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RESEARCH ARTICLE

MANAGEMENT OF BONE HYPERTROPHY FOR A GOOD PROSTHETIC REHABILITATION: CASE REPORT

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ABSTRACT

The Removable prosthetic rehabilitation of a thoroughly edentulous person is not always as simple as it may appear. The prosthetic supporting surface can be the shelter of bone hypertrophy. This hypertrophy can compromise and make prosthetic treatment difficult and even impossible as these anatomical obstacles compel the practitioner to harmful compromise for the stability of the prostheses, as much at the extent of the bases as at the level of the occlusion and the esthetics. A surgical arrangement of the prosthetic space is therefore necessary. A preprosthetic analysis is mandatory so as to quantify the tissues to be removed. Through this work, we will try to illustrate via a clinical case the analytical and therapeutic approaches adopted to resolve this problem for an optimal prosthetic balance.

Key words: Exostosis, Prosthetic Space, Surgical Management, Preprosthetic Therapeutic, Removable Prosthesis, Occlusal plan.

INTRODUCTION

The therapeutic of total toothless gap or partial one with large-scale involves a maximum exploitation of anatomical areas that can optimize sustentation and prosthetic retention. Those fundamental imperatives of the removable prosthesis sometimes face unfavorable anatomical constraints that can considerably hinder even prohibit the removable prosthesis implementation. This is the case of the maxillaries' bone hypertrophies (Schittly, 2006; Princ *et al.,* 1999). Indeed, the presence of bone hypertrophy at the level of the prosthesis supporting areas (edentulous ridge, maxillary tuberosity or palate) can force the practitioner to harmful compromises to the stability of prostheses and for its aesthetic and occlusal integration that imposes a surgical arrangement of the prosthetic space useful before any prosthetic rehabilitation (Schittly, 2006; Princ *et al.,* 1999). The etiological factors and types of these buccal bone hypertrophies are diverse. This induces complexity in the management and also raises the problem of differential diagnosis with hypertrophies of tumor origin (Jainkittivong, 2000).

Buccal bone hypertrophy

Buccal bone hypertrophies are exophytic bone neoformations, usually found along the alveoli or on the hard palate. Depending on their location and extent, they can be classified as palatal torus, mandibular torus and buccal exostosis. Clinically detectable, they are not associated with any pathological condition and can easily be distinguished from other traumatic or tumorous bone high outgrowths (Jainkittivong *et al.,* 2000; Jainkittivong *et al.,* 2007; Sawair and Coll, 2009).

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Clinical forms

The palatal torus: It is an osteogenic exostosis constituting an elevation of the medial line of the palate, on the cruciform suture which unites the palatal and maxillary bones (Garcia-Garcia *et al.,* 2010; Naidoo *et al.,* 2013).

The mandibular torus: It is an outgrowth of the alveolar bone of the mandible, usually bilateral. It is located on the medial side of the anterior part of the horizontal branch of this bone. It sits in front of the mylohyoidal line, above the sublingual fossa which can sometimes partially fill it and below the alveolar rim. It is composed of more or less voluminous nodules sometimes bringing up the appearance of a horizontal hump. It generally extends from the lateral incisor or the canine to the 2nd - 3rd ipsilateral molar. Its maximum development is always located opposite to the premolars (Garcia-Garcia *et al.,* 2010; Hasset, 2006).

Buccal exostoses: These are a variety of buccal bone hypertrophies other than the palatal torus and the mandibular torus. Variables in expression, maxillary exostoses can be smooth and continuous with the ridge, or manifest as single or multiple nodules more or less discrete. Maxillary exostoses are distinguished from vestibular and / or palatal location. Vestibular exostoses often get in contact with each other and tend to be thicker near the molars, sometimes extending to the 2nd premolar and, in rare cases, to canine and incisors. Palatal exostoses are usually found in the tuberosity area. In the maxilla, they are most often vestibular. On the other hand, their location is often lingual to the mandibular (Jainkittivong, 2000; Horning *et al.,* 2000; Antoniades,1998).

Etiologys: The etiology of tori is not yet clearly defined. Many theories have been advanced to explain the formation and development of tori. Many of them, associating the tori with the extension of a general pathology, are abandoned, leaving room for theories putting environmental factors at stake.

Fig 1 : Intrabuccal view of the higher maxilla showing bone hypertrophy in the right lateral sector

Fig 2 : intrabuccal view of the lower maxilla

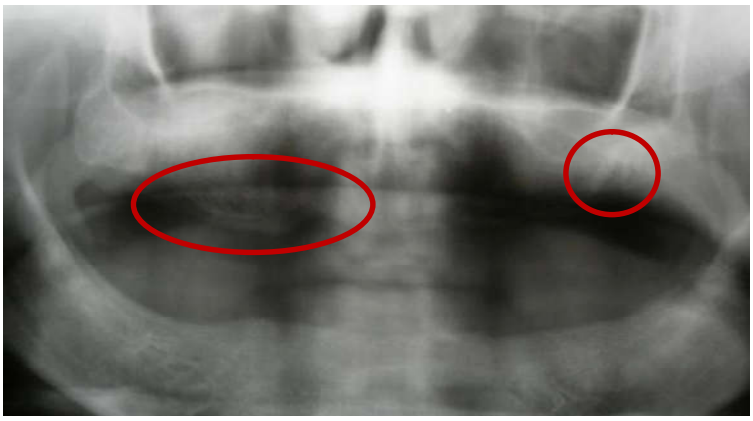

Fig 3. Panoramic radiography: right maxillary ridge prominent, persistent roots of 26

Fig 4a. Upper model where the occlusal plane is materialized

Fig 4b. Lower occlusion model recording the centric relation to the vertical dimension of occlusion

Fig 4c : Study models mounted on articulator

Fig 5. Upper model with the lower model: note the absence of space between the maxillary ridge at the right lateral sector and the lower model which prohibits the mounting of maxillary teeth

Fig 6a. In the frontal plane, the occlusal plane must be parallel to the bipupillary line

Fig 6 b, c: in the sagittal plane, the occlusal plane should be parallel to the Camper's plane

Fig 7: Corrected study model

Fig 8 : The surgical guide is made on a duplicate of the corrected study model

Fig 9 : Perfect adaptation of the surgical guide in the mouth after bone resection showing the perfect reproduction of the rectifications performed on the plaster model.

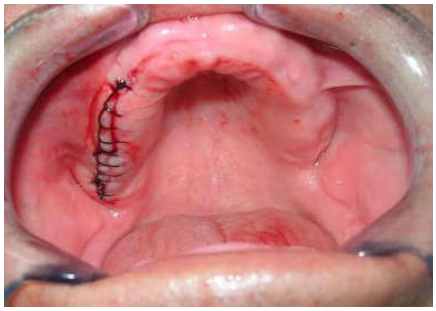

Fig 10. Realization of sutures.

Fig 11. Aspect of the ridge 2 months after surgery

Fig 12. Mounting prosthetic teeth on articulator-mounted work models

Fig 13. Prosthesis use in mouth

Indeed, genetic, mechanistic and environmental theories are today favored by the authors. A study conducted in the United States in 2002 by the Department of Anthropology, Missouri-Columbia University, on the role of occlusal stress in the genesis of localized hypertrophy (exostosis) showed a strong correlation between the manifestations of occlusal stress (pathology of TMJ, wearing the teeth occlusal surfaces) and the appearance of vestibular exostoses at the maxillary and lingual levels in the mandible. Other studies on bruxism have reported a significant correlation with vestibular exostoses. This favors occlusal forces in the formation of localized buccal hypertrophies (Jainkittivong, 2000; Hasset, 2006).

Clinical Case: This is a 56-year-old patient, from south-west Morocco, in good general health condition, with no particular medical-surgical background, who is total edentulous who presented himself in consultation for a total bimaxillary prosthetic rehabilitation.

Clinical and radiological examination: Clinical examination of the higher maxilla shows a large volume of the ridge at the level of the right premolar-molar sector. The ridge is covered by a firm adhering fibromuceusal to the periosteum. The patient reports that the teeth of this sector are the last ones to be extracted (2months before his consultation). Clinical examination of the lower maxilla shows resorption of the ridge at the level of the right lateral sector in relation to old dental extractions (more than 10 years). This may partly explain the origin of hypertrophy in the right lateral sector. Indeed, uncompensated edentation in the lower premolar-molar area caused the egression of the right upper molar premolars with their periodontium. (Fig 1, Fig 2)

At rest, the interridged space is reduced because of the right maxillary crestal hypertrophy making difficult if not impossible to set up the future maxillary prosthesis. Radiological examination revealed hypertrophy of the maxillary bone base in the right lateral sector. It excludes the presence of the included tooth. It informs about the anatomical neighboring relations with the sinus (far in this case) and allows estimating the thickness of the fibromatosa at this level. It also shows the persistence of the roots of 26. (Fig 3)

Casts study: Transfer of the articulator study models through occlusion models is done after recording the intermaxillary ratios in centric relation and the vertical dimension of occlusion (Fig 4a, b, c). It confirms a significant hypertrophy of the maxillary ridge that encroaches on the occlusal plane (Fig 5).

It allows (Berrada, 2005; Castany, 2002):

- The assessment of the deficit of the available prosthetic space.
- The determination of the situation and the orientation of the prosthetic occlusion plane.
- The quantification of the surgical arrangements to be made.
- The realization of the surgical guide after rectification of the model.

The orientation of the occlusion plane is defined at the level of the bead of the upper model (Helfer, 2010) (Fig 6a, b, c). To define the sagittal orientation of the occlusion plane, other techniques can be used: the Wadsworth flag technique, cepahlometry, or the anatomical technique of the 4 Hue mandible markers (Helfer, 2010; Hüe, 2003). The indication of a segmental bone surgery is then posed, in order to arrange the available prosthetic space.

Correction of the upper study model: The determined occlusion plane will guide the subtractive surgery of the maxillary ridge. A simulation of the surgical corrections is carried out on the model of maxillary study (Fig7). It makes it possible to evaluate the quantity of bone to be resected during the operative act to arrange the prosthetic space sufficient for the assembly of the teeth in compliance with the occlusion plane (Berrada *et al.,* 2005; Princ *et al.,* 1999).

Realization of the surgical guide: A surgical guide is made on a duplicate of the corrected study model (Fig8) .It is made of transparent resin trying to have a perfectly uniform thickness, it reproduces the entire surface of the rectified model (Berrada *et al.,* 2005; Princ *et al.,* 1999).

The surgical phase

Although essential, subtractive corrective surgery should not be mutilating. Paradoxically, it aims at tissue preservation. It only makes sense if it is induced by a pre-prosthetic study and directed by a surgical guide, transparent replica of the prosthetic base

The surgical technique is as follows:

- Local anesthesia ;
- Incision with discharge;
- Detachment of the flap;
- bone and mucous lining;
- Sutures.

Plated at the level of the palate with the index finger so as to exert an axial and uniform pressure, the guide highlights the areas of compression to be removed and allows a permanent control of the osteoplasty. It allows to postpone in the mouth corrections made on model (Fig 9). The retouches are made gradually until a perfect seating of the guide on the bearing surfaces (Berrada *et al.,* 2005; Castany *et al.,* 2002). The hypertrophic bone tissue is removed using the gouge and the bone bur with high irrigation and regular bone grater. The fibro mucosa became excessively estressequed then the suture of the banks is carried out (Fig10). At the end of the surgery, the usual prescriptions in oral surgeries are made; namely: antibiotic (amoxicillin or clindamycin / pristinamycin), analgesic, antiseptic, anti-inflammatory steroid (to reduce postoperative edema).

The realization of the prosthesis use: After complete cicatrization (2 to 3 months), the realization of the prosthesis use is started (Fig 11,12,13).

Conclusion

Bone hypertrophies of the maxillae are rare. But, when they exist, they can constitute a real obstacle for prosthetic rehabilitation for the toothless patient. Thus, they can constrain the essential requirements of the success of the removable prosthesis, namely: retention, sustentation and stabilization. In some cases, they interfere with the insertion of the removable prosthesis and prohibit its placement. The management of patients with these hyperostoses requires the determination of their etiologies to take them into consideration in the therapeutic decision, and in the follow-up of the patient. Often, when the patient's condition permits, subtractive bone surgery is required. But, if the patient has one or more contraindications to surgery (general or local) a removable prosthesis that bypasses bone prominence is required. Given the diversity of the etiological factors of these hypertrophies, the management is complex especially as in some cases bone hypertrophy recurrence after surgery.

But, pre-prosthetic surgery gives satisfactory results from the functional and aesthetic point of view for the patient.

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