successful treatment. (8) Since its immediate management is key to preventing OAF from forming, diagnostic tests should be performed directly after an extraction. (14) Subjective symptoms are distinctive and should be taken into consideration in decision-making. (20,21)

Clinical history:

Fluid regurgitation: the patient often reports passage of fluids from the oral cavity to the nose while drinking. (5,19) Gentle alveolar socket irrigation performed after the extraction can confirm the suspicion of Oroantral Communication. (5)

Voice change: Changes in voice resonance (hypernasal speech) and characteristic whistling sounds during speech and breathing may be observed. These symptoms indicate airflow through the OAC, which alters the resonant function of the sinus. (5,15,20)

Concomitant symptoms: one-sided nasal discharge (purulent or bloody), halitosis, hyposmia or parosmia, and headaches, especially in the infraorbital region. (5,24)

Diagnostic tests:

Valsalva maneuver: is commonly used in the clinical diagnosis of oroantral communication and fistula. (5,25) During the examination, the patient is asked to press both nostrils and gently exhale through the nose while keeping the mouth open. (8,25) In the presence of an OAC/OAF, air passage through the communication may produce a characteristic whistling sound. (7,20) Additionally, air bubbles, blood, or mucus discharge at the site of the defect may be observed. (8,20) This test's sensitivity is reported to be around 52%. (26) When performing the test, the patient should avoid forceful blowing, as it can perforate the Schneiderian membrane and create communication. (20)

Cheek-blowing Test: The patient is asked to puff out their cheeks with the mouth closed. Air leakage through the sinus into the nose confirms the communication. (5,7) Similar to the Valsalva maneuver, this test should be performed with extreme caution, as it carries a risk of inducing OAC. Additionally, research shows that conducting this test may transport bacteria into the maxillary sinus, leading to sinus inflammation. (7,24)

Probing an empty socket consists of gentle palpation with a blunt instrument- the Bowmann's probe. (8,26) It can successfully detect Oroantral Communication in 98% of cases. (26) It should be performed very carefully; excessively forceful probing can cause the Schneiderian membrane to perforate or the displacement of a foreign body into the maxillary sinus. (8,24)

Visual inspection: In large Oroantral Communications, the tract can be directly observed, making the diagnosis straightforward. (8,14)

Socket Irrigation: Observing the passage of irrigation fluid (e.g., saline) from the socket into the nasal cavity is a definitive sign of OAC. (5)

Gold standard: Considering imperfections of clinical tests, most authors recommend confirming the diagnosis and assessing the maxillary sinus with CBCT, in order to avoid diagnostic errors or risks when performing certain tests. (5,19,27,28)

2.2. Radiological risk assessment

Diagnostic imaging is necessary to confirm clinical suspicions and to plan the treatment adequately. (1,9)

Orthopantomogram (OPG) is a standard screening examination that provides an initial assessment of the position of the apices of the posterior upper teeth relative to the maxillary sinus. (5,12,29) It is an accessible diagnostic tool with relatively low radiation exposure; however, it is a two-dimensional examination, which lowers its diagnostic value. (12,30) The imaging is altered by structural superimposition and geometric distortion, including magnification effects, which can lead to a significant overestimation of root projection into the sinus cavity. (6,9,31) Research suggests that OPG may not be a reliable tool for accurately predicting the risk of Oroantral Communication when used as the sole diagnostic modality. (8,29)

The FROMS index (Fraction of the Root Overlapping the Maxillary Sinus) is a parameter developed to objectify the assessment of the risk of oroantral communication (OAC) based on two-dimensional imaging. (8) It divides teeth based on the degree of overlapping of the root on the maxillary sinus as a fraction of the total root length, rather than in millimeters. This helps reduce errors related to variable magnification in panoramic radiographs. (8,31)

Tab 1. FROMS Index and Risk of Oroantral Communication (OAC) (1,8)

FROMS Class	Root–Sinus Overlap	Risk of OAC
Class A	No overlap	~1.0%
Class B	0.1–25%	3.3%
Class C	25.1–50%	10.1%
Class D	>50%	17.7% (highest risk)

Clinical studies have shown that the risk of OAC increases significantly with higher FROMS values. Especially in these cases, CBCT should be considered for more accurate evaluation of OAC risk. (8,28)

Cone Beam Computed Tomography CBCT: recognized as a radiographic gold standard for the evaluation of the maxillary sinus and its complications. (1,5,12) As a three-dimensional examination, it allows thorough evaluation of the thin bony layer separating the root apices from the maxillary sinus. (6,31) It eliminates the overlapping of anatomical structures (superposition) as well as distortion and geometric magnification. (9,30,31) CBCT can therefore be used to verify two-dimensional imaging techniques. It detects cases of direct apposition of tooth apices to the Schneiderian membrane, or of its perforation, prior to extraction. (9) CBCT allows identification of intra-sinus septa and assessment of sinus

pneumatization, which is crucial for planning extraction techniques or sinus lift procedures. (27,28)

The CBCT is also key in the diagnosis and management of OAC. (5,6) It definitively confirms sinus floor disruption and provides a precise measurement of the diameter of the communication tract, which is crucial for choosing an appropriate treatment approach. (5,14) CBCT is the diagnostic method of choice for evaluating additional complications. It is the most effective tool for precise localization of root fragments, entire teeth, or dental materials dislodged into the maxillary sinus, and for overall sinus condition assessment. (6,7) CBCT identifies soft-tissue changes, such as Schneiderian membrane thickening, antral polyps, or fluid levels, all of which are definitive signs of acute or chronic odontogenic sinusitis. (1,6,9)

2.3. Risk Factors

There are many aspects affecting the extraction outcome. Each case is different, and the risk should be evaluated individually. Verifying all factors is essential for preoperative planning, which allows the clinician to estimate the probability of Oroantral Communication (OAC) and implement appropriate preventive measures. (1,5)

- **Patient-Related Factors**

Anatomy: The primary risk factor is the close proximity of the maxillary posterior teeth apices to the sinus floor. These structures are often separated by a thin osseous layer of only 1 to 7 mm. (3,4,10) The risk of OAC rises significantly when the bone thickness between the root and the sinus is less than 2 mm. (28,31) Such a thin bony lamina provides insufficient resistance to surgical forces and is prone to disruption, which causes the oroantral communication to open. (3,18)

Sinus Pneumatization: The expansion of the maxillary sinus (alveolar recess), which progresses with age or following the loss of neighboring teeth, drastically reduces the thickness of a protective bony barrier. (10,31)

Age: The risk of OAC increases with age due to physiological changes in bone structure, progressive sinus pneumatization, and alveolar recession. (3,29,32) Changes in bone microarchitecture can be observed and precisely evaluated with CBCT. (27) In elderly patients, a higher prevalence of chronic periapical infections or systemic conditions (such as diabetes) can compromise the integrity of the sinus floor and disable the host's healing response. (5,19)

Gender: Statistically, this complication is more prevalent in males, with a reported female-to-male ratio of approximately 1:1.28 to 1:1.5. (3,9,18) The reason for this difference is debatable. One possibility is an anatomical difference between men and women. Some studies report that men‘s teeth more often protrude into the maxillary sinus. (31)

Local Pathologies: chronic periapical infections, such as granulomas and radicular cysts, can destroy the bone separating the root from the sinus. It causes the bone to thin as well as weaken its structure. (1,25,33–35)

Systemic Diseases: Conditions such as diabetes, immunosuppression, or a history of head and neck radiotherapy alter tissue healing abilities. (5,19,33) They can exacerbate chronic odontogenic infections, leading to erosion of the bone, which can result in an OAC forming even without excessive force during extraction. (5) It can also increase the risk of flap necrosis or an OAC treatment failure. (7)

Smoking: a major risk factor, with some studies reporting an increase in the risk of sinus membrane perforation by up to 25 times. (27) Smoking is one of the most critical risk factors for both OAC occurrence and treatment failure. (5,20)

Systemic Medications: especially the use of bisphosphonates, antiangiogenics, or other bone-modifying agents increases the risk of Medication-Related Osteonecrosis of the Jaw (MRONJ). (1,17,24) This condition often presents as a non-healing extraction socket that can progress into a communication with the maxillary sinus. (17)

- **Iatrogenic Factors**

Iatrogenic causes of complications represent the majority of oroantral communication (OAC) cases. (14)

Technical Errors: such as applying an excessive apical force during extraction, the incorrect or over-vigorous use of elevators. (1,32) Another example is not performing root separation in multi-rooted teeth, particularly in the maxillary first molars. The lack of a minimally invasive approach and the use of traumatic instruments increase the diameter of the resulting defect. (1,14)

Implantation and Sinus Lift Errors: Complications often occur during the preparation of the implant bed or during sinus floor elevations. (1,20) They include overheating of the bone during drilling, insufficient primary stability of an implant, or technical mistakes during bone

augmentation. Additionally, the displacement of implants or materials into the maxillary sinus can lead to chronic infections. (1)

Experience: The practitioner's clinical experience and skill level are crucial for a successful outcome. (8) The risk of complications is statistically higher among clinicians with fewer years of practice. (20,33) More experienced surgeons demonstrate better diagnostic intuition and greater confidence in managing complications, whereas procedures performed by less competent practitioners may result in higher failure rates. (8)

3. Prevention

Thorough procedure planning is key to preventing extraction-related complications, including OAC. (1) An adequate approach particularly lowers the iatrogenic risk. (14) The fundamental aspect of prevention is precise radiographic evaluation of the risk, which has been described in the previous chapter. The most important part is choosing the correct examination, whereas a panthomogram is an acceptable screening tool, CBCT is necessary to precisely assess the three-dimensional proximity of the tooth roots to the sinus floor. (12,28,31) The CBCT is especially indispensable in cases of antral teeth, which show no or little bony barrier separating them from the sinus floor. (26,31)

When it comes to intraoperative prevention, low-invasive techniques are preferred. It reduces surgical forces, lowers the risk of OAC, reduces the diameter of a potential defect, and provides better control over the surgical field. (1,12,15,36)

With multirooted teeth, root separation is strongly recommended. (1,5) It reduces the required force to extract the tooth and results in a force distribution comparable to that of single-rooted teeth extraction. It helps protect the thin bone of the maxillary sinus floor, which is especially prone to mechanical stress. If the roots are not separated, they anchor in the bone and may fracture it during extraction. (1,5,6)

It is particularly important to avoid an excessive apical force. Strong pressure with forceps or elevators directed toward the sinus floor may result in perforation of the thin bony plate or displacement of the root into the maxillary sinus. (6,9,18) The use of atraumatic instruments instead of conventional tooth elevation with high-leverage elevators is recommended. Especially, luxators and instruments designed to cut the periodontal ligament create less stress and are therefore much safer. (1,37)

For impacted upper wisdom teeth, the Buccal Rotation technique is advised. Instead of the traditional approach, the tooth is rotated in a distobuccal direction. The dislocation pathway is located along the lateral wall of the alveolar process, away from the alveolar crest and bone sutures. This significantly reduces the risk of Oroantral Communication despite the proximity of the maxillary sinus. Additionally, this technique avoids resistance from adjacent tooth crowns, minimizing surgical trauma. (38)

The preventive strategy includes the patient's comprehensive medical preparation. A part of this preparation is smoking cessation. Active smoking reduces vascularization of the sinus mucous membrane and the alveolar process, increasing the risk of perforation and healing complications. (5,20) Preoperative medical optimization includes the treatment of any existing inflammation within the maxillary sinus prior to the planned procedure. An uncompromised sinus environment is considered a primary requirement for the success of a possible OAC management. (2,3,24)

After the extraction of high-risk teeth, even if no communication is detected, the clinician should instruct the patient to follow the sinus regimen. (1,15) The patient should avoid creating high pressure in the sinus. Excessive physical strain, nose blowing, and sneezing with the mouth closed are restricted. (22,27) These rules should be followed for up to two weeks in order to prevent secondary opening of a communication due to pressure changes. (1,15)

4. Treatment possibilities

There are numerous treatment possibilities. The choice of an appropriate approach should be guided by multiple factors. The most important ones are the size of the communication, the time since its occurrence, the presence of a sinus infection, and the patient's systemic health. (5,7).

4.1. Conservative treatment

This non-invasive approach is possible in small communications, early diagnosis and treatment, and healthy tissues. (4,5,18)

Spontaneous Healing: Small defects are considered to have high potential for spontaneous healing. Most researchers agree that the diameter of the tract that can be closed without surgical intervention is 2-3mm. (7,21,23,24,35) There are works suggesting the limit value is higher,

reaching up to 5mm. (2,4,16,18) Spontaneous healing is based on stable clot organization and secondary epithelialization. (2,18)

Clot Stabilization: In small defects (2-5mm), techniques aiding the clot retention are often used to support the healing process. (18,25) It is achieved using gelatin or collagen sponges and hemostatic plugs, secured with figure-of-eight sutures. (2,12,24)

Protective Appliances: These are helpful when surgery is contraindicated, such as in severe immunosuppression. (4,17) Acrylic surgical splints or palatal plates can be used to isolate the communication from the oral environment for 1 to 2 weeks, allowing the tissues to close the gap. (4,9)

Low-Level Laser Therapy (LLLT): Some clinical evidence suggests that biostimulation with laser light can accelerate the healing process and epithelialization of small communications. (4,9).

4.2. Surgical Treatment

Surgical intervention is necessary for defects larger than 5 mm or communications that haven't been immediately managed and have progressed into an oroantral fistula (OAF). (2,5) It is also the last chance for cases where conservative treatment has failed. (22,24) Early closure (in 24–48 hours) is considered the gold standard, with success rates of 90–95%. (15,39)

- **Local Flap Techniques:**

Buccal Advancement Flap (BAF - Rehrmann Method): The most common and the oldest technique. It consists of fixing a trapezoidal mucoperiosteal flap over the defect. (4,22) It is reliable and provides predictable outcomes. Its primary problem is a permanent reduction of vestibular depth, which may complicate future prosthetic rehabilitation. (12,14)

Buccal Fat Pad (BFP - Bichat Fat Pad): It is a method of choice for posterior defects. (11,40) It can cover large communications, with a diameter of up to 5 cm. The BFP is highly vascularized and capable of rapid epithelialization within 2–4 weeks, often converting into a structure resembling oral mucosa. (4,24,40) It has a very high success rate (near 100%) and preserves the oral vestibule. (14,40)

Palatal Rotational Flap: This technique utilizes the robust blood supply of the greater palatine artery. The thick flap is ideal for large or recurrent defects. (5,14) Its main drawback is the

exposure of a large area of palatal bone in the process. The palate must heal by secondary intention, causing significant postoperative discomfort and pain. (2,15)

- **Regenerative and Biomaterial-Based Techniques:**

Platelet-Rich Fibrin (PRF): It is used in clot or membrane form. PRF is an entirely autologous material rich in growth factors, which promotes angiogenesis and tissue regeneration. (36) It can be used as a sole treatment method for communications smaller than 5 mm or as a supplementary measure in complex surgeries to reduce pain and swelling. (1,15,16)

Barrier Membranes: Resorbable collagen membranes can be used to seal the OAC without an extensive flap mobilization. (12) This approach preserves the keratinized gingiva. Non-resorbable d-PTFE membranes (Open Barrier Technique) can also be used and left exposed to the oral cavity, simplifying the procedure. (7,35)

- **Combined (Sandwich) Techniques:**

For large bone defects or when future implantation rehabilitation is planned, double- or triple-layer techniques are preferred. (5,7,15) These involve a combination of materials, such as bone grafts (autogenic/xenogenic), covered by a collagen membrane, followed by a soft-tissue flap (e.g., BAF or BFP). (21,26)

In cases of chronic sinusitis, surgical closure should be performed together with Functional Endoscopic Sinus Surgery (FESS) to surgically restore proper sinus ventilation and drainage. (25)

5. Postoperative precautions

Strict obedience to postoperative recommendations is key to successful OAC treatment. The standard protocol generally applies for a period of two weeks following the procedure. (1,12,33)

5.1. Sinus Regimen (Sinus Precautions)

The primary goal of the sinus regimen is to avoid sudden changes in pressure within the maxillary sinus. The sudden pressure changes could disrupt delicate healing tissues or dislodge the blood clot. (12,20)

Nose-Blowing Restriction: Patients must strictly avoid blowing their noses for at least 14 days. The nose should only be gently dabbed with a tissue. (1,27,33)

Sneezing Technique: Patients are instructed to always sneeze with their mouth open to lower the pressure in the nasal cavity and sinuses. (12,15)

Avoiding Negative Pressure: Activities that create negative pressure in the oral cavity, such as drinking through a straw, sucking actions, or smoking, are strictly prohibited. (20,21)

Travel and Recreational Restrictions: Air travel and scuba diving should be avoided for at least two weeks because of significant atmospheric pressure changes. (1)

5.2. Physical Activity and Sport

Exercise recommendations change as the healing process progresses. Research emphasizes the importance of maintaining a simple lifestyle, especially during the initial recovery phase. (20)

Tab. 2 Recommended Physical Activity Following OAC/OAF Closure (1,12,15,22,35,40)

Time After OAC/OAF Closure	Permitted Physical Activity	Restricted / Prohibited Activity	Clinical Rationale
First 48–72 hours	Rest, short and gentle walking	Bending the head downward, strenuous movement, exercise	To minimize bleeding risk and avoid increased pressure in the craniofacial region
Up to 14 days postoperatively	Light daily activity; calm walking without sudden head movements	Vigorous sports, weightlifting, high-intensity running, and contact sports	To prevent disruption of healing tissues and pressure-related complications

After 14 days	Gradual return to moderate exercise following clinical confirmation of successful closure	Competitive sports and heavy lifting until complete soft tissue healing	To ensure stable healing and reduce the risk of recurrence
After complete soft tissue healing	Full return to normal and competitive physical activity	—	Complete tissue regeneration allows safe resumption of unrestricted activity

5.3. Hygiene and Diet

Diet: A soft diet consisting of lukewarm foods is recommended for the first 7 days. Patients should chew on the opposite side to prevent mechanical injury to the wound or infection. Crunchy or hard foods should be avoided. (7,15,20)

Oral Hygiene: Patients should avoid brushing the surgical area for the first 7 to 14 days. It is recommended to use 0.12% to 0.2% chlorhexidine digluconate mouthwash to reduce the bacterial load. Patients should also avoid touching the wound with their tongue. (11,15,40)

5.4. Pharmacological Support

Pharmacological help is useful for keeping the sinuses and nasal cavity clear and ensuring sufficient drainage. (1,20)

Nasal Decongestants: Drops or sprays (e.g., xylometazoline or oxymetazoline) are used for approximately 5 to 7 days to maintain nasal cavity patency. (27,33)

Antibiotic Therapy: A course of broad-spectrum antibiotics, most commonly amoxicillin with clavulanic acid, is prescribed for 5 to 10 days as prophylaxis for sinusitis. (20,23)

Analgesics: Non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen or aceclofenac are used to manage postoperative pain and swelling. (15)

6. Summary and conclusions

Oroantral communication (OAC) is a relatively frequent complication following the extraction of maxillary posterior teeth, occurring in 0.31% to 11% of cases. (1,8) The time of treatment is the most critical prognostic factor. (1,5) A communication that remains open for more than 48–72 hours typically undergoes epithelialization and progresses to an oroantral fistula (OAF). (13,35) Once a fistula forms, it lacks the ability to heal spontaneously and significantly increases the risk of chronic odontogenic sinusitis. (5)

Diagnostic precision with CBCT is recognized as the gold standard, providing a three-dimensional assessment of the defect and the condition of the sinus. (6,19) The CBCT is especially important for managing "antral teeth". (28) Prevention of OAC includes thorough preoperative planning and the use of atraumatic surgical techniques, such as mandatory root separation and avoidance of excessive apical force. (5,41)

The treatment technique is primarily determined by the size of the defect and the presence of infection. (18,22) Small, acute, and uninfected communications (typically <2–5 mm) may be managed conservatively by stabilizing blood clots with collagen sponges or Platelet-Rich Fibrin (PRF). (2,5) Defects larger than 5 mm or chronic fistulas require surgical intervention. (7,17) While the Buccal Advancement Flap (BAF) is a common standard, the Buccal Fat Pad (BFP) becomes more frequently selected for large posterior defects because of its strong vascularity, high success rate (near 100%), and preservation of vestibular depth. (1,11) Modern minimally invasive techniques using PRF and barrier membranes provide effective alternatives to traditional techniques. (1,18) They are notable for preserving the soft tissue architecture necessary for future implant rehabilitation. (12,39) Each management measure is supported by broad-spectrum antibiotics and nasal decongestants. (12,19)

Regardless of the surgical technique, clinical success depends heavily on strict patient compliance with a sinus regimen, typically for two weeks. (20) The precautions include avoiding nose blowing and sneezing only with the mouth open. Most importantly, patients must strictly avoid strenuous physical activity and vigorous sports for at least 14 days. (1,22) Avoiding heavy lifting and high-intensity exercise is essential to prevent sudden changes in sinus pressure that could dislodge the blood clot or disrupt the delicate healing tissues. (15) Finally, chronic cases complicated by pre-existing sinusitis require a multidisciplinary approach, often involving Functional Endoscopic Sinus Surgery (FESS) to clear the infection and restore proper sinus drainage before or during OAC closure. (5,24)

Disclosure

Supplementary Materials:

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