Orthodontic cements: Immediate protection and fluoride release

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The objective of the authors was to evaluate fluoride release of 3 glass ionomer cements with immediate protection of fluoride varnish (Cavitine, SS White), divided into 3 groups: Group M (Meron, VOCO), Group V (Vidrion C, SS White) and Group KC (Ketac-Cem, 3M ESPE). Fluoride release was measured during 60 days by means of an ion-selective electrode connected to an ion analyzer. After 4 weeks, the test specimens were exposed to a solution of 0221% sodium fluoride (1000 ppm of fluoride). Results showed that the cements reached a maximum peak of fluoride release in a period of 24h. There was a statistically significant difference between the amount of fluoride released after the applications of fluoride among the groups from the 31st to 60th day ($p > 0.05$). The Vidrion C and Meron cements showed better performance to uptake and release fluoride when compared with Ketac-Cem cement.

Keywords: Glass ionomer cement. Fluoride release. Varnish.

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Editor's Summary

The glass ionomer cements (GICs) have the properties of fluoride release and chemical adhesion to enamel, which makes it the material of choice for cementation of orthodontic bands. Additionally, the GICs work as true deposits of fluoride in the oral cavity, absorbing the available fluoride in the oral environment and releasing it posteriorly, thus prolonging its anticariogenic effect. This becomes very important in orthodontic patients undergoing long-term treatments, especially those at high risk for dental caries. Given the doubts about the actual fluoride release by GICs exposed to recharge at intermittent intervals, the purpose of this study involved evaluating the fluoride release of conventional GICs before and after its recharging after 28, 30, 31 and 32 days, during a total of 60 days trial. There were made ten samples of three different brands of conventional GICs: Meron (VOCO, Germany), Vidrion C (S.S. White, Brazil) and Ketac Cem™ (3M ESPE, United States). After application of fluoride varnish, the specimens were kept in a humidifier at 37° C for 30 minutes. Then, the samples were immersed in deionized water, which was changed every 24 hours. The fluoride concentrations were measured by an ion analyzer at 1 hour and 2, 3, 7, 14, 21 and 28 days after the initial setting reaction. After 28 days, the samples were rinsed and subjected to a 0.221% sodium fluoride solution (1000 ppm fluoride) for 5 minutes. New refills of fluoride were made on days 30, 31 and 32, being the fluoride release assessed from day 29 to 33, and on days 45 and 60. The amount of fluoride released was compared between the three trademarks using the Kruskal-Wallis and Mann-Whitney test ($p<0.05$). It was found that all cements showed the same behavior prior to the first fluoride recharge, with a greater fluoride release 24 hours after the reaction of initial setting and a decrease to the seventh day. There was greater release of fluoride for cements Vidrion C and Meron. Interestingly, both GICs (Meron and Vidrion C) continued this behavior after refills of fluoride, suggesting that probably, GICs that initially released more fluoride have a greater ability to recharge afterwards.