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RESEARCH ARTICLE

CHEMO MECHANICAL ABRASION: A NOVEL MINIMALLY INVASIVE APPROACH FOR MANAGEMENT OF DENTAL FLUOROSIS LESIONS- CASE REPORT

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Abstract

The purpose of this case report is to describe a novel minimally invasive approach- Chemo mechanical abrasion using Opalustre (Ultradent products, USA)for ameliorating mild(grade 2) tomoderate (grade 3) dental fluorosis(grading as per Dean's classification of dentalfluorosis).

Introduction:-

Fluoride is one of the most successful measures for prevention of dental caries in publichealth (Petersen & Lennon, 2004). However, there has always been controversy about usingfluoride because of fluorosis (Sapolsky, 1968; Null & Feldman, 2003; Ananian, Solomowitz&Dowrich, 2005).

Dental fluorosis is a specific disturbance of toothformation caused by excessive fluoride intake.Ingestion of water with a fluoride concentrationtwo or three times greater than the recommendedamount causes mild fluorosis while its concentrationfour times therecommended amount causesmoderate to severe forms of fluorosis. It is characterized by lustreless opaque white patches on theenamel, which may become mottled striated and/orpitted. The mottled areas may become stainedyellow or brown.[1]

The initial attempt of Hydrochloric acid (HCl) applicationto improve aesthetics of teeth with fluorosiswas of Dr.D Kane in 1916. Since the resultsobtained were favourable, researches were carriedout in order to verify the effectiveness of themicro abrasion technique using HCl in differentconcentrations ranging from 6.6% to 18% andphosphoric acid (H3 PO4) from 30% to 40% concentrationsin association with abrasives.Microabrasion causes reduced wear of toothsurface and minimum discomfort to the patient,and hence is an effective method toimprove the aesthetics of dental fluorosis lesions.[2-4]

Case Presentation

A 13-year-old female patient reported to theDepartment of Pedodontics& Preventive Dentistry,S.C.B Dental College & Hospital, Cuttack, Odisha with chief complaint of yellowish discoloration of her upper frontteeth. No relevant systemic disorder wasrecorded in anamnesis. During clinical examination,brown stains were noted over the middle

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and incisal thirds of maxillary central incisors, cervical thirds of mandibular incisors, and generalised non discolouredfluorotic lesions (figure 1). The patient did not have any othersignificant finding in the oral cavity. Medical andfamily history was not relevant.

Investigations
Tooth vitality tests were performed on selected maxillary central incisors which showedthat the teeth were vital.

Differential Diagnosis
Based on prenatal and postnatal history of the patient, and clinical examination differential diagnosisof tetracycline staining wasruled out.

Procedure:
Pumice prophylaxis was done in selected teeth, followed by application of viscous water-soluble paste (1 mm thick layer) ofOpalustre(This material contains 6.6% Hydrochloric acid and 20-160 μm-sized silicon carbidemicroparticles, It is purple incolour and supplied in syringes)on the tooth surface(figure 2). Lightpressure is applied for 60-120 sec with Opal Cups in gear reduction contra angled handpiece. The teeth were observed after abundant rinsing withwater. After two applications of Opalustre (Ultradent Products)done in a single session, the removal of stains and aestheticimprovement were visualised on the wet surfaces.(figure 3).The polishingwas performed using prophylaxis paste (3M, Clinpro, United States of America).

Follow-Up
The patient was recalled after 3 months for follow-up examination. It was observed that the shiny aspects andthe surface smoothness were maintained.Tooth vitality tests were performed on the teeth that had beentreated withmicroabrasion, which showedthatthe teeth were vital.

Discussion:-

The morphology of the teeth is a contributing factor to a radiant smile, as appreciated by all age groups and genders. Aesthetic problems which may range from macro to micro level may psychologicallyaffect patients, especially teenagers, and may interferewith their social life.It was reported that microabrasion could improve theappearance of teeth by eliminating the outer defective layer of the enamel. Clinical studies have confirmed the benefit of using microabrasion to obtain a goodesthetic outcome for white spot lesions .The components ofmicroabrasion include 6.6% hydrochloric acid and 20-to 160-lm-sized silicon carbide microparticles thatremoves superficial parts of a lesion by chemicalerosion and mechanical abrasion.

Chemo mechanical abrasion has become accepted as a minimally invasive method to improve the appearance of teeth withsuperficial demineralisation and decalcification effects.Literature shows that enamel microabrasion should be considered as the first treatment option when trying to improve aestheticsof teeth that presents with intrinsic or extrinsicstains. It only requires a small amountof structure removal, does not cause postoperative pain or sensitivityand in majority of cases can be done in a single sessioncausing minimum discomfort to the patient. Other advantagesof this technique includes immediate, permanent andlasting results due to the fact that microabrasion involves theremoval of the stain instead of just covering up the stain or alteringthe enamel; shorter time required for the procedurewhich is easy to carry out;avoiding dental cavity preparationfor restorative materials;and does not cause injuries eitherto the pulp or to the periodontal tissue.[4-10]

In this case reported, two applications ofOpalustrewere required inone session in order to remove the brown pigmentation. Enamel microabrasion was designed to improve thesurface texture, remove the stains and recover remineralization.It removes superficial parts of thelesion by abrasion with a slurry of hydrochloric acidand pumice, and the enamel surface becomes smooth and glossy. Both chemical erosion with hydrochloricacid and mechanical abrasion with pumice simultaneouslytake place.Donly et al. found that microabrasionre-created the outer, prism-free region and teethbecame glassy and named it as ‘abrosion effect’. Thislayer reflects or scatters the light and masks mildimperfections. However, substantial amounts ofenamel often unfortunately have to be eroded toimprove appearance with this technique.[10-13]

The combination ofOpalustre and the mechanical techniqueresulted in anaesthetic morphological appearance of teeth which prevents the need for invasive restorative procedures, and prosthetic veneers or crowns.

Figure 1:- Initial clinical appearance of the maxillarycentral incisors(Note the brown stainson the teeth).

Figure 2:- Application of Opalustre (Ultradent Products, U.S.A) on selected teeth.

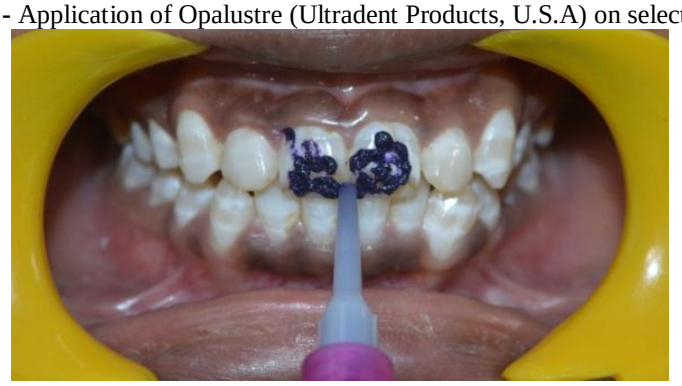

Figure 3:- Appearance of teeth after polishing.

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