

# Proceeding



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## **Microleakage in composite restoration due to the application of carbamide peroxide bleaching material with a concentration of 10%, 15% and 20%**

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### **ABSTRACT**

**Introduction:** Anterior teeth bleaching process aims to improve the aesthetics and patient confidence. Often the anterior teeth that will be bleached contained composite restorations. **Objective:** The purpose of this study was to determine the effect of carbamide peroxide bleaching materials applications with a concentration of 10%, 15% and 20% of the value of microleakage of composite restorations. **Material and Methods:** The study sample consisted of four test groups: control group, the group with the application of 10% carbamide peroxide (A), 15% (B), 20% (C). Samples are first maxillary premolar teeth that were prepared are circular with a diameter of 3 mm and a depth of 2.5 mm, then restored composite. The test group A, B and C applied carbamide peroxide 8 hours a day for 5 days and immersed in the liquid methylene blue. Then microleakage composite restorations tested using a digital microscope. **Results:** Value microleakage of composite restorations group A average of 80,12 $\mu$ m, group B average of 90,92 $\mu$ m, and group C average of 201,22 $\mu$ m. **Conclusions:** Application of materials carbamide peroxide bleaching with a concentration of 20% lead to microleakage greater than carbamide peroxide bleaching materials applications with a concentration of 15% or 10%.

**Keywords :** *bleaching, microleakage, carbamide peroxide*

## INTRODUCTION

Teeth discoloration creates aesthetic problems that affect a person psychologically, especially on anterior teeth discoloration. The need for aesthetics drives someone to do bleaching on their teeth<sup>1</sup>. Bleaching is a method or attempt to get the color of teeth brighter and closer to the original tooth color through a chemical process with the aim to restore the aesthetic factor<sup>2,3,4</sup>. Bleaching can be done on a tooth that has discoloration due to pulp necrosis, developmental defects such as fluoriasis, due to consumption of tetracycline, discoloration iatrogenic such as root canal treatment and amalgam restoration<sup>5</sup>. Bleaching is not recommended on teeth with large caries, tooth restoration, and on teeth with pulp that is still wide, as well as patients who are allergic to bleaching ingredients<sup>6</sup>.

Bleaching is done internally and externally. Internal bleaching (intracoronal bleaching) is performed on non-vital teeth that already had root canal treatment done well. External bleaching (extracoronal bleaching) is performed on vital teeth discoloration. External bleaching is done with two techniques which are home bleaching technique and in-office bleaching. Home bleaching technique performed by the patient themselves but still monitored by the dentist. In-office bleaching technique is performed by dentists. Home bleaching technique typically uses carbamide peroxide with low concentration, while the in-office bleaching technique typically uses hydrogen peroxide with the concentration of 15% -50%. Carbamide peroxide that can be used as a teeth whitener for in-office bleaching method has to have a high concentration from 30% -50%<sup>7</sup>.

Anterior teeth that had been bleached often have composite restorations. Bleaching, other than to whiten teeth, also has side effects, such as; can cause the enamel surface roughness on teeth, increase sensitivity to temperature changes and also reduce or decrease the enamel roughness while on composite restorations can cause discoloration, increased roughness, hardness reduction in the composite and can decrease the strength of the connection between teeth and restorative materials<sup>2,8,9,10</sup>.

To get the desired tooth color, tooth bleaching is the most often way done recently, because it is the simple way and is not invasive. The purpose of this study was to determine the effect of carbamide peroxide applications with the concentration of 10%, 15%, and 20% against microleakage composite restorations.

## MATERIALS & METHODS

Samples were divided into 4 groups, each group consisting of three pieces of specimens. The control group, Group A was applied with bleaching material carbamide peroxide 10%, group B was applied with bleaching material carbamide peroxide 15%, and group C was also applied with bleaching materials carbamide peroxide 20%.

Each specimen in group A, B and C was applied with bleaching ingredients for 8 hours daily for 5 consecutive days. After the application of bleaching materials, each specimen was put in an incubator at the temperature of 37°C. After the application of bleaching materials

