BIOACTIVE GLASS VERSUS BIO-GEN GRANULES AS BONE SUBSTITUTE FOR INTRAORAL BONY LESIONS

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بسم الله الرحمن الرحيم

((وعلمك ما لم تكن تعلم وكان فضل الله عليك عظيماً))

صدق الله العظيم

سورة النساء الاية ١١٣

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قسم جراحة الفم والأسنان

من

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في جراحة الفم والفكين

كلية طب الفم والاسنان

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٢٠٠٩

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٥-٢ باللغة الأجنبية (Absract):

(key word: Bio-glass, Bio-Gen, cystic lesion)

Twenty patients were selected for the present study from the Outpatient Clinic, Department of Oral and Maxillofacial Surgery, Faculty of Oral and Dental Medicine, Cairo University. Patients' ages ranged from 20 to 40 years, mean age 30 years, male: female ratio was 1:1. All the patients were diagnosed that they have cystic lesions in the anterior maxillary area, of diameter ranging between 2-3 centimeters, which would create intrabony defect after cyst enucleation. The patients were randomly divided into two equal groups.

GROUP A: Consists of 10 patients, where the residual osseous defects after cyst enucleation were grafted by Bio-glass granules as a bone substitute material.

GROUP B: Consists of 10 patients, where the residual osseous defects after cyst enucleation were grafted by Bio-Gen ® Mix granules as a bone substitute material.

There was no significant difference in rate of relative bone density changes between the two graft materials radiographiclly throughout the whole postoperative intervals.

LIST OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

Bone is one of the tissues in the adult human body with the ability to regenerate its form and function after injury. However, a factor affecting the amount of healing in a bony defect is the wound size [(1)].

Different methods have been used in an attempt to overcome the limitation of bony healing in large defects. Autogenous grafts or the use of bone substitutes are popular materials that have been used to assist the body in bony healing [(2)].

These materials or grafts work through the process of osteoinduction, osteo-conduction, and osteogenesis. Although many clinicians have attempted to obtain similar results with allogeneic or xenogeneic bone, bone substitute, and alloplasts, nothing has equalled the results obtained with autogenous bone grafting [(3-7)].

Autogenous bone grafts from extra-oral or intra-oral donor sites, known as gold standard, are used especially to regenerate bony defects in the craniofacial region. It utilizes osteogenesis, osteoinduction and osteo-conduction in the formation of new bone. The disadvantages of donor site morbidity, using Autogenous bone, can be avoided by using bone substitutes [(8, 9).]

Allografts are obtained from cadavers, living – related persons, and living – unrelated persons. The primary forms of allografts are frozen, freeze-dried (lyophilized), demineralized freeze-dried and irradiated.

Because allografts are not osteogenic, bone formation takes longer time and result in less volume than is found with Autogenous grafts [10, 11].

Xenografts, (xenogenic grafts) are taken from one species and grafted to another. These grafts are osteoconductive and biologically compatible. The antigenic dissimilarity of these grafts is greater than allogeneic bone due to the presence of organic matrix which is antigenically dissimilar to the host bone; therefore the graft must be treated more vigorously to prevent rapid rejection of the graft [12].

Alloplastic grafts are transplants using synthetic biocompatible osteo-conductive materials. They can be classified into ceramics, polymers and composites. Ceramics are most commonly used which may be bio-inert as aluminium oxide and titanium oxide or bio-active as calcium phosphate [13].

Bio-inert ceramics do not have direct bonding with host bone but they are mechanically attached to bone, while bioactive ceramics have the ability to bond with bone [14-16].

In 1991, Hench et al, found out that bioactive glass form apatite gel layer on the surface of the particles consisted of carbonate containing HA, which attracted osteoprogenitor cells and osteoblasts. Collagen fibers of bone reached the surface of the apatite gel layer formed on the surface of the bioglass and chemical bonding occurs between them, thus stimulating bone formation [17, 18].

It was found that when the bioactive glass particles were mixed with saline or blood, they rapidly formed a cohesive mass because of the gel layer that forms on the surface [19-21]. This cohesive layer formed when the materials come in contact with moisture thus making them pack into a defect easily and stay in place even when the site is bleeding [20-23].

Bio-Gen system, a bone substitute material, is a natural bone tissue, reabsorbable, deantigenated, osteoconductive material without collagen of equine origin which guarantees a high level of osteogenesis. The final tissue is available in both cortical and spongy granules deriving from femoral and humeral sections [24]. The Bio-Gen methodology is, in its type, a unique system, since it is actually able to accelerate the physiological process of bone remodelling [25].

The Bio-Gen tissues have been developed to solve cases of reconstruction of well delimited bone cavities. Therefore, they offer no load resistance and require residual cortical support or mechanical means of support during recovery of the surgical site. There principal feature is to speed up the physiological response of endogenous bone repair [24, 25].

Therefore, this study was carried out to investigate the influence of bioactive glass versus Bio-Gen granules in obliterating intraoral bony defects of the maxillary alveolar ridge resulting from cyst enucleation.