ORIGINAL RESEARCH PAPER

Volume-7 | Issue-9 | September-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

AESTHETIC MANAGEMENT OF MILD FLUOROSIS IN PERMANENT ANTERIOR TEETH BY RESIN INFILTRATION - PATIENT PERCEPTIONS.

Dental Science

Dr. Richa Khanna MDS, Paediatric and Preventive Dentistry, Associate Professor Department of Paediatric and Preventive Dentistry King George's Medical University, Lucknow, UP.

Dr. Rajeev Kumar Singh* MDS, Paediatric and Preventive Dentistry, Associate Professor Department of Paediatric and Preventive Dentistry King George's Medical University, Lucknow, UP. *Corresponding Author

Dr. Afroz Alam Ansari MDS, Paediatric and Preventive Dentistry, Associate Professor Department of Paediatric and Preventive Dentistry King George's Medical University, Lucknow, UP.

ABSTRACT

INTRODUCTION: Several treatment strategies have been suggested for qualitative defects of fluorosis depending upon the type and progression of the defect. Resin infiltration material is a promising alternative in this context. Present study was designed to explore the improvement in enamel translucency of young permanent anterior with mild fluorosis after treatment with Resin Infiltration, with patient perceptions as one of the important outcomes.

Methodology: All the selected teeth (fifty) with mild fluorosis were subjected to the 'resin infiltration' intervention. Defects were subjected to photographic imaging using digital camera before and after intervention. Patients were blinded to pre-operative and post-operative photographs of their treated teeth. They were asked to rate the photographs on a given scale. Similar photography and rating was done after one visit.

RESULTS: All teeth scored fairly well on the post-operative photographs than the pre-operative photographs. Hence, most of the patients were highly satisfied with the intervention and did not feel any scope of improvement in appearance.

KEYWORDS

INTRODUCTION:

Dental enamel is secreted by specialized epithelial cells called ameloblasts. Ameloblasts are highly susceptible to relatively minor changes in their environment, for example, increase in temperature, hypocalcaemia and pH level[1,2]. Any maternal or childhood illness or exposure to medications, environmental contaminants like fluoride may change the environment in which ameloblasts are functioning and can contribute to development of defective enamel.[3]

The defective enamel produced by effect of fluoride can be either qualitative or quantitative in nature. Qualitative defects are visible as white-creamy or brown opacities. Quantitative defects appear as hypoplasia of different grades. Qualitative defects are considered as mild fluorosis according to Dean's index[4]. They are further characterised by an intact surface layer which is smooth and hypermineralised, and a porous subsurface layer, that is soft and hypomineralised. Affected teeth pose significant clinical challenges due to this characteristic structure. There is increased dental treatment need as the teeth are more susceptible to plaque accumulation and dental caries. Children with affected molars may receive upto ten times more dental treatment than those without and are likely to be more fearful in the dental environment[5]. There is rapid post-eruptive tissue loss associated with the teeth and increased porosity of residual enamel. Pulpal inflammation is unsurprising, therefore. These factors therefore necessitate a treatment protocol that includes prevention of unwanted sequel of these defects and simultaneously provides aesthetic improvement for better quality of life.

Several treatment strategies have been suggested for qualitative defects of fluorosis depending upon the type and progression of the defect, like micro abrasion, tooth bleaching, composite restorations, full crown restorations. Most of the treatment strategies that focus on aesthetic improvement, do not concentrate on the functional demands; like micro abrasion and bleaching. On the other hand, restorative procedures, which meet the functional demands, follow a much invasive protocol. All of these treatment alternatives are not without side effects. The invasive procedures usually result in excessive sacrifice of tooth material, which accelerate the destruction of the tooth at an earlier age, resulting in increased dependency on dental treatment.

The resin infiltration material (Icon, DMG Germany) is a promising alternative in this context. This new technique has been found to be highly effective in infiltrating natural early carious lesions which are structurally similar to qualitative developmental enamel defects. In natural enamel caries, resin infiltration works by obstructing the diffusion pathways for acids and dissolved minerals in the enamel.[6,7] Besides, the resin matrix can strengthen the enamel structure mechanically, thereby preventing breakdown of the enamel[6,7]. As an additional effect of this method, the resin-infiltrated enamel lesions have been reported to lose their whitish opaque colour and recover the healthy enamel colour and translucency[8].

Hence, the present study was designed to explore the improvement in *enamel translucency of young permanent anterior with mild fluorosis after treatment with Resin Infiltration, with patient perceptions as one of the important outcomes.*

METHODOLOGY

Male and female subjects in the age group of 8-12 years attending the outpatient department were screened for presence of mild fluorosis according to the Dean's index. Subjects partially erupted affected teeth, symptoms of thermal sensitivity associated or affected teeth with compromised periodontal health were excluded from the study. A written Informed consent for participation in the study was obtained from the parent/guardian of the selected participants after the study purpose and procedure was explained.

All the selected teeth (fifty) were subjected to the 'resin infiltration' intervention. Each selected tooth was cleaned with pumice using a rubber cup before rubber dam was placed. Each tooth was then isolated using rubberdam. 'Resin infiltration' intervention was administered following manufacturers' instructions (Icon, DMG Germany). The surface of each enamel defect was etched with 15% hydrochloric acid gel (available in the Resin infiltration kit- composed of 15% hydrochloric acid, water, silica, and additives; Icon, DMG.) for 120 seconds. The tooth was then rinsed and dried with compressed air. Next, ethanol was applied on the surface of the affected tooth for 30 seconds and air dried. Following this, infiltrant (ICON® -Infiltrant) was applied to the teeth. It was allowed to penetrate for three minutes on the surface of the defect. The excess material was removed with an explorer and the teeth were flossed. Finally, there was application of curing light for forty seconds. The application of the infiltrant was repeated a second time, followed by forty seconds of light curing. The teeth were later polished with composite finishing discs (Sof-Lex disk; 3M ESPE).

The fluorosis defects were subjected to photographic imaging using

digital camera (Nikon coolpix S6500) before and after intervention. All precautions were taken to ensure standardised settings of photography both pre and post intervention. The patients were blinded to pre-operative and post-operative (post 1) photographs of their treated teeth. They were asked to rate the photographs on a given scale (appendix 1). This Rating questionnaire was translated in Hindi and administered to the patients. The patients were recalled again after one week to observe the effects from salivary hydration of the treated enamel, as etching under resin infiltration leaves it highly dehydrated. The treated teeth were photographed under similar settings and the patients were again asked to rate the preoperative and postoperative photographs (post 2) on the given scale.

Appendix 1
Rating Questionnaire
Please answer the following questions rate the photograph of your tooth selected for the present study.

1. I am satisfied with the appearance of the tooth Highly Satisfied-4 Satisfied-3No idea-2Unsatisfied-1 Highly Unsatisfied-0
2. What percentage of the tooth do you think has non-uniform opaque white color? 100%-4 75%-350%-225%-1<10%-0
3. There is still scope of improvement in the color of my tooth Highly Agree -4Agree-3No idea-2Disagree-1Highly Disagree-0

RESULTS:

A total of eighteen patients with fluorosis defects involving fifty teeth were enrolled in the study, out of which twenty-two were maxillary central incisors, eighteen were maxillary lateral incisors, ten were maxillary canines. Out of eighteen patients enrolled, ten were male and eight female.

On the rating scale given to patients for each of their selected tooth photographs, during the first visit, almost all the teeth (45 out of 50) scored a four on the post-operative photographs (post 1) for item 1. Rest scored three on item 1. It indicated that for most of the post 2 photographs, patients were satisfied with the appearance of the tooth. The same teeth scored poorly on the pre-operative photographs for item 1 (table 1).

For the second item related to percentage of the tooth with non-uniform opaque white color, a total of thirty-five teeth scored 0, ten scored 1, three scored 2, and two scored 3 in post 1 photographs. It showed that for most of the teeth, patients felt that non-uniform color was present in only less than ten percent of the enamel surface in post-operative photographs of first visit. The same teeth scored poorly on the pre-operative photographs for item 2 (table 1).

For the third item related to scope of improvement three scored 4, six scored 3, twelve scored 1 and twenty-nine scored 0 on post 2 photographs. This again indicated that that most of the patients disagreed to the fact that there was scope of improvement in the appearance of the treated teeth. The same teeth scored poorly on the pre-operative photographs for item 3 (table 1).

TABLE 1 : Distribution of photographic scores of selected teeth by patients in first visit.

	Number of teeth with score 4		Number of teeth with score 3		Number of teeth with score 2		Number of teeth with score 1		Number of teeth with score 0	
	Pre	Post 1	Pre	Post 1	Pre	Post 1	Pre	Post 1	Pre	Post 1
Item 1	0	45	2	5	0	0	20	0	28	0
Item 2	48	0	2	2	0	3	0	10	0	35
Item 3	36	3	12	6	0	0	1	12	0	29

Similarly good scores were attained by teeth in post 2 photographs as compared to pre-operative photographs (Table 2)

Table 1 : Distribution of photographic scores of selected teeth by patients in second visit (after one week).

	Number of teeth with score 4		Number of teeth with score 3		Number of teeth with score 2		Number of teeth with score 1		Number of teeth with score 0	
	Pre	Post 2	Pre	Post 2	Pre	Post 2	Pre	Post 2	Pre	Post 2
Item 1	0	48	1	2	0	0	18	0	31	0
Item 2	47	0	3	1	0	2	0	11	0	36
Item 3	38	2	11	3	0	0	1	14	0	31

DISCUSSION

The present study was an attempt to bring insight of patient perceptions to dental aesthetics. The area of fluorosis defects was chosen, as this is a highly prevalent problem causing aesthetic alterations and altered appearance in permanent anterior teeth of children and young adolescents. Several case reports demonstrating improvement in aesthetics after resin infiltration technique for developmental defects of enamel have been reported in literature[9,10,11], evidence is less[12]. But patient perceptions were not explored previously. Hence, this small pilot study attempted to explore this using a self - designed rating scale. The scale was vetted by subject experts in focus group discussion.

The results of the study demonstrate a positive perception of patients for aesthetic improvement of mild fluorosis defects treated with resin infiltration. Most of the treated defects scored better in post-operative visit than the pre-operative visits. Literature has varied evidence of using patient perception for dental aesthetics and tooth color shades[13,14]. The perceptions may vary according to personality traits of the patient and thereby the satisfaction from the results[15]. The present study however, did not explore personality traits, but it definitely opens an area of involving patients in clinical outcome assessment as major stakeholders. The authors of the study further aim to correlate the patient perceptions to clinicians' assessment as an extension of this study.

REFERENCES:

1. YamagutiPM, Arana-ChavezVE, AcevedoAC. Changes in enamelogenesis in in the rat incisor following short-term hypocacCaemia. Arch Oral Biol 2005:50:185-88.
2. Robinson C, Connell S, Brookes SJ, Kirkham J, Shore RC, Smith DAM. Surface chemistry of enamel apatite during maturation in relation to pH : implications for protein removal and crystal growth. Arch Oral Biol 2005:50:267.
3. TungK, FujitaH, YamashitaY, TakagiY. Effect of turpentine induced fever during the enamel formation of rat incisor. Arch Oral Biol 2006;51;464-70.
4. Clarkson J, O'mullane D. A modified DDE Index for use in epidemiological studies of enamel defects. Journal of Dental Research. 1989 Mar;68(3):445-50.
5. JalevikB. Klingberg GA, Dental treatment, dental fear and behaviour management problems in children with severe enamel hypomineralization of their permanent first molars. Int J Paediatr Dent 2002;12:24-32.
6. Meyer-Lueckel H, Paris S. Progression of artificial enamel caries lesions after infiltration with experimental light curing resins. Caries Res 2008; 42: 117–124.
7. Paris S, Meyer-Lueckel H, Co¨lfen H, Kielbassa AM. Resin infiltration of artificial enamel caries lesions with experimental light curing resins. Dent Mater J 2007; 26: 582–588
8. Paris S, Meyer-Lueckel H. Masking of labial enamel white spot lesions by resin infiltration – A clinical report. Quintessence Int 2009; 40: 713–718
9. Omar SI. Using resin infiltration to treat developmental defects of enamel: Three case reports. J Res Dent 2013;1:31-5
10. Auschill TM, Schmidt KE, Arweiler NB. Resin Infiltration for Aesthetic Improvement of Mild to Moderate Fluorosis: A Six-month Follow-up Case Report. Oral Health Prev Dent. 2014 Sep 18. doi: 10.3290/j.ohpd.a32785.
11. Torres CR, Borges AB. Color masking of developmental enamel defects: a case series. Oper Dent. 2015 Jan-Feb;40(1):25-33. Epub 2014 Aug 19.
12. Borges AB, Caneppele TMF, Masterson D, Maia LC. Is resin infiltration an effective esthetic treatment for enamel development defects and white spot lesions? A systematic review. Journal of Dentistry 2017; 56: 11-18,
13. Naveh, Gili & Grossman, Yoav & Bachner, Yaacov & Levin, Liran. (2010). Patients' self-perception of tooth shade in relation to professionally objective evaluation. Quintessence international (Berlin, Germany : 1985). 41. e80-3.
14. Musskopf Marta Liliana, Rocha Jose Mariano da, Rosing Cassiano Kuchenbecker. Perception of Smile Esthetics Varies Between Patients and Dental Professionals When Recession Defects are Present. Braz. Dent. J. [Internet]. 2013 Aug [cited 2018 Aug 09] ; 24(4): 385-390. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-64402013000400385&lng=en. http://dx.doi.org/10.1590/0103-6440201302223.
15. Martin Javier, Rivas Vanessa, Vildósola Patricio, Moncada Laura, Oliveira Junior Osmir B., Saad José Roberto C. et al . Personality Style in Patients Looking for Tooth Bleaching and Its Correlation with Treatment Satisfaction. Braz. Dent. J. [Internet]. 2016 Feb [cited 2018 Aug 09] ; 27(1): 60-65. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-64402016000100060&lng=en. http://dx.doi.org/10.1590/0103-6440201600127.