



Successful Prosthetic Rehabilitation of Dental Fluorosis: A Case Report

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Abstract

Dental fluorosis is a Fluoride-related alteration of the enamel tissue characterized by its hypomineralization. Clinically, many aspects varying from white marks to dark discoloration and confluent pitting can be observed. Its severity depends on many factors mainly the concentration of the fluoride and the duration of exposure. Nowadays, with the constant increase of esthetic demands, this teeth alteration is a chief complaint for patients. Different therapeutic modalities varying from the bleaching to the full coverage crowning are available. The choice between these options depends on the severity of fluorosis and patients' expectations. As the dental fluorosis is widespread in Tunisia, this paper reports a clinical case of a 45-year-old man suffering from dental fluorosis and treated by full coverage crowns.

Keywords: Teeth Discoloration; Therapeutic Gradient; Mini Invasive Dentistry; North Africa; Veneers

Introduction

Dental fluorosis is a Fluoride-related alteration of the enamel tissue. During teeth formation, the excessive fluoride leads to its hypomineralization [1]. Clinically, it is characterized by many aspects varying from white marks to dark discoloration with, sometimes confluent pitting [1,2]. Its severity depends on many factors mainly the concentration of the fluoride and the duration of exposure.

Nowadays, with the constant increase of esthetic demands, this teeth alteration is a chief complaint for patients. This discoloration, especially of maxillary anterior teeth, would certainly spoil the smile appearance leading to psychological distress [2].

The proper treatment of fluorosed teeth is not yet established [2]. Different therapeutic modalities varying from the bleaching to

the full coverage crowning are available. The choice between these options depends on the severity of fluorosis and patients' expectations.

The aim of the present paper was to illustrate a detailed clinical case of successful prosthetic rehabilitation of dental fluorosis and to give guidelines for its proper management.

Clinical Presentation

A 45 healthy male patient consulted the fixed Prosthetic department of the Military Hospital of Tunis, Tunisia. His chief complaint was mainly related to the discolored maxillary anterior teeth. The clinical examination showed a poor oral hygiene and a deep dental fluorosis. All the anterior teeth were restored with resin material. (Figure 1.a and 1.b). The first left premolar was missing. The panoramic radiograph showed endodontically treated teeth (Figure 2).



Figure 1a: Initial situation: frontal view.



Figure 1b: Initial situation: occlusal view.



Figure 2: Panoramic radiograph.

After explaining the therapeutic approaches to the patient, it was decided to perform Zirconia full-coverage crowns. The missing tooth was, as well, replaced by a full coverage bridge. The prosthetic rehabilitation extends from the left first molar to the right one.

The first appointment was devoted for scaling and root planing. The restorative aspects were, then, undertaken by removing old restorations and decayed dental tissues. Necessary root canal treatments were, also, performed. Metallic post and core were placed for both left central incisor and right lateral incisor. Teeth were carefully prepared (Figure 3) and provisional prostheses were placed (Figure 4).

Once the cementation of provisional prostheses, the patient was extremely satisfied due to the significant change of the teeth



Figure 3: Prepared teeth.



Figure 4: Cemented provisional prostheses.

colors. The crowns were slightly short, particularly both central incisors which cervical line was aligned with the lateral incisors (Figure 4). The periodontal examination showed an excessive gum tissue. So, it was decided to perform crown lengthening using gingivectomy technique. After assessing the location of the alveolar bone and the cemento-enamel junction, the gingival tissue was removed and then sutured (Figure 5.a and 5.b). Teeth preparation and provisional prostheses were immediately adjusted (Figure 5.c and 5.d)

After 3 months of gingival healing, the master impression was taken. Then, zirconia crowns and bridge were placed. The zirconium material was chosen due to its capacity to hidden the discoloration caused by the both dental fluorosis and the metallic post and core (Figure 6).

The final outcome was pleasing and the patient was very satisfied by both color and shape (Figure 7.a and 7.b).



Figure 5: Steps of Crown lengthening.

- a: Gingival incision respecting its scalloped path
- b: Sutures after excessive gingival tissue removal
- c: The apical placement of finish lines after teeth preparation
- d: Placement of rectified provisional prostheses showing the enhancement of teeth shapes and proportion.



Figure 6: First try in :Labial view of zirconia frameworks and soft tissue aspect after healing.

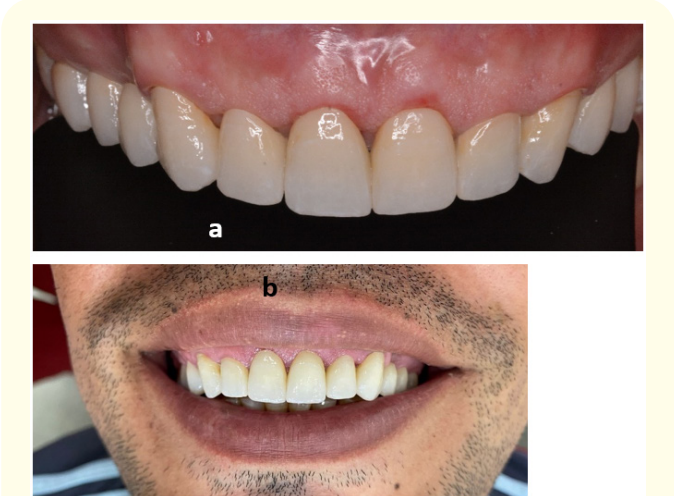


Figure 7: Final outcome with both color and shape enhancement.
a: Intra oral frontal view.
b: Final smile.

Discussion

Dental fluorosis is multifactorial teeth discoloration. The UNICEF estimated that it is widespread in Africa, the Eastern Mediterranean and South Asia [3]. A national survey [4], performed in 1988, reported that the prevalence of Dental fluorosis in Kairouan city was 33.6%.

In Tunisia, fluorine is widespread in nature especially in the vicinity of deposits of calcium phosphate, cryolite and fluorite or fluorspar. In many Tunisian areas, the fluoride concentration, in public water, have the interest of various previous studies [5,6]. In 1998, Maatouk., *et al.* [11] assessed the quality of the Tunisian tap water among all districts of Kairouan city using specific probes. They reported variable concentrations ranging from 0.4 to 2.23 ppm [11]. In 2021, Gritli., *et al.* [6] reported high fluoride concentration in Hammem Zriba city over 78 water samples ranging from 0.98 to 2.65 ppm.

When treating dental fluorosis, many factors have to be taken into consideration such as its severity, the patients expectations and the teeth conditions. For mild cases, bleaching should be the first indicated options of fluorosis. High concentrations (35% hydrogen peroxide) of the bleaching gel are used for in-office bleaching leading to teeth sensitivity in some situations [3]. From moderate to severe cases, microabrasion, often combined with bleaching technique, could enhance the dark discoloration. It was suggested that this is a treatment of choice when fluorosis is mild [3]. By removing superficial enamel tissue, it was reported that this technique could remove a thickness between 100 and 200µm of enamel layer [7,8]. Ideally, it would be followed by an active remineralisation using a fluoride varnish to restore the resistance of the enamel tissue altered by the microabrasion [7]. The main advantage of described method is not time-consuming with an acceptable results. This conservative technique could be followed by more invasive treatment options.

Despite the significant improvement in teeth shade and esthetics, both bleaching and abrasion cannot be considered as an ultimate solution for moderate to severe dental fluorosis. Consequently, either veneers or full crowns seems to be more suitable to perform both color and shapes [1].

Laminate veneers could be the most suitable option, especially when teeth are intact and their discoloration are not very deep [9]. This prosthetic pieces may be made of porcelain or resin composite. They require an ultra-conservative enamel preparation and owe their retention and strengthens to the bonding procedure. It was proved that at the etching step, no particular considerations

are needed for fluorosed teeth which consists of the application 37% phosphoric acid for 30 seconds [10]. Nevertheless, this prosthetic option could not be indicated when the discoloration is very important or when the loss of dental tissue is important.

Using full-coverage crowns is the most invasive prosthetic treatment. It requires a careful planning and involves tooth preparations. They are indicated, when veneers could not be indicated, especially for dark discolorations or when concerned teeth need to be crowned. In the present clinical situation, the full coverage crowns were most suitable treatment for three reasons: the resin restoration were important, teeth were pulpless and the teeth discoloration was important. No further treatment is necessary if the patient is not bothered by his teeth discoloration.

The appropriate management of dental fluorosis must respect the therapeutic gradient. The clinician should balance between the patient's expectations and the requirements of the clinical situation.

Conclusion

Dental fluorosis is major health problem. The alteration of smile appearance is the main consequence which could alter both the patient's psychology and confidence. The prevention is considered as a major step to avoid its occurrence. Many therapeutic treatments could be indicated. The dentist has to be ultra conservative taking into consideration the therapeutic gradient and the patient's expectations.

Competing Interests

The authors declare no competing interest.

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