

ZYGOMATIC BONE GRAFT FOR ORAL-ANTRAL COMMUNICATION CLOSURE AND IMPLANT PLACEMENT

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The roots of molar and premolar maxillary teeth are often very close to the floor of the maxillary sinus. As a result, extraction of these teeth can leave an oral-antral communication or lead to a fistula that requires treatment. A woman with an oral-antral communication secondary to extraction of a maxillary molar is presented. The communication was closed by means of a bone graft harvested from the wall of the sinus (zygomatic bone). After 3 months, 2 dental implants were placed, one in the pterygoid area and the other with parasinus angulation. Rehabilitation followed in the form of a screw-retained, fixed prosthesis 3 months after implant placement. There have been no complications after 1 year of follow-up. This surgical technique allowed closure of an oral-antral communication produced by molar extraction through placement of a zygomatic bone graft and subsequent placement of 2 dental implants.

Key Words: zygomatic bone graft, oral-antral communication, pterygoid implants

INTRODUCTION

Approximately 50% of all oral-antral communications that are left untreated will give rise to sinusitis within 24 hours; this figure increases to 90% after 2 weeks.¹ If such communications persist, chronic inflammation of the sinus membrane may result, with adhesion to the oral mucosa.¹ This in turn would preclude sinus lift procedures.¹ A close relationship between the maxillary molars and the sinus is observed in 20% of cases^{2,3}; extraction of these teeth may therefore produce an oral-antral communication.⁴ This complication is not a result of

deficient surgical practice but is rather a consequence of predisposing anatomic conditions.⁴ A number of techniques for closing oral-antral communications have been proposed,⁵⁻⁹ including bone grafting.

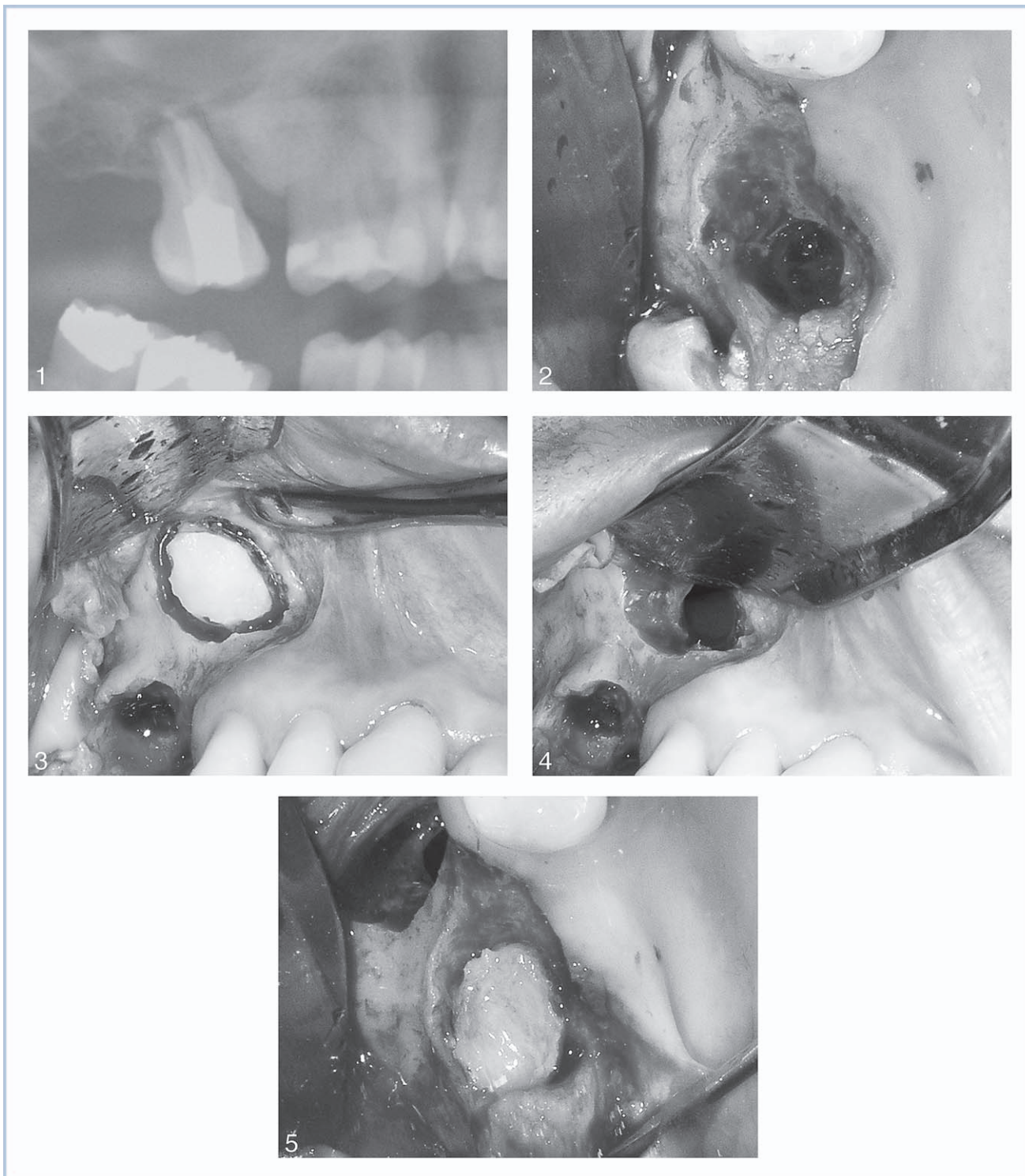
The present report describes the treatment of a woman with an oral-antral communication secondary to extraction of a maxillary molar. The communication was closed by means of a bone graft harvested from the wall of the sinus (zygomatic bone).¹⁰

CLINICAL CASE

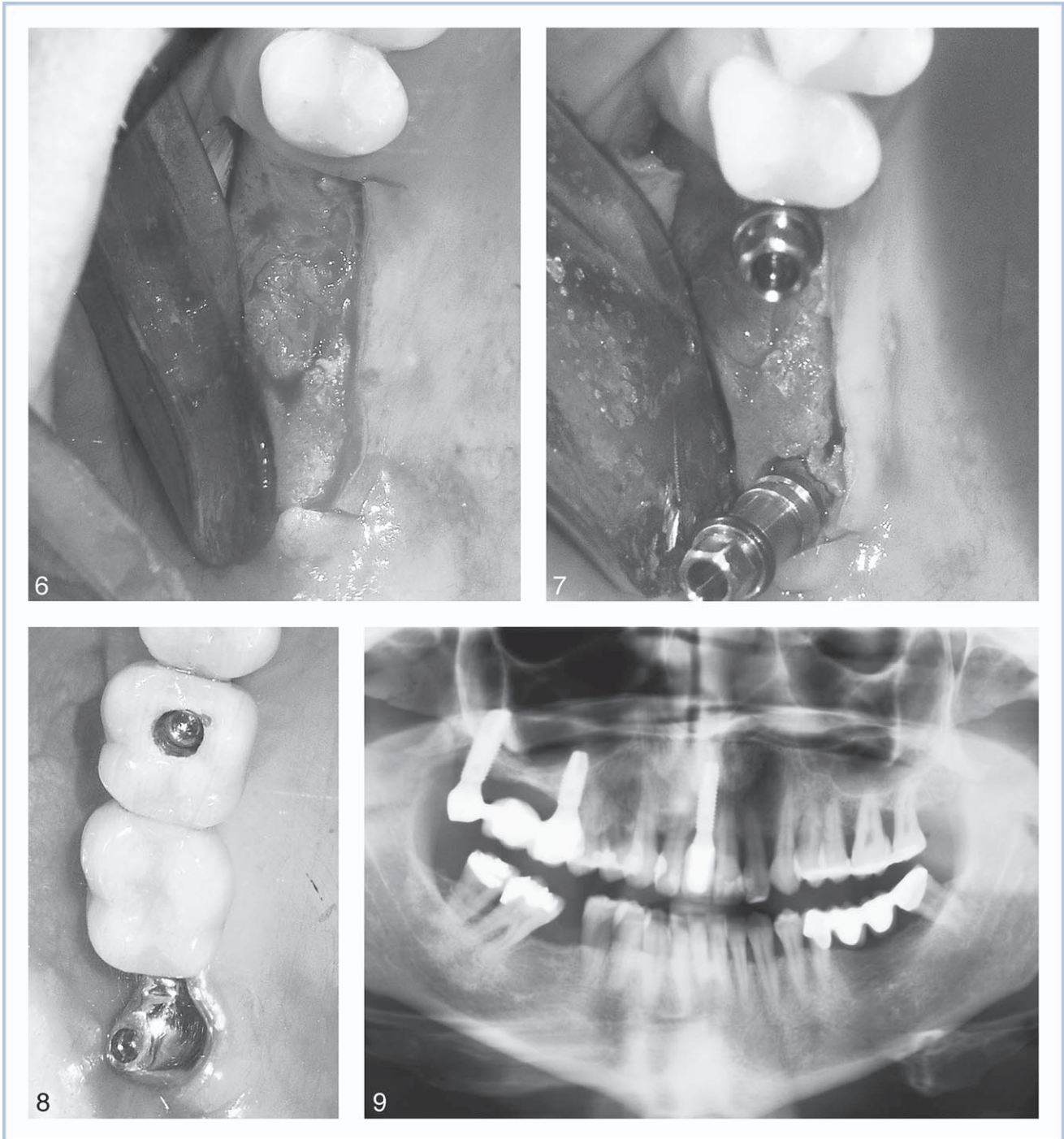
A 52-year-old woman with no medical contraindications presented with pain in the region of the maxillary right second molar. Clinical examination revealed inflammation in the area of this tooth, which showed grade II mobility. A radiolucency was observed in relation to the sinus, with a significant loss of bone support around the apices of the tooth (Figure 1). Removal of the tooth was the chosen treatment.

The surgical procedure was carried out under local anesthesia with 4% articaine and 1:100 000 adrenalin (Inibsa, Barcelona, Spain). Following removal of the

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FIGURES 1-5. FIGURE 1. Panoramic X-ray showing the loss of supporting bone tissue at the maxillary right second molar. FIGURE 2. An oral-antral communication was produced following extraction of the maxillary right second molar. FIGURE 3. A full-thickness flap was raised to the inferior portion of the infraorbital nerve and lower part of the zygoma to visualize the anterior wall of the maxillary right sinus. A rounded tungsten drill was used to prepare a window measuring approximately 10 mm in length and 8 mm in width in the anterior wall of the maxillary sinus. FIGURE 4. The zygomatic bone graft was obtained and perforation of the sinus membrane was avoided. FIGURE 5. The harvested bone was placed within the socket of the maxillary right second molar. The graft was stabilized and the communication was completely sealed.



FIGURES 6-9. FIGURE 6. Three months later a full-thickness flap was raised, and closure of the oral-antral communication and graft integration was confirmed. FIGURE 7. Two dental implants were placed at the site: one with palatal angulation to take advantage of the palatal root bone of the first molar and the other in the pterygomaxillary zone. FIGURE 8. Clinical intraoral view after placement of a screw-retained prosthesis. FIGURE 9. Postoperative panoramic X-ray view.

right second molar, curettage of the alveolar walls was undertaken. It was immediately evident that the curette could be introduced completely into the sinus. On carrying out the Valsalva maneuver, it was

found that the air exited via the extraction socket, leading to diagnosis of an oral-antral communication (Figure 2). It was decided to close the communication with the aid of a bone graft taken from the zygoma

area on the same day as the extraction.¹⁰ An incision was made distal to the maxillary right first premolar to the tuberosity, following the contour of the alveolar crest, along with a retromolar releasing incision. A full-thickness flap was raised with a periosteal elevator to the inferior portion of the infraorbital nerve and lower part of the zygoma to visualize the anterior wall of the right sinus. A round tungsten drill was used under abundant sterile saline solution irrigation to prepare a window measuring approximately 10 mm in length and 8 mm in width in the anterior wall of the sinus (Figure 3). With a piezosurgery instrument (Surgysonic, Esacrom, Bologna, Italy), the sinus membrane was gradually separated from the internal surface of the bone graft, with care taken to avoid perforating it. Finally, a zygomatic bone graft was harvested using forceps (Figure 4) and placed within the socket of the maxillary molar tooth. The graft, which was greater in surface area than the alveolar bed, was fixed in the alveolus and stabilized by compaction with a mallet and osteotome (Figure 5). The wound was sutured with 3-0 silk (Lorca-Marin, Murcia, Spain). Amoxicillin (Clamoxyl, GlaxoSmith Kline, Madrid, Spain) was prescribed (500 mg 3 times a day for 7 days), together with ibuprofen (Bexistar, Laboratorio Bacino, Barcelona, Spain) (600 mg 3 times a day for 4 days) and 0.12% chlorhexidine rinses (GUM, John O. Butler Co, Chicago, Ill). The postoperative course was uneventful.

One week after the intervention, the sutures were removed, and 3 months later 2 implants were placed. A full-thickness flap was raised under local anesthesia (4% articaine with 1:100 000 adrenalin; Inibsa, Lliça de Vall, Barcelona, Spain) from the maxillary right second premolar distally to the retromolar area. The keratinized gingival area distal to the maxillary right second premolar was preserved. Sealing of the oral-antral fistula and integration of the zygomatic bone graft was confirmed (Figure 6). Osteotomes and rotary instruments were used to place 2 threaded dental implants (Defcon TSA series 4, Impladent, Barcelona, Spain) measuring 4.2 mm in diameter (Figure 7). The implant in the maxillary right first molar area was 11.5 mm in length and was placed with a palatal angulation to take advantage of the palatal root bone. The second implant measured 16 mm in length and was placed in the pterygoid area. Resonance frequency measurements (Ostell, Integration Diagnostics AB, Göteborg, Sweden) were 64 and 57, respectively. Suturing with 3-0 silk was completed, leaving the implants exposed.

After 3 months, a screw-retained fixed prosthesis

was inserted, with an acceptable esthetic result (Figure 8), and good marginal adaptation was noted from a panoramic X-ray (Figure 9). There have been no complications after 1 year of follow-up.

DISCUSSION

Different techniques have been developed to close oral-antral communications, including vestibular replacement flaps,⁴ palatal rotation flaps,⁹ adipose tissue vestibular flaps,^{6,8} and third molar transplants.¹¹ Haas et al¹ presented 5 cases in which mental symphyseal grafting was carried out to close the communications. In 2 cases the graft had to be fixed with miniplates or screws. Dehiscence was recorded in 1 case, although in all patients the communication was effectively closed. In 3 cases the authors performed sinus membrane elevation for dental implant placement after 3 months.

A new donor area has recently been described for bone regeneration in extraction sockets involving grafts harvested from the zygomatic process.¹⁰ In the present patient an oral-antral communication was observed following removal of a maxillary second molar. Bone from the zygomatic area was used to close the defect. The proximity of the donor site and receptor bed contributed to minimization of surgical time and patient discomfort. The technique described by Kainulainen et al¹⁰ allows a small amount of bone tissue to be obtained with practically no postoperative complications. One of the advantages of this technique is that a spongy and cortical bone graft can be harvested using local anesthesia. The main inconveniences are that only limited bone is obtainable, and accidental sinus membrane perforation can occur. However, with adequate antibiotic treatment, complications are usually minimal.¹²

Three months after the first intervention, 2 dental implants were placed at the limits of the sinus. Because of the significant atrophy, a maxillary pterygoid implant was placed,¹³ with a second implant in parasinus angulation,¹⁴ using osteotomes and the palatal bone. Sinus lifting was not needed.

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