

The effect of Platelet Rich Fibrin on the Healing of Autogenous Bone Grafts in Mandibular Reconstruction

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

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Dedication

*To my big family, my father, my mother and brothers and sisters
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List of abbreviations

AIS	Anterior iliac spine
BMP	Bone morphogenetic protein
CBCT	Cone beam computed tomography
CT	computed tomography
FEA	Fine element analysis
FGF	Fibroblast growth factor
FGFR	Fibroblast growth factor receptor
GDFs	Growth and differentiation factors
IL	Interleukin
IGF	Insulin growth factor
MRI	Magnetic reasoning imaging
MSCs	Mesechymal stem cells
PDGF	Platelet derived growth factors
PRF	Platelet rich fibrin
PRP	Platelet rich plasma
TGF	Transforming growth factor
TNF	Tumor necrosis factor

Introduction

The need for reconstruction of body defects is an essential rule of any health care providers especially surgeons and it has evolved through the late years of the 19th century and the beginning of the 20th century driven by the challenges of wars and assisted by the general advancement in the medical field through years.

The goal of any reconstructive surgery is to replace bone and soft tissue loss in such a fashion that function and esthetics approach their preablative levels. In so doing, the benefits of surgical reconstruction should equal or surpass the patient's quality of life without the reconstruction and avoid complications and deformities that may reduce their quality of life⁽¹⁾.

Reconstruction of the jaws because of trauma or congenital defects or after removal of pathological lesions poses a challenge to the oral and maxillofacial surgeons because of the complex anatomy of the area and the functional requirements that must be satisfied⁽²⁾.

There are three important factors that play a role in the overall success of any reconstruction in the jaws. First, rigid fixation of the graft Second, adequate soft tissue to guarantee coverage and good blood supply, Third, the volume and contour of the reconstructed bone should mimic the original or desired volume and contour of the resected or missing part as close as possible⁽³⁾.

Bone as a tissue has the capacity of postnatal self-reconstruction, in small defects bone can heal without the need of any grafts. However, with large defects To restore structural and functional integrity, either autografts or allogenic bone are required.⁽⁴⁾

Bone heals in a complex cascade of biological events, regulated by specific cells, the extracellular matrix and distinct growth factors .So bone healing process may be further stimulated and supported by the biomechanical delivery of growth factors that have a role in its healing for a longer period and higher concentrations⁽⁵⁾ .

Platelets contains a variety of growth factors that plays a rule in bone healing Several technique since Ross et al⁽⁶⁾ has shown the ability and the efficacy to use this growth factors to augment tissue healing has been developed to directly deliver this growth factors into the required sites .

At the beginning of 2006 chockroun et al⁽⁷⁾ developed a method to concentrate and deliver those growth factors and called it platelet rich fibrin the major benefits of this new method beside that it gives us the growth factors in the form of membrane which can be adapted directly on the bone graft, it is very simple in preparation, non time consuming and it is a reproducible method.

This thesis will examine the effect of the platelet rich fibrin on the healing of corticocancellous bone grafts in reconstruction of the mandible.