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Case Report

Surgical Treatment of Late Complication Resulting from Zygomatic Implant

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Abstract

The zygomatic implants were developed to meet the indications for atrophic edentulous maxillae, or when it is not possible to install osseointegrated implants or to perform bone grafts. The technique requires some care and particularly the expertise of the dental surgeon. Several complications can occur with the zygomatic implant technique, among them mucositis; peri-implantitis; gingival hyperplasia; oroantral fistula formation; sinusitis and sinusopathies; hypoesthesia; epistaxis; periorbital and facial hematomas; subcutaneous malar emphysema; and penetration of the orbital cavity. The purpose of this article is to present a case of subcutaneous granulation tissue formation in the periapical region of a zygomatic implant, installed 3 years ago, which was treated by removal and curettage.

Keywords: *Zygomatic Implants; Dental Implants; Complications; Implant Apicoectomy; Oral Surgery*

Introduction

Discovered by Per Ingvar Branemark, osseointegration is characterized by the condition of direct anatomical and functional biological union between the bone tissue and the titanium implant, obtaining the replacement of the root of dental organ in partially or totally edentulous patients. After exodontia, the process of bone resorption of the alveolar bone starts, reaching, in more advanced cases, the basal bone of the jaws [1-5].

Osseointegration depends on several factors, among them the quantity and quality of bone-implant contact; cellular phenomena (healing, repair and bone remodeling); the mechanical and biocompatible characteristics of the implant surface; the amount of bone available, in height, width, and thickness; bone quality; the skill and knowledge of the dental surgeon; the surgical technique used; the load and its conditions [1,3].

Anatomical anomalies of the maxillary bones can also cause surgical and implant prosthetic rehabilitation restrictions or difficulties. In the maxilla, low bone quality and increased pneumatization of the maxillary sinus, associated with excessive bone resorption can make it difficult to perform onlay bone grafts and sinus floor elevation (maxillary sinus lift). Subsequently, these clinical conditions may hinder the installation of conventional osseointegrated implants [5,6].

The zygomatic implant technique has been developed since 1998 to meet the indications for atrophic, edentulous maxillae when it is not possible to install osseointegrated implants or perform bone grafts [2,3,5-8]. Initially, zygomatic implants were also indicated for patients with cleft palate, oncologic patients who underwent maxilectomy, or large maxillary defects caused by tumor resections or trauma [1,3]. The technique has been used in patients

with total edentulous atrophic maxillas or syndromic conditions such as maxillary hypoplasia due to ectodermal dysplasia or cleidocranial dysostosis, allowing rehabilitation of masticatory function and improving facial aesthetics and appearance [1-3].

The length of zygomatic implants ranges from 35 to 55 mm and are installed at 45° to the occlusal plane, anchored to the zygomatic bone by its apex [2-4,7]. Activation by immediate loading raises the survival rate compared to delayed loading [8].

The installation of zygomatic implants presents several risks due to its technical complexity of execution. The limited intraoperative visibility and the adjacent anatomical structures involved in the surgical procedure require high expertise of the dental surgeon [3,5,6]. Since it is a very complex and invasive procedure, it is recommended that zygomatic implants be performed under general anesthesia in a hospital environment [1].

Zygomatic implants present several complications and morbidity resulting from the surgical procedure. Lip laceration is an immediate complication resulting from the surgical procedure, in which great effort is required to open the mouth of the patient. Late complications related to the installation of zygomatic implants include mucositis; periimplantitis; gingival hyperplasia; oroantral fistula formation; sinusitis and sinusopathies; temporary sensory nerve deficits; temporary epistaxis; periorbital and facial hematomas; subcutaneous malar emphysema; and penetration of the orbital cavity. Granulation tissue formation after exposure of the implant apex in the zygomatic region has been reported [1-10]. The purpose of this article is to present a case of subcutaneous granulation tissue formation in the periapical region of a zygomatic implant, installed 3 years ago, which was treated by removal and curettage.

Case Report

A Caucasian female patient, 49-years-old, came to the clinic with a complaint of swelling in the right malar region. She was reported to have bilateral zygomatic implants installed 3 years ago, and other conventional osseointegrated implants 6 years ago.

Clinically, a slight symptomatic edema was observed in the malar region on the right side (Figure 1). During palpation on clinical examination, the presence of more consistent granulation tissue was noted in the malar region, with painful symptoms.

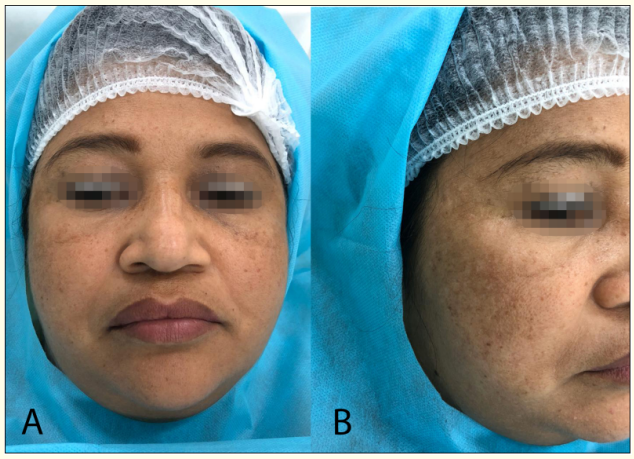

Figure 1: Slight symptomatic edema observed in the malar region on the right side. Frontal view (A). Right side view (B).

Panoramic radiograph showed the presence of bilateral zygomatic implants and 6 other implants in the maxilla (Figure 2). In the mandibula, the absence of some teeth antagonistic to the upper total prosthesis retained by the implants (Branemark protocol prosthesis) was observed.

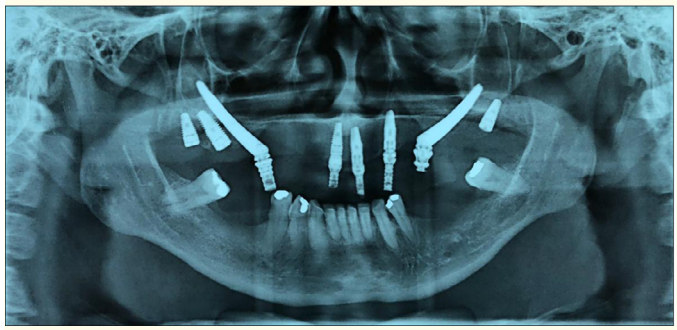

Figure 2: Panoramic radiograph showed the presence of bilateral zygomatic implants and 6 other implants in the maxilla.

The patient was informed about the need for therapeutic and surgical intervention, the latter through extraoral access. After clarifying all doubts about the procedure, the patient agreed and consented to the procedure. Initially, the patient received systemic administration (orally) of amoxicillin for 7 days.

Palpating the malar region, the incision was planned longitudinally parallel to the expression lines of the orbicular eye muscle

(crow's foot) (Figure 3). Under local anestesia, the incision was made in the cutaneous and muscular planes (Figure 4 and 5, respectively) and periosteum, until the bone tissue was exposed. The tissue adjacent to the incision was divulsioned and a greenstick fracture was presented on the outer cortical wall of the zygomatic bone, in addition to the granulation tissue, which was curetted. Washing with saline was performed abundantly (Figure 6). The edges of the surgical wound were digitally approximated to perform the sutures (Figure 7). Intradermal sutures were performed (Figure 8) and covered with adhesive tape (Figure 9) to protect the surgical wound. The patient received analgesic and anti-inflammatory drugs (for 5 days) and antibiotics (amoxicillin for another 7 days).

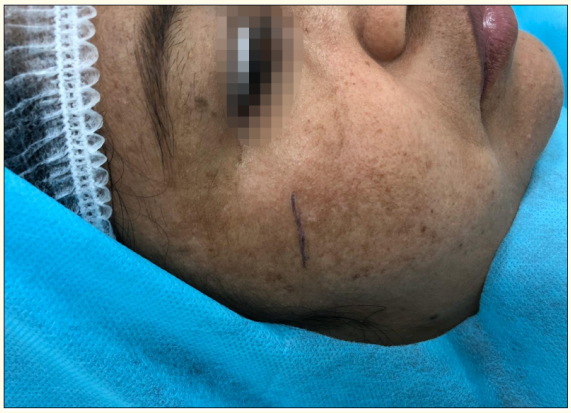

Figure 3: Incision planned longitudinally parallel to the expression lines of the orbicular eye muscle (crow's foot).

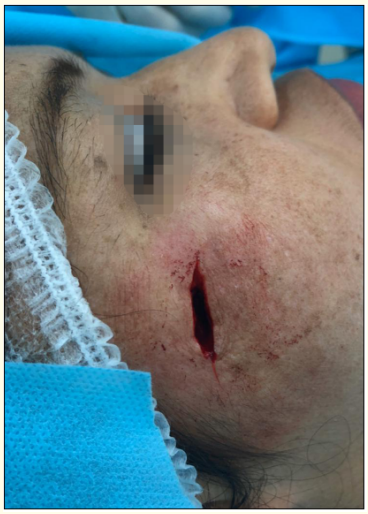

Figure 4: Incision made in the cutaneous plane.

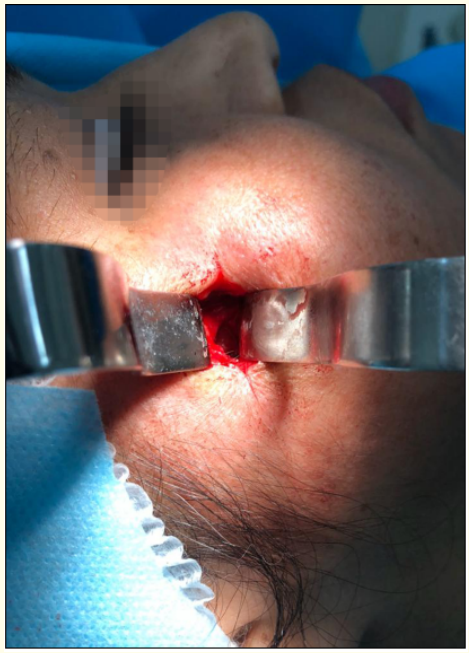

Figure 5: Incision made in the muscular plane.

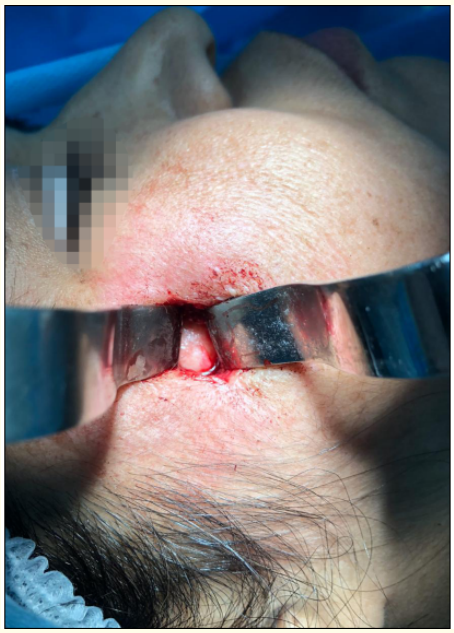

Figure 6: Exposition of greenstick fracture and granulation tissue.

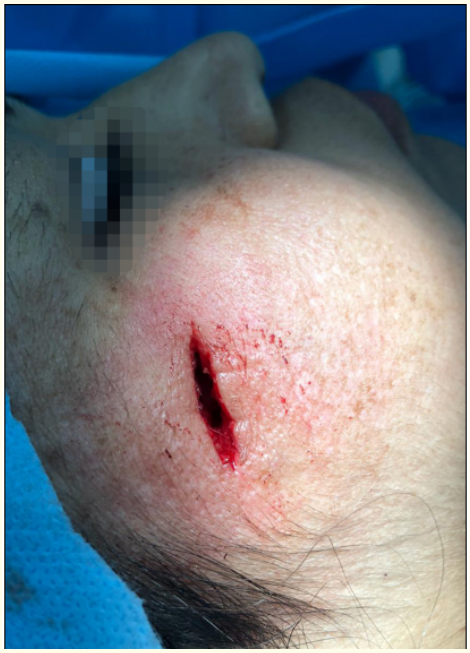

Figure 7: Edges of the surgical wound were digitally approximated to perform the sutures.

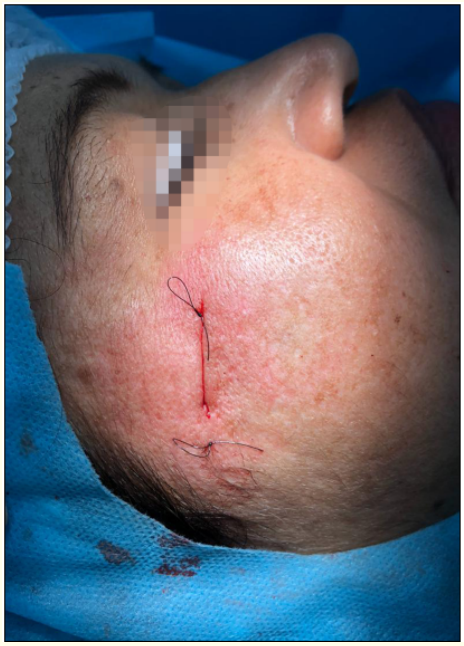

Figure 8: Intradermal sutures performed.

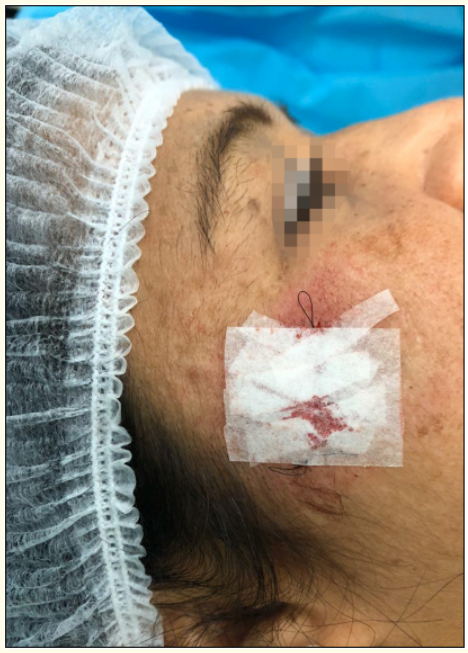

Figure 9: Surgical wound protected with adhesive tape.

At the postoperative visit after 15 days, no complaints or complications were reported (Figure 10). The adhesive tape (Figure 11) and subsequently the sutures were removed (Figure 12). The incision line was well closed and despite the partial repair, the patient was discharged from treatment. The patient was instructed that if the pain or swelling recurred, to return for a follow-up visit.

Discussion

The absence of the osseointegration process can be caused by overheating, contamination and trauma during surgery; insufficient quantity or quality of bone; lack of primary stability and incorrect immediate indication, which can cause oroantral fistulas and sinusopathies. The absence of the osseointegration process presents a frequency of 2.4% to 4.2% [3,8].

The rate of sinusopathies arising from zygomatic implants range from 3.9 to 26.6%. They are characterized by sinus infection due to contamination and colonization of microorganisms [6,8]. Post-surgical debris has also been reported inside the sinus, caused by perforation of the sinus membrane and bringing bacteria from the

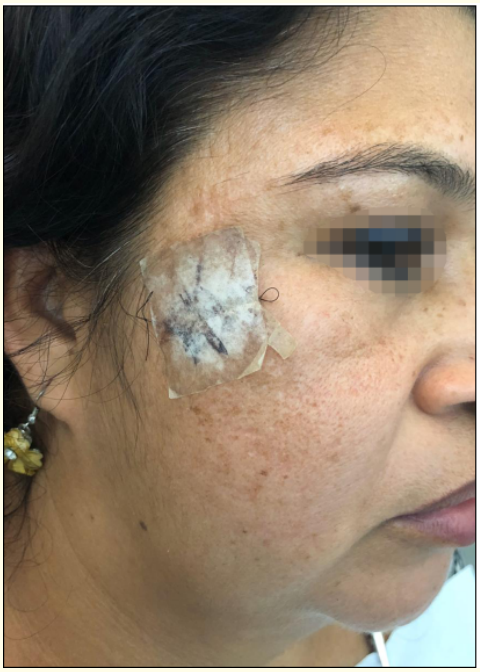

Figure 10: Postoperative evaluation after 15 days.

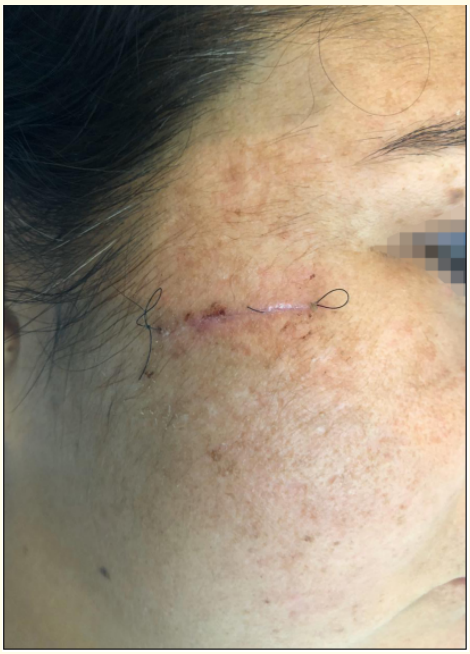

Figure 11: Removal of adhesive tape.

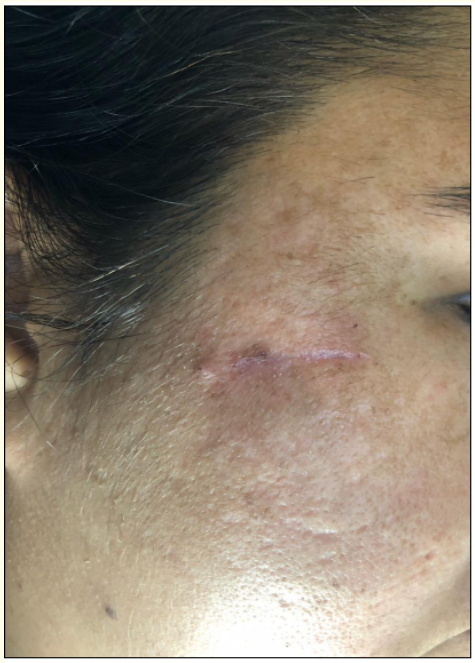

Figure 12: Removal of intradermal sutures.

mouth. Consequently, lack of osseointegration at the marginal level of the palatal area ensues. Sinusopathies can be related to oroantral communications, these being the pathways of the microbiological agent into the maxillary sinus and causing the infection [8]. Another route of sinusitis contamination occurs through bone loss by peri implant disease. In these cases, implant removal is suggested [5]. Inflammation of the maxillary sinus interferes with normal drainage and causes mucus retention, consequently reducing mucociliary clearance and predisposing to bacterial growth [1]. In sinus involvement, its treatment was indicated [4].

Oroantral fistulas can be caused by lack of primary stability of the zygomatic implant, inadequate irrigation during drilling, and poor sealing between the alveolar bone and the implant head, which can lead to communication between the oral cavity and the maxillary sinus [2,8]. Oroantral fistulas occur in 1.5% of reported cases [2].

Hypoesthesia can occur following damage to the branches of the facial nerve 3 to 8 weeks after zygomatic implant installation surgery [6,8].

Accidental penetrations of the orbital cavity may occur from the angular error of drilling that coincide for the final trajectory of drilling and subsequent installation of the zygomatic implant [8]. Proptosis and diffuse eyelid edema have been observed after surgery to remove granulation tissue and zygomatic implant apices [10].

Exposure of the apical spirals of the zygomatic implant can occur, noticeable on palpation in the malar region. Additionally, granulation tissue formation and subcutaneous fistula can be observed in the apical region of the zygomatic implant [6,10]. Exeresis of the granulation tissue and removal of the zygomatic implant when osseointegration fails have been recommended [5,9,10]. The extraoral access is usually performed for the excision of granulation tissue, whose incision is parallel to the crow's feet wrinkles, as presented in this report. This care, as well as other skin accesses in the activity of Oral and Maxillofacial Surgery and Traumatology, prevents scar formation, and can mimic it in the skin tissue [11].

In the present report, the zygomatic implant was completely covered by bone. No spiral exposure was observed. Possibly, the greenstick fracture occurred during the installation of the zygomatic implant in the external cortical wall of the zygomatic bone at the time of installation. Functionally, after wearing the prosthesis, the area received the masticatory load and probably developed an inflammatory process, causing the formation of granulation tissue and soft tissue edema in the same region. The treatment consisted of curettage of the fibrous (granulation) tissue and abundant washing. The implant was maintained because there were no signs of osseointegration loss.

Currently, zygomatic implants are in disuse, due to the biological evolution of grafting techniques, and technological evolution of short implants, due to surface treatment and macrogeometry [5,9].

Conclusion

Zygomatic implants were developed to meet the indications for atrophic edentulous maxillae. In view of the wide use of zygomatic implants in the recent past, it is possible that the incidence of several complications resulting from this technique has increased. The dental surgeon should be aware of the signs and symptoms and the treatment modalities indicated for each situation.

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