

**Ministry of Higher education  
&Scientific Research  
University of Baghdad  
College of Dentistry**



**Evaluation of Carious Tissue Removal Efficacy  
Between Chemomechanical (Brix3000) Method and  
Conventional (Rotary) Method  
(Comparative in Vivo Study)**

A Thesis

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## **Abstract**

**Background:** In spite of the improvement of the rotary instruments concerning their efficacy and accuracy, they are still perceived as unpleasant by many patients. New approaches for caries removal were done using chemomechanical methods that require effective materials with antibacterial and anti-inflammatory proportions. Brix 3000 is a recently developed material, comprised papain based gel that has the ability to be used as a minimally invasive agent for the removal of the carious dentin and preserving the sound dentin.

### **Aims of this study**

This study aims to evaluate clinically and compare efficacy of chemomechanical method (Brix3000) of caries removal with conventional (rotary) method, evaluate behavioral aspect of study groups, estimate the duration of operating time and report pain severity and the need for local anesthesia.

### **Materials and methods**

The study followed randomized a split mouth design; the sample included a total of 32 children aged 8-12 years. Each child had two contralateral permanent molars with open occlusal carious dentinal lesion. Caries excavation was done using Brix 3000 one side and ceramic bur on the other side. Thus, 64 teeth were included in this study divided into two groups; each group consisted of 32 teeth.

Teeth in group (I) were treated according to the manufacturer's instructions of the Brix 3000 while in group (II) teeth were treated by using handpiece with ceramic bur. Complete caries removal was approved by visual , tactile sensation and DIAGNOdent caries detection device.

Dentine samples were collected from each tooth before and after the use of each method that was done using sterilized sharp spoon excavator which was immediately placed in a suitable transported media to be transferred to the laboratory for microbiological investigations. Caries measurement was evaluated before and after treatment using DIAGNOdent caries detection device. The cooperation of the child was recorded during and after each method according to the Frankle rating scale. Pain reaction was determined for each technique according to the sound (S), eye (E) and motor (M) (SEM) scale. Finally, time required for the treatment of each tooth was recorded using a stop watch.

After caries removal with either method, each tooth was restored using theracal, glass liner and light cured composite filling material.

## **Results:**

In this study, for the two groups, the statistical analysis reveal that there is a significant reduction concerning the measurement of caries using the DIAGNOdent ( $p=0.000$ ), however, there is no significant difference between the two groups ( $p>0.05$ ). For the microbiological investigations, the results show a highly significant difference in the reduction of the total bacterial count between the two periods (before and after treatment) for each method ( $p<0.001$ ), while this difference does not achieve a statistical significance when compared between the two groups ( $p=0.746$ ). Statistically, there is a significant difference in the patient behaviour during and after the period of the treatment, when compared the two methods. The comparison concerning pain reaction reveal that the value of Chi-Square showed high significant difference between the two methods ( $p=0.000$ ), indicating that the Brix 3000 is more comfortable to the child than the conventional method by using the ceramic bur. Hence, 80% of the cases treated with Brix 3000 did not need local anaesthesia to complete the treatment compared to only 6.7% for the ceramic bur group that treated without local anaesthesia. The mean of the preparation time need for Brix 3000 method

is 37.67 minutes which is longer than that of the ceramic bur method, which is 23.53 minutes, that results a significant difference between the two methods ( $p=0.000$ ).

**Conclusion:**

The use of Brix 3000, as a method of chemomechanical caries removal, is alternative treatment for dental caries that has the same effectiveness of the traditional method and more comfortable, even it requires longer time.