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Resin infiltration for esthetic improvement of mild fluorosis in a patient with autism spectrum disorder: A 36-month follow-up

Infiltração de resina para melhora estética de fluorose leve em paciente com transtorno do espectro autista: acompanhamento de 36 meses

Infiltración de resina para la mejora estética de la fluorosis leve en un paciente con trastorno del espectro autista: seguimiento de 36 meses

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Abstract
Report a case using a minimally invasive technique (ICON®) to treat mild dental fluorosis in an adolescent with an autism spectrum disorder. Male patient, 15 years old, diagnosed with autism spectrum disorder, with the chief complaint of white spots on anterior teeth resulting in low self-esteem. Upon clinical examination, opaque white areas were observed in the enamel of all teeth, compatible with the diagnosis of mild dental fluorosis. As the patient has a mild degree of autism spectrum disorder and exhibits collaborative behavior, the treatment of choice was the resin infiltration in the maxillary incisors, canines, and first premolars. The step-by-step application was carried out according to the manufacturer's recommendations under the rubber dam. An immediate improvement in the appearance of fluorosis was significant, and the aesthetic result was satisfactory, with color stability after 36 months of follow-up. Resin infiltration was excellent for treating mild dental fluorosis, improving aesthetics, and easy of application. Additionally, the infiltrant obtained color stability 36 months after treatment and met the expectations of the patient and his family. Aesthetics should be considered when they impact their lives, facilitating care in these cases is essential to complete treatment.
Keywords: Fluorosis, dental; Autism Spectrum Disorder; Resin infiltration; Enamel microabrasion; Infection control; Practice management.

Resumo
Relatar um caso usando uma técnica minimamente invasiva (ICON®) para tratar fluorose dental leve em um adolescente com transtorno do espectro do autismo. Paciente do sexo masculino, 15 anos, diagnosticado com transtorno do espectro autista, com queixa principal de manchas brancas nos dentes anteriores resultando em baixa

autoestima. Ao exame clínico, foram observadas áreas brancas opacas no esmalte de todos os dentes, compatíveis com o diagnóstico de fluorose dental leve. Como a paciente apresenta um grau leve de transtorno do espectro autista e apresenta comportamento colaborativo, o tratamento de escolha foi a infiltração de resina nos incisivos superiores, caninos e primeiros pré-molares. A aplicação passo a passo foi realizada de acordo com as recomendações do fabricante sob o dique de borracha. A melhora imediata no aspecto da fluorose foi significativa, e o resultado estético foi satisfatório, com estabilidade de cor após 36 meses de seguimento. A infiltração de resina foi excelente para o tratamento de fluorose dental leve, melhorando a estética e a facilidade de aplicação. Além disso, o infiltrante obteve estabilidade de cor 36 meses após o tratamento e atendeu às expectativas do paciente e de sua família. A estética deve ser considerada quando impacta em suas vidas, facilitar o atendimento nestes casos é essencial para completar o tratamento.
Palavras-chave: Fluorose dentária; Transtorno do Espectro Autista; Infiltração de resina; Microabrasão do esmalte; Controle de infecção; Manejo clínico.

Resumen

Reportar un caso utilizando una técnica mínimamente invasiva (ICON®) para el tratamiento de fluorosis dental leve en un adolescente con trastorno del espectro autista. Paciente masculino, de 15 años, diagnosticado con trastorno del espectro autista, con la queja principal de manchas blancas en los dientes anteriores que resultan en baja autoestima. Al examen clínico se observaron áreas blanquecinas opacas en el esmalte de todos los dientes, compatibles con el diagnóstico de fluorosis dental leve. Debido a que el paciente presenta un grado leve de trastorno del espectro autista y muestra un comportamiento colaborativo, el tratamiento de elección fue la infiltración de resina en los incisivos, caninos y primeros premolares maxilares. La aplicación paso a paso se realizó según las recomendaciones del fabricante bajo el dique de goma. Fue significativa la mejoría inmediata en el aspecto de la fluorosis, y el resultado estético fue satisfactorio, con estabilidad del color a los 36 meses de seguimiento. La infiltración de resina fue excelente para tratar la fluorosis dental leve, mejorando la estética y la facilidad de aplicación. Adicionalmente, el infiltrante obtuvo estabilidad de color a los 36 meses del tratamiento y cumplió con las expectativas del paciente y su familia. La estética debe ser considerada cuando impactan en sus vidas, facilitar la atención en estos casos es fundamental para completar el tratamiento.
Palabras clave: Fluorosis dental; Trastorno del Espectro Autista; Infiltración de resina; Microabrasión del esmalte; Control de infecciones; Manejo de la práctica.

1. Introduction

The resin-infiltration technique is an ultraconservative approach available to manage enamel opacities aesthetically. This treatment aims to impede the microporosities within the lesion body using infiltration with low-viscosity light-curing resins optimized for rapid penetration into the porous enamel. (Muñoz et al., 2013) Color-masking efficacy with resin infiltration has been demonstrated using artificial caries models. (Torres et al., 2011)(de Lacerda et al., 2016) Some clinical reports also found favorable aesthetic results. (Auschill et al., 2015)(Cocco et al., 2016) Low viscosity resins decreased the visibility of white spot lesions as a supplementary positive influence due to a refractive index similar to that of enamel. (Saxena et al., 2021)

Visible developmental enamel defects, poor aesthetics, and a sense of feeling different may have psychosocial impacts and particularly adverse effects on social interactions and self-esteem in young people. (Coffield et al., 2005) Applying minimally invasive dental treatment to reduce the visibility of enamel opacities has already been shown to impact children's well-being positively. (Hasmun et al., 2018)

Autism spectrum disorder (ASD) is a disorder of neurodevelopment, defined as a persistent deficit in social communication and patterns in the behavior of interest or restricted and repetitive activities. (American Psychiatric Association, 2013) Because it is a spectrum, there is variation in individuals, from mild cases with great independence and social inclusion to more severe cases. (Tchaconas & Adesman, 2013) Previous studies on self-concept in adolescents with ASD have shown that they perceive themselves as less competent in various domains, including social, athletic, and peer likability. They also have lower overall global self-worth compared to neurotypical adolescents. (Goddard et al., 2017)

Dental fluorosis (DF) is a specific aesthetic disturbance. It is a chronic condition where enamel development is disrupted, and the resulting enamel is hypomineralized. (Di Giovanni et al., 2018) Clinically, DF is characterized by white

opacities that vary from small spots and lines to more extensive areas. Brown stains and superficial pitting characterize more pronounced fluorosis. (Schoppmeier et al., 2018) (Revelo-Mejía et al., 2021) Traditionally, microabrasion is the treatment of choice for fluorosis. However, during the ongoing COVID-19 pandemic, the usage of handpieces that produce aerosols and consequently increase the risk of contaminating the dental team and patients has been discussed. The biologic risk of COVID-19 inhalation transmission is exceptionally high when performing dental procedures due to the use of handpieces under irrigation, which favors the diffusion of aerosol particles of saliva, blood, and other secretions. (Meng et al., 2020) Therefore, the use of techniques that do not produce aerosols is encouraged.

The present article aims to present a treatment option for mild DF using resin infiltration (ICON) in a 15-year-old patient with autism spectrum disorder (ASD) through a case report with a 36-month follow-up.

2. Methodology

The type of study addressed was the case report, of a single patient, with an aesthetic complaint due to mild dental fluorosis; the proposed treatment was with a minimally invasive technique, using the resinous infiltrant. After the execution, this patient was monitored to assess stability, aesthetic gain, permanence, and patient motivation. The person responsible for the patient signed the Informed Consent Form.

3. Case Report

A 15-year-old boy diagnosed with ASD attended the dental clinic of Universidade Federal do Rio de Janeiro, Brazil, with a chief complaint of the discoloration of the anterior teeth and low self-esteem mainly caused by this problem. During the initial oral examination, opaque white areas in the enamel of all teeth were observed as compatible with “mild” DF (according to Dean’s index). It had a significant impact on aesthetic appearance (Figure 1ab). However, the patient had no caries lesions, and all his teeth were healthy.

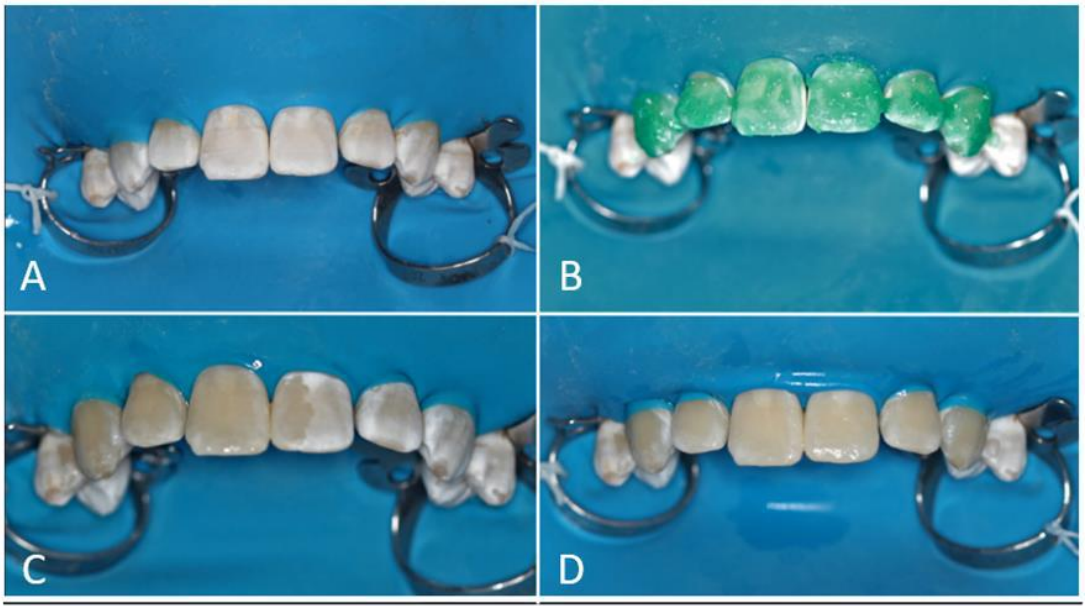
Figure 1A - Initial appearance of the smile. Evidence the presence of white spots in all anterior teeth. 1B- Intra-oral view before the resin infiltration.

Souce: Authors.

Considering the patient’s young age, more conservative treatment was proposed to improve his teeth condition. Therefore, the resin infiltration ICON (DMG, Germany) was chosen. After careful prophylaxis with pumice and water, the operative field was isolated with a rubber dam (Figure 2a). This technique was initially performed, according to the manufacturer’s instructions, on the maxillary canines and incisors. Subsequently, it was observed that the spots on the first premolars were quite evident when smiling, so they also were infiltrated one week later.

The first step included applying 15% HCl gel (ICON-Etch, DMG) for two minutes (Figure 2b). The etching gel was then thoroughly washed away using a water spray for 30 seconds. Next, the enamel surfaces were dried using ethanol (ICON-Dry, DMG) for 30 seconds, followed by air drying. Low viscosity resin (ICON-Infiltrant, DMG) was applied to the enamel surfaces of the eroded teeth and then allowed to penetrate for three minutes (Figure 2c), then excess material was removed with a cotton roll. After this infiltration, light-curing was performed for 40 seconds at 1400 mW/cm2 (Radii LED Curing Light, SDI, Bayswater, Australia). The application of the infiltrating resin was repeated on the same tooth once for one minute, followed by light curing again for 40 seconds (Figure 2d).

Figure 2: A) Dehydrated teeth right after the rubber dam isolation. B) application of 15% HCl gel in maxillary incisors and canines. C) Teeth infiltrated compared to the homologous that were not infiltrated yet. D) Incisors and canines after the resin infiltration.



Souce: Authors.

Improvements in the white spots were significant, and the aesthetic results were satisfactory (Figure 3 AB). Figures 4 and 5 show that the result was adequate and had stability 18 and 36 months after treatment.

Figure 3: A) Appearance of the smile immediately after the resin infiltration. B) Intra-oral view after the resin infiltration.

Souce: Authors.

Figure 4: 18 months clinical control. A) Right side view. B) Frontal view C) Left side view.

Souce: Authors.

Figure 5: 36 months clinical control. A) Right side view. B) Frontal view C) Left side view.

Souce: Authors.

3. Discussion

In the last two decades, fluoride exposure in various forms and vehicles is most likely the explanation for the worldwide decline of caries, concurrent with an increase in the prevalence of enamel fluorosis. The case presented showed a 15-year-old patient with ASD with mild fluorosis.(Aoba & Fejerskov, 2002) The technique of the first choice for the treatment of dental fluorosis is non-invasive or minimally invasive procedures. (Schoppmeier et al., 2018) Therefore, the treatment chosen in this case proved to be an excellent option, primarily because of the patient's age, good teeth, and periodontal condition.

A study in Brazil evaluated the effects on oral-health-related quality of life (OHRQoL) of two treatment protocols for DF in people over 15 years of age. The study showed significant improvement in smiling, laughing, and showing teeth without embarrassment after treatment. Also, problems with eating and enjoying food, cleaning teeth, and maintaining one's typical emotional state without being irritable showed a statistically significant reduction. (Meireles et al., 2018) Furthermore, since adolescence is a stage in which patients desire great aesthetic appeal, the patient in the present case reported improvement in self-esteem and improved socialization in school after treatment.

Although there is no difference between the prevalence of fluorosis in children with ASD and healthy neurotypical children, patients with ASD have salivary pH and buffering capacity that is lower when compared with others. Thus, awareness regarding the oral health of all children among parents, caregivers, and instructors should be emphasized to reinforce preventive oral hygiene measures for the oral and general well-being of the child. (Bhandary & Hari, 2017)

A systematic review concluded that the resin infiltration technique is a feasible option for color-masking whitish enamel discolorations resulting from both white spot lesions and enamel-development defects. (Borges et al., 2017) On the other hand, another systematic review showed that resin infiltration seems more effective in mild to moderate aesthetic treatment than bleaching and microabrasion. No additional gains were found compared to conventional resin infiltration by increased application time of the etchant on enamel or combination with bleaching. (Di Giovanni et al., 2018)Thus, there is

still a need for long-term clinical trials with large samples to evaluate the stability of the esthetic changes. The use of resin infiltration in different types of stains and opacities also should be studied.

A randomized clinical trial showed that resin infiltration alone could effectively mask mild to moderate DF in young adults. Still, the association with in-office bleaching before resin infiltration provides significantly better masking effects. (Schoppmeier et al., 2018) (Zotti et al., 2021) In-office bleaching combined with resin infiltration can also result in the successful aesthetic treatment of brown and white stains caused by enamel fluorosis. (Perdigão et al., 2017) In our case, only resin infiltration was performed. In-office bleaching was suggested to the patient after the resin infiltration, but he was delighted with the results obtained and rejected the proposal.

Due to the characteristics of dental settings, the risk of cross-infection may be high between dental practitioners and patients. Therefore, for dental practices and educational institutions in countries/regions that are (potentially) affected by COVID-19, strict and effective infection-control protocols are urgently needed. (Meng et al., 2020) In addition, the use of rubber dams can significantly minimize the production of saliva- and blood-contaminated aerosol or spatter, particularly in cases when high-speed handpieces are used. (Peng et al., 2020)

4. Conclusion

The aesthetic result was immediate and satisfactory with color stability and is under follow-up study for 36 months. Resin infiltration is an effective choice for treating mild fluorosis, mainly because of its easy application and low chair time, meeting the expectations of the patient and his family. There remains question for future works, do children of different ages perceive the aesthetic gain in the same way? Are the procedure time and the way younger children deal with it equivalent?

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