EFFECT OF DIODE LASER DEPIGMENTATION ON GINGIVAL TISSUE OF DOGS

(Light and Electron microscopic study)

Thesis Submitted in Partial Fulfillment of
the Requirements for Doctorate Degree in Oral Biology

By

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2017

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إِنَّمَا يَخْشَى اللَّهَ مِنْ عِبَادِهِ الْعُلَمَاء

صَدَقَ اللهُ العَظِيمْ

سورة فاطر (الأية ٢٨)

ACKNOWLEDGEMENT

First and foremost, I would like to express my greatest thankfulness to ALLAH, who created man and gave him the knowledge to think, believe and worship.

I would like to express my sincere gratitude and appreciation to ***Prof. Dr. Ahmed Mahmoud Halawa,*** *Professor and head of Oral Biology Department Faculty of Dentistry, Ain Shams University. I will remain grateful for his valuable guidance, continuous scientific supervision, spiritual encouragement, unforgettable efforts and proper planning that lead to the formation of this work.*

I am deeply grateful and thankful to ***Dr. Hanaa Mohamed el Shenawy,*** *Assistant professor in Laser dental application, Oral surgery and Medicine department, National Research Center for her close supervision and I will remain grateful for her guidance.*

I also express my gratitude to ***Dr. Dina Mohamed Abdel Khalek,*** *Lecturer of Oral Biology, Faculty of Dentistry, Ain Shams University for her great effort, her valuable guidance, her meticulous observation and for giving me generously of her time.*

I should not miss the chance to express my gratitude and thanks to all my professors and colleagues in the Oral Biology Department at MSA University for their help and encouragement. Special thanks to ***Dr. Sahar Shawkat,*** *Professor*

and head of Oral Biology Department, Faculty of Dentistry, MSA University for her great cooperation and support.

Dedication

This thesis is dedicated to the soul of my mother, for her kindness, devotion and for her endless support. She is gone now but left fingerprints of grace on my life that shan't be forgotten.

I would also like to dedicate this work to my father and my younger brother for supporting me and being always my backbone.

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Abbreviations	Words
TYR	Tyrosinase enzyme
ANOVA	Analysis of variance test
H&E	Hematoxylin and eosin stain
MF	Masson Fontana stain
IM	Intramuscular
TEM	Transmission electron microscope
GMP	Gingival marginal pigmentation

Abstract

Introduction: Intraoral soft tissue esthetics has become a significant aspect of dentistry and clinicians are faced with achieving acceptable gingival esthetics as well as addressing biologic and functional problems.

Aim of study: was to histologically, histochemically and ultrastructurally evaluate the effect of diode laser irradiation on gingival pigmentation.

Materials and methods: 3 Watts continuous mode diode laser was used to remove gingival hyperpigmentation of dogs. Specimens were divided according to the follow up periods of (1, 2, 4 and 8 weeks) where the experimental specimens were contralateral to the control ones. Specimens were evaluated pre- and post-treatment histologically using H&E, histochemically using Masson Fontana and ultrastructurally by transmission electron microscope.

Results: histological, histochemical and ultrastructural evaluation revealed a statistically significant decrease in melanin content in the follow up periods compared to the baseline. Meanwhile, the recurrence of melanin was observed more in groups of 4 and 8 weeks after laser irradiation yet did not reach the baseline.

INTRODUCTION

A smile expresses a feeling of joy, success, sensuality, affection and can reflect self-confidence and kindness. The harmony of a smile is not only determined by the shape, position and color of the teeth, but also by the gingival tissues. Gingival health and appearance became of a great concern since they are essential components of an attractive smile. Melanin pigmentation of the gingiva occurs in all ethnicities. Therefore, an increasing number of persons are found seeking treatment for this condition **(Lagdive et al., 2009).**

Aesthetics has become a significant aspect of dentistry and clinicians are faced to achieve acceptable gingival aesthetics as well as addressing biologic and functional problems. Gingival depigmentation is a treatment to remove melanin hyperpigmentation of gingiva and various methods have been used for this procedure **(Humagain et al., 2009).**

Laser has been used in dentistry since the beginning of the 1980s. Recent research has centered on using diode laser for oral surgery of the tongue and gingiva and to remove infected epithelium in chronic periodontitis. Diode laser has offered some advantages over the others, such as easy gingival reshaping, reduced need of local anesthesia and dry operative field due to excellent hemostasis associated with significant decrease in pain and inflammatory postoperative score. Minimal scarring and satisfactory clinical outcome on the long term have also been achieved

(Singh et al., 2012). Moreover, there is evidence in the recent literature of successful depigmentation using diode laser **(Hedge et al., 2013).**

REVIEW OF LITERATURE

Gingiva is an important component of masticatory mucosa, contributing not only to the mastication process but also to the anatomic and aesthetic characteristics of the individuals. The color of the gums is determined by the thickness of epithelium, keratinization degree, the presence and the degree of melanin deposition and the underlying connective tissue with presence of other pigments such as haemoglobin or oxyhaemoglobin **(Tal et al., 2003; Khalilian et al., 2016).**

Histology of the gingiva in humans

In routine histologic sections a keratinized epithelium shows a number of distinct layers or strata. The basal layer or stratum basal is a layer of cuboidal or columnar cells adjacent to the basal lamina. Above the basal layer are several rows of larger polyhedral or spherical cells known as the prickle cell layer or stratum spinosum. This term arises from the appearance of the cells in histologic preparation, they frequently shrink away from each other, remaining in contact only at points known as intercellular bridges or desmosomes. The next layer consists of larger flattened cells containing small granules that are basophilic, this layer is the granular layer or stratum granulosum and the granules are called keratohyaline granules. The surface layer is composed of flat (squamous) cells that do not contain any nuclei. This layer is the keratinized layer or stratum corneum **(Nanci, 2008).**