Ultraconservative treatment modalities for management of discoloured tooth: Case reports

Dr. Nandhini Ambalavanan, Dr. Srilekha Jayakumar and Dr. Aruna Raj

Abstract
Discolouration of the anterior tooth causes considerable cosmetic impairment to a patient. Intrinsic stains are particularly difficult to manage with techniques like bleaching alone. Combination techniques are effective in selective patients depending on the severity of discolouration. This article describes the efficient management of discolouration of patients using ultra-conservative combination techniques that reduces the chair time and prevents loss of tooth structure.

Keywords: Discolouration, microabrasion, bleaching, macroabrasion, combination techniques, topical fluoride

Introduction
Discolouration of anterior teeth can cause considerable cosmetic impairment, psychological and social impact on a patient. Vogel introduced two categories for tooth discolouration as intrinsic and extrinsic [1]. Watts et al has introduced a third category called internalised discolouration. Intrinsic stains may result from pulpal necrosis, dental fluorosis, tetracycline induced stains, inherited developmental anomalies of enamel and dentin, haematological factors and aging [2]. Treatment modalities for managing discolorations include bleaching, micro abrasion, macroabrasion porcelain veneers and crowns. The main problem with invasive procedure is that most patients are young adults wherein the use of invasive procedures may result in excessive loss of tooth structure at an early age [3, 4]. The improvement in the field of conservative dentistry has paved a way for a new dimension in the dental treatment of patients with discoloured anterior teeth. Thus there has been a tendency towards conservative approaches even in severely fluorosed tooth. In accordance with the principles of bio mimetics every effort should be made to preserve the structural integrity of the tooth [5]. The aim of this clinical case report is to determine the clinical situations that do not require ceramic veneering and can be managed by ultra conservative techniques and combination techniques that do not violate the subtle balance, where the combination of enamel dentin demonstrate in maintaining the structural integrity of the tooth structure.

Case Report I
A twenty five years old female patient reported to the Department of Conservative Dentistry with the complaints of stains in upper front teeth since the eruption of permanent teeth. Clinical examination revealed brown stains that were hard, pitted and intrinsic in nature. Patient was provisionally diagnosed as enamel hypoplasia with moderate discolouration affecting the anteriors (fig 1). As the stains were moderately brown involving the superficial enamel and the difficulty of the patient to report for multiple sittings, the patient was offered the option of enamel microabrasion followed by vital bleaching of the upper anteriors. After obtaining the desired aesthetic result, topical fluoride (Flour protector) was applied for four minutes (fig 5, 6).
Case Report II
A twenty three year old male patient reported to the Department of Conservative Dentistry with the complaints of discolouration of upper teeth ever since eruption of his permanent teeth. Clinically the stains were dark brown, hard with white opaque areas and intrinsic in nature. The patient was provisionally diagnosed as enamel hypoplasia with severe dicolouration affecting the anteriors (fig 9). After determining the degree of staining, which was severe, it was decided to go for macroabrasion treatment followed by an in office vital bleaching procedure. The patient was explained about the treatment protocol and the patient’s consent was obtained. Under rubber dam isolation, macroabrasion was done using 12 & 30 fluted tungsten carbide bur (fig 10). After this procedure, in-office vital bleaching was done using McInnes solution (1 part of 0.2 % diethyl ether + 5 parts of 36 % HCl + 5 parts of 30 % hydrogen peroxide) (fig 11). The patient underwent two sittings of vital bleaching in a week interval of three minutes application of bleaching agent followed by irrigation. Finishing and polishing of the tooth were done. Topical fluoride (Fluor protector) application was done in the final sitting to avoid post-operative sensitivity (fig 12).

Discussion
Different modalities for management of discoloured tooth include in-office vital bleaching, night guard vital bleaching, laser assisted bleaching, micro and macro abrasion and combination techniques [6]. Combination techniques are particularly useful in treating moderate to severe discolorations that are not amenable to bleaching alone. Moderate discoloration involving the superficial enamel can be resolved with microabrasion and bleaching particularly when the patient cannot come for multiple sittings. Enamel microabrasion technique associated with dental bleaching is an excellent and successful clinical technique for re-establishing esthetics of severe case of enamel fluorosis eliminating the use of dental restoration. Microabrasion involves removal of small amount of enamel surface and incorporating both abrasion with the help of dental instruments and erosion with the acid mixture. Controversy exists whether or not high concentration of hydrogen peroxide can cause morphological changes in the enamel. A study by Sundfeld et al. have concluded that enamel microabrasion with vital bleaching is an excellent clinical procedure for re-establishing esthetics in case of severe enamel fluorosis, eliminating the use of adhesive restoration with minimal loss of enamel [7].

According to Celik et al. though microabrasion improves the appearance of the teeth with brown stains, combination of microabrasion and bleaching results in better aesthetics [10]. Long term effectiveness of microabrasion has been clinically proven in several studies with minimal post-operative and intra operative discomfort like dentinal hypersensitivity [8, 9]. Microabrasion followed by polishing with a fluoride prophylactic paste provides better surface smoothness and better hardness of the enamel. These factors are important in determining the amount of residual enamel left after microabrasion and the final appearance of the teeth after bleaching protocol [11].

When the stains are very deep and conservative management strategies are ineffective, macroabrasion is a valuable alternative. Some enamel defects or white spots that do not respond to microabrasion and bleaching may respond better to macroabrasion. Initial macroabrasion removes the superficial layer of fluoride that displays the most unaesthetic colour and defective structure. This procedure eliminated darkest stains in the enamel and minimized clinical chair time [12]. Light intermittent pressure with careful monitoring of removal of tooth structure will avoid irreversible damage. Both the procedures are less time consuming negating the use of local anaesthesia with the high degree of patient satisfaction. If defects or discoloration remain after treatment, a restorative procedure may remove stains without removing deeper enamel, they have the disadvantage of multiple office visits and overall cost. Some enamel defects and stains respond better to combined therapy of removing intrinsic stains using macroabrasion and in-office bleaching.

A combined chemo mechanical approach may be considered as an interesting alternative to more invasive prosthetic techniques like veneers, provide better aesthetic and possible cost reduction to the patient [14, 15]. Microabrasion in combination with in-office vital bleaching technique is beneficial in treating mild discolorations, whereas severe discolorations can be treated with macro abrasion and composite restorations. Further to avoid post operative hypersensitivity topical application of fluoride is effective. Studies have concluded that remineralization of bleached enamel can be improved by the application of high concentration of topical fluoride [16].
Fig 3: Microabrasion

Fig 4: In-office vital Bleaching

Fig 5: Fluoride varnish

Fig 6: Varnish application

Fig 7: Pre-operative photograph

Fig 8: Post-operative photograph

Case 1: Microabrasion and Bleaching

Fig 9: pre-operative photograph

Fig 10: Macroabrasion
Case 2: Macroabrasion and Bleaching

Conclusion
The application of ultra conservative treatment modalities should always precede a more sophisticated treatment plan. From the patients perspective conservative techniques are less expensive and a satisfactory. Before resorting to a invasive protocol, effort should be made to restore the tooth structure. The procedures that maintain the biomechanical, structural and esthetic integrity of the tooth should always be the treatment option instead of opting for a more sophisticated treatment plan.

References
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