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Restoring the midline single tooth fracture in fluorosis case in the easiest way

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Abstract
Midline direct composite fractures present a unique set of challenges, particularly in patients with dental fluorosis. This case study details a systematic approach to restoring a fractured midline tooth in a 23-year-old patient with fluorosis. The restoration process involved meticulous shade matching, use of appropriate composite materials, and precise layering techniques to achieve both aesthetic and functional results. Through careful case analysis, pre-planning, and the application of modern dental materials and techniques, a durable and visually pleasing restoration was accomplished. This study provides insights and practical guidance for dental practitioners facing similar cases.

Keywords: Dental fluorosis, midline tooth fracture, composite restoration, shade matching, aesthetic dentistry, layering techniques, dental materials, tooth enamel discoloration, restoration durability, dental case study

Introduction

Midline direct composite fractures are common due to several reasons:

1. Improper bonding
2. Low strength of material
3. Inability to remove biofilm
4. Patient's habits
5. Malocclusion
6. Direct bite to hard substances

These factors make such restorations challenging. In this case, the challenge was increased due to the presence of fluorosis. Fluorosis of the tooth is a condition in which the enamel of the teeth becomes discoloured and mottled due to excessive intake of fluoride during the developmental stages of the teeth. [1]
Let us explore how to handle it effectively.

Materials and Methods

Materials

1. Composite Resins

- Body Layer: A2O composite resin.
- Dentin Shade: A1 composite resin.
- Enamel Layer.

2. Bonding Agent

- Universal bonding agent 7th generation.
- Etching Agent:
- 37% Phosphoric acid

4. Isolation Material

- Rubber dam

5. Matrices

- UNICA matrices (Polydentia)

6. Shade Matching Tools:

- Polymerized composite shade guide
- High-definition camera for colour mapping

Methods / Case Presentation

A 23-year-old patient visited our clinic with the chief complaint of a fractured midline restoration which had been done a year earlier. The patient had a midline diastema, and his previous dentist had restored it with direct composite. Upon examination, we observed the restoration on tooth number 21 and the fractured composite on tooth number 11.

1. Case Analysis and Pre-Planning

We analysed the case

- Thorough examination of the patient's dental history and previous restorations.
- Digital pre-planning using editing software to mark the midline, occlusal line, and outline of the tooth to be restored.

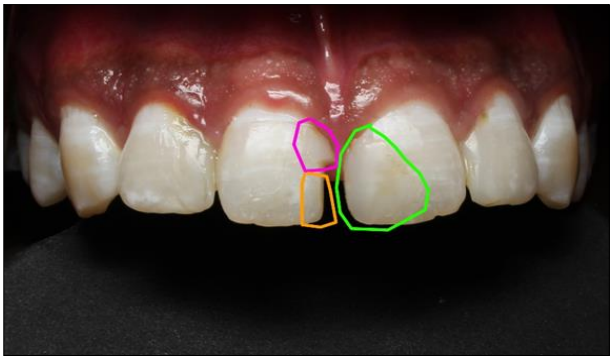

Fig 1

- Tooth No. 11: The remaining old composite is marked in pink. There is undermined dentin after the fracture, marked in orange.
- Tooth No. 21: The old restoration with demarcated margins between the restoration and dentin is visible. Pre-planning with editing software involved marking the midline and occlusal line, and drawing the approximate outline to recreate the tooth. This preparation set the stage for the procedure.

2. Shade Matching

Shade matching is crucial and challenging, especially in cases with fluorosis. Here is the shade matching process: The recommended tool for matching shades is a polymerized composite shade guide.

Another helpful technique is colour mapping: decrease the exposure and increase the contrast of a high-definition photograph. Mark the different shade areas:

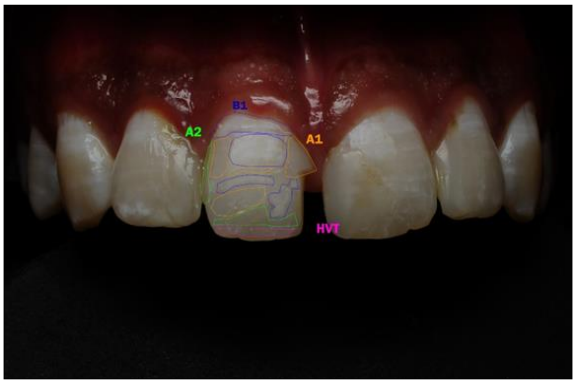

Fig 2

- Shade B1 is marked in blue
- Shade A1 is marked in orange
- Shade A2 is marked in green
- High-value translucent shade is marked in pink

These shades need to be matched during the composite layering process.

3. Old Restoration Removal, Isolation, Etching

Firstly, we removed the old composite and bevelled the dentine on the mesial surface. Etching with 37% phosphoric acid was done, and isolation was achieved using a rubber dam.

4. Selection of matrix band

The selection of an appropriate matrix band is crucial in restorative dentistry as it directly impacts the contour, contact, and overall success of the restoration. A well-chosen matrix band ensures proper adaptation to the tooth, preventing overhangs and ensuring tight interproximal contacts, which are essential for the longevity and functionality of the restoration.

The Unica matrix band is particularly advantageous because of its anatomical shape, which provides an optimal fit for anterior teeth, facilitating easier and more accurate restorations. Its pre-contoured design minimizes the need for manual adjustments, saving time and reducing the risk of errors. [2]

5. Bonding and Composite Layering

Fig 3

- Application of bonding agent that is 7th generation universal bond is used and placement of the first layer, which is the body layer A2O.
- Application of dentin shade (A1) to mimic natural dentin.

Fig 4

- Addition of patches of dentin shade (A1) to replicate the natural appearance of fluorosis stains & Final placement of the enamel layer to complete the restoration.

6. Finishing and Polishing

- Gross reduction and shaping of the composite restoration with red banded bur.
- Finishing protocols to refine the restoration's contours abrasive discs.
- Pre-polishing and final polishing to achieve a smooth and aesthetically pleasing surface. [3] After gross reduction and finishing protocol.

7. Post-Procedure Evaluation

- Assessment of the restored teeth for proper shade matching and integration with the surrounding teeth. Post pre-polishing and polishing with both teeth 11 and 21. The beautiful merging of layers can be appreciated, mimicking the fluorosis and its patches.
- Comparison of before and after images to evaluate the success of the restoration.

Fig 5: Before and after image of the procedure

This systematic approach ensures a durable and visually appealing restoration that addresses both functional and cosmetic concerns in patients with fluorosis.

Conclusion

This case highlights the complexities and steps involved in restoring a midline fracture in a patient with fluorosis. By carefully analysing the case, pre-planning, and employing precise shade matching and layering techniques, a successful restoration can be achieved. The use of proper tools and techniques ensures the restoration is durable and aesthetically pleasing, addressing both functional and cosmetic concerns [4].

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