ORIGINAL RESEARCH ARTICLE

Comparison of the clinical efficacy of at-home and in-office bleaching

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Abstract

Background: There is a lack of consensus regarding the superiority of the two vital bleaching methods. Aims: To compare the clinical efficacies of the two methods at home and in- office. Materials & Methods: Data was collected from PubMed, Embase, Cochrane, Lilacs, Scielo and BBO. Two independent researchers selected the articles, ie., only randomized clinical trials. Where there was no initial agreement, researchers reached a consensus. The search strategy initially yielded 483 titles. After the exclusion by titles, 408 articles remained and following the abstract-based evaluation, only 5 were subjected to further analysis. Results: The most of the authors did not find any statistically significant differences between at home and in-office bleaching procedures. Conclusion: Both the at home and in-office methods alone or in association are equally efficient when a 14 day protocol is used.

Key Words: Dentistry;Operative Dentistry;Dental Bleaching

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Introduction

Dental bleaching is one of the most common cosmetic procedures performed. The two methods most frequently applied for such purpose are the in-office and at-home techniques both of which use hydrogen peroxide-based bleaching agents.(1-9) At present, however, there appears to be no consensus regarding which method is more efficient.(10-12) The aim of this study was compare the clinical efficacies of the two methods at home and in- office.

Materials and Methods

A systematic literature search was performed in the following electronic databases: PubMed, Embase, Cochrane, Lilacs, Scielo and BBO. The search criteria included all articles available upto January 2009. Keywords and their corresponding synonyms in both English and Portuguese were used. The search strategy is described on Table 1. As expected, the number of articles gradually decreased as the search progressed. The search was stopped when the number of articles was sufficiently reduced without the risk of leaving out relevant studies. Article titles were evaluated by two independent examiners (A.G.G.C. e A.A.M.V.). The articles were selected for further consideration if they satisfied the following inclusion criterion: Present in their title any word related to dental bleaching.

Keywords	Keyword combinations
Search #1 (Dent / Odont)	Search #5 (#1 , #2)
Search #2 (Bleaching / Whitening / Clareamento /Branqueamento)	Search #6 (#5 , #3)
Search #3 (Home / At Home /At-Home /Office / In Office / In-Office / Caseiro / Consultorio)	Search #7 (#6 , #4)
Search #4 (Efficacy / Comparison /Effect / Effectiveness / Efficiency / Eficacia /Comparaçao / Efeito /Eficiencia)	

Table 1. Search strategy sequence

Isolated keywords
Search Update #1 (bleaching / whitening) , dentistry , home , Office
Search Update #1 (clareamento / branqueamento),odontologia , caseiro , consultorio

Table 2. Strategy sequence in the search update

BASES	Search #1	Search Update	Search #2	Search #3	Search #4	Search #5	Search #6	Search #7
BBO	20.875	0	303	611	3.468	302	48	*
Cochrane	46	0	8	*	*	*	*	*
Embase	422.849	1	7.372	174.120	4.554.631	1.164	206	133
Lilacs	43.427	0	370	8.887	41.364	272	46	*
PubMed	479.147	2	5.461	180.716	2.778.858	1.793	393	181
Scielo	8.094	0	101	1.144	23.378	29	*	-

Table 3. Final search result by database. (Total number of titles after searches in all databases 485 *A search was not necessary)

	Auschill 2005(16)	Bizhang 2009(15)	Bernardon 2010 (14)	Kugel 1997 (18)	Zekonis2003 (17)
Bleaching method	A–At home (Strips) B–At home (Tray) C–In-office	A–At home (Tray) B–In-office C-At home (Strips)	A–In-office with light + at-home (Tray) B–In-office with light + In-office Without luz C.1-In-office with light + At home (Tray) C.2 At home (Tray)	A-In-office + at- home (Tray) B-In-office	A At home (Tray) B–In-office
Bleaching agent	A-PH** 53% Strips B-PC***10% at-home C-PH**38% In-office	A-PC***10% at-home B-PH**15% In-office C-PH** 6% Fitas	A-PH**35%in-office with light+PC***10% at-home B-PH**35% In-office with light + PH**35% In-office with light C-1PH**35%In-office with light + PC***10% at -home C.2PC***10% at- home	A-PC*** 35% In-office +PC*** 15% at-home B-PC*** 35% In-office	A-PC*** 10% At-home B-PH** 35% In-office
Trademark name	A-Whitestrips B-Opalescense PF C-Opalescense Xtra Boost	A-Illumine, Home, Dentsply B-Illumine, Office, Dentsply C-blend-a-med white strips, Procter & Gamble	A-PH**Whiteness HP maxx, FGM + PC*** Whiteness Perfect, FGM B-PH**Whiteness HP maxx, FGM + PH**Whiteness HP maxx, FGM C.1 PH** Whiteness HP maxx, FGM + PC***Whiteness Perfect, FGM C.2PC***Whiteness Perfect, FGM	A-Rembrandt accelerate bleaching system + Quik Start + Rembrandt Gel Plus B- Rembrandt Quik Start	A-Opalescense Tooth Whitening Gel B-tarBrite
Study duration	A-30 min, 2x/d, during 16 days B-8 h at night, during 7 days C-15 min, single application (1day)	A–8hrs at night during 2 weeks B-45min, 1x / week during 3 weeks C-2 30min/day applications during 2 weeks	A-PH** (Three 15min applications / appointment during 2weeks) + PC***(8hrs at night during 2 weeks) B-PH(Three 15 min applications/appointment during 2 weeks) + PH(Three 15 min applications / appointment during 2 weeks)) C.1 PH** (Three 15min applications / appointment during 2 weeks) + PC*** (8h at night, during 2 weeks) C.2 PC***(8h at night, during 2 weeks)	A–In-office: 15 min/week, during 2 weeks At home: 1h, 2x/d, during 5 days B-15 min/week, during 2 weeks	A –2 weeks B–Two 30min applications/week during 2 weeks
Evaluation methods	Photographs + "Vita" Scale	Colorímeter + "Vita" Scale	Spectrophotometer + "Vita" Scale	Photographs + "Vita" Scale + Level of patient acceptance	Photographs + "Trubyte Scale Bioform Color Ordered" + Colorímeter
Results	No bstatistically significant differences between groups.	At home bleaching (trays) eand in-office bleaching. Same clinical efficacy. At home bleaching showed (strips) inferior results.	At home bleaching = In-office bleaching = Association at home/ in-office bleaching	Association at home/ in-office bleaching was more efficient	At home bleaching is better than in-office bleaching

Table 4. Bleaching protocols, evaluation methods and results **Hydrogen Peroxide ***Carbamide Peroxide

An exclusion criterion was the lack of relevance to the object of study proposed such as for example, traditional literature reviews, pilot studies, case reports, as well as, studies on non-vital bleaching or that used whitening toothpastes. At the end of this stage 483 titles were selected. The level of inter examiner agreement was determined by calculating the Kappa coefficient and was found to be "very good" (0.997), according to the classification proposed by Altman (1991).(13)

When selection disagreements occurred, they were discussed until a consensus was reached regarding the titles that were to be maintained (408 articles). The same procedure was used to eliminate articles based on their abstracts. In addition, at this stage, animal studies and studies in vitro were also eliminated. Remaining, thus for the further analysis were

Criteria	Auschill (16)	Bernardon (14)	Bizhang (15)	Kugel (18)	Zekonis (17)
Group sample size	13	15	30	10	10
Sample calculation?	Unknown	Unknown	Unknown	Unknown	Unknown
Random selection?	Yes	Yes	Yes	Yes	Yes
Report of dropout rates?	No	No	No	No	No
Ausência de erro de "performance"?	Yes	Yes	Yes	Yes	Yes
Adequate statistical test?	Partially*	Yes	Yes	Yes	Unknown
Blind study?	Yes	Yes	Yes	Yes	Yes
Split mouth study?	No	No	No	No	Yes
Risk of error?	Medium	Low	Low	Low	Medium

*the author performed two statistical tests but only one was adequate for the purpose of the study.
Table 5. Quality assessment of the articles selected.

only randomized controlled clinical trials studies where either the sample size was smaller than 10. The studies where there were no control groups were also excluded. Four articles remained, one of which was in duplicate. Thus, at the end, only three full-text articles thought to be relevant to the object of the study were analyzed by both examiners. In January 2010 complementary search updates were performed before submission of this systematic review for publication. In all databases, a simplified search strategy was used (Table 2). This was done to make future updates more practical. A second motive was to investigate whether search #4 was not excessively limiting. In Pubmed and Embase, only words in English were used, whereas in the other databases words in Portuguese were also utilized. In PubMed, nine articles were found but only two met the inclusion criteria.(14, 15) In Embase, only one article arose and it was one of the articles already selected from the Pubmed search. Searches in the other databases did not yield additional articles.

Results

The final result of the search strategy implemented is presented on Table 3. The full-text articles considered for analysis were those produced in the search column before the asterisks, as well as, those raised in the search update. The bleaching protocols performed in the articles selected, the evaluation methods utilized and the results are detailed on Table 4.

Auschill et al. (16), Bernardon et al. (14) and Bizhang et al.(15) were not reported any statistically significant differences between the two groups in regard to efficacy of whitening (Table 4). Only Zekonis et al.(17) observed that at-home bleaching is more efficient than the in-office method (Table 4). In Kugel et al.(18) it was shown that the association of the at-home / in-office methods is more efficient than the in-office technique alone (Table 4).

Quality assessment of the five articles selected was based on the Cochrane Collaboration criteria.(Table 5) The fulfillment of five or more quality criterions corresponds to a low risk of error, three or more to a medium risk and less than three were of high risk.

Discussion

Using a systematic review approach the present study evaluated two methods of dental bleaching: the at-home and in-office methods. The small number of studies analyzed was due to the rigorous inclusion criteria established in which only randomized controlled clinical trials were selected (RCCT's). This, of course, increases the strength of the results.(19, 20) According to the Cochrane Collaboration quality criteria the studies by Bernardon et al.(14), Bizhang et al.(15) and Kugel et al.(18) have low risk of error, i.e. very high level quality studies (Table 5).

The findings of this systematic review appear to break the paradigm that in-office bleaching is more efficient than the at-home modality. Bernardon et al.(14) and Bizhang et al (15) observed that there were no statistically significant differences between the two methods. Kugel et al.(18), on the other hand, showed that the association of the two techniques is more efficient than in-office bleaching alone. This makes us question whether the super valorization of in-office bleaching is not just a reflex of marketing campaigns promoted by the dental industry.

A positive aspect of the use of at home bleaching is the reduction of time in the dental office, which reduces operational costs and appears, in fact, to be an advantage. However, it must be pointed out that the need for patient collaboration is a disadvantage that must be considered since, the 14-day minimum at home protocol appears to be the most efficient.

Conclusion

It was concluded that during the first week of treatment both the in-office technique and the association in-office / at-home bleaching were more efficient than the at-home method alone. However, after 14 days the efficiencies of the three protocols (at-home, in-office or association at-home / in-office) were equivalent.

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