

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

Review Council

Council on Clinical Affairs

Latest Revision

2014

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 policy was developed by the Council on Clinical Affairs and adopted in 2004. This document an update from the last revision in 2009. This revision included a new literature search of the PubMed®/MEDLINE database using the terms: dental bleaching, dental whitening, and tooth bleaching; fields: all; limits: within the last 10 years, humans, English, clinical trials, and birth through age 18; 260 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 (i.e., 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 (e.g., fluorosis, tetracycline staining).¹⁻⁶ A negative self-image due to a discolored tooth or teeth can have serious consequences on adolescents and could be considered an indication for bleaching.⁷ 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 or whitening products dispensed and monitored by a dental professional include:

- an initial professional examination to help identify causes of discoloration and clinical concerns with treatment (e.g., existing restorations, side effects).
- professional control and soft-tissue protection.
- patient compliance.
- rapid 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.⁷⁻¹¹ 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 fewer adverse gingival effects.¹² Over-the-counter products for at-home use include bleaching gels, whitening strips, brush-on agents, toothpaste, mints, chewing gum, and mouth rinse. 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 percent carbamide peroxide (equivalent to about three percent hydrogen peroxide) to 38 percent carbamide peroxide (equivalent to approximately 13 percent hydrogen peroxide). Carbamide peroxide is the most commonly used active ingredient in dentist-dispensed tooth-bleaching products for home-use.¹⁰ These agents sometimes are used sequentially. In-office bleaching products require isolation with a rubber dam or a

ABBREVIATION

AAPD: American Academy Pediatric Dentistry.

protective gel to shield the gingival soft tissues. Home-use bleaching products contain lower concentrations of hydrogen peroxide or carbamide peroxide.^{1-3,13} Many whitening toothpastes contain polishing or chemical agents to improve tooth appearance by removing extrinsic stains through gentle polishing, chemically chelating, or other nonbleaching action.^{9,14}

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.^{1,3,7,13,15-18} The more common side effects associated with bleaching vital teeth are tooth sensitivity and tissue irritation. Sensitivity affects eight to 66 percent of patients and often occurs during the early stages of treatment.^{6,9,13,15,17,18} Tissue irritation, in most cases, results from an ill-fitting tray rather than the bleaching agents and resolves once a more accurately fitted tray is used. Both sensitivity and tissue irritation usually are temporary and cease with the discontinuance of treatment.^{5,6,13-15,17-20} Another side effect associated with bleaching vital teeth is increased marginal leakage of an existing restoration.¹³ The more common side effects from internal bleaching of nonvital teeth are external root resorption²¹⁻²⁴ and ankylosis. With external bleaching of nonvital teeth, the most common side effect is increased marginal leakage of an existing restoration.^{2,25-29} 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 radical³⁰⁻³² 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.^{28,29} Studies have shown higher incidences of root resorption when hydrogen peroxide is mixed with sodium perborate²¹⁻²⁴ or any mixture of sodium perborate is heated.²⁹ Therefore, the use of hydrogen peroxide and heating any mixture of sodium perborate are not recommended.

Policy statement

The AAPD encourages:

- The judicious use of bleaching for vital and nonvital teeth.
- 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.
- Dental professionals and consumers to consider side effects when contemplating dental bleaching for child and adolescent patients.
- 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. Abbott P, Heah SY. Internal bleaching of teeth: An analysis of 255 teeth. *Aust Dent J* 2009;54(4):326-33.
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. Kugel G, Gerlach RW, Aboushala A, Ferreira S, Magnuson B. Long-term use of 6.5% hydrogen peroxide bleaching strips on tetracycline stain: A clinical study. *Compend Cont Educ Dent* 2011;32(8):50-6.
5. Bizhang M, Muller M, Phark JH, Barker ML, Gerlach RW. Clinical trial of long-term color stability of hydrogen peroxide strips and sodium percarbonate film. *Am J Dent* 2007;20(Spec No A):23A-27A.
6. Donly KJ, Gerlach RW. Clinical trials on the use of whitening strips in children and adolescents. *Gen Dent* 2002;50(3):242-5.
7. Donly KJ. The adolescent patient: Special whitening challenges. *Compend Contin Educ Dent* 2003;24(4A): 390-6.
8. Lima DA, DeAlexandre RS, Martins AC, AGuiar FH, Ambrosano GM, Lovadino JR. Effect of curing lights and bleaching agents on physical properties of a hybrid composite resin. *J Esthet Restor Dent* 2008;20(4): 266-73.
9. Bpay S, Cakir FY, Gurgan S. Effects of toothbrushing with fluoride abrasive and whitening dentifrices on both unbleached and bleached human enamel surface in terms of roughness and hardness: An in vitro study. *J Contemp Dent Pract* 2012;13(5):584-9.
10. Metz MJ, Cochran MA, Batis BA, Gonzalez C, Platt JA, Pund MR. Clinical evaluation of 15% carbamide peroxide on the surface microhardness and shear bond strength of human enamel. *Oper Dent* 2007;32(5):427-36.
11. Mullins JM, Kao EC, Martin CA, Gunel E, Ngan P. Tooth whitening effects on bracket bond strength in vivo. *Angle Orthod* 2009;79(4):777-83.
12. Aushcill TM, Schneider-Del Savio T, Hellwig E, Arweiler NB. Randomized clinical trial of the efficacy, tolerability, and long-term color stability of two bleaching techniques: 18 month follow up. *Quintessence Int* 2012; 43(8):683-94.
13. Dawson PF, Sarif Mo, Smith AB, Brunton PA. A clinical study comparing the efficacy and sensitivity of home vs combined whitening. *Oper Dent* 2011;36(5):460-6.
14. American Dental Association Council on Scientific Affairs. Statement on the safety and effectiveness of tooth whitening products; April 2012. Available at: "http://www.ada.org/en/about-the-ada/ada-positions-policies-and-statements/tooth-whitening-safety-and-effectiveness". Accessed September 1, 2014.

15. Donly KJ, Donly AS, Baharloo L, et al. Tooth whitening in children. *Compend Contin Educ Dent* 2002;23(1A):22-28; quiz 49.
16. Giachetti L, Bertini F, Bambi C, Nieri M, Scaminaci Russo D. A randomized clinical trial comparing at-home and in-office tooth whitening techniques: A nine-month follow up. *J Am Dent Assoc* 2010;141(11):1357-64.
17. Donly KJ, Segura A, Henson T, Barker ML, Gerlach RW. Randomized controlled trial of professional at-home tooth whitening in teenagers. *Gen Dent* 2007;55(7):69-74.
18. Donly KJ, Segura A, Sasa I, Perez E, Anastasia MK, Farrell S. A controlled clinical trial to evaluate the safety and whitening efficacy of a 9.5% hydrogen peroxide high-adhesion whitening strip in a teen population. *Am J Dent* 2010;23(5):292-6.
19. Matis BA, Cochran MA, Eckert G, Carlson TJ. The efficacy and safety of a 10 percent carbamide peroxide bleaching gel. *Quintessence Int* 1998;29(9):555-63.
20. Da Costa JB, McPharlin R, Paravina RD, Ferracane JL. Comparison of at-home and in-office tooth whitening using a novel shade guide. *Oper Dent* 2010;35(4):381-8.
21. Heithersay GS. Invasive cervical resorption following trauma. *Aust Endod J* 1999;25(2):79-85.
22. 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.
23. Heithersay GS. Invasive cervical resorption: An analysis of potential predisposing factors. *Quintessence Int* 1999;30(2):83-95.
24. 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.
25. 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.
26. Ferrari R, Attin T, Wegehaupt FJ, Stawarczyk B, Taubock TT. The effects of internal tooth bleaching regimens on composite-to-composite bond strength. *J Am Dent Assoc* 2012;143(12):1324-31.
27. Shinohara MS, Rodrigues JA, Pimenta LA. In vitro microleakage of composite restorations after nonvital bleaching. *Quintessence Int* 2001;32(5):413-7.
28. Sharma DS, Sharma S, Natu SM, Chandra S. 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):289-94.
29. Palo RM, Valera MC, Camargo SE, Carmago CH, Cardoso PE, et al. Peroxide penetration from the pulp chamber to the external root surface after internal bleaching. *Am J Dent* 2010;23(3):171-4.
30. Firat E, Ercan E, Gurgan S, Yucel OO, Cakir FY, Berker E. The effect of bleaching systems on the gingiva and the levels of IL-1B and iL-10 in gingival crevicular fluid. *Oper Dent* 2011;36(6):572-80.
31. Anderson DG, Chiego DJ Jr, Clickman GN, McCauley LK. A clinical assessment of the effects of 10 percent 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.