

Policy on the Use of Dental Bleaching for Child and Adolescent Patients

Originating Council

Council on Clinical Affairs

Review Council

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Purpose

The American Academy of Pediatric Dentistry (AAPD) recognizes that the desire for dental whitening in pediatric and adolescent patients has increased. This policy is intended to help professionals and patients make informed decisions about the indications, efficacy, and safety of internal and external bleaching of primary and young permanent teeth and incorporate such care into a comprehensive treatment plan.

Methods

This revision included a new systematic literature search of the MEDLINE/Pubmed[®] electronic database using the following parameters: Terms: “dental bleaching”, “dental whitening”, and “tooth bleaching”; Field: all fields; Limits: within the last 10 years, humans, English, clinical trials, and birth through age 18. Sixty-two articles matched these criteria. Papers for review were chosen from this list and from the references within selected articles. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

Background

Through news stories and advertisements, the public has become more aware of advances in cosmetic dentistry. Both the variety and availability of bleaching products on the market have increased. Consequently, parents and the news media request information on dental whitening for children and adolescents with increasing frequency.

Clinical indications for internal or external dental whitening for individual teeth may include discoloration resulting from a traumatic injury (ie, calcific metamorphosis, darkening with devitalization), irregularities in enamel coloration of a permanent tooth due to trauma or infection of the related primary tooth, or intrinsic discoloration/staining (eg, fluorosis, tetracycline staining).¹⁻⁸ A negative self-image due to a discolored tooth or teeth can have serious consequences on adolescents and could be considered an appropriate indication for bleaching.⁹ Due to the

difference in the thickness of enamel of primary and permanent teeth, tooth coloration within a dental arch may vary significantly during the mixed dentition. Full arch cosmetic bleaching during this developmental stage, however, would result in mismatched dental appearance once the child is in the permanent dentition.

Dental whitening may be accomplished by using either professional or at-home bleaching modalities. Advantages of in-office whitening include:

1. an initial professional examination to help identify causes of discoloration and clinical concerns with treatment (eg, existing restorations, side effects);
2. professional control, including use of accelerants (eg, lights, lasers) and soft-tissue protection;
3. patient compliance;
4. rapid results;
5. stability of results.

The pretreatment professional assessment helps identify pulp pathology that may be associated with a single discolored tooth. This examination also identifies restorations that are faulty or could be affected by the bleaching process, and the associated costs for replacing such restorations to maximize esthetic results.^{1,4,6,10-13} By using photographs and/or a shade guide, the dentist can document the effectiveness of treatment. In addition to providing in-office bleaching procedures, a dentist may fabricate custom trays for at-home use of a bleaching product. Custom trays ensure intimate fit and greater efficiency of bleaching agents. Over-the-counter products for at-home use include bleaching gels, whitening strips, and brush-on agents. Their main advantages include patient convenience and lower associated costs.

Peroxide-containing whiteners or bleaching agents improve the appearance by changing the tooth's intrinsic color. The professional-use products usually range from 10% carbamide peroxide (equivalent to about 3% hydrogen peroxide) to 38% carbamide peroxide (equivalent to approximately 13% hydrogen peroxide). Carbamide peroxide is the most commonly used

active ingredient in dentist-dispensed home-use tooth-bleaching products.¹⁰ These agents sometimes are used sequentially. In-office bleaching products require isolation with a rubber dam or a protective gel to shield the gingival soft tissues. Home-use bleaching products contain lower concentrations of hydrogen peroxide or carbamide peroxide.^{1-3,14-16} Many whitening toothpastes contain polishing or chemical agents to improve tooth appearance by removing surface stains through gentle polishing, chemically chelating, or other nonbleaching action.¹⁰

Side effects from bleaching vital and nonvital teeth have been documented. It should be noted that most of the research on bleaching has been performed on adult patients, with only a small amount of published bleaching research using child or adolescent patients.^{1-3,14-16} The more common side effects associated with bleaching vital teeth are tooth sensitivity and tissue irritation. Sensitivity affects 8% to 66% of patients and often occurs during the early stages of treatment.^{4,9,11,17-21} Tissue irritation, in most cases, results from an ill-fitting tray rather than the bleaching agents and no longer occurs once a more accurately fitted tray is used. Both sensitivity and tissue irritation usually are temporary and cease with the discontinuance of treatment.^{4,11,22} Another side effect associated with bleaching vital teeth is increased marginal leakage of an existing restoration.^{4,11,22} The more common side effects from internal bleaching of nonvital teeth are external root resorption^{12,23-26} and ankylosis. With external bleaching of nonvital teeth, the most common side effect is increased marginal leakage of an existing restoration.²⁶⁻³⁰ One of the degradation byproducts of hydrogen peroxide or carbamide peroxide results in a hydroxyl-free radical. This byproduct has been associated with periodontal tissue damage and root resorption. Due to the concern of the hydroxyl free radical³¹⁻³⁶ and the potential side effects of dental bleaching, minimizing exposure at the lowest effective concentration of hydrogen peroxide or carbamide peroxide is recommended.

Current literature and clinical studies support the use of sodium perborate mixed with water for bleaching nonvital teeth.^{13,37} Studies have shown higher incidences of root resorption when hydrogen peroxide is mixed with sodium perborate^{12,38-41} or any mixture of sodium perborate is heated.⁴² Therefore, the use of hydrogen peroxide and heating any mixture of sodium perborate are not recommended.

Policy statement

The AAPD encourages:

1. the judicious use of bleaching for vital and nonvital teeth;
2. patients to consult their dentists to determine appropriate methods for and the timing of dental whitening within the context of an individualized, comprehensive, and sequenced treatment plan;
3. dental professionals and consumers to consider side effects when contemplating dental bleaching for child and adolescent patients;
4. further research of dental whitening agents in children.

The AAPD discourages full-arch cosmetic bleaching for patients in the mixed dentition.

References

1. Zekonis R, Matis BA, Cochran MA, Al Shetri SE, Eckert GJ, Carlson TJ. Clinical evaluation of in-office and at-home bleaching treatments. *Oper Dent* 2003;28(2):114-21.
2. Whitman FJ, Simon JF. A clinical comparison of two bleaching systems. *J Calif Dent Assoc* 1995;23(1):59-64.
3. Matis BA, Wang Y, Jiang T, Eckert GJ. Extended at-home bleaching of tetracycline-stained teeth with different concentrations of carbamide peroxide. *Quintessence Int* 2002;33(9):645-55.
4. Matis BA, Cochran MA, Eckert G, Carlson TJ. The efficacy and safety of a 10% carbamide peroxide bleaching gel. *Quintessence Int* 1998;29(9):555-63.
5. Barnes DM, Kihn PW, Romberg E, George D, DePaola L, Medina E. Clinical evaluation of a new 10% carbamide peroxide tooth-whitening agent. *Compend Contin Educ Dent* 1998;19(10):968-72, 977-8.
6. Croll TP. Esthetic correction for teeth with fluorosis and fluorosis-like enamel dysmineralization. *J Esthet Dent* 1998;10(1):21-9.
7. Croll TP, Sasa IS. Carbamide peroxide bleaching of teeth with dentinogenesis imperfecta discoloration: Report of a case. *Quintessence Int* 1995;26(10):683-6.
8. Croll TP, Segura A. Tooth color improvement for children and teens: Enamel microabrasion and dental bleaching. *J Dent Child* 1996;63(1):17-22.
9. Donly KJ. The adolescent patient: Special whitening challenges. *Compend Contin Educ Dent* 2003;24(4A):390-6.
10. American Dental Association. Statement on the safety and effectiveness of tooth whitening products; June 2002. Available at: "<http://www.ada.org/prof/resources/positions/statements/whiten2.asp>". Accessed October 10, 2008.
11. Haywood VB, Leonard RH, Nelson CF, Brunson WD. Effectiveness, side effects and long-term status of nightguard vital bleaching. *J Am Dent Assoc* 1994;125(9):1219-26.
12. Haywood VB. Bleaching of vital and nonvital teeth. *Curr Opin Dent* 1992;2:142-9.
13. Fieldhouse J. Teeth whitening debate I. *Br Dent J* 2002;193(6):300-1.
14. Kwon YH, Huo MS, Kim KH, Kim SK, Kim YJ. Effects of hydrogen peroxide on the light reflectance and morphology of bovine enamel. *J Oral Rehabil* 2002;29(5):473-7.
15. Slezak B, Santarpia P, Xu T, et al. Safety profile of a new liquid whitening gel. *Compend Contin Educ Dent* 2002;11(suppl 1):4-11.
16. Kugel G, Aboushala A, Zhou X, Gerlach RW. Daily use of whitening strips on tetracycline-stained teeth: Comparative results after 2 months. *Compend Contin Educ Dent* 2002;23(1A):29-34; quiz 50.

17. MacIsaac AM, Hoen CM. Intracoronal bleaching: Concerns and considerations. *J Can Dent Assoc* 1994;60(1):57-64.
18. Donly KJ, Donly AS, Baharloo L, et al. Tooth whitening in children. *Compend Contin Educ Dent* 2002;23(1A):22-28; quiz 49.
19. Donly KJ, Gerlach RW. Clinical trials on the use of whitening strips in children and adolescents. *Gen Dent* 2002;50(3):242-5.
20. Almas K, Albaker A, Felebam N. Knowledge of dental health and diseases among dental patients, a multicentre study in Saudi Arabia. *Indian J Dent Res* 2000;11(4):145-55.
21. Marin PD, Heithersay GS, Bridges TE. A quantitative comparison of traditional and non-peroxide bleaching agents. *Endod Dent Traumatol* 1998;14(2):64-7.
22. Schulte JR, Morrisette DB, Gasior EJ, Czajewski MV. The effects of bleaching application time on the dental pulp. *J Am Dent Assoc* 1994;125(10):1330-5.
23. Szajkis S, Tagger M, Tamse A. Bleaching of root canal treated teeth and cervical external resorption: Review of the literature. *Refaat Hashinayim* 1986;4(2):10-2.
24. Lado EA, Stanley HR, Weisman MI. Cervical resorption in bleached teeth. *Oral Surg Oral Med Oral Pathol* 1983;55(1):78-80.
25. Heller D, Skriber J, Lin LM. Effect of intracoronal bleaching on external cervical root resorption. *J Endod* 1992;18(4):145-8.
26. Madison S, Walton R. Cervical root resorption following bleaching of endodontically treated teeth. *J Endod* 1990;16(12):570-4.
27. Haywood VB. Greening of the tooth-amalgam interface during extended 10% carbamide peroxide bleaching of tetracycline-stained teeth: A case report. *J Esthet Restor Dent* 2002;14(1):12-7.
28. Barkhordar RA, Kempler D, Plesh O. Effect of nonvital tooth bleaching on microleakage of resin composite restorations. *Quintessence Int* 1997;28(5):341-4.
29. Teixeira EC, Hara AT, Turssi CP, Serra MC. Effect of non-vital tooth bleaching on resin/enamel shear bond strength. *J Adhes Dent* 2002;4(4):317-22.
30. Teixeira EC, Hara AT, Turssi CP, Serra MC. Effect of non-vital tooth bleaching on microleakage of coronal access restorations. *J Oral Rehabil* 2003;30(11):1123-7.
31. Anderson DG, Chiego DJ Jr, Clickman GN, McCauley LK. A clinical assessment of the effects of 10% carbamide peroxide gel on human pulp tissue. *J Endod* 1999;25(4):247-50.
32. Kinomoto Y, Carnes DL Jr, Ebisu S. Cytotoxicity of intracanal bleaching agents on periodontal ligament cells in vitro. *J Endod* 2001;27(9):574-7.
33. Rotstein I, Friedman S, Mor C, Katznelson J, Sommer M, Bab I. Histological characterization of bleaching-induced external root resorption in dogs. *J Endod* 1991;17(9):436-41.
34. Weiger R, Kuhn A, Löst C. Radicular penetration of hydrogen peroxide during intra-coronal bleaching with various forms of sodium perborate. *Int Endod J* 1994;27(6):313-7.
35. Li Y. [Safety of peroxide containing tooth whiteners]. *Shanghai Kou Qiang Yi Xue* 2001;10(2):97-9.
36. Li Y. Tooth bleaching using peroxide-containing agents: Current status of safety issue. *Compend Contin Educ Dent* 1998;19(3):783-6, 788, 790.
37. Macey-Dare LV, Williams B. Bleaching of a discoloured non-vital tooth: Use of a sodium perborate/water paste as the bleaching agent. *Int J Paediatr Dent* 1997;7(1):35-8.
38. Heithersay GS. Invasive cervical resorption following trauma. *Aust Endod J* 1999;25(2):79-85.
39. Heithersay GS. Treatment of invasive cervical resorption: An analysis of results using topical application of trichloroacetic acid, curettage, and restoration. *Quintessence Int* 1999;30(2):96-110.
40. Heithersay GS. Invasive cervical resorption: An analysis of potential predisposing factors. *Quintessence Int* 1999;30(2):83-95.
41. Weiger R, Kuhn A, Lost C. In vitro comparison of various types of sodium perborate used for intracoronal bleaching of discolored teeth. *J Endod* 1994;20(7):338-41.
42. Attin T, Paqué F, Ajam F, Lennon AM. Review of the current status of tooth whitening with the walking bleach technique. *Int Endod J* 2003;36(5):313-29.