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Review Article

Oral and Maxillofacial Implantology, Fundamental Pillar in Prosthetic Restoration

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Abstract

Since ancient times, the human tends to replace the lost organs of his body with prosthetics, for functional and also aesthetic reasons [1]. As such, the dental pieces as well as the organs of the face are indispensable for a normal psychosocial life of the individual. Modern implantology with osseointegration was undoubtedly the major advance for the fixation of this type of prosthesis.

Keywords: *Dental Implants; Extra-Oral Implants; Buco-Maxilo-Facial Prothesis; Dental Prothesis*

Introduction

The disease of caries and periodontal disease are the most frequent pathologies that cause loss of teeth. The causes of facial resections are traumatologic, tumor and congenital diseases.

In this article we make a review and update of the prosthesis advances and how it helped the discovery of osseointegration for the fixation and retention of the same.

History

The first examples of dental prostheses were made by skilled goldsmiths and craftsmen, while doctors and barber surgeons were engaged in performing the exodoncias.

Figure 1: *Piece of ivory fixed to dental pieces through plates of gold made by the Etruscans. 700 BC.*

Figure 2: *Jaw with prosthesis of lower incisors.*

Figure 3: *Phoenician denture prosthesis. 500 BC.*

The idea of using facial prostheses also goes back to ancient times, as witnessed by some Egyptian mummies that appear with artificial noses and ears.

Years ago, professionals from other disciplines developed some type of maxillofacial prosthesis, especially ocular ones, but it is only from the 1970s that the first specialists in this area appear.

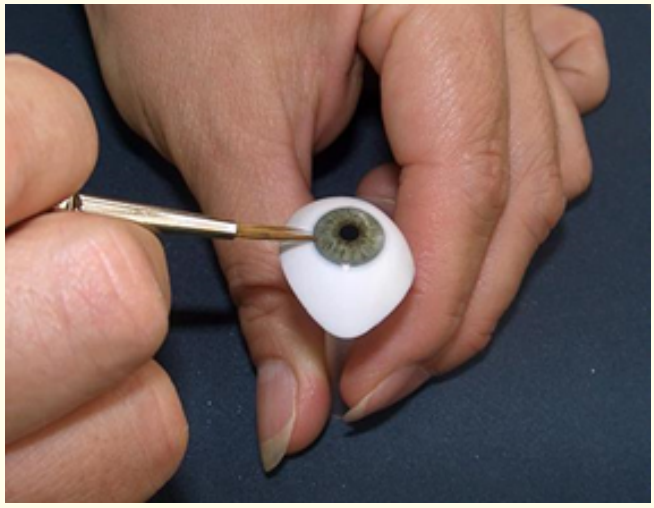

Figure 4: *Making an intraocular prosthesis.*

Classification of dental prostheses

To replace lost dental organs, dentists have basically 2 types of prosthesis to make; removable and fixed.

The former can replace the entire dental arch, called complete superior and inferior dentures; or may be removable partial dentures also individualized for the upper and lower maxillary ridge.

Figure 5: *Complete removable prosthesis set.*

They are removable by the patient for their hygiene after each intake.

Figure 6: *Set of removable partial prostheses in cobalt chromium.*

They can support and look for retention on mucosa, on remaining dental pieces or in both zones of the arch.

Many times they replenish not only lost teeth, but also bone that is reabsorbed with the passage of time, using pink acrylics simulating gingiva and giving more height to the prosthesis [2].

Fixed prostheses are made by the professional preparing as pillars of the same to remnants adjacent to the edentulous gaps, being permanently cemented and not being able to be removed by the patient.

Figure 7: *A. Pillars prepared to receive a fixed prosthesis; in canines with carving and in centers with metal stud bolts. B. Fixed cemented ceramic prosthesis.*

Classification of maxillofacial prostheses:

Depending on the contact with the defect, facial maxillofacial prostheses are classified as anaplerosis and epithesis.

Anaplerosis is a prosthesis that is introduced into the cavity, maintaining contact with the whole defect. For this the defect must be covered with healthy skin or mucosa. In these cases the ideal is to obtain a model that reproduces the defect. This is achieved by means of an impression called "facial moulage" [3]. Epithesis is a type of prosthesis that rests on the periphery of the defect only. In these cases it would not be necessary to make an impression. It is started by adapting a wax to the defect area [3]. This wax must contact all edges of the defect. From this sheet is constructed a support of plaster that will serve as a support to work on the sculpture in a stable form.

The types of maxillofacial maxillary prostheses are varied, depending on the defect to be rehabilitated we can find [4]:

Obturatrices: For the losses of substance of the upper jaw, which produce buco sinusal communications.

Figure 8

Velopharyngeal: When there is loss of tissues of the palate.

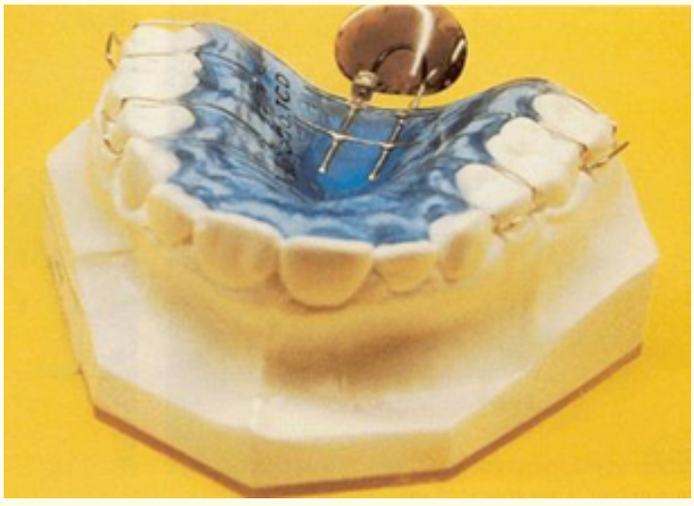

Figure 9

Eyepieces: They are used when there is loss or atrophy of the eyeball.

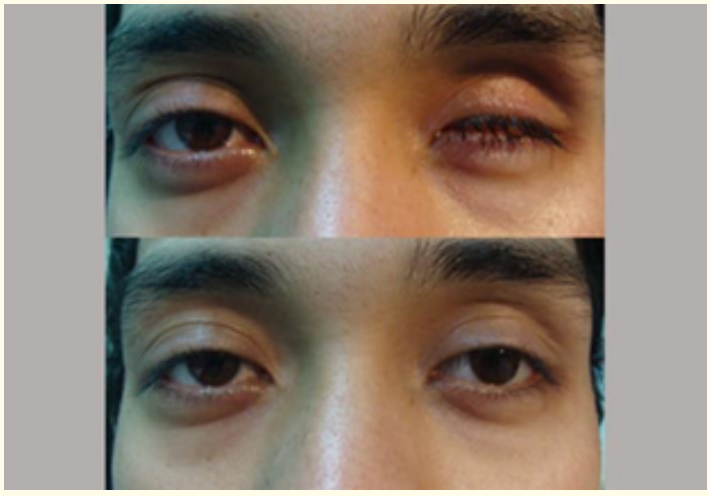

Figure 10

Orbital or oculopalpebral: When the extension of the lesion also involves the peri-ocular tissues.

Figure 11

Nasal: When there is excision of the nasal appendix.

Figure 12

Headphones: For the rehabilitation of the ear pavilion.

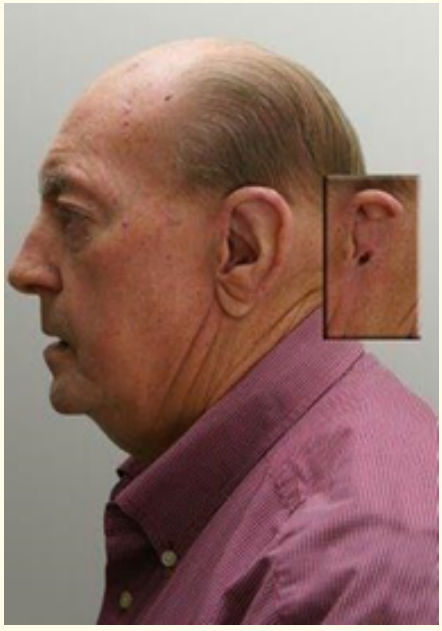

Figure 13

Cranial: By cranial bone defects.

Figure 14

Complexes: When the defect involves 2 or more regions of the face.

Figure 15

The traditional retention methods used prior to osseointegration are [5]:

Adhesives: The use of skin adhesives can cause contact allergies, can lose adhesion with perspiration and have little effectiveness, depending on the size and weight of the prosthesis. In addition, some patients report having difficulty repositioning prostheses.

Mechanics: Lens frames, acrylic pieces, magnets and clips are retention means traditionally used in facial prostheses. Lens frames are excellent means for retention of nasal prostheses and eye-eyelid, however, many patients are distressed by the need to remove the prosthesis together with the lenses.

Anatomic: They can be used in anatomical cavities to retain through prolongations of soft materials or when the supporting tissues around the cavity manages to support acrylic structures, such as bridges.

Osseointegration and its fundamental role

The classical prostheses have the problem of stability and retention that the osseointegration was able to solve.

Undoubtedly, this was the most important advance for prosthetic restorations in the last 25 years. The osseointegration allows a retention and stability that ensure the immobility of the prosthesis, thus eliminating the use of adhesives, giving good termination and fine edges, generating a better aesthetic result and providing greater patient safety [6].

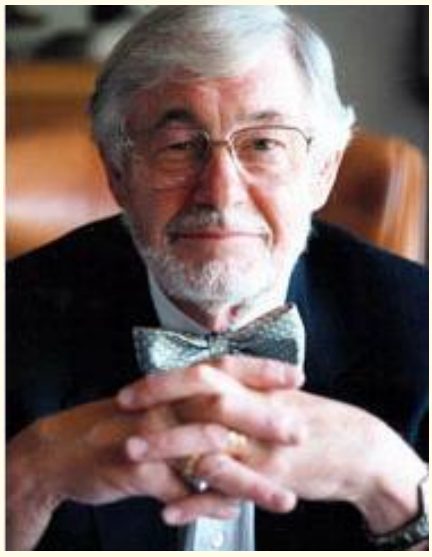

Figure 16: *Per-Ingvar Brånemark, father of osseointegration (1929-2014).*

Implantology has evolved constantly in recent years, becoming an effective and safe means of anchoring for maxillofacial prostheses. Studies confirm high success rates, making osseointegrated implants a treatment of choice for certain patients [7].

The means of fixation or retention are a vital aspect given the possibilities of eviction of the rehabilitation by its magnitude, high weight and to be in areas of great mobility.

The use of titanium implants has minimized the problem of prosthesis edge integrity and poor positioning, and improved camouflage [8].

Due to the need to determine the sites for the placement of implants in the facial skull region, this classification, which gives an approximate idea of the amount of bone in the different regions, arises. Jensen and Col. divide the different sectors into sites α, β and δ. The α site has a bone depth of 6 millimeters or more, the β site, 4 or 5 millimeters, and the δ site 3 or less [3].

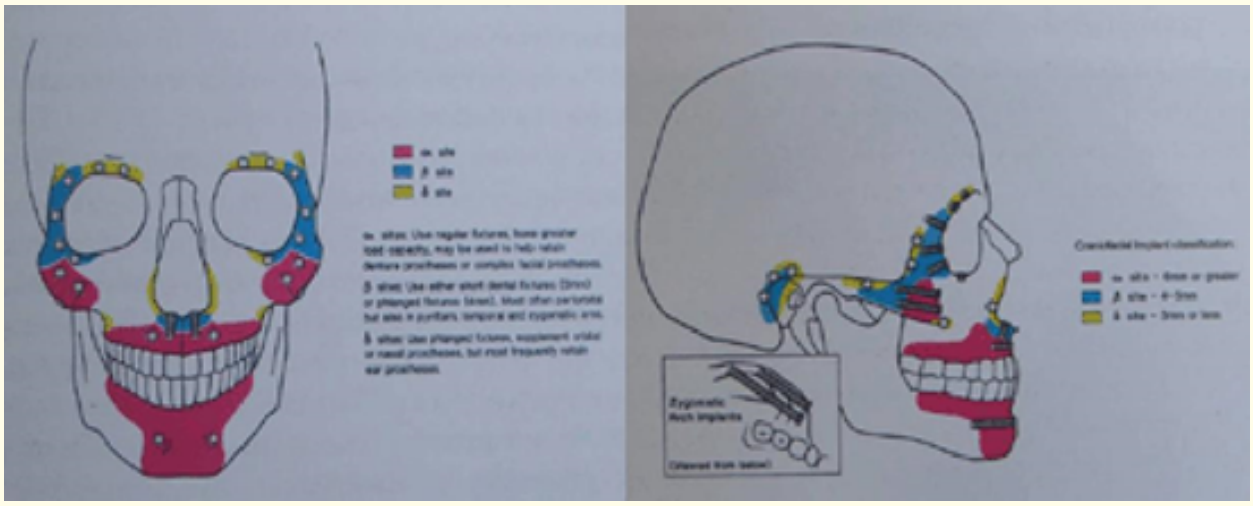

Figure 17

Oral implants and occlusal rehabilitations

With the surgical placement of titanium root implants and then waiting to be fully integrated into the patient's bone (approximately 2 to 4 months), we can rehabilitate from a lost tooth to a complete arch.

Figure 18: *Ceramic crown screwed to unitary implant.*

It is important to have surgical guides to determine where the prosthesis will come from and where we need to place the implant (s).

Fixed prostheses can be implemented by screwing them into the internal threads of the implant, as well as removable with magnet attachment systems or the so-called "ball attach".

Figure 19: *A. Ball attachments on 2 jaw implants. B. Removable lower complete prosthesis fixed with cups and their O-rings to implants.*

We can rehabilitate exclusively dental crowns, or if the loss also encompassed bone, prostheses can replace tooth and bone/gingiva, called hybrid prostheses.

Figure 20: *Superior complete arch hybrid prosthesis on 7 implants.*

Extraoral implantology and maxillofacial rehabilitation

In the case of maxillofacial prostheses we have specific bone structures and implant sites.

For the case of auricular prosthesis, it is ideal to place 2 implants positioned 18 millimeters from the center of the external auditory meatus at a distance of 15 millimeters from each other [9].

Figure 21: *Atrial prosthesis fixed to metal structure cast and screwed to 2 implants placed in the mastoid process of the temporal.*

In the oculopalpebral the zones of implantation are the lateral borders, inferior and superior of the orbit.

It is convenient to place 2 implants on the upper edge and 2 on the lower edge to retain this type of prosthesis.

Figure 22: *Capsulopalpebral prosthesis fixed to 2 implants placed at the upper edge of the orbit and another fixed at the lower edge.*

For nasal prostheses it is advisable to reduce the septum anteriorly to gain space and bone width. It is advisable to place 2 implants to retain this type of rehabilitation.

Figure 23: *Placement of 2 implants in the floor of nostrils and prosthetic rehabilitation installed.*

Conclusion

Implantology is undoubtedly, one of the greatest advances in the stomatological area, allowing better functional and aesthetic results.

No part of the body reveals the character of the person in equal proportion to the face; no part is able to express feelings, feelings and emotions like the face.

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