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## Direct Composite Veneers using Omnichroma-Treatment of Generalized Dental Fluorosis with Minimally Invasive Technique

Dr. Pradnya V. Bansode

[nishagdalal@gmail.com](mailto:nishagdalal@gmail.com)

Government Dental College and Hospital, Aurangabad,  
Maharashtra

Dr. Seema D. Pathak

[seemadpathak@gmail.com](mailto:seemadpathak@gmail.com)

Government Dental College and Hospital, Aurangabad,  
Maharashtra

Dr. M. B. Wavdhane

[mbwavdhane@gmail.com](mailto:mbwavdhane@gmail.com)

Government Dental College and Hospital, Aurangabad,  
Maharashtra

Dr. Nisha Girish Dalal

[nishadalal1998@gmail.com](mailto:nishadalal1998@gmail.com)

Government Dental College and Hospital, Aurangabad,  
Maharashtra

### ABSTRACT

*The significance of aesthetic dental restorations in fostering the emotional and psychological well-being of patients cannot be overstated. Dental Fluorosis in anterior teeth often pose a cosmetic concern in numerous instances. Achieving precise color and shade matching between resin composite and natural teeth stands out as the primary objective for patients in assessing treatment quality<sup>1</sup>. A promising new product recently introduced to the market is Omnichroma by Tokuyama Dental, which offers a comprehensive color-matching concept. Unlike conventional composites that rely on dyes or pigments, OMNICHROMA utilizes "smart chromatic technology" to capture the structural color of its environment. This article showcases the esthetic rehabilitation of anterior teeth affected by dental fluorosis and decay using Omnichroma<sup>2</sup>.*

**Keywords** – Dental Fluorosis, Esthetic, Shade, Omnichroma.

### INTRODUCTION

The role of aesthetics is significant in every person's life, and the discoloration of teeth can profoundly impact overall quality of life. Teeth discoloration can manifest as either extrinsic stains, caused by external factors, or intrinsic stains, which are more complex to treat compared to extrinsic ones. The rise in dental fluorosis cases in developing nations in recent decades is largely attributed to the widespread use of fluoride. Fluorosis-induced discoloration can impact both vital and non-vital teeth. Vital teeth might exhibit discoloration during crown formation due to various factors, such as hereditary disorders, medications (especially tetracycline preparations), excessive fluoride exposure, high fever linked to early childhood illnesses, and trauma.

Excessive fluoride present in drinking water and other sources during teeth formation can lead to a specific type of intrinsic staining known as fluorosis (Edward, 2006). The esthetic alterations in permanent dentition are particularly concerning in dental fluorosis, with occurrences more frequent in children who experience excessive fluoride exposure between the ages of 20 and 30 months.

Skeletal and dental fluorosis have been extensively examined in literature, with a general agreement that the critical period of overexposure occurs between 1 and 4 years of age (Rodrigues et al., 2002). The recommended safe level for daily fluoride intake is between 0.05 and 0.07 mg F/kg/day, beyond which the risk of fluorosis development becomes more pronounced (Burt, 1992).

India falls within the geographical fluoride belt stretching from Turkey to China, with a substantial portion of the earth's fluoride deposits, around 12 million tons out of 85 million tons, located in India. Consequently, it's unsurprising that dental fluorosis is endemic across 15 states of India. The highest rates of endemic fluorosis have been documented in Andhra Pradesh, Haryana, Karnataka, Tamil Nadu, Uttar Pradesh, Assam, Kerala, Maharashtra, Rajasthan, Gujarat, Bihar, West Bengal, Delhi, and Orissa (Jagan, 2008). Even for the most skilled clinicians, restoring discolored anterior teeth and reinstating a bright, confident smile can be a challenging endeavor. Fortunately, modern dentistry offers a variety of techniques and materials to achieve aesthetically pleasing smiles (Keri, 2009). Generalized fluorosis of anterior teeth can be addressed cosmetically, although the cost of success can vary significantly depending on treatment options, which may include tooth bleaching, microabrasion, and the application of direct composite veneers or porcelain veneers and crowns.

Direct composite veneers can serve as a viable option in treatment plans, particularly when conservative approaches are not only indicated but should be prioritized before considering more invasive procedures. They offer a superb alternative to full coverage crowns, especially in young patients, those with healthy dentition, and individuals with financial constraints. In this case report, we demonstrate a minimally invasive technique for treating discoloration resulting from fluorosis and dental caries using direct composite veneers.

## I. CASE REPORT

A 23 years old female patient hailing from district Bhandara in Maharashtra, known for its high fluoride content in water, reported to the Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Aurangabad with chief complaint of discoloration of anterior teeth (Figure 1). Examination revealed severe brown stained enamel surfaces, with loss of tooth structure with respect to 12,13,23,32,33,42 teeth, with a good periodontal status, Discolored Composite resin restoration with respect to 21, and Deep dental caries with 12,23,43,44.



Figure 1

Based on clinical examination, esthetic build up with Omnicroma composite resin was decided and explained to patient. Preoperative photographs were taken and the teeth were isolated using Rubber dam. The area to be restored was cleaned using pumice slurry and old composite resin restoration with respect to 21, and dental caries with respect to 12,23,43,44 were removed, following this primary and secondary bevels were given with respect to 12,13,21,22,23,32,33,42,43.

Light chamfer gingival bevel was placed.

After air drying the teeth, etchant (37% phosphoric acid) was applied for 15 seconds (Figure 2).



Figure 2

Then the etchant was removed using water spray and again dried . Then bonding agent was applied and slightly blown with air and then cured for 20 seconds (Figure 3).

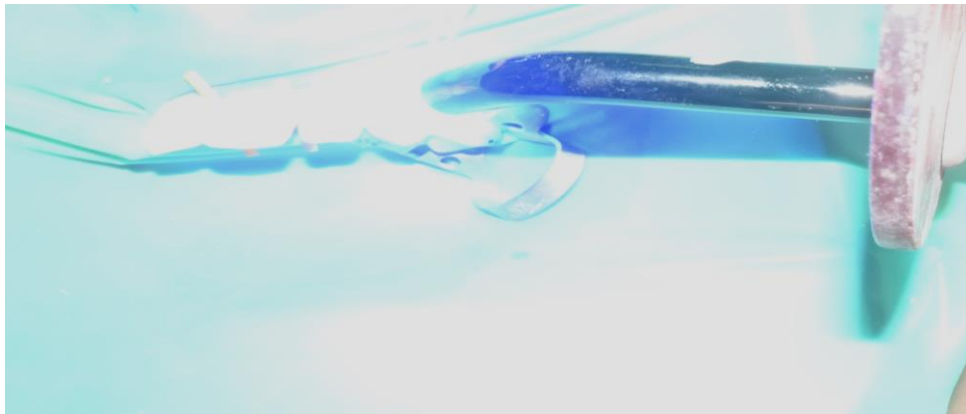


Figure 3

As Omnicroma is material of choice there is no need of shade matching, so material Omnicroma was applied incrementally (thickness of 1-2 mm) and cured for 30 seconds each time.

After complete build up, finishing and polishing was done for esthetic concern and to prevent plaque accumulation (Figure 4)



Pre-operative left lateral view





Post-operative left lateral view



Pre-operative right lateral view



Post-operative right lateral view



Figure 4

## DISCUSSION

The differential diagnosis between stains induced by fluorosis and opacities not caused by fluoride requires establishing differences in the patterns of opaque defects, whether symmetrical or asymmetrical, and/or discrete (Thylstrup and Fejerskov, 1978). It's crucial to note that non-fluoride enamel opacities encompass all types of opacities not classified as fluorosis, such as dental hypoplasia. These opacities are typically characterized by discrete, demarcated white or discolored areas, often affecting a single tooth and less commonly multiple teeth, with a symmetrical distribution. Regulating fluoride intake stands as the most effective preventive measure against dental fluorosis. However, when fluorosis has already developed and is causing aesthetic concerns for the patient, several treatment options have been outlined, with the choice depending on the severity of the condition.

The initial conservative approach typically involves vital bleaching, especially effective for superficial staining. However, it may not yield satisfactory results for severe intrinsic stains. A key drawback is the potential for prolonged sensitivity due to increased intrapulpal temperature and inflammatory changes associated with hydrogen peroxide usage. In mild cases of fluorosis, tooth whitening can be accomplished by abrasion of the outer enamel layer to eliminate surface stains. However, in severe dental fluorosis, where the enamel often becomes porous, tooth whitening methods are generally not recommended as a treatment option. For severe cases of fluorosis, treatment typically involves covering the affected teeth with restorations, such as composite veneers, porcelain veneers, or full coverage crowns. However, in this case, we explore the potential of a minimally invasive approach using a direct composite veneer to effectively address fluorosis-induced brown spots in a manner that is both esthetically pleasing and functional. Direct composite veneers are gaining popularity as a means to address cosmetic imperfections and enhance the appearance of teeth, providing a straighter and more aesthetically pleasing smile (Pincus, 1937). They also boast a high patient satisfaction rate due to their ability to be replaced in a single day, offering immediate results (IDATM, 2006).

This procedure necessitates minimal removal of tooth structure compared to a full coverage crown, making it less expensive and faster to complete. In the current case, prior to crafting the veneers with composite, the tooth was prepared using a large tapered diamond bur. The light chamfer gingival margin offers the highest strength for composite veneers.

The composite veneer was prepared using Omnicroma (Tokuyama), known for its outstanding polishability, beautiful aesthetics, non-sticky and sculptable handling, and superior properties. OMNICHROMA aims to promote a sustainable future where neither the clinician nor the patient needs to worry about shade selection or replacing the filling if it becomes stained<sup>3</sup>.

Its applications include direct restorations in both anterior and posterior dentitions, direct composite veneering, closure of diastema or any interdental spacing, as well as porcelain and composite repair<sup>7</sup>. Omnicroma boasts excellent esthetic properties, unparalleled color matching, high polishability, exceptional physical-mechanical properties, including high wear resistance and compressive strength, as well as exceptional handling<sup>5</sup>.

As per the manufacturer, OMNICHROMA employs "smart chromatic technology," enabling it to capture the structural color of its surroundings. In contrast, conventional composites typically contain dyes or pigments. This capability is achieved through the size of its filler particles. OMNICHROMA, functioning within an additive color mixing system, achieves comprehensive color matching by producing red-to-yellow structural color akin to natural teeth<sup>5</sup>. Omnichroma achieves its color by generating structural color, as mentioned above (smart chromatic technology), and encompasses all VITA classical shades<sup>5,7</sup>. Structural color is solely expressed through the physical properties of light, devoid of pigments or dyes. This is accomplished by regulating the morphology of the filler particles to reflect color within the red-yellow spectrum<sup>3</sup>. Omnichroma boasts good flexural and compressive strength, minimal staining compared to other composites, excellent adaptation to the tooth structure, and a generous working time<sup>4</sup>. Given these advantages and properties, Omnichroma can be considered one of the best material choices for clinicians for esthetic rehabilitation in anterior teeth.

Direct composite resin offers excellent smoothness, strength, color, and ease of use. They necessitate minimal removal of tooth structure, and their color and blending capabilities enable them to match almost any tooth color and contour (Gordon and Christensen, 2004). In contrast, ceramic veneers are more expensive due to the custom impressions taken in the dental office and custom fabrication by a dental laboratory technician. The patient greatly appreciated the treatment as her dentition's discoloration was promptly addressed at a lower cost. Throughout the six-month follow-up period, the patient remained completely asymptomatic and expressed full satisfaction with the treatment received.

## CONCLUSION

Omnichroma material emerges as an excellent choice for esthetic restorations and anterior teeth rehabilitation owing to its numerous advantages. It minimizes time requirements, exhibits excellent adaptation to the tooth, and automatically matches the shade of adjacent teeth, thereby restoring the normal form and contour of the teeth. Utilizing Omnichroma as a material of choice can yield quick and satisfactory results in anterior esthetic areas.

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