

The Contribution of Surgery to Prosthesis: With Step by Step Realization

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Abstract

Before starting any prosthetic treatment, it is essential to perform a preoperative assessment that will guide the treatment. However, the anatomical peculiarity of the maxilla of a significant number of edentulous patients is not always favorable to the placement of complete removable prostheses. Hence the interest in integrating pre-prosthetic surgery into the overall treatment plan, in order to get closer to the initial conditions of the patients favorable to prosthetic rehabilitation.

Introduction

Many patients wear complete removable prostheses for many years, which accelerates bone resorption and causes the appearance of defects in the para-prosthetic tissues.

It is essential to perform clinical, radiological and casting examinations. All these examinations allow us to orient the choice of treatments prior to the realization of the prosthesis.

Their management must imperatively include clinical and radiological examinations and casts. All these examinations allow us to orient the choice of treatments prior to the realization of the prosthesis.

Pre-prosthetic surgery is part of a therapeutic arsenal that allows for the correction or even elimination of factors unfavorable to stability, support and retention. This surgical maneuver improves aesthetics and modifies the architecture of the mucosal tissues covering the bearing surface, in order to prepare the way for the prosthetic steps.

Interventions should only be undertaken if all indications and contraindications, whether general or local, have been considered and presented to the patient.

The interest of this article is to illustrate through a clinical case, the contribution of surgery in the realization of a stable and durable complete removable prosthesis.

Description

Surgical component

First day of consultation in the periodontal department

At the time of the clinical examination, our patient presented a type 3 pathological frenum according to the classification of Placek et al 1974. With the presence of an unstable prosthesis in the mouth. She was referred by the prosthesis department in order to perform a pre-prosthetic surgery.

At the examination of the mucous membranes, we observed an inflammation due mainly to the wearing of the old prosthesis, as well as the presence of the frenum's insertion which prevented the stability of the prosthesis (Figure 1).

In order to reduce the inflammation, an antiseptic gel was prescribed, gingival massage and a chlorhexidine mouthwash, while insisting that the patient avoid wearing the old denture. In the vestibule of the upper left side, we noticed a mucous duplication, accompanied by a slight inflammation.



Figure1: 1st day of consultation. Intraoral view

One week later

There are several techniques for frenectomy, the simplest of which consists of performing a para-apical anesthesia in the vestibular region. The incisions in the attached gingiva 1 mm on either side of the attachment of the frenulum to the gingiva delimit the two sides of a triangle whose gingival apex may be in the interdental space or on the palatal surface. Then a second triangle with the opposite vertex is dissected on the inner side of the lip, in the labial mucosa, using a blade or gingival scissors, the whole forming a diamond. This technique, which we chose, allowed us to obtain a complete and optimal healing of the mucosa (Figure2).

The prescription consisted of an analgesic, a chlorhexidine mouthwash, and finally an antiseptic gel to massage the surgery area.



Figure 2(1)



Figure 2(2)

Figure 2: Day of surgery intraoral view: 1: After surgery, 2: After sutures

Two Weeks after the procedure

The patient was seen again for removal of the sutures. We noticed an almost complete healing with a disappearance of the inflammation (Figure 3).

For visible mucosal lesions, a prescription was made based on an antiseptic gel that was applied with massage to the inflamed area.



Figure 3: 2 weeks after surgery: Intraoral view

Prosthesis section

It is agreed that the healing time for taking the final impression is four weeks on average for the first intention healing (Tacquet & Hoornaert, 2013). In this phase the mucosa must have a normal aspect without any morphological defect or inflammation to be able to start the prosthetic steps.

The objective is to achieve a satisfactory prosthetic rehabilitation on the functional, aesthetic and psychological levels (Zerbout, 2014).

The prosthetic step that follows the healing phase is the primary impression taken by a commercial impression tray. After receiving the primary models and the individual impression trays, they must be adapted in the mouth to check their stability as well as the quality and location of the edges (Biou, 1996).

Impression tray specifications:

- Rigid base
- Smooth rounded edges 2mm from the mucosal reflection line
- Biocompatible material
- Bead conforms to paraprosthetic structures

The registration of the peripheral joint is the first step to be validated; it is an essential step for a perfect registration of the paraprosthetic musculature in dynamics. Immediately after remargining, the secondary impression material is applied to the margins and intrados to fine-tune the secondary impression (Figure 4).



Figure 4: Study designs from the primary footprint

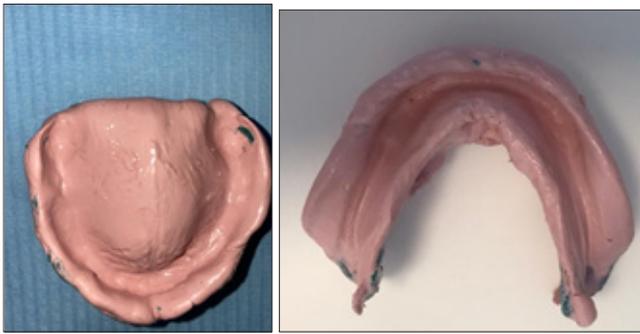


Figure 5:Maxillary and mandibular secondary impressions

The recording of the maxillo-mandibular relationships (MMR), imposes the use of occlusion models because of the complete absence of teeth.

After receiving the model from the laboratory, its stability is checked on the model and then in the mouth. Before determining the orientation and inclination of the occlusal plane, the facial integration of this occlusal model is necessary. In our patient's case, we added Kerr paste on the vestibular side to improve the anterior esthetics and to make up for the insufficient labial support.

Indeed, the validation of the anterior labial and posterior jugal support allowed us to start the next phase which is the determination of the occlusal plane (OP) of the patient. To do so, an adaptation and a finishing of the surface of the bead is necessary, in order to be able to apply Fox's rule on this bead (Devin, 1960).

The anterior component of the OP is determined by parallelism with the bipupillary line, and the posterior component is determined by parallelism with the Camper plane. After finalizing this step, indentations were made in the posterior to be able to reposition the model on the Moyco wax fork and still in centered relationship (Dabadie & Jacquemond, 1986) (Figure 6).

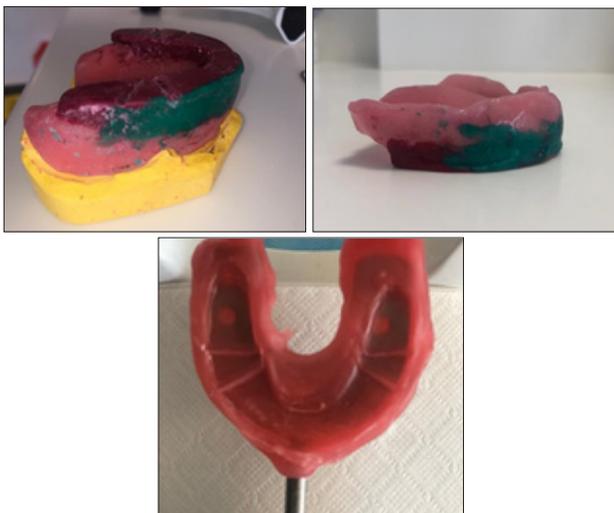


Figure 6: Correction of lip support with Kerr paste/Moyco wax



Figure 7: Stability of the facebow on the face (front view (a) and side view (b))

When introducing the fork first into the oral cavity, it must be well centered with a purely sagittal projection of the stem. This position was well fixed throughout this step thanks to pressure exerted by the practitioner opposite the molars.

The final situation is maintained by locking all the screws, including the central screw (Figure 7).

Disinsertion of the facebow is done carefully with a single and simple gesture, which is the unscrewing of the central screw for its placement on the articulator (Figure 8).

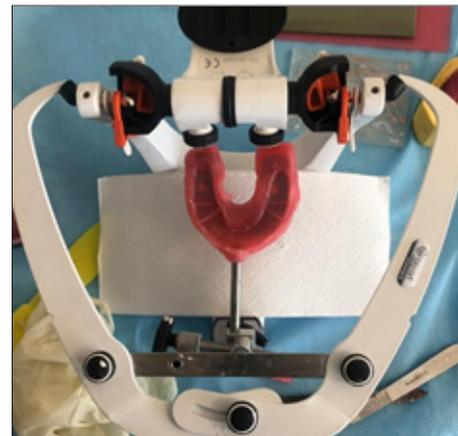


Figure 8: Positioning of the fork and facebow on the articulator

After placing the facebow on the articulator, the tips of the bow were inserted into the ear tips of the articulator. The assembly was locked again with the central screw.

A plaster wedge was designed to support the weight of the fork, the model and the base afterwards. The mandible was transferred after registration and fixation of the RMM in the mouth. (Figure 9)



Figure 9: The transfer of the two models to the articulator (maxilla* by facebow/mandible** by RMM)

The choice of prosthetic teeth in a prosthesis influences the aesthetic appearance of the final result. This choice concerns the shape, the shade, the material and the dimensions. The dentist bases these choices on the sex, age and personality of each patient (Mariani & Pini, 1979).

In order to determine the shade of our patient's prosthetic teeth, we based ourselves on the triad "skin-eye-hair", in daylight, concerning the shape and diameter, we chose them according to the age and sex of the patient. All these personalized details were sent to the laboratory to make the wax-up (Lejoyeux et al., 1979).

The wax-up is sent by the laboratory for an esthetic and functional fitting. This allows us to validate the assembly, the occlusion and the aesthetics with the patient and his entourage. It is in this phase that the maximum of rectifications were made, in order to minimize the grievances after the final installation of the prosthesis (Perez et al., 2007).



Figure 10: Final result

The fitting of the polymerized prosthesis was successful (Figure 10).

Post-operative advice was given to the patient, emphasizing good hygiene, with adherence to check-up, balancing and follow-up sessions (Berteretche & Hùe, 2003).

Discussion

Several prostheses are made around a pronounced labial frenum, resulting in a poorly adapted prosthesis, irritation of the mucosa and loss of surface area that could contribute to retention and stability (Ephros et al., 2015). Hence the interest of its surgical removal in a preventive or curative framework, this plastic surgery technique is called frenectomy (Prato et al., 1995).

There are several frenectomy techniques described in the literature. Miller's technique in 1985 for post orthodontic diastemas. Z-plasty is indicated in cases of hypertrophy of the frenulum with a low insertion, associated with an inter incisal diastema and in cases of a shallow vestibule. V-section frenectomy, used to enlarge localized areas such as brakes in the molar premolar region. Electrosurgery in the case of patients with hematological disorders, whose cold blade could interfere with hemostasis or in the case of non-cooperative patients. It offers the advantage of saving time without the need for sutures (Devishree et al., 2012).

Frenectomy is often associated with a vestibuloplasty, which is a mucogingival surgical procedure to deepen the vestibule (Bouchemit & Kuntz, 1997). But in our patient's case, there were no indications to do so, because we had enough bone crest height.

In order to perform a proper prosthetic rehabilitation, it is necessary to ensure that the operated tissue heals properly. There are two types of healing possible, depending on the type and extent of the surgery. First intention healing is the most sought after because it allows for faster repair and requires the edges to be sealed with hermetic sutures. Second intention healing is more time consuming and results from the difficulty of making hermetic sutures due to the loss of substance (Pierot, 2002).

Once the defects have been taken care of in the pre-prosthetic

phase, it is possible to proceed immediately to prosthetic rehabilitation of the patient.

Total edentulism is one of the most difficult challenges to manage. On the one hand, the effect of tooth loss is accompanied by a loss of control proprioception; on the other hand, the resorption that takes place over the years modifies the architecture of the osteo-mucosal support tissues. In addition to these functional disturbances, there are aesthetic and phonetic alterations.

Many techniques are proposed for the treatment of total edentulism, ranging from the simple conventional removable prosthesis to the immediate and permanent implant prosthesis. According to the Bränemark-Novum concept, it is possible to place the implants and the customary prosthesis on the same day. According to Bränemark and al., multicenter clinical studies have demonstrated the possibility of systematically placing a fixed utility prosthesis immediately after implant placement, on the same day, in a completely edentulous patient. In this case, this option would allow for additional retention by relying on the implants. In addition to an increase in the masticatory coefficient by a gain in stability and a significant comfort for the patient by a less cumbersome and more adherent prosthesis.

The supra-implant removable complete prosthesis is also of interest in the management of cases with unfavorable anatomical conditions. It is a complete removable prosthesis with additional implant retention that constitutes a simple and reliable solution that optimizes the prosthetic balance.

The use of conventional removable prosthesis is still in use today and remains the most indicated, despite the undeniable rise of implantology and other more developed techniques. In our patient's case, we treated her with a conventional complete removable prosthesis, given her unfavorable socioeconomic context. During the different operative steps of the prosthetic rehabilitation, we exploited the anatomical (positive) factors, the poli-stabilizing surfaces and the occlusal factors: "bilaterally balanced occlusion" in order to meet the components of the Housset triad.

Conclusion

Apart from the contribution of pre-prosthetic surgery to the complete removable prosthesis, there are now other alternatives such as the supra-implant prosthesis which offers better results in terms of stability and retention. However, it is important to take into consideration the patient's general state of health and financial means.

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