

THE EFFECT OF CHANGES IN THE POWDER LIQUID RATIO OF GLASS-IONOMER SEALANT ON THE AMOUNT OF FLUORIDE RELEASED

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Abstract. Glass-ionomer sealant is used to seal teeth pits and fissures in order to prevent caries formation and release fluoride. It is made by mixing powder and liquid, where the powder contains fluoride and the liquid enables it to penetrate into small pits and fissures. The powder to liquid (P/L) ratio can determine the efficiency of the sealant. We aimed to determine the amount of fluoride released by varying P/L ratios in order to obtain the best penetration versus fluoride released ratio. The study was performed on 4 groups of 5 sealant specimens each: Group 1 – the P/L ratio was that recommended by the manufacturer; Groups 2, 3 and 4 had 25%, 50% and 75% less powder than recommended by the manufacturer. In each group the prepared sealant was placed in a mold and light cured for 20 seconds. Each group of specimens was placed in deionized water and the amount of fluoride released in each group was measured in the water on days 1, 7, 14 and 21. The measured results for each group at each time period were compared with the one-way ANOVA and Tukey's tests. In all the groups the fluoride levels were highest on day 1 slowly decreased for 7 days and then remained the same after 7 days for the duration of the study. Group 4 released significantly more fluoride than Groups 1-3 on day 1 ($p=0.000$). Groups 3 and 4 were not significantly different from each other in fluoride release after 1 day ($p>0.05$) but both released significantly more fluoride than Groups 1 and 2 at all times sampled ($p<0.05$). There were no significant differences in fluoride release between Groups 1 and 2 ($p>0.05$). Reducing the amount of powder to lower than the manufacturer's recommendations resulted in significantly greater release of fluoride. Further studies are needed to determine the duration of fluoride release is affected for greater than 21 days and whether the protective effect of the sealant is altered by the lower powder to liquid ratio.

Keywords: fluoride, fluoride releasing sealant, glass ionomer, powder/liquid ratio, release

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