

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

Latest Revision

2019

Purpose

The American Academy of Pediatric Dentistry recognizes that the desire for dental whitening by 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 is an update from the last revision in 2014. 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. Over 350 articles were selected and reviewed. Additional information was obtained from reviewing references within selected articles.

Background

The desire for improved dental esthetics has fueled innovations in dental materials. Patients, parents, and the news media request information on dental whitening for children and adolescents with increasing frequency. In addition, increased demand for bleaching materials and services has affected both the variety and availability of dental bleaching products on the market.

Discoloration of teeth is classified by etiology.¹ 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).²⁻⁷ Teeth staining from metals (e.g., iron supplements) or consumption of tea, coffee, soft drinks, alcohol, and certain foods is extrinsic and easier to treat compared to intrinsic factors whether congenital or acquired. Severe discolorations may be best treated with microabrasion and subsequent bleaching to achieve desirable results.⁸

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. Adolescents present with unique dental needs, and the impact of tooth discoloration on an adolescent's self-image could be considered an indication for bleaching.⁸ Tooth whitening has been successful in adolescent patients using typical bleaching agents,⁸ but research is lacking on the effects of bleaching on the primary 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.
- immediate attention to teeth sensitivity and other adverse effects.

The pretreatment professional assessment helps identify pulpal 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.⁸⁻¹² 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.¹³ 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). 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.^{2,4,14} Efficacy and long-term outcomes of home whitening products will vary according to the concentration of peroxide used and the severity of the initial tooth discoloration.¹⁵⁻¹⁸ 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.^{10,19} Carbamide peroxide is the most commonly used active ingredient in dentist-dispensed tooth-bleaching products for home-use.^{10,20}

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.^{2,4,8,14,17,21-24} The more common side effects associated with bleaching vital teeth are tooth sensitivity and tissue irritation. Tooth sensitivity associated with vital bleaching may be due to permeation of enamel and dentin by hydrogen peroxide and a subsequent mild, transient inflammatory response.²⁵⁻²⁷ Hydrogen peroxide is a highly reactive substance which can cause damage to oral hard and soft tissues when used at high concentrations and an extended period of time.^{28,29}

Between eight and 66 percent of patients experience post-bleaching sensitivity, most often during the early stages of treatment.^{7,10,14,17,21,24} Overtreatment has been shown to harm tooth structure, which is of particular concern when bleaching products are used excessively by overzealous teens and young adults.²⁹⁻³¹ 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.³² Both sensitivity and tissue irritation usually are temporary and cease with the discontinuance of treatment.^{6,7,14,17,19,21,24,33,34} Additional risks may include erosion, mineral degradation, pulpal damage, and increased marginal leakage of existing restorations.^{14,35} When used correctly, however, teeth bleaching has been proven to be safe and causes no irreversible tooth structure damage.²⁹

Internal bleaching for non-vital endodontically treated teeth in young patients can be performed in the same way as for adults.²⁹ The more common side effect from internal bleaching of nonvital teeth is external root resorption.³⁶⁻³⁹ With external bleaching of nonvital teeth, the most common side effect is increased marginal leakage of an existing restoration.^{3,40-44} 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 radical damage⁴⁵⁻⁴⁷ and the potential side effects of dental bleaching, minimizing exposure at the lowest effective concentration of hydrogen peroxide or carbamide peroxide is recommended. Providers should use caution when bleaching primary anterior teeth, as the underlying permanent teeth are in jeopardy of developmental disturbance from intramedullary inflammatory changes.^{29,48}

Of growing concern is the preponderance of non-dental professionals offering teeth whitening services to the public.⁴⁹

Tooth whitening is defined as any process to whiten, lighten, or bleach teeth.⁴⁹ Teeth-whitening kiosks and beauty salons, and retail stores are providing whitening services and dispensing teeth whitening agents.^{19,50} Dental organizations have supported state regulations that restrict the practice of providing bleaching services to only dentists or other qualified dental staff under the direct supervision of a dentist.⁴⁹⁻⁵¹ The use of over-the-counter whitening products remains exempt from such regulation. Legislation defining the scope of practice by non-dentists offering whitening treatment varies from state to state and should be examined when these services are being provided.⁵⁰⁻⁵²

Policy statement

Teeth whitening procedures that have been shown to be safe may be beneficial for children and adolescents. Although the use of whitening agents can improve dental esthetics and enhance a person's self-esteem, proper treatment planning with objectives should be conducted prior to engaging in any bleaching protocol. Use of whitening agents should follow the safety and efficacy standards as defined by clinical research and best practice. Bleaching by young patients should be supervised by an adult and under the guidance of a dentist.

The American Academy of Pediatric Dentistry 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 American Academy of Pediatric Dentistry discourages full-arch cosmetic bleaching for patients in the mixed dentition and primary dentition.

References

1. Pinto MM, Leal de Godoy CH, Bortoletto CC, et al. Tooth whitening with hydrogen peroxide in adolescents: Study protocol for a randomized controlled trial. *Trials* 2014;15:395.
2. 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.
3. Abbott P, Heah SY. Internal bleaching of teeth: An analysis of 255 teeth. *Aust Dent J* 2009;54(4):326-33.
4. 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.

5. 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.
6. 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.
7. Donly KJ, Gerlach RW. Clinical trials on the use of whitening strips in children and adolescents. *Gen Dent* 2002;50(3):242-5.
8. Donly KJ. The adolescent patient: Special whitening challenges. *Compend Contin Educ Dent* 2003;24(4A):390-6.
9. 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.
10. Bolay 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.
11. 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.
12. 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.
13. 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.
14. 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.
15. Demarco FF, Meireles SS, Masotti AS. Over the counter whitening agents: A concise review. *Braz Oral Res* 2009;23(Sec Iss 1):64-70.
16. Francci C, Marson FC, Briso ALF, Gomes MN. Clareamento dental-tecnicas e conceitos atuais. *Rev Assoc Paul Cir Dent* 2010;64(1):78-89.
17. 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.
18. Ermis RB, Uzer CE, Yildiz G, Yazkan B. Effect of tooth discoloration severity on the efficacy and colour stability of two different trayless at-home bleaching systems. *J Dent Res Dent Clin Dent Prospects* 2018;12(2):120-7.
19. American Dental Association Council on Scientific Affairs. Tooth whitening/bleaching: Treatment considerations for dentists and their patients; September 2009, Revised November 2010. Available at: "https://www.ada.org/-/media/ADA/About%20the%20ADA/Files/ada_house_of_delegates_whitening_report.ashx effectiveness". Accessed June 30, 2019.
20. Walsh LJ. Safety issues relating to the use of hydrogen peroxide in dentistry. *Aust Dent* 2000;45(4):257-60.
21. Donly KJ, Donly AS, Baharloo L, et al. Tooth whitening in children. *Compend Contin Educ Dent* 2002;23(1A):22-28; quiz 49.
22. Bacaksiz A, Tulunoglu O, Tulunoglu I. Efficacy and stability of two in-office bleaching agents in adolescents: 12 months follow-up. *J Clin Pediatr Dent* 2016;40(4):269-73.
23. 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.
24. 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.
25. Bowles WH, Ugwuneri Z. Pulp chamber penetration by hydrogen peroxide following vital bleaching procedures. *J Endo* 1987;13(8):375-7.
26. Cooper JS, Bokmeyer TJ, Bowles WH. Penetration of the pulp chamber penetration by carbamide peroxide bleaching agents. *J Endo* 1992;18(7):315-7.
27. Moncada G, Sepulveda D, Elphick K, et al. Effects of light activation, agent concentration, and tooth thickness on dental sensitivity after bleaching. *Oper Dent* 2013;38(5):467-476.
28. Haywood VB, Heymann HO. Nightguard vital bleaching. *Quintessence Int* 1991;22(7):515-23.
29. Croll T, Donly K. Tooth bleaching in children and teens. *J Esthet Restor Dent* 2014;26(3):147-150.
30. Goldberg M, Grootveld M, Lynch E. Undesirable and adverse effects of tooth-whitening products: A review. *Clin Oral Investig* 2010;14(1):1-10.
31. Lee SS, Zhang W, Lee DH, Li Y. Tooth whitening in children and adolescents: A literature review. *Pediatr Dent* 2005;27(5):362-8.
32. Haywood VB. Nightguard vital bleaching: Current concepts and research. *J Am Dent Assoc* 1997;127(suppl):19S-25S.
33. 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.
34. 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.

References continued on the next page.

35. Carey CM. Tooth whitening: What we now know. *J Evid Based Dent Pract* 2014;14(Suppl):70-6.
36. Heithersay GS. Invasive cervical resorption following trauma. *Aust Endod J* 1999;25(2):79-85.
37. Heithersay GS. Invasive cervical resorption: An analysis of potential predisposing factors. *Quintessence Int* 1999;30(2):83-95.
38. 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.
39. 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.
40. 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.
41. 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.
42. Shinohara MS, Rodrigues JA, Pimenta LA. In vitro microleakage of composite restorations after nonvital bleaching. *Quintessence Int* 2001;32(5):413-7.
43. 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.
44. Palo RM, Valera MC, Camargo SE, et al. Peroxide penetration from the pulp chamber to the external root surface after internal bleaching. *Am J Dent* 2010;23(3):171-4.
45. 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-1 Beta and IL-10 in gingival crevicular fluid. *Oper Dent* 2011;36(6):572-80. Erratum in *Oper Dent* 2012;37(1):108.
46. 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.
47. 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.
48. Croll T, Pascon EA, Langeland K. Traumatically injured primary incisors: A clinical and histological study. *J Dent Child* 1987;54(6):401-22.
49. State Board of Dentistry Pennsylvania Dental Association. Regulating teeth whitening as the practice of dentistry. Available at: "https://www.padental.org/Online/Advocacy/SBOD_Regulatory_Issues/Regulating_Teeth_Whitening.aspx". Accessed March 25, 2019.
50. Otto M. Understanding the legal battles over teeth-whitening. Association of Health Care Journalists. Available at: "<https://healthjournalism.org/resources-tips-details.php?id=827#.W-IApNVKiUk>". Accessed March 25, 2019. (Archived by WebCite® at: "<http://www.webcitation.org/778lRYEFF>")
51. Litch CS. Supreme court rules against North Carolina's dental board. Available at: "<https://www.aapd.org/assets/1/7/LLL.March.2015.pdf>". Accessed March 25, 2019. (Archived by WebCite® at: "<http://www.webcitation.org/778ly58ce>")
52. American Dental Education Association State Update. Federal court upholds Georgia Board of Dentistry policy on teeth whitening. Available at: "<https://www.adea.org/Blog.aspx?id=36111&blogid=20132>". Accessed March 25, 2019. (Archived by WebCite® at: "<http://www.webcitation.org/778lfyF0T>")