

**An evaluation of three fissure sealants
microleakage with presence or absence of
bonding agent through time intervals.**

(In vitro study)

A thesis

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Abstract

Background: Pit and fissure sealants are thin plastic coatings placed on the occlusal surface of posterior teeth which form a mechanical barrier between tooth structure and oral environment that reduce the impact of food and microorganisms, which may contribute to the formation of dental caries. Reports for more than three decades have documented the efficacy of pit and fissure sealants in reducing occlusal dental caries.

Aims of the study: The aims of this in vitro study were to evaluate the marginal microleakage of different types of fissure sealants (SDI, Tg and tetric N-flow) by time interval one day and (45) days, in the presence or absence of bonding agent among maxillary and mandibular teeth.

Materials and methods: Seventy two sound human maxillary and mandibular first premolar teeth were collected which were free from obvious carious lesions, morphological defects, restorations, and with deep pits and fissures that were typically indicated for sealant placement. The teeth were randomly divided into two main equal groups, group (1) and group (2), each group consists of (36) teeth involving equal numbers of maxillary and mandibular teeth. The first group incubated for one day, while the second incubated for (45) days. Each group divided into two subgroup; one of them treated with bonding agent while the other without. Then each subgroup was treated with three different materials which were; Tg sealant (without fluoride) group (A), SDI sealant (containing fluoride) group (B) and TetricN-flow (flowable composite) group (C). Each one consist of six teeth involving three maxillary and three mandibular. Then dye penetration tested by using methylene blue dye, after that the teeth cleaned and sectioned by sectioning device and tested under microscope.

Results and conclusions: Results had shown that the microleakage can be prevented by using of flowable composite containing nanofillers (Tetric N-flow) that treated with bonding agent after etching of enamel with 35% phosphoric acid gel as a conditioning technique, as shown in group (C+) in both periods of incubation and both maxillary and mandibular teeth that have no microleakage (score 0), but there was an opposite effect when using bonding agent with sealant materials not containing filler particles that showed a significant increase in the microleakage rate as shown in groups (A+ and B+). The opposite effect was seen also when used sealant materials containing filler particles but without bonding agent that seen in group (C) during both incubation periods that showed significant increasing in microleakage rate. While the effect of fluoride was very clear in decreasing significantly the microleakage rate after (45) days of incubation in both groups that treated with and without bonding agent (groups B and B+). Concerning the anatomical variation, the results showed that there were no significant changes in most groups regarding the microleakage rate.