USE OF TITANIUM SCREWS FOR DENTURES OR SURGICAL GUIDE FIXATION AFTER SULCOPLASTY

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ABSTRACT

It is presented an alternative procedure to the fixation of prostheses and surgical guides to the maxilla, avoiding the use of maxillary suspensions. Titaniun screws are used in this technique fixing the prostheses in the anterior wall of the maxillary sinus. In this method the inconvenience of performing suspensions is eliminated, reducing surgical time, making possible to carry it out under local anesthesia, minimizing the risk of infections, promoting a more stable fixation and more comfortable post-operative period for the patient.

KEY WORDS: Rigid Fixation; Screws; Sulcoplasty; Pre-prosthetic surgery.

INTRODUCTION

The prosthetic rehabilitation of totaly edentulous patients may pose some difficulties, which are mostly related to the insufficient height of the prosthetic area. The absence of prosthesis or the use of in adequately adapted prosthetic devices increase the absorption of the alveolar crest (CARVALHO, 1980; ZANINI, 1990). Moreover, the bone structures undergo a continuous reshaping process and the reabsorption phase may be enhanced by local and/or systemic pathologies (CARVALHO, 1980).

The insufficient height of the prosthetic area may be corrected through surgery in the soft tissues, namely the vestibular fornix

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deepening or vestibuloplasty (PETERSON et al., 1999). Such procedures aim to increase the height of the prosthetic area (ZANINI, 1990). To indicate surgery it is necessary to evaluate the bone height of the alveolar crest, what can be done through X-rays. According to Peterson et al., (1999) 15 mm is the minimal height of the mandibular bone necessary to obtain some predicable success in the procedure.

The earliest technique for sulcoplasty was described by Kazanjian in 1924. From then on, many techniques have been developed with the same objective (CLARK, 1953; KETHEY; GAMBLE, 1978; OBWEGESER, 1959; ARRUDA, 1965). Such techniques aim to obtain healing through reepithelization since there is healing by second intention. Other techniques use mucosa or skin to cover the row area (ARRUDA, 1965; YRASTORZA, 1976).

To be successful these procedures need to maintain the depth of the vestibular sulcus during the post operative period. If tissues are not kept within the desirable limits and there is healing by second intention it is possible to have a loss of 60% of the deepened area (GREGORY, 1982; PETERSON et al., 1999).

For a very long time now authors have been seeking a method to keep the vestibular flap in a more apical region, mainly during the early post operative period, aiming to obtain less scar contraction and, thus, a better predictability for the final result.

With this purpose, many techniques have been used, such as the simple suture of the vestibular flap in the deepest regions close to the periosteum, transfixing suture through the soft tissue of the submentonian region with a capitel, transfixing suture through a latex tube aiming to keep the flap in a more apical position, use of prosthesis or fixed / non-fixed surgical guides by mandibular cerclage and/or maxillary suspension (CARVALHO, 1980; ZANINI, 1990) and the isolated use of screws to anchor tissues in a more apical position (DYM; CERBONE, 1991).

Recently, its was proposed by Nary Filho et al. (1994) the positioning of prosthetic devices in the maxilla in cases of facial fractures and/or ortognatic surgery through the transfixation of such devices or surgical guides with titanium screws bolted in the lateral and anterior maxillary wall.

The objective of this study is to show the viability of the use of titanium screw to fix prosthesis or surgical guides to the bone crest following sulcoplasty aiming to obtain a more stable deepening with less discomfort to the patient.

CASE REPORT

J. M., male, 45 years old, attended the Clinic of Bucomaxilofacial Traumatology of the University of the Sacred Heart, reporting failure of previous dentistry treatment, when several total superior prosthesis were made. Lack of retention and the instability of the prosthesis were the main reasons for discontinuing its use.

An intraoral exam revealed healthy oral mucosa lining both superior and inferior crests. It was noted that the patient had low muscular insertion in the upper crest leading to a deficiency in height (FIGURE 1). The inferior arch was partially dented allowing the use of a removable partial prosthesis. By palpation it was identified that the upper crest showed a reasonable height.

To support the clinical diagnosis some X-ray were used; orthopantomography (FIGURE 2) and cephalometry of the lateral aspect of the face were used to confirm the presence of bone tissue in the upper crest. These X-ray views revealed enough upper crest bone tissue to sustain the prosthetic device.

In association with the prosthesis technician the plan of treatment was established including the pre-prosthetic surgery for vestibular fornix deepening and later construction of a total superior and a partial inferior removable prosthesis.

The proposed treatment was superior sulcoplasty and maintenance of tissue by means of a surgical gutter fixed with four titanium screws to the lateral and anterior wall of the maxilla since the patient had already lost the previously constructed prosthesis. Fol-

FIGURE 1 - Pré operative view showing low muscular insertion.

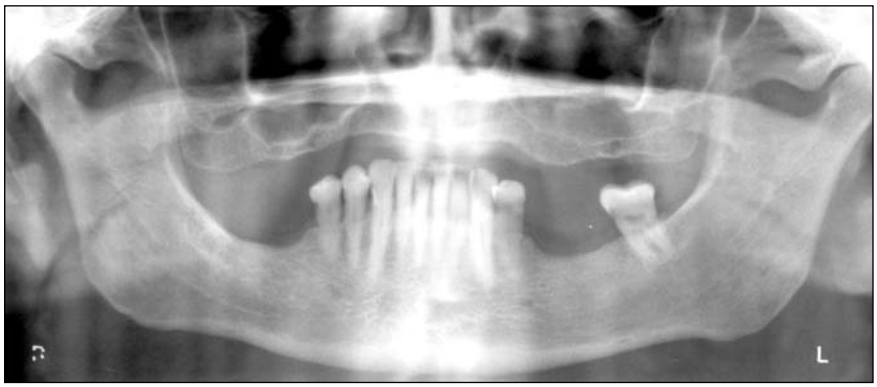

FIGURE 2 - Panoramic X-ray take showing the maxillary alveolar bone crest height.

lowing the anamnesis and the analysis of routine laboratorial exams the superior arch of the patient was molded to permit the construction of the surgical guide in acrylic resin.

After antisepsis and preparation of the surgical field the area was anesthetized with mepivacaine 2% with vasoconstrictor 1.100.000 by infiltrative regional block of the superior posterior, medium superior and anterior alveolar nerves and by infiltrative terminal anesthesia of all the alveolar process.

The selected surgical technique was that described by Clark (1953) with a mucosa incision in the rim of the alveolar crest through the vestibular area from one tuber to the other. Then, with a scalpel or scissor with blunt points the mucous flaps was undermined preserving the periosteum adhered to the vestibular crest. The undermining was extended to the apical regional ticker muscular fibers that were making difficult the placement of the flap in a more superior position or up to the point that the crest showed a sufficient height to the construction of a suitable total prosthesis.

After undermining the flap was sutured (polyglactine 910, 4/0) with continuous sutures bringing near the free vestibule muscosa to the muscular region and to the periosteum of the deep region of the vestibule (FIGURE 3).

The edges of the previously constructed surgical guide were far from the innermost part of the new alveolar sulcus (FIGURE 4) and, thus, to maintain tissues in the desirable position the guide had to be relined, which initially was done with a specific resin for rebasing of template of total rigid prosthesis after polymerization (*Kooliner*)[1], applied directly in the mouth of the patient. In this step, the guide was removed and replaced till the final polymerization of the material. After that, a new relining was done with a resilient resin (*Coesoft)*[2] allowing a better conditioning of tissues during the repair process (FIGURE 5).

[1] *Kooliner, rebasing resin. Manufacturer: GC America Inc*

[2] *Coesoft, resilient resin for postoperative prosthesis. Manufacturer: GC America inc*

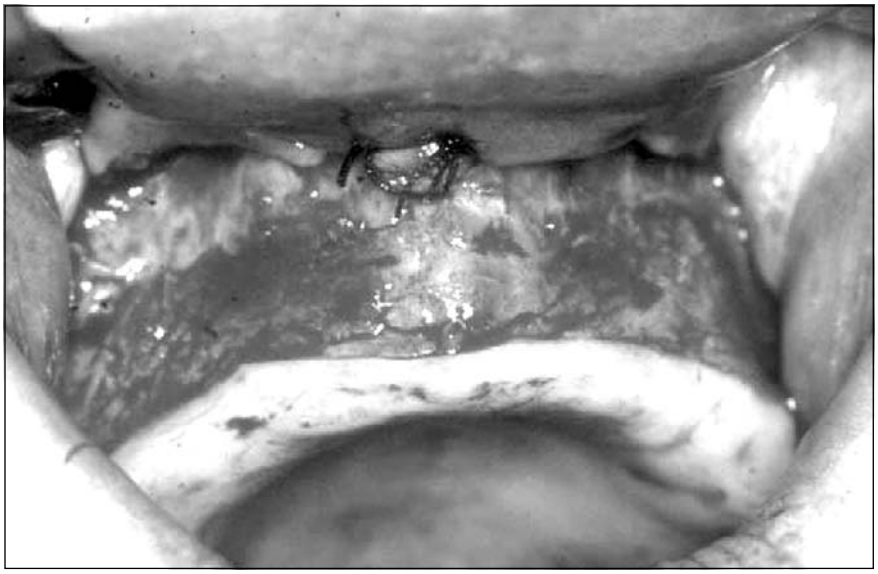

FIGURE 3 - Trans operative view showing the vestibular height after Clark's sulcoplasty.

After removing the residual resin, the guide was put again on the maxillary crest in order to allow the perforation with a drill transfixing the guide and the maxilla bilaterally in the region of the canine and zigomatic pillar. The screws used for the fixation of the surgical guide measured 2.0 mm x 12 mm being the perforation obtained with a 1.5 mm drill, belonging to the same fixation system, mounted in a low rotation motor under continuous irrigation with

FIGURE 4 - The picture shows the surgical guide previously made in a cast model and the gain in vestibular height.

FIGURE 5 - The surgical guide being reshaped to aid in the suppor t of undermined tissues.

saline. The desirable depth was obtained when the drill reached the inner part of the maxillary sinus. A screw was placed after each perforation. Two screws were used at each side to obtain an optimum stability of the guide (FIGURE 6). After the procedure a micropore dressing was applied on the upper lip to control edema, bleeding and maintain the area immobile.

The patient received ampicilin, 500 mg e very 6 hours, for 7 days; dipirone 40 drops every 6 hours, for 2 days and mouth washes with chlorhexidine 0.12 every 12 hours for 21 da ys. Postoperative control was done weekly including oral higienization, br ushing of mucosa and the external surface of the guide.

After 21 days the screws and the surgical guide was removed after terminal infiltration anesthesia of the scre w region (FIGURE 7). At this moment it was observed the beginning of the reepithelization process in the area, which was kept raw and protected by the reshaped guide. After another reshape with resilient resin the guide was kept till the installation of the definitive total prosthesis, which construction started one month after the sulcoplasty . The patient was followed-up and he did not repor t any complaint regarding the treatment (FIGURE 8) or the stability of the prosthesis.

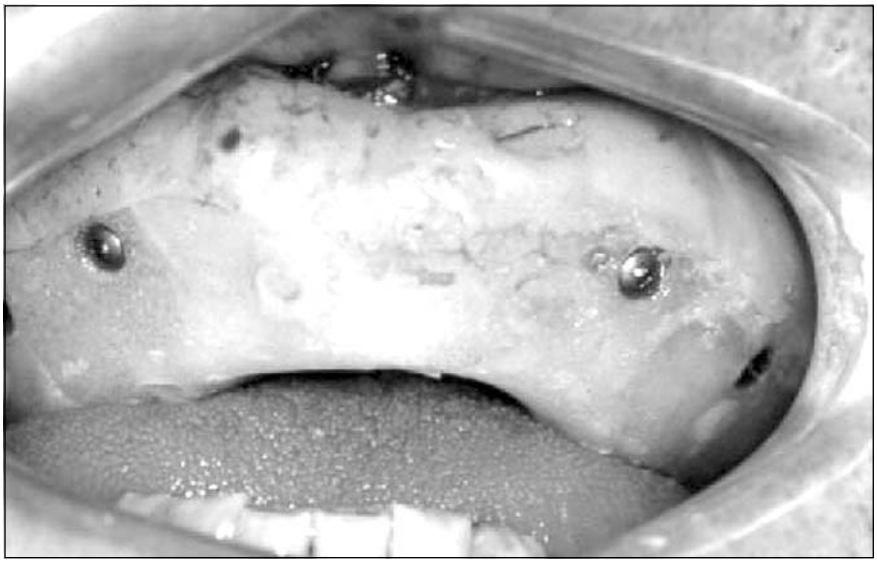

FIGURE 6 - Fixation of the surgical guide in the maxilla through screws for internal rigid fixation.

DISCUSSION

Since the introduction of rigid internal fixation, that is, osteosynthesis with screws and plaques, the use of intermaxillary fixation was restrict to a few cases and, when used, for a short period (CROFTS et al., 1990). However, the intermaxillary block in the transoperatory period was always necessary. Taking this into consi-

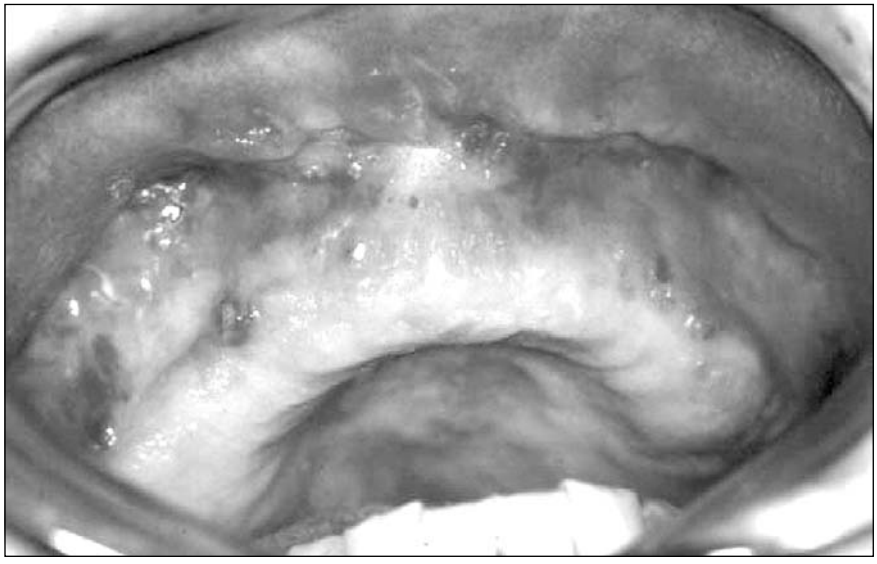

FIGURE 7 - 21st day postoperative. The surgical guide and sutures were removed. Note the alveolar crest undergoing reepithelization.

FIGURE 8 - 6th month post operative. Note the alveolar crest vestibular height that was obtained.

deration and in the difficulty of these procedures to be carried out in edentulous patients with total prosthesis, Shetty et al. in 1987, proposed a variation of the intermaxyllary block. In these cases they proposed the use of "minihooks" similar to screws fixed in the maxillary bone and in the mandible. According to them, such "hooks" allowed an efficient intermaxillary block during the trans-operative period protecting surgeons form possible accidents. With the same objective and considering the potential of exposure of health professional to punctures and wounds, which may be caused by traditional techniques of inter maxillary block, through odontosynthesis, Erich's plaques and suspensions, Arthur and Berardo (1989) used titanium screws fixed in the basal maxillary and mandibular bone of toothed patients. The screws, externally connected by a steel wire, promoted the intermaxillary block. The authors emphasized the importance of this technique in the treatment of facial fractures in high-risk patients.

Dym and Cerbone (1991) used screws to maintain tissues after sulcoplasty. They avoided the use o guides and or patient's own prosthesis and used only the sutures and two screws at each side to the maxilla to maintain tissues. They report some success of this procedure with a partial loss of the depth of the sulcus. The inconvenient of this technique is that, in some areas, tissues are not adequately maintained in the desirable position, which could be attained only with a great number of screws. Besides that, the crown of the crew was covered by soft tissue, at the moment of its removal, due to the action of muscles in the region. The discomfort of pa-

tients due to the tissues remaining raw and not protected should be borne in mind.

Nary Filho et al. (1994) used titanium screws to maintain total prosthesis on the crest or surgical guides in the conservative treatment of mandibular fractures in edented patients that were in need for stabilization by intermaxillary block. The good results opened way for the use of this technique in other situations, such as partial resection of mandible, in which the fixation of the total prosthesis aimed the oclusal orientation during mandibular reconstruction, or even for postoperative physical therapy. The technique was also used in sulcoplasty with skin graft, in which the surgical quid was kept on place through screws, as reported in this study. While removing the fixation it was noted the advantages of this technique as compared to the maxillary suspension. It is more comfortable since the screws are unbolted with a simple anesthetic infiltration in the area. There was no complication, such as bucosinusal communication or infectious process. It is even a more aseptic procedure since it prevents an element from being exposed to the oral cavity to go through tissues as happens with the removal of maxillary suspensions.

CONCLUSION

The authors believe that the fixation of guides and or prosthesis with screws may be done safely and that the dissemination of this method among dentists may increase confidence with sulcoplasty since it is a simple and safe procedure, with adequate fixation of prosthesis or surgical guide allowing more favorable results in attaining sulcus depth and comfort to the patient.

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