ADA CE Program ARTICLE 2

Effect of preventive use of nonsteroidal anti-inflammatory drugs on sensitivity after dental bleaching

A systematic review and meta-analysis

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Bleaching procedures have a high success rate for the treatment of discolored teeth; however, sensitivity after dental bleaching reported by patients remains a challenge for clinicians.[1-5] Tooth sensitivity, related mainly to in-office bleaching by using high-concentration peroxides,[6] occurs most commonly within the first 24 hours after treatment.[7,8] Clinical trial investigators have demonstrated that 30% to 80% of patients who undergo in-office bleaching report tooth sensitivity.[9,10] Although

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ABSTRACT

Background. Tooth sensitivity associated with bleaching remains a challenge for clinicians. Inflammatory mediators released by the penetration of bleaching agents into dental tissues can sensitize nociceptors, leading to tooth sensitivity.

Type of Studies Reviewed. In this systematic review, the authors included randomized clinical trials in which the investigators compared the preventive use of nonsteroidal anti-inflammatory drugs (NSAIDs) with a placebo for sensitivity after dental bleaching. The authors included only studies in which the investigators evaluated in-office tooth bleaching with high-concentration hydrogen peroxide and reported the risk or the level of tooth sensitivity after bleaching.

Results. The authors included 3 studies and evaluated the levels of sensitivity reported at up to 1 hour after the procedure and from 1 to 24 hours after bleaching. The authors also calculated the pooled relative risk for the effect of preventive use of NSAIDs on sensitivity after dental bleaching. Preventive analgesia with NSAIDs did not have a significant effect on the risk of sensitivity after dental bleaching or on the levels of sensitivity reported by patients.

Practical Implications. There is insufficient evidence about the use of NSAIDs to prevent tooth sensitivity caused by in-office bleaching procedures.

Key Words. Nonsteroidal anti-inflammatory drugs; tooth bleaching; sensitivity, tooth; prescriptions, drug.
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this tooth sensitivity is transitory, it can lead to treatment interruption and compromise the results.

Sensitivity after dental bleaching is associated with the presence of hydrogen peroxide and its degradation products in the pulp chamber.[3,7,11,12] Free radicals released by hydrogen peroxide result in inflammatory processes and hyperalgesia.[7] Thus, considering the relationship between sensitivity after dental bleaching and pulpal inflammation, the preventive use of anti-inflammatory agents is an interesting approach that may reduce the dentin hypersensitivity associated with tooth whitening. However, scientific evidence from clinical trials is necessary to permit the indication of preventive analgesia for sensitivity after dental bleaching. The aim of this systematic review and meta-analysis was to analyze the effect of preventive analgesia with nonsteroidal anti-inflammatory drugs (NSAIDs) on tooth sensitivity associated with in-office bleaching.

METHODS

We conducted this systematic review and meta-analysis according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement,[13] supplemented by guidance from the Cochrane Collaboration handbook.[14] We designed a protocol for this systematic review a priori and registered it in the PROSPERO database (registration number CRD42014010761).

Eligibility criteria. We used the following inclusion criteria in this analysis: randomized clinical trials (RCTs) in which the investigators compared the preventive use of NSAIDs with a placebo for sensitivity after dental bleaching, studies with samples consisting of patients who underwent in-office tooth bleaching with high-concentration hydrogen peroxide, and studies in which the investigators reported the risk or the level of tooth sensitivity after bleaching. We excluded studies if they met any of the following criteria: studies with no placebo group, studies from which we were unable to extract data regarding the risk or level of tooth sensitivity, and duplicate studies.

Search strategy. We performed a systematic search without language restriction to identify relevant studies from the MEDLINE electronic database. To retrieve RCTs in PubMed, we used a filter for therapy-related clinical questions optimized for increased sensitivity (70-90%), as suggested by Haynes and colleagues.[15] The full electronic search strategy is illustrated in the eTable (available online at the end of this article). In addition, we searched trials electronically at ClinicalTrials.gov by using the following terms: *tooth bleaching* and *anti-inflammatory*. We also scanned the reference lists of all eligible studies and reviews manually to identify additional studies for potential inclusion. We performed the search April 30, 2014. Two authors (F.P.S.N. and M.T.G.F.) screened titles and abstracts of identified studies for eligibility. The reviewers were not masked to the authors or journals.

Data extraction. Using a standardized data extraction sheet, we extracted and recorded the following information from the studies: authors, year of publication, total sample size, age, preventive protocol, bleaching agent, and data about the risk of tooth sensitivity in the placebo and experimental groups. For the level of sensitivity, we used only data obtained from visual analog scales (VASs), and we standardized the scores from 0 to 100.

Risk of bias assessment. We assessed the risk of bias according to the Cochrane guidelines for clinical trials.[14] We assessed 7 domains for evaluation: sequence generation (selection bias), allocation concealment (selection bias), masking of participants and personnel (performance bias), masking of outcome assessment (detection bias), incomplete outcome data (attrition bias), selective outcome reporting (reporting bias), and other potential sources of bias.

Data synthesis and grading. The outcome variables we used for combining the results related to the levels of sensitivity were the pain intensity scores up to 1 hour after the bleaching procedure and from 1 to 24 hours after bleaching. Because the outcome measure data were the mean and standard deviation, the effect size for this meta-analysis was the standardized mean difference (SMD) expressed in standardized units. A negative effect size indicated that preventive analgesia with NSAIDs was effective, and a positive value indicated that analgesia was ineffective. A point value of 0 indicated that the treatment had no effect. We also calculated the pooled relative risk for the effect of preventive use of NSAIDs on sensitivity after dental bleaching. We used a forest plot to present the effect sizes and the 95% confidence intervals (CIs) graphically. Each study was represented by a square in the plot that was proportional to the study's weight in the meta-analysis. We used a 2-tailed P value less than .05 to indicate a significant difference.

We assessed statistical heterogeneity by using the Cochran Q test and quantified it by using the I^2 index. In the presence of a high level of heterogeneity, we selected a random-effects model to pool the data by using the DerSimonian-Laird method, assuming that the results for individual studies vary around a pooled estimate. For all outcome measures, we also performed subgroup analysis according to the type of anti-inflammatory drug. We conducted all analyses by using software (Review Manager Version 5.3, Cochrane IMS).

ABBREVIATION KEY. **COX:** Cyclooxygenase. **GRADE:** Grading of Recommendations Assessment, Development and Evaluation. **NA:** Not applicable. **NSAID:** Nonsteroidal anti-inflammatory drug. **RCT:** Randomized clinical trial. **VAS:** Visual analog scale.