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Original Research Article

Effect of Low-Concentration Chlorhexidine Mouthrinses on the Microleakage of Class V Resin Composite Restorations: An *In Vitro* Study

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ABSTRACT

Aim: This *in vitro* study investigated the effect of two daily-use mouthrinses containing 0.05% chlorhexidine (CHX), with or without cetylpyridinium chloride (CPC), on the microleakage of standardized Class V resin composite restorations.

Materials and Methods: Forty-five sound human premolars were included. Standardized non-beveled Class V cavities were prepared on the buccal surfaces and restored using a universal adhesive system and resin composite. After finishing, polishing, and thermocycling (1000 cycles, 5–55 °C), specimens were randomly assigned to three groups (n = 15): artificial saliva (control), CHX-only mouthrinse, and CHX + CPC mouthrinse. To simulate cumulative exposure equivalent to one year of daily use, each specimen was immersed in the assigned solution for 12 h. After methylene blue dye immersion and buccolingual sectioning, microleakage was assessed by stereomicroscopic examination at 40× magnification using an ordinal scoring system. The data were analyzed using the Kruskal-Wallis test, followed by Mann-Whitney U tests for pairwise comparisons when appropriate. Statistical significance was set at $p < 0.05$.

Results: Mean microleakage scores were 1.80 ± 0.46 in the control group, 2.80 ± 0.65 in the CHX group, and 2.77 ± 0.62 in the CHX + CPC group. A statistically significant difference was observed among the groups ($p < 0.001$). Both CHX-containing mouthrinse groups showed significantly higher microleakage than the control group ($p < 0.001$), whereas no significant difference was found between the CHX and CHX + CPC groups ($p = 0.87$).

Conclusion: Within the limitations of this study, prolonged exposure to low-concentration CHX-containing mouthrinses may compromise the marginal integrity of class V resin composite restorations.

Keywords: Chlorhexidine gluconate; Composite dental resin; Dental leakage; Mouthwashes.

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INTRODUCTION

Resin-based composite restorations represent a fundamental component of contemporary restorative dentistry, owing to their superior esthetic properties, minimally invasive application protocols, and ongoing advancements in material science. Notwithstanding these advantages, the long-term clinical performance of composite restorations remains critically influenced by marginal integrity, with microleakage constituting one of the principal factors compromising restoration longevity.[1] Microleakage, defined as the clinically imperceptible diffusion of oral fluids, ions, and microorganisms across the tooth-restoration interface, is implicated in the pathogenesis of secondary caries, postoperative hypersensitivity, and premature restorative failure.[2,3] Accordingly, the identification and characterization of biological and chemical determinants influencing microleakage are of considerable clinical and scientific importance.

In periodontal practice, chemical plaque control is routinely advocated as an adjunct to mechanical debridement, particularly in clinical scenarios characterized by impaired plaque removal, such as post-periodontal therapy, acute gingival inflam-

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mation, or diminished patient compliance with oral hygiene measures.[4] In such contexts, antiseptic mouthrinses are frequently prescribed for adjunctive short-term use, whereas low-concentration chlorhexidine (CHX) formulations may be recommended for sustained daily application in selected cases.[5] Among available antiseptic agents, CHX is widely regarded as the gold standard, supported by substantial evidence demonstrating its efficacy in plaque inhibition and gingivitis control. Comparative evaluations have further indicated that CHX exhibits superior antiplaque performance relative to essential-oil-based mouthrinses[6] and a modest advantage over cetylpyridinium chloride (CPC), particularly under conditions where mechanical plaque control is absent.[7] Moreover, combination formulations incorporating low concentrations of CHX and CPC have been shown to achieve plaque-regrowth inhibition comparable to higher-concentration CHX regimens, while exhibiting a more favorable tolerability profile.[8]

In routine clinical settings, the repeated or prolonged use of CHX-containing mouthrinses inevitably results in continuous exposure of existing restorative materials to both the active agent and auxiliary formulation components.[4] From a periodontal perspective, the morphology and adaptation of restorative margins -particularly within the cervical region- exert a decisive influence on local biofilm dynamics and gingival inflammatory status by modulating plaque retention and surface cleanability.[9] Longitudinal clinical observations further suggest that restored tooth surfaces may be associated with comparatively less favorable periodontal outcomes, thereby underscoring the critical importance of achieving optimal marginal adaptation in plaque-sensitive regions.[10]

This consideration is particularly pertinent in class V restorations, wherein cervical lesions frequently extend toward or beyond the cementoenamel junction (CEJ), resulting in margin placement on dentin or cementum within a biologically vulnerable, plaque-prone environment.[11,12] It is well established that margins located on dentin and cementum demonstrate inferior sealing ability and increased susceptibility to microleakage when compared to enamel margins.[11] Consequently, the preservation of cervical marginal integrity in Class V restorations represents a persistent and clinically significant challenge. Furthermore, marginal discrepancies -such as subgingival margin placement, overcontoured restorations, or subtle interfacial defects- may exacerbate plaque accumulation and contribute to adverse periodontal sequelae.[9,13]

Although CHX is extensively prescribed for its antiplaque and antigingivitis properties, *in vitro* evidence suggests that exposure to CHX-containing mouthrinses may influence the physicochemical properties of resin-based materials, including surface roughness, microhardness, and color stability, with potential implications for both biofilm accumulation and esthetic performance.[14] Moreover, certain investigations have indicated that CHX-containing mouthrinses may adversely affect marginal adaptation or increase microleakage, with these effects appearing to be dependent on concentration, application protocol, and the specific adhesive system employed.[15] Conversely, other studies have reported that low-concentration CHX formulations used in routine daily mouthrinses exert negligible effects on restorative performance.[16]

Despite these findings, the available evidence remains heterogeneous with respect to CHX concentration, exposure protocols, restorative materials, and methodological approaches, thereby limiting the generalizability of the findings to routine clinical practice.[5,17,18] Previous studies have primarily focused on changes in the surface properties of restorative materials,[14,15] the effects of antimicrobial pretreatments,[19,20] or microleakage under specific experimental conditions such as bleaching protocols,[18] rather than evaluating the influence of commercially available low-concentration CHX mouthrinses intended for prolonged daily use on marginal integrity.

In particular, commercially available 0.05% CHX mouthrinses formulated for long-term daily use have received limited attention, despite being routinely recommended to selected periodontal patients.[5] Furthermore, it remains uncertain whether the incorporation of CPC into these formulations influences the marginal integrity of existing composite restorations during prolonged exposure. Addressing this question is clinically relevant because CHX/CPC formulations are increasingly prescribed as daily-use antiseptic mouthrinses to improve tolerability while maintaining antimicrobial efficacy.

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Therefore, the present *in vitro* study aimed to evaluate the effect of two commercially available daily-use mouthrinses containing 0.05% CHX, one containing CHX alone and the other combining CHX with CPC, on the microleakage of standardized class V composite restorations with cervical margins located approximately 1 mm above the CEJ. By evaluating commercially available 0.05% daily-use CHX mouthrinses with and without CPC, this study may contribute to a better understanding of their potential effects on the marginal integrity of composite restorations following prolonged exposure to products intended for daily use.

The null hypothesis was that microleakage would not differ significantly among the groups exposed to the CHX-containing mouthrinses and the artificial-saliva control.

MATERIALS AND METHODS

Tooth selection and sample size determination

A total of 45 intact human premolars extracted for orthodontic or periodontal reasons were obtained for this *in vitro* study. Ethical approval was granted by the Trakya University Non-Interventional Scientific Research Ethics Committee (Approval No: TUTF-GOBAEK 2025/539), and all procedures followed the Declaration of Helsinki. Prior to extraction, patients provided written consent allowing the use of their discarded teeth for research.

Teeth with caries, restorations, previous endodontic treatment, visible structural defects such as cracks or fractures, or developmental anomalies were not included. After extraction, residual soft tissues were removed, and the specimens were cleaned and disinfected in chloramine solution. The teeth were then maintained in distilled water at 37 °C until testing, for a standardized storage period of 7 to 10 days.

Sample size determination was performed using G*Power software (Heinrich Heine University, Düsseldorf, Germany), based on an effect size derived from a previous study.[19] Using an estimated effect size of f = 0.5, a two-sided α level of 0.05, and a statistical power of 80% (1−β = 0.80), the minimum required sample size was calculated as 45 specimens. Accordingly, 15 teeth were allocated to each group to ensure adequate statistical power to detect anticipated intergroup differences.

Tooth preparation

Non-beveled class V cavities were prepared on the buccal surfaces of all premolar specimens using a high-speed handpiece under continuous water cooling. Cavities were prepared to standardized dimensions of 3 mm mesiodistal width, 2 mm occlusogingival height, and 2 mm axial depth, based on a previously described design.[20] Dimensions were confirmed using a color-marked periodontal probe (Michigan Williams type; Hu-Friedy, Chicago, IL, USA) (Figure 1). The occlusal margin was placed in enamel, and the cervical margin was positioned approximately 1 mm coronal to the CEJ.

All restorative procedures were performed by a single calibrated operator following the manufacturers' instructions. A universal adhesive system (Bond

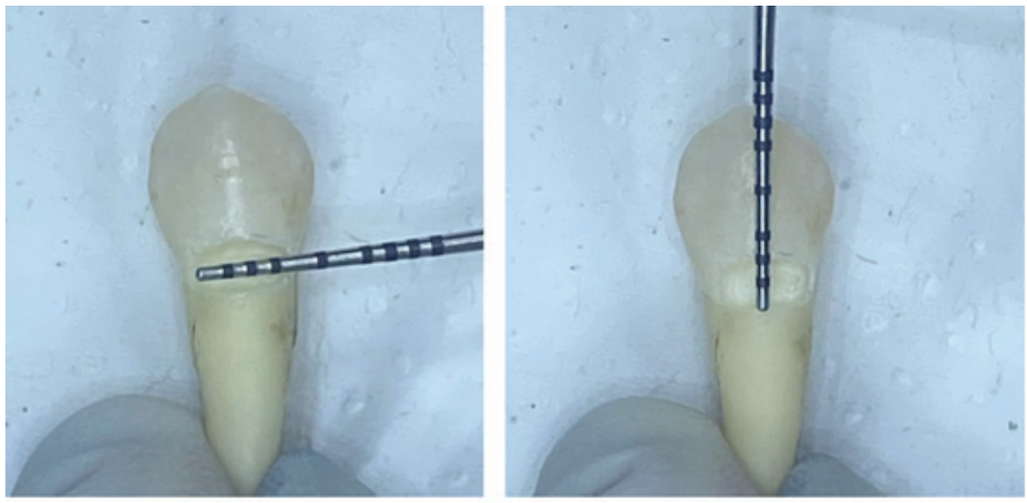


Figure 1. Measurement of standardized class V cavity dimensions using a color-coded periodontal probe.

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Force II, Tokuyama Dental Corp., Tokyo, Japan) was applied, gently air-thinned, and light-cured using a LED curing unit (Elipar DeepCure-S, 3M ESPE, St. Paul, MN, USA). The cavities were restored with a universal resin composite (Estelite Sigma Quick, shade A2; Tokuyama, Japan) placed in a single increment because the cavity depth did not exceed 2 mm, and polymerization was completed using the same LED curing unit. Light output was checked after each use with a calibrated radiometer (SDI Radiometer, SDI, Germany).

Following restoration, specimens were stored in distilled water at 37 °C for 24 h. Finishing was performed with a 12-fluted carbide bur (SS White Burs Inc., Lakewood, NJ, USA), and polishing was completed using a multi-step composite polishing system (Diatech Plus, Coltene, Switzerland) according to the manufacturer's recommendations. Artificial aging was then carried out by thermocycling for 1000 cycles between 5 °C and 55 °C (Thermocycler THE 1100, SD Mechatronik, Feldkirchen-Westerham, Germany), with a dwell time of 30 s and a transfer time of 10 s.

Experimental groups

The specimens were randomly assigned to three experimental groups (n = 15 per group) according to the immersion medium:

Group 1 (Control): Artificial saliva prepared in accordance with ASTM E2720 and ISO 10271 standards (Testonic Laboratories, Colin Kimya San. Tic. A.Ş., Istanbul, Turkey).

Group 2 (CHX): DentaSave Klorhex mouthrinse (DentaSave®; Drogsan, Ankara, Turkey), an alcohol-free mouthrinse containing 0.05% chlorhexidine digluconate.

Group 3 (CHX + CPC): Perio-Aid Active Control mouthrinse (Perio-Aid®; Dentaid, Spain), an alcohol-free mouthrinse containing 0.05% chlorhexidine digluconate and 0.05% cetylpyridinium chloride.

To simulate cumulative exposure corresponding to approximately one year of daily clinical use, each specimen was immersed once in the assigned solution for a total duration of 12 h under standardized laboratory conditions.

Preparation for microleakage assessment

Dye penetration was restricted to the tooth–restoration interface by sealing the apical openings when applicable and applying two layers of surface varnish, leaving an uncoated band of approximately 1 mm around the restoration margins. Specimens were subsequently immersed in 2% methylene blue solution for 24 h at room temperature.[19,21] After dye immersion, the specimens were rinsed thoroughly with running water, lightly air-dried, and embedded in acrylic resin to allow standardized sectioning. Buccolingual sections were obtained under continuous water cooling using a precision cutting device (Isomet 2000, Buehler, USA). Three longitudinal sections-one central and two peripherals-were obtained from each specimen.

Microleakage scoring

Dye penetration at both occlusal and cervical margins was assessed using a digital stereomicroscope (SZ61, Olympus Corp., Japan) at 40× magnification by a blinded and calibrated examiner. For each specimen, the maximum dye penetration noted across the three sections was used for analysis.

Microleakage was graded using an ordinal scoring system as follows:[19]

0 = No dye penetration observed
1 = Dye penetration limited to less than half of the cavity wall depth
2 = Dye penetration reaching approximately half of the cavity wall depth
3 = Dye penetration extending beyond half of the cavity wall depth without involving the pulpal floor
4 = Dye penetration reaching the pulpal floor.

Statistical analysis

Microleakage data were processed in SPSS Statistics (version 31; IBM Corp., Armonk, NY, USA). Intra-observer agreement was assessed using the Kappa statistic. Microleakage scores were treated as ordinal data and summarized as median and range values. Accordingly, differences among groups were evaluated using the Kruskal-Wallis test, with Mann-Whitney U tests applied for post hoc pairwise comparisons when indicated. Statistical significance was set at $p<0.05$.

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RESULTS

The Kappa coefficient was determined to be 0.913, indicating an excellent level of intra-observer reliability. Descriptive statistics for microleakage scores across the experimental groups are summarized in Table 1.

Among the experimental groups, the CHX-only mouthrinse group exhibited the highest median microleakage score (median = 2.50; range, 1.50–4.00), followed by the CHX + CPC mouthrinse group (median = 2.50; range, 1.50 to 3.50). In contrast, the artificial saliva (control) group demonstrated the lowest median microleakage score (median = 1.50; range, 1.00 to 2.50) (Figures 2-4).

The Kruskal–Wallis test revealed a statistically significant difference among the three groups ($H = 18.4$, $df = 2$, $p < 0.001$), indicating that the storage solution had a significant influence on marginal microleakage. Microleakage scores in the CHX-only group were significantly higher than those in the artificial saliva (control) group ($U = 25.0$, $Z = -3.71$, $p < 0.001$), (Figure 4). Similarly, the CHX + CPC group exhibited significantly greater microleakage compared with the artificial saliva (control) group ($U = 26.0$, $Z = -3.71$, $p < 0.001$). However, no statistically significant difference was observed between the two chlorhexidine-containing mouthrinse groups (Denta Save Klorhex vs. Perio-Aid Active Control), ($U = 108.0$, $Z = -0.19$, $p = 0.87$).

Table 1. Descriptive statistics of microleakage scores by experimental groups

Group	n	Mean ± SD	Median	Min–Max	p
Control	15	1.80 ± 0.46^{A}	1.50	1.00–2.50	$<0.001^{*}$
CHX-only	15	2.80 ± 0.65^{B}	2.50	1.50–4.00	
CHX + CPC	15	2.77 ± 0.62^{B}	2.50	1.50–3.50	

Kruskal-Wallis test: $H = 18.4$, $^{*}p < 0.05$. Different uppercase letters indicate significant differences between groups. CHX, chlorhexidine; CPC, cetylpyridinium chloride.

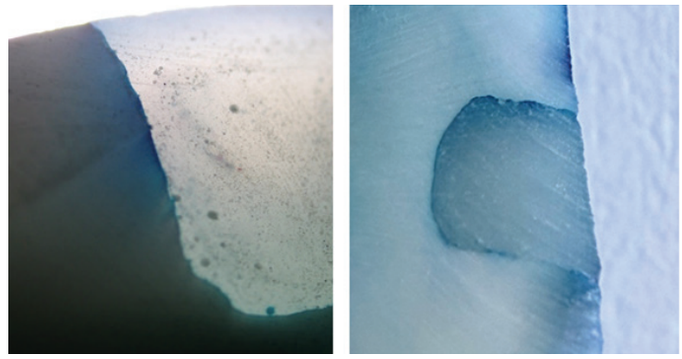


Figure 2. Representative stereomicroscope image and microphotograph from the CHX-only group showing a score of 4, with dye penetration extending beyond half of the cavity wall depth and reaching the pulpal floor.

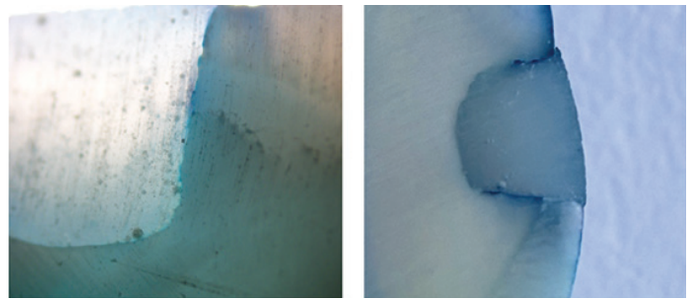


Figure 3. Representative stereomicroscope image and microphotograph of a specimen from the CHX + CPC group showing a score of 3, characterized by dye penetration extending more than half of the cavity wall depth but not reaching the pulpal floor.

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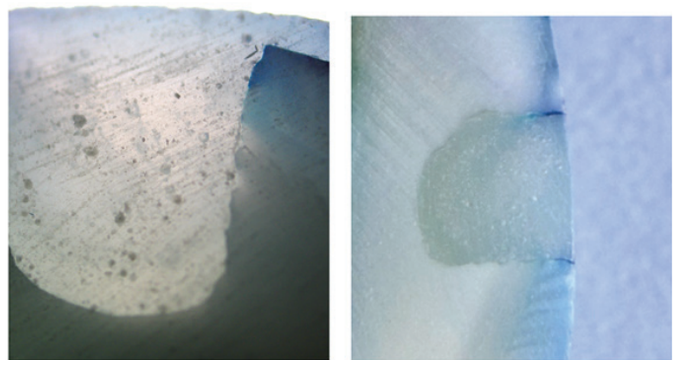


Figure 4. Representative stereomicroscope image and microphotograph of a specimen from the artificial saliva (control) group showing a score of 1, characterized by dye penetration extending less than half of the cavity wall depth.

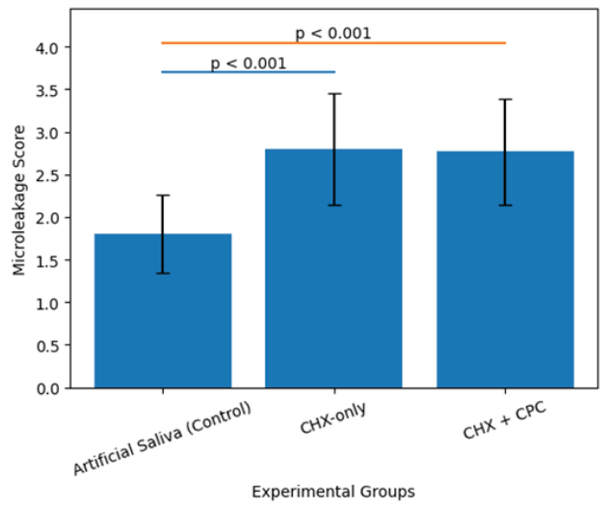


Figure 5. Microleakage scores of composite restorations after exposure to different storage solutions. Bars represent the mean microleakage scores, and error bars indicate standard deviations.

DISCUSSION

The present *in vitro* study evaluated the effect of commercially available, daily-use, low-concentration (0.05%) CHX mouthrinses, with or without CPC, on microleakage of standardized class V composite restorations. The results demonstrated that both CHX-containing mouthrinses significantly increased marginal microleakage compared with the control group immersed in artificial saliva, whereas no significant difference was observed between the CHX-only and CHX + CPC groups. These findings suggest that prolonged exposure to low-concentration CHX formulations, regardless of CPC content, may compromise the marginal integrity of class V composite restorations.

Resin-based composites are widely preferred in the restoration of cervical lesions due to their favorable esthetic properties and minimally invasive application protocols. However, their long-term clinical success remains closely linked to the stability of the adhesive interface. Interfacial degradation may arise from a combination of polymerization shrinkage stress, thermal fluctuations, mechanical loading, and material-specific physicochemical characteristics.[11] These processes can compromise marginal adaptation over time, thereby contributing to clinically relevant complications such as marginal discoloration, postoperative sensitivity, and an increased risk of secondary caries.[22]

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The increased microleakage observed in the CHX-exposed groups suggests that prolonged exposure to CHX-containing mouthrinses can affect the stability of the tooth-restoration interface. One possible explanation is that repeated exposure to aqueous mouthrinse solutions can facilitate processes associated with hydrolytic aging of the adhesive interface. Previous studies have shown that hydrolytic aging of the hybrid layer is characterized by gradual resin degradation and collagen breakdown, which may ultimately compromise the long-term durability of adhesive restorations.[23,24] Although CHX has been widely recognized for its sustained antimicrobial effect and potential to inhibit matrix metalloproteinases,[25] its long-term interaction with polymeric restorative interfaces remains complex and may vary depending on the concentration, mode of application, adhesive strategy, and duration of exposure. However, the mechanisms underlying the present findings remain speculative and warrant further investigation.

Microleakage in composite restorations is inherently multifactorial. Factors such as cavity configuration (C-factor), orientation and density of dentinal tubules, intrinsic moisture of dentin, and the chemical composition of adhesive systems all influence the quality of hybrid layer formation and subsequent marginal sealing.[11] In particular, self-etch adhesive systems can exhibit limitations related to incomplete smear layer modification, suboptimal demineralization, and insufficient resin infiltration into the collagen matrix. These characteristics have been associated with reduced long-term bond durability and may render the bonded interface more susceptible to degradation during aging processes.[23,24] Because a mild self-etch adhesive system was used, prolonged mouthrinse exposure may have further challenged this interface. However, this interpretation remains hypothetical, as bond strength and ultrastructural changes were not evaluated.

In the present study, microleakage assessment was based on the maximum dye penetration observed, irrespective of margin location. Although cavity preparations were standardized with cervical margins positioned approximately 1 mm coronal to the CEJ, thereby remaining within enamel, evidence of microleakage was also observed at the cervical margin. This finding can be related to the reduced thickness and structural characteristics of cervical enamel, which may compromise the quality and durability of the adhesive interface compared with thicker enamel regions. This observation is consistent with the broader understanding that cervical areas represent a structurally and functionally more vulnerable zone for marginal sealing.[22] Even when margins are confined to enamel, the transitional nature of the cervical region, combined with its proximity to dentin and cementum, can adversely affect bonding performance.[26] Consequently, the cervical margin can still be considered a relative “weak point” in terms of marginal integrity, playing a critical role in the periodontal-restorative interface.[11,12] Furthermore, under clinical conditions, this region is particularly susceptible to contamination from gingival crevicular fluid, which may interfere with adhesive procedures and compromise bonding effectiveness.[27] Although these clinical conditions were not reproduced in the present *in vitro* model, they can further contribute to marginal deterioration and affect the long-term performance of cervical restorations, particularly in plaque-retentive environments.

It is important to emphasize that no currently available restorative material or adhesive strategy is capable of completely eliminating microleakage, particularly at dentin margins. Consistent with previous investigations, marginal leakage has been reported to persist regardless of the restorative material, placement technique, or adhesive approach employed. This underscores the inherently multifactorial nature of interfacial degradation and the challenges associated with achieving a durable seal at the tooth-restoration interface.[11,28]

Various strategies have been proposed to improve marginal adaptation and reduce polymerization shrinkage stress, including incremental placement techniques, flowable composite liners, reinforcing fibers, and different adhesive strategies.[29–31] Although these approaches may improve marginal sealing under certain conditions, their effectiveness depends on several factors, including the restorative material, adhesive strategy, cavity configuration, and operator technique. In particular, the beneficial effect of reinforcing fibers appears to be limited when self-etch adhesive systems are used.[31] Moreover, total-etch adhesive strategies, particularly when combined with incremental composite placement, have gener-

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ally been associated with lower microleakage than self-etch approaches in class V composite restorations.[32] Therefore, the use of a mild self-etch adhesive system without selective enamel etching or beveling may have contributed to the baseline level of microleakage observed in the present study. However, because the same restorative protocol was applied to all specimens, this factor is unlikely to explain the differences observed among the experimental groups.

The increased microleakage observed following exposure to CHX-containing mouthrinses is generally consistent with previous *in vitro* studies suggesting that mouthrinse solutions may influence the behavior of restorative materials. Ajami *et al*.[18] likewise reported increased microleakage following exposure to CHX-containing mouthrinses. Although both studies demonstrated a detrimental effect on marginal sealing, direct comparison should be made cautiously because their study was performed after bleaching treatment and employed different adhesive systems and experimental conditions. In contrast, the present study specifically evaluated prolonged exposure to commercially available 0.05% CHX mouthrinses intended for daily use, representing a different experimental scenario. In addition, mouthrinse solutions have been shown to alter the surface properties of resin-based composites, including surface roughness, microhardness, and color stability,[14,15] changes that may indirectly influence biofilm accumulation and the local microenvironment surrounding restorations. Similarly, previous studies have shown that the effects of antibacterial agents on marginal integrity vary according to the adhesive strategy, restorative material, and experimental protocol employed,[19] which may partly explain the heterogeneous findings reported across studies.

No statistically significant difference was detected between the CHX-only and CHX + CPC groups, suggesting that the observed increase in microleakage was primarily associated with CHX exposure rather than with the addition of CPC. Nevertheless, the possibility of subtle inter-product differences cannot be entirely excluded because such effects may remain undetected due to the inherent limitations of ordinal dye-penetration scoring systems, which are constrained in terms of sensitivity and discriminatory capacity. Although CPC is frequently incorporated into low-concentration CHX mouthrinses to enhance antiplaque efficacy and improve tolerability,[5,33] evidence regarding its influence on the marginal integrity of resin-based restorations remains limited. Most available studies have focused on the physicochemical properties of restorative materials rather than microleakage,[34] while one previous study evaluating CPC and dye penetration employed substantially different experimental conditions, limiting direct comparison with the present findings.[35] Taken together, these findings suggest that the addition of CPC did not measurably influence microleakage under the experimental conditions evaluated. However, this interpretation should be made cautiously, as different restorative materials, adhesive systems, CPC concentrations, and exposure protocols may influence the observed outcomes.

Importantly, the present findings should be interpreted within the limitations of an *in vitro* study and should not be considered a contraindication to the clinical use of CHX-containing mouthrinses, given their well-established efficacy in plaque control and periodontal therapy. Because this study employed a prolonged immersion protocol, the extent to which the observed increase in microleakage reflects clinical performance remains uncertain. Nevertheless, maintenance of marginal integrity remains particularly important in cervical restorations because these restorations are frequently located in plaque-retentive areas where access for effective mechanical plaque control may be limited. Accordingly, CHX use should continue to be guided by clear clinical indications, with attention to duration of use and routine monitoring of restoration margins during supportive periodontal care.[4,9,36]

Certain methodological aspects of the present study should also be considered. The absence of selective enamel etching, lack of beveling at enamel margins, and the use of a self-etch adhesive system may have influenced the bonding effectiveness and contributed to the observed microleakage patterns. These factors should be taken into account when interpreting the results and comparing them with studies employing different adhesive strategies.

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Several limitations should also be acknowledged. As an *in vitro* investigation, the study does not fully replicate the complex biological and mechanical conditions of the oral environment, including salivary dynamics, biofilm interactions, and functional loading. Additionally, microleakage was assessed using an ordinal dye-penetration method, which, although widely accepted, has intrinsic limitations in sensitivity and reproducibility. The findings are inherently limited to the specific materials and experimental protocols employed; accordingly, generalization to alternative restorative systems or clinical scenarios should be approached with caution. Finally, microleakage represents an indirect indicator of marginal integrity and does not necessarily correlate directly with clinical performance or periodontal outcomes.

CONCLUSION

Within the inherent limitations of this *in vitro* investigation, prolonged exposure to low-concentration CHX-containing mouthrinses was found to be associated with increased microleakage in cervical class V composite restorations, irrespective of the presence of CPC. These findings suggest a potential adverse effect of sustained antiseptic exposure on the integrity of the resin–dentin interface. However, given the controlled experimental conditions and the surrogate nature of microleakage assessment, caution is warranted in extrapolating these results directly to clinical practice. Further well-designed *in vivo* studies are required to clarify the clinical significance of these observations and to elucidate the long-term interactions between antiseptic mouthrinses and restorative interfaces under dynamic oral conditions.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

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Düşük Konsantrasyonlu Klorheksidin İçeren Ağız Gargaralarının Sınıf V Rezin Kompozit Restorasyonlarda Mikrosızıntı Üzerine Etkisi: *In Vitro* Bir Çalışma

ÖZET

Amaç: Bu *in vitro* araştırmada, %0,05 klorheksidin (CHX) içeren ve setilpiridinyum klorür (CPC) içeriğine göre farklılık gösteren iki günlük kullanım ağız gargarasının, standardize edilmiş Sınıf V rezin kompozit restorasyonlarda mikrosızıntı üzerindeki etkisi incelenmiştir.

Gereç ve Yöntemler: Çalışmada 45 sağlıklı insan premoları kullanıldı. Bukkal yüzeylere standart, bevelsiz Sınıf V kaviteler hazırlanarak üniversal adeziv sistem ve rezin kompozit ile restore edildi. Bitim ve polisajın ardından örnekler termal siklusa (1000

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siklus, 5–55 °C) tabi tutuldu ve yapay tükürük (kontrol), yalnızca CHX içeren gargara ve CHX + CPC içeren gargara olmak üzere rastgele üç gruba ayrıldı (n = 15). Bir yıllık günlük kullanım eşdeğerini simüle etmek amacıyla her örnek ilgili solüsyonda 12 saat tutuldu. Metilen mavisi ile boyama ve bukkolingual yönde kesit alma işlemlerinin ardından, mikrosızıntı 40× büyütmede stereomikroskobik inceleme ile ordinal bir skor sistemi kullanılarak değerlendirildi. Gruplar arasındaki mikrosızıntı farklılıkları Kruskal-Wallis testi kullanılarak analiz edildi, gerekli durumlarda ikili karşılaştırmalar için Mann-Whitney U testleri uygulandı. İstatistiksel anlamlılık düzeyi $p < 0.05$ olarak kabul edildi.

Bulgular: Ortalama mikrosızıntı skorları kontrol grubunda 1.80 ± 0.46, CHX grubunda 2.80 ± 0.65 ve CHX + CPC grubunda 2.77 ± 0.62 idi. Gruplar arasında istatistiksel olarak anlamlı fark gözlendi ($p < 0.001$). CHX içeren her iki gargara grubu, kontrol grubuna göre anlamlı olarak daha yüksek mikrosızıntı gösterdi ($p < 0.001$); buna karşın CHX ve CHX + CPC grupları arasında anlamlı fark bulunmadı ($p = 0.870$).

Sonuç: Bu çalışmanın sınırlılıkları dahilinde, düşük konsantrasyonlu CHX içeren ağız gargaralarına uzun süreli maruziyet sınıf V rezin kompozit restorasyonların marjinal bütünlüğünü etkileyebilir.

Anahtar Kelimeler: Dental sızıntı; Gargaralar; Klorheksidin glukonat; Kompozit dental rezin.

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