# بسم الله الرحمن الرحيم

∞∞∞

تم رفع هذه الرسالة بواسطة / حسام الدين محمد مغربي

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

| |
|---|
| ملاحظات : لا يوجد |

# The Effect of Different Remineralizing Agents on Restored Demineralized Enamel: An In vitro Comparative Study

A Thesis Submitted to the Operative Dentistry Department,
Faculty of Dentistry, Ain Shams University
in Partial Fulfillment of the Requirements of the
Doctor Degree in Operative dentistry

***BY***
***Nahla Hamed Mohamed Hamed***
B.D.S. Faculty of Dentistry, Ain Shams University, 2007
M.Sc Faculty of Dentistry, Ain Shams University, 2014
Assistant Lecturer of Operative Dentistry, Faculty of Dentistry,
Ain Shams University

2022

**Supervisors**

***Dr. Omaima Hassan Ghallab***
Professor of operative dentistry,
Faculty of Dentistry, Ain Shams University

***Dr. Mohammed Nasser Mohammed Anwar***
Lecturer of Operative Dentistry,
Faculty of Dentistry, Ain Shams University

# *Acknowledgement*

I would like to express my most sincere gratitude and grateful appreciation to *professor Dr. Omaima Hassan Ghallab*, professor of operative dentistry, faculty of dentistry, Ain shams university for her kind guidance, sincerity and unlimited support.

I deeply thank and faithfully express my gratitude and appreciation to *Dr. Mohammed Nasser Mohammed Anwar*, Lecturer of operative dentistry, faculty of dentistry, Ain shams university for his excellent advice, valuable stimulating guidance and help during this study and throughout my academic and clinical work.

# *Dedication*

*To my support system, my backbone, my family.*
*My dearest mom and dad*
*My loving and supporting husband*
*My little heroes Abd Al Rahman & Ammar*
*My mother and father-in law*
*My caring sisters & brother*
*Thank you for being there for me every step of the way.*

# *List of Contents*

## *List of Tables*

## *List of Figures*

Regardless of the restorative material used, demineralization around the margins of restorations has been regarded as the principal cause for restoration replacement. Reduced dental restoration durability necessitates several restorative therapies, including the placement of larger and larger restorations and the execution of complex therapeutic procedures. As a result, restoring the balance between demineralization and remineralization has a significant impact on preventing or minimizing caries formation around restorations[1].

Remineralization is the body's natural repair mechanism for non-cavitated carious lesions, in which calcium and phosphate from saliva or other topical sources diffuses into the tooth and, with the help of fluoride, repairs existing crystal remnants rather of forming new ones. The repaired crystalline structure is significantly more resistant to acid attack than the original structure and this is accredited to the new mineralized structure which comprises the harder fluorapatite crystals. Demineralization and remineralization occurs simultaneously in the oral cavity. Whether dental caries occurrence is progressive, static or reversal is determined by the balance between demineralization and remineralization. As a result, any factor that can thrust this balance toward remineralization can be utilized as a weapon in the war against dental caries disease [2].

The principles of minimally invasive dentistry clearly dictate the need for clinically effective measures to remineralize early enamel caries lesions. While fluoride-mediated remineralization is the cornerstone of current caries management philosophies, a number of new remineralization strategies have been commercialized or are under development that claim to promote deeper remineralization of lesions, reduce the potential risks associated with high-fluoride oral care products, and facilitate caries control over a lifetime[3]. These non-fluoride remineralizing systems can be broadly categorized into

biomimetic enamel regenerative technologies and the approaches that repair caries lesions by enhancing fluoride efficacy [2].

Few researches have been conducted to investigate the effect of remineralizing agents on the demineralized lesions adjacent to restorations. Therefore, This research highlights the effect of different remineralizing protocols on the integrity of the tooth and tooth/restoration margins.