



Clinical and CBCT Evaluation of Perforated Resorbable Membranes in Treatment of Class II Furcation Defects: A Randomized Clinical Trial

Thesis

Submitted in partial fulfillment for the requirements of Master Degree in Oral Diagnosis, Oral Medicine and Periodontology

BY

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بسم الله الرحمن الرحيم

وقل ربي زدني علما

صدق الله العظيم

Dedication

*This effort is dedicated to
My beautiful & supportive
family*

My Great Parents

&

My lovely Brother

&

*To my encouraging and
sincere friend (Amany)*

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First of all I would like to thank God who paved the way and by his will every thing can be achieved.

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List of Abbreviations

Acronym	Definition
AC	Alveolar Crest
BD	Bony Defect
BDX	Bovine Derived Xenogenic Bone Graft
BG	Bioresorbable Collagen Barrier
BMP	Bone Morphogenic Protein
BRG	Bone Replacement Graft
CAL	Clinical Attachment Level
CBCT	Cone Beam Computed Tomography
CEJ	Cemento Enamel Junction
CPRT	Combined Periodontal Regenerative Techniques
CT	Connective tissue
DFDBA	Decalcified Freeze Dried Bone Allograft
DF	Depth Of Furcation
DICOM	Digital Imaging And Communication In Medicine
ECM	Extracellular Matrix
EMDs	Enamel Matrix Derivatives
EMPs	Enamel Matrix Proteins
FDDBA	Freeze Dried Bone Allograft
FDDMA	Freeze Dried Dura Matter
FD	Furcation Defect
FGF	Fibroblast Growth Factor

GBR	Guided Bone Regeneration
GCF	Gingival Crevicular Fluid
GMSCs	Gingival Mesenchymal Stem Cells
GSC	Gingival Stem Cells
GTR	Guided Tissue Regeneration
HF	Height Of Furcation
HGF	Human Gingival Fibroblasts
HPD	Horizontal Probing Depth
IL-1	Interleukin-1
MPM	Modified Perforated Membrane
NPCM	Non Perforated Collagen Membrane
OFD	Open Flap Debridement
OPG	Osteoprotegerin
PCL	Poly Caprolactone
PCM	Perforated Collagen Membrane
PD	Probing Depth
PDGF	Platelet Derived Growth Factor
PDLF	Periodontal Ligament Fibroblasts
PGE ₂	Prostaglandin E ₂
PLA	Poly Lactic Acid
PRF	Platelet Rich Fibrin
PRP	Platelet Rich Plasma
TGF	Transforming Growth Factor
TGF-β	Transforming Growth Factor βeta

TNF- α	Tumor Necrosis Factor Alpha
UV	Ultraviolet
VEGF	Vascular Endothelial Growth Factor
VPD	Vertical Probing Depth
WBC	White Blood Cells
WF	Width Of Furcation

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INTRODUCTION

The progression of chronic inflammation during periodontitis may affect the bifurcation or trifurcation area of multirrooted teeth. The furcation defects represent one of the challenging aspects of periodontal therapy because of the complex morphology of the furcation area which makes it difficult for debridement during routine therapy (**Gattani D, et al. 2017**).

Therapies for furcation defects ranged from thorough debridement to regenerative procedures; the therapy of furcation involvement primarily depend on the extent of the disease, on the strategic importance of the affected tooth, and on the degree of patient cooperation (**Sánchez-Pérez A, et al .2009**).

Regeneration of the periodontium become a primary therapeutic goal in the treatment of furcation defect providing the opportunity to regenerate the lost periodontium, re-establish health and improve support for the dentition (**Rachel A. 2014**).

In **Grade I** involvement the treatment is simple because this kind of furcation usually exhibits supra-bony pockets, so this grade is treated by scaling and curettage or by gingivectomy, depending on pocket depth and the fibrosity of pocket walls. While in **Grade II** it involves the creation of a flap and then the area is debrided of granulation tissue, the root surfaces are carefully scaled and

planed with currettes and ultrasonic scalers, various regenerative procedures have been tried as guided tissue regeneration (GTR) in combination with bone grafts, emdogain or hydroxyapatite. In Grade **III and IV** the destruction of inter-radicular tissue allows a probe to pass freely through the furcation; gingiva is resected on the coronal level for better visibility and accessibility from all the directions so that the involved root surfaces may be thoroughly planed and smoothed without disturbing the bone (**Boariu M. 2007**).

The principle of GTR is based on the exclusion of gingival connective tissue cells and prevention of epithelial down growth into the wound, thereby allowing cells with periodontal regenerative potential (PDL cells and bone cells) to enter the periodontal wound first (**Wang H, et al. 2005**). However the combination of barrier membranes and grafting materials for the treatment of furcation defects was reviewed and authors indicated that no additional benefits of combination treatments were detected in Class II furcation defects (**Sculean A, et al. 2008**).

The most important factor that affects GTR treatment outcome is periosteal isolation; during the GTR procedure, the periosteum is elevated with the flap, and the barrier is placed over the defect, thereby excluding any contribution of mesenchymal stem cells and osteoblasts from the periosteum (**Deliberador T, et al. 2006**).