Severe Dental Fluorosis from Toothpaste Ingestion: A Case Study

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INTRODUCTION

Dental fluorosis is a cosmetic dental condition, which is characterized by hypomineralization of enamel, due to excessive exposure to fluoride during enamel mineralization. The late secretory and maturation phases of enamel development are vulnerable to disruption by exposure to inappropriate levels of fluoride ions. This disruption leads to water and secretory proteins, such as amelogenins to be retained resulting in enamel subsurface porosity. Mild cases of fluorosis present as white lines or spots due to accentuated perikymata. In severe cases, the entire enamel surface is chalky white. Discoloration can occur due to the susceptibility of the fluorotic enamel's porosity to extrinsic stains. Pitting and detachment of surface enamel is seen in cases with extensive subsurface porosity subjected to post-eruptive trauma. In the most severe cases only an opaque cervical rim of enamel remains.

The principal risk factor in determining fluorosis and its severity is the total amount of fluoride consumed from all sources during the critical period of tooth development. Sources that have been linked to fluorosis include fluoride containing drinking water, fluoride supplements and fluoride toothpaste.

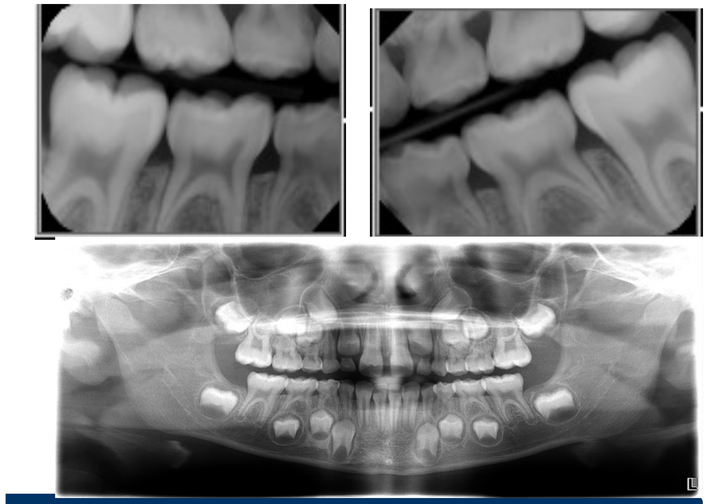
CASE REPORT

A 7-year-old female presented to MetroHealth Family Dentistry in the fall of 2022 accompanied by her mother for her first dental appointment. Mother's chief concern was the discoloration of her daughter's permanent teeth. Past medical history includes speech delay, obstructive sleep apnea, no current medications, and no known allergies. Had tonsils removed one year prior, as treatment for her obstructive sleep apnea. Patient is of low socioeconomic status.

Patient has lived in Cleveland her entire life and sources of consumed water include tap and bottled. Mother affirms that patient had a habit of swallowing toothpaste while brushing her teeth from the age of one to around five years old. Patient would brush or have her teeth brushed twice daily with more than a pea size amount of fluoridated toothpaste. Mom did not recall ever using a training toothpaste to brush her daughter's teeth. According to mother no other family members have permanent teeth with a similar presentation, and patient does not have any siblings.

Upon clinical examination the enamel of the anterior permanent teeth along with the 6-year-old molars had a chalky white appearance with brown pitting noted on #8 and 9. #K and T had discrete opaque enamel on the cervical buccal and lingual surfaces. No caries were noted during clinical or radiographic examination. A diagnosis of severe fluorosis was made based on patient's medical/social history, clinical findings, and radiographic examination.

RADIOGRAPHIC PRESENTATION



CLINICAL PRESENTATION

TREATMENT PLAN

The proposed treatment plan will be a combination of zirconia crowns, porcelain veneers and resin infiltration for the teeth that are in the esthetic zone. Our definitive treatment of crowns and veneers won't be render until the patient reaches physical maturity. This is to avoid esthetics being compromised from further passive eruption. When she enters her early teenage years, composite veneers may serve as a temporary cosmetic solution for the teeth requiring crowns or veneers. Utilizing the Thylstrup-Fejerskov Index #8 and 9 were given a score of 7(severe) and the mandibular anterior teeth were given a score of 5(moderate). The literature suggests teeth exhibiting severe fluorosis are best treated with veneers or crowns and resin infiltration has been successful in treating cases of mild to moderate fluorosis. We will have to wait until the other maxillary anterior teeth erupt to determine what treatment modality would be appropriate.

DISCUSSION

Daily fluoride ingestion of 0.05-0.07mg/kg body weight during enamel formation is generally considered as optimal or an upper limit. The drinking water in Cleveland Ohio contains 0.7 to 0.9mg/L. Which is on the upper end of the recommended dosage . A pea size amount of over-the-counter toothpaste contains 0.25mg of fluoride. However, it is not recommended for children to ingest more than a grain of rice size amount of toothpaste while brushing. The patient in this case study consumed over a pea size amount of toothpaste twice daily which we strongly believe to be the cause of her fluorosis. The drinking water she consumed and possibly foods that naturally contain fluoride may have had an additive effect on the severity of her case. Mother was unaware of the consequences of her child's toothpaste consumption. Although she did attempt to teach her to expectorate after brushing. Unfortunately, our patient did not have her first dental visit until the age of 7. As a result, mother never received proper guidance from a dentist on how to administer toothpaste to her child.

In conclusion, cosmetic dental conditions such as fluorosis are known to have a negative psychological impact and affect an individual's self-esteem. This emphasizes the importance of setting realistic expectations for the patient. While informing them of the pros and cons of possible temporary treatments, until the patient is old enough to receive definitive restorations such as crowns and veneers.

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