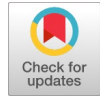


Brighten Up Your Smile. Bring out the Natural Whiteness

Nishtha Sharma, Varinder Goyal, Puneet Goyal, Shaveta, Nitin Garg, Rashim



Abstract: Aesthetics are often a major concern for young patients with anterior tooth involvement. Patients typically seek dental care to improve their smiles due to irregularities in the enamel and superficial stains. These stains or anomalies in dental hard tissue can be caused by fluorosis, mineralized white patches, hypoplasia, and amelogenesis imperfecta. Different treatment modalities are used to treat these staining of teeth. In the present case report dental fluorosis is treated with MDC Antivet Bleaching agent in anterior teeth and stainless-steel crowns in all four permanent molars in a thirteen-year-old child. The minimal invasive technique was used for bleaching anterior teeth and molars were preserved with full coverage stainless steel crowns. The appearance of the treated enamel showed a surface almost completely free of fluorotic stains, demonstrating the satisfactory results of this treatment.

Keywords: Bleaching, Mild Fluorosis, Moderate Fluorosis, Stainless steel crowns

I. INTRODUCTION

Desire for perfect smile is the upper most priority of every individual. Aesthetics is the art and science which deals with the study of beauty and taste. Aesthetic consideration have a significant role in defining the direction of treatment in contemporary restorative dentistry. Discolored, damaged or missing front teeth requires prompt treatment as sometimes it lowers the self-esteem of an individual. Dentists treating children often are challenged by esthetic restorations of primary teeth that are discolored, malformed or have multi surface carious or traumatic destruction. Tooth discoloration is a common problem. People of various ages may be affected but it can occur in both primary and permanent dentition.

Discoloration being the prime cause of esthetic dental treatment. There are numerous factors that result in tooth discoloration. Tooth discoloration can occur as a result of intrinsic or extrinsic factors. Dental fluorosis is a common cause for discoloration of teeth in several places. Dental fluorosis is a specific disturbance of tooth formation caused by excessive intake of fluoride. When fluoride level is more than 1.5 ppm in drinking water there are high chances of dental fluorosis to occur [1]. It was Dean, 1934, who developed a classification for fluorosis, which is still widely used, based on his interpretation of clinical appearance. Modified Dean's Fluorosis index given in 1942 is used for grading dental fluorosis. Treatment procedure for dental fluorosis depends on the severity of disease. Different treatment modalities which are used in treatment of dental fluorosis includes microabrasion, macroabrasion, bleaching, composite restorations, veneering and full crown restorations [2]. It is well documented that fluoride can have both beneficial and detrimental effects on the dentition. The purpose of this case report is to describe the treatment of moderate dental fluorosis with antivet solution and stainless steel crowns.

II. CASE REPORT

13-year-old boy who complained of his teeth being discoloured and having an unattractive appearance reported to the outdoor patient Department of Pediatrics and Preventive Dentistry, Guru Nanak Dev Dental College in Sunam.

The child's grin, which was marked by brown patches on the upper and lower incisors, was the primary factor in the dentist appointment. The patient's medical and family histories were ordinary.

The clinical examination revealed that all enamel surfaces of the tooth are affected, brown stains are widespread. Maxillary and Mandibular molars were also affected and presented a corroded like appearance and the general form of the teeth was affected. The patient's fluorosis stage was classified as Moderate (3) by Dean's Fluorosis Index - Modified Criteria (1942).

The left mandibular permanent first molar and right permanent maxillary first molar were found to be clinically exposed. Following additional radiographic analysis, it was determined to proceed with the root canal therapy for the two aforementioned molars followed by placement of stainless-steel crown (3M ESPE). Since the other two permanent first molars' crown (right mandibular permanent first molar and left permanent maxillary molar)

Manuscript received on 02 March 2024 | Revised Manuscript received on 16 March 2024 | Manuscript Accepted on 15 April 2024 | Manuscript published on 30 April 2024.

* Correspondence Author (s)

Dr. Nishtha Sharma*, Department of Paedodontics, Guru Nanak Dev Dental College & Research Institute, Sunam (Punjab), India. E-mail: nishtha6jan@gmail.com, ORCID ID: [0000-0002-0681-924X](https://orcid.org/0000-0002-0681-924X)

Dr. Varinder Goyal, Department of Paedodontics, Guru Nanak Dev Dental College & Research Institute, Sunam (Punjab), India. E-mail: virinderg@gmail.com, ORCID ID: [0000-0001-5747-466X](https://orcid.org/0000-0001-5747-466X)

Dr. Puneet Goyal, Department of Paedodontics, Guru Nanak Dev Dental College & Research Institute, Sunam (Punjab), India. E-mail: Go2goyal@gmail.com, ORCID ID: [0000-0001-7957-8160](https://orcid.org/0000-0001-7957-8160)

Dr. Shaveta, Department of Paedodontics, Guru Nanak Dev Dental College & Research Institute, Sunam (Punjab), India. E-mail: shavetagarg07@gmail.com, ORCID ID: [0000-0003-3346-8251](https://orcid.org/0000-0003-3346-8251)

Dr. Nitin Garg, Department of Paedodontics, Guru Nanak Dev Dental College & Research Institute, Sunam (Punjab), India. E-mail: nitingarg451@gmail.com, ORCID ID: [0009-0007-5238-4340](https://orcid.org/0009-0007-5238-4340)

Dr. Rashim, Department of Paedodontics, Guru Nanak Dev Dental College & Research Institute, Sunam (Punjab), India. E-mail: rashimgrover1518@gmail.com, ORCID ID: [0009-0004-1327-3400](https://orcid.org/0009-0004-1327-3400)

© The Authors. Published by Lattice Science Publication (LSP). This is an open access article under the CC-BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)



Brighten Up Your Smile. Bring out the Natural Whiteness

structures were all clinically compromised, it was chosen to place full coverage restoration with prefabricated stainless-steel crowns (3M ESPE). The molar teeth's functionality was maintained and future deterioration of the crown structures was preserved by the crowns.

Procedure included root canal treatment of 16 and 36 with proper access opening and working length was measured, followed by biomechanical preparation with rotary endodontics with Protaper Gold rotary file system (Dentsply) and X-Smart (Dentsply). The canals were prepared up to F1 Protaper Gold file with copious irrigation with 3% Sodium Hypochlorite followed by irrigThe obturation was done with Protaper F1 (Dentsply) gutta percha followed by post obturation restoration with restorative glass ionomer cement (SDI, Riva Self cure Glass ionomer restorative material).

After 1 week of completion of root canal treatment of 16 and 36 the placement of preformed stainless steel crown (3M ESPE) was carried out. Patient was asymptomatic. The crown size was selected for each permanent first molar by measuring the mesio – distal diameter of each tooth. The crown size was checked by trying it on the tooth. The vertical dimension of the crown was checked.

The occlusal height of the crown was reduced as the vertical dimension of crowns was high to prevent open bite with the help of crown cutting scissor. The crimping and contouring of the crown was done with crimping and contouring pliers. After establishing the proper fit of the crowns and checking the occlusion, luting of crown was carried out after drying the tooth with cotton pellets and air syringe with luting Glass ionomer cement (Tokuso Ionomer luting cement, Japan).

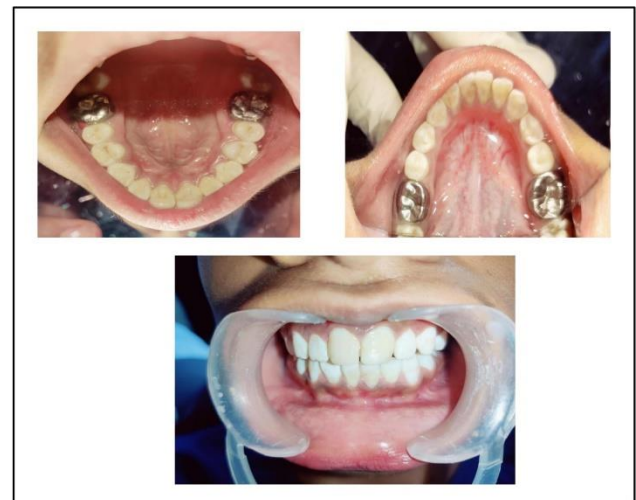
The treatment plan for anterior teeth was made with aesthetic consideration. The bleaching of anterior maxillary and mandibular teeth was done followed by composite restoration of the teeth. The bleaching of anterior teeth was done with MDC Antivet Bleaching Agent followed by composite restoration (3M ESPE) through minimal invasive technique. First teeth were dried with gentle blow of air or cotton pellets. The MDC Antivet solution was applied on the labial surface of the teeth with the help of cotton pellet and MDC Antivet twizzer. The cotton pellet was rubbed for almost 2 to 4 minutes on the tooth surface. The cotton pellet began to darken as the brown discoloration of cotton pellet was visible as the stains got lighter.

The brown spot on the tooth soon appears to be getting diminished. As the brown spots get lighter in shade, composite shade was selected under direct vision. The teeth were completely isolated and there was no salivary contamination present. The etchant (37% orthophosphoric acid) was applied for 30 seconds. Etchant was removed with flow of water and teeth were dried with gentle blow of air and cotton pellets. The bonding agent was applied with microtip applicator on labial surface of anteriors and was light cured for 20 seconds. Then, a layer of composite shade A2 (3M ESPE) was applied with the help of Teflon coated composite instrument and silicone brushes. The composite layer was light cured for 20 seconds. The steps were repeated for all the maxillary and mandibular anterior teeth. The polishing and finishing was done with polishing discs and high speed contra-angle handpiece.

The patient was kept on follow up for 1 month. At 1 month follow up patient was asymptomatic. The stainless steel crowns on permanent first molars and composite restoration were intact. The aesthetic appearance of the patient was enhanced with no brown discoloration on the tooth surface.



Pre operative view

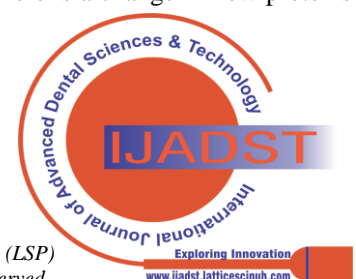


Post Operative View

III. DISCUSSION

An aesthetic appearance of the teeth is the key to a beautiful smile and something valued by people of all ages and genders. Aesthetic problems could have a negative impact on a patient's psychology, limiting their social life.

Fluoride remains dentistry's best preventive tool and optimal fluoride exposure is a tenet of early intervention. It is the pillar of preventive dentistry. It is often called as a double edged sword as inadequate ingestion is associated with dental caries and excessive intake leads to dental fluorosis. Dental fluorosis is as old as mankind and is caused by excessive intake of fluoride during the period of enamel formation [3][11][12]. It has been hypothesised that more amelogenins attach to the crystals during the secretory stage when hydroxyapatite crystals are produced with a higher fluoride concentration. As a result, there is a change in how proteins and crystals interact.



The enamel matrix proteins take longer to hydrolyze. As a result, they are kept in the matrix while the organisms are maturing. As a result, the pH rises, delaying the transition of ruffle-ended ameloblasts into smooth-ended ones, which make up the aprismatic enamel's surface layer. In the maturation stage, prolonged fluoride exposure causes the development of a severely hypomineralized subsurface enamel, which is what gives clinically opaque white spots their look [4].

The treatment of dental fluorosis varies with the severity of the disease. In-office bleaching can be done in mild fluorosis cases, which is more successful for fluorosis in younger patients presenting with opaque to orange colour stain rather than older patients with darker type of brown stains [5].

Micro and macro abrasion technique can be done for mild to moderate dental fluorosis. Advantage of micro and macro abrasion being its much faster procedure in achieving the desired result compared to other treatment options. However, the main disadvantage is that these procedures employ high speed rotary instrument which can lead to excessive removal of tooth structure is operator does not have the desired skill level. The other techniques which can be used for treatment of dental fluorosis includes composite restorations, veneering and full crown restorations [6].

Panchal A. et al reported case reports on treating dental fluorosis through minimal invasive technique using MDC Antivet Solution on patients with mild to moderate dental fluorosis [7].

Sherwood A. has reported a case series on different treatment modalities of dental fluorosis. McInnes solution for treatment of mild dental fluorosis was used in the study [6].

Bauer, M.L.M et al reported a case of a 12 year old child with moderate dental fluorosis treated with MDC Antivet Solution on upper maxillary anteriors [8].

Kabil S. et al performed a randomized clinical trial investigating the clinical effects of Antivet. According to the results of the current study, Antivet is considered a promising alternative to products that contain HCL in the management of discolored enamel by microabrasion [9] [13][14].

A systematic review compared the effectiveness of treatments for fluorosis-stained enamel. It concluded that resin infiltration with increased infiltration time, resin infiltration followed by bleaching, and resin infiltration alone will provide a better esthetic results. Thus, these treatments are recommended in mild-to-moderate dental fluorosis [10].

IV. CONCLUSION

Fluoride is a double edge sword and when consumed in excess, it can be perilous. Dental fluorosis is the most convenient biomarker of exposure to fluoride. Fluorosis is a major health problem, different treatment modalities can be taken into consideration. It is essential to analyze the fluorosis index before treating the patient with a complaint of tooth discoloration to determine the most effective approach in treating the patient. In this article, MDC antivet was used for management of dental fluorosis with extensive restorations. The appearance of the enamel treated showed the loss of fluorotic stains, improving over time. For removing

superficial enamel stains and flaws, the treatment is considered a safe, conservative, and atraumatic method.

DECLARATION STATEMENT

Funding	No, I did not receive.
Conflicts of Interest	No conflicts of interest to the best of our knowledge.
Ethical Approval and Consent to Participate	No, the article does not require ethical approval and consent to participate with evidence.
Availability of Data and Material	Not relevant.
Authors Contributions	All authors have equal participation in this article.

REFERENCES

- DenBesten, P. and Li, W., 2011. Chronic fluoride toxicity: dental fluorosis. *Fluoride and the oral environment*, 22, pp.81-96. <https://doi.org/10.1159/000327028>
- Rozier, R.G., 1994. Epidemiologic indices for measuring the clinical manifestations of dental fluorosis: overview and critique. *Advances in dental research*, 8(1), pp.39-55. <https://doi.org/10.1177/08959374940080010901>
- Burt BA. Fluoride—how much of a good thing? Introduction to the symposium. *J Public Health Dent*. 1995 Winter;55(1):37-8. doi: 10.1111/j.1752-7325.1995.tb02329.x <https://doi.org/10.1111/j.1752-7325.1995.tb02329.x>
- Bronckers, A.L.J.J., Lyaruu, D.M. and DenBesten, P.K., 2009. The impact of fluoride on ameloblasts and the mechanisms of enamel fluorosis. *Journal of dental research*, 88(10), pp.877-893. <https://doi.org/10.1177/0022034509343280>
- Abdullah AO, Muhammed FK, Zheng B, Liu Y. An Overview of Extrinsic Tooth Bleaching and its Impact on Oral Restorative Materials. *World J Dent* 2017;8(6):503-510 <https://doi.org/10.5005/jp-journals-10015-1494>
- Sherwood IA. Fluorosis varied treatment options. *J Conserv Dent*. 2010 Jan;13(1):47-53. doi: 10.4103/0972-0707.62631. PMID: 20582220; PMCID: PMC2883808. <https://doi.org/10.4103/0972-0707.62631>
- Akshita Panchal., et al. "Enamel Micro abrasion: An Effective Method for Improving Esthetics - A Case Series". *Acta Scientific Dental Sciences* 6,5 (2022): 19-23 <https://doi.org/10.31080/ASDS.2022.06.1352>
- Bauer, M.L.M., Bermudez, J.P., Aldaz, M.A.N., Chibinski, A.C.R., Loguercio, A.D. and Wambier, D.S., 2021. Clinical performance of a micro invasive treatment based on demineralization-reminerization for dental fluorosis: case report. *Revista Científica do CRO-RJ (Rio de Janeiro Dental Journal)*, 6(1), pp.62-66. <https://doi.org/10.29327/244963.6.1-11>
- Kabil, Shadwa & Khalil, Sarah. (2023). Esthetic Management of Anterior Teeth Utilizing Two Micro Abrasion Treatments: Randomized Clinical Trial. *Egyptian Dental Journal*. 69. 3067-3077. 10.21608/edj.2023.217606.2603. <https://doi.org/10.21608/edj.2023.217606.2603>
- Shahroom, N.S.B., Mani, G. and Ramakrishnan, M., 2019. Interventions in management of dental fluorosis, an endemic disease: A systematic review. *Journal of family medicine and primary care*, 8(10), p.3108. <https://doi.org/10.4103/jfmpc.jfmpc.648.19>
- U.S., K., J.A., D., U.N., V., & A.J., B. (2021). Morphological Characteristics of the Cysts of the Maxillary Sinuses. In *International Journal of Advanced Medical Sciences and Technology* (Vol. 1, Issue 3, pp. 3–10). <https://doi.org/10.54105/ijamst.b3007.061321>
- Muluk, Dr. S., & Shanmugasundaram, Dr. S. (2023). Effects of Remineralising Agents on Attrited Teeth- An in Vitro Study. In *International Journal of Advanced Dental Sciences and Technology* (Vol. 3, Issue 1, pp. 1–8). <https://doi.org/10.54105/ijadst.d1008.123122>



13. Singh, S., Rao, P. S., & Verma, S. (2020). Automatic Toothbrush for Specially Abled Patients. In International Journal of Innovative Technology and Exploring Engineering (Vol. 9, Issue 5, pp. 758–762). <https://doi.org/10.35940/ijitee.e2610.039520>
14. Prakash, K. J., & Prasad, Dr. B. S. (2019). Modeling and Additive Manufacturing of a Missing Teeth Human Mandible. In International Journal of Engineering and Advanced Technology (Vol. 8, Issue 6s2, pp. 1071–1075). <https://doi.org/10.35940/ijeat.f1321.0886s219>

AUTHORS PROFILE



Dr. Nishtha Sharma, Myself, a final year post-graduation student, pursuing MDS in Department of Pediatrics and Preventive Dentistry in Guru Nanak Dev Dental College and Research Institute, Sunam. I did my graduation from Uttaranchal Dental and Medical Research Institute, Dehradun in 2020. I have presented paper in two international conferences and posters in three national conferences in the field of Pediatric dentistry. An article on “A paradigm of esthetic post and core in primary dentition”- A Review written by me, has published in an esteemed journal.



Dr. Varinder Goyal, He is Professor & Head in Department of Pediatrics and Preventive Dentistry in Guru Nanak Dev Dental College and Research Institute, Sunam. He did his bachelors from Government dental College, Patiala and masters in Pediatric dentistry from Government dental College, Amritsar. He is enriched with the experience of 25 years in clinical practices and 10 years as Head of the department. He is the former president of Indian Society of Pedodontics and preventive Dentistry and South Asian Association of pediatric Dentistry. Presently he is the board member of International Association of pediatric dentistry. More than 40 articles written by him, have been published in international and university journals. He has attended forty plus international and national conferences.



Dr. Puneet Goyal, is Professor in Department of Pediatrics and Preventive Dentistry in Guru Nanak Dev Dental College and Research Institute, Sunam. He did his bachelors and masters from Guru Nanak Dev Dental College and Research Institute, Sunam. He has an experience of 15 years of clinical practices and 4 years as professor in the department Pediatrics and Preventive Dentistry. Currently he is the president of IDA Sunam. He has written approximately 25 papers which have been published in various international and national journals. He has attended 20 plus international and national conferences.



Dr. Shaveta, She is Professor in Department of Pediatrics and Preventive Dentistry in Guru Nanak Dev Dental College and Research Institute, Sunam. She did his bachelors from National Dental College, Dera Bassi and masters from Dashmesh Dental College, Faridkot. She has an experience of 10 years of clinical practice in the department Pediatrics and Preventive Dentistry. Approximately 20 papers written by her, have been published in international and university journals. She has attended 15 plus international and national conferences.



Dr. Nitin Garg, He is a final year post-graduation student, pursuing MDS in Department of Pediatrics and Preventive Dentistry in Guru Nanak Dev Dental College and Research Institute, Sunam. He did his graduation from Guru Nanak Dev Dental College and Research Institute, Sunam in 2020. He has presented two paper in international and three posters in national conferences in field of Pediatric dentistry. An article on “A paradigm of esthetic post and core in primary dentition”- A Review written by him, has published in a leading journal.



Dr. Rashim, She is a second year post-graduation student, pursuing MDS in Department of Pediatrics and Preventive Dentistry in Guru Nanak Dev Dental College and Research Institute, Sunam. She did her graduation from MM College of Dental Sciences and Research Institute, Ambala in 2020. She has presented one paper in international and one poster in national conferences in field of Pediatric dentistry.

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of the Lattice Science Publication (LSP)/ journal and/ or the editor(s). The Lattice Science Publication (LSP)/ journal and/ or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.

