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Fluorosis-No More An Aesthetic Problem

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Abstract

Once in a millennium, one comes across a landmark discovery, the ramifications of which span an entire century. A great forward stride in the field of public health was made with the inverse correlation between dental caries prevalence and fluoride concentration in drinking water. The prevalence of fluoride in drinking water reduces dental caries. This is achieved by both systematic and topical application of fluoride. Dental fluorosis is caused by excessive fluoride intake during tooth formation. It could be dental or skeletal fluorosis. Dental fluorosis is of aesthetic concern for patients and hence aesthetic restorative techniques are advocated. Increasing demand for aesthetics from patients has resulted in the development of several techniques for restoring anterior teeth. Aesthetic management of molted enamel is planned according to the severity of discolorations and the extent of surface aberrations. Various treatment modalities for aesthetic rehabilitation exist like micro-abrasion, direct composite resin restorations, indirect composites or a combination of both, crowns, aesthetic veneers and so on which may be necessary for some patients.

Keywords: Aesthetics, Fluorosis, Micro and Macro abrasion, Bleaching, Veneers, Zirconia Crowns, Porcelain crowns, Stainless steel crowns, Edelweiss crowns.

Introduction

Excessive fluoride intake during teeth development stages can lead to dental fluorosis. Fluoridated water used for drinking is the main potential source for this developmental tooth disorder. Chronic consumption of

high levels of fluoride from drinking water results in dental fluorosis. Dental fluorosis, an environmental disturbance occu during the formative stage of tooth results in defects in mineralized structures which may produce morphogenic and structural changes on dental hard tissues [1] White opaque spots with secondary brown stains caused by the surface hyper-mineralization and sub-surface hypo-mineralization are seen as fluoride alterations. [2] Numerous studies have reported that water fluoridation is a safe and effective public health measure for reducing the occurrence of dental caries. [3]However, excessive fluoride in drinking water, exceeding a concentration of 0.5–1.5 mg/l, can lead to metabolic alteration in ameloblasts; this results in a defective matrix and improper calcification of teeth, known as dental fluorosis .[4]

Aesthetics is a branch of philosophy which deals with beauty and the beautiful. (Merriam Webster dictionary). The goal of aesthetic dentistry should be "bright, beautiful, but believable". [3] Smile is an important feature of the face showcasing its attractiveness and the need for aesthetics will always motivate patients to seek dental treatment. Paediatric aesthetic dentistry is the branch that deals with maintenance and enhancement of beauty of the mouth of infants and children through adolescence, including those with special healthcare needs. Various treatment modalities for aesthetic rehabilitation exist like micro-abrasion, direct composite resin restorations or a combination of both, indirect composites, crowns, aesthetic veneers and so forth.

Discussion

Micro-abrasion and macro-abrasion: Micro-abrasion is a mechanical procedure used to remove discolorations of the tooth surface .It is a conservative treatment done when the enamel wear and tear is minimal and clinically imperceptible. The mottled area which is removed is permanent and achieved with a minimal loss of surface enamel. [5]Macro-abrasion is a technique which is indicated in deeper stains and defects which extend beyond 0.4 mm of enamel and no more than a quarter of the thickness of the enamel.[6] It is indicated for the removal of localised surface stains. It is a combined chemico-mechanical approach for aesthetic management of superficial enamel defects.[7] In our nation, it could serve as a magic wand to serve the poor and needy in a most aesthetic, conservative and inexpensive way.

Bleaching: One of the techniques used for masking enamel fluorosis is bleaching. It is defined as the process of removing stains or colour from teeth by applying chemicals, such as hydrogen peroxide or urea peroxide; in other words use of an oxidizing chemical to remove stain or discoloration from a tooth.[8] Various bleaching techniques are available. Vital bleaching -chair side technique using hydrogen per oxide and a heat source have been used. The teeth are bleached in a single appointment for 25-30 minutes. After bleaching, the previously stained lesions are more aesthetically acceptable. [9]

Vital bleaching –night guard technique has also been used which is done at home on a daily basis. [10] Focal bleaching technique has also been used. [11]

Composite resin restorations: Modern dentistry provides us with many techniques and materials to create an aesthetically perfect smile. Composite resin restorations present a minimally invasive technique to treat discolouration due to fluorosis. The indirect composite resin restorations include strip crowns, acid etch composite crowns, pedo jacket crowns. The resin composite strip crowns have been utilised for over two decades to restore the carious primary teeth. This is the first choice of many clinicians due to ease of repair if the crown gets chipped off or fractured, not to mention

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superior aesthetics. Advantages include high aesthetics and parental satisfaction. The disadvantages are technique sensitive, proper isolation and hemostatis. Ideal oral hygiene is required prior to the commencement of treatment.[13-14]

Veneers: Teeth affected by moderate to severe effects of fluorosis are restored by ceramic veneers, given their colour maintainability, bio-compatibility and wear-resistance. [15] Ceramic veneers require a minimally invasive design preparation and mask the discoloured tooth with minimal reduction of sound tooth substance. Composite veneers are of two types- direct (placed at the initial appointment) or indirect (placed at subsequent appointment having been fabricated at the laboratory). Computer Aided Designing/Computer Aided Manufacturing is the most innovative and state- of- the-art dental service , especially when it deals with the new ceramic materials of high strength. Not only adult patients, but pediatric patients are also treated by this system with great success. [15]

Stainless steel crowns: Stainless steel crowns are considered to be the most durable, economical and reliable, easy to place and wear- resistant but are not aesthetic due to their silver metallic appearance. A stainless steel crown is an extremely durable silver metal crown that has pre-formed anatomy and can be adapted to the tooth at the edges. Stainless steel crowns have both research and time-proven records of durability, longevity, and biocompatibility, although they do not possess aesthetics as good as we would like. They do not hinder the loss of primary teeth and do not affect the developing permanent teeth. Facial cut out stainless steel crowns, pre-veneered stainless steel crowns, Cheng crowns, Dura crowns , Kinder crowns and Pedo pearls are a few of the types of stainless steel crowns.

Zirconia Crowns: Zirconia crowns are the new generation crowns with excellent aesthetics. They have superior bio-compatibility, good dimensional stability, adequate mechanical strength, tooth colour and toughness. Even at maximal masticatory force levels, Zirconia crowns can withstand stress much better than a tooth restored with stainless steel crown. Full coverage zirconia crowns branded by the name Nusmile was introduced in the year 2012 and pre-formed zirconia crowns named Kinder Krowns were also introduced in the year 2012. In India, the first zirconia crown was by the name Kids – E-Crown [17]

Porcelain Crowns: Children get affected psychologically by the un-aesthetic appearance of the fluoresced teeth. Chronological age alone should not be used to determine the treatment that is necessary whenever aesthetics and function are of prime concern.[18] If the teeth are erupted fully and with complete root formation, prosthodontics treatment like porcelain crowns can be used in young patients who are 12– 14 years old. Such treatments can be more challenging in children because of the anatomy, growth patterns, erupting teeth and co-operation from the patient. All Ceramic crowns, lithium di- silicate porcelain crowns, solid or monolithic zirconia, High translucent zirconia, metal ceramic crown are a few examples of porcelain crowns.[19-20]

Edelweiss Pediatric crowns: The Edelweiss Pediatric crowns resemble natural milk teeth in form and function perfectly. Fixing these crowns is a minimally invasive procedure. An iatrogenic opening of the pulpa is done following the natural enamel dental line during crown cutting. The wide proximal contacts have to be optimized. The previous caries are removed. If there are underlying fillings, they are filled with composites. Manual excavators are used more often to remove the caries because it is a conservative preparation. The enamel has to

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be tapered for a better life -long stay of edelweiss pediatric crowns. [21]

Advantages: It is prefabricated for universal size, It is a minimally invasive method, Morphology protects the pulpal peaks of deciduous teeth, It functions like natural tooth, It is biocompatible, bio-functional, antibacterial and plaque resistant, It can be easily repaired, cost effective and a natural abrasor also.[22] Disadvantages- Being a minimally invasive method, it cannot be used for huge cavities unless a post and core is used, it is contra-indicated in bruxism patients as it might chip off.[7]

Conclusion

Fluorosis causes discolouration of teeth and provides an unaesthetic appearance of the teeth. Fluorides when used judiciously is a boon but when used excessively can even prove to be lethal. Frequent community health programmes should be conducted from time to time, and surveys should also be included. Endemic fluorosis should be prevented and the belts where they reign should be constantly monitored. The amount of fluoride present in water should be such that children are safe, not affected at a young age as it may affect the functional capacity of the child..A happy smile is a sign of a happy person. So, aesthetics is of prime importance and because of advances being made continuously, it is a boon to the patient.

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