ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of DEVELOPMENT RESEARCH

International Journal of Development Research
Vol. 05, Issue, 08, pp. 5286-5288, August, 2015

Case Report

THE SCIENCE OF BLEACHING IN DENTISTRY

[1,*]Dr. Prashanth Kumar Katta, [2]Dr. sreedhara, S., [3]Dr. Megharaj, D. and [4]Dr. Raghavendra Nagappa

[1]Department of Conservative Dentistry and Endodontics, Bapuji Dental College & Hospital, Davangere-577004
[2]Department of orthodontics, SJM Dental College, Chitradurga- 577501
[3,4]Deparment of Prosthodontics, Faculty of Medicine technology, Derna, Libya

ARTICLE INFO

Article History:
Received 25th May, 2015
Received in revised form
30th June, 2015
Accepted 11th July, 2015
Published online 31th August, 2015

Key words:
Stains,
Treatment Modalities,
Mechanism

ABSTRACT

The discoloration of teeth is most common and universal problem. The causes of discoloration can be many. But proper management in a conservative and non invasive way is bleaching. With the advances in materials used for bleaching, the results can be obtained in a shorter duration, more patient friendly and affordable.

INTRODUCTION

Tooth discoloration creates a wide range of cosmetic problems and the dental profession and the public expend considerable amounts of time and money in attempts to improve the appearance of discoloured teeth.

Intrinsic discoloration

Systemic causes

Genetic defects

Alkaptonuria

Congenital erythropoietic porphyria

Congenital hyperbilirubinaemia

Amelogenesis imperfecta. (AI) Syndromes associated with AI; Tricho-dento-osseous syndrome.

Corresponding author: Dr. Prashanth Kumar Katta,
Department of Conservative Dentistry and Endodontics, Bapuji Dental College & Hospital, Davangere-577004.

Cone-rod dystrophy. Kohlshütter-Tönz syndrome. McGibbon syndrome. Vitamin D-dependent rickets. Vitamin D-resistant rickets.

Dentinogenesis imperfecta.(DI) Syndromes associated with (DI); Osteogenesis imperfecta, Ehlers-Danlos syndrome, Goldblatt syndrome, Schimke immunoosseous dysplasia. Drug induced.

Tetracycline staining

Ciprofloxacin

Fluorosis. Local causes: Acquired

Pulpal haemorrhagic products

Root resorption

Ageing

Internalized discoloration

Developmental defects

Enamel hypoplasia

Acquired defects

Tooth wear and gingival recession.

Extrinsic discoloration

Extrinsic color discoloration is outside the tooth substance and lies on the tooth surface or in the acquired pellicle. The origin of the stain may be:

- Metallic.
- Non-metallic.

The causes of extrinsic staining can be divided into two categories

- Direct extrinsic tooth staining: Those compounds which are incorporated into the pellicle and produce a stain as a result of their basic color.
- Indirect extrinsic tooth staining: Those which lead to staining caused by chemical interaction at the tooth surface.

Mechanism of Stain formation

To date the process of stain formation is not well understood. Pellicle-coated enamel is known to have a net negative charge, so permitting selective adhesion of positive ions to tooth surfaces. This is believed to play a critical role in the deposition of stains on tooth surfaces. It seems likely that ions from food and drink containing tannins as well as chromogens such as copper, nickel, and iron, attach to the negative charge on the pellicle-coated enamel, causing dental stains.

Bleaching Agents

Superoxol is a 30% solution of hydrogen peroxide by weight and 100% by volume in pure distilled water. It is a clear, colorless, odorless liquid, stored in lightproof amber bottles. It is unstable and should be kept away from heat, which could cause it to explode. superoxole should be stored in sealed refrigerated containers where it retains sufficient potency for approximately 3 to 4 months, but it decomposes readily in an open container and in the presence of organic debris. Care should be exercised when handling superoxol because its iscemic effect on skin and mucous membrane resembles a chemical burn. it is especially painful if it comes in contact with the nail bed or the soft tissue under the finger nail.Because the amount needed for a bleaching operation is about 1 to 2 ml, the solution can be dispensed into a clean depen dish.once treatment has been completed.any remaining solution should be discarded. Superoxol can be used alone or mixed with sodium perborate into a paste for use in the "walking bleach."

Mcinnes solution

30% H2O2, 36%HCl and 0.2%anesthetic ether in the ratio of 5:5:1

Anesthetic ether removes surface debris; hydrochloric acid etches the tooth and facilitates penetration of hydrogen peroxide deeper. Hydrogen peroxide removes the stains by the process of oxidation.

Disadvantage of HCl: Loss of contour, irritation to gingival and sensitivity of teeth.

So HCl was replaced by 20% NaOH. It's alkaline and dissolves calcium at a slower rate.

1:1 mixture of H2O2 and 20%NaOH was as effective as old Mcinnes solution and dissolved less calcium than new Mcinnes solution.

Mechanism of action of bleaching agents

The mechanism of action of bleaching is also unclear. Bleaching is an oxidation reaction. The enamel to be bleached donates electrons to the bleaching agent. Ten per cent carbamide peroxide breaks down to 3% hydrogen peroxide and 7% urea. The hydrogen peroxide metabolizes into water and free radicals of oxygen. These free radicals possess a single electron, which is thought to combine with the chromagens to decolourize or solubize them.

Types of teeth Whitening

When you are looking to brighten your smile, you have array of options from which you can select.

Over-the-Counter Methods

As stated above, over-the-counter methods are the cheapest form of whitening. These methods can include

- **Toothpastes:** These products strictly whiten and will not bleach your teeth. Whitening toothpastes have a mildly abrasive effect, and some can lighten teeth by up to one shade.
- **Gel:** Whitening gel can offer comparable results to strips. The exact treatment regimen will depend on the type and strength of gel you choose.
- **Rinses:** Whitening mouthwash contains small amounts of peroxide. You will use these rinses just as you would use a traditional anti-bacterial mouthwash. Many experts believe that whitening rinses are not as effective as other methods, since the peroxide is only in contact with your teeth for about 60 seconds.
- **Pre-made whitening trays:** Store bought whitening trays often fit uncomfortably. Because they are not customized for your smile, the gel may ooze out and irritate your gum tissue. Dental professionals recommend dentist-provided trays instead.
- **Strips:** Whitening strips are thin pieces of plastic coated in peroxide. You will attach the strips to the front of your teeth, and you will wear them about 30 minutes a day for two weeks. The results typically last around four months. Most experts and consumers agree that whitening strips are the most effective form of do-it-yourself whitening.

At-Home Care

Dentist-prescribed whitening offers much more dramatic results than over-the-counter products. At the same time, it is still quite affordable, making it an excellent investment in your smile. If you choose this method, you will receive custom-made whitening trays. They will fit comfortably in your mouth, and you will fill them with whitening gel. This gel will use a lower concentration of peroxide than in-office treatment. Therefore, the procedure will pose little risk for gum sensitivity, even without complete dentist supervision. You will wear the trays for 30 minutes to several hours every day, depending on your dentist's instructions and the whitening method you use. You could also choose overnight whitening. Although take-home whitening is quite effective, in-office care usually offers the most dramatic results

In-Office Whitening

Although take-home whitening is quite effective, in-office care usually offers the most dramatic results. Your dentist will use whitening gel with a much stronger concentration of peroxide. After an hour or less, the gel will break apart the bonds between stained molecules, giving you a dramatically brighter smile. Many dentists use lasers or specially formatted lights to achieve optimal results. The high-power light will activate the gel, allowing the oxygen to penetrate your teeth more thoroughly. Your dentist may also combine in-office and take-home methods for more dramatic and long-lasting results.

Bleaching options for patients

- Home bleaching
- Power bleaching
- Combination bleaching: power bleaching first followed by home bleaching
- Home bleaching and power bleaching after prolonged bleaching (deep bleaching).

Bleaching and aesthetic dentistry: quick hints

- Bleaching first
- Wait at least six weeks for the shade to settle prior to shade matching for anterior crowns
- Wait at least two weeks to replace composite restorations to a new, lighter shade
- Wait at least six-eight weeks to place veneers, as bond strength could be weakened
- Place glass ionomer over access cavity for internal bleaching until bleaching is complete, as the composite bond strength is weakened

Bleaching map concept

It should be drawn for every single tooth to be bleached. It describes how deep, wide and intermittently the stains are present.

Safety and Side Effects

Has been used for over 75 years

Not indicated for use in children, pregnant or breastfeeding women

Potential side effects are very real and need to be assessed by the clinician and may include dentine sensitivity, gingival irritation, effects on tooth structure and effects on aesthetics of restorations. Higher concentrations balance faster results with a higher incidence of side effects.

Conclusion

Esthetic treatment procedures have come a long way. Bleaching is a non invasive, economical and reliable treatment procedure for whitening of teeth. Despite the bleaching can't give total success in case of extrinsic stains the discolouration can be significantly treated and that of extrinsic stains is very good. The dentist must educate and motivate about these conservative esthetic procedures and not resort to more invasive procedures like veneers or crowns.

Conflict of interest: None

Source of funding: Self

Acknowledgements: None

Ethical clearance: Not applicable

REFERENCES

Baroudi, K., Hassan, N.A.[1]. 014 Sep. The effect of light-activation sources on tooth bleaching. *Niger Med. J.*, 2 55(5):363-8.

Carey, C.M[1]. 2014 Jun. Tooth whitening: what we now know. *J. Evid Based Dent. Pract.*, 14 Suppl: 70-6.

Gerlach, R.W. and Barker, M.L. 2004 Feb. Professional vital bleaching using a thin and concentrated peroxide gel on whitening strips: an integrated clinical summary. *J. Contemp Dent Pract.* 15; 5(1):1-17.

Gerlach, R.W., Gibb, R.D. and Sagel, P.A. 2002 Feb. Initial color change and color retention with a hydrogen peroxide bleaching strip. *Am. J. Dent.*, 15(1):3-7.

Hasson H, Ismail AI, Neiva G. Home-based chemically-induced whitening of teeth in adults. Cochrane Database Syst Rev. 2006 Oct 18 ;(4):CD006202.

Joiner, A. 2006 Mar 29. The bleaching of teeth: a review of the literature. *J. Dent.*, 2006 Aug; 34(7):412-9. Epub.

Kihn, P.W. 2007 Apr. Vital tooth whitening. *Dent. Clin. North Am.*, 51(2):319-31, viii.

Kugel, G. and Ferreira, S. 2005. The art and science of tooth whitening. *J Mass Dent Soc.*, winter; 53(4):34-7.

Kugel, G., Papathanasiou, A. and Williams, A.J. 2006 Jan. 3rd, Anderson C, Ferreira S. Clinical evaluation of chemical and light-activated tooth whitening systems. *Compend Contin Educ Dent.*, 27(1):54-62.

Li, Y. 2011 Apr. Safety controversies in tooth bleaching. *Dent Clin North Am.,* 55(2):255-63, viii.

Li, Y. and Greenwall, L. 2013 Jul. Safety issues of tooth whitening using peroxide-based materials. *Br. Dent. J.*, 215(1):29-34.

****