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In-office bleaching with a two- and seven-day intervals between clinical sessions: A randomized clinical trial on tooth sensitivity

Q1 Eloisa Andrade de Paula [a], Jéssica Andressa Nava [a], Cheilla Rosso [a], Cristina Monteiro Benazzi [a], Karen Tamura Fernandes [a], Stella Kossatz [b], Alessandro Dourado Loguercio [b], Alessandra Reis [b,*]

[a] School of Dentistry, Paranaense University, Umuarama, Paraná, Brazil
[b] School of Dentistry, State University of Ponta Grossa, Ponta Grossa, Paraná, Brazil

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ABSTRACT

Objectives: In-office bleaching is usually performed in 2–3 sessions with one-week interval. The impact of shorter interval times on tooth sensitivity has not been evaluated. This study aimed to compare the absolute risk of tooth sensitivity (TS) and colour change after in-office bleaching with a two- and seven-day intervals between sessions.

Methods: We selected for this randomized, single-blind study, 40 patients with colour C2 or darker. We performed two bleaching sessions with a 35% hydrogen peroxide gel with either a 1-week or 2-day interval. We recorded the TS up to 48 h with a VAS scale and the colour at baseline and 30 days after bleaching with a value-oriented shade guide and a spectrophotometer. The risk and intensity of TS were compared with the Fisher's exact test and two-way repeated measures ANOVA. Colour change (ΔSGU and ΔE) were evaluated by Student's t-test (alpha = 5%).

Results: Approximately 60% of the participants reported TS (65% and 55% for the 7 and 2-day groups). A significant whitening of approximately 6 shade guide units was detected for both groups. No difference was detected between groups.

Conclusions: The reduction of the interval between bleaching sessions from seven to two days reduced the treatment time without increasing the bleaching-induced TS (clinicaltrials.gov identifier: NCT1959789). Q3

Clinical significance: In-office bleaching with a 2-day interval did not increase the risk and intensity of bleaching-induced tooth sensitivity.

1. Introduction

Bleaching is the most conservative treatment for discoloured teeth. Since the introduction of carbamide peroxide for at-home bleaching,[1] new bleaching techniques have been developed. Although at-home bleaching achieves a high success rate and it is the most widely used technique by clinicians for bleaching vital teeth,[2,3] some patients do not want to use a bleaching tray or do not want to wait two to three

* *Corresponding author at*: Universidade Estadual de Ponta Grossa, Faculdade de Odontologia, Rua Carlos Cavalcanti, 4748, CEP 84030-900, Brazil. Tel.: +55 42 30277898. Q2
E-mail addresses: reis_ale@hotmail.com, alereis@uepg.br (A. Reis).
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weeks to see the results of the treatment. These patients typically prefer a method that produces more immediate results. In such cases, in-office bleaching is an alternative bleaching option since the dental professional can perform the in-office bleaching at the same day the patient visits the dental office. This method of tooth whitening has been around for many years and remains popular because some degree of whitening can be seen after one clinical appointment.

However, a single in-office bleaching session[4–7] seems not to be enough to whiten teeth effectively and reach patient's satisfaction.[8,9] Usually two or three visits should be performed to achieve effective whitening with colour stability.[9–12] This has the disadvantage of prolonging the time needed to reach satisfactory results, since these visits are usually arranged with at least one week interval.[13–19]

Although this one-week interval is not an evidence-based decision, it may be due to the clinician's concern of producing severe pulp damage and increase the TS levels. Bleaching-induced tooth sensitivity (TS) affects more than 70% of the patients.[14,19–21] This TS usually starts during bleaching and ceases 24–48 h after the procedure.[16,20–22] From the professional and patient standpoint, in-office bleaching with shorter intervals between sessions could allow faster results.

To the best of the author's knowledge, there is no clinical study that investigated the effect of the interval time between in-office bleaching sessions on the risk and intensity of bleaching-induced TS. Therefore, this study attempted to investigate the risk and intensity of bleaching-induced TS after in-office bleaching with a two or seven-day intervals between sessions. The null hypotheses of the present study were (1) the 7-day and 2-day groups will yield the same bleaching effectiveness and (2) both groups will have the similar risks of bleaching-induced TS.

2. Materials and methods

This clinical investigation was approved (protocol number 22564/2011) by the Ethics Committee for the protection of human subjects of the University of Umuarama, Paraná, Brazil. The experimental study was described according to the Consolidated Standards of Reporting Trials statement.[23]

Two weeks before the bleaching procedures, selected volunteers from the city of Umuarama, (Paraná, Brazil) received a dental screening and a dental prophylaxis with pumice and water in a rubber cup and signed an informed consent form.

2.1. Study design

This was a randomized, single-blind (evaluators), parallel and equivalence trial with an equal allocation rate between groups. The study was conducted at the School of Dentistry, Paranaense University in Umuarama, Paraná from August 2011 to August 2012.

2.1.1. Inclusion and exclusion criteria

Participants included in this clinical trial were at least 18 years old and had good general and oral health. Participants were recruited by means of visual communication through posters in the university and in stores at Umuarama city. A total of 116 participants were examined in a dental chair to check if they met the inclusion and exclusion criteria (Fig. 1). The participants should have at least six maxillary and mandibular anterior teeth caries-free and without restorations on the labial surfaces. The central incisors should be C2 or darker according to a value-oriented shade guide (Vita Lumin, Vita Zahnfabrik, Bad Säckingen, Germany). Participants with pre-existing anterior restorations, pregnant/lactating, with severe internal tooth discoloration (tetracycline stains, fluorosis, pulpless teeth), taking any drug with anti-inflammatory and antioxidant action, bruxism habits or any other pathology that could cause TS (such as recession, dentine exposure) were excluded from this study to minimize confounding experimental variables.

2.2. Sample size calculation

We selected the absolute risk of TS as the primary study outcome. Considering the absolute risk of TS to be approximately 90%,[19] 40 participants were required to be 90% (study power) sure that the limits of a two-sided 90% confidence interval will exclude a difference between the standard and experimental group of more than 30% (equivalence limit).

2.3. Study intervention

We randomly divided the participants in the 2-day and 7-day groups. A third operator, not involved in the research protocol, conducted the randomization process, which recorded the details of the allocated groups on cards placed in sequentially numbered, opaque and sealed envelopes. Once the participant was eligible for the procedure and completed all baseline assessments, the operator could open the envelope. Neither the participant nor the operator knew the group allocation before this stage.

We isolated the gingival tissue of the teeth using a light-cured resin dam (Top Dam, FGM, Joinville, SC, Brazil). The 35% hydrogen peroxide gel (Whiteness HP Blue, FGM, Joinville, Brazil, Table 1) was applied in a single 40-min application according to the manufacturer's directions in all upper incisors, canines and premolars. After 2 days (2-day group) and 7 days (7-day group), this procedure was repeated using the same protocol. We instructed all participants to brush their teeth at least three times daily using fluoridated toothpaste (Sorriso Fresh, Colgate-Palmolive, São Paulo, SP, Brazil). The lower arch was also bleached in another clinical session, but data was not collected from this arch.

2.4. Shade evaluation

We recorded the shade evaluation before and 30 days after the end of the bleaching treatment using a subjective (value-oriented shade guide Vita Lumin, Vita Zahnfabrik, Bad Säckingen, Germany) and an objective method (Easyshade spectrophotometer, Vident, Brea, CA, USA). Colour evaluation was done in a room under artificial lightning conditions without interference from outside light.

For the subjective examination, we arranged the shade guide's 16 tabs from highest (B1) to lowest (C4) value, making

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