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Introduction to the case

A 35 year-old male came to our department after fracturing his upper right central incisor from a traffic accident. After a one-month follow-up period at our endodontics department, the tooth remained vital without any symptoms. As the patient preferred a minimally invasive procedure, direct composite restoration was selected for esthetic rehabilitation.

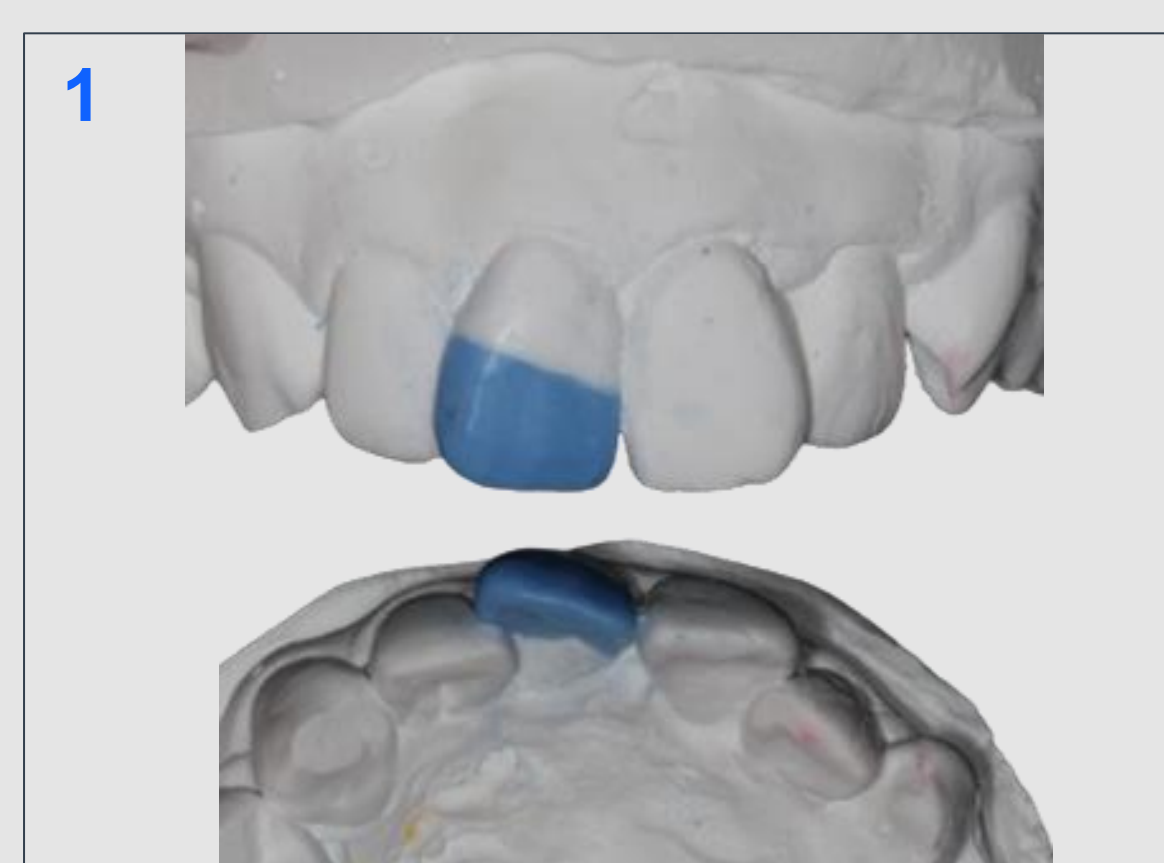


Pre-operative view of fractured tooth 11 with slight malalignment



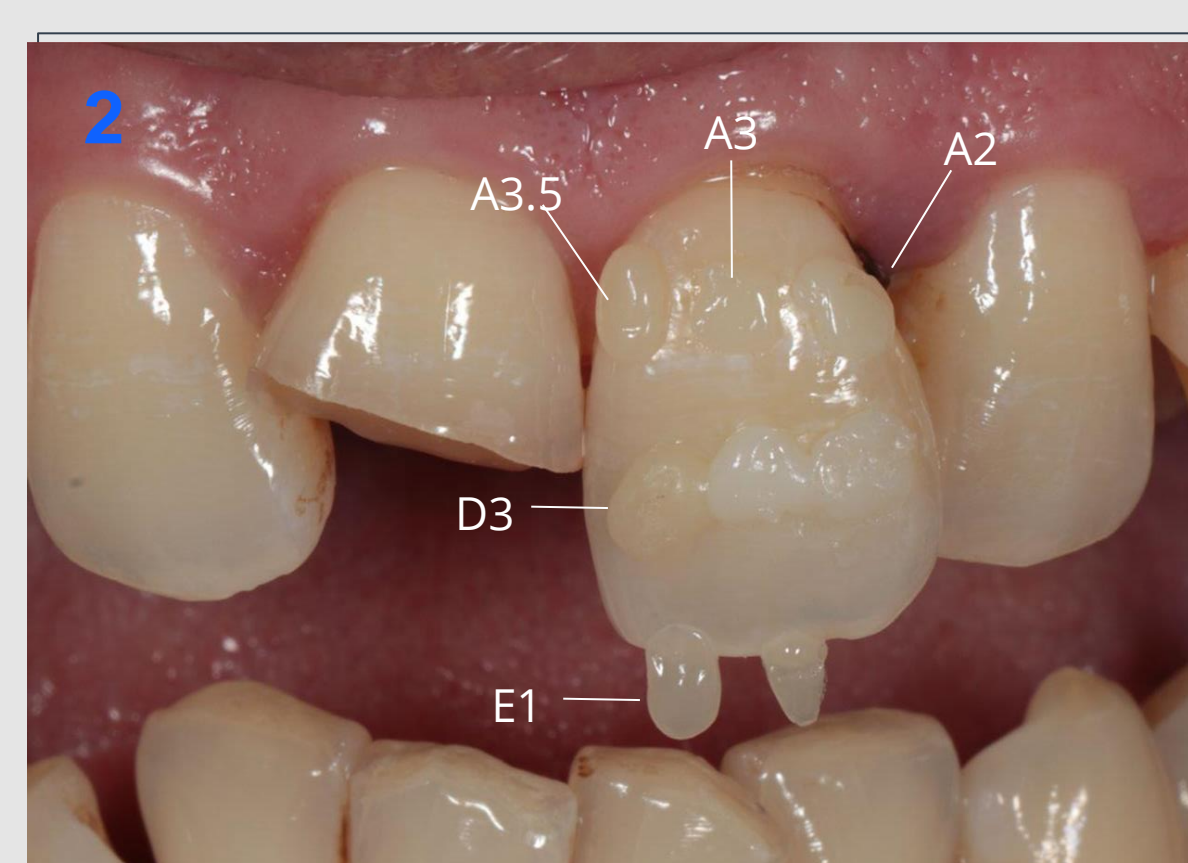
Post-operative view at 1-week follow-up

Treatment steps



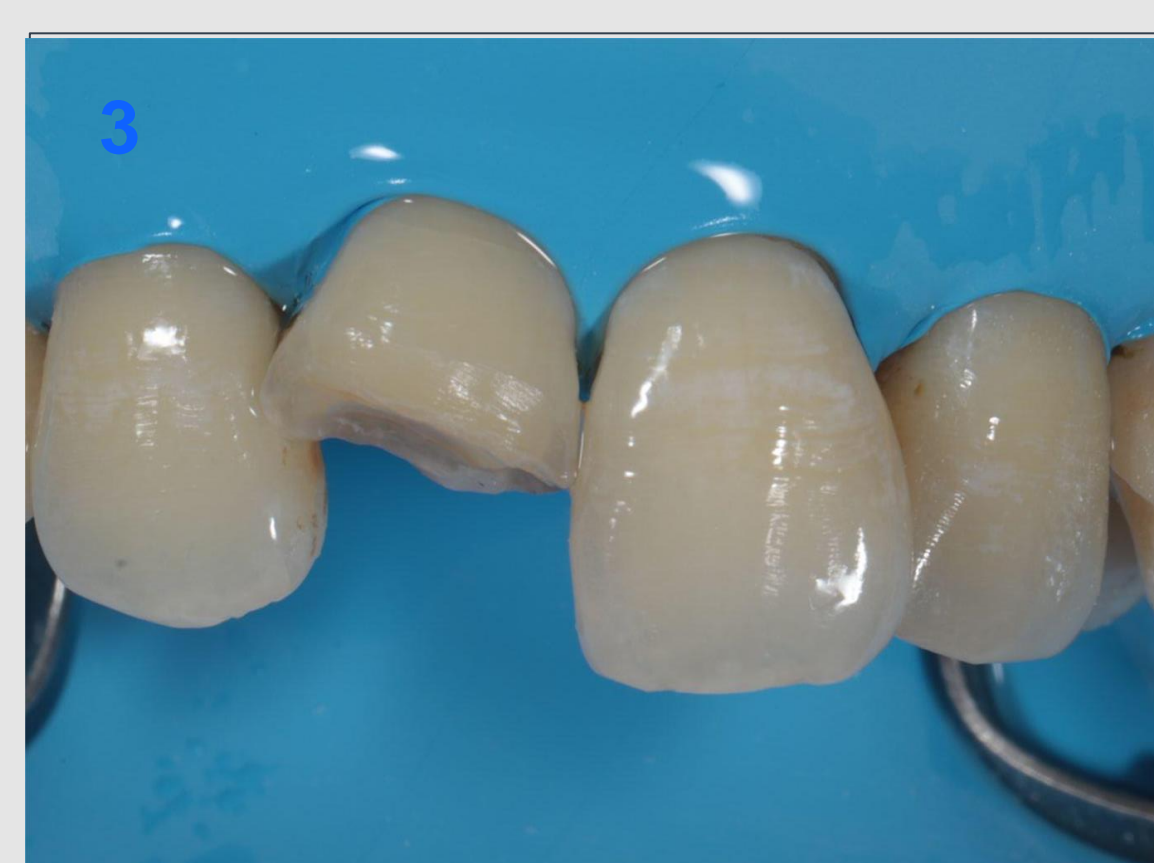
Diagnostic Wax-up and Silicone Shell Fabrication

A diagnostic wax-up of the fractured tooth was made to serve as a guide for silicone key fabrication. Note that as tooth 11 is oriented more buccally, the wax-up aimed to harmonize the orientation between the two central incisors.



Color Mapping and Shade Selection

Color matching was performed by placing and curing **Neo Spectra®** composite buttons prior to rubber dam isolation. A3.5 was chosen for the restoration.



Rubber Dam Isolation and Cavity Preparation

After isolating the maxillary anterior teeth with rubber dam, sharp edges were removed and a 2 mm bevel was placed in order to achieve an optimal esthetic result.



Cavity Restoration and Palatal Shell Fabrication

The cavities were etched with **Detrey Conditioner 36®** followed by **Prime&Bond®** application. A thin layer of **Neo Spectra® E1** was applied to the silicone key for palatal shell fabrication.



Layering

Upon examination, the dentin layer of tooth 21 is consisted of two stronger mamelons on the side with two smaller ones in the middle. Resin sculpted into the shape of mamelons was utilized to resemble the dentin body. A translucent effect is inserted into the mamelon depression.



Tooth Characteristic Refinement

As white spots are evident over the cervical portion of tooth 21, the thicker band followed by the thinner striae were mimicked on the restoration. Finally, a final layer of enamel resin was placed to complete the build-up.



Tooth Morphology Refinement

Primary and secondary anatomies were marked with pencil and accomplished with a fine-grit diamond bur. Perikymata were replicated using a medium grit diamond bur. Finally, **Enhance Finishing®** polishers and **Prisma Gloss®** were utilized to achieve the glossy appearance.



Rehydration

A 1-week postoperative view demonstrates a favorable integration of form and color. The tooth remained vital at the follow-up appointment.

Material and Method

At the initial visit, a wax-up diagnostic cast was made to allow silicone key fabrication. Tooth alignment was also corrected from the wax-up in order to achieve a harmonized esthetic result (Fig. 1). Shade selection was performed using Dentsply composite buttons (Fig. 2). During cavity preparation, sharp edges were removed and a 2 mm bevel was prepared along the fracture margin for to optimize the blending and integration of restorative materials (Fig. 3). The adhesive procedure was performed using **DeTrey Conditioner 36®** and **Prime&Bond®**, after which a thin layer of **Neo Spectra®** in E1 was used to establish palatal contour (Fig. 4). An D3 artificial dentin was placed before layering opalescent resin(E1), tint, and a final layer of A3.5 to mimic the contralateral tooth (Fig. 6). Finally, finishing and polishing were performed using **Enhance Finishing®** system and **Prisma Gloss®** to remove extraneous texture (Fig. 7,8).

Discussion and Conclusion

Direct composite restoration of a class IV defects allows preservation of more sound structure while being less expensive. However, the process often present clinical challenges in terms of proper selection and application of restorative materials. Understanding of material properties allows successful manipulation of restorative composites to achieve a realistic aesthetic result through a layering technique.