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Poster Session P03 – Dental Materials 2

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Poster Session P03/Dental Materials 2

P03-33

The effects of children's drinks on the colour stability of restorative materials

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Introduction: Discoloration of restorative materials may cause patient dissatisfaction and result in additional expenses for replacement. The aim of this study was to evaluate the effects of exposure to various children's drinks on the colour stability of different aesthetic restorative material commonly used in paediatric dentistry.

Materials and methods: Cylindrical specimens $(15 \times 2 \text{ mm})$ were prepared from four different restorative materials: Fuji IX, a glassionomer cement (GIC) Fuji II LC, a resin-modified glass-ionomer cement (RMGIC), Dyract Xtra, a polyacid-modified composite resin (PMRC), and Filtek Z250, a composite resin. For each material, 20 specimens were prepared and divided into four groups. Each group was stored in a different solution (distilled water, chocolate milk, cola, grape juice) for 24 h. A colorimeter was used to measure the colour of each specimen both before (baseline) and after staining. Colour change (E*) was calculated, and data was analyzed using two-way ANOVA and Tukey HSD tests.

Results: Two-way ANOVA showed the effects of restorative materials, staining agents and their interaction to be statistically significant (P = .0001). For all restorative materials, the lowest E* values were recorded for specimens stored in distilled water (0.42), followed by chocolate milk (0.88), grape juice (3.45) and cola (3.97). Among the four restorative materials tested, Fuji II LC showed the profoundest colour change (3.71) and Fuji IX the least (1.33). There were statistically significant differences among above groups (P < 0.05).

Conclusion: E* values were acceptable for all materials tested, with the exception of Fuji II LC. Therefore, the use of Fuji II LC is not recommended for use in anterior restorations in children.

P03-34

Evaluation of micromorphology of etched primary and permanent enamel following APF treatment

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Introduction: The purpose of this study was to evaluate the etchpattern of permanent and primary enamel with or without the application of Acidulated Phosphate Fluoride (APF) gel.

Materials and methods: 60 sound proximal enamel surfaces (30 permanent maxillary first pre-molar and 30 primary maxillary first molar) were selected. In Group 1, primary teeth were treated with APF gel for 4 min and then etched with 37% phosphoric acid gel for 30 s. In Group 2, primary teeth were etched, without the application of APF. In Group 3, permanent teeth were treated with APF and then etched. In Group 4, permanent teeth were etched,

without the application of APF. Then, all teeth were evaluated using a Scanning Electron Microscope (SEM) in magnifications 1000, 2000, 3000 and 4000. Chi-square test was used for statistical analysis.

Results: Out of 3 etch-pattern types (I: acid dissolves the enamel rod-core, II: acid dissolves the enamel rod-periphery and III: irregular pattern) in Group 3, etch-pattern type I was more frequently observed (86.7%), but in Group 4, all etch-pattern types (I, II, III) were observed, whereas in Groups 1 and 2, typically etch-pattern type II was found (66.7% and 60% respectively, P < 0.001).

Conclusion: Etch-pattern type I was more present in permanent teeth and etch-pattern type II was more scanned in primary teeth. Since the acid usually dissolves the inorganic part of the enamel, it may be concluded that in permanent teeth, the enamel rod cores have more inorganic material, while primary teeth have more mineral material in the enamel rod peripheries.

P03-35

Clinical evaluation of /F releasing of «Esterfill /F» in primary teeth

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Introduction: To evaluate the clinical effectiveness of a direct resin based composite material «Esterfill /F » (NII Medpolymer RUSSIA) without bonding system in primary teeth.

Patients and methods: A total of 83 restorations (32 class I and 51 class II) were placed in primary molars in 4–6-year-old children. Following caries removal and cavity preparation, the teeth were restored with flowable and condensable materials «Esterfill /F» without bonding system, using acid-etching (enamel 20 s, dentin 15 s). The restorations were evaluated according to the U.S. Public Health Service's (USPHS) criteria at the end of one year. The data obtained were analyzed using the Chi-Square-Test.

Results: The evaluations showed no statistically significant difference between class I and class II restorations in terms of the color mismatch, anatomic form, marginal adaptation, and secondary caries (P > 0.05), but they were statistically significant with regard to cavosurface marginal discoloration (P < 0.05). At the end of one year, the success rate of the class I and class II restorations of the primary molars restored with «Esterfill /F» was 93.7 and 86.3%. **Conclusion:** The 12-month clinical performance of «Esterfill /F » materials was satisfactory for the restoration of Class I and II primary molars.

P03-36

Feature of gap formation between different cavities walls and resin composite systems on primary teeth A. G. SEDOYKIN, V. M. ELIZAROVA & A. P. POLIKARPOVA Department of Paediatric Dentistry, Moscow State University of Medicine and Dentistry, Moscow, Russia

Introduction: The aim of this study was to compare the effectiveness of self-etching, etch-rinse dentin-bonding agents and materials «Esterfill /F» NII Medpolymer RUSSIA without bonding in achieving a gap-free adaptation between the restorative material and substance of primary teeth.

Materials and methods: The authors randomly divided 30 noncarious primary teeth into three groups (self-etching, total-etching and etching without bonding). In the first group the self-etching system «Optibond –all-in one» Kerr was used and the teeth were restored with «Herculite» Kerr. In the second group acid-etching was used (enamel: 20 s, dentin: 15 s) in combination with «Optibond FL» and the restorative material «Herculite». In the third group following acid-etching the restorative material «Esterfill /F» without bonding system was applied. Longitudinal sections of the restored teeth were evaluated using scanning electron microscopy (SEM). We estimated length, width and quantity of gaps between restoration and substance of the primary teeth.

Results: In all three groups the greatest quantity of gaps was observed in the field of an angle of a cavity and at one of edges of enamel. Minimal the width and length of a gap in the field of a dentine-restoration is also was observed in group with «Optibond FL». However in this group cracks in the structure of enamel have been found. Statistical results of the SEM analysis revealed fewer gaps in the restorations made with «Esterfill /F» restorative material than «Optibond -all-in one» agents at the restoration-dentin interface in both groups. As the porous layer which forms «Optibond-all-in one» agents, was regarded by us as a gap.

Conclusion: In spite of the fact that «Optibond FL» showed the best results, «Esterfill /F» can establish adhesive layers for bond of restorative material to dentine of primary teeth.

P03-37

In-vitro evaluation of the effects of power bleaching on enamel microhardness

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Introduction: This *in vitro* study aimed to evaluate the surface micro hardness of human enamel subjected to bleaching with Zoom Advanced Power (AP) in-office bleaching kit and Opalescence Boost 38% hydrogen peroxide an in-office vital bleaching agent.

Materials and methods: One hundred recently extracted and intact human impacted third molar teeth were used. The teeth were sectioned into buccal and lingual halves than 150 tooth sections without any enamel crack were selected. These sections were randomly divided into five groups (n = 30). Bleaching agents were applied according to manufacturer's instructions. Three measurements were made from each tooth section using a Vickers Microhardness (Shimadzu HMV, Japan) tester before initial exposure to the bleaching agents and post treatment. The indentations were made on the flattened middle third top surface of each specimen using 300-gr loads and a dwell time of 20 s. The three values were averaged to produce one value for each specimen. G1: Control (no light no gel), G2: Opalescence Boost 38% hydrogen peroxide in-office bleaching gel, G3: Zoom 2 25% hydrogen peroxide in-office bleaching gel, G4: Zoom 2 25% hydrogen peroxide in-office bleaching gel and Zoom 2 AP light, G5: Placebo gel and Zoom 2, AP light. Colourless glycerine based placebo gel was used to prevent dehydration. All specimens of a respective group were subjected to the treatment agents for three sequences of 15 min. The data were evaluated with one-way ANOVA and post hoc Tukey tests.

Results: Microhardness values for G4 before and after treatment were 345.76 and 358.16 respectively. Statistical analyses revealed no significant differences among initial enamel groups P > 0.05;

while significant differences occurred between initial and after treatment group values for G4 (P < 0.05).

Conclusion: Bleaching treatment conducted with light had no adverse effect on enamel microhardness.

P03-38

Calcium and hydroxyl ion diffusion through dentin – comparison study of various materials

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Introduction: Calcium Hydroxide is used as an intracanal medicament in endodontic treatment of dental trauma complications, such as root resorption, because of its antibacterial and antiresorptive properties.

Materials and methods: Calcium Hydroxide preparations which are used in Dentistry Department of Faculty Hospital in Pilsen, such as Calxyd and Dentbalzam (in paste form) from Spofa Dental, Calxyl red and blue (in paste form) from OCO and Plus points from Roeko were used in this study. 25 intact pre-molars, extracted for orthodontic reasons, were treated endodontically *in vitro*. Every fifth tooth was filled with one from the above materials. The clinical crowns and the apex were covered by glass ionomer cement. A cavity on the middle root third of each tooth was prepared, simulating root resorption. Subsequently, the teeth were placed into pipes containing saline solution and every 24 h the concentration of calcium ions was measured for 21 days. From that concentration, the pH of each solution was calculated.

Results: Calxyl red and blue had the best results among all materials, since 3 weeks after the initial measuring their pH values varied between 12,10 and 12,25. Dentbalzam and Calxyd resulted in pH values of 11.80 and 12.00 respectively. The pH of saline solution with teeth filled with Plus points varied between 11.20 and 11.40.

Conclusion: Measurements proved that hydroxyl and calcium ions pass through dentinal tubules into saline solution, causing alcaline environment. Materials in paste form should be preferred, since they cause stronger alcaline environment than the points, in shorter time.

P03-39

Effect of chlorhexidine on self-etch bond on primary teeth dentin *in vitro*

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Introduction: Studies showed that matrix metalloproteinases (MMPs) may partially be responsible for bond strength decrease. Since chlorhexidine (CHX) inhibits MMPs, the purpose of this *in vitro* study was to investigate the effect of chlorhexidine on dentin bonding durability of self-etch adhesive systems on primary teeth. **Materials and methods:** 46 sound primary molars were collected with parents' informed consent. All molars were sectioned into two halves to expose flat dentin surfaces. All-in-one self-etch adhesive systems were applied and followed by composite application in one half (control group), the other was treated with 2% CHX before self-etch. Paired specimens in both groups were submitted to microtensile bond strength test immediate, 75 and 150 days after being stored at artifical saliva respectively. Fracture patterns of specimens were observed using scanning electron microscopy (SEM). Paired–samples *t* test and One–way ANOVA were used.

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Results: Microtensile bond strengths were 44.15 \pm 10.09MPa, 23.52 \pm 6.75MPa and 27.84 \pm 15.31 MPa in the control group at immediate, 75 days and 150 days,respectively, while they were 43.83 \pm 11.27 MPa, 24.56 \pm 6.36 MPa and 29.16 \pm 9.41 MPa in the CHX group. There were no significant differences between two groups at all test time intervals (P > 0.05). The storage resulted in significant bond strength reduction in both control and CHX groups at 75 days and 150 days compared to the immediate test (P < 0.05). No significant differences were found between 75 days and 150 days in each group (P > 0.05). SEM showed that fractures patterns were mainly adhesive fractures in both groups at all observed intervals.

Conclusion: This *in vitro* study suggests that chlorhexidine might not preserve self-etch dentin bond.

P03-40

Evaluation of a new material in restoration of primary molars

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Introduction: It is claimed that ceramic inserts can reduce polymerization shrinkage and microleakage in posterior tooth-colored restorations. The purpose of this study was to evaluate the gingival microleakage in tooth colored restorations with ceramic - inserts in primary pulpotomized molar teeth.

Materials and methods: Forty extracted human primary second molars were prepared with standardized MOD cavities so that the gingival margin was located on the dentin in mesial box and on the enamel in distal box. We used 3 materials in 4 groups: composite resin (3M-Z100), light-cured glass ionomer (Fuji) and cerana glass ceramic insert (Nordiska, Helsingborg.Sweden). The teeth were randomly divided into 4 groups with 10 teeth in each and restored as follows: Group 1: light-cured glass ionomer. Group 2: light-cure glass ionomer with cerana glass ceramic insert. Group 3: composite resin. Group 4: composite resin with cerana glass ceramic insert. The high intensity program (HIP) was used for light-curing (Ivoclar vivadent, Astralis 7). After termocycling (1000 cycles, 5-55°C) and load cycling (250 000 cycles-80 N), microleakage was evaluated by 'dye penetration' technique (basic fushin 0.5%). Data were statistically analyzed by ANOVA, Kruskal -Wallis and Wilcoxon test at significance level P < 0.05.

Results: No statistically significant differences were found between the groups with and without cerana in enamel (P = 0.891) and dentin (P = 0.197). Microleakage at the dentin margins was greater than the enamel margins (P = 0.001).

Conclusion: The use of cerana in combination with HIP cannot reduce microleakage at gingival margin in class II restorations. However, more studies using other restorative techniques and light – curing methods are recommended.

P03-41

Knoop hardness of resin-modified glass ionomer cements

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Introduction: The constant concerns with prevention and restoration longevity allow researchers to be in constant improvement of dental materials, on the attempt to reproduce dental structure in its aesthetics and physical properties. New materials with different formulations and presentations frequently are introduced to the clinicians, as it is the case of nanotechnology glass ionomer cement. The aim of this study was to assess the Knoop hardness of resinmodified glass ionomer cements.

Materials and methods: Ten specimens of each material were made: G1-VitremerTM (3M-ESPE), G2-KetacTM N100 (3M-ESPE) and G3-Vitro Fill LC[®] (DFL). The materials were dosed and mixed according to the manufacturer's instructions and inserted in PVC molds, light cured for 40 s and stored in lubricant (Paraffin highly liquid, Merck) at 37ordm;C, for 24 h. The surfaces were wet polished till the excess was removed. The Knoop hardness was determined (Microhardness Tester HVS – 100 – PANTEC[®]), with 25-g load and 5-s dwell time, with Knoop indenter. On each specimen three indentations were made in upper surface and three in the lower surface. ANOVA and Tukey test were conducted (P < 0.05).

Results: The mean Knoop hardness (and SD) of each group were: G1: 69.9 (16.5), G2: 39.3 (8.8), G3: 53.5 (3.1). Significant differences between the hardness of the materials existed and no significant difference between the upper and lower surfaces of the same specimen was found.

Conclusion: Glass ionomer cement with nanotechnology did not achieve similar Knoop hardness compared to the others materials tested.

P03-42

Effects of MTA on proliferation and differentiation capacity of human pulp cells

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Introduction: The purpose of the study was to investigate the effects of mineral trioxide aggregate (MTA) and calcium hydroxide on the proliferation and differentiation capacity of pulp cells of primary teeth.

Materials and methods: Pulp cells were isolated from the retained primary teeth without apparent root resorption. The cells of 4–8 passages were used in the study. The experiment was divided into three groups: MTA group, calcium hydroxide group and control group. Cell proliferation was detected by MTT array. Von Kossa staining was employed to observe the formation of mineralized nodules, and mRNA expression level of alkaline phosphatase (ALP) and dentin sialophosphoprotein (DSPP) was determined by Real Time PCR. ANOVA analysis was applied to all the values, and statistical significance was determined at P < 0.05.

Results: Calcium hydroxide-treated cells grew slower than the control significantly (F = 1792.301 P < 0.01); While MTA-treated cells proliferated significantly faster than the other two groups (F = 1835.065, P < 0.01). The formation of mineralized nodules was found in both MTA-treated and calcium hydroxide-treated pulp cells. MTA increased mRNA expression of ALP and DSPP in pulp cells (F = 349.651, P < 0.01), whereas calcium hydroxide down regulated them in comparison to the control (F = 1653.001, P < 0.01).

Conclusion: MTA is more suitable than calcium hydroxide as pulpcapping agent in primary teeth.

P03-43

The effect of storage media on the solubility of three restorative materials

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Introduction: The purpose of this study was to compare the solubility of three restorative materials in various storage media. **Materials and methods:** A glass ionomer cement Ionofil, a compomer Dyract-Xtra and a micro hybrid composite Esthet-X were used in the study. Forty disk shaped specimens, 10 per each group were prepared in a stainless steel mold according to the manufacturers' instructions and then stored in distilled water, cola, orange juice and milk. Over a 30-day test period the specimens in each group were immersed in the storage media at 37°C for 3 h a day. Solubility tests were made by using gravimetric test method at 24 h and at days 7, 14, 21 and 30. The data (μ g/mm³) were subjected to Kruskal–Wallis and nonparametric multiple-comparison tests using ranked sums.

Results: There were statistically significant differences among materials' solubility values in distilled water after 14th day. In cola, Dyract Xtra showed significantly higher solubility value than Esthet-X and Ionomer (P < 0.05; P < 0.001). In orange juice, Ionomer showed the highest value for solubility (P < 0.001). In milk Ionomer showed significantly lower solubility than Dyract Extra and Esthet-X (P < 0.05).

Conclusion: The results showed that the storage media affects the solubility of restorative materials.

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Handling time of self-etching adhesives *versus* etch and rinse adhesives

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Introduction: The aim of this study was to test handling time necessary to complete restoration using several different adhesive systems, etch and rinse and self-etching in terms of manipulation time in paediatric dentistry clinical practice.

Materials and methods: Tested self-etching adhesive systems were AdheSe (Ivoclar/Vivadent, Lot G2718), Clearfil SE Bond (Kuraray Dental, Lot 4194), Clearfil S3 Bond (Kuraray Dental, Lot 41120), Adhese One Vivapen (Ivoclar/Vivadent, Lot K10655), Unifil Bond (GC, Lot 0406021), Futura Bond NR (Voco, Lot 581031) and Adper Prompt-L-Pop (3M Espe, Lot 223261). Etch and rinse tested systems were Single Bond (3M Espe, Lot 6FN) and Excite (Ivoclar/ Vivadent, Lot J14884). Restorations were made with composite Tetric (Ivoclar/Vivadent, Lot E 46159) according to manufacturer's instructions as cylinders of the material. Each cylinder was adhered to enamel with the tested adhesive system. Time necessary to complete each restoration was measured. Statistical analysis was performed using Anova and Tukey HSD test.

Results: The score measured produced statistical significance and confirmed difference among tested adhesives (P < 0.01). Significantly better time was measured for Prompt-L-Pop (78.7 s), AdheSe One Vivapen (82.7 s) and Clearfil S3 (92.4 s) than Excite (115.8 s) and Single Bond (116.7 s). All other tested self-etching systems did not produce statistically significant difference compared to tested etch and rinse systems.

Conclusion: Handling properties of the 'all in one' self etching systems are less time consuming because of the easier manipulation

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and faster application and thus easier to use in paediatric dentistry clinical practice.

P03-45

Basic research on biomaterials for restoration of primary teeth

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Introduction: The restoration of primary teeth should consider not only the various functions, but give sufficient consideration to their replacement by permanent teeth according to physiological root resorption of their roots. We studied the possibility of using a post after root canal filling of primary teeth examining the biomaterials in a medical and an environmental aspect.

Materials and methods: In this research, we took up Poly-Glycolic-Acid (PGA) and Poly-L-lactic Acid (PLLA), which chemical structure is identified by Attenuated Total Reference with FT-IR as being comparatively simple in several biomaterials. We compared these with resins after examining them, shaped by the standard preparation of extrusion molding. 1. Bending strength test (conforming to ISO4049, JIS T6523), 2. Bending elastic modulus test, 3. Adhesion to cement test (conforming to ISO 11405). And we manufactured the posts for trial by extrusion molding after designing them, which influenced the occlusal force in primary dentition, the size of primary tooth and the mechanical stresses in the root of primary tooth in trauma.

Results: No significant difference was found between biomaterials and resins. And we could make trial manufactures shaped screw length 9.51 mm, diameter 1.62 mm referred mechanical examinations and several data of primary tooth.

Conclusion: It is possible to use biomaterials as restorative materials for the primary tooth which change the composition and orientation.

P03-46

Resistance to degradation of bonded restorations to simulated caries-affected primary dentin

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Introduction: This study aimed to investigate the resistance to degradation of resin modified glass ionomer cement (RMGIC) and adhesive/composite restorations in sound and simulated caries-affected dentin of primary teeth subjected to caries challenge using a pH-cycling model and load-cycling, by microtensile test.

Material and methods: Occlusal cavities were prepared in sixty sound exfoliated primary second molars. Half of the specimens were submitted to pH-cycling to induce simulated caries lesions. The teeth were randomly assigned to restoration with one of the two materials: (1) a RMGIC (Vitremer) and (2) a total-etch adhesive system (Adper Single Bond 2) followed by resin composite (Filtek Z100). After storage in distilled water 37°C for 24 h, control group specimens were subjected to test procedures while the specimens in the experimental groups were subjected to two different aging methods: load-cycling (50 000 cycles, 90 N, 3 Hz) or carious challenge (pH-cycling: alternately 8 h in demineralizing

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and 16 h in remineralizing solutions, for 10 days). Teeth were sectioned into 1 mm² slices and tested to failure under tension. ANOVA and multiple-comparisons tests were used (P < 0.05). **Results:** Vitremer bond strength was not altered by the condition of dentin. Conversely, Adper Single Bond 2 showed significantly lower bond strength values when bonded to simulated caries-affected dentin. Load-cycling did not influence bond strength for any of the tested materials, while carious challenge resulted in a significant decrease in microtensile bond strengths of Adper Single Bond 2, but not for Vitremer restorations.

Conclusion: The use of Vitremer (RMGIC) is encouraged for pediatric patients with caries activity. This investigation was supported by CAPES #BEX- 4711-06-8.

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Survival rate of class II ART restorations testing different salivary barriers

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Introduction: The aim of this study was to evaluate the survival rate of class II ART restorations in primary teeth, made under rubber dam or with cotton wool rolls, after two years.

Patients and methods: Prior to the study, the local ethical committee approval and the patients' and guardians' informed consents were obtained. A total of 2316 children, between 6 and 7 years old, of both genders, from public schools of two medium size cities in Brazil, were examined. 232 children were selected and one tooth having a class II cavity was selected. The children were randomly divided into two groups: a) class II ART restoration made under normal salivary control conditions using cotton wool; and b) using rubber dam. The restorations were assessed by calibrated evaluators (n = 8, Kappa > 0.8) at 6-month intervals for 2 years. Survival analysis using Kaplan-Meier test was carried out to determine the survival rates of the restorations.

Results: The survival rates, for 6 months, 1 year, $1^{1}/_{2}$ year, and 2 years were 65.1%, 49.9%, 37.9% and 26.2%, respectively. Groups a and b had similar behavior patterns. The general survival analysis Kaplan-Meier test showed no statistically significant difference between groups a and b (Log rank = 3.72; gl = 1; P = 0.054).

Conclusion: After 2 years, the survival rate of class II ART was critical and there was no difference between the methods of salivary control. Research supported by CAPES.

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Survival rate of ART restorations in primary and permanent dentitions: meta-analysis

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Introduction: The traditional material for restoring tooth cavities is amalgam. Some time ago a restorative treatment concept, the Atraumatic Restorative Treatment (ART) has emerged. This meta-analysis compares the longevity of single surface ART to that of amalgam restorations in both dentitions over 1, 2 and 3-year periods.

Materials and methods: Eleven databases were searched for articles up to 5 January 2008. Inclusion criteria for articles were: abstracts relevant to topic and published in English, Portuguese or Spanish. Exclusion criteria were: lack of randomization, control group, blinding or baseline data; drop-out rate > 35%. Articles were only accepted if they complied with all the exclusion criteria. Logrank tests and multi-level regression analysis were done (P < 0.05).

Results: 222 articles were identified of which 16 were included for further review. Of the 16 articles, 6 were excluded and 10 were accepted. Due to heterogeneity in 3 of them, meta-analysis was possible for 7 articles. Data were compared for 1, 2 and 3 year follow-up periods and showed survival rates for ART restorations of 96.2; 93.9; 85.1% and amalgam 93.7; 88.8; 76.6% respectively. There was a statistically significant difference between the second (P = 0.0346) and third year (P < 0.0001). The chances of amalgam restorations to fail in relation to the ART were 1.69 (CI 95%: 0.80–3.57) in one year, 1.93 (CI 95%: 1.04–3.57) after 2 years and 1.74 (CI 95%: 1.37–2.20) after 3 years.

Conclusion: The evidence suggests that the longevity of single surface ART restorations using glass ionomer cement is higher after three years than amalgam restorations in primary and permanent teeth.

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Enamel etching of immature and mature permanent teeth in children – A comparative study

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Introduction: The aim of this research was to compare the etching patterns of unground enamel surfaces between immature and mature teeth in children.

Materials and methods: 40 extracted pre-molars were divided into 2 groups. [Group A-20 immature (uncompleted root development), Group B-20 mature (completed root development) pre-molars]. Buccal surfaces of each group were divided in two areas: mesial and distal. Mesial surfaces were etched with 37.5% H3PO4 for 30 s and the distal for 15 s. The surfaces were examined with a SEM and analysed according to Galil and Wright's classification.

Results: In Group A the etched mesial surfaces were lined with remnant etched aprismatic enamel (smallest area) and etched enamel prisms by Type 1–3 etching patterns (greatest area). For an etching time of 15 s in Group A the etched enamel was almost lined with etched aprismatic enamel. No differences in the degree of surface irregularity after etching for 30 or 15 s were found in Group B. The etched enamel surface was covered by Type 1–3 etching patterns. 2 variations in the appearance of the Type 2 etching pattern were observed. The first variation resulted in a preferential loss of enamel in the interprism and prism periphery regions (groups A and B). In the second variation only a preferential dissolution of the prism periphery was observed (group B).

Conclusion: Variations in the appearance of the Type 2 etching pattern seemed to depend on the level of maturation in interprism regions.

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