

Posterior restoration with the new thermoviscous nano-hybrid composite VisCalor[®] bulk

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Treatment of a carious lesion with the new thermoviscous composite VisCalor[®] bulk reduces the number of treatment steps required, even when employing the incremental technique in the scope of restorative treatment with composites in the posterior region. Following removal of the caries and preparation of tooth 14, the operating site is isolated with a rubber dam and a sectional matrix placed in position. Following the usual pre-treatment of the cavity with a bonding agent, the warmed VisCalor[®] bulk was applied directly into the Class II cavity and the mesial proximal wall completely sculpted in one layer up to the marginal ridge. In a second step, the rest of the cavity was first filled and then sculpted. This was followed by finishing and polishing of the posterior restoration.

Case description

• Medical History

The patient, who was 17 years old at the time of the treatment, was sent to the dentist by his mother because of brown stains on his anterior teeth. He was in good general health but with teeth showing signs of caries activity. The teenager had not seen a dentist for three years because he “wasn’t motivated” and presented with correspondingly poor oral hygiene. Nevertheless, he wished to have the caries in the visible area removed.

Findings and diagnosis

• Clinical and instrumental findings

There was nothing extraordinary about the extraoral findings. The intraoral investigation, however, revealed poor oral hygiene with relatively healthy looking oral mucosa, although gingivitis with probe depths of ≥ 3 mm was recorded. Carious lesions were identified in teeth 13, 14 and 16. The radiological diagnostics using a panoramic radiograph and bitewing x-rays confirmed the presence of multiple carious lesions in both the anterior and posterior regions. A mesial C3 lesion in combination with demineralisation extending into the outer dentine was found in tooth 14.

• Diagnosis

Mild gingivitis and primary caries in teeth 13, 14 and 16.

Treatment

• Treatment plan

The treatment plan consisted of removal of the caries using an adhesive restorative treatment.

Sequence of treatment steps for tooth 14

1. Removal of caries with diamond bur and rose bur
2. Separation from neighbouring tooth with sectional matrix ring and wedges
3. Production of bevelled margins with preparation instruments and Bevelshape files
4. Insertion of rubber dam and rubber dam clamp W4
5. Insertion of sectional matrix with wedge
6. Etching with Ultra-Etch 35% phosphoric acid (Ultradent)
7. Application of Futurabond U bonding agent (VOCO)
8. Curing of bonding agent with Valo curing light (Ultradent)
9. Insertion of Palodent V3 sectional matrix ring (Dentsply Sirona)
10. Application of first layer of warmed VisCalor bulk (VOCO), sculpting with CPRO1 spatula (Deppeler) and curing (Valo, Ultradent)
11. Insertion of second layer of warmed VisCalor bulk, sculpting with Microbrush applicator (Microbrush International) and CPRO1 spatula (Deppeler), curing (Valo, Ultradent)
12. Removal of surgical aids followed by removal of excess material with scaler (T2/T3, Aesculap)
13. Finishing, occlusion check and polishing with red-ring diamond bur (Komet), articulating paper red 200 μ m (Bausch) and diamond polisher (Dimanto, VOCO)

Products used with manufacturer's details

Product name	Product type/purpose	Manufacturer
Diamond bur and rose bur	Bur for removal of caries	Komet
Palodent BiTine	Sectional matrix ring, round	Dentsply Sirona
Barman's wedges	Separation from neighbouring tooth	Polydentia
EVA head	Setting of individual filing positions	KaVo Dental
Bevelshape file	Proximal chamfer preparation	Intensiv
Sigmadam heavy	Rubber dam	Sigma
Rubber dam clamp W4	Hold rubber dam in place	Hu-Friedy
ComposiTight 3D Fusion	Sectional matrix	Garrison Dental
Composi-Tight 3D Fusion	Wedge	Garrison Dental
Ultra-Etch	Etching acid	Ultradent
Futurabond U	Universal adhesive	VOCO
Valo	LED curing light	Ultradent
Palodent V3	Sectional matrix ring	Dentsply Sirona
VisCalor bulk	Thermoviscous composite	VOCO
VisCalor Dispenser	Warming of composite caps	VOCO
CPR01	Sculpting instrument	Deppeler
Microbrush fein	Sculpting instrument	Microbrush Internat.
Scaler T2/T3	Periodontal instrument	Aesculap
Articulating paper (red, 200 µm)	Occlusion check	Bausch
Dimanto	Diamond polisher	VOCO

Result

- **Before-and-after comparison**

The carious lesion in tooth 14 was treated minimally invasively using a direct composite filling. The lesion in tooth 13 was treated in the same session and that in tooth 16 in one of the subsequent sessions.

Discussion

- **Reasons for treatment decisions**

The progression of the multiple carious lesions should be stopped and the future development of further lesions avoided. With the aim of avoiding a relapse, the decision was taken for a session on motivation and individual prophylaxis.

- **Indications of VOCO products used**

Among other things, restorative treatment employing the adhesive technique in the posterior region can be used to treat large and partly narrow Class I and II cavities as well as Class V cavities. The materials would also be suitable for the core build-up.

- **Particular advantages of VOCO products used**

- The Futurabond U adhesive is a kind of two-bottle system in a SingleDose as it is available in this practical and hygienic delivery form and so can be applied in one step.
- The thermoviscous VisCalor bulk composite caps are warmed and applied with the same VisCalor Dispenser. The warming makes the material flowable first and then packable and sculptable after a short time (thermoviscous technology). The optimal flow properties over the cavity floor, margins and undercut regions minimises the risk of marginal gap formation, plus the thin tip is ideal for hard-to-reach areas.

Conclusion

The patient was very satisfied with the treatment and its results. He has been attending the practice for regular individual prophylaxis ever since. Conscientious following of the guidelines within the scope of restorative treatment and adhesive dentistry can generally ensure a sense of achievement for both the patient and dentist.

The new thermoviscous nanohybrid composite VisCalor bulk simplifies and improves the procedure for the adhesive restorative treatment of large and narrow cavities. With a volume shrinkage of just 1.44% by volume and a shrinkage stress of 4.6 MPa, VisCalor bulk displays lower shrinkage values than conventional bulk-fill composites after warming.

Further reading

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Fig. 01: Situation before treatment: carious lesions in teeth 14 and 13

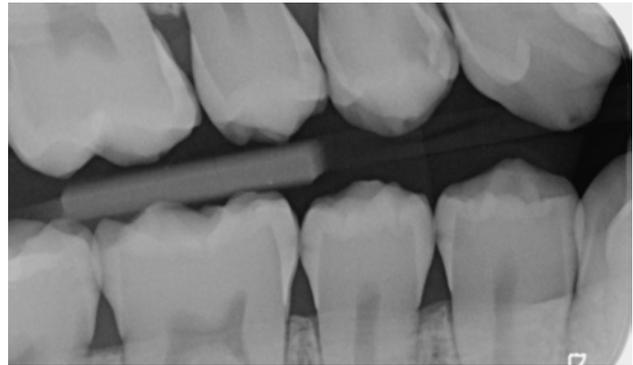


Fig. 02: Bitewing x-ray: mesial C3 lesion in tooth 14 among other findings



Fig. 03: Minimally invasive removal of caries with rotary instruments



Fig. 04: Insertion of sectional matrix ring for separation and a wedge to protect the cervical enamel edge



Fig. 05: Preparation of bevelled margins with Bevelshape file. The non-diamond-coated rear can be rested on the proximal surface of the neighbouring tooth without risking injury.



Fig. 06: Finished preparation with rubber dam



Fig. 07: Demonstration of cavity depth with a periodontal probe: 4 mm



Fig. 08: Sectional matrix in position with cervical adaptation by means of plastic wedge



Fig. 09: Etching of cavity with 35% phosphoric acid gel



Fig. 10: Result of preparatory measures



Fig. 11: Application of the adhesive (Futurabond U, VOCO)



Fig. 12: Light-curing of adhesive Futurabond U



Fig. 13: Pretreated cavity with sectional matrix ring tooth 14



Fig. 14: Application of the first layer of the warmed thermoviscous nano-hybrid composite VisCalor bulk (VOCO)



Fig. 15: First increment in situ prior to sculpting



Fig. 16: Sculpting of mesial proximal wall against sectional matrix



Fig. 17: Proximal creation of marginal ridge



Fig. 18: Light-curing of first increment



Fig. 19: Application of second layer of warmed VisCalor bulk following removal of the sectional matrix ring



Fig. 20: Adaptation and sculpting with microbrush



Fig. 21: Removal of sectional matrix and wedge following curing and removal of the excess material with a scaler



Fig. 22: High-lustre polishing with diamond polisher (Dimanto, VOCO)



Fig. 23: Finished restorations in teeth 14 and 13 with rubber dam



Fig. 24: Follow-up image of restorations after individual prophylaxis 3 months later