

Arrested Caries Lesion: Minimal Invasive Treatment Approach- A case report

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Abstract: Esthetic treatment of stained arrested caries lesions (ACLs) has mostly been done using invasive restorative techniques. The aim of this paper was to propose and report the efficacy of a conservative approach based on dental bleaching to esthetically treat these lesions. This paper reports a clinical case of pit and fissure-stained ACLs in four posterior teeth and proximal ACL on canine, which were treated with 35 % hydrogen peroxide in-office bleaching. Digital photographs were taken to document the efficacy of the treatment. The lesions showed noticeable increase in color lightness indicating the efficacy and suitability of the proposed approach. By using the conservative clinical technique presented, the esthetics of most stained ACLs could be improved, eliminating the need for invasive restorative treatments.

Key words: arrested caries lesion, bleaching, color change, esthetics, hydrogen peroxide.

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I. Introduction

Esthetics has become as important as function, structure and biology, until about the last two decades, in dental practice as current advertising and the media in general emphasize the effect of a pleasant appearance because of its importance in many everyday situations. This fact leads to changes in patients' esthetic needs and consequence of dental treatment priority¹.

The appearance of the teeth could be influenced by gender, age and education level. Females are reported to be more sensitive than males for the appearance of teeth and the importance of teeth decreases with ageing and higher education levels².

Now active caries can be converted into arrested caries by improved oral hygiene, fluoride tooth pastes and remineralizing agents. Arrested caries, are remineralized lesions that are no longer active, presenting highly mineralized surfaces, along with frequent and undesirable dark discoloration, due to pigment incorporation during the remineralization process. These arrested caries appear unesthetic which may concern certain patients' especially female patients⁴.

In this study patients were apprehensive and refused invasive treatments, hence bleaching was opted for treatment for discolored natural teeth, also it has got some advantages as it is noninvasive, effective, predictable, and cost-effective. Also dental bleaching does not exacerbate the mineral loss of existing caries lesions.

Aim of the study was to perform minimally invasive procedure of applying bleaching agent on the arrested carries and evaluate the efficacy of bleaching agent on treating caries conservatively and esthetically.

II. Material Used

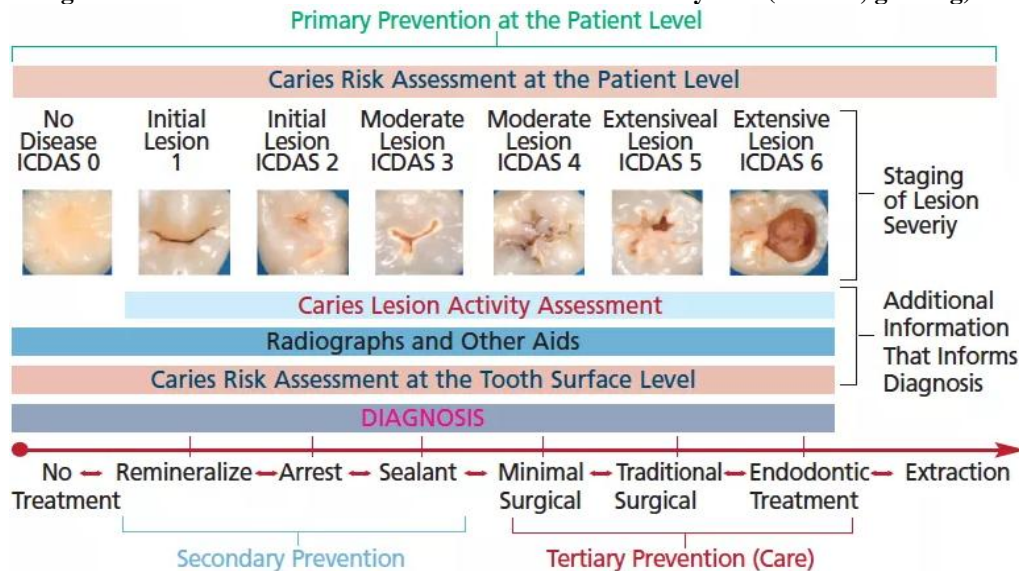


III. Clinical Case Report: 1

25 year boy reported to Dept of Conservative Dentistry and Endodontics at Pandit Deendayal Upadhyay Dental College, Solapur Maharashtra, having complain of dark discoloration of ACLs present on his teeth. The patient signed written informed consent prior to screening, and received oral soft and hard tissue examinations

Boy reported dissatisfaction about his generalized yellowish teeth, along with the dark discoloration of ACLs present in the pits and fissures of mandibular left and mandibular right first and second molars. Caries severity was classified using the International Caries Detection and Assessment System: ICDAS; grading details³.

Figure 1 International Caries Detection and Assessment System (ICDAS; grading) ⁵.



All the treatment modalities were explained to the patient. The patients indicated the desire to remove the discoloration and didn't want any procedure that included tooth preparation. After explanation of risks and benefits of treatment options, the patient chose to perform in-office bleaching.

Teeth were cleaned with pumice, air-dried, and initial digital photographs were taken. Hydrogen peroxide 35 % (Pola Office, SDI, Australia) was applied on the teeth (0.5- to 1.0-mm thick layer) along with the discolored pits and fissures for 10 minutes, removed, and then applied again three times for 10 minutes (total of 40 minutes) and finally rinsed with water.

All teeth were photographed and re-evaluated.



IV. Clinical Case Report: 2

40 year healthy man reported to Dept of Conservative Dentistry and Endodontics at Pandit Deendayal Upadhyay Dental College, Solapur Maharashtra, complained about discolored spot on his left maxillary canine. Patient received oral soft and hard tissue examinations and bleaching procedure was performed under rubber dam isolation



V. Discussion

Dental caries affects all populations on earth and it is considered one of the most prevalent chronic oral diseases and the second most common disease after the common cold. Differences between active and arrested (inactive) caries

- Active lesions tend to be whitish or yellowish in colour and opaque (non-glossy). Inactive lesions can be whitish, yellowish or darkened in colour but tend to be shiny or glossy.
- Active lesions are located close to the gingival margin (gum line) when the lesion is in a smooth surface. Inactive lesions are located farther away from the gingival margin.
- Active lesions feel rough when the tip of the explorer is moved gently across their surface while inactive lesions feel hard and less rough.
- Active lesions show evidence of progression or change over time, while arrested lesions do not.
- Active lesions may show an obvious hole in the tooth and caries may extend into the dentine while inactive lesions will have no apparent progression into enamel when viewed on the x-ray⁸.

Arrested caries are dark discolored inactive caries, and require no restorative treatment unless they affect form, function, or esthetics. The hard, arrested lesions are black as they pick stain from exogenous sources⁶. Early investigation into the change in colour with the carious process centered around the amino-acids released during proteolysis, as a result of the proteolysis-chelation theory of cavity formation. Discoloration can also be due to the presence of trapped organic debris and metallic ions within the tooth structure⁷. Blackish discoloration or blackish staining of arrested caries, in particular, results from the presence of ferric sulfide, a byproduct from the reaction between iron present in saliva or gingival fluid and hydrogen sulfide formed by bacteria^{9, 10}.

Results of present study co-relate with the study results of study done by sarah S Al-Angari et al, who had used 40% Opalscence Boost as the bleaching agent and similar results were found. The study also included laboratory experiments on extracted teeth by using agent 15 % carbamide peroxide.

This study showed noticeable changes in the ICDAS scores of the bleached teeth. In first case of 25 year boy the score changed from 3 to 2 while in case of 40 year man it changed from 3 to 1. This method may not completely remove the caries or the discoloration but it definitely reduces the amount of preparation to be done if needed.

This method though useful from esthetic point of view but may affect the ability of caries detection methods to distinguish sound from affected enamel (brown spot/ white spot lesions), especially those based on light excitation wavelengths differentiation such as fluorescence spectroscopy¹¹. The color change during the bleaching treatment is related to the oxidative free radicals as they break the double bonds of the chromophore molecules, alter their configurations, and, subsequently, change their optical properties¹². The color change is more significant in light discolored arrested caries compared to dark colored arrested caries. Also light colored arrested caries after treatment blend more easily than dark colored. This may affect the patient satisfaction.

After the bleaching of the arrested caries, the surface becomes rough which may lead to plaque accumulation and further may turn it into active lesions. Thus to prevent this conversion of arrested caries into active one, dentist should prescribe or apply remineralizing agents to the tooth surface. Remineralizing agents should be applied for atleast a week before any further treatment is commenced¹³.

VI. Conclusion

Though the bleaching agent is not a complete reliable treatment option on arrested caries, it has got its own certain benefits, it is less invasive, low cost, effective, can be successfully used in apprehensive-mentally retarded patients who have fear of dental equipment. Still further studies are required on bleaching agent's usage on arrested caries lesion.

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