Evaluation of Clinical Efficacy of Indirect Posterior Composites in Children

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International Association of Pediatric Dentistry 24rd Congress, June 2013 Seoul, Korea

Introduction

Composite resins are the materials commonly used in restorations of molar teeth having excessive substance loss. However, negative aspects of composites have been reported such as postoperative sensitivity, discoloration, polymerization shrinkage, wear of these materials and micro-leakage occurring at the edges. To resolve these drawbacks, indirect restorations polymerized in laboratory and bonded to tooth cavity with adhesive cement appeared to be used. Due to the fact that indirect restorations polymerized outside the mouth, polymerization shrinkage occurs only on a thin layer of adhesive resin and so a decrease occurs on the microleakage caused by shrinkage. Indirect restorations protect the remaining tooth structure with a maximum degree and it does not require full crowns application. Indirect restorations can form a good alternative for restoration of teeth with excessive substance loss in children. Therefore, in this study it was aimed to evaluate clinical effectiveness of direct and indirect composite restorations applied to the teeth with more substance loss in children.

Materials and Method

In the study the children between the ages of 9-15 who has crown damage on at least two or more of the surface, was done the appropriate endodontic treatment, who has any parafunctional habits (eg bruxism) were included in this study. The patients in this study randomly allocated into two groups were restored with indirect or traditional resin composites.

Group 1: 13 teeth were restored with posterior composite. Tooth root canal therapy was performed with AH Plus (Dentsply, USA) and gutta-percha (Diadent, the Netherlands). Then, the glass ionomer cement (Fuji IX, GC Cooperation, Tokyo, Japan) was inserted as a base material. Dental cavities were restored with the posterior composite resin by using the incremental technique.

Group 2: 16 teeth were restored with indirect composite system. Cavity preparation was performed by using appropriate drills for an indirect restoration (Bisco, USA). The glass ionomer cement was inserted as a base material. After the tooth cavity preparation, the measure of the tooth cavity was taken by polyvinyl siloxane impression paste. Then the measure was taken with alginate from the opposite jaw. The restorations were completed on the plaster model with indirect composite resin (Tescera, Bisco, USA).The polymerization process was completed in the oven belonging to the indirect composite set heat, light, and under pressure. A restoration completed laboratory procedures was bonded to tooth with dual-cure resin cement (Panavia F2.0, Kuraray Medical, Japan). After the polishing of the restoration, the glaze material was applied on the surface of the restoration. The intraoral photos, the radiographs of restorations, gingival and plaque index were recorded.

All the restorations were evaluated by using the USPHS criteria at every three months, a total of 24 months. On the control examinations, 2% basic fuchsin solution were applied to the surface of the restorations for 2 minutes, and restorations were photographed. . Statistical analysis was performed with SPSS statistical program (SPSS 15.0, Chicago, USA). The Mann-Whitney U test was used to determine the difference between data because of data not shows normal distribution in the study.

Results

According to the USPHS data

According to the USPHS criteria clinical evaluation of restorations at the end of 24 months, it was observed statistically no significant difference between indirect and posterior composite (p>0.05) (Table). It was determined to be decrease in marginal adaptation, surface appearance and marginal discoloration both indirect composite and posterior composite restorations.

Evaluation of intraoral photograph

When the photos taken of the patients after staining with basic fuchsin were evaluated, we found statistically difference between posterior composite and indirect composite restorations after the nine months (p<0.05), and ovserved that direct composites has more stained (Table).

It was determined the marginal staining by basic fuchsin on restoration on both composites type after 3 months as a time-dependent increase (p<0.05). It was determined that the teeth restored by posterior composite were stained more than those of the teeth restored indirectly (p<0.05).

There was no statistically significant difference between radiographs data (p>0.05). It was observed that there was no significant difference statistically when the patients were evaluated in terms of plaque density and gingival bleeding index (p>0.05).
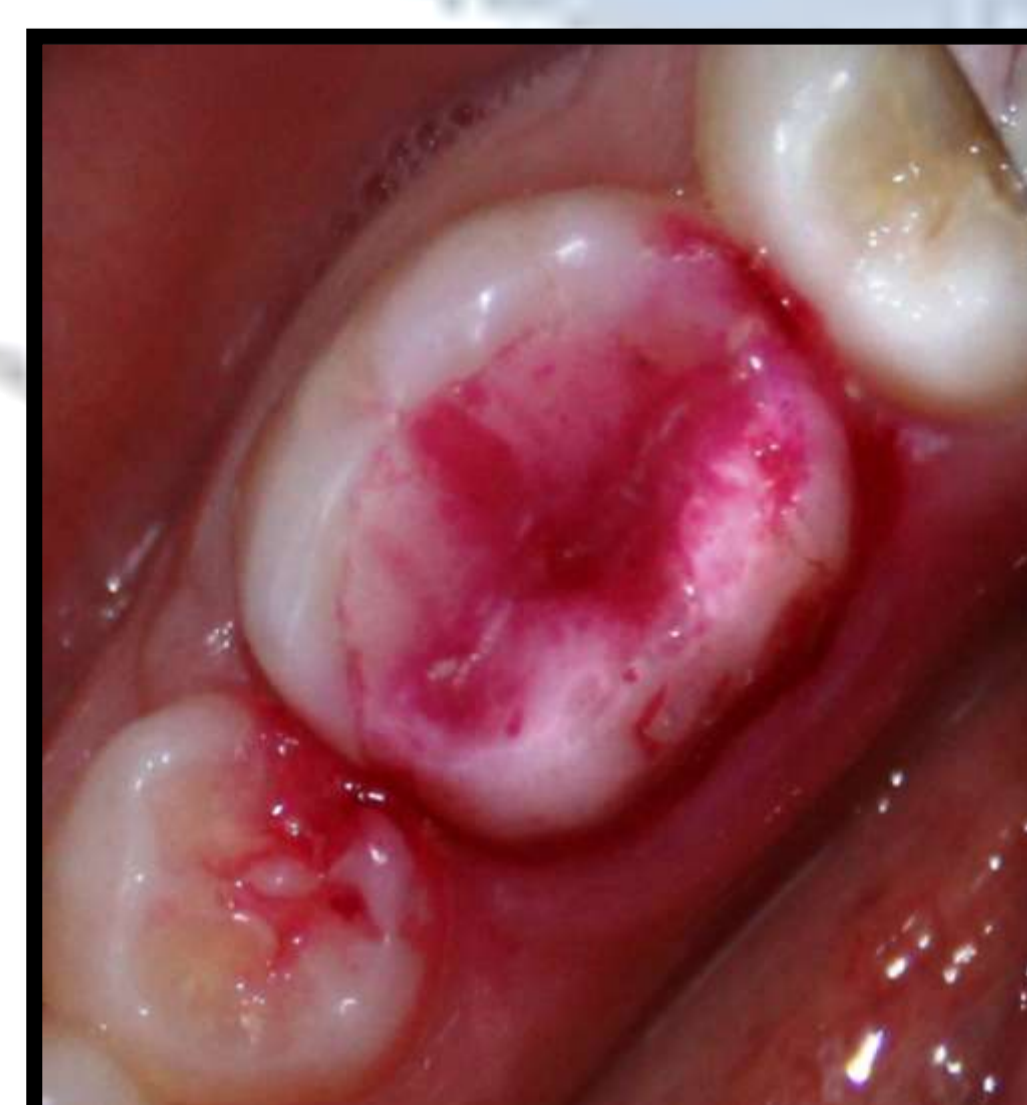
Conclusion

When it considered difficulties in the restoration of permanent teeth with root canal treatment and with the excessive material loss in child patient, indirect restorations may be seen beneficial.
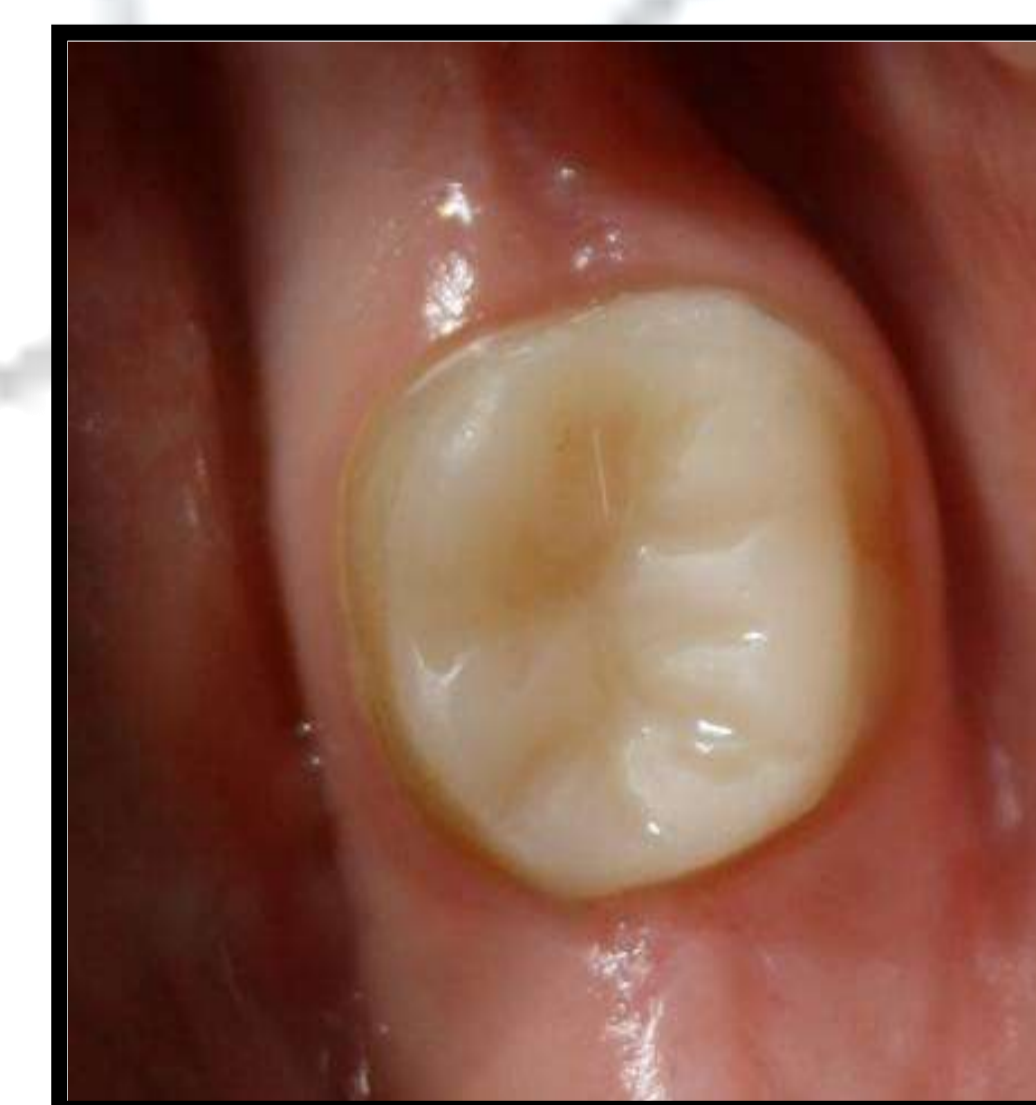

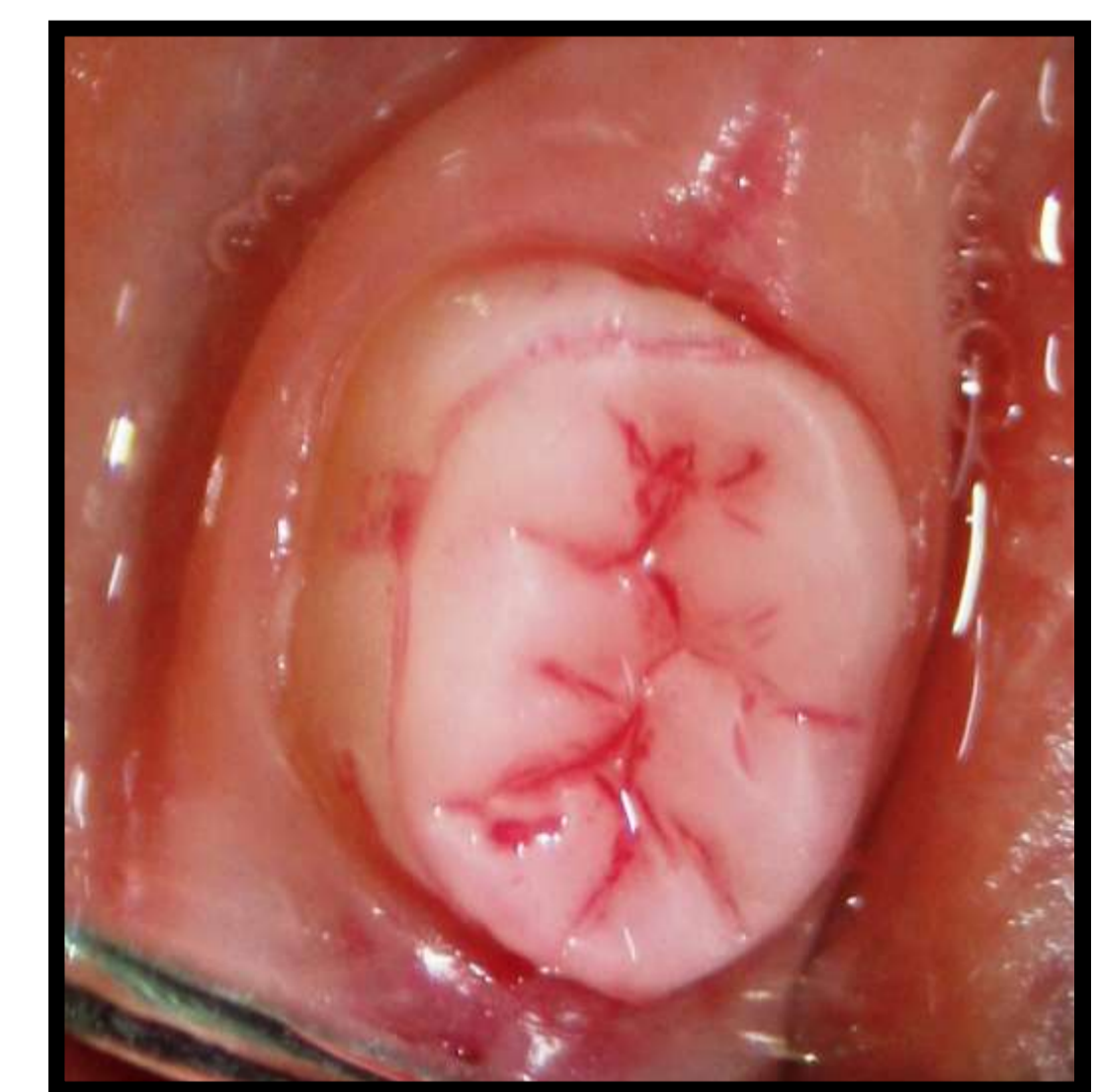| Posterior composite cavity preparation | Posterior composite restoration | Marginal painting by basic fuchsin | Indirect composite cavity preparation | Indirect restorations made of cementation finished polishing | Marginal painting by basic fuchsin |

Table: According to the USPHS criteria clinical evaluation of restorations

Evaluation Criteria	Material	3. month (Mean±SD)	6. month (Mean±SD)	9. month (Mean±SD)	12. month (Mean±SD)	15. month (Mean±SD)	18. month (Mean±SD)	21. month (Mean±SD)	24. month (Mean±SD)
Surface Appearance	IC	0	0	0	0	0.07±0.26	0.07±0.27	0.07±0.27	0.08±0.28
	PC	0	0	0	0.08±0.28	0.08±0.28	0.08±0.28	0.09±0.3	0.18±0.40
Marginal Adaptation	IC	0	0.06±0.25	0.06±0.25	0.06±0.25	0.07±0.26	0.07±0.27	0.07±0.27	0.15±0.38
	PC	0.08±0.28	0.08±0.28	0.08±0.28	0.15±0.38	0.33±0.65	0.36±0.67	0.55±0.69	0.82±0.6
Marginal Adaptation	IC	0	0.19±0.40	0.19±0.40	0.19±0.40	0.2±0.41	0.21±0.43	0.21±0.43	0.23±0.44
	PC	0	0.08±0.28	0.23±0.43	0.23±0.43	0.25±0.62	0.27±0.65	0.45±0.69	0.55±0.69
Soft tissue Health	IC	0	0	0	0	0	0	0	0.08±028
	PC	0.15± 0.36	0.15± 0.38	0.15±0.38	0.15±0.38	0.15±0.38	0.15±0.38	0.15±0.38	0.18±0.4
Color Match	IC	0	0.06±0.25	0.06±0.25	0.06±0.25	0.06±0.25	0.06±0.25	0.06±0.25	0.06±0.25
	PC	0	0	0	0	0	0	0.09±0.3	0.18±0.40
Retention	IC	0	0	0	0	0	0	0	0
	PC	0	0	0	0	0.17± 0.39	0.18±0.4	0.27±0.47	0.36±0.5

IC: Indirect composite, PC: Posterior composite, SD: Standart Deviation