

POSTER

Adhesion of 4 different impression materials to Flock-PA66 covered dental tray

Area: Dental Materials

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Objective:
An innovative standard impression tray has been recently released. These new trays are fully covered with a tiny colored layer of microfibers (Polyamide Nylon), self-retentive for all impression materials without applying any adhesive.

Aim of this investigation were :

- to assess the tensile bond strength of different impression materials (2 polyvinylsiloxane and 1 Polyether) used in combination with a Polyamide Nylon Flock tray (Flock PA66), a standard plastic tray (PC-110) and a Stainless Steel standard tray
- to compare results between Flocked dental tray and a metal metal tray, with or without holes, using an alginate.

Materials:
90 squared boxes were manufactured for the study as well as 90 specimens/trays (30 Flock PA66, 30 PC-110 and 30 Stainless Steel). Specimens were treated with adhesive according to indications given by the manufacturers. The Impression materials selected were Aquasil Ultra Heavy (DENTSPLY), Impregum and Imprint 4 Penta Heavy(3M) Boxes were filled in with impression material and the specimens were embedded into the impression material and maintained in position following the manufacturer instruction for material polymerization. After materials were fully set, each was pulled in tension with a crosshead speed of 250 mm/min until failure occurred. Normality and ANOVA test were conducted. Since differences were significant, a Tukey Post hoc test was run to evaluate pairs of group that differs. In order to reach the second aim of the study 30 squared boxes were manufactured as well as other specimens (10 Flock PA66, 10 Stainless Steel with escape holes and 10 Stainless Steel without holes). Stainless Steel tray have been treated with adhesive, while none adhesive have been applied on flocked specimens.

Results:
The Tukey post hoc test identifies three subsets. The Flock PA66 specimens showed higher adhesion values than the Plastic PC-110 and Stainless Steel covered with adhesive for each tested impression material. Impregum and Aquasil Ultra Heavy combined with Flock PA66 showed the best value of adhesion, relevant at 5% level of significance. When used with alginate, flocked and steel tray with hole have the same behavior. Stainless steel tray without holes showed weak adhesion.

Conclusion:
Tensile bond strength reach greater value using flocked surface, than non flocked surfaces covered with adhesive. The use of Flock PA66 as a tray coating system seems to be a better alternative to the use of conventional metal or resin tray covered with adhesive. Best value of adhesion occur when Polyether and flocked surface is used. The alginate tests showed that flocked surface and steel with escape hole could reach good adhesion value able to resist to strength exercised during removal of the impression from the oral cavity. Using a flocked surface is possible to reduce time spent for impression, reaching satisfactory adhesion values with all the tested materials. The use of a single-use impression tray can also reduces the need to sterilize the tray and the risk of cross-infection.