



Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/gie



ORIGINAL ARTICLE/ARTICOLO ORIGINALE

Influence of different pulp capping materials to induce coronal tooth discoloration



Influenza di differenti materiali da incappucciamento diretto nel provocare discolorazione dentale coronale

Natália Gomes e Silva Leonardo, Luiza Helena Silva Almeida, Ayumi Kodama, Marcos Jacobovitz, Alexandre Severo Masotti, Junia Carolina Linhares Ferrari, Fernanda Geraldés Pappen*

Department of Semiology and Clinics, Federal University of Pelotas UFPel, Pelotas, RS, Brazil

Received 18 September 2015; accepted 6 April 2016

Available online 25 April 2016

KEYWORDS

Calcium aluminate cement;
Color stability;
MTA;
Staining susceptibility.

Abstract

Aim: This study aimed to evaluate the influence of white MTA, gray MTA, calcium hydroxide and calcium aluminate cement (CAC) in tooth color when used as pulp capping materials.

Methodology: Extracted third molars were used ($n = 50$). According to the experimental groups, a 2 mm layer was placed in the pulp canal chamber: Group 1 – White MTA; Group 2 – Gray MTA; Group 3 – CAC; Group 4 – calcium hydroxide paste followed by calcium hydroxide cement. In the control group white gutta-percha was used. Vestibular, lingual, mesial and distal color readout was performed at baseline and after 30 days. Images were captured using a digital camera Nikon D80 and shade evaluation performed using Photoshop 7.0. The blue channel in red, green and blue color mode (RGB) was used to measure chromatic changes in a scale from 0 (darkest) to 255 (lightest). The data were evaluated by univariate analysis.

Results: All teeth showed some discoloration after 30 days. The mean variation of pixel intensity for the blue channel was similar between groups. However, considering the mean pixel intensity for the blue channel after 30 days, teeth where CAC was used were significantly darker than those from the control group.

* Corresponding author at: Federal University of Pelotas, Faculty of Dentistry, Rua Gonçalves Chaves, 457/507, CEP 96015-560 Pelotas, RS, Brazil. Tel.: +55 53 84033599.

E-mail: ferpappen@yahoo.com.br (F.G. Pappen).

Peer review under responsibility of Società Italiana di Endodonzia.



Production and hosting by Elsevier

<http://dx.doi.org/10.1016/j.gien.2016.04.003>

1121-4171/© 2016 Società Italiana di Endodonzia. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

PAROLE CHIAVE

Cemento alluminato di calcio;
Stabilità di colore;
MTA;
Suscettibilità al discoloramento.

Conclusions: This study demonstrated that all tested materials induced teeth shade changes after 30 days of simulated pulpotomy. The mean variation of color was similar between groups and CAC caused the higher color change.

© 2016 Società Italiana di Endodonzia. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Riassunto

Obiettivi: Questo studio ha lo scopo di valutare l'influenza di MTA bianco, MTA grigio, idrossido di calcio e cemento alluminato di calcio (CAC) sul colore dei denti se usati come materiale da incappucciamento diretto.

Metodologia: Sono stati utilizzati n = 50 terzi molari estratti. Uno strato di 2 mm di materiale è stata posizionato nella camera pulpare a seconda dei gruppi sperimentali: Gruppo 1 - MTA bianco; Gruppo 2 - MTA grigio; Gruppo 3 - CAC; Gruppo 4 - Pasta di idrossido di calcio seguita da cemento idrossido di calcio. Nel gruppo di controllo è stata utilizzata guttaperca bianca. La lettura del colore è stata eseguita vestibolare, linguale, mesiale e distale al momento dell'incappucciamento e dopo 30 giorni. Le immagini sono state catturate utilizzando una fotocamera digitale Nikon D80 e la valutazione del colore eseguita utilizzando Photoshop 7.0. Il canale blu in modalità rosso, verde e blu (RGB) è stato utilizzato per misurare le variazioni cromatiche in una scala da 0 (più scuro) a 255 (più chiaro). I dati sono stati valutati da analisi univariata.

Risultati: Tutti i denti ha mostrato scolorimento dopo 30 giorni. La variazione media di intensità dei pixel è risultata simile tra i gruppi. Tuttavia, considerando i valori dopo 30 giorni, i denti in cui è stato usato il CAC erano significativamente più scuri rispetto a quelli del gruppo di controllo.

Conclusioni: Questo studio ha dimostrato che tutti i materiali testati hanno indotto cambiamenti di colore dopo 30 giorni dalla pulpotomia. La variazione media del colore è stata simile tra i gruppi ma il CAC ha causato il cambiamento di colore più alto.

© 2016 Società Italiana di Endodonzia. Production and hosting by Elsevier B.V. Cet article est publié en Open Access sous licence CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Introduction

Although slight discoloration may be reversible,¹ the poor aesthetic appearance of teeth involved in endodontic procedures is an ongoing concern for clinicians and significantly affects patients' quality of life. Thus, partial and total pulpotomy procedures should not focus solely on biological and functional aspects, once aesthetic must be taken into account as well.

Partial or total pulpotomy is the treatment of choice for immature permanent teeth with exposed pulps, since definitive endodontic root canal filling will result in thin root canal walls and predisposition to fractures.^{2,3} The maintenance of the vital pulp tissue contributes to the production of secondary dentin, peritubular dentin (sclerosis) and reparative dentin in response to biological and pathological stimuli.⁴ Indeed, a vital functioning pulp seems to be the best barrier for protection from microorganisms that may invade the pulp tissues.^{5,6}

For decades calcium hydroxide has been the first choice among the available pulp capping materials. More recently, however, mineral trioxide aggregate (MTA) has been used as an alternative to calcium hydroxide materials in pulpotomy treatments.^{7,8} It has been reported that MTA can induce a thicker dentinal bridge with no tunnels or imperfections, in comparison to calcium hydroxide.^{9,10} However, some studies have mentioned negative features like the discoloring effect when both white or gray MTA are used as a pulpotomy agent.^{11–18}

Consequently, the development of new materials presenting favorable biologic and physicochemical properties are valuable due to the absence of an ideal pulp capping material.¹⁷ Recently, a novel calcium aluminate cement (Patent Number PI0704502-6, 2007 – Endobinder, Binderward, São Carlos, SP, Brazil) produced by the process of Al_2O_3 and $CaCO_3$ calcination at temperatures ranging from 1315 to 1425 °C¹⁸ was developed. In the process of synthesis of this calcium aluminate-based cement, the levels of impurities such as Fe_2O_3 are controlled, what diminished tooth darkening.¹⁶

Thus, the present study aims to evaluate the influence of white MTA, gray MTA, calcium hydroxide and calcium aluminate cement in tooth color when these materials are used as pulp capping materials. The null hypothesis tested was that there would be no difference in the staining capacity of the tested cements.

Materials and methods**Sample preparation**

For this study, 50 intact freshly extracted upper and lower third molars were selected. The teeth extractions were performed after clinical and radiological examinations. All procedures were in accordance with the Ethical Committee of the Faculty of Dentistry, Federal University of Pelotas, Brazil (document n. 148/2010).

Download English Version:

<https://daneshyari.com/en/article/3131326>

Download Persian Version:

<https://daneshyari.com/article/3131326>

[Daneshyari.com](https://daneshyari.com)