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التوثيق الالكتروني والميكروفيلم

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A Clinical Study of the Effect of Bioactive Glass and Bioabsorbable Barrier Membrane on Healing and Bone Formation Around Immediate Implant

THESIS

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CONTENTS

Introduction

Throughout the history of dentistry, clinicians and patients have struggled with options for replacing missing teeth. Treatment options have evolved from acrylic dentures to metal framework removable partial dentures to fixed partial dentures. [1]

Recently, titanium implants have joined the armamentarium of the restorative dentist. Implants are now becoming mainstream treatment in dentistry. The benefits of endosseous dental implants are many. [1]

Dental implants provide the patient with a fixed anchor for a tooth or teeth that need not be removed at night or for cleaning. Implants also do not require preparation of healthy, asymptomatic teeth. In addition, the edentulous patient is afforded a prosthesis that is both stable and, in most cases, highly esthetic. [1]

Implants are being placed in greater numbers each year as patients become more familiar with their advantages. Once the dentist introduces implants as a treatment option, the patient may access information using resources such as the Internet to learn more about this treatment modality. As a result, today's dental consumer is better informed and more often requests dental implants as their treatment of choice. . [1]

Dental implants are becoming more predictable. Studies have demonstrated success rates ranging from 80-92 % success for the maxilla over 5 to 10 years. Other studies have reported long-term success rates for the maxilla at 92% and the mandible at 94% at 5years with up to 78% success in the maxilla and 86% success in the mandible at the 15-year time period[2,3,4,5]

When teeth cannot be salvaged, the clinician and patient must decide on the most appropriate method of tooth replacement. One factor that must be considered is that upon the extraction of teeth, there is usually a considerable change in bone topography [6]

In 1967, Carlsson et al [7], demonstrated up to 30% buccal resorption of the residual ridge in the first thirty days following extraction of maxillary teeth.

In 1989, Lazzara [8], showed that by immediately placing implants into extraction sites, the dimensions of the sockets could be preserved, thereby limiting the amount of bone loss.

Osseointegration has been shown to occur around implants placed immediately after tooth extraction in humans. Implants placed at the time of tooth extraction reduce morbidity and time to prosthetic reconstruction. immediate placement has been shown to be as clinically successful as placing implants into healed sites . [9]

Placement of an implant into a fresh alveolus will in most cases result in a gap between the occlusal part of the implant and the bone walls. If the gap surrounding an implant is large, fibrous connective tissue cells may proliferate into the area and produce a fibrous capsule around the implant. To ensure osseointegration, various guidelines for the immediate implantation technique have been suggested including bone reconstructive treatment strategies, such as application of membranes ,grafting materials, and bone inductive substances. [10,11]

The principle of guided tissue regeneration has been employed at fresh extraction sites with positive results, either with the use of barrier membranes alone or in combination with grafting materials. [10]

The concept of anatomical sealing with a physical barrier to protect the clot and prevent the early invasion by adjacent tissues in the defect has been employed in Periodontology to allow regeneration of the entire supporting apparatus of the tooth. This surgical technique is called guided tissue regeneration (GTR) [12]

These principles were already employed in Medicine for the treatment of persistent extensive bone defects through the guided bone regeneration (GBR) technique. These two surgical techniques employ membranes or biological barriers, either resorbable or non-resorbable, to separate the adjacent tissues from the surgical site. [13]

GBR was used in different studies in which the purpose was bone regeneration within intra-bony defects. This technique utilizes a mechanical barrier in an intra-bony defect with the aim of creating a secluded space to receive only cells with an osteogenic potential so osteogenesis may occur unimpeded within the space. In an intraosseous wound, invasion of the clot by fibroblasts can result in non-union of bone. [11]

In maxillofacial surgery, fibrous non-union can be an undesirable outcome, especially in extensive reconstructive surgery. Non-union may occur when the fibroblasts organize the clot before the osseous cells migrate into the wound and initiate the bone-forming process. It has been suggested this occurs because fibroblasts have a faster rate of migration than osteoblasts. GBR offers a means of excluding fibroblasts from the clot; permitting slower bone-producing osteoblasts to affect clot organization and produce osseous healing[14]

Despite the lack of clinical differences between the two types of membrane, the resorbable membranes eliminate a second surgery for removal of the non-resorbable membranes, providing shorter surgical time, better acceptance by the patient and reduced risk of loss of the new insertion . [15]

Moreover, the possibility of associating growth factors to the resorbable membranes has encouraged their utilization instead of the non-resorbable membranes. [15,16]

Recent studies have reported the successful use of resorbable membranes in

guided bone regeneration (GBR). [14]

Of the bioabsorbable barriers, collagen membranes would appear to be agood alternative to the established extended polytetrafluoroethylene (ePTEF) membranes. [17]

The association of membranes to materials for bone graft has improved the clinical outcome, especially for the treatment of periodontal intraosseous defects, furcation lesions and dehiscence. [15,18]

Various graft materials are being utilized today in an attempt to repair osseous defects around implants. [19]

Recent studies report that a newer ceramic alloplast , bioactive glass (BG),in addition to being osteoconductive ,bonds directly to bone tissue . [20]

Better bone-implant contact was achieved with BG implants than with titanium implants regardless of the type of granules used. The results indicate that BG may prove to be useful as filler and coating material in connection of implants projecting into bone cavities. [21]

When defects or sockets are not space-maintaining, bone graft material is not only critical to promote osteogenesis, but also to prevent membrane collapse against implant surfaces. In addition, the advent of bone grafting and guided bone regeneration has also allowed for more restorable placement of dental implants. [22]

Review of literature