Bacterial Leakage of Endodontic Temporary Restorative Materials *in vitro*

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The aim of this study was to determine *in vitro* the time needed for human saliva bacteria to penetrate through three temporary restorative materials: IRM, Caryosan and Cavfil. Forty extracted single-rooted, noncarious, not restored teeth were used in this study. Five teeth with intact crowns were used as a negative control group; five teeth, which were prepared and left without temporary filling, were used as a positive control group. The 30 teeth used in the experimental group were divided into three groups. In Group 1 the access cavities of 10 teeth were temporarily restored with IRM; in group 2 – with Caryosan and in group 3 – with Cavfil. All 40 teeth were mounted individually placing the crown in contact with human saliva. All five teeth in the positive control group caused broth turbidity in 24 hours. Broth in the negative control group remained clear throughout the entire experimental period. During the period of incubation one specimen of Group 2 became contaminated and was discarded from the study. The average time for broth contamination of access cavities closed with IRM, Caryosan and Cavfil was 8.8, 6.1 and 4.4 days, respectively. The Kruskal-Wallis nonparametric test showed significant differences between the groups, while a multiple comparison test showed that IRM group had been statistically better than Cavfil and Caryosan groups when the average contamination time was compared ($p < 0.05$).

Key words: temporary restorative material, bacterial leakage, human saliva, bactericidal property, penetration

INTRODUCTION

The problem of an effective sealing of endodontic access has been investigated for many years. Currently there are a lot of data about physical, chemical and biological properties of endodontic temporary restorative materials.

Several studies *in vitro* have shown that inadequate filling of endodontic access may cause penetration of oral microorganisms into the root canal system. If there occurred microleakage of oral microorganisms, contamination of the periapical tissues could result in root canal failure and adversely affect the long-term prognosis of the root canal treatment. Therefore, upless the endodontic access is restored permanently the use of temporary restorations is an important factor in preventing contamination of the root canal system.

The root canal system can be recontaminated between the appointments in clinical situations by leakage through temporary restorative material, breakdown or loss of the temporary filling, or fracture of temporary restoration and/or tooth structure. This would require surgical therapy or nonsurgical endodontic retreatment with extra costs, time, and possible discomfort for the patient.

The necessary properties of the temporary restorative materials used in endodontics have been described by E. Deveayx and colleagues: 1) good marginal seal, 2) minimal porosity, 3) dimensional stability, 4) resistance to abrasion and compression, 5) easy insertion and removal, 6) biocompatibility, 7) compatibility with intracanal medication, 8) aesthetics.

A great number of temporary restorative materials have been used to seal access cavities, including zinc oxide-eugenol cements (ZOE) and their coproducts, zinc phosphate cements, polycarboxylate cements, glass ionomer cements, composite resins and other materials. However, nowadays most popular is ZOE cement (1, 2).