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GLASS IONOMER CEMENT AS AN AMALGAM BONDING AGENT - A MICROLEAKAGE EVALUATION

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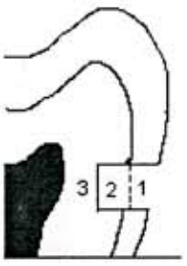
Dental amalgam has the unique distinction of being used for over 150 years as the primary posterior restorative material in dentistry. However, one of its major shortcomings has been its inability to bond to the tooth structure, leading to the problem of microleakage. This phenomenon of microleakage remains the darkest blemish on the prospect of amalgam being an effective restorative material in the next millennium. Over the years, various researchers have advocated several methods to enhance the marginal seal. These include Oxalates, Copal varnish, and the 4-meta group of resin bonding agents; with all exhibiting mixed results. This study evaluates the possibility of using glass ionomers as an effective amalgam bonding agent.

The test specimens comprised of 40 freshly extracted bicuspids, divided into three groups. In the control group, the class V cavities were restored using copal varnish with high copper amalgam. The two test groups were restored using GIC type I & type II (Fuji GC) as the bonding agents respectively. A thin film of the glass ionomer cement was applied & the amalgam was condensed into the preparations before the cement was allowed to set. The specimens were then subjected to 300 cycles of thermocycling (between 5 and 55°C) followed by immersion in 4% eosin dye . After 48 hrs the teeth were sectioned and evaluated under a trinocular microscope.

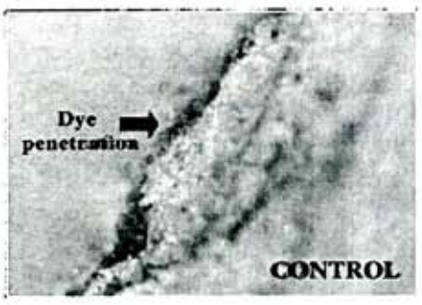
MICROLEAKAGE SCORING SCALE

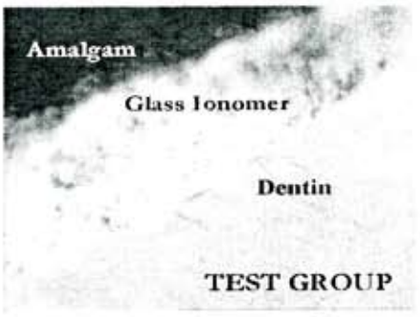
1 = Leakage < ½ of Gingival / Occlusal Walls
2 = Leakage > ½ of Gingival / Occlusal Walls & upto Axial wall
3 = Leakage along axial wall



RESULTS

LINER	MICROLEAKAGE 0 1 2 3	MEAN
VARNISH	0 3 7 5	2.13
GIC Type I	12 2 1 0	0.26
GIC Type II	11 3 1 0	0.31





The results conclusively show that the control group could not withstand the rigorous thermocycling regime as evident by the high microleakage scores. The test groups comprising of both type I & II GIC showed remarkably low scores with the difference between the two being statistically insignificant. This study reiterates the fact that copal varnish is a poor agent in this regard due to its lack of adhesion as well as high solubility rate. In spite of the short term success of the 4-meta polymers, the concept of using a cost effective restoration like amalgam gets defeated when one opts for such an expensive and technique sensitive bonding agent.

This study shows that Glass ionomers with its time tested virtues of fluoride release, chemical nature of bonding & biocompatibility can also be employed as an effective amalgam bonding agent. Despite the fact that the results between type I & II GIC are equally good, we do not recommend the use of type II cement as a bonding agent because the mechanical interlocking formed by the penetration of the unset ionomer into the amalgam will be less effective in the type II GIC because of its higher film thickness.