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Microleakage of an experimental cement used as dentin substitute

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INTRODUCTION: The aim of this study was to compare and to observe the microleakage of an experimental cement (RD94), at present marketed (Biodentin, Septodont) used as dentin substitute in the " opened sandwich " technic for the restoration of cavities of class II with regard to that of a resin modified glass ionomer cement (RMGIC, Fuji II LC, GC).

METHODS: 84 class II were realized on mesial and distal faces of every 42 extracted third molars. Cavities were randomized in 6 groups. The dentin substitutes were used as the RD94 (Septodont) to fill the first third of the cavity, excepted for groups 1 and 2 having been totally filled:

G1: RD94; G2: Fuji II LC; G3: RD94 + Optibond Solo Plus® + silane + Filtek Z250®; G 4: same as group 3, without silane; G5: RD94 + Septobond® + Filtek Z250®; G6: Fuji II LC® + Optibond Solo Plus® + Filtek Z250®.

Teeth were thermocycled 2500 times in two baths of water (5 and 55°C, dwell time of 20s). The tracer used for the microleakage evaluation was the silver nitrate (Ag NO₃); 50 % in weight). Teeth were then embedded in a resin (Scandiplast®) and three sections were realized through the restorations (6 measures by interface for every restoration). The microleakage was estimated by ordinal scores.

All the measures were realized at the level of the interface composite enamel / resin, resin composite / dentin substitute (dentin bonding agent), dentin substitute / dentin (cervical wall). The penetration was evaluated separately by two examiners.

The maximum score found among the 6 evaluated surfaces per restoration was selected to summarize the information.

RESULTS:

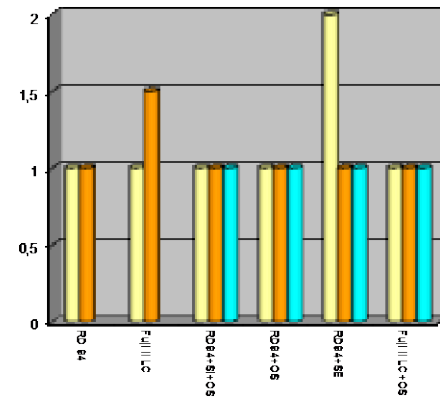


Figure 1: Median of the maximum scores of microleakage at the enamel (yellow), dentin (orange) margins and at the interface dentin substitute/ composite resin (blue)

No statistical significant difference was registered between every group, excepted for the group 5 at the enamel limit.

DISCUSSION AND CONCLUSION: The RD94 had a behavior similar to the RMGIC (Fuji II LC®) with biological (no cytotoxicity by induction of pulp fibroblasts in odontoblasts cells) and mechanics (better compression resistance) properties, superior to the RMGIC as well as an easier implementation (no cavity conditioning walls). The RD94 is also more tolerant with the humidity but is more time consumer.