The Effect of Grafting the Horizontal Gap Distance in Non-Submerged Immediate Single-Tooth Implants on Hard and Soft Tissues

Thesis Submitted

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DEDICATION

This manuscript is dedicated to all of the people who have supported and encouraged me throughout my life. To my mother and father, I am eternally grateful for the sacrifices that you both endured to allow me to pursue my goals. None of this would have been possible without your guidance, love, and support. Thanks to my older brother, ***Abdullrahman****, for your unconditional support and encouragement. To my wife* ***Afaq*** *and son* ***Qusai****, thank you for your never-ending love and support and for the joy that you bring to each day of my life. I love each and every one of you and am eternally grateful to have such a wonderful family. Last but not least, I would like to dedicate this project to my injured country* ***(Yemen)*** *and to my second home* ***(Egypt)*** *the place where I spent three amazing years that I will never forget.*

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LIST OF ABBREVIATIONS

1- **GBR** : Guided Bone Regeneration

2- **ABB :** Anorganic Bovine Bone

3- **HA** **:** Hydroxy Apatite

4- **HG** **:** Horizontal Gap

5- **GB** **:** gingival biotype

6- **LBP :** labial bone Plate

7- **CBCT:** Cone Beam Computed Tomography

8- **PES :** Pink Esthetic Score

9- **ASA:** American Association of Anesthesiologists

10- **B-TCP :** Beta Tricalcium Phosphate

11- **SBS:** Synthetic Bone Substitute

12- **DBBM :** Deproteinized Bovine Bone Mineral

13- **AB** **:** Autogenous Bone

ABSTRACT

The Effect of Grafting the Horizontal Gap Distance in Non-Submerged Immediate Single-Tooth Implants on Hard and Soft Tissues

Aims. The purpose of the study was to assess clinically and radiographically the hard and soft tissue responses and esthetic outcome after grafting the horizontal gap distance in immediately placed non-submerged single implants.

Methods. 14 implants were placed in 11 patients with a tooth in the maxillary anterior esthetic zone scheduled for replacement with an immediate implant who had at least one adjacent tooth were included in the study. 7 implants were placed in the study group (A) in which the horizontal gaps were grafted with Anorganic Bovine Bone, and 7 implants were placed in the control group (B) without the addition of Anorganic Bovine Bone. Healing abutments were connected to implants in both groups. At 6 months period second stage procedure ensued by taking impressions and fabrications of the definitive restoration. CBCT scans were taken prior to teeth extraction to measure the thickness of the LBP, immediately post-implant placement to measure the size of the HG and at 1 year follow up period to measure the amount of alteration the thickness of LBP. GB was assessed before extraction and at 1 year follow up period and PES values were taken two months post-loading of the implants.

Results. The mean thickness of the LBPs before extraction in the study group were 1 ±0.22 and 0.68 ± 0.3 in the control group. At 1 year follow up period the thickness of the LBPs were 2.04 ± 0.66 and 1.28 ±0.54, in the study group (A) and control group (B), respectively. The percentage of ridge alteration in the study group (A) was 34.15 and 56.68 in the control group (B) and the difference was statistically significant ($p \leq 0.05$). No association was found between the groups as regard to the GB pre-operatively and post-operatively, however Pearson correlation showed a moderate correlation between the pre-operative GB and the thickness of the original LBPs ($r=0.432$). as regard to PES values t test shows no significant difference between the assessments and the average of PES in the study group (A) was 11.3 ± 0.54 and 10.4 ± 0.86 for the control group (B).

Conclusions. The use of grafting materials to augment the HG around immediately placed implants seems to minimize the amount of bone resorption especially in the LBPs. Furthermore, initial LBP thickness is positively correlates with the type of the gingival biotype.

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INTRODUCTION

Wound healing process in post extraction socket is a distinctive process as resorption follows which may lead to many prosthetic complications regarding the replacement of a tooth. Extraction socket is characterized by marked bone loss of the socket bony wall in the horizontal plane, which is also escorted by loss of vertical height, the majority of this bone loss occurs during the first year after extraction, and one third of this total bone loss occurs during the first three months.[1-5] For this reason, preservation of the socket immediately after tooth extraction by applying socket augmentation procedures once feasible is recommended and has a great effectuation on the functional and aesthetic outcomes of the subsequent prosthetic treatment.[6]

Immediate implant placement in the post extraction socket has given implant dentistry the opportunity to ascertain preferable and faster functional results, this approach is a routine surgical procedures that has been utilized since 1980s, the University of Tübingen advocated the procedure as the technique of choice for Tübingen and München ceramic implants and has been thoroughly described in the literature. [7] Immediate implant placement is referred to the placement of an