POST IMPLANTATION MONITORING - THE GUARANTEE OF SUCCESS IN PROSTHETIC RESTORATIONS ON IMPLANTS

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Abstract: *Objective: The presentation of data regarding tissue integration of oral endosseous implants. Description of the two types of tissue integration: epithelial-conjunctive and bone recalling the two physiological mechanisms in which a titanium implant can be retained in bone, osteo-acceptance and osteo-indulgence. Highlighting the dual responsibility (treatment team and pacient) in maintaining the prosthetic restorations in physiological limits. The physician instructs the pacient regarding oral hygiene under the subscriber's signature. Argumentation of monitoring need and then the description of short and long term monitoring of pacients treated with implants. Material and method: The study was accomplished on a group of 98 pacients, presenting fixed and mobile prosthetic restorations of implants, both sexes, with ages between 25 and 65 years old, treated separately. Results: General data presented lead us to support that a correct monitoring and following of an implants carrier, treated separately, has a great importance and topicality. Conclusions: Any preimplantation bone modification revealed after the checkups during the following of an implants carrier, reclaim quick measures in remedy the situation. In most of the situations, the loss of implants occurs in the first year from insertion and during the period of gradual prosthetic loading until obtaining final functional integration.*

Cuvinte cheie: *restaurări protetice pe implanturi, monitorizare postimplantară*

Rezumat: *Obiectiv: Prezentarea datelor referitoare la integrarea tisulară a implanturilor endoosoase orale. Descrierea celor două tipuri de integrare tisulară: epitelio-conjunctivă şi osoasă, amintind cele două mecanisme fiziologice prin care un implant din titan poate fi retenţionat în os, osteoacceptarea şi osteotolerarea. Evidenţierea responsabilităţii duble (echipa de tratament şi pacient) pentru menţinerea în limite fiziologice a protezării pe implante. Medicul instruieşte pacientul privind igiena bucală sub semnătura beneficiarului. Argumentarea necesităţii monitorizării şi apoi descrierea monitorizării pe termen scurt şi pe termen lung a pacienţilor trataţi cu implanturi. Material şi metodă: Studiul a fost realizat pe un lot de 98 de pacienţi, care prezentau restaurări protetice fixe şi mobilizabile pe implanturi, de ambele sexe, cu vârsta cuprinsă între 25 şi 65 de ani. Rezultate: Datele generale prezentate ne fac să susţinem că o monitorizare şi dispensarizare corectă a purtătorului de implante, tratate în mod separat, au o importanţă foarte mare şi constituie un subiect de actualitate. Concluzii: Orice modificare periimplantară osoasă evidenţiată în urma consultaţiilor pe timpul dispensarizării purtătorului de implanturi, reclamă măsuri rapide de remediere a situaţiei. În marea majoritate, pierderea implantelor survine în primul an de la inserare şi pe timpul perioadei de încărcare protetică graduală până la obţinerea integrării funcţionale definitive.*

The following of an implants carrier is an important phase, subjected to both the treatment team and patient that share equally the responsibilities.

The following of an oral implants carrier begins the second day after bone insertion of the implants and continues for lifetime.

We can divide the monitoring into these phases:

1. Monitoring during primary tissue integration
2. Monitoring the implants carrier during the first year after executing the first provisional prosthesis when usually definitive prosthetic loading is also done
3. Following of the implants carrier after executing the definitive prosthetics.

Osseointegration of dental implant

Maintaining oral implants in a physiological state depends on keeping as long as possible their osteo and tissular integration, which requires that patients with prosthetic restorations of implants to be followed, while pursuing the maintaining in a physiological state of both types of tissular integration. Thru epithelial-conjunctive integration, a closing of communication between internal and external environment of the body is performed.

Failure or loss in time of epithelial-conjunctive integration will lead to affecting bone integration and periimplantary bone resorption, epithelial migration towards the implant's apex, its encapsulation, and finally the appearance of implant's pathological mobility and its loss.

The epithelial-conjunctive integration of implants accomplishes a sealing communication with the external environment thru periimplantary ring similarly to epithelial insertion of the natural tooth.

Because destruction of the circular periimplantary ring always leads to affecting bone integration, Gould's studies revealed that the epithelial cells attached to the surface of

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titanium implants in the same way as in natural tooth thru a basal light and formation of desmosomes.

Inoculation of gingival epithelium cells from the titanium surface revealed the fact that after 24 hours epithelial cells adhere to the implant's surface, but the amount is three times lesser than hydroxyapatite.

Recent studies show that in cases in which the periimplantary ring misses, the superficial gingival tissue produces a deep epithelial invagination on the bone-implant interface with compromising the implant. Following these epithelial invaginations, a periimplantary pocket appears similar to periodontal pockets in natural teeth.

In our opinion, a titanium implant can be bone retained thru two physiological phenomena: osteo-acceptance and osteo-indulgence.

For hydroxyapatite implants appears another way of bone retention which we named biointegration.

Osteo-acceptance involves the development of a complex of elements on the bone-implant interface formed around the implant, the proteoglycan layer being between 20-400 A and the surrounding bone tissue.

Osteo-indulgence involves the development of a complex the bone-implant interface composed from the implant surface, a surrounding layer of connective tissue and the surrounding bone in different stages of damage.

Biointegration presumes the absence of proteoglycan layer or connective tissue on the bone-implant interface and development of bone crystals common to surrounding bone and implant's surface, circumstance existing in a significant extent in the hydroxyapatite-ceramic implants.

To achieve a correct bone integration with good lasting results, we consider that the bone inserted implant should be allowed to stand for a period of 4-6 moths and then, after a second surgical phase of mounting the prosthetic abutment, the functional loading should be done in stages between 4 months and 1 and a half year. During this period of time a balance can be created between the forces that act on the implant and the ability of physiological periimplantary bone remodelling.

After bone insertion of an implant, in the periimplantary space a bone callus will be formed, that will need a period of 6 weeks, whereupon bone remodelling will begin completed with appearance of mature and structured bone.

During this period of time it is very important that the implant is not mobilized, because the bone in formation and maturation has a very low capacity to support forces that are exercised upon it.

Maturation of periimplantary bone will be obtained in minimum 18 weeks, whereupon by progressive prosthetic loading a physiological bone integration of the implant will be achieved.

Other causes of failure:

- Insertion of the implant in a neo-socket too small and inducing a high pressure on the periimplantary bone
- Bone overheating during milling the new position of the implant
- Creating a neo-socke larger than the implant's volume, the implant presenting an early clinical mobility.

Under the conditions that provide therapeutic success, the bone insertion of the implant should be made by creating a close contact between the bone and the implant, a good initial stability, the initial contact between the implant's surface and the bone from 40% up.

The bone integration of the titanium is biomagnetic one, which means the implant is fixed in the bone through the proteoglycan layer who adheres to the implant's surface and then structural binds with surrounding bone.

Mechanical retention of the implant is also obtained by undercuts created on the surface of the implant in which the periimplantary bone will penetrate but without creating biochemical links between implantary surface and proteoglycan layer.

The biointegration of the implant is obtained by using on their surface of bioactive materials, like hydroxyapatite, which "stick" to the surrounding bone similar to a bone stiffness.

In these cases, at the bone-implant surface, as a result of physicochemical interactions between bone and hydroxyapatite, bone crystals are formed that connect the bone to the materials on the surface of the implant with almost complete disappearance of peiimplantary proteoglycan layer.

It is assumed that our future research will prove which type of bone integration is is more advantageous.

Postimplantation monitoring

After exhausting oral rehabilitation stages of edentulous patients treated with implants, the treatment team and the patient have a great and long responsibility, sometimes on a long term, to maintain in physiological limits this type of prosthesis.

Patients should be instructed about their responsibility regarding their oral hygiene and functional limitations of implant prosthesis and of the tissues in which they are integrated as well as of the use of this type of dentition.

This education and information of the patient under signature is an integral part of the responsibility the implant physician.

The following of the patient must begin with achieving impeccable oral rehabilitation on implants on edentulous patients, step by step, until the definitive prosthesis. Among other things, it must achieve a uniform distribution of forces and functional load of implants, without minimizing the negative effect of overexertion of the support systems of prostheses.

Immediate postoperative care of the patient can bring many benefits in removing long-term biomechanical problems.

During the monitoring we will determine and eliminate potential failures and complications generated by them on the prosthetic and biomechanical complex.

The monitoring of the patient is done to prevent irreversible failure by determining the earliest possible the non-physiological condition of the implant-prosthesis complex.

Long-term monitoring cannot be completed until the prosthetic restoration restores physiologic occlusal function and only gradual completion of prosthetic loading of implants, period that may last between 1-5 years maximum.

During this period and after, maintaining oral hygiene should be a basic element, both the patient and physician. Equally important to follow is the functional load that the prosthesis-implant complex undergoes and the status of tissue integration of implants. Serial radiographic data are key elements for evaluating osteo-acceptance prognosis status of implants. Are valued equally the occlusal function and prosthetic superstructure integrity, which must be close to normal operation.

Long-term studies have shown that an increase of masticatory force along with increasing their efficiency and of the occlusal function during remodelling and adaptation during treatment phases (gradual prosthetic loading of the implants) is installed.

A small number of cases reduced occlusal surface generated by prosthetic reconstruction may cause poor occlusal

stability; it will become clinically apparent after a brief period of operation situation where occlusal stability must be restored. After having reached the stage of secondary functional bone integration of the implant with the establishment of periimplantary bone remodelling, final prosthetic reconstruction will pursue a physiological and long-lasting occlusal relief to provide optimal clinical comfort for the patient.

Existence or occurrence of parafunctions and / or bruxism will be diagnosed and treated by creating a neutral relief, to minimize their adverse effects, especially at night.

Effects of occlusal surface wear in prosthetic work stability will be monitored by determining the presence or absence of occlusal stops.

When occlusal surface is ceramic we will follow especially occlusal imbalances created by the abrasion of antagonists as natural teeth or as prosthetics made out of other material than ceramics.

Abrasion of natural teeth or dentures antagonists without implants is driven into the bone anchoring system of the implants which don't present a physiological vertical and horizontal mobility, the order of a few microns.

In a partially edentulous implant prostheses, occlusal modeling will pursue a "full contact" on prosthetic implants in centric occlusion under the force of mastication.

Such occlusal philosophy, consistent with the dynamics of the relationship dental dental contacts can be applied in well-developed dentition, contributing to an optimal distribution of occlusal forces between periodontal antagonists of natural teeth and implants.

In all cases we will avoid eccentric occlusal contacts, realizing an occlusal scheme for an immediate desoclussion by an anterior and definitive guide. When it is not possible to achieve, we will use the group guide function as a suitable compromise physiology.

Ordinarily, damaged relief dentures on implants will be recovered in the laboratory, on the articulator with occlusal elements determined and transferred, as we set out to achieve in the volume pre-and post-implantation prosthetic reconstruction.

If the prosthesis on implants are supported by implants and teeth, by special systems of connection of the body between the two support elements or without these systems, dispensary will follow functionality, long prosthesis, intervening when deterioration will occur in prosthetic systems.

Prosthetic superstructure is the first line of defence against wear and tear of prosthetic reconstruction.

We will follow the periimplantar soft tissue especially the epithelial-connective integration of the implant. Health education on techniques and methods used to maintain a rigorous oral hygiene prosthesis on implants, is a continuing professional responsibility for the implant doctor.

Maintaining gingival implant integration is heavily dependent on oral hygiene which must remove plaque. Periimplantary complications and treatments will be address to each case.

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