

Triodent/Voco GmBH

Utilization of the V3 sectional matrix system in predictable complex composite restoration: a Case Report

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Treatment List (FDI classification)

- Tooth 26MODL acid-etched direct composite resin restoration

Restorative Material

- Single shade chameleon and opaquing ability of Voco Grandio SO A3.25

Restorative Matrix System

- Triodent V3 Sectional Matrix System: V3 Ring Universal, SuperCurve 5mm Non-Stick Matrix, Wave-Wedge medium.

Adhesive System

- Tooth 26MODL: 35% orthophosphoric acid (Ultradent), Optibond Solo Plus (Kerr Corp.)

Introduction and Chief Complaint

Patient A. M. presented to my service reporting unspecified sensitivity in his posterior 2nd quadrant of 1 month duration. The pain was primarily to cold stimuli with no intermittent or nocturnal pain or

throbbing. He suspected and wanted tooth 24 extracted, as it had received a restoration from another dentist recently. No cellulitis was noted extra-orally, and no paruli or draining fistula noted intra-orally. Soft tissue examination with probing in the 26-23 region revealed the deepest probing depth to be 3mm with bleeding. His 27 was missing. Cold tests were within the normal range for teeth 26-23 with no lingering reversible pulpitis noted. Tooth 26 was the only tooth not intact, with a fractured DOL aspect featuring deep recurrent caries. Indeed, this tooth featured 2-3 fragmented and defective composite restorations. Radiographic examination revealed the chronic nature of this deep-seated carious lesion on 26M4OD4R.

Medical History

Conditions: none reported

Medications: none

Allergies: no known drug allergies (NKDA)

Treatment Plan for Limited Treatment of Maxillary Anterior Sextant (12-22)

- Informed consent, topical and local anaesthesia (1 carpule 4% Articaine with 1:100,000 epi) via buccal infiltration
- Rubber dam (Roeko, Coltene-Whaledent) isolation of quadrant
- Preparation of 26MODL using Triodent WedgeGuard medium (pink)
- Caries detector (Kuraray)
- 2% Chlorohexidine (Vista Dental Products)
- Triodent V3 System (Universal ring, SuperCurve (5mm) Non-Stick matrix, Wave-Wedge medium (pink) for mesial wall reconstruction
- Omnimatrix (Ultradent) used for distal wall reconstruction due to missing 27.
- Restoration of marginal ridges before occlusal reconstruction using single shade, multi-layered lobe placement technique with unique shade A3.25 from Voco Grandio SO.

Description of Treatment Including Rationale for Choice of Restorative Material

Patient A. M. is a 52-year-old patient with poor dental attendance and financial contra-indications. Treatment options were explained, including the lack of need for any extractions. Indeed, the most salient reason for sensitivity points to the deep, recurrent caries under the old comminuted composite restorations on 26MODL.

Considerations for Restorative Material

Ideal restorative options in this case revolve around bonded porcelain partial-coverage restoration, namely to increase and restore tooth stiffness. Financial constraints obviated this option, and thus a direct composite restoration was elected as a long-term provisional option. The restorative modality called upon would need to fulfil the criteria of minimal tooth preparation yet exhibit the strongest compressive and flexural strengths. If bonded lithium disilicate was not a financially-viable solution, the composite chosen would need to exhibit ultra-high filler particle density, minimal polymerization contraction, excellent modulus of elasticity, surface hardness; essentially, a super-composite.

Treatment Description

Following administration of local anaesthesia, the 2nd quadrant was isolated with a 12A Hu-Friedy rubber dam clamp and a Roeko non-latex rubber dam. The medium WedgeGuard (pink) was inserted, and the preparation completed. Caries was removed using Caries Detector Dye (Kuraray) as a guide along with tactile feedback. The preparation was finished by bevelling the enamel 15 degrees on the residual buccal wall to increase surface area for bonding. An Omnimatrix (Ultradent) was fitted, with a medium Wave-Wedge (pink) placed mesial to tooth 26 to seal the margin. It is important to understand the function of the Omnimatrix as a matrix technique for the distal aspect of 26 only. Use of this matrix for mesial wall reconstruction inevitably may lead to a straight emergence profile, under-contoured contact region and excess material in the occlusal embrasure, not to mention a real possibility of an open contact if adequate wedging force is not applied. Tooth 26 was etched with 33% H₃PO₄ (aq) before application of Optibond Solo Plus (Kerr Corp.), air-thinned for 10 seconds and light-cured. The distal marginal ridge was built up incrementally using A3.25 Grandio SO (Voco) and the Omnimatrix removed. The Wave-Wedge was left in place to protect the papilla as the SuperCurve 5.5mm (blue) Non-Stick matrix was slid into position. The Universal V3 Ring (green) was used in this molar case for predictable contact strength and morphology. The mesial marginal ridge was also constructed using incremental placement of A3.25 Grandio SO (Voco). The V3 sectional apparatus were removed and the occlusal aspect restored after confirmation of mesial contact strength. Individual lobes were fashioned incrementally taking C-Factor stresses into account. Small lobe-specific increments allowed for a minimization and optimization of an already-low polymerization contraction figure (1.61%: Voco Grandio SO Scientific Data). Final polishing was completed using Dimanto (Voco), a single-stage ultra-high shine polishing system specific to Grandio SO.

Rationale for Choice of Restorative Material

For patient A. M., principal factors in material selection revolved around preservation of residual healthy tooth structure and enamel for bonding, coronal re-strengthening and esthetic predictability.

In this case, the patient did not have financial liberty, obviating the bonded porcelain restorative solution that would be ideal for coronal re-stiffening and best long-term prognosis. The beauty of resin bonding is maximum conservation of tooth structure with maximum esthetic outcome if the restorative technique is correct, not to mention low-cost of maintainability over time. In this case, the buccal wall of the tooth has not been significantly compromised, and thus merely added to.

Triodent has invented the V3, a proprietary sectional matrix system incorporating features that respect the natural anatomy of both the soft and hard tissues in the restoration of Class II lesions. The WedgeGuard is a brilliant solution to prevent accidental contact with the neighboring teeth during preparation, and doubles as a wedge when the metal guard is lifted off. The Wave-Wedge is the ultimate wedge with unsurpassed sealing properties cervically. The built-in central concavity fits the interdental area like a glove. In this case, the SuperCurve Non-Stick matrix was chosen for its extreme shapeliness and non-stick coating, needing minimal refinement and finishing after removal.

The V3 Ring used in this case not only adapts the matrix intimately against the surface of the tooth, but actually applies a separating force to the teeth; a unique feature that is normally the function of the wedge. If greater separating force is required for a stronger contact, the premolar Narrow (yellow) V3 Ring is selected over the Universal (green) ring. Separating force is maintained through the use of nickel-titanium in the V3 Ring, minimizing plastic deformation.

Voco's Grandio SO is a super-composite. With a filler content of 89%, a Vickers Micro-Hardness of 211MHV and a flexural modulus (16650MPa) that stands in the top 1% of the market, it features physical properties suitable for predictable complex composite restorations. Its compressive strength stands at 438MPa, which is very comparable to IPS e-max Press (Ivoclar Vivadent) at 400MPa. Its 3-point flexural strength stands at 187MPa, which is significantly lower compared to the 375-400MPa flexural strength exhibited by lithium disilicate. This is no surprise when comparing a composite to a bondable ceramic, but it is notable that these physical properties place Voco Grandio SO in the top tier of all direct composites available today.

The shade selected for this case was A3.25, a unique Voco Grandio SO shade positioned halfway between A3 and A3.5. Personal experience shows use of this shade to be second only to A3 in my direct restorative repertoire. Voco's Grandio SO represents the cutting edge of modern direct composites. With super-composite-like properties, the modes of application are expanded and, most importantly, clinical predictability is enhanced.



Fig. 1: Tooth 26 with recurrent caries under old MODL composite restorations.



Fig. 2: After cavity prep.



Fig. 3: Distal wall created using Omnimatrix (Ultradent), Optibond Solo Plus (Kerr) and A3.25 Grandio SO (Voco).



Fig. 4: Mesial wall created using V3 Ring and SuperCurve Non-Stick matrix (both Triodent).



Fig. 5: Build-up of occlusal anatomy.



Fig. 6: Final polishing using Dimanto (Voco).



Fig. 7: Completed case.



Fig. 8: Post-operative radiograph showing excellent contact.