

## Dental Fluorosis: What Prevention? What Therapeutic Solutions?

Soraya Dendouga<sup>1</sup> and Zeriati Chafika<sup>2</sup>

<sup>1</sup>Professor of Dental Prosthesis University Algeries, Algeria

<sup>2</sup>CHU Lamine Debaghine Algiers, Algeria

**Corresponding author:** Sorya Dendouga, Professor of Dental Prosthesis, University Algeries, Algeria.

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### Abstract

Every day we see young patients who come for cosmetic reasons, complaining of unsightly stains on their teeth: the clinical examination reveals the presence of dental fluorosis. These are students who live in southern Algeria "sahra" and who generally come north to study and there the urgency sets in: they no longer want such teeth that make them "different" from others.

### Keywords

Fluoride; Dental fluorosis; Manifestation; Normal tooth; Tooth whitening

### Introduction

Every day we see young patients who come for cosmetic reasons, complaining of unsightly stains on their

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teeth: the clinical examination reveals the presence of dental fluorosis. These are students who live in southern Algeria "sahra" and who generally come north to study and there the urgency sets in: they no longer want such teeth that make them "different" from others. Faced with such a situation, the dentist must provide a satisfactory solution for the patients. This is what we will try to illustrate in this article.

### Fluoride and Teeth

Fluoride, which is found everywhere in nature, is beneficial for teeth: at very low doses: it protects against cavities thanks to a significant cariostatic effect induced by its fixation during organogenesis on dental enamel [1]. Fluorides reach teeth in two ways:

- By local route, by adsorption. This is the preferred route because it is deemed to have the most benefits and the fewest side effects. It is provided by toothpaste, whose fluoride content (for toothpaste for adults) is relatively constant: 1000 to 1500 ppm. The fluorides contained in the toothpaste will attach themselves directly to the teeth during brushing [1,2].
- Systemically. This possible route, in the event of a high caries risk, can only be used during tooth formation (see dentition), from 6 months to around 12 years. If deemed necessary by the doctor or dentist, the intake is then either by tablets or fluoride drops, or via a food source: fluoridated drinking water (water fluoridation is prohibited in some countries), or salt fluoride kitchen [1,2]. However, any excess can be the cause of dental fluorosis.

### Definition of Dental Fluorosis

Ingesting too much fluoride, most often in drinking water, can cause fluorosis which affects teeth and bones. Moderate amounts have effects on the teeth, but long-term ingestion of large amounts can cause potentially serious bone problems [3]. Paradoxically, the consumption of fluoride in low doses helps prevent tooth decay. Controlling the quality of drinking water is therefore essential to prevent fluorosis. Fluorosis is caused by too much fluoride intake. The effects of fluorosis on teeth appear much earlier than the effects on the skeleton seen in people exposed to significant amounts of fluoride [1,3]. Dental fluorosis is defined as chronic fluoride poisoning, occurring during the period of odontogenesis. This period begins in the third month of intrauterine life and ends around the age of about 12 years [4].

### Manifestations of Fluorosis

The first manifestations are dental, which gives the dentist an important role in the diagnosis. A review of the literature revealed that general manifestations can arise, in particular at the level of the skeleton: fluoride being fixed at the level of the bone framework, the excess can be manifested by peripheral myelopathy and neuropathy [1,4] (Figure to Figure 4).



**Figure 1:** Bone manifestations of fluorosis.

### Dean's Classification

Several classifications of the different stages of dental fluorosis have been established [1,4]. The most used is Dean's summarized in this table 1:

Criteria	Description of the Enamel
Normal tooth	Glossy smooth appearance, creamy white color, clear translucent surface
Suspicion	A few white spots or white dots.
Fluorosis very light	Small opaque spots (resembling pieces of white paper that would be stuck on the tooth), covering up to 25%
Fluorosis medium	White opaque areas covering up to 50% of the tooth surface.
Fluorosis moderate	The entire surface of the teeth is affected, with marked wear of the contacting surfaces. Sometimes brown spots are present.
Fluorosis serious	The entire surface of all teeth is affected; with discreet stitching. Presence of brown spots

**Table 1:** Several classifications of the different stages of dental fluorosis.



**Figure 2a and 2b:** Fluorosis very; Fluorosis medium.



**Figure 3a and 3b:** Fluorosis Moderate; Fluorosis Serious.

### Origin of Fluorosis

The WHO recalled that it was necessary to be vigilant about the total amount of fluoride ingested (and therefore not to base calculations only on the fluorine provided by water and salt), and not to multiply the sources. The dose recommended by the WHO is 0.05 mg / kg / day [4]. The Dose at risk of fluorosis is

0.1 mg / kg / day (4). However, children always swallow part of the toothpaste, so it is very important to adopt the fluoride concentration at the child's age (250-500 ppm fluoride before 6 years) [3]. WHO teach children to use just the size of a dab of toothpaste and spit it out without swallowing it. Check with the State Decentralized Services to find out the characteristics of their water point. Filter drinking water from wells in endemic areas. In order to avoid ingesting high levels of fluorides, it is advisable to use the least contaminated water for drinking. It is also important not to overexploit and dig the wells without having the benefit of the advice of a technician. It's important to prohibit fluoride tablets and fluoridated toothpastes in endemic areas. In some areas of southern Algeria, where the water contains a lot of fluoride, it is recommended to reduce the consumption of tea because it contains 100 mg of fluoride / kg (a consumption of 4.62 glasses / day of tea can alone, in some regions, explain the existence of fluorosis) [1,2,4].

### Treatment of Dental Fluorosis

Patients who present with dental fluorosis consult in the majority of cases for aesthetic reasons. In the majority of cases the dentist is faced with healthy teeth with significant aesthetic damage.



**Figure 4:** Healthy teeth with significant aesthetic damage (Fluorosis serious).

In these cases, several treatments are possible depending on the stage of the fluorosis:

**Abstention:** l'abstention is a real therapeutic choice in its own right. Indeed, if the fluorosis does not cause any aesthetic or functional problem in the subject, there is no has no need to perform a therapeutic act [4].

**Tooth whitening:** Whitening teeth is the first step in treating dyschromia due to fluorosis. This is the only technique that can treat stains due to fluorosis without affecting the structure of the tooth. Lightening is indicated as a first-line treatment for fluorosis Light. The results vary depending on the patient. Indeed, the final aesthetic rendering is difficult to predict because there is a high variability individual. The lightening should be renewed approximately every 3 to 5 years [5].

**Macro / micro-abrasion:** Macro / micro-abrasion is a technique consisting in eliminating in a controls the superficial colorings of the enamel thanks to a double action physical and chemical The physical action is performed using burs and cups. Chemical action is made using a micro-abrasive paste. This technique can be used in cases of mild to moderate fluorosis It is a very conservative technique and in if unsuccessful, other more invasive treatment options can still be chosen. It is a simple, quick and inexpensive technique.

In some cases, this technique is combined with a lightening for a better final aesthetic rendering [6,7].

**Restauration par composite:** Composite restoration consists of removing the colored surface part enamel and fill the gap created by the composite. This technique is indicated in cases of moderate to severe fluorosis. However, it is a technique invasive because it damages the structure of the tooth.

### Prosthetic restorations

**Veneers:** Can be composite or ceramic

**Composite veneers:** Produced in the laboratory are widely used today. Microfilled composites make it possible to obtain a smooth and glossy surface condition, therefore a satisfactory appearance, but can fracture quite easily under the effect of occlusal forces; conversely, macrocharged composites and hybrid composites are more resistant but cannot be polished satisfactorily. Composite veneers produced in the laboratory are widely used today. Microfilled composites make it possible to obtain a smooth and glossy surface condition, therefore a satisfactory appearance, but can fracture quite easily under the effect of occlusal forces; conversely, macrocharged composites and hybrid composites are more resistant but cannot be polished satisfactorily [5,6,7]. The composite veneer treatment is used in the case of fluorosis moderate to severe. Treatment with ceramic veneers is indicated in cases of fluorosis moderate to severe if there are no too dark colorings.

**Ceramic veneers:** Ceramic has always been a material of choice for anterior restorations due to its effectiveness in reproducing the structure and translucency of the natural tooth. Long-term evaluations of ceramic veneers show excellent biocompatibility and good chemical stability. Due to the exceptional clinical performance of this type of restoration, indications today include cases of fractured teeth and severely abraded teeth. This development is justified by their ability to distribute mechanical stresses throughout the dental crown, which allows it to withstand chewing forces. Ceramic veneer treatment is a technique expensive which requires several clinical and laboratory sessions [8].

**Peripheral crowns:** Restoration with ceramic crowns is only indicated in cases severe fluorosis with very deep dark colorations and / or significant enamel loss.

### Clinical cases

A 23-year-old patient presented to our consultation following an aesthetic discomfort due to the presence of dental fluorosis which has already been treated by micro abrasion and clearing of teeth. These two therapies attenuated the degree of fluorosis without giving satisfaction to this young patient. At the clinical examination the teeth are healthy and for reasons of biocompatibility we opted for ceramic veneers, a choice which has been validated by the patient.



Figure 7: Clinical Cases.

A 23-year-old patient presented to our consultation with cosmetic discomfort due to the presence of dental fluorosis. The clinical examination reveals a class I fluorosis according to the Dean classification which includes 4 classes. The patient was informed of the possible therapeutic solutions, namely: micro abrasion associated or not with lightening and ceramic veneers. The patient opted for a ceramic veneer treatment; the first two solutions did not work for her brother who has the same problem. The patient received explanations regarding the ceramic veneer treatment insisting that these teeth which do not show any loss of substance will be cut and this is irreversible. Once informed consent has been approved by the patient; we start by filling in the clinical file and drawing lots to determine the different types of coronary preparations.



**Figure 8:** Coronary Preparation.



**Figure 9:** Clinical case N ° 1 / Before and after veneer restoration.

We note the translucency of this type of restoration which gives a natural look. The good gingival adaptation accentuates this natural aspect.

## Conclusion

Dental fluorosis in Algeria is a real public health problem. As far as we are concerned dental practitioners, nothing allows us to act correctly, because nothing in the curriculum of studies medical treatment does not allow us to cope with it either in curative care or in preventive care. You have to know today that you are able to smile to these patients thanks to proven therapy Elsewhere, namely ceramic veneers, you just have to use it with us.

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