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A SOLUTION AND MAINTENANCE OF PERI-IMPLANT PROBLEM; CASE REPORT FOR 5 YEARS PERI-IMPLANT TISSUE

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Abstract

The overall objective of this study is to evaluate the long term results of interpositional connective tissue graft and horizontal and vertical bone augmentation in recessed area of interproximal papilla. Atrophic ridges rebuilt through GBR procedures. For this study, 2 major alterations are made in the surgical technique describes. First, the horizontal and vertical bone augmentation graft is obtained from autograft like ascending ramus or allograft with or without platelet-rich plasma and barrier membrane. Second, connective tissue for interpositional grafting is obtained from hard palate. This interpositioning graft would be success by use of pouch technique or envelope flap technique.

From 1998, among over than 120 patients of implant treated, for this study, regardless of 1-staged or 2-staged surgery or type of implant surface treated, 60 implants of 18 patients which has a dissatisfaction on anterior region, food impaction on posterior region subjectively, or has a black-triangle on anterior and flattened inter-implant spaces clinically, was selected.

Differences of success rate between inter-dental and inter-implants depend on blood supply and distance between implants. Autografts, PRP and anorganic bovine bone Bio-Oss have been successfully employed for isolated augmentation area. It is essential to make the CT graft neovascularize to a recipient site, overcorrection of graft, immobilization of graft and tension-free suture. Based on annual measurements of gross texture, pocket probing depth, attachment level, and width of keratinized mucosa, this 5-year study indicates that interpositional CT graft, when used in conjunction with appropriate bone augmentation technique, can become successfully esthetics and yield predictable maintenance results.

Key words: Interpositioning; PRP; blood supply; bone regeneration; overcorrection; immobilization

Introduction

Implant has been used and verified scientifically over 35 years. Both submerged, two-staged approach and nonsubmerged, one-stage technique became two major technique, and everybody noticed both method were successful approach with a point of view about long-term studies success criteria, especially, peri-implant hard tissue integration (osseointegration) and implant survival. But, Biology at crestal hard and soft tissue reactions and clinical implication at that part is still difficult to be understood.

There is well known the major cause of teeth loss is chronic periodontitis. If several teeth damaged by periodontitis, then which tooth got to be extracted and which should be keep alive? In addition,

final purpose of implant is to make morphologic and histologic similarities and with the consideration of selecting the material for long term success rate, we need to consider periodontium of natural teeth and implant. Especially interdental or inter-implant space would be very important subject of this study.

Basic factor for aesthetic implant treatment is primary diagnostic plan, beautiful gingival outline and contour (this outline include bone contour). In case of lost in aesthetic view, especially insufficiency of proximal papilla forms black triangle, for the patient will be experienced hardly acceptable esthetic problem. These disrupt all the hard effort to make successful osseointegration of implant treatment.

We see current trend, the product on the market is the implant about which is link structure between prosthesis and implant top, and another one is esthetic trend of soft tissue management. As a result, internal connection and external connection would be a debate and an assignment. Also, soft tissue management and reconstruction technique of insufficient soft tissue around implant would be a first point in current implant dentistry. In brief, another interesting thing about this study is about that esthetic implant dentistry.

There are so many disputing with implant surgery and prosthesis, but no specific arguments with perio-esthetics of implants. As with most oral and maxillofacial regenerative procedures, a wide variety of materials have been used and reported in the literature for the vertical bone augmentation procedure in humans. Implant site development often requires ridge augmentations and sinus lifts, utilizing a variety of materials, multiple surgical sites and extensive healing periods.

Thereupon, at this study, with my experience in private clinical practice and case presentation that has been followed up with the patient, radiographic evaluation and clinical investigation of objective periodontal data is going to discuss about in processing implant biomechanics. Then study the implant in way of annual measurements of texture, pocket probing depth, attachment level, and width of keratinized mucosa. This 5-year study confirms that interpositional CT graft provides predictable esthetics results.

GBR and tissue grafting in area of interproximal papilla has proven highly adventurous because soft and hard tissue reaction of this area is depend upon blood supply and distance between implants [1].

The overall objective of this study is to evaluate the long term results of interpositional connective tissue graft and vertical and horizontal bone augmentation in area of insufficient inter-implant papilla spaces. Also, the purpose of this implant esthetic surgery is to help patient more comfortable in esthetics. So Research of us should concern minimize the pain and maximize the satisfaction with consideration of demands, psychology and economic status from the time to establish treatment plan.

Prognostic result of this study will be different wide with the operator's experience and skill. So, to offer more upgraded treatment for esthetic evaluation, need more study and hard work. Especially peri-implant and peri-oral environments.

Treatments Materials and Methods

Clinically, for this study, among the over 120 patients of implant treated from 1988, regardless of 1-staged or 2-staged surgery or type of implant surface treated, 60 implants of 18 patients was selected Also, all of this evaluation was established after 6 months implant loaded

For this study, 2 major alterations are made in the surgical technique describes. First, the horizontal and vertical bone augmentation graft is obtained from various autograft [2] or allograft [3] with or without platelet-rich plasma and barrier membrane. Second, connective tissue for interpositional graft is obtained from hard palate. This interposition graft would be success by means of pouch technique [4] or envelope flap technique, coronally positioned flap.

All implants were stable at the time of placement. Clinically, all control and test sites healed, with complete bone fill in the defect and there is only soft tissue gap (insufficient vertical connective tissue profile) between implants. As the gap widened, the amount of needed graft and times of operation increased. In aspects of re-newel and re-generation of surrounding periodontium, differences of its rate between inter-dental and inter-implants are currently depends on blood supply.[5]

In anterior region, especially, the treatment of choice is that esthetics. In case lost in aesthetic view, especially insufficiency of proximal papilla forms black triangle, for the patient will be experienced hardly acceptable esthetic problem. This disrupts all the hard effort to make successful osseointegration of implant treatment.

Autografts obtained from numerous donor locations have been utilized with success. Both autografts and the anorganic bovine bone Bio-Oss (Osteohealth, Shirley, NY) have been successfully employed for isolated augmentation area.[6, 7, 20]

Most of autografts obtained from ascending ramus and adjacent bone. For obtaining autografts, numerous donor locations have been utilized. Both autografts and the anorganic bovine bone Bio-Oss (Osteohealth, Shirley, NY) have been successfully employed for isolated augmentation area.

Numerous combinations, including those with anorganic bovine bone (Bio-Oss), particulated or blocked autografts, with platelet-rich plasma (PRP) have been employed.[8, 9, 21] Anorganic bovine bone is integrated and subsequently replaced with vital host bone. More over, several other studies have reported promising clinical and histologic data using anorganic bovine bone in a variety of oral and maxillofacial applications.

Background of interpositioning CT graft; a histologic study

The mucosal tissues around intraosseous implants form a tightly adherent band consisting of dense collageneous lamina propria covered by stratified squamous keratinizing epithelium.[10] The Implant epithelium junction is analogous to the junctional epithelium around natural teeth, in that the epithelium cells attach to the titanium implant by means of hemidesmosomes and a basal lamina.[11]

Evidence for an adhesive junctional epithelium attachment to implants has also been presented by senior scholars. This evidence supports the concept that a viable biologic seal can exist between the epithelial seal can exist between the epithelial cells and the implants.[12]

Collagen fibers are nonattached and run parallel to the implant surface, owing to the lack of cementum. This is an important difference between peri-implant and periodontal tissues.[13] The marginal portion of the peri-implant mucosa contains significantly more collagen and fewer fibroblasts than the corresponding gingival tissue, which may indicate that tissue turnover in the peri-implant mucosa is less rapid than that in the gingiva.[14]

Operation procedures

Prognosis of papilla reconstruction is based on anatomical space of interdental area and blood supply of surgical site.[15] Papilla reconstruction is a kind of vertical ridge augmentation. Though most vertical augmentation looks similar, but it differ from each other, and it needs more operation, in addition it takes several surgical operation.

Preparation of donor site.

If there is no bony defect from the facial side, make partial thickness flap and interposinal incision makes envelope shaped pouch. If there is bony defect partial and full thickness flap is started from palatal or lingual side and roll the flap.

Obtaining Connective Tissue.

According to the quantity and position, give a enough quantity of semi

lunar incision and then take sharp dissection of flap. In a different way of labial recession, proximal papilla's tip should be raised, so flap dissection should be extended to palatal or lingual side. After dissection, flap should be at the status of tension free that can be extended to the position of papilla as operator intended.[16]

General concepts for flap management associated with preparation of donor and recipient site include the following : [17]

1. Whenever possible, it is desirable to make incisions remote relative to the placement of barrier membranes (vertical releasing incisions at least one tooth away from the site to be grafted). In the anterior maxilla, keeping vertical incisions remote is also an esthetic advantage.
2. Full mucoperiosteal flap elevation at least 5mm beyond the edge if the bone defects are desirable.
3. The use of vertical incisions, although often required for surgical access, should be minimized whenever possible.
4. Use of periosteal releasing incision to give the flap elasticity and permit tension-free suturing is essential. This permits complete closure without stress on the wound margins.
5. Avoid postoperative trauma to the surgical site. That is immobilization of graft material.
6. Wound closure should incorporate a combination of mattress sutures to approximate connective tissues and interrupted sutures to adapt wound edges and layer by layer suture to obtained CT.

Now, Take the connective tissue as enough as to fill the space. Likewise to cover proximal recession, got to design CT graft shape to safe arrival of more CT on proximal space. Also, make it fixed with palatal gingival, with this, we can prevent of push down of CT to apical. There are always shrinking (at least 30-40%) in the grafted CT, so we should overcorrect that site.[18]

Platelet-Rich plasma.

If necessary, Platelet-rich plasma (PRP) is made. Its ability to produce a more dense bone 'sooner' has permitted many clinicians to place implants into bone grafts as early as 10 weeks, and to load implants at three months. Generally, Because PRP is an autogenous preparation; it represents a safe and effective access of growth factors and tissue engineering support for today's clinicians. It is easy to manipulate PRP. Originally, PRP has now gained a wide acceptance and utilization in several other specialties.[19]

PRP contains the pivotal growth factors, platelet derived growth factor (PDGF etc.). These growth factors have been shown to promote bone regeneration and revascularization in sinus lifts grafts, ridge augmentation procedures, and continuity defect reconstructions, and any other needs to be grafted. Make add about PRP. This is a source of growth factors and cell adhesion molecules that enhance bone regeneration related to autogenous bone grafting and soft tissue

Results

60 implants of 18 patients (anterior 12 patients, posterior 6 patients) was operated with above treatment protocol had a dissatisfaction on anterior region or food impaction on posterior region subjectively, and has a black-triangle on anterior and flattened inter-implant spaces clinically was selected. 18 patients had a dissatisfaction on anterior region and food impaction on posterior region was treated appropriate surgical technique separately. They had a black-triangle on anterior region and flattened inter-implant soft tissue spaces clinically.

In anterior region (regardless of maxilla and mandible), 47 implants was needed for reconstruction of inter-implant papilla or bone regeneration. Among 47 implants using radiographic examination and peri-implant probing depth examination, bone level and its depth of 33 implants were not problematic, so they needed only interpositional papilla reconstruction and another 14 implants

were needed to be additional bone augmentation. 13 implants of posterior region, it is difficult to solve that problem, since visibility and flap management for access is not clear. So there is no amount of bone loss, corolally positioned flap with interpositional graft or onlay block bone graft is recommended. In this area, 30% overcorrection is essential.

The importance of appropriate patient and defect selection, anticipatiory flap designs, decortication of existing bone, interpositional incision, space maintenance and clot stabilization beneath the placed membrane, adequate fixation of membrane, and the attainment of passive primary soft tissue closure throughout the course of regeneration have all been detailed.

Conclusions

Consequently, in anterior region, 47 implants of 12 patients was operated 33 papilla regeneration and 14 bone augmentation separately, 43 implants was reconstructed successfully, but 4 implants of 2 patients might be influenced smoking and insufficient blood supply and then failed of reconstruction. In posterior region, all of 13 implants were regenerated by block bone and interpositional free gingival connective tissue graft. Like this results, Smoking might be a first cause of failure.

We discussed from the preparation of operation, determine situation during operation, objective valuation about initial status, whether one time operation or two times, criteria when graft is used, to use of membranes, to use of PRP, rate of natural teeth.

The importance of keratinized mucosa width is unclear, since controlled clinical studies on its role are lacking. Nonetheless, we prefer that the interpositional free CT graft with or without bone augmentation was attributed to particular attention paid to maintaining as much keratinized tissue as possible during second-stage or additional surgery through an apically positioned flap or coronally positioned flap, and when needed, by increasing that with a free gingival graft.

Conclusively in surgical aspects, the surgical focus of this study was that soft tissue outlines represents inner bone contour (especially, regeneration . of insufficient papilla between implant/tooth and implant/implant surface).

It is advantageous for the materials employed for bone augmentation to be resorbed and replaced over time with the patients' own bone. The mechanisms and time for replacement of the majority of graft materials are unclear.

This 5-year study confirms that interpositional CT graft provides predictable esthetics recovery results. Also, this study indicates that interpositional CT graft, when used in conjunction with appropriate bone augmentation technique, can become successfully esthetics and yield predictable maintenance results.

Under the conditions of this investigation it can be concluded that:

1) Particulate bone autografting using anorganic bovine bone (Bio-Oss) and PRP yields a stable result, with no apparent "slumping" over time
2) There is significantly greater bone formation using resorbable barrier membrane than no coverage
3) Anorganic bovine bone is integrated and subsequently replaced with vital host bone.
4) Obtained CT graft has to be regular thickness and fix it as rapid as possible

Participants objectives

Following this presentation, participants should be able to:

1) Understand the role of growth factors in bone regeneration and healing
2) Know how to clinically access PRP and to make and use PRP constructs.
3) Know how to clinically obtain and fix the graft

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