GCCC Global Clinical Case Contest 2024-2025

Student: Yiting Chen
Supervisor: Prof. Benxiang Hou
Tutor: Prof. Chen Zhang
Dr. Haiying Zhang
University: Capital Medical University
Country: China

Introduction to the case

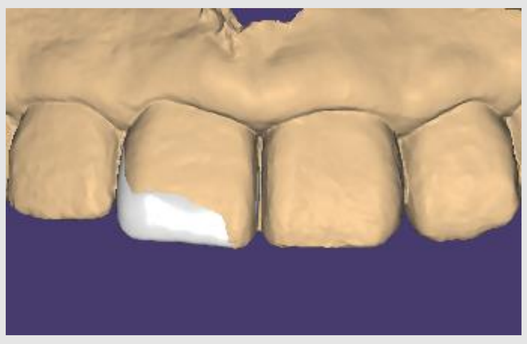
A 26-year-old female came to our department with a chief complaint of compromised esthetics of her right maxillary central incisor. It was fractured in a traffic accident one month ago. Upon clinical examination, the affected tooth remained vital and asymptomatic. As the patient preferred a minimally invasive treatment, direct composite restoration was selected for esthetic rehabilitation. To enhance chairside efficacy, the digital design technology and a full-coverage transparent silicon matrix were utilized to assist the treatment.

Preoperative view of fractured tooth 11 with shape defect.

Postoperative view of the reconstructed tooth 11 at 1-week follow-up.

Treatment steps

1



Step 1 Digital design & 3D printing

Restored morphology by mirroring the contralateral tooth and further adjusted to create a digital wax-up. After patient approval, the final diagnostic model was 3D-printed.

2

Step 2 Silicon matrix fabrication

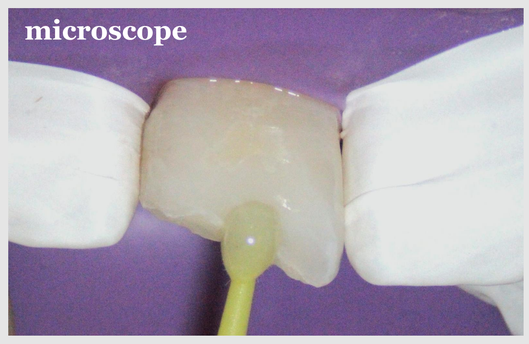
Fabricated a full-coverage transparent silicon matrix based on the 3D-printed diagnostic model.

3

Step 3 Colorimetric

Before rubber dam isolation, the color of the affected tooth was selected utilizing a shade guide, and the corresponding resin shade was determined via the **Neo Spectra® shade-matching system**.

4



Step 4 Preparation

After isolating the maxillary anterior teeth with a rubber dam, a 2 mm bevel was prepared on both labial and palatal surfaces to increase the bonding area and achieve an optimal esthetic outcome.

5

Step 5 Dentin core layer fabrication

The surfaces were etched with 35% phosphoric acid, followed by **Prime & Bond®** application. A layer of **Neo Spectra® D1** was applied by free-hand for dentin layer fabrication.

6

Step 6 Layered composite restoration with the transparent silicon matrix

Sequentially reconstructed the palatal wall, distal surface, incisal edge and labial surface with **Neo Spectra® E1** relied on the silicon matrix.

7

Step 7 Modified morphology refinement

Different grit diamond burs were utilized to simulate natural secondary and tertiary anatomy. Then, achieved the glossy appearance using a multi-tip polishing brush and wheel kit.

8

Step 8 Immediate effect

The immediate postoperative view demonstrates excellent morphology and incisal translucency. The patient showed high satisfaction with the final outcome.

Material and Method

Performed digital design and fabricated a full-coverage transparent silicon matrix before restoration (Fig. 1, 2). Shade selection was performed using a shade guide and the **Neo Spectra® shade-matching system** (Fig. 3). Following bevel preparation, the adhesive procedure was performed using 35% phosphoric acid and **Prime & Bond®** (Fig. 4). The **Neo Spectra®** D1 was applied to establish the dentin core layer (Fig. 5). Sequentially restored the palatal wall, distal surface, incisal edge, and labial surface with E1 relied on the silicon matrix (Fig. 6). Finally, finishing and polishing were performed using different grit diamond burs and polishing tools to restore surface textures and glossy(Fig. 7,8).

Discussion and Conclusion

This case reports the esthetic restoration of a maxillary central incisor using composite resin assisted by digital technology. Compared to conventional palatal guides, the combined use of digital design and the full-coverage transparent silicone matrix enhances patient-clinician-technician communication, simplifies restorative procedures for a class IV defect, and improves operative efficiency. The use of layering filling technology and Neo Spectra® resin improves the esthetic outcomes of composite restorations.