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

Latest Revision

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Purpose

The American Academy of Pediatric Dentistry recognizes the desire for dental whitening by pediatric and adolescent patients. This policy is intended to help professionals and patients make informed decisions about the indications, efficacy, and safety of internal and external bleaching of the young mixed and permanent dentitions and incorporate such care into a comprehensive treatment plan.

Methods

This policy was developed by the Council on Clinical Affairs, adopted in 2004[1], and last revised in 2019[2]. This revision included a new literature search of the PubMed/MEDLINE database using the terms: *dental bleaching*, *dental whitening*, *tooth bleaching*, *etch*, *seal*, and *resin infiltration*; fields: all; limits: within the last 5 years, humans, English, clinical trials, and birth through age 18. Over 350 articles were selected and reviewed in this revision. 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 and venues that provide bleaching services.

Discoloration of teeth is classified by etiology.[3] 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).[4-9] Teeth staining from metals (eg, 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 best be treated with microabrasion and subsequent bleaching to achieve desirable results.[10]

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.[10] Tooth whitening has been successful in adolescent patients using typical bleaching agents,[10] but research is lacking on the effects of bleaching on the primary dentition.

Dental whitening may be accomplished by using dentist-directed modalities (ie, prescription-strength products for in-office or at-home use), over-the-counter bleaching products for self-application, or nondentist-directed whitening locations (as permitted by state regulations). Treatment under dental professional guidance offers several advantages. A pretreatment dental 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.[10-14] 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.[15] Over-the-counter products for at-home use include bleaching gels, whitening strips, brush-on agents, toothpastes, mints, chewing gum, and mouth rinses. Commercial locations may also utilize bleaching gels and brush-on agents without the supervision of a dentist. Advantages of both commercial bleaching centers and at-home products include patient convenience and lower associated costs. However, the lack of customization and supervision may result in an increase in side effects.

In-office bleaching products require isolation with a rubber dam or a protective gel to shield the gingival soft tissues. 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).[16] However, products containing 20% to 35% hydrogen peroxide also have been studied.[17,18] Additionally, ozone therapy has been used to whiten teeth.[19]

Home-use bleaching products contain lower concentrations of hydrogen peroxide or carbamide peroxide.[7-9,20] 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.[21-24] Many whitening toothpastes contain polishing or chemical agents to improve tooth appearance by removing extrinsic stains[25] through gentle polishing, chemical chelating, or other nonbleaching action.[11] Carbamide peroxide is the most commonly used active ingredient in dentist-dispensed tooth-bleaching products for home use.[11,25,26]

Permanent teeth with intrinsic discoloration (eg, fluorosis, hypomineralization) present a difficult esthetic challenge. Techniques involving breakdown of the outer enamel surface using acid etch and pumice (microabrasion), followed by subsequent remineralization with sodium fluoride or casein phosphate, have been used with positive results.[27,28] Additionally, techniques using acid etch and sodium hypochlorite bleach and sealing over the surface with sealant have successfully corrected some discolorations.[29] More recently, unfilled resin infiltration systems have been used to treat these defects, with and without the use of bleaching agents, with significant improvements.[30-34]

Side effects from bleaching vital and nonvital teeth have been documented. Most research on bleaching has been performed on adult patients, with only a small amount of published bleaching research using child or adolescent patients.[8-10,20,22,35-38] 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.[39-41] Hydrogen peroxide is a highly reactive substance which can cause damage to oral hard and soft tissues when used at high concentrations and for an extended period of time.[42,43] Studies have examined the possibility of local and systemic cytotoxic and genotoxic effects that occur during bleaching.[44-46] Two studies[45,46] found no clinically-significant systemic genotoxic risk, while another[44] found the potential to induce systemic oxidative stress (albeit on a small sample size tested 1 day after bleaching).

Research regarding dental bleaching and pregnant patients is lacking. Effects on the unborn fetus are unknown. Given this lack of evidence regarding its safety, deferring dental bleaching, along with other elective dental treatment, until after delivery (and possibly after breastfeeding) can help minimize risk to patient and fetus.[47]

Between 8% and 66% of patients experience postbleaching sensitivity, most often during the early stages of treatment.[11,20,22,36,37] Pre- and posttreatment medicaments and additives to bleaching products have been used to reduce sensitivity, with mixed results.[18,48-52] The use of casein phosphopeptide-amorphous calcium phosphate with fluoride (which reduced whitening treatment times with laser or light-emitting diode [LED] lights) and ozone therapy have shown to reduce sensitivity.[19] 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.[42,53,54] 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.[55] Both sensitivity and tissue irritation usually are temporary and cease with the discontinuance of treatment.[4,5,20,22,25,36,37,56,57] Additional risks may include erosion, mineral degradation, pulpal damage, and increased marginal leakage of existing restorations.[20,58] However, when used correctly (in accordance with manufacturer's instructions or as directed by the dentist), teeth bleaching has been proven to be safe and causes no irreversible tooth structure damage.[42]

Internal bleaching for nonvital endodontically-treated teeth in young patients can be performed in the same way as for adults.[42] The more common side effect from internal bleaching of nonvital teeth is external cervical root resorption.[59-62] With external bleaching of nonvital teeth, the most common side effect is increased marginal leakage of an existing restoration.[7,63-67] Both hydrogen peroxide and carbamide peroxide bleaching agents produce a degradation product that results in a hydroxyl-free radical.[68,69] This byproduct has been associated with periodontal tissue damage and root resorption.[70] Due to the concern of the hydroxyl-free radical damage[71-73] and the potential side effects of dental bleaching, minimizing exposure at the lowest effective concentration of hydrogen peroxide or carbamide peroxide has been recommended.[70] When bleaching primary anterior teeth, the underlying permanent teeth are in jeopardy of developmental disturbance from intramedullary inflammatory changes.[42,74]

Of concern is the preponderance of nondental providers offering teeth whitening services to the public.[75] Tooth whitening is defined as any process to whiten, lighten, or bleach teeth.[75] Teeth-whitening kiosks, beauty salons, and retail stores are providing whitening services and dispensing teeth-whitening agents.[25,76] 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.[75-77] The use of over-the-counter whitening products remains exempt from such regulation. Legislation defining the scope of practice by nondentists offering whitening treatment varies from state to state.[76,78] Consumers may contact their state's dental board or board of health to learn more about educational and licensure requirements for nondentist providers.

Policy statement

The AAPD supports procedures that have been shown to be safe and effective for whitening discolored teeth of children and adolescents. Although the use of whitening agents can improve dental esthetics and enhance a person's self-esteem, AAPD advocates dental bleaching be incorporated into an individualized, comprehensive, and sequenced treatment plan in accordance with safety and efficacy standards defined by clinical research and best practice. Because side effects are

important considerations for dental bleaching, AAPD encourages

- state regulations that restrict provision of bleaching services to credentialed practitioners.
- over-the-counter or dentist-dispensed at-home bleaching products used by young patients to be supervised by an adult.
- additional research on the use of dental whitening agents for children.

Furthermore, the AAPD discourages

- full-arch cosmetic bleaching for patients in the mixed dentition and primary dentitions.
- use of dental bleaching products during pregnancy.

References

1. American Academy of Pediatric Dentistry. Policy on dental bleaching for child and adolescent patients. *Pediatr Dent.* 2004;26(Suppl issue):45-47.
2. American Academy of Pediatric Dentistry. Policy on use of dental bleaching for child and adolescent patients. *The Reference Manual of Pediatric Dentistry.* American Academy of Pediatric Dentistry; 2019:103-106.
3. 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. DOI: 10.1186/1745-6215-15-395
4. 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. Erratum in *Am J Dent*. 2009;22(2):114.
5. Donly KJ, Gerlach RW. Clinical trials on the use of whitening strips in children and adolescents. *Gen Dent.* 2002;50(3):242-245.
6. 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):50-56.
7. Abbott P, Heah SY. Internal bleaching of teeth: An analysis of 255 teeth. *Aust Dent J.* 2009;54(4):326-333. DOI: 10.1111/j.1834-7819.2009.01158.x
8. 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):645-655.
9. 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):114-121.
10. Donly KJ. The adolescent patient: Special whitening challenges. *Compend Contin Educ Dent.* 2003;24(4A): 390-396.
11. 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):584-589.
12. Lima DA, De Alexandre 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):266-273. DOI: 10.1111/j.1708-8240.2008.00190.x
13. Metz MJ, Cochran MA, Matis 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):427-436. DOI: 10.2341/06-142
14. Mullins JM, Kao EC, Martin CA, Gunel E, Ngan P. Tooth whitening effects on bracket bond strength in vivo. *Angle Orthod.* 2009;79(4):777-783. DOI: 10.2319/042308-226.1
15. 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):683-694.
16. Li Y. Safety controversies in tooth bleaching. *Dent Clin North Am.* 2011;55(2):255-263. DOI: 10.1016/j.cden.2011.01.003
17. Goncalves MLL, Tavares ACDS, Mota ACCD, Penna LAP, Deana AM, Bussadori SK. In-office tooth bleaching for adolescents using hydrogen peroxide-based gels: Clinical trial. *Braz Dent J.* 2017;28(6):720-725. DOI: 10.1590/0103-6440201701516
18. Mondelli R, Rizzante F, Rosa ER, Borges A, Furuse AY, Bombonatti J. Effectiveness of LED/laser irradiation on in-office dental bleaching after three years. *Oper Dent.* 2018;43(1):31-37. DOI: 10.2341/16-208-C
19. Al-Omiri MK, Lamfon HA, Al Nazeh AA, Kielbassa AM, Lynch E. Randomized clinical trial on the comparison of bleaching outcomes using either ozone or hydrogen peroxide. *Quintessence Int.* 2018;49(8):625-634. DOI: 10.3290/j.qi.a40783
20. Dawson PFL, Sarif MO, Smith AB, Brunton PA. A clinical study comparing the efficacy and sensitivity of home vs combined whitening. *Oper Dent.* 2011;36(5):460-466. DOI: 10.2341/10-159-C
21. Demarco FF, Meireles SS, Masotti AS. Over-the-counter whitening agents: A concise review. *Braz Oral Res.* 2009; 23(Suppl 1):64-70. DOI: 10.1590/s1806-83242009000500010
22. 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):292-296.
23. Ermis RB, Uzer CE, Yildiz G, Yazkan B. Effect of tooth discolouration 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):120-127. DOI: 10.15171/joddd.2018.019

24. Francci C, Marson FC, Briso ALF, Gomes MN. Clareamento dental: Técnicas e conceitos atuais: [Revisão]/ Dental bleaching–Current concepts and techniques [Review]. *Rev Assoc Paul Cir Dent.* 2010;64(1):78-89.
25. Council on Scientific Affairs. Whitening. American Dental Association; August 16, 2022. Accessed March 9, 2023. https://www.ada.org/resources/ada-library/oral-health-topics/whitening/
26. Walsh LJ. Safety issues relating to the use of hydrogen peroxide in dentistry. *Aust Dent.* 2000;45(4):257-260. DOI: 10.1111/j.1834-7819.2000.tb00261.x
27. Bhandari R, Thakur S, Singhal P, Chauhan D, Jayam C, Jain T. In vivo comparative evaluation of esthetics after microabrasion and microabrasion followed by casein phosphopeptide-amorphous calcium fluoride phosphate on molar incisor hypomineralization-affected incisors. *Contemp Clin Dent.* 2019;10(1):9-15. DOI: 10.4103/ccd.ccd_852_17
28. Croll TP. Enamel microabrasion: Observations after 10 years. *J Am Dent Assoc.* 1997;128(Suppl):45S-50S. DOI: 10.14219/jada.archive.1997.0424
29. Wright JT. The etch-bleach-seal technique for managing stained enamel defects in young permanent incisors. *Pediatr Dent.* 2002;24(3):249-252.
30. Borges AB, Caneppele TMF, Masterson D, Maia LC. Is resin infiltration an effective esthetic treatment for enamel development defects and white spot lesions? A systematic review. *J Dent.* 2017;56:11-18. DOI: 10.1016/j.jdent.2016.10.010
31. Gençer MDG, Kirzioğlu Z. A comparison of the effectiveness of resin infiltration and microabrasion treatments applied to developmental enamel defects in color masking. *Dent Mater J.* 2019;38(2):295-302. DOI: 10.4012/dmj.2018-074
32. Pan Z, Que K, Liu J, et al. Effects of at-home bleaching and resin infiltration treatments on the aesthetic and psychological status of patients with dental fluorosis: A prospective study. *J Dent.* 2019;91:103228.72. DOI: 10.1016/j.jdent.2019.103228
33. Saxena P, Grewal MS, Agarwal P, Kaur G, Verma J, Chhikara V. Clinical efficacy of resin infiltration technique alone or in combination with micro abrasion and in-office bleaching in adults with mild-to-moderate fluorosis stains. *J Pharm Bioallied Sci.* 2021;13(Suppl 1):S301-S305. DOI: 10.4103/jpbs.JPBS_795_20
34. Schoppmeier CM, Derman SHM, Noack MJ, Wicht MJ. Power bleaching enhances resin infiltration masking effect of dental fluorosis. A randomized clinical trial. *J Dent.* 2018;79:77-84. DOI: 10.1016/j.jdent.2018.10.005
35. 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):269-273. DOI: 10.17796/1053-4628-40.4.269
36. Donly KJ, Donly AS, Baharloo L, et al. Tooth whitening in children. *Compend Contin Educ Dent.* 2002;23(1A):22-28; quiz 49.
37. 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.
38. 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):1357-1364. DOI: 10.14219/jada.archive.2010.0081
39. Bowles WH, Ugwuneri Z. Pulp chamber penetration by hydrogen peroxide following vital bleaching procedures. *J Endo.* 1987;13(8):375-377. DOI: 10.1016/S0099-2399(87)80196-6
40. Cooper JS, Bokmeyer TJ, Bowles WH. Penetration of the pulp chamber penetration by carbamide peroxide bleaching agents. *J Endo.* 1992;18(7):315-317. DOI: 10.1016/S0099-2399(06)80479-6
41. 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. DOI: 10.2341/12-335-C
42. Croll T, Donly K. Tooth bleaching in children and teens. *J Esthet Restor Dent.* 2014;26(3):147-150.DOI: 10.1111/jerd.12108
43. Haywood VB, Heymann HO. Nightguard vital bleaching. *Quintessence Int.* 1991;22(7):515-523.
44. Akbari M, Nejat AH, Farkhondeh N, Mehraban Moghadam S, Hashemy SI, Mohammadipour HS. Does at-home bleaching induce systemic oxidative stress in healthy subjects? *Aust Dent J.* 2017;62(1):58-64. DOI: 10.1111/adj.12425
45. Monteiro MJF, Lindoso JBC, de Oliveira Conde NC, da Silva LM, Loguercio AD, Pereira JV. Evaluation of the genotoxic potential of different delivery methods of at-home bleaching gels: A single-blind, randomized clinical trial. *Clin Oral Investig.* 2019;23(5):2199-2206. DOI: 10.1007/s00784-018-2659-8
46. Sürmelioğlu D, Gündoğar H, Taysi S, Bağiş YH. Effect of different bleaching techniques on DNA damage biomarkers in serum, saliva, and GCF. *Hum Exp Toxicol.* 2021;40(8):1332-1341. DOI: 10.1177/0960327121996030
47. Pregnancy and dental work. American Pregnancy Association. Accessed March 15, 2023. https://americanpregnancy.org/healthy-pregnancy/is-it-safe/dental-work-and-pregnancy/
48. Alexandrino LD, Alencar CM, Silveira ADSD, Alves EB, Silva CM. Randomized clinical trial of the effect of NovaMin and CPP-ACPF in combination with dental bleaching. *J Appl Oral Sci.* 2017;25(3):335-340. DOI: 10.1590/1678-7757-2016-0408
49. Coppla FM, Rzende M, de Paula E, et al. Combination of acetaminophen/codeine analgesics does not avoid bleaching-induced tooth sensitivity: A randomized, triple-blind two-center clinical trial. *Oper Dent.* 2018;43(2):E53-E63. DOI: 10.2341/17-092-C
50. Kury M, Wada EE, Silva DPD, Tabchoury CPM, Giannini M, Cavalli V. Effect of violet LED light on in-office bleaching protocols: A randomized controlled clinical trial. *J Appl Oral Sci.* 2020;28:e20190720. DOI: 10.1590/1678-7757-2019-0720

References continued on the next page.

51. Vaez SC, Faria-E-Silva AL, Loguércio AD, Fernandes MTG, Nahsan FPS. Preemptive use of Etodolac on tooth sensitivity after in-office bleaching: A randomized clinical trial. *J Appl Oral Sci.* 2018;26:e20160473. DOI: 10.1590/1678-7757-2016-0473
52. Yassin O, Milly H. Effect of CPP-ACP on efficacy and postoperative sensitivity associated with at-home vital tooth bleaching using 20% carbamide peroxide. *Clin Oral Investig.* 2019;23(4):1555-1559. DOI: 10.1007/s00784-018-2574-z
53. Goldberg M, Grootveld M. Lynch E. Undesirable and adverse effects of tooth-whitening products: A review. *Clin Oral Investig.* 2010;14(1):1-10. DOI: 10.1007/s00784-009-0302-4
54. Lee SS, Zhang W, Lee DH, Li Y. Tooth whitening in children and adolescents: A literature review. *Pediatr Dent.* 2005;27(5):362-368.
55. Haywood VB. Nightguard vital bleaching: Current concepts and research. *J Am Dent Assoc.* 1997;127(suppl):19S-25S. DOI: 10.14219/jada.archive.1997.0416
56. 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):381-388. DOI: 10.2341/09-344-C
57. 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):555-563.
58. Carey CM. Tooth whitening: What we now know. *J Evid Based Dent Pract.* 2014;14(Suppl):70-76. DOI: 10.1016/j.jebdp.2014.02.006
59. 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):313-329. DOI: 10.1046/j.1365-2591.2003.00667.x
60. Heithersay GS. Invasive cervical resorption: An analysis of potential predisposing factors. *Quintessence Int.* 1999;30(2):83-95.
61. Heithersay GS. Invasive cervical resorption following trauma. *Aust Endod J.* 1999;25(2):79-85. DOI: 10.1111/j.1747-4477.1999.tb00094.x
62. Heithersay GS. Treatment of invasive cervical resorption: An analysis of results using topical application of trichloracetic acid, curettage, and restoration. *Quintessence Int.* 1999;30(2):96-110.
63. 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):1324-1331. DOI: 10.14219/jada.archive.2012.0095
64. 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):171-174.
65. 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):289-294. DOI: 10.17796jcpd.35.3.q83063560x866037
66. Shinohara MS, Rodrigues JA, Pimenta LA. In vitro microleakage of composite restorations after nonvital bleaching. *Quintessence Int.* 2001;32(5):413-417.
67. 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):1123-1127. DOI: 10.1046/j.1365-2842.2003.01161.x
68. Kawamoto K, Tsujimoto Y. Effects of the hydroxyl radical and hydrogen peroxide on tooth bleaching. *J Endod.* 2004;30(1):45-50. DOI: 10.1097/00004770-200401000-00010
69. Li Y. Tooth bleaching using peroxide-containing agents: Current status of safety issues. *Compend Cont Educ Dent.* 1998;19(8):783-786, 788, 790, passim; quiz 796.
70. Tredwin CJ, Naik S, Lewis NJ, Scully C. Hydrogen peroxide tooth-whitening (bleaching) products: Review of adverse effects and safety issues. *Br Dent J.* 2006;200(7):371-376. DOI: 10.1038/sj.bdj.4813423
71. Anderson DG, Chiego DJ Jr, Glickman GN, McCauley LK. A clinical assessment of the effects of 10 percent carbamide peroxide gel on human pulp tissue. *J Endod.* 1999;25(4):247-250. DOI: 10.1016/S0099-2399(99)80152-6
72. 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-1β and IL-10 in gingival crevicular fluid. *Oper Dent.* 2011;36(6):572-580. DOI: 10.2341/10-058-C Erratum in: *Oper Dent.* 2012;37(1):108. DOI: 10.2341/1559-2863-37.1.108
73. Kinomoto Y, Carnes DL Jr, Ebisu S. Cytotoxicity of intracanal bleaching agents on periodontal ligament cells in vitro. *J Endod.* 2001;27(9):574-577. DOI: 10.1097/00004770-200109000-00005
74. Croll T, Pascon EA, Langeland K. Traumatically injured primary incisors: A clinical and histological study. *ASDC J Dent Child.* 1987;54(6):401-422.
75. Deem LP. Tooth whitening in Pennsylvania – The issues. *Pennsylvania State Board of Dentistry Newsletter*. August 2009. Accessed March 15, 2023. www.dos.pa.gov/ProfessionalLicensing/LicensingServices/2009/DentistryAugust2009.pdf
76. Otto M. Understanding the legal battles over teeth-whitening. Association of Health Care Journalists. Accessed March 9, 2023. https://healthjournalism.org/resources-tips-details.php?id=827#.W-IApNVKiUk
77. Supreme Court of The United States. 13-534. North Carolina State Board of Dental Examiners v. Federal Trade Commission; February 25, 2015. Accessed March 9, 2023. https://supreme.justia.com/cases/federal/us/574/13-534/case.pdf
78. American Dental Education Association State Update. Federal court upholds Georgia Board of Dentistry policy on teeth whitening. Accessed March 9, 2023. www.adea.org/WorkArea/DownloadAsset.aspx?id=36113