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A comparative analysis of different bleaching agents in primary and permanent teeth

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ABSTRACT

Background: The intrinsic stains can be treated by various measures such as internal bleaching of nonvital teeth, external bleaching of vital teeth. The present study was conducted to compared carbamide peroxide (CP), sodium perborate (SP) and hydrogen peroxide (HP) as bleaching agents in primary and permanent teeth.

Materials & Methods:

Results: The mean color value at day 0 in sub group I A was 9.6, in group IB was 10.4 and in group III A was 11.5, in sub group II A was 10.6, group II B was 10.7 and group III B was 11.3. The difference was non- significant (P> 0.05).The mean color value at day 0 in sub group I A was 3.9, in group IB was 6.8 and in group III A was 9.4, in sub group II A was 8.4, group II B was 8.7 and group III B was 8.8. The difference was non- significant (P> 0.05). The mean color value at day 0 in sub group I A was 2.7, in group IB was 6.5 and in group III A was 8.5, in sub group II A was 7.0, group II B was 7.8 and group III B was 8.3. The difference was non- significant (P> 0.05).

Conclusion: All bleaching found to be equally efficient in discolored primary teeth whereas CP was effective in discolored permanent teeth.

Key words: Bleaching agent, Primary teeth, Hydrogen peroxide

Introduction

The tooth discolorations are classified as extrinsic and intrinsic, where the extrinsic stains can be removed with the routine prophylactic measures in the dental office.[1] The intrinsic discolorations in the tooth might result from penetration of discoloring agents in the dentinal tubules, systemic

medications, excess water fluoridation, or due to by-products of the body such as bilirubin released into the dentinal tubules during illness. The intrinsic stains can be treated by various measures such as internal bleaching of nonvital teeth, external bleaching of vital teeth, microabrasion of enamel and prosthetic rehabilitation by crowns and veneers.[2] The intracoronal bleaching is an established, simple, cost-effective, and conservative method for improving the color of discoloured teeth in permanent and primary teeth. The advantage like minimal patient compliance makes the intracoronal bleaching technique more applicable in the children and young adolescents.[3]

The cause of tooth discolorations is multiple and can result from individual behavior, diseases, injury and other exposures along with various physiological processes.[1] Professional cleaning of discolored teeth is a common procedure to remove the majority of extrinsic strains. Various bleaching techniques and products are used to remove intrinsic stains: In-office or power bleaching, home bleaching, and over-the-counter bleaching products.[4] The intracoronal bleaching is an established, simple, cost-effective and conservative method for improving the color of discoloured teeth in permanent and primary teeth.[5] The hydrogen peroxide (HP) (30% and 35%), sodium perborate (SP), carbamide peroxide (CP) in different concentration are the most commonly used bleaching agents for permanent and primary teeth.[5] The present study compared efficacy of carbamide peroxide (CP), hydrogen peroxide (HP), sodium perborate (SP) as bleaching agents in primary teeth and permanent teeth.

Materials & Methods

An in vitro study was conducted on 30 primary teeth and 30 permanent extracted teeth with intact crowns.

Extracted teeth were cleaned to remove stains with centrifugation method and compared to the prestained state by means of Vita 3D Master Shade guide. The color change was recorded, and the stained teeth were photographed. After standard access cavity preparation, the root canals were cleaned and shaped using 5% sodium hypochlorite and normal saline for irrigation. Biomechanical preparation was done with K files, and the canals were subsequently enlarged using selective filing technique in deciduous teeth and step-back technique in permanent teeth. This was followed by obturation with zinc oxide eugenol in primary teeth and gutta-percha with root canal sealer using lateral condensation in permanent teeth. Teeth were divided into 3 groups, according to the bleaching material used in the pulp chamber in both permanent and primary teeth (subgroup A: 10% CP gel; subgroup B: 9.5% HP gel; subgroup C: 10% SP paste). In all samples, bleaching agent was syringed into the access cavity of the tooth and then sealed with temporary sealing material. After 7 days, color of bleached teeth was determined. The teeth were then again evaluated for their shade change after another 7 days. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table I Distribution of teeth

Groups	Group I (30)	Group II (30)
Subgroup	(Group IA) CP =10	(Group II A) CP =10
	(Group IB) HP= 10	(Group II B) HP =10
	(Group IC) SP= 10	(Group II C) SP=10

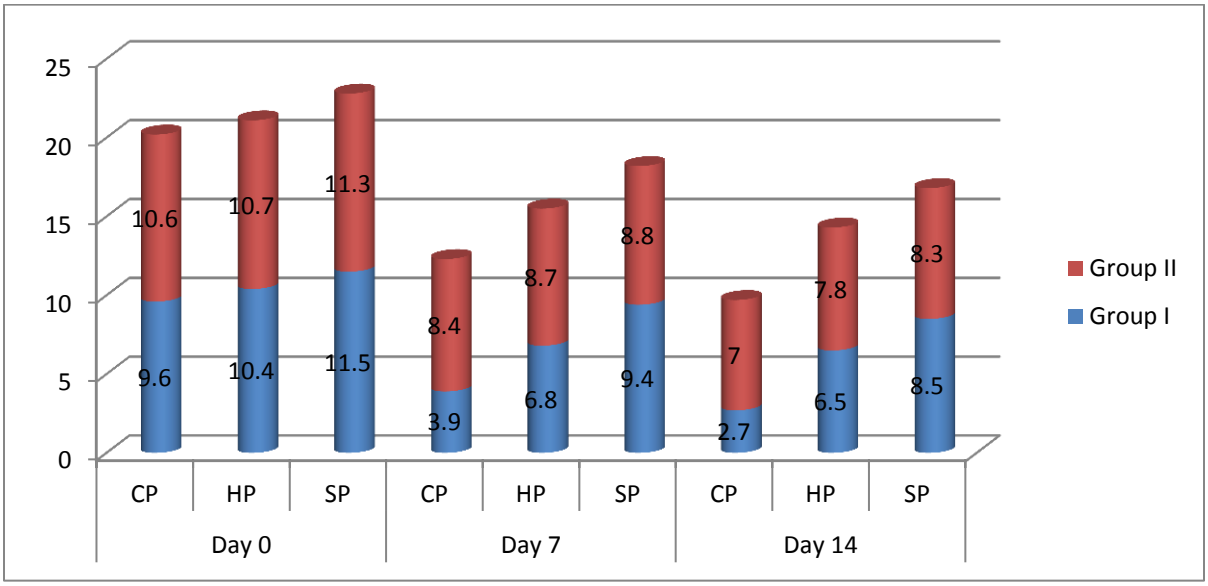
Table I shows that teeth were subdivided into subgroups based on bleaching agents used. Each sub group had 10 teeth.

Table II Mean values of the color change at different intervals

Day	Sub group	Group I	Group II	P value
Day 0	CP	9.6	10.6	0.05
	HP	10.4	10.7	0.80
	SP	11.5	11.3	0.82
Day 7	CP	3.9	8.4	0.01
	HP	6.8	8.7	0.02
	SP	9.4	8.8	0.15
Day 14	CP	2.7	7.0	0.02
	HP	6.5	7.8	0.05
	SP	8.5	8.3	0.17

Table II, graph I shows that mean color value at day 0 in sub group I A was 9.6, in group IB was 10.4 and in group III A was 11.5, in sub group II A was 10.6, group II B was 10.7 and group III B was 11.3. The difference was non- significant (P> 0.05).The mean color value at day 0 in sub group I A was 3.9, in group IB was 6.8 and in group III A was 9.4, in sub group II A was 8.4, group II B was 8.7 and group III B was 8.8. The difference was non- significant (P> 0.05). The mean color value at day 0 in sub group I A was 2.7, in group IB was 6.5 and in group III A was 8.5, in sub group II A was 7.0, group II B was 7.8 and group III B was 8.3. The difference was non- significant (P> 0.05).

Graph I Mean values of the color change at different intervals



Discussion

The tooth discolorations are classified as extrinsic and intrinsic, where the extrinsic stains can be removed with the routine prophylactic measures in the dental office.[3] The intrinsic discolorations in the tooth might result from penetration of discoloring agents in the dentinal tubules, systemic medications, excess water fluoridation, or due to by-products of the body such as bilirubin released into the dentinal tubules during illness.[6] The intrinsic stains can be treated by various measures such as internal bleaching of nonvital teeth, external bleaching of vital teeth, micro-abrasion of enamel and prosthetic rehabilitation by crowns and veneers. The European Scientific Committee on Consumer Products reported that the use of tooth whitening products containing >0.1 to 6.0% hydrogen peroxide or equivalent hydrogen peroxide-releasing substances is safe after consultation with a dentist.[7] The present study compared efficacy of carbamide peroxide (CP), hydrogen peroxide (HP), sodium perborate (SP) as bleaching agents in primary teeth and permanent teeth.

In this study, teeth were subdivided into 3 groups, according to the bleaching material used. We found that mean color value at day 0 in sub group I A was 9.6, in group IB was 10.4 and in group III A was 11.5, in sub group II A was 10.6, group II B was 10.7 and group III B was 11.3. The difference was non- significant (P> 0.05).The mean color value at day 0 in sub group I A was 3.9, in group IB was 6.8 and in group III A was 9.4, in sub group II A was 8.4, group II B was 8.7 and group III B was 8.8. The difference was non- significant (P> 0.05). The mean color value at day 0 in sub group I A was 2.7, in group IB was 6.5 and in group III A was 8.5, in sub group II A was 7.0, group II B was 7.8 and group III B was 8.3. Behl et al[8] it is well established that visual color determination is subjective and can be compared to the accuracy of spectrophotometer evaluation. Vachon et al[9] suggested that although the spectrophotometer

readings might indicate a statistically significant difference, these differences could be clinically identical to the human eye.

Bizhand et al[10] in their study 40 subjects participated which were randomly allocated to two groups (n=20). The test group received the OTC product (iWhite Instant) and the placebo group received an identically composed product except for the active agents. Each subject was treated with a prefilled tray containing iWhite Instant or the placebo for 20 minutes. There were no significant differences at E_0 between placebo and test groups regarding the tooth color. Differences in tooth color changes immediately after (ΔE1_0) and 24 h after treatment (ΔE2_0) were calculated for both groups. The mean values (standard deviations) of tooth color changes for ΔE1_0 were 2.26 (0.92) in the test group and 0.01 (0.21) in the placebo group. The color changes for ΔE2_0 showed mean values of 2.15 (1.10) in the test group and 0.07 (0.35) in the placebo group. For ΔE1_0 and ΔE2_0 significant differences were found between the groups.

We observed that mean color value at day 14 in sub group I A was 2.8, in group IB was 6.4 and in group III A was 8.4, in sub group II A was 7.2, group II B was 7.6 and group III B was 8.2. Lim et al[11] concluded that 35% CP could be recommended as an effective alternative to HP. However, in this concentration, the biological effects of CP to dental and periodontal tissues should be more studied. Shaheen et al[12] have evaluated the efficiency of 10% CP in the primary teeth and observed that intracoronal bleaching using 10% CP is an effective approach for whitening discolored extracted primary teeth. The shortcoming of study only 3 bleaching agents were compared.

Conclusion

Authors found that all bleaching found to be equally efficient in discolored primary teeth whereas CP was effective in discolored permanent teeth.

References

1. Perrine GA, Reichl RB, Baisden MK, et al. Comparison of 10% carbamide peroxide and sodium perborate for intracoronal bleaching. Gen Dent 2000;48(3):264–270.

2. Marin PD. Intra-coronal bleaching: the past, present and future. Ann R Australas Coll Dent Surg 2006;18:36–39.

3. Schemel-Suárez M, López-López J, Chimenos- Küstner E. Dental pigmentation and hemochromatosis: a case report. Quintessence Int 2017;48(2):155–159.

4. Kahler B, Rossi-Fedele G, Chugal N, et al. An evidence-based review of the efficacy of treatment approaches for immature permanent teeth with pulp necrosis. J Endod 2017;43(7):1052–1057.

5. Alkhatib MN, Holt R, Bedi R. Prevalence of self-assessed tooth discolouration in the United Kingdom. J Dent. 2004;32:561–566.

6. Sharma DS, Sharma S, Natu SM, et al. An in vitro evaluation of radicular penetration of hydrogen peroxide from bleaching agents during intra-coronal tooth bleaching with an insight of biologic response. J Clin Pediatr Dent 2011;35(3):289–294.

7. Azer SS, Hague AL, Johnston WM. Effect of bleaching on tooth discolouration from food colourant in vitro. J Dent 2011;39(Suppl 3):52–56.
8. Behl M, Patnana AK, Khanna V. Evaluation of Three Different Bleaching Agents in Permanent and Primary Teeth: An In Vitro Study. Int J Clin Pediatr Dent 2020;13(2):130–135.
9. Vachon C, Vanek P, Friedman S. Internal bleaching with 10% carbamide peroxide in vitro. Pract Period Aesthet Dent 1998;10(9):1145–1148.
10. Bizhang M, Domin J, Danesh G, Zimmer S. Effectiveness of a new non-hydrogen peroxide bleaching agent after single use-a double-blind placebo-controlled short-term study. Journal of Applied Oral Science. 2017 Oct;25(5):575-84.
11. Lim MY, Lum SO, Poh RS, et al. An in vitro comparison of the bleaching efficacy of 35% carbamide peroxide with established intracoronal bleaching agents. Int Endod J 2004;37(7):483–488.
12. Shaheen MA, Elkateb MA, Bakry NS, et al. Efficacy of 10 percent carbamide peroxide as an intracoronal bleaching agent in nonvital discolored primary teeth: an in vitro study. J Dent Child (Chic) 2017;84(1):22–29.