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Avaliação clínica de um infiltrante resinoso utilizado para mascarar lesões de mancha branca no esmalte dental

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Dissertação apresentada ao Programa de Pós-Graduação em Odontologia – Mestrado Acadêmico da Universidade de Uberaba, como requisito para obtenção do título de Mestre em Odontologia, na área de concentração em Clínica Odontológica Integrada

Orientador: Prof. Dr. Vinícius Rangel Geraldo-Martins

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Dissertação apresentada como parte dos requisitos para obtenção do título de Mestre em Odontologia do Programa de Pós-Graduação em Odontologia – Mestrado da Universidade de Uberaba.

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Resumo

O objetivo deste estudo foi avaliar, *in vivo*, o efeito do mascaramento de lesões de mancha branca (LMB) tratadas com uma resina infiltrante (RI). A investigação foi realizada em 40 jovens adolescentes e adultos (11 a 23 anos), que apresentaram pelo menos um dente permanente superior ou inferior anterior com LMB ativa no esmalte (escore 2 do International Caries Detection and Assessment System). Antes da infiltração da resina, a cor da LMB e do esmalte adjacente hígido (EAH) foram avaliadas por um espectrofotômetro digital (sistema CIELab). Posteriormente, a técnica de infiltração de resina (Icon) foi realizada na LMB de acordo com as instruções do fabricante. No final da sessão clínica, a cor da lesão infiltrada (RI) foi avaliada. A diferença de cor (ΔE) foi calculada entre LMB x EAH, LMB x RI e RI x EAH, e depois analisada pela *One-Way* ANOVA, seguida do teste de *Tukey*. Os valores L*, a* e b* da LMB, EAH e RI foram comparados usando o teste t de *Student* para amostras relacionadas (α = 5%). O ΔE observado foi de 5,93 ± 0,41 na comparação LMB x RI e 5,77 ± 0,41 na comparação entre RI e EAH, indicando que a cor da EAH foi alterada após o tratamento, mas a infiltração não camuflou totalmente a EAH quando comparada à EAH. A luminosidade foi maior no EAH quando comparado ao RI. Concluiu-se que o tratamento com a resina infiltrante não foi capaz de camuflar a cor da LMB, quando comparado com a EAH. No entanto, o tratamento foi capaz de atenuar a descoloração do esmalte dentário desmineralizado.

Palavras-chave: Cárie Dentária, Esmalte Dentário, Resina Infiltrante.

Abstract

The purpose of this study was to evaluate, in vivo, the masking effect of white spot lesions (WSL) treated with an infiltrant resin. The investigation was conducted on 40 young adolescents and adult patients (11 to 23 years old), who present at least one upper or lower anterior permanent tooth with active WSL on enamel (ICDAS Score 2). Before resin infiltration, the color of the WSL and of the sound adjacent enamel (SAE) were evaluated by a digital spectrophotometer (CIELab system). Subsequently, resin infiltration technique (Icon) was performed on the WSL according to manufacturer's instruction. At the final of the clinical session, the color of the infiltrated lesion (IR) was evaluated. The color difference (ΔE) was calculated between WSL x SAE, WSL x IR and IR x SAE, and then analyzed by the One-Way ANOVA, followed by the Tukey´s test. The L*, a*, and b* values of WSL, SAE and IR were compared using Student's t-test for related samples (α= 5%). The ΔE observed was 5.93±0.41 on WSL x IR comparison and 5.77±0.41 when comparing IR x SAE, indicating that the color of WSL was changed after treatment, but the infiltration did not fully camouflage the WSL when compared to SAE. The lightness was higher in SAE when compared to IR. It was concluded that the treatment with the infiltrating resin was not able to camouflage the color of the WSL, when compared to SAE. However, the treatment was able to attenuate the discoloration of the demineralized dental enamel.

Keywords: Dental Caries, Dental Enamel, Infiltrant Resin.

Sumário

1. **Introdução**

A cárie é uma doença de cunho infeccioso, de progressão lenta, que engloba, além de fatores determinantes locais, como os microrganismos presentes na saliva, a dieta do hospedeiro e a presença do biofilme na superfície do esmalte, fatores modificadores, como a frequência de higienização bucal e a condição sociocultural do indivíduo (KIDD ; FEJERSKOV, 2013). As lesões cariosas podem se desenvolver em qualquer local da cavidade bucal onde ocorra acúmulo de biofilme. Essa lesão é o resultado clínico do desequilíbrio dos processos de desmineralização e remineralização das estruturas do dente, onde a perda mineral se sobrepõe ao processo remineralizador do esmalte ou da dentina (PITTS *et al.,* 2017). Essa desmineralização, que se inicia na superfície e na subsuperfície do esmalte, ocorre devido à ação de ácidos, principalmente o lático, produzidos por bactérias cariogênicas, como o *Streptococcus mutans*. Esses ácidos levam o pH do biofilme para valores abaixo daquele considerado crítico (pH 5.5) e, se esse biofilme não for removido, o dente perderá minerais para a saliva. A desmineralização aumenta a porosidade e os espaços entre os cristais do esmalte, além de reduzir a dureza superficial, o que permite a difusão de ácidos para o interior do dente, resultando na desmineralização da subsuperfície do esmalte (KIDD; FEJERSKOV, 2013; PITTS *et al.*, 2017).

Os estágios iniciais na formação da lesão de esmalte manifestam-se clinicamente como lesões brancas localizadas. A continuidade do desequilíbrio do processo de desmineralização/remineralização leva ao aumento da porosidade no esmalte e, consequentemente, à redução da translucidez da área afetada. A mancha branca ocorre devido aos diferentes índices de refração da hidroxiapatita (1,62-1,65) e do ar (1,00) que preenche os poros que foram desmineralizados, resultando nesse efeito óptico, que causa o comprometimento estético nos dentes anteriores (OGURO *et al.,* 2016). Por serem indicativos de maior porosidade do esmalte, é comum os pigmentos dos alimentos penetrarem nos poros, levando essa desmineralização à uma coloração marro-acastanhada ou preta (PRETTY; EKSTRAND, 2016). As lesões de mancha branca podem ser consideradas ativas, quando o esmalte mostra uma aparência rugosa e opaca sob o biofilme dental, ou inativa, quando o esmalte apresenta uma superfície brilhante e lisa. De acordo com o Sistema Internacional de Detecção e Avaliação de Cárie (International Caries Detection and Assessment System - ICDAS), as lesões iniciais sem evidência de ruptura da superfície ou sombreamento da dentina subjacente podem ser pontuadas em 1 (cárie inicial) ou 2 (alteração visual distinta em esmalte) (ISMAIL *et al.*, 2015).

Com a mudança na perspectiva de diagnóstico através da utilização do ICDAS, a detecção da cárie dental que era tradicionalmente realizada no estágio de cavitação e tratada com intervenção operatória, passou a ser detectada precocemente e sua gestão realizada de forma conservadora (GOMEZ *et al*., 2013). O ICDAS foi proposto por um grupo de pesquisadores em cárie dental em 2002, quando epidemiologistas e dentistas da odontologia restauradora se reuniram a fim de integrar as diferentes definições e classificações das lesões de cárie. Foram criados critérios baseados no estudo de Ekstrand *et al.* (1997) integrando aos melhores aspectos de outros sistemas. O impulso para a criação do sistema surgiu, justamente da necessidade de detecção da cárie em nível de superfície dental (sem cavitação), a partir do consenso de mais de 100 participantes em um *workshop* internacional de estudos clínicos em cárie(ICW-CCT) que aconteceu em Loch Lomond na Escócia. O ICDAS foi desenvolvido para detectar desde alterações visíveis em esmalte causadas por desmineralização até cavitações extensas, e para que isso seja possível utiliza da integração de vários novos sistemas de critérios para detecção das lesões, por isso ele se mostra um grande aliado da odontologia moderna, permitindo que as lesões sejam tratadas precocemente evitando a utilização de tratamentos invasivos (ISMAIL *et al.,* 2007). A primeira intervenção restaurativa invasiva deve ser sempre adiada o maior tempo possível porque pode levar o dente a um ciclo dependente de restaurações, onde as restaurações são frequentemente substituídas, cada vez mais tecido dentário perdido (PARIS; MEYER, 2018).

O diagnóstico precoce das lesões de mancha branca permite que um tratamento não invasivo seja indicado para a remineralização das lesões ativas (LUSSI *et al.,* 2012; CLARK; SLAYTON, 2014). A utilização de dentifrícios fluoretados ajuda a remineralizar o esmalte dental e mantém o flúor na cavidade oral, sendo sua utilização de fundamental importância para o controle dos processos de desmineralização e remineralização que ocorrem constantemente na cavidade bucal. Além disso, os dentifrícios fluoretados são de fácil acesso e baixo custo (LUSSI *et al.,* 2012). Um método regularmente utilizado nos consultórios odontológicos é a aplicação tópica de flúor. Além da remineralização dos dentes, as vantagens da aplicação tópica de flúor profissional incluem o baixo custo, o tempo de tratamento e o baixo risco de ingestão do fluoreto, diminuindo a chance do aparecimento da fluorose dental (CLARK; SLAYTON, 2014). Contudo, apesar dos compostos fluoretados remineralizarem o dente, o esmalte acometido pela lesão continuará a apresentar uma aparência mais esbranquiçada, contrastando com o aspecto saudável do tecido, comprometendo a estética do dente (YUAN *et al.,* 2014).

Uma abordagem alternativa para essas lesões cariosas é o selamento desses poros com resinas infiltrantes, que é uma técnica considerada microinvasiva, podendo ser a solução plausível para adiar a necessidade de uma restauração (TORRES *et al.*, 2012).

As porosidades nas lesões de cárie não cavitadas, são infiltradas com uma resina de baixa viscosidade que posteriormente é fotopolimerizada (DOMEJEAN *et al.*, 2015). Isso deve reduzir (ou mesmo paralisar) a progressão das lesões, visto que os poros dentro da lesão cariosa servem de vias de difusão para as bactérias e seus respectivos ácidos e para os minerais dissolvidos (TORRES *et al.*, 2012; PARIS; MEYER, 2018; ASKAR *et al.*, 2015). Diferentemente dos compostos fluoretados, que criam uma barreira apenas superficial no esmalte, as resinas infiltrantes criam uma barreira tanto na superfície quanto no interior da lesão e isso gera o reforço da estrutura desmineralizada com uma matriz resinosa polimerizada (TORRES *et al.*, 2012).

O infiltrante resinoso foi desenvolvido para o tratamento de lesões incipientes, restritas ao esmalte, ou seja, niveladas com o código 1 e 2 do ICDAS-II. O principal infiltrante, conhecido como ICON, foi produzido em Hamburg, Alemanha, pela DMG (Dental Milestones Guaranteed). O ICON possui dois kits comercialmente disponíveis, um para infiltração vestibular e outro proximal. Ambos possuem duas unidades de tratamento, cada uma incluindo: uma seringa de Icon-Etch, que é composto por ácido clorídrico a 15%, ácido silício pirogênico e substâncias de reação ativa com a superfície; uma seringa de Icon-Dry composto por etanol 99%; e uma seringa de Icon-Infiltrant composto de uma matriz de resina à base de metacrilatos, iniciadores e aditivos.

Essa resina de baixa viscosidade e alto coeficiente de penetração permite a realização de um tratamento indolor e minimamente invasivo. Esse biomaterial tem como objetivo ocluir as porosidades dos espaços intercristalinos que foram ampliados devido à desmineralização. Portanto, ele vai encapsular os prismas de esmalte reforçando as estruturas do esmalte e evitando a cavitação (ULRICH *et al.*,2015). A resina infiltrante é vantajosa devido à sua capacidade de penetração, por estabilizar mecanicamente a estrutura do esmalte poroso e por impedir o fornecimento de nutrientes para as bactérias cariogênicas (RAHIOTIS *et al.*, 2015). Outra vantagem seria a melhora significativa na estética, pois a técnica promete mimetizar as cores do esmalte desmineralizado com aquelas do esmalte sadio (BORGES *et al*., 2017).

Embora a maioria dos estudos sobre a eficácia do mascaramento de cor com a infiltração de resina tenha sido conduzida *in vitro*, alguns relatos clínicos também mostraram resultados estéticos favoráveis (PARIS *et al.*, 2013; YUAN *et al.*, 2014; ALWAFI, 2017; BORGES *et al.*,

2017). No entanto, há uma falta de evidência sobre a eficácia clínica da técnica para mascarar as lesões de mancha branca do esmalte dental. Dessa forma novos estudos são necessários para verificar se essa técnica é capaz de deixar a cor da lesão de cárie inicial com a mesma cor do esmalte hígido.

2. **Objetivo**

O objetivo do presente estudo foi avaliar, *in vivo*, o efeito de mascaramento de lesões de manchas brancas tratadas com um infiltrado resinoso. A hipótese nula é de que a cor da lesão da mancha branca não se alterará após o tratamento.

3. **Artigo**

Clinical evaluation of an infiltrant resin used to mask white spot lesions on dental enamel

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Short Title: An infiltrant can be used to mask the color of white spot lesions in enamel.

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1. Abstract

The purpose of this study was to evaluate, in vivo, the masking effect of white spot lesions (WSL) treated with an infiltrant resin. The investigation was conducted on 40 young adolescents and adult patients (11 to 23 years old), who present at least one upper or lower anterior permanent tooth with active WSL on enamel (ICDAS Score 2). Before resin infiltration, the color of the WSL and of the sound adjacent enamel (SAE) were evaluated by a digital spectrophotometer (CIELab). Subsequently, resin infiltration technique (Icon) was performed on the WSL according to manufacturer's instruction. At the final of the clinical session, the color of the infiltrated lesion (IR) was evaluated. The color difference (ΔE) was calculated between WSL x SAE, WSL x IR and IR x SAE, and then analyzed by the One-Way ANOVA, followed by the Tukey´s test. The L*, a*, and b* values of WSL, SAE and IR were compared using Student's t-test for related samples (α= 5%). The ΔE observed was 5.93±0.41 on WSL x IR comparison and 5.77±0.41 when comparing IR x SAE, indicating that the color of WSL was changed after treatment, but the infiltration did not fully camouflage the WSL when compared to SAE. The lightness was higher in SAE when compared to IR. It was concluded that the treatment with the infiltrating resin was not able to camouflage the color of the WSL, when compared to SAE. However, the treatment was able to attenuate the discoloration of the demineralized dental enamel.

2. Introduction

Dental caries is a slow progressing infectious disease, which involves local factors such as the microbial biofilm formed on the tooth surface, diet based on fermentable carbohydrates as well as salivary and genetic influences, and modifying factors such as the frequency of oral hygiene and the social condition of the individual [Kidd and Fejerskov, 2013]. The initial demineralization starts at and below the enamel surface. The formation of caries lesion occurs due to demineralization of enamel caused by acids produced by cariogenic bacteria, such as *Streptococcus mutans*. Despite a lot of organic acids may be generated by cariogenic bacteria, lactic acid is the most produced and is the main acid involved in caries formation as well [Pitts et al., 2017]. Those acids decreases the pH of the biofilm below critical levels (5.5) and, if this biofilm is not removed, the tooth will lose minerals like hydroxyapatite. The demineralization increases the porosity and the spaces between the enamel crystals, besides softening of the surface, which allows the diffusion of acids into the tooth resulting in demineralization of the enamel subsurface. The excess demineralization will be represented by the appearance of a white spot on enamel [Kidd and Fejerskov, 2013; Pitts et al., 2017].

White spot lesions represents the initial demineralization of the surface of anterior and posterior teeth. They can be active, when enamel shows a rough and white-opaque appearance beneath the dental plaque, or inactive, when enamel presents a shiny and smooth surface. It is possible that these lesions present brown coloration due to the absorption of extrinsic pigments by decalcified enamel [Pretty and Ekstrand, 2016]. According to the International Caries Detection and Assessment System (ICDAS), the initial lesions with no evidence of surface breakdown or underlying dentine shadowing. can be scored at 1 (initial caries) or 2 (distinct visual change in enamel) [Ismail et al., 2015].

Past studies have shown that white spot lesion can be reversed by modifying the causative factors or applying preventive measures [Lussi et al., 2012; Clark and Slayton, 2014]. Several approaches have been proposed for the noninvasive management of non-cavitated enamel, in which fluoride compounds are the most used agents for the prevention or remineralization of caries. Besides being inexpensive easily accessible, the daily use of fluoride toothpaste provides fluoride ions for caries-protective processes on the tooth's surface [Lussi et al., 2012]. One method regularly used in dental offices is the topical application of fluoride. Professionally applied fluoride compounds, such as varnishes or gels, are recommended for high-risk patients 4 times a year. In addition to tooth remineralization, the advantages of professional application include relative low cost, treatment time and low risk of fluoride intake, reducing the risk of dental fluorosis in children [Clark and Slayton, 2014]. However, although fluoride compounds remineralize the white spot lesion, the affected enamel will continue to have a white stain, contrasting with the healthy appearance of the tooth, compromising the smile esthetics in anterior teeth [Yuan et al., 2014]

The white spots on enamel results of the optical effect of light scattering, which occurs due to different refractive indexes. When the porosities on enamel are filled by air, a greater light dispersion occurs because the refractive index of the air (1,00) is lower than that of the hydroxyapatite (1,62-1,65), leading to an opaque and whitish appearance [Oguro et al., 2016].

In order to inhibit the progression of carious lesions and to restore the healthy appearance of the demineralized enamel, an infiltrant resin was developed. The infiltrant is

described as a low viscosity resin which penetrates into demineralized enamel creating a diffusion barrier, allowing the replacement of the lost mineral by the resin applied [Lausch et al., 2014; Doméjean et al., 2015]. This minimally invasive technique is applied in a single session, without anesthesia, cavity preparation, enamel abrasion or pain [Cazzolla et al., 2018]. Other indications of that technique includes amelogenesis imperfecta, molar incisor hypomineralization and fluorosis have also been suggested [Doméjean et al., 2015].

When fluoride treatment is performed, the white spot may remain even if the lesion is inactivated. This happens because remineralization occurs only superficially. In contrast to the infiltration technique, the filling of the porosities occurs by capillary action, reaching the interior of the lesion. Thus, the masking of the lesion may occurs since the refractive index of the infiltrating resin is 1.51, being similar to that of hydroxyapatite [Borges et al., 2014].

An important difference between the infiltration technique and the topical application of fluoride would be that the fluoride gels or varnishes create a diffusion barrier only superficially whereas the resin infiltration technique creates a barrier both on surface and inside the enamel, reinforcing the demineralized structure with a resinous matrix, hindering the progression of the lesion [Doméjean et al., 2015]. Other benefits of the infiltration technique includes the mechanical stabilization of the demineralized enamel obtained after treatment, preservation of the hard tooth structure, stimulation of the remineralization process, permanent closure of superficial micropores and cavities, and a minimized risk of secondary caries development by not leaving gaps for infiltration of saliva and microorganisms [Gelani et al., 2014; Doméjean et al., 2015; Yazkan and Ermis, 2018]. Although most studies on the color masking efficacy with resin infiltration have been conducted in vitro, some clinical reports also showed favorable esthetic results [Paris et al., 2013; Yuan et al., 2014; Alwafi, 2017; Borges et al., 2017]. However, there is a lack of evidence concerning the clinical efficacy of the technique for masking enamel whitish discolorations [Borges et al., 2017].

The objective of the present study was to evaluate, in vivo, the masking effect of white spot lesions treated with a resin infiltrant. The null hypothesis was that the color of the white spot lesion would not change after its treatment.

3. Materials and Methods

The present research was fully approved by the Uberaba University Ethics Committee (reference CAAE 65927817.4.0000.5145) and informed consent was obtained from all patients.

The investigation was conducted on 40 young adolescents and adult patients (11 to 23 years old), who present good general health and had at least one upper or lower anterior permanent tooth with active white spot lesion on enamel. Active white spot lesion was defined as opaque, matte, chalky white area on enamel. The selected tooth should be classified as “score 2” of the International Caries Detection and Assessment System (ICDAS – Score II) [Schneider et al., 2017] and should not present direct restorations. Patients who did not meet the inclusion criteria or did not agree to participate in the study were excluded from this research.

Before resin infiltration, the color of the white spot lesion and of the area adjacent to the lesion (sound enamel) were evaluated by a digital spectrophotometer (Vita Easyshade Compact Advance V, VITA Zahnfabrik H. Rauter GmbH & Co. KG - Bad Säckingen – Germany)

using the CIELab System. This system has three coordinates to define the color: L* specifies the lightness and darkness of the color, while the a* and b* coordinates define the chromatic characteristics of the color. This system provides one with the ability to examine the color differences between two objects or teeth [Karaman et al., 2018]. The spectrophotometer was positioned perpendicularly to the labial surface of the clinical crown, and the measurements before and after treatment were performed against a black background that was positioned behind the tooth. Variance in assessments with the spectrophotometer error were determined on the basis of 3-times repeated. The initial and final color measurements were performed by a researcher other than the one who performed the treatment.

Initially, a rubber dam was placed and the selected tooth was cleaned with prophylactic toothpaste and rubber cup in low speed. Subsequently, a trained dentist performed resin infiltration (Icon, DMG – Hamburg - Germany) on the white spot lesion, according to manufacturer's instruction, as follows: the lesion was etched with 15% hydrochloric (Icon etch, DMG) acid, rinsed after 2 min and dried with air for 30s; on the second step, ethanol (Icon Dry, DMG) was applied for 30s, and air blowing was done for 10s; finally the infiltrant resin (Icon Infiltrant, DMG) was applied and, after 3 minutes, the excess resin was subsequently removed with air spray and flossed and light-cured for 40s. The resin infiltration step was repeated with a penetration time of 60s to allow resin to infiltrate the remaining porosities and light-cured for 40s. The polishment was done with polishing cups and then the rubber dam was removed. At the final of the clinical session, the color of the infiltrated lesion and the adjacent enamel were reevaluated by the same digital spectrophotometer and using the procedures cited before.

Statistical analysis

The data were tabulated and subjected to statistical analysis (Sigmastat 3.01, Systat, USA). Means and 95% confidence intervals of lightness and color parameters L*, a*, and b* of white spot lesion (WSL), sound adjacent enamel (SAE) and infiltrated lesion (IR) were calculated separately and summarized by ΔE-values using the formula $\Delta E^* = [(\Delta L^*)2 + (\Delta a^*)2 + (\Delta b^*)2]1/2$.

The color difference (ΔE) was calculated between WSL x SAE, WSL x IR and IR x SAE, and then analyzed by the One-Way ANOVA, followed by the Tukey´s test. The L*, a*, and b* values of WSL, SAE and IR were compared using Student's t-test for related samples (α= 5%).

4. Results

The present study was conducted in 40 patients, 53% females and 47% males. The mean age of the patients was 16.3 years old. Treatment was performed in only one tooth of each patient, according to the criteria established before. In the upper arch, 13 (32.5%) canine, 9 (22.5%) central incisors 7 (17.5%) lateral incisors were treated. In the lower arch, 6 (15%) canine, 2 (5.5%) central incisors 3 (7.5%) lateral incisors were treated.

Table 1 shows the means (± standard error of the mean) of the ΔE found on WSL, SAE and IR comparisons. The color difference found for WSL x SAE was 8.05(±0.48), indicating that the lesions were easily visible in enamel. The ΔE observed on WSL x IR comparison (5.93±0.41) pointed out that the infiltrante resin treatment changed the color of the WSL, and that the treatment reduced the color difference between the adjacent enamel and the demineralized enamel ($p<0.05$). The comparison between IR x SAE was 5.77(±0.41), showing

that the infiltrante resin was not capable to fully camouflage the WSL on enamel, but approached the color of the treated lesion to that of the sound enamel when compared to the ΔE found on WSLxSAE ($p<0.05$).

Table 2 shows the means (± standard error of the mean) of the L*, a* and b* found on WSL, SAE and IR analyzes. The WSL lightness (L; 71.4±2.03) showed no difference when compared to SAE (73.62±1.78) and IR (71.78±1.79). However, lightness was higher in SAE when compared to IR ($p<0.05$). The a* is a measure of redness ($a > 0$) or greenness ($a < 0$) of the teeth, and the values were statistically different in all comparisons. While values WSL (1.58±0.48) and IR (0.99±0.35) presented positive values, SAE showed slight greenness (-0.55±0.27). The b* is a measure of yellowness ($b > 0$) or blueness ($b < 0$) of each analyzed area. All values pointed out to yellowness, and the only difference was found when infiltrated lesion (24.41±1.21) and SAE (23.08±1.05) were compared.

5. Discussion/Conclusion

The objective of the present research was to evaluate, in vivo, the camouflage effect of white spot lesions treated with a resin infiltrante. The results showed that, although the treatment reduced the color difference between the treated white spot lesion and the sound enamel, the treatment performed in vivo was not able to totally mimic the color of the white spot lesion with that of the dental enamel. Therefore, the null hypothesis that the color of the white spot lesion would not change after its treatment was not rejected.

As described before, white spot lesions occurs due demineralization of the enamel surface and is the first signal o dental caries. Several methods have been proposed to remineralize the affected area and, although some of them (mainly fluoride compounds) show satisfactory effects, they do not make the color of the white spot lesion look like that of sound enamel [Doméjean et al., 2015; Sleibi et al., 2018]. From a functional point of view, the aim of the resin infiltration technique is to arrest caries lesion progression with low-viscous light-curing resins, since it creates a diffusion barrier on the surface and within the enamel, thus occluding pathways for acid entry into enamel [Doméjean et al., 2015]. Furthermore, due to its composition, in some situations the infiltrant resin leads to an esthetic improvement in caries lesions [Yuan et al., 2014].

There are reports in the literature about the use of infiltrate resin in cases of enamel hypoplasia and amelogenesis imperfecta [Doméjean et al., 2015; Cagetti et al., 2017]. The present study selected only patients diagnosed with alterations on the color of vestibular enamel of anterior teeth due to demineralization (Score 2 - ICDAS II) and, so, the discussion was focused on that problem.

The color measurement in the present study was done using a portable spectrophotometer. The color analyses were done by the same operator, who did the measurements tree times in each area. The instrumental color analysis is advantageous when compared to a visual color determination because instrumental readings are objective, can be quantified, and are instantly obtained [Mohammad et al., 2017]. A spectrophotometer functions by measuring the spectral reflectance or transmittance curve of a specimen. The color change (ΔE) of the teeth was evaluated using the CIELAB system, one of the most common color measurement systems in dentistry today [Karaman et al., 2018]. Three different intervals are used for distinguishing color differences: ΔE values of 1 are regarded as not appreciable by the human eye; ΔE values between 1.0 and 3.3 mean

that this change is noticeable only by a qualified person (i.e. the color difference is clinically acceptable); and ΔE values over 3.3 indicate that the color difference of the objects can be easily observed [Johnston and Kao, 1989].

The initial situation of the teeth evaluated here showed a remarkable difference between the color of the white spot lesion and the sound dental enamel (ΔE= 8.05±0.48), which represented one of the main complaint of the subjects. White spot lesion present a porous surface and those microholes are filled with water or air that presents refractive index of 1.33 and 1.0 respectively, while the refractive index of sound enamel is 1.62. The difference in refractive indexes between the enamel crystals and medium inside the porosities affects the light scattering and gives these lesions a whitish appearance, especially when desiccated [Gugnani et al., 2012].

It was also observed that the infiltrant resin technique changed the color of the white spot lesion, since the color difference between the initial lesion and after the treatment was 5.93(±0.41), which is above the reference threshold for visual changes of color between two objects. The color change occurs because the micropores of the white spot lesions were infiltrated by the low-viscosity resin (refractive index= 1.46), which has a similar refractive index as sound enamel [Prasada et al., 2018].

The comparison between the color of the infiltrated lesion and the adjacent enamel showed that the treatment was not able to mask the white spot lesion (ΔE = 5.77±0.41), but the technique was able to decrease this color difference when compared to the ΔE between the initial lesion and the sound adjacent enamel. Previous in vivo studies have reached same results than those observed here [Kim et al., 2011; Eckstein et al., 2015]

It must be highlighted that different factors may influence masking outcomes, such as extension, depth, and activity of lesions. Differently from the in vitro studies, where there is complete control of the initial situation of the enamel demineralization, clinical studies has no condition to standardize the degree of demineralization of the white spot lesion for all subjects. It is known that the effectiveness of the treatment is directly related to the demineralization of the WSL by the 15% hydrochloric acid used in the infiltrant resin technique [Paris et al., 2014]. The function of the acid etch is to increase the enamel porosity to allow the penetration of the low-viscosity resin. Therefore, if the pores of the lesion body can be completely occluded with the infiltrant, the progression of the WSLs can be prevented and the aesthetic issues can also be resolved. Thus, considering the same time of action, the effect of acid conditioning may be lower on a more mineralized tissue when compared to a less mineralized tissue, which could explain the better performance of the infiltration technique on in vitro studies, when compared to in vivo outcomes.

As described before, two applications in the same session of the infiltrant resin were performed in the present research to follow the manufacturer's specifications. Likewise, the evaluation was performed only immediately after treatment. Past longitudinal clinical studies have shown that, although the camouflage effect is reported to be immediate, concern exists about the durability of esthetic results due to staining and aging of the low-viscosity resin used for infiltration. Although studies show that the infiltrate resin exhibits satisfactory long-term color stability, it is possible that brushing and food/beverage intake could interfere with the aesthetic result of the treatment over time [Paris et al., 2013; Eckstein et al., 2015; Borges et al., 2017; Knösel et al., 2018].

After treatment, it was possible to observe without the spectrophotometer that the color of the WSL was attenuated by the infiltrante resin, and in some cases the color difference was imperceptible. This was also observed in a past study comparing the subjective and objective methods of color analysis of teeth treated with infiltrant resin [Mazur et al., 2018].

Table 2 showed that there was a little difference on the L* and b* values, and the main color changes due to treatment occurred in the a* value, which represents the degree of redness (a > 0) or greenness (a < 0) of an object. This was probably due to the color of the infiltrating resinous monomers, on an attempt to leave the white stain in a shade closer to the yellow.

As previously described, the research was performed in adolescent patients and young adults, in a university clinic. As there was no longitudinal analysis, it was not necessary to standardize the oral hygiene protocol of the patients. Thus, studies are necessary to verify if this color change obtained immediately after treatment will present satisfactory results over time.

Considering the results obtained here, it was possible to observe that the treatment with the infiltrating resin was not able to leave the lesion of white spot of the dental enamel with the same coloration of the sound tissue. However, the treatment was able to attenuate the discoloration of the demineralized dental enamel.

6. Appendix

Table 1

Comparisons	ΔE
WSL x SAE	8.05(±0.48)A
WSL x IR	5.93(±0.41)B
IR x SAE	5.77(±0.41)B

Table 2

	WSL	SAE	IR	p
L	71.4(±2.03)	73.62(±1.78)	----	0.13
L	71.4(±2.03)	---	71.78(±1.79)	0.28
L	---	73.62(±1.78)	71.78(±1.79)	0.02
a	1.58(±0.48)	-0.55(±0.27)	---	<0.01
a	1.58(±0.48)	---	0.99(±0.35)	0.02
a	---	-0.55(±0.27)	0.99(±0.35)	<0.01
b	24.08(±1.35)	23.08(±1.05)	---	0.13
b	24.08(±1.35)	---	24.41(±1.21)	0.28
b	---	23.08(±1.05)	24.41(±1.21)	0.02

7. Supplementary Material

8. Statements

8.1. Acknowledgement

I would like to thank the permission granted to perform the treatment of the patients in the polyclinic of the University of Uberaba, represented by its director Prof. Dr. Anderson Silva.

8.2. Statement of Ethics

This Project followed all the ethical principles for medical research, according to Declaration of Helsinki.

8.3. Disclosure Statement

The authors have no conflicts of interest to declare.

8.4. Funding Sources

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10. Figure Legends

Table 1. Mean (± standard error of the mean) of the ΔE found on different comparisons. Different letters indicate statistically significant differences ($p<0.05$). (WSL: White Spot Lesion; SE: Sound Adjacent Enamel; IR: Infiltrate Resin).

Table 2. Mean (± standard error of the mean) of the L*, a* and b* found on WSL, SAE and IR analyzes, and the p values. The comparisons were performed between the columns ($\alpha = 0.05$)

4. **Conclusão**

Considerando os resultados aqui obtidos, foi possível observar que o tratamento com a resina infiltrante não foi capaz de deixar a lesão da mancha branca do esmalte dental com a mesma coloração do tecido hígido. No entanto, o tratamento foi capaz de atenuar a descoloração do esmalte dentário desmineralizado.

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6. Apêndice

Fig. 1: Lesão de mancha branca.

Fig. 2: Avaliação inicial com espectrofotômetro.

Fig. 3: Profilaxia.

Fig. 4: Condicionamento com Icon-Etch.

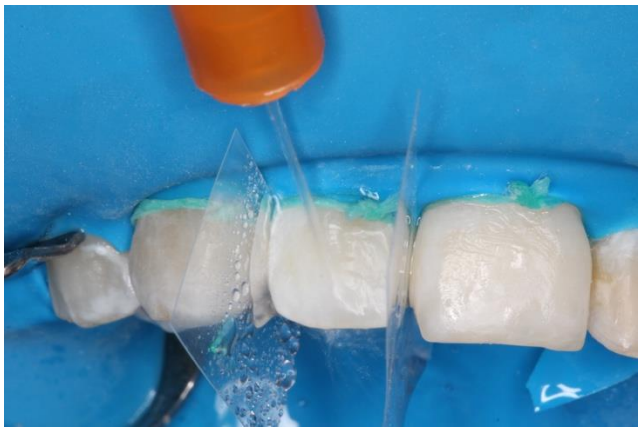

Fig. 5: Enxágue.

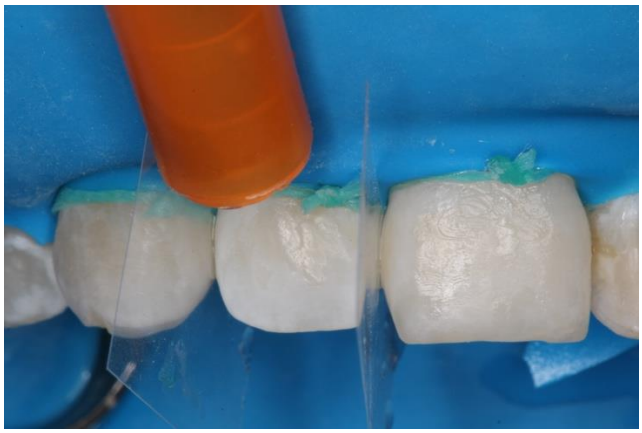

Fig. 6: Secagem.

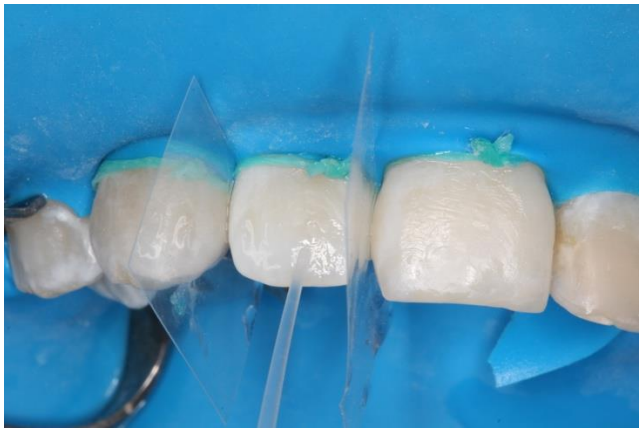

Fig. 7: Aplicação do Icon-Dry.

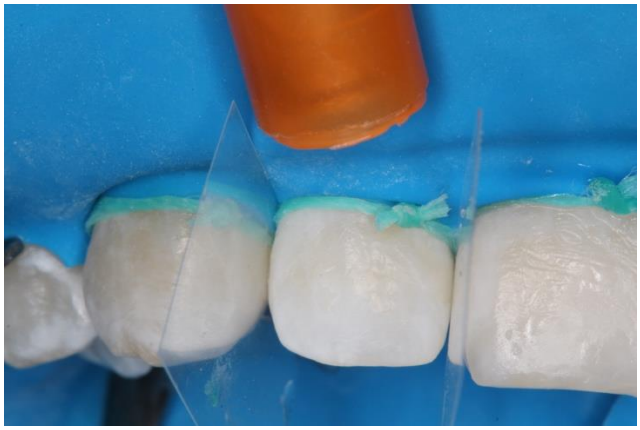

Fig. 8: Secagem.

Fig. 9: Aplicação do Icon-Infiltrant.

Fig. 10: Fotopolimerização.

Fig. 11: Polimento.

Fig. 12: Resultado final.

7. **Anexos**

Anexo 1:

Caries Research

Author Guidelines

About the Journal

Aims and Scope

Caries Research publishes epidemiological, clinical and laboratory studies in dental caries, fluorosis, erosion and related dental diseases. Some studies build on the considerable advances already made in caries prevention, e.g. through fluoride application. Some aim to improve understanding of the increasingly important problem of dental erosion and the associated tooth wear process. Others monitor the changing pattern of caries in different populations, explore improved methods of diagnosis or evaluate methods of prevention or treatment. Studies using genetic methods to identify human genes or mutations associated with caries prevalence are welcome as are manuscripts using modern high-throughput sequencing methods to characterise microbial biofilms associated with oral health and active caries. The broad coverage of innovative research into dental caries is unique and has given the journal an outstanding international reputation as an indispensable source for both basic scientists and clinicians engaged in understanding, investigating and preventing dental diseases.

Journal Sections

In addition to the standard Article Types, we also welcome contributions to the following sections: **Current Topics**
Current topics are concise articles that present critical discussion of a topic of current interest, or a fresh look at a problem, and should aim to stimulate discussion.

Article Types

Research Articles

Research Articles report on primary research. They should represent original research in basic, translational, or clinical science. They must describe significant and original observations. Consideration for publication is based on the article's originality, novelty, and scientific soundness, and the appropriateness of its analysis.
Research Articles are reports of original work (including systematic reviews and meta-analyses). Authors are asked to follow the EQUATOR Network for Research Articles.
Prior approval from an Institutional Review Board (IRB) or an Ethics Review Committee is required for all investigations involving human subjects.
More information is available in the downloadable Research Article sample below.

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Research Article (DOC, 47 KB)

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Review Articles are considered reviews of research or summary articles. They are state-of-the-art papers covering a current topic by experts in the field. They should give evidence on and provide answers to a well-defined aspect or question in a particular area. Review Articles must include a critical discussion of the reported data and give a clear conclusion with potential impacts on the standard of care.
More information is available in the downloadable Review Article sample below.

Documents

Review Article (DOC, 43.5 KB)

Systematic Review

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Systematic Review (DOC, 43.5 KB)

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Fig. 2. Legend text.

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Uberaba, _____ de _____ de _____

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Nome do paciente/sujeito da pesquisa

Identificação (RG) do paciente/sujeito da pesquisa

Nome do responsável (quando aplicável):

Identificação (RG) do responsável:

Título do projeto: Avaliação Clínica Longitudinal de Um Infiltrante Resinoso Utilizado para Paralisar Lesões de Mancha Branca do Esmalte Dental

Instituição onde será realizado: Universidade de Uberaba

Pesquisador Responsável: Prof. Dr. Vinícius Rangel Geraldo Martins

Identificação (conselho): CRO-MG: 47150

Telefone:34-3319-8919

e-mail: vinicius.martins@uniube.br

CEP-UNIUBE: Av. Nenê Sabino, 1801 – Bairro: Universitário – CEP: 38055-500-Uberaba/MG, tel: 34-3319-8959 e-mail: cep@uniube.br

Você (ou Seu/Sua _____ _____ (colocar o nome e grau de parentesco do paciente/sujeito, no caso de menores) está sendo convidado para participar do projeto **Avaliação Clínica Longitudinal de Um Infiltrante Resinoso Utilizado para**

Paralisar Lesões de Mancha Branca do Esmalte Dental, de responsabilidade de **Prof. Dr. Vinícius Rangel Geraldo Martins** (CRO-MG: 47150), desenvolvido na **Universidade de Uberaba.**

Este projeto tem como objetivo avaliar a eficácia de um material odontológico (infiltrante resinoso) em paralisar lesões iniciais de cárie no esmalte dental de pacientes adolescentes.

Este projeto se justifica pois, caso este tratamento seja efetivo, ele poderá ajudar a tornar o dente mais resistente à cárie e fazer com que o dente recupere sua aparência natural, e pode trazer como benefícios o desenvolvimento da área de prevenção em odontologia, através da utilização deste método em outros indivíduos, e evitar que a lesão inicial de cárie promova uma cavidade no dente do paciente.

Se aceitar participar desse projeto, você receberá um tratamento odontológico preventivo. Inicialmente, os dentes do paciente serão protegidos, através da colocação de um lençol de borracha entre eles. Caso necessário será realizada a anestesia da gengiva do paciente. Estes dentes serão limpos e, em seguida, um material odontológico (resina infiltrante) será colocado sobre os dentes que apresentarem uma mancha branca (lesão inicial de cárie). Serão realizadas fotografias e avaliação da cor dos seus dentes na primeira consulta e nas consultas de retorno, que serão realizadas após 6 e 12 meses do tratamento inicial. Cada consulta terá duração aproximada de 30 minutos. O paciente poderá apresentar algum desconforto como, por exemplo, se houver a necessidade da aplicação de anestesia local. O risco de participação é mínimo, sendo igual àquele de qualquer tratamento odontológico preventivo de rotina. Os seus dados serão mantidos em sigilo e serão utilizados apenas com fins científicos, tais como apresentações em congressos e publicação de artigos científicos. Seu nome ou qualquer identificação sua (voz, foto, etc) jamais aparecerá. Para preservar a identidade do paciente, o nome dele será substituído por letras e números.

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_____

Nome do paciente (ou sujeito) ou responsável e assinatura

_____

Prof. Dr. Vinícius Rangel Geraldo Martins
Pesquisador Principal
CRO-MG: 47150
Telefone: 34-33198913 e-mail: vinicius.martins@uniube.br

_____

C.D. Rosa Maria Moises Pereira de Andrade
Aluna de Mestrado
Telefone: 34-33198913 e-mail: rosamaria_moises@uniube.br

Anexo 3:

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Você, _____, está sendo convidado para participar da pesquisa “Avaliação Clínica Longitudinal de Um Infiltrante Resinoso Utilizado para Paralisar Lesões de Mancha Branca do Esmalte Dental”, de responsabilidade de Prof. Dr. Vinícius Rangel Geraldo

Martins (CRO-MG: 47150), desenvolvido na Universidade de Uberaba. Seus pais ou responsáveis permitiram que você participe.

Queremos saber se um material odontológico (infiltrante resinoso) consegue impedir lesões iniciais de cárie no esmalte dental fiquem maiores, e se esse material consegue fazer com que seu dente volte a ter sua cor normal.

Os adolescentes que irão participar dessa pesquisa têm de 12 a 18 anos de idade. Você não precisa participar da pesquisa se não quiser, é um direito seu, não terá nenhum problema se desistir. A pesquisa será feita na Policlínica Getúlio Vargas, da Universidade de Uberaba. Se aceitar participar desse projeto, você receberá um tratamento odontológico preventivo. Inicialmente, seus dentes serão protegidos, através da colocação de um lençol de borracha entre eles. Caso necessário será realizada a anestesia da sua gengiva. Estes dentes serão limpos e, em seguida, um material odontológico (resina infiltrante) será colocado sobre os dentes que apresentarem uma mancha branca (lesão inicial de cárie). Serão realizadas fotografias e avaliação da cor dos seus dentes na primeira consulta e nas consultas de retorno, que serão realizadas após 6 e 12 meses do tratamento inicial. Cada consulta terá duração aproximada de 30 minutos. Você poderá apresentar algum desconforto como, por exemplo, se houver a necessidade da aplicação de anestesia local. O uso desta técnica é seguro, e risco de participação é mínimo, sendo igual àquele de qualquer tratamento odontológico preventivo. Caso aconteça algo errado, você pode nos procurar pelo telefone 34-3319-8913 do/a pesquisador Prof. Vinicius R. G. Martins.

Mas há coisas boas que podem acontecer, pois esse tratamento irá ajudar a tornar o dente mais resistente à cárie e fazer com que o seu dente recupere sua aparência natural. Ninguém saberá que você está participando da pesquisa, não falaremos a outras pessoas, nem daremos a estranhos as informações que você nos der. Os resultados da pesquisa vão ser publicados, mas sem identificar os adolescentes que participaram da pesquisa. Se você tiver alguma dúvida, você pode me perguntar ou perguntar à pesquisadora Rosa Maria. Eu escrevi os telefones na parte de cima desse texto.

Eu _____ aceito participar da pesquisa “Avaliação Clínica Longitudinal de Um Infiltrante Resinoso Utilizado para Paralisar Lesões de Mancha Branca do Esmalte Dental”, que tem os

objetivos de saber se um material odontológico (infiltrante resinoso) consegue impedir lesões iniciais de cárie no esmalte dental fiquem maiores, e se esse material consegue fazer com que seu dente volte a ter sua cor normal Entendi as coisas ruins e as coisas boas que podem acontecer. Entendi que posso dizer "sim" e participar, mas que, a qualquer momento, posso dizer "não" e desistir que ninguém vai ficar bravo comigo. Os pesquisadores tiraram minhas dúvidas e conversaram com os meus responsáveis. Recebi uma cópia deste termo de assentimento e li e concordo em participar da pesquisa.

Uberaba, ____ de _____de ____.

_____
Assinatura do menor

_____
Prof. Dr. Vinícius Rangel Geraldo Martins
Pesquisador Responsável
34-33198913

_____
C.D. Rosa Maria Moises Pereira de Andrade
Aluna de Mestrado
Telefone: 34-33198913 e-mail: rosamaria_moises@uniube.br

Anexo 4:

UNIVERSIDADE DE UBERABA - UNIUBE

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA
Título da Pesquisa: Avaliação Clínica Longitudinal de Um Infiltrante Resinoso Utilizado para Paralisar

Lesões de Mancha Branca do Esmalte Dental **Pesquisador:** Vinicius Rangel Geraldo Martins

Área Temática:
Versão: 1
CAAE: 65927817.4.0000.5145
Instituição Proponente: SOCIEDADE EDUCACIONAL UBERABENSE **Patrocinador Principal:** Financiamento Próprio

DADOS DO PARECER Número do Parecer: 2.096.698

Apresentação do Projeto:

A cárie é uma doença de cunho infeccioso, de progressão lenta, que engloba fatores determinantes locais, como os microrganismos presentes na saliva, a dieta do hospedeiro e a presença do biofilme na superfície do esmalte, e fatores modificadores, como a frequência de higienização bucal e a condição sociocultural do indivíduo. O esmalte dentário é uma estrutura rígida que cobre toda a coroa dental e fica em contato direto com o meio bucal. Embora o esmalte seja um tecido sem vitalidade, ele é permeável, e trocas iônicas podem ocorrer entre o esmalte e o ambiente da cavidade oral, particularmente com a saliva.As trocas iônicas com o biofilme e perdas de estruturas no esmalte podem causar sua desmineralização, levando ao aparecimento de manchas brancas no tecido duro. As lesões de mancha branca indicam o início da cárie dental. Clinicamente elas podem se apresentar ativas ou inativas. As manchas ativas são caracterizadas pelo aspecto rugoso e branco-opaco do esmalte, em locais de retenção de biofilme. Já as manchas brancas inativas apresentam um aspecto brilhante e lisura superficial. Estudos recentes mostraram que o diagnóstico precoce das lesões de mancha branca permite que um tratamento não invasivo seja indicado para a remineralização das lesões ativas. A superfície de esmalte remineralizada torna-se diferente da original, pois ela apresenta em sua composição uma maior concentração de fluoretos e uma estrutura com menor porosidade, tornando-se mais

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resistente à uma nova desmineralização e ao desgaste. A utilização de dentifrícios fluoretados ajuda a remineralizar o esmalte dental e mantém o flúor na cavidade oral, sendo sua utilização de fundamental importância para o controle dos processos de desmineralização e remineralização que ocorrem constantemente na cavidade bucal. Além disso, os dentifrícios fluoretados são de fácil acesso e baixo custo. Um método regularmente utilizado nos consultórios odontológicos é a aplicação

tópica de flúor. Além da remineralização dos dentes, as vantagens da aplicação tópica de flúor profissional incluem o baixo custo, o tempo de tratamento e o baixo risco de ingestão do fluoreto, diminuindo a chance do aparecimento da fluorose dental. Contudo, apesar dos compostos fluoretados remineralizarem o dente, o esmalte acometido pela lesão continuará a apresentar uma aparência mais esbranquiçada, contrastando com o aspecto saudável do tecido, comprometendo a estética do dente. Na tentativa de alcançar uma diminuição na progressão dessa lesão de mancha branca, alguns estudos foram realizados sobre a utilização

de um infiltrante resinoso, que seria capaz de penetrar nesse esmalte desmineralizado e promover sua remineralização.

Objetivo da Pesquisa:

Objetivo Primário:

Trata-se de um estudo clínico, longitudinal, prospectivo, que tem por objetivo avaliar a eficácia clínica da técnica de infiltração de resina de baixa
viscosidade em lesões de mancha branca no esmalte dental em pacientes hebiátricos.

Objetivo Secundário:

1- Avaliaçar a efetividade do tratamento de lesões de mancha branca do esmalte dental com um infiltrante resinoso, através dos escores estabelecidos pelo International Caries Detection and Assessment System (ICDAS-II).

2- Avaliar a estabilidade de cor esmalte dental com um infiltrante resinoso, através de análise por espectrofotometria.

Metodologia

A pesquisa será realizada em 20 pacientes, de ambos os gêneros, com idade entre 12 e 18 anos,

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que possuírem boa saúde geral e que apresentem, pelo menos, um dente com lesão de mancha branca ativa no esmalte dos dentes anteriores permanentes superiores ou inferiores. Os dentes serão selecionados caso eles obtenham o escore 2 do critério ICDAS-II (International Caries Detection and Assessment System) de diagnóstico de cárie (SCHNEIDER et al., 2017). O dente avaliado não deverá apresentar restaurações. De acordo com a literatura, os pacientes desta faixa etária compreendem um grupo com alta incidência de lesões de mancha branca no esmalte, principalmente devido à falta de higienização adequada. (FRENCKEN ET AL., 2017)

Após a aceitação da participação na pesquisa, através da assinatura do termo de consentimento livre e esclarecido pelo responsável pelo paciente, e através da assinatura do termo de assentimento pelos pacientes menores de idade, serão iniciados os procedimentos experimentais.

Para avaliação inicial da lesão de mancha branca, os dentes receberão profilaxia com pedra pomes e taça de borracha previamente ao diagnóstico. O diagnóstico de lesão de mancha branca no esmalte dos dentes anteriores será realizado pelos critérios ICDAS-II. Após o diagnóstico de lesão de mancha branca ativa e não cavitada no esmalte (ICDAS-II escore 2), o dente será fotografado e sua cor do será avaliada com o espectrofotômetro, de acordo com o sistema CIELab. Para fins de avaliação e comparação, além da lesão de mancha branca, será avaliada a cor do esmalte dental em uma área adjacente à lesão. Os dados e fotografias serão armazenados para futuras comparações. Para a padronização das medições, a avaliação da alteração de cor com o espectrofotômetro será realizada sempre pelo mesmo pesquisador.Para o tratamento das lesões de mancha branca será realizado de acordo com as instruções fornecidas pelo fabricante da resina infiltrante. Após o isolamento absoluto dos dentes anteriores, será realizada a profilaxia da face acometida pela lesão de mancha branca com pasta profilática e taça de borracha. Em seguida, será realizado o condicionamento da lesão de mancha branca com Icon-Etch durante 2 min, seguida de lavagem com água durante 30 segundos. Após a remoção do Icon-Etch, a superfície será seca com jato de ar durante 30 segundos, seguida da aplicação do Icon-Dry durante 30 segundos e secagem com jato de ar também por 30 segundos. Após a secagem, o Icon-Infiltrant será aplicado sobre a superfície, deixando-o agir sobre o esmalte desmineralizado por 3 minutos, seguida da fotoativação do produto por 40 segundos. Em seguida, o Icon-Infiltrant será reaplicado na superfície do esmalte, fotoativado e polido com pontas de borracha abrasiva. Para fins de padronização, o tratamento será realizado sempre pelo mesmo pesquisador.

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Imediatamente, após o tratamento, o dente será fotografado e sua cor do será avaliada com o espectrofotômetro, da mesma maneira proposta previamente ao início do tratamento. Os dados e fotografias serão armazenados para futuras comparações. Para a avaliação clínica serão considerados os critérios estabelecidos pelo ICDAS-II. O paciente será avaliado por 3 examinadores distintos, que não terão acesso aos dados do início do tratamento.

Após 6 e 12 meses do tratamento. inicial, o paciente retornará à Policlínica Getúlio Vargas para avaliação dos dentes tratados, da mesma maneira como ocorrerá para a avaliação imediatamente após o tratamento. Em cada momento de avaliação, os pesquisadores não terão acesso aos dados obtidos nas avaliações passadas.

Critério de Inclusão:
A presente pesquisa será realizada em 20 pacientes, de ambos os gêneros, com idade entre 12 e 18 anos, que possuírem boa saúde geral e que apresentem, pelo menos, um dente com lesão de mancha branca ativa no esmalte dos dentes anteriores permanentes (incisivo central, incisivo lateral ou canino) superiores ou inferiores. Os dentes serão selecionados caso eles obtenham o escore 2 do critério ICDAS-II (International Caries
Detection and Assessment System) de diagnóstico de cárie (SCHNEIDER et al., 2017). O dente avaliado não deverá apresentar restaurações. De acordo com a literatura, os pacientes

desta faixa etária compreendem um grupo com alta incidência de lesões de mancha branca no esmalte, principalmente devido à falta de higienização adequada. (FRENCKEN ET AL., 2017)

Critério de Exclusão:
Serão excluídos do trabalho aqueles pacientes que não se enquadrarem nos critérios de inclusão ou que não aceitem participar da pesquisa. Nestes casos, o tratamento do indivíduo na clínica universitária, que já estará em andamento por outros motivos, continuará normalmente.

Avaliação dos Riscos e Benefícios:

Os riscos são aqueles inerentes ao tratamento odontológico de rotina como, por exemplo, aplicação de anestesia local, caso necessária. Para minimizar esse risco, será realizada uma criteriosa anamnese antes do tratamento a fim de verificar a história pregressa de alergia aos anestésicos locais. O tratamento coma a resina infiltrante é considerado minimamente invasivo, e

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sua aplicação não produz sensação dolorosa no paciente. Existe o risco da perda da confidencialidade dos dados. Para minimizar este risco e proteger os sujeitos da pesquisa, os pacientes serão identificados por letras e números.

Como benefícios, os pacientes irão receber um tratamento que, de acordo com a literatura, consegue remineralizar a lesão inicial de cárie e reabilitar a estética dos dentes tratados. Além disso, a condição bucal do paciente será monitorada durante a pesquisa. caso alguma anormalidade seja identificada, o paciente será encaminhado para tratamento odontológico nesta universidade. Adicionalmente, os resultados obtidos nesta pesquisa poderão beneficiar a comunidade, através do avanço sobre o conhecimento desta área de estudo e da futura adoção do tratamento remineralizador na prática diária dos cirurgiões-dentistas

Comentários e Considerações sobre a Pesquisa:

A pesquisa é pertinente e relevante. Está bem elaborado e descrito.

Considerações sobre os Termos de apresentação obrigatória:

O projeto apresenta a carta de encaminhamento ao CEP, folha de rosto e autorização para realização da pesquisa nas dependências da clínica, termos de consentimento livre e esclarecidos, tanto para pacientes adultos quanto para pacientes menores, sendo os pais autorizando a participação na pesquisa.

Recomendações:

Não há.

Conclusões ou Pendências e Lista de Inadequações:

O projeto está bem estruturado e atende as resoluções do CONEP, salvo melhor juízo desse comitê.

Considerações Finais a critério do CEP:

Em 01/06/2017, a plenária votou de acordo com o relator, pela aprovação da proposta. O CEP-UNIUBE lembra o proponente de seu compromisso com aquilo que estabelece a Resolução 466/2012, especialmente no que tange à entrega do relatório ao final do projeto.

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações	PB_INFORMAÇÕES_BÁSICAS_DO_P	20/03/2017		Aceito

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Básicas do Projeto	ETO_882766.pdf	09:23:14		Aceito
Folha de Rosto	folhaDeRosto.pdf	20/03/2017 09:21:42	Vinicius Rangel Geraldo Martins	Aceito
Outros	Carta_de_encaminhamentoCEP.pdf	17/03/2017 10:55:47	Vinicius Rangel Geraldo Martins	Aceito
Outros	CurriculoVinicius.pdf	17/03/2017 10:54:40	Vinicius Rangel Geraldo Martins	Aceito
Outros	CurriculoRuchele.pdf	17/03/2017 10:54:25	Vinicius Rangel Geraldo Martins	Aceito
Outros	CurriculoRosa.pdf	17/03/2017 10:54:10	Vinicius Rangel Geraldo Martins	Aceito

Outros	CurriculoMariaAngelicaHuebdeMenezes Oliveira.pdf	17/03/2017 10:53:47	Vinicius Rangel Geraldo Martins	Aceito
Outros	CurriculoCesarPenazzoLepri.pdf	17/03/2017 10:52:41	Vinicius Rangel Geraldo Martins	Aceito
Declaração de Instituição e Infraestrutura	Autorizacao_Infraestrutura.pdf	17/03/2017 10:50:34	Vinicius Rangel Geraldo Martins	Aceito
Projeto Detalhado / Brochura Investigador	Projeto.pdf	17/03/2017 10:49:40	Vinicius Rangel Geraldo Martins	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	Termo_de_assentimento.pdf	17/03/2017 10:49:29	Vinicius Rangel Geraldo Martins	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE.pdf	17/03/2017 10:47:33	Vinicius Rangel Geraldo Martins	Aceito

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

UBERABA, 02 de Junho de 2017

Assinado por:

Geraldo Thedei Junior (Coordenador)

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