

Bleaching for Children and Adolescents: Review Article

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Abstract

Physical appearance plays a key role in human social interaction. Moreover, the impact of dental appearance goes beyond the attractiveness of a face; it affects others' perceptions about their personal traits. Children with a normal dental appearance are considered more attractive and perceived as socially and intellectually more competent than those with visibly altered dental esthetics. The first evidence of variation from normal dentition is the difference in the colour. Thus, dental esthetics is becoming the main reason for seeking dental treatment among children and adolescent patients.

Keywords: Bleaching; Children; Adolescents

Introduction

An attractive smile and an appealing cosmetic appearance have lately become the focus of attention, tooth discoloration can be an important esthetic concern to children, adolescents, and their parents [1]. The treatment of choice is often dependent on a range of factors including: the cause of discoloration, coronal tooth structure remaining, operator experience, and patient finances [1]. Dental bleaching or known as "Tooth whitening" had offered a conservative, and effective approach for treatment of teeth discoloration, however it presents a major challenge to pediatric dentists [2]. It is defined as any process to whiten, lighten, or bleach teeth [3,4]. While the American Academy of Pediatric Dentistry (AAPD) advocated that teeth whitening procedures had proven to be safe and beneficial for children and adolescents to improve their dental esthetics and so enhance their self-esteem [5]. The majority of studies have involved adults [5,6].

Single tooth discoloration had always been a long-term esthetic challenge in children and adolescents [7]. It had been stated that 72% of primary teeth become discolored post-concussion [8] it might be vital or non-vital [7]. Discoloration due to trauma is the only indication for bleaching primary teeth [4,8]. Young permanent teeth with calcific metamorphosis, hypoplasia or hypomineralisation defects, enamel coloration due to trauma or infection of the related primary tooth are good candidates for single tooth bleaching [1]. There were suggestions that the children's teeth might be easier to bleach than adult teeth and have a higher success rate [9]. This might be due to the increased permeability of the enamel and dentine that enhanced the diffusion flux of bleaching agent [9].

Since 1980s, the field of dental bleaching dramatically changed; with the development of the current professional bleaching technique using oxidant agents [10]. There are two basic classes of products used in bleaching: hydrogen peroxide and carbamide peroxide [7], Hydrogen peroxide directly reacts to color pigments, while carbamide peroxide releases one third of its volume in the form of hydrogen peroxide and the rest in the form of urea [7,11]. Bacaksiz, *et al.* [12] revealed that in-office bleaching using hydrogen peroxide at high

concentrations (25% and 35%) could be safe for the adolescent patient. However, carbamide peroxide was the recommended bleaching product for patients who are under 18 years, as the released urea would have a beneficial cariostatic and an antibacterial effect [13]. In 2014 Croll and Donly [14] stated that bleaching for children and adolescents is safe and can be performed as the same procedure used for adults. Haywood has recommended commencing bleaching at ages of 10 - 14 [10].

Before commencing the bleaching protocol the possible risk and benefits should be discussed with parents [5,14]. Proper treatment planning with objectives should be conducted before signing the informed consent [5,14]. The AAPD discourages full-arch cosmetic bleaching for patients in the primary and mixed dentitions, as it would result in mismatched dental appearance once the child is in the permanent dentition [5]. The main concern regarding bleaching in the adolescent patients is the risk of tooth sensitivity [13], that occurs due to the passage of hydrogen peroxide through intact enamel and dentin, thus it would be more prevalent in the adolescent patients [5]. However, several randomized control trials by Donly have shown that tooth sensitivity was relatively minor in adolescent patients in comparison to reported sensitivity among adult patients [8,9,15]. That was explained by the larger pulp complexes in young permanent teeth allowing faster recovery from the acute inflammation experienced during a sensitivity episode [9].

Bleaching agents cause enamel microhardness, as well as surface roughness, that may further exacerbate the degree of post-treatment staining [16]. The use of remineralizing agents before and/or after dental bleaching to restore minerals was found useful as the application of Casein phosphopeptide--amorphous calcium phosphate (CPP-ACP) [17-19]. A clinical study showed that immediate application of a CPP-ACP based paste was effective in reducing the incidence and intensity of postoperative sensitivity after bleaching [20] and could also prevent demineralization from occurring [18,19]. There would also be an increased risk of extrinsic discoloration attributed to the increased roughness of the enamel allowing subsurface penetration of colorant [21]. But the use of calcium compounds with or after bleaching maintained a stable, high pH of 8 to 9 [6].

A safe bleaching according to Greenwall [22], would include: delaying bleaching following recent trauma, verifying adequate isolation of the tooth, avoiding heat and etching before bleaching not to remove smear layer, avoiding high concentrations of bleaching agent (especially Hydrogen peroxide), and recalling periodically. Regular monitoring is required and bleaching should be continued until the desired shade is reached [23]. There is a significant relationship between the initial tooth discoloration and the duration of the bleaching procedure [24]. The darker the tooth shade, the longer the bleaching time required to reach the desired shade [4]. In 2017 a study by Shaheen, *et al.* [4] on intracoronal bleaching using 10% carbamide peroxide proved to be an effective approach for whitening discolored primary teeth, which returned to their initial shade after three successive weekly applications for 21 days [4]. Restricting the use of dental bleaching for patients under 18 years old, had always placed pediatric dentists in clinical dilemmas, They were only permitted to more invasive, direct and indirect restorations for discolored teeth [13]. But nowadays AAPD supports the use of bleaching for vital and nonvital primary and young permanent teeth [5].

Conclusion

Esthetics problems in childhood and adolescence could have a significant effect on their psychosocial development. Dental esthetics are becoming the main reason for seeking dental treatment among children and adolescents patients. Pediatric dentists must be committed to perform the best dental treatment to restore the esthetics of both primary and young permanent teeth. And just because primary dentition is soon to be replaced that should not be an excuse for negligence. Conservatism and the wishes of the patient should be of the highest priority for dentists when formulating a dental treatment plan.

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