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CLINICAL EVALUATION OF THREE DIFFERENT SELF-ADHERING MATERIALS IN CLASS I RESTORATIONS

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Abstract: Introduction: Self-adhering flowable composite (Vertise Flow, Kerr, USA) simplified the long-lasting restorative procedure and opened a new chapter in conservative dentistry. This study aimed to evaluate the clinical effect of VF in comparison with resin-modified glass ionomer (Fuji II LC, GC, Japan) and glass carbomer (Glass Fill, GCP Dental, Vianen, Netherlands) in cavities of I class.
Material and methods: Thirty patients with initial occlusal caries lesions were recruited in the study. For each patient, three restorations of I class were placed, one each with each examined material. All materials were applied according to the manufacturer's instructions. The restoration was evaluated after one month and after 6 months using the modified United States Public Health Service criteria measuring (retention, postoperative sensitivity, color match, marginal adaptation, and marginal discoloration). For statistical analysis, Fisher's test, Student's test, Mann-Whitney, and Chi-square test were used to investigate changes in the follow-up periods.
Results: After one month and after 6 months, there was no statistically significant difference between the three materials for all the parameters tested ($p<0.05$).
Conclusion: VF showed a clinical effect similar to resin-modified glass ionomer (Fuji II LC, GC, Japan) and glass carbomer (Glass Fill, GCP Dental, Vianen, Netherlands) in cavities of I class after 6- months of follow-up.

Keywords: Clinical evaluation, self-adhering materials, flowable composite, glass carbomer.

1. INTRODUCTION

Continuous progress in the development of dental materials and techniques has led to significant changes in contemporary dental practice. In the past fifty years, various dental materials have been introduced to the market, and a large number of them relate to adhesive dentistry. Adhesive dentistry has become imperative in clinical practice. When a clinically satisfactory connection of the material with the hard dental tissues is achieved, the efforts are aimed at shortening and simplifying the restorative procedure [1-3]. Numerous simplified adhesives have been introduced, e.g. resin-modified glass ionomer cement (RMGIC), single-phase bonding agents, self-adhesive resin cement, self-adhering flowable composites, and glass carbomer cement [1-3].

Glass ionomer cement (GIC) forms a category of bioactive dental materials. Initially, these materials had numerous advantages, such as biocompatibility and fluoride release, but were criticized for poor aesthetics and low wear resistance. The improvement of GICs has led to the development of light-curing RMGICs, which have increased bending resistance, lower elastic modulus, and higher wear resistance compared to GICs [4-10].

Glass Carbomer is a restorative material based on glass ionomers. Glass carbomer differs from conventional glass ionomers due to the presence of powder nanoparticles and fluorapatite crystals. The belief that glass ionomers change to a fluorapatite-like material over time led to the inclusion of fluorapatite in glass carbomers [11,12]. Compared to conventional GIC, glass carbomer has significantly better mechanical and chemical properties (eg strength, shear, and wear) [11-14]. The clinical application of glass carbomer is similar to that of conventional GICs, except that the application of heat reaction during placement is recommended [11-14]. Although several laboratory studies have evaluated this material, only one clinical study has examined its use as a permanent restorative material in adult individuals. According to the results of this study, the glass carbomer (GC) material is recommended only as a short-term restoration. Further development to improve its physical properties is needed to improve its clinical performance when compared with composite resin [15].

Self-adhering flowable composites are new composite resin systems that bond to dentin and enamel without the use of an adhesive bonding agent. They combine adhesive and composite technology. These composites are claimed to rely on chemical and micromechanical interaction between the material and tooth structures or other substrates, which is achieved by incorporating an acidic adhesive monomer into the flowable composites. Monomer glycerol dimethacrylate (GPDM) is the basis of self-bonding of self-adhering flowable composites. With a simplified application procedure of this new flowable composite, it is claimed to be indicated for the restoration of class V cavities, and small class I cavities, as a liner, fissure filling, restoration of non-carious lesions, and ceramic repair [16-19].

This study aims to investigate the clinical effect of VF compared to resin-modified glass ionomer cement (Fuji II LC, GC, Japan) and glass carbomer (Glass Fill, GCP Dental, Vianen, Netherlands) in Class I cavities.

2. MATERIAL AND METHODS

The criteria for participation in the study were: male or female patients aged 20 to 65 years, initial class I caries on the occlusal surfaces of the teeth, good oral hygiene, vital tooth pulp, no sensitivity to percussion, no spontaneous pain, having good cooperation and having agreed to attend regular follow-up evaluations. Exclusion criteria from the study were: systemic diseases or severe medical complications, allergy to methacrylates, deep caries, pregnancy, disability, xerostomia, bruxism, disorders of the temporomandibular joint, endodontic treated teeth, marginal and apical periodontitis.

Before the very beginning of the study, all respondents were informed in detail about the procedures required for conducting this research and only those who gave written consent were included in this research. 30 systemically healthy patients with initial caries on the occlusal surfaces of teeth participated in the study. Before restoration of the teeth, cavity isolation was provided with a rubber dam, cotton rolls, and saliva aspirator for both materials. In each of the 30 patients, 3 minimally invasive Class I cavities were prepared with a round diamond drill (DRENDELL + ZWEILING, Quezon City, Philippines 0.8) using a high-throughput drill (Kavo do Brasil Ind. Com. Ltda, Joinville, SC, Brazil), with mandatory water cooling. After that, for each patient, three restorations of I class were placed, one each with each examined material:self-adhering flowable composite (Vertise Flow, Kerr, USA), resin-modified glass ionomer cement (Fuji II LC, GC, Japan), and glass carbomer (Glass Fill, GCP Dental, Vianen, Netherlands), according to the manufacturer's instructions.

In the cavities restored with the self-adhering flowable composite Vertise flow after the preparation was completed, the cavities were rinsed and dried, followed by the application of the material in a layer of 0.5 mm thickness and its distribution with a brush for 15 to 20 seconds. The material was then polymerized for 20 seconds with a Bluephase C8 LED lamp (Ivoclar Vivadent) and a second layer of the same composite was placed. This layer was applied without spreading with a brush, polymerized for 20 seconds, and then processed and polished with paper discs and rubber polishers, of different fineness (Dental Medical).

In the cavities restored with modified glass ionomer cement (Fuji II LC, GC, Japan), after the

preparation was completed, the cavity was rinsed and dried, and the prepared material was applied into the cavity. After bonding the material, the filling was processed and polished with paper disks and rubber polishers of different fineness (Dental Medical).

In the cavities restored with glass carbomer (GCP Dental, Vianen, the Netherlands, after the preparation was completed, the cavity was rinsed and dried, the prepared material was applied into the cavity and illuminated at 60°C using a thermo-polymer lamp (CarboLED, 1400 mw / cm2; GCP Dental, The Netherlands). The restoration was finally processed and polished with paper discs and rubber polishers of different fineness (Dental Medical).

The clinical evaluation of the restorations was performed by one examiner after one month and after 6 months from the placement of the filling. A modified USPHS criterion was applied:

1. Postoperative sensitivity (grade A - no sensitivity, grade B - sensitivity present)

2. Retention (grade A-no loss of restoration, grade C-loss of restoration)

3. Filling color (grade A-matched color with the tooth, grade B-acceptable mismatch, grade C-unacceptable mismatch)

4. Marginal discoloration (grade A- No color change between the tooth and restorative material, grade B-superficial discoloration without axial penetration, grade C-deep discoloration with axial penetration)

5. Marginal adaptation (grade A-Well adapted without edge crack, grade B-visible edge crack clinically acceptable, grade C-clinically unacceptable crack).

2.1. Statistical Analysis

Data were statistically analyzed using Fisher's test, Student's test, Mann-Whitney, and Chi-square test to investigate changes in the follow-up periods. The value ($p>0.05$) was considered statistically significant.

3. RESULTS

After 6 months, 90 restorations in 30 patients were evaluated and scored according to USPHS criteria. The overall clinical recall rate of the restorations after 6 months was 100%. The modified USHPS results of the restorations are given in Table 1 and Table 2.

After a month of follow-up dental restorations, the analysis of restorations according to USPHS criteria showed that there was no postoperative sensitivity in any tooth. (n=90) after using Vertise flow, Fuji II LC, and GCP Glass Fill materials. The tested restorative materials showed complete retention, without loss of restoration of all teeth.The filling color all ninety teeth remained unchanged after one month. There was no marginal discoloration, i.e. there was no change in color between the color of the tooth and the restorative material in all analyzed fillings of the patient's teeth. All ninety analyzed dental restorations of the patients had good adaptation without edge cracks and confirmed excellent marginal adaptation regardless of the restorative material with which they were restored. The results of all the listed parameters show that there was no difference in the quality of the restoration between the analyzed materials: Vertise flow, Fuji II LC, and GCP Glass Fill. All parameter values obtained by USHPS analysis of tooth fillings were tested by Fisher, Student, Mann-Whitney, and Chi-square tests, with a confidence level of 95% ($p>0.05$). As expected, no level of confidence showed a difference ($p=0.00$), and therefore not a statistically significant difference, between all the values of the analyzed parameters.

After six months of follow-up of dental restorations, the analysis of dental fillings according to USPHS criteria showed that there was no presence of postoperative sensitivity in any tooth (n=90) after the use of Vertise flow, Fuji II LC, and GCP Glass Fill materials. All three types of dental restorations had complete retention without loss of restoration of all teeth, as well as after a one-month follow-up period. All ninety analyzed fillings of the patient's teeth had good adaptation without marginal cracks and confirmed excellent marginal adaptation, regardless of the restorative material with which they were restored over six months. After six months, the color of Vertise flow dental filling remained unchanged at 100% (n=30), GCO Glass Fill at 90% (n=27), and Fuji II LC at only 83% (n=25) of dental fillings. This proves that Vertise flow dental restoration is of the highest quality, insensitive, and unchanged, i.e. it was harmonized with the existing color of the teeth, with the color change after six months. Differences in the filling color values of the tested materials six months after their application were analyzed by Fisher, Student, Man-Whitney, and Chi-square tests, with a confidence level of 95% ($p>0.05$). Sta-

tistical analysis showed that although the degree of confidence was greater than zero between the values of Vertise flow, and Fuji II LC (F-test p=0.033, S-test p=0.024, Man-Whitney test p=0.028 and Chi-square test p= 0.018), Vertise flow, and GCO Glass Fill (F-test p=0.028, S-test p=0.021, Man-Whitney test p=0.028 and Chi-square test p=0.015), and Fuji II LC, and GCO Glass Fill (F -test p=0.026, S-test p=0.018, Man-Whitney test p=0.022 and Chi-square test p=0.012) there was no statistically significant difference between the tested materials.

With Vertise flow material, marginal discoloration was absent in 93% (n=28), with GCO Glass Fill in 83% (n=25), while with Fuji II LC, tooth filling was absent in 90% (n=27). The result of the last parameter proves that the Vertise flow dental restoration is of the highest quality and unchanged, because the marginal zones were the most harmonized with the existing tooth color, in the six months. Differences in the marginal discoloration values of the fillings of the tested materials six months after their application were analyzed by Fisher, Student, Man-Whitney, and Chi-square tests, with a confidence level of 95% (p>0.05). Statistical analysis showed that although the degree of confidence was greater than zero between the values of Vertise flow and, Fuji II LC (F-test p=0.028, S-test p=0.022, Man-Whitney test p=0.025 and Chi-square test p= 0.024), Vertise flow and GCO Glass Fill (F-test p=0.020, S-test p=0.018, Man-Whitney test p=0.016 and Chi-square test p=0.021) and Fuji II LC and GCO Glass Fill (F -test p=0.026, S-test p=0.025, Man-Whitney test p=0.024 and Chi-square test p=0.016) there was no statistically significant difference between the tested materials.

The results of all analyzed parameters show that there was no difference in the quality of the restoration between the tested materials: Vertise flow, Fuji II LC, and GCP Glass Fill, so they are all equally applicable in the restoration of small class I cavities.

Table 1. *1-month Clinical Evaluation of Restorations According to USPHS Criteria*

Criterias	Vertise flow (n=number of patients)	Fuji II LC (n=number of patients)	GCP Glass Fill (n=number of patients)
Postoperative sensitivity	A=30 B=0	A=30 B=0	A=30 B=0
Retention	A=30 C=0	A=30 C=0	A=30 C=0
Color match	A=30 B=0 C=0	A=30 B=0 C=0	A=30 B=0 C=0
Marginal discoloration	A=30 B=0 C=0	A=30 B=0 C=0	A=30 B=0 C=0
Marginal adaptation	A=30 B=0 C=0	A=30 B=0 C=0	A=30 B=0 C=0
comparison	Vertise flow/Fuji II LC	Vertise flow/GCP Glass Fill	Fuji II LC/GCP Glass Fill
Fisher's test (p>0.05)	p=0.00 no significant difference	p=0.00 no significant difference	p=0.00 no significant difference
Student's test (p>0.05)	p=0.00 no significant difference	p=0.00 no significant difference	p=0.00 no significant difference
Mann-Whitney test (p>0.05)	p=0.00 no significant difference	p=0.00 no significant difference	p=0.00 no significant difference
Chi-square test (p>0.05)	p=0.00 no significant difference	p=0.00 no significant difference	p=0.00 no significant difference

Table 2. *6-month Clinical Evaluation of Restorations According to USPHS Criteria*

Criterias	Vertise flow (n=number of patients)	Fuji II LC (n=number of patients)	GCP Glass Fill (n=number of patients)
Postoperative sensitivity	A=30 B=0	A=30 B=0	A=30 B=0
Retention	A=30 C=0	A=30 C=0	A=30 C=0
Color match	A=30 B=0 C=0	A=25 B=5 C=0	A=27 B=3 C=0
Marginal discoloration	A=28 B=2 C=0	A=25 B=5 C=0	A=27 B=3 C=0
Marginal adaptation	A=30 B=0 C=0	A=30 B=0 C=0	A=30 B=0 C=0
comparison	Vertise flow/Fuji II LC	Vertise flow/GCP Glass Fill	Fuji II LC/GCP Glass Fill
Fisher's test (p>0.05)	p=0.033 no significant difference	p=0.028 no significant difference	p=0.026 no significant difference
Student's test (p>0.05)	p=0.024 no significant difference	p=0.021 no significant difference	p=0.018 no significant difference
Man-Whitney test (p>0.05)	p=0.028 no significant difference	p=0.024 no significant difference	p=0.022 no significant difference
Chi-square test (p>0.05)	p=0.018 no significant difference	p=0.015 no significant difference	p=0.012 no significant difference

4. DISCUSSION

The last and most important step in the evaluation of new materials and techniques is clinical studies. Knowledge of material properties is extremely important in clinical and scientific dentistry. The properties of the material and its clinical performance influence the clinical selection and thus the clinical application [20]. Data in the literature on the use of flowable composites in posterior restorations are limited because due to poor mechanical properties, These materials are not recommended as restorative materials in cavities with high occlusal load [21]. Heavy occlusal loads are not expected in small Class I cavities, as most of the functional stresses are absorbed in the remaining tooth structure. Despite the limited data in the literature on flowable composite, the best available evidence in the databases recommends the use of flowable composite in conservative minimally invasive cavities [22,23].

In this study, the clinical effect of self-adhering flowable composite resin VF was investigated in comparison with resin modified with glass ionomer cement (Fuji II LC, GC, Japan) and glass carbomer (Glass Fill, GCP Dental, Vianen, Netherlands), in small Class I cavities.

The modified USPHS criteria and the International Dental Federation (FDI) criteria are the most commonly used criteria for evaluating dental restorations. The USPHS method remains the most widely used to assess important characteristics of

dental restorations, such as postoperative sensitivity, secondary caries, marginal discoloration, adaptation, and color matching, and can generate data of clinical relevance [15]. For this reason, the USPHS method was also applied in this research.

Postoperative sensitivity, which is defined as a response to a stimulus after completion of the restoration and develops as a spontaneous or short-term pain sensation, is an important criterion in the evaluation of clinical studies. After 6 months, postoperative sensitivity was completely absent. There was no statistically significant difference between the restorative materials examined according to the criterion of postoperative sensitivity ($p<0.05$). The complete absence of postoperative sensitivity is probably due to the work of the therapist and the application of the material strictly according to the manufacturer's instructions. During the GC application phase, without the acid etching process, no additional bonding agent is required. This can be effective in preventing sensitivity problems. When it comes to Vertise Flow, the absence of postoperative sensitivity is attributed to the fact that Vertise Flow is a flowable resin with adhesive properties, which does not require an additional bonding step, thus simplifying the restorative procedure. [22]. Besides, the study was done on shallow cavities, which may be the reason.

After 6 months, there was no loss of a single restoration, retention, and marginal adaptation was 100%. Glass ionomer cement are unique materials due to their ability to chemically bind to the dental structure, due to the carboxyl groups in their composition that bind directly to the Ca of hard dental tissues. In addition, Fuji II LC contains triethylene glycol dimethacrylate (TEGDMA). This component is commonly used for most dentin-luting agents and resin composites. The inclusion of TEDGMA provides improved wear resistance, fluidity, better marginal adaptation, and less microleakage [20]. Glass Carbomers contain FAS glass formed in nanosynthesized particles, but additionally contain liquid silicate and fluorine/hydroxyapatite crystals which are said to reduce solubility, improve flexural and compressive strength, and improve wear resistance [14,15]. The inclusion of fluorapatite in glass carbomer contributed to its better mechanical and chemical properties and probably resulted in good marginal adaptation in this case. Good marginal adaptation of Vertise flow was expected. In this resin, the bonding mechanism is primarily based on the chemical bond between the phosphate functional group of the GPDM monomer and the calcium ions of the tooth. The micromechanical bond resulting from the interpenetrating network between Vertise Flow polymerized monomers and dentinal collagen fibers also contributes to adhesion [24-26]. One study examined the marginal adaptation/microleakage of a self-adhering flowable composite of Vertise flow, glass carbomer, and Fuji II using dye penetration methodology (basic fuchsin) in Class V cavities. When self-adhesive materials were compared, Glass Carbomer-based self-adhesive material showed more microleakage than resin-based self-adhesive materials on gingival surfaces, but consistent with our findings on occlusal surfaces, all tested materials performed well [20].

According to the results of this study, differences between VF, glass carbomer, and GJC were determined only in terms of color match and marginal discoloration. VF proved superior to the other two materials but without a statistically significant difference. After the application of VF color, the filling was matched to the color of the teeth in all 30 patients. After the application of Fuji II, 25 patients were graded as alpha, and 5 patients were graded as bravo, while after the use of Glass carbomer, 27 patients were graded alpha and 3 patients were graded bravo. This can be explained by the fact that the aesthetic moment in composite materials is more pronounced compared to GJC.

Marginal discoloration was present after 6 months in all tested materials. It was most pronounced after the application of Fuji II but without a statistically significant difference compared to glass-carbomer and Vertise flow. Almost all fillings with marginal discoloration were recorded in smokers, which is followed by the clinical study by Peumans et al [27]. Marginal discoloration might be due to the presence of minute cracks within the tested material or thin enamel in the discolored areas.

At the clinical level, severaal studies have been conducted to evaluate the clinical characteristics of Vertise flow in Class I cavity restoration [22,28-30].

The results of this research are following the results of the research carried out by Vishija et al. During a six-month follow-up period, they evaluated the clinical outcome of Class I restorations after using Vertise Flow self-adhering flowable composite. All 40 Class I restorations restored with Vertise

Flow showed satisfactory results, and no loss of retention was noted, no postoperative sensitivity was noted, only 3 showed limited marginal discoloration, which corresponds to our findings, with the difference that a minor defect in marginal integrity was also noted. The results of this study confirmed the ability of Vertise Flow to achieve effective closure at the tooth-restoration interface and demonstrated a successful clinical outcome when this self-adhering flowable composite is used to restore small Class I cavities [22].

The results of the study by Shaalan et al. are also consistent with our findings. They confirmed the satisfactory clinical performance of Vertise™ Flow in the restoration of minimally invasive occlusal cavities after 24 months of follow-up using the modified USPHS criteria. No postoperative sensitivity was noted for Vertise-Flow in any period, which is consistent with our results. Vertise Flow did not remove the smear layer, and the dentinal tubules remained closed. There was no statistically significant difference between Vertise™ Flow and Filtek flow Z350XT for all investigated parameters (retention, marginal adaptation, marginal discoloration, anatomical form, surface texture, secondary caries) at baseline and after 24 months [28].

Oz et al. addressed the long-term evaluation of Class I restorations with Vertise-Flow/Kerr-VR compared to conventional flowable composite Luxaflow/DMG-LX. The filler content of Vertise Flow (mass fraction 70%) and LuxaFlow (mass fraction 63%) is similar according to the manufacturer, so it is expected that the mechanical and physical properties are similar. Interestingly, none of the restorations showed postoperative sensitivity, as well as in our study during the six-month follow-up. [29].

In contrast to our results are the findings of Maya et al. They compared the application of Vertise Flow without prior enamel etching and the application of dentin adhesive with Premise flowable without prior enamel etching combined with OptiBond All-In-One and Premise flowable after etching treatment combined with OptiBond All-In-One in Class I cavities. The Vertise Flow material, which was used without etching and adhesive agent, showed the weakest results in terms of marginal adaptation and smoothness, while fillings with Premise flowable after etching treatment in combination with OptiBond All-In-One showed the best quality. The authors believe that this result is a consequence of abandoning the enamel etching process and instead relying on acidic monomers included in the composition of the material itself [30].

When it comes to the clinical application of glass carbomer and Fuji II for restorative fillings in the adult population, the data available in the literature are very scarce.

One of the few clinical studies that considered the application of glass carbomer for restorative fillings in permanent dentition is the study by Kaynar et al. After 20 months of follow-up, the absence of postoperative sensitivity and marginal discoloration was noted here as well, which corresponds to our results. On the other hand, significantly worse marginal adaptation, anatomical form, and retention were recorded compared to the conventional composite. This may be because GC was less resistant to occlusal forces than the composite resin (84% filler by weight and 70% filler by volume). After all in this study, it was applied in the restoration of classic Class I cavities and complex Class II cavities, which suffer greater pressure during chewing. In addition, the follow-up period was longer and amounted to 20 months [15].

Rayapudi et. al compared the clinical performance of glass carbomer and glass ionomer (RMGIC) in non-carious cervical lesions (NCCL) in adults over one year. Contrary to our knowledge, glass carbomer did not show an acceptable clinical effect. Glass ionomer RMGIC restorations showed better results in terms of retention, marginal integrity ($p= 0.005$), color matching ($p < 0.0001$), wear ($p = 0.0311$), recurrent caries ($p = 0.0228$), marginal staining ($p = 0.0086$), fractures ($p = 0.0054$), and postoperative sensitivity ($p = 0.0574$). The authors believe that during the chemical reaction in glass carbomer, hydroxyapatite may have been partially consumed during the installation phase. This reduced the number of available ions needed to bond with the mineral portion of the tooth and resulted in inferior bond strength. Inadequate bonding resulted in inadequate marginal adaptation, microleakage, and subsequently secondary caries and postoperative sensitivity. The appearance of sclerotic dentin in NCCL, which is more resistant to adhesion compared to normal dentin, is possibly responsible for the failure of retention, and the presence of nanopowder particles in the composition of the carbomer potentially led to a decrease in fracture resistance [31].

5. CONCLUSION

By the limitations of this study, we can conclude that VF showed a similar clinical effect to resin-modified glass ionomer cement (Fuji II LC, GC, Japan) and glass carbomer (Glass Fill, GCP Dental, Vianen, Netherlands) in class I cavities after 6 months of follow-up. Although there was no difference in the quality of small Class I cavity restorations between the tested materials and all of them proved to be equally applicable, additional studies with a larger number of patients and a longer follow-up period are needed.

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КЛИНИЧКО ИСПИТИВАЊЕ ТРИЈУ РАЗЛИЧИТИХ САМОНАГРИЗАЈУЋИХ МАТЕРИЈАЛА У РЕСТАУРАЦИЈИ КАВИТЕТА I КЛАСЕ

Сажетак: Увод: Самонагризајући течни композит (Vertise Flow, Kerr, USA) поједноставио је дуготрајну рестауративну процедуру и отворио ново поглавље у конзервативној стоматологији. Циљ ове студије је био да се процијени клинички ефекат VF у поређењу са смолом модификованим гласјономер цементом (Fuji II LC, GC, Japan) и гласкарбомером (Glass Fill, GCP Dental, Vianen, Netherlands) у кавитетима I класе.

Материјал и методе: У студију је регрутовано 30 пацијената са почетним оклузалним каријесним лезијама.. Код сваког пацијента постављена су три испуна I класе, по један са сваким испитиваним материјалом. Сви материјали су аплицирани према упутству произвођача. Рестаурације су оцјењиване након мјесец дана и након шест мјесеци примјеном модификованог USPHS критеријума (ретенција, постоперативна осјетљивост, боја испуна, маргинална адаптација и маргинална дисколорација). За статистичку анализу су примијењени Fisherov тест, Studentov тест, Man-Whitneyev тест и Chi-square тест. за истраживање промјена у периодима праћења. Вриједност ($p > 0.05$) је сматрана статистички значајном.

Резултати: Након мјесец дана и након шест мјесеци није било статистички значајне разлике између три материјала за све испитиване параметре.

Закључак: VF је показао клинички учинак сличан смолом модификованом гласјономер цементу (Fuji II LC, GC, Japan) и гласкарбомеру (Glass Fill, GCP Dental, Vianen, Netherlands) у кавитетима I класе након шест мјесеци праћења.

Кључне ријечи: клиничка евалуација, самонагризајући материјали, течни композит, гласкарбомер.

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