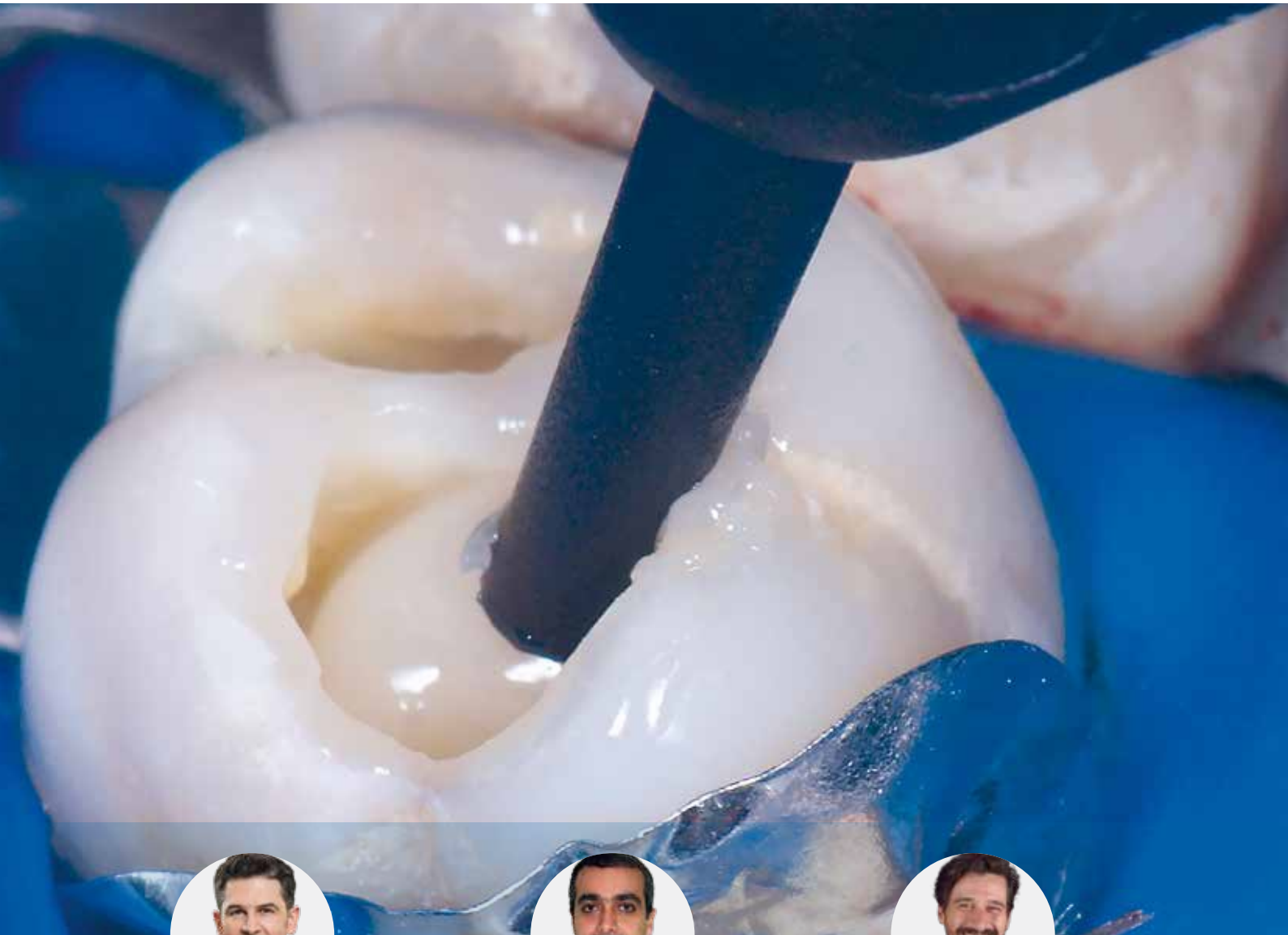


CLINICAL EXPERIENCE

Case documentation of the first composite with thermally controlled viscosity behavior – VisCalor / VisCalor bulk



Posterior restoration
class II

Dr. Walter Denner

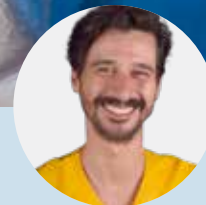
More on page 8



Direct vertical dimension increase
with silicone impressions

Dr. Marcelo Balsamo

More on page 13



Restoration know-how of
weakened cusps in vital teeth

Alessandro Pezzana

More on page 28



**Dear colleagues,
Dear Ladies and Gentlemen,**

Direct restorations in the anterior and posterior region should be as uncomplicated and reliable as possible for both the user and the patient. At the same time, the aspect of economic efficiency should be taken into account. With this in mind, VOCO has developed the universal composite VisCalor. The composite with thermally controlled viscosity behaviour represents a new class within filling composites and is considered a global innovation.

In order to be able to produce high-quality restorations, especially in deep and narrow cavities, it is now standard to work with materials of different viscosities, namely a flowable composite as an increment on the cavity floor, as well as a packable composite for the stability and modelling of the restoration in the upper part of the cavity. This common approach provides solid results, but is also very time-consuming and complex.

With the new Thermo-Viscous-Technology it is possible to avoid this effort and thus optimise the treatment process. The innovative procedure causes the composite to be flowable during application at first. The restorative material flows optimally onto cavity walls

and undercut regions, which simplifies and facilitates the filling therapy tremendously. The previous warming of the composite to 65–68°C is carried out extraorally using a pre-heating device or a specially developed hand dispenser. On contact with the tooth, VisCalor cools rapidly to body temperature, gets highly viscous and can be sculpted and modelled without delay just like a conventional, packable composite.

The first clinical experiences have shown that the bulk-fill version, VisCalor bulk, with an increment thickness of up to 4 mm, is particularly suitable for the direct therapy of large, narrow or difficult to reach cavities as well as for the treatment of several teeth in one session. The thermoviscous universal composite VisCalor is applied, as usual for conventional composites, in up to 2 mm increments and due to a wide range of shades also enables very aesthetic restorations in visible regions.

VisCalor and VisCalor bulk are used internationally by many colleagues, which encouraged VOCO to share their experiences and positive feedback with you on the following pages. Enjoy reading. Sending you best regards from Cuxhaven.

Dr. Kai Klimek
Dentist
Global Head of Knowledge Communication

VisCalor bulk

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Efficient restorations with flowable, packable bulk-fill composites which change their properties to low viscosity when heated (“Thermo-Viscous-Technology”)

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Restoration know-how of weakened cusps in direct restorations of vital teeth –

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Anterior tooth restorations with the thermoviscous composite VisCalor

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The thermoviscous composites VisCalor bulk and VisCalor deliver outstanding results in routine dentistry

Július Ročkár (Slovakia)



Efficient restorations with flowable, packable bulk-fill composites which change their properties to low viscosity when heated (“Thermo-Viscous-Technology”)

Prof. Dr. Jürgen Manhart (Germany)

Introduction

VisCalor bulk takes on the consistency of a flowable composite when heated at the temperature of 68°C with the particularly advantageous VisCalor Dispenser (VOCO) or with a standard Caps Warmer. While cooling down to body temperature it can be modelled like a standard packable composite.

Case description

- **Patient's age and sex**

59 years, female

- **Diagnosis**

Insufficient amalgam filling in tooth 16



Fig. 2: Situation after the removal of the inadequate restoration



Fig. 3: Situation after excavation of the carious areas and preparation



Fig. 1: Initial situation – insufficient amalgam filling in tooth 16 (photo above intraoral mirror)



Fig. 4: Isolation of the treatment area with rubber dam



Fig. 5: Demarcation of the defect with a metal partial matrix



Fig. 9: Application of the adhesive agent (Futurabond M+, VOCO) on the enamel and dentine with a mini-brush (SingleTim, VOCO)



Fig. 6: Application of phosphoric acid gel (Vococid, VOCO) on the enamel



Fig. 10: The adhesive is carefully distributed on the area with oil-free compressed air



Fig. 7: After 15 s, etching is done on the dentine too where it acts for another 15 s



Fig. 11: Light-curing of the adhesive for 10 s



Fig. 8: Careful drying of the cavity after spraying out the phosphoric acid gel



Fig. 12: After light-curing of the adhesive, the sealed cavity shows a uniform shiny surface



Fig. 13: The thermoviscous composite VisCalor bulk is heated to 68°C in a Caps Warmer (VOCO)



Fig. 17: Light-curing of the first layer of the filling material for 10 s



Fig. 14: The slender, flexible cannula of the VisCalor bulk caps facilitates direct application of the filling material even in areas that are hard to reach or narrow cavities



Fig. 18: The second increment of the thermoviscous bulk fill composite (VisCalor bulk) is used to fill the entire remaining volume of the cavity



Fig. 15: In the first step, the cavity is filled with VisCalor bulk up to about half of the defect height (shade universal)



Fig. 19: Polymerization of the second increment of restorative material for 10 s

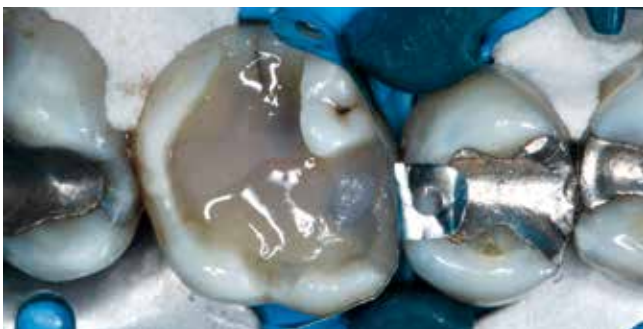


Fig. 16: The low-viscosity consistency when heated results in excellent flow properties on the cavity walls



Fig. 20: Checking of the filling after removing the metal matrix

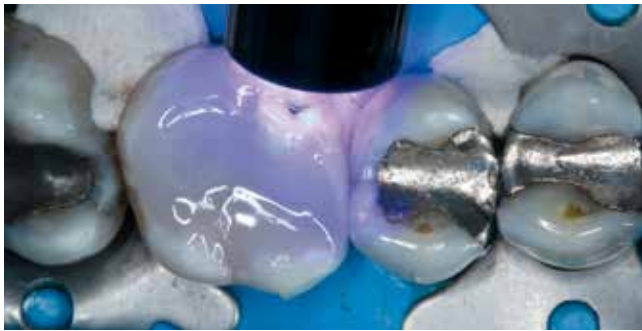


Fig. 21: Additional light-cured polymerisation of the filling material for 10 s on the palatal and approximal side



Fig. 22: Additional light-curing for 10 s on the buccal and approximal side



Fig. 23: Completely finished and highly polished VisCalor bulk composite restoration. The function and aesthetics of the tooth are restored.

Conclusion

As soon as VisCalor bulk has cooled down to tooth temperature in the cavity, the modelling properties of the material match those of a good posterior tooth composite, i.e., anatomical structures such as marginal ridges, cusp slopes or triangular ridges can be worked accurately. VisCalor bulk can be easily contoured and finished with rotating diamond instruments. A high gloss can easily be achieved complication-free with composite polishers.

Author

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Posterior restoration with the new thermoviscous nanohybrid composite VisCalor bulk

Dr. Walter Denner (Germany)

Introduction

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 an adhesive, 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. Caries removal and preparation with rotary instruments
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 phosphoric acid gel (Ultradent)
7. Application of adhesive (Futurabond U, VOCO)
8. Curing of adhesive with Valo curing light (Ultradent)
9. Insertion of Palodent V3 sectional matrix ring (Dentsply Sirona)
10. Application of first layer of warmed VisCalor bulk, sculpting with CPR01 spatula (Deppeler) and curing (Valo, Ultradent)
11. Insertion of second layer of warmed VisCalor bulk, sculpting with microbrush applicator (microbrush International) and CPR01 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 rotating instruments (Komet), articulating paper red 200 μm (Bausch) and diamond polisher (Dimanto, 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.

• Particular advantages of VOCO products used

The use of VOCO products is simple and uncomplicated:

- The Futurabond U adhesive is a one-component system, which is available in the practical and hygienic *SingleDose* and can be applied in one step.
- The thermoviscous VisCalor bulk composite caps are warmed and applied with the same VisCalor Dispenser (VOCO). The warming makes the material flowable first and then packable and sculptable after a short time (thermo-viscous-technology). The optimal flow 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.



Fig. 1: Situation before treatment – carious lesions in teeth 14 and 13

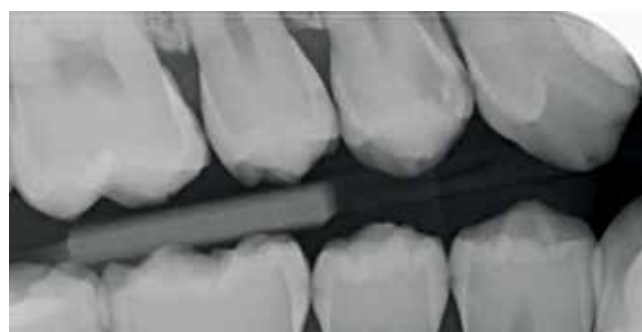


Fig. 2: Bitewing x-ray – mesial C3 lesion in tooth 14 among other findings



Fig. 3: Minimally invasive removal of caries with rotary instruments



Fig. 4: Insertion of sectional matrix ring for separation and a wedge to protect the cervical enamel edge



Fig. 8: Sectional matrix in position with cervical adaptation by means of plastic wedge



Fig. 5: 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. 9: Etching of cavity with phosphoric acid gel



Fig. 6: Finished preparation with rubber dam



Fig. 10: Result of preparatory measures



Fig. 7: Demonstration of cavity depth with a periodontal probe: 4 mm



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

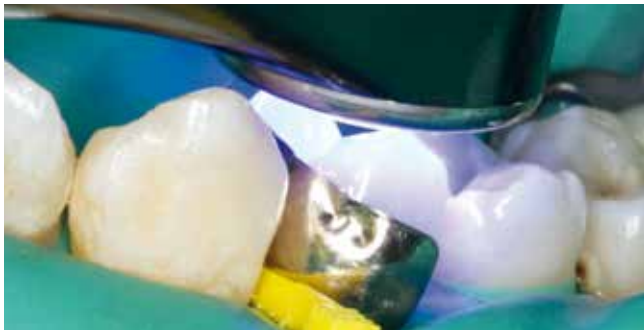


Fig. 12: Light-curing of adhesive (Futurabond U, VOCO)



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



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



Fig. 17: Proximal creation of mesial marginal ridge



Fig. 14: Application of the first increment of the warmed thermoviscous nano-hybrid composite VisCalor bulk



Fig. 18: Light-curing of the first increment



Fig. 15: First increment in situ prior to sculpting



Fig. 19: Application of the second increment of 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 light-curing and removal of the excess material with a scaler



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



Fig. 23 and 24: Finished restorations in teeth 14 and 13 with rubber dam / Follow-up image of restorations after individual prophylaxis 3 months later

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Direct vertical dimension increase with silicone impressions

Dr. Marcelo Balsamo (Brazil)

Introduction

Functional disorders can result in excessive loss of dental hard tissue, further resulting in loss of the vertical dimension of occlusion (VDO) over time. This can consequently be detrimental to the long-term success of an aesthetic restoration. In the case described below, the bilateral balanced occlusion was severely compromised, which should be viewed as a serious risk of failure with regard to the planned anterior restorations with ceramic veneers.

This study describes the approach the clinical procedure for oral rehabilitation with long-lasting success can take if the vertical dimension of occlusion is classed as compromised. In such cases, direct restorations with the thermoviscous bulk-fill composite VisCalor bulk and the help of the silicone impression technique in the form of a function-orientated template can contribute to long-lasting success.

Case description

• Medical history

A middle-aged male patient presented in the dental practice complaining of “fracture sites on the upper teeth”, which were “becoming worse every year”. He did not report any pain; it was more the aesthetic aspect that had been the main problem for the patient for some time already. His medical history was normal.

• Diagnosis

Loss of vertical dimension of occlusion (VDO) with associated defects in the posterior region, resulting from parafunctional habits.

Enamel fractures on all upper and lower anterior teeth as a result of different chemical and physical influences.

Result

The vertical dimension increase with direct composite restorations using silicone impressions is an easy-to-use, cost-effective and efficient technique, which is why the dentist should always consider it as a treatment option.



Fig. 1. 2a and 2b: Initial situation with enamel fractures on the anterior teeth as well as multiple and severe instances of attrition, abrasion and erosion



Fig. 2a



Fig. 2b



Fig. 6: Application of the adhesive (Futurabond U, VOCO)



Fig. 3: Silicone impression (Registrado Clear, VOCO) for transfer of the wax-up simulation



Fig. 7: Light-curing of the adhesive



Fig. 4: All areas of the teeth involved in this process must be roughened to produce a retentive surface

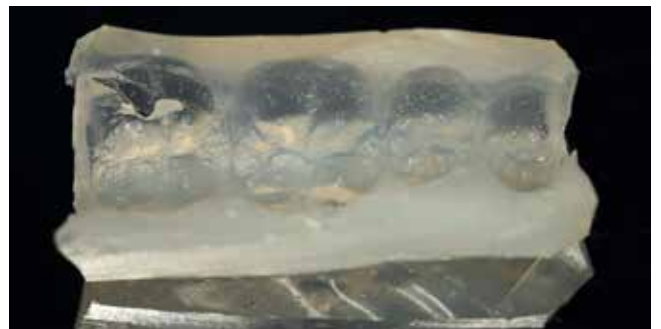


Fig. 8: The silicone impression is produced from the lab's diagnostic wax-up and aids the dentist with the clinical orientation



Fig. 5: Application of phosphoric acid gel (Vococid, VOCO)



Fig. 9: VisCalor bulk is applied to the silicone impression in a flowable consistency following warming in the special VisCalor Dispenser (VOCO)



Fig. 10: The consistency changes during the cooling phase, with VisCalor becoming increasingly packable



Fig. 14: Before-and-after comparison – Situation following vertical dimension increase with direct restorations

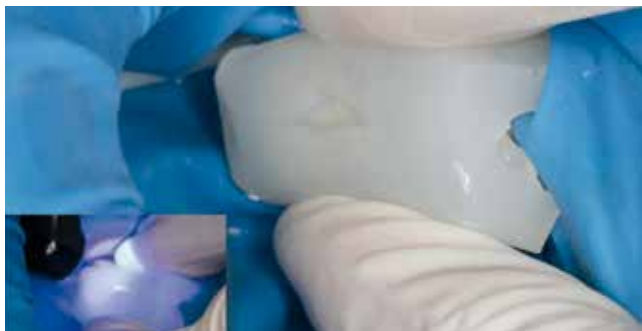


Fig. 11: The silicone impression is pressed gently against the teeth and light-cured for 10 s. The final light-curing is then performed for a further 10 s.



Fig. 15: The occlusal adjustment should naturally be performed directly after restoration of the bilaterally supported occlusion



Fig. 12: Preliminary results following repair of the enamel defects. The buccal and lingual surfaces still need to be finished



Fig. 16: As there is more space available between the incisors in the anterior region following the vertical dimension increase, the fractured and abraded areas could initially be temporarily restored



Fig. 13: Unlike with a conventional direct restoration, the silicone impression technique does not require the time-consuming removal of excess material, especially on the occlusal surfaces



Fig. 17: Admira Fusion (VOCO) was used for the temporary restoration in the anterior region. The permanent restoration with ceramic veneers should not be performed until weeks after the completion of the familiarisation phase.



Fig. 18: Situation prior to treatment of the anterior region with permanent restorations



Fig. 19: Permanent anterior restorations in mandible and maxilla with ceramic veneers (IPS e.max, Ivoclar)

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Restorative treatment of an approximal caries on tooth 16 with the bulk-fill material VisCalor bulk

Prof. Dr. Christian Gernhardt, Dominik Zech, Dr. Antje Diedrich (Germany)

Introduction

Both the patient and the dentist want a restoration of carious lesions that is fast and as aesthetic as possible. Conventional bulk-fill materials have already made it possible to restore large defects very quickly, but they have problems with narrow, small cavities, as adapting to cavity walls and floor is often difficult to achieve. The new bulk-fill material VisCalor bulk combines primary flowability and final modelling in one product, thus making the treatment procedure much easier. In the case described below, a 24-year-old female patient was directly restored with VisCalor bulk in an approximal primary caries on tooth 16 diagnosed during the annual check-up.

Case description

Case history

- **Patient's age and sex**

The patient, female, was 24 years old at the time of treatment

- **Diagnosis**

Primary caries was diagnosed on all wisdom teeth and on teeth 16, 46 and 47

Results

- **Before-and-after comparison**

Discoloured, insufficient occlusal-palatal filling. Subsequently, anatomical cusp and molar tooth shape was restored. Good colour matching thanks to high translucency.

Conclusion

VisCalor bulk is impressive for its quick processing in two viscosities within a same work step and its good colour matching. Preheating of the material allows good application which does not have a negative effect on the material's properties after polymerisation (Yang et al. 2020). It combines the flowability of a flowable and the modelling properties of a packable composite, and can be used for both narrow and large cavities.

Compared to conventional layered adhesive filling materials, VisCalor bulk stands out for the easier and faster application of larger layers (Colombo et al. 2020). In addition, its comparatively high translucency and the four available colour shades ensure good colour matching



Fig. 1: The occlusal overview shows a neat, almost caries-free permanent dentition. The affected tooth 16 clinically hardly shows its distal caries.



Fig. 2: Occlusal detail view of tooth 16 – The distal caries is hardly visible



Fig. 3: The patient's X-ray image (OPG) – These lesions can be diagnosed as approximal caries 16 (C3) and approximal caries 46/47 (C3)



Fig. 4: Occlusal view of tooth 16 after placing the rubber dam



Fig. 5: View of tooth 16 after removal of marginal ridge and presentation of the lesion



Fig. 6: View of tooth 16 after complete removal of the caries, the old restoration and the preparation of the cavity



Fig. 7: View of tooth 16 after placing an already anatomically curved matrix



Fig. 8: Occlusal view after phosphoric acid gel application for selective enamel etching



Fig. 9: View of the tooth after the entire cavity was covered with phosphoric acid gel



Fig. 10: Occlusal view of the cavity after conditioning with phosphoric acid gel



Fig. 14: The four different shades of the VisCalor bulk material - in addition to the universal shade U there are the three VITA shades A1, A2 and A3 available



Fig. 11: The activation of Futurabond U (VOCO) before application



Fig. 15: VisCalor Dispenser (VOCO) during the warming phase in setting 1 (30 s) - after that, the warming material can be applied



Fig. 12: Occlusal view of the cavity wetted with adhesive (Futurabond U, VOCO)



Fig. 16: Occlusal view of the cavity with filling material applied. In this case, two different shades (A3 and A2) were used.



Fig. 13: VisCalor Dispenser (VOCO) enables a simple and effective warming of the composite to 65 °C. Two different settings, which differ in warming time and intensities, are available.



Fig. 17: View directly after placing the filling and removing the matrix in the run-up to finishing and polishing



Fig. 18: Final occlusal view of the final restoration after finishing and polishing



Fig. 19: At the end of treatment, a smiling and satisfied patient

Detailed references

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Detailed case
documentation as pdf



Restoration of class II cavity with VisCalor bulk

Miguel Stanley, Inês Miguel, Catarina Rodrigues (Portugal)

Introduction

This case describes a patient with an insufficient amalgam restoration in tooth 36, which is replaced with an ultra-modern bulk-fill composite filling using an innovative, novel technique. The amalgam was removed using a rubber dam, the cavity cleaned and the filling replaced with a pre-warmed thermoviscous composite employing the adhesive technique.

Case description

Medical history

- **Age and sex of patient**

Female, 61 years old

- **Reason for visiting dentist**

The patient reports about “problems at back left of lower jaw”

- **Diagnosis**

Insufficient filling in tooth 36 requiring replacement

Result

- **Before-and-after comparison**

An insufficient and older amalgam filling was replaced with an ultra-modern bulk-fill composite restoration, achieving outstanding results from an aesthetic perspective and the patient could be discharged with satisfaction.

Discussion

- **Particular advantages of VOCO products used**

VisCalor takes on the consistency of a flowable composite when warmed to 68 °C. The warming can be performed in the particularly advantageous VisCalor Dispenser (VOCO) or a Caps Warmer (VOCO). As it cools down and at body temperature the material changes its consistency and

becomes increasingly sculptable, comparable to a packable composite. It is practical and efficient in its use, delivering aesthetic results.

Authoren

Inês Miguel, dentist

Miguel Stanley, dentist

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Fig. 1: Situation before treatment – Tooth 36 with rubber dam. The premolars are to be restored in the subsequent session at the patient's request.



Fig. 2: Clinical situation after removal of the insufficient amalgam restoration in tooth 36



Fig. 3: Application of the dual-curing universal adhesive Futurabond U (VOCO) in the Class II cavity



Fig. 7: FinalTouch (VOCO) in brown is used for the shade characterisation



Fig. 4: VisCalor Dispenser (VOCO) – Setting the programme for the VisCalor bulk material



Fig. 8: Restoration following application of the bulk-fill composite made from VisCalor bulk and shade characterisation with FinalTouch (VOCO)



Fig. 5: VisCalor Dispenser (VOCO) – VisCalor bulk is warmed for 30 s and can be applied within two and a half minutes with the VisCalor Dispenser (VOCO)



Fig. 9: Finished composite restoration with rubber dam in situ



Fig. 6: VisCalor Dispenser (VOCO) – Application of the VisCalor bulk composite in shade A3



Fig. 10: Final clinical situation of tooth 36 following finishing



Direct restoration of multiple teeth with the thermoviscous composite VisCalor bulk

Trifon Trifonov (Bulgaria)

Introduction

The case presented here describes the post-endodontic (tooth 24) direct restoration of multiple teeth (teeth 24, 25 and 26) with a thermoviscous bulk-fill nano-hybrid-composite (VisCalor bulk, VOCO) which is characterised by unique advantages. The first upper left premolar had been treated endodontically for removing the odontogenic source of infection and resulted in the complete regression of the fistula that was draining pus on the vestibular mucosa between the upper premolars.

Case description

Reason for dental consultation

A 25-year-old woman presented for throbbing pain in the left maxillary region as a possible odontogenic infection.

Diagnosis

- Caries on teeth 24–27
- Reversible pulpitis of tooth 26 and irreversible pulp damage of tooth 24
- Pulp necrosis and acute suppurative pulpitis draining pus in the oral cavity through a fistula between the maxilla's left upper premolars

Results

Before-and-after comparison

- Healing of the sinus tract with no symptoms
- No radiological findings at 6 months follow-up
- Conservative restoration of teeth 24 to 26
- Restoration of function and aesthetics to teeth 24 to 26
- Full patient satisfaction with shortest treatment time possible



Fig. 1: Intraoral x-ray for pre-operative assessment of crown, pulp chamber, roots and peri-radicular areas reveals apical transparency at one root of tooth 24 and several fillings in-situ



Fig. 2: Intraoral x-ray for the operative assessment of working lengths for RCT (root canal treatment) of tooth 24 with rubber dam clamp in-situ



Fig. 3: The intraoral x-ray for the post-operative assessment showed an RCT. This x-ray was used as a reference when reviewing the patient 6 to 12 months later. No signs or symptoms after 6 months



Fig. 4: Rubber dam isolation after caries removal

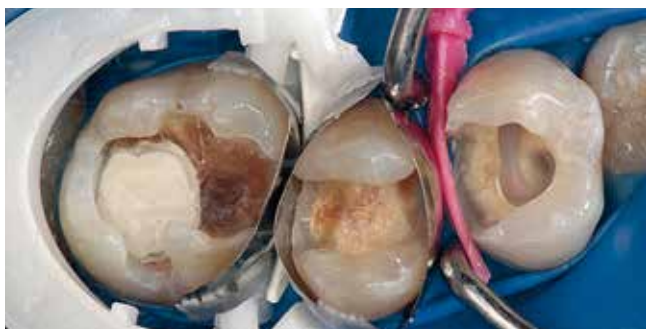


Fig. 5: Matrices in place



Fig. 6: Proximal wall build-up



Fig. 7: Finished thermoviscous bulk-fill with VisCalor bulk

Author

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Detailed case
documentation as pdf



Composites with variable viscosity for bulk-fill restorations in one step

Gianfranco Roselli (Italy)

Introduction

The aims in the further development of the adhesive technique are the conservation of the dental hard tissue, a simplified procedure and thus a shorter treatment time. In the direct restoration of posterior teeth, the aim can also be achieved by utilising universal adhesives and bulk-fill composite materials.

Case description

• Reason for visiting dentist

A 31-year-old patient presented with pain resulting from a broken-off piece of tooth in the upper left jaw. The gingiva in the area was also swollen and bits of food would get stuck in the area.

• Diagnosis

- Dental caries (ICD10 > K02.1) with Class II geometry according to Black in tooth 25
- Deep extension of caries in tooth 25 into the dentine (D4 caries according to Marthaler and Lutz)
- Partial crown fracture of tooth 25 in the area of the distal marginal ridge

Result

• Before-and-after comparison

It was possible to relieve the pain. The anatomical redesign of the occlusal surface on tooth 25 restores the functionality within the masticatory apparatus.

Author

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Fig. 1: Carious lesion in tooth 25



Fig. 2: Cleaning of cavity

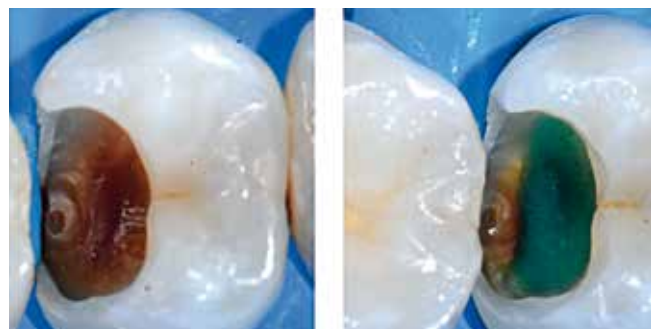


Fig. 3: Indirect capping with a glass ionomer cement, followed by treatment with a temporary filling (not shown in photo)



Fig. 4: Indications of irreversible pulp damage with heavy bleeding 2 days later

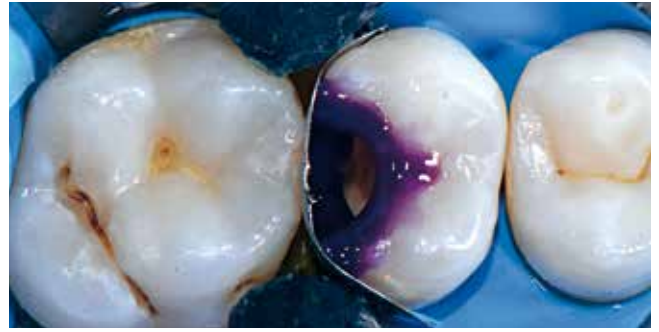


Fig. 9: Etching of the enamel for 30 s (on avital tooth)



Fig. 5 and 6: Situation following preparation of root canal / Situation following root-canal filling



Fig. 10: Rubbing of Futurabond M+ (VOCO) into surface for 20 s



Fig. 7: Separation of the distal portion of tooth 25



Fig. 11: Restoration of marginal ridge with GrandioSO (VOCO) to convert the cavity from Class II to Class I



Fig. 8: Stabilized matrices and wedge in situ



Fig. 12: Finishing of marginal ridge without sectional matrix



Fig. 13: VisCalor in the flowable phase following warming to 65°C in the VisCalor Dispenser (VOCO)



Fig. 17: Shade customisation with FinalTouch (VOCO) in brown



Fig. 14: Bulk-fill restoration in just one step



Fig. 18: View from palatal with good shade results



Fig. 15: Occlusal sculpting once sculptable consistency reached



Fig. 19: Result following finishing and polishing



Fig. 16: View from palatal shortly prior to shade customisation



Fig. 20: X-ray upon completion of treatment



Restoration know-how of weakened cusps in direct restorations of vital teeth

Cusp coverage and cavity class conversions to avoid indirect restorations

Alessandro Pezzana (Italy)



Fig. 1: Thickness measuring of the extremely thin cusp wall (< 1.5 mm) due to a previous amalgam filling of tooth 26



Fig. 4: Class II and Class VI combined preparation design



Fig. 2: Silicone key prior to cusp reduction for later reconstruction of the original cusp profile



Fig. 5: Application of adhesive (Futurabond DC, VOCO)



Fig. 3: Calibrated reduction of the weakened cusp in preparation for cuspal protection



Fig. 6: Placement into the key of a thick layer of VisCalor bulk (A2) to convert Class VI at the distopalatal cusp into Class II



Fig. 7: Inner reinforcement of the cusp with GrandioSO Light Flow (VOCO), to achieve maximum stabilization of the distopalatal cavity wall



Fig. 11: Occlusal modeling with tiny instruments and endodontic files



Fig. 8: Reestablishment with VisCalor bulk of the marginal ridges and interproximal contacts for converting the Class II into a Class I



Fig. 12: FinalTouch (shade brown, VOCO) for the chromatic characterization of enamel fissures



Fig. 9: GrandioSO Light Flow (VOCO) for interproximal reinforcement and for a first occlusal layering



Fig. 13: Chromatic interplay with a lighter shade of VisCalor to lend depth to the cusp slopes



Fig. 10: VisCalor bulk (A2) for completing the filling of the Class I cavity



Fig. 14: Finishing and polishing



Fig. 15: Final result

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Short video of the
clinical case



Class V restorations with GrandioSO Light Flow and VisCalor bulk

Dr. Yassine Harichane (France)

Introduction

Class V cervical defects are common in both younger and older patients. The causes in older patients are often inadequate dental care and reduced saliva production, for example as a result of taking medications, whilst cervical lesions in young people are more associated with the consumption of sugary drinks and smoking. They can also trigger psychological effects, especially in women. Producing functionally stable, invisible, long-lasting restorations in this area often represents a challenge. The solution selected in the clinical case described below consisted of the use of GrandioSO Flow (VOCO) as the base material in combination with the thermoviscous composite VisCalor bulk as the bulk-fill material.

Case description

Medical history

- **Patient's age and sex**

The female patient was 30 years old at the time of treatment.

- **Reason for visiting dentist**

Multiple Class V cervical lesions not damaged by caries and inadequate fillings.

- **General and particular medical history**

At the time of treatment, the patient appeared to be in good health overall. There was no evidence of systemic conditions. The patient said she smoked 10 to 20 cigarettes per day. She did not report any toothaches.

- **Patient's expectations**

The patient wished to have the cervical lesions treated and her "beautiful, healthy teeth" restored.

Findings and diagnosis

- **Clinical and instrumental findings**

The intraoral examination identified old, inadequate composite restorations in teeth 12 and 13, which had originally been inserted to treat cervical caries. A further cavity in the cervical region of tooth 14 was also diagnosed. The examination of the periodontium reflected the findings – gingivitis with probe depths of ≥ 3 mm was identified in some regions of the gingiva.

The panoramic radiograph confirmed the clinical findings described above in teeth 12–14 in the scope of the radiological diagnostics.

- **Diagnosis**

Active C2 caries in tooth 14, mild gingivitis, additional cervical lesions in teeth 12 and 13, stains from tobacco consumption.

Treatment

- **Treatment plan**

- Professional cleaning and polishing with non-surgical scaling and root planing
- Briefing about the risks of smoking
- Replacement of inadequate Class V fillings and treatment of lesions in teeth 13–14
- Tooth 12 is to be treated in a separate, subsequent session
- Application of a desensitising agent as a dressing following preparation
- Assessment prior to bleaching and after two months
- Follow-up care after 6 months

- **Sequence of treatment steps with products (and manufacturer) in text**

- Removal of old fillings and optimisation of prepared cavities (Komet Dental)
- Isolation of operating site with rubber dam (Hygienic Dental Dam, Coltene; dental floss, Oral-B)
- Etching with 37 % phosphoric acid (Conditioner 36, DeTrey)
- Rinsing and drying
- Desensitising and dressing (Telio CS, Ivoclar Vivadent)
- Adhesive (Prime&Bond XP, Dentsply) both tooth 13 and tooth 14
- 10-second light-curing of adhesive layer (Mini LED Active, Acteon)
- Cavity liner on teeth 13–14 (GrandioSO Light Flow, shade A3, VOCO) and subsequent restorative treatment with bulk restoration of same teeth (VisCalor bulk, shade A3, VOCO)
- Sculpting of restorations
- 20-second light-curing of composite filling (Mini LED Active, Acteon)
- Preventive measure against formation of an oxygen inhibition layer (glycerine, Comed)
- 10-second light-curing (Mini LED Active, Acteon)
- Rinsing off of glycerine
- Finishing and polishing of restorations (Sof-Lex, 3M)
- Final visual assessment

Result

- **Before-and-after comparison**

The treatment and production of the restorations in the affected teeth taking the function and aesthetics into consideration took around 30 minutes. As the patient was primarily concerned with the appearance of the restorations and her smile, the re-treatment with an invisible restoration exceeded her expectations. As a result, she agreed to have tooth 12 retreated.

Discussion

- Class V restorations require particular attention to the anatomy of the tooth. In order to be able to preserve the biological width, a technology should be used which allows light-curing of restorations with a thickness of up to 4 mm (bulk technology). The use of a thermoviscous bulk-fill composite (VisCalor bulk, VOCO) was thus the method of choice, as the material characteristics make it possible to recreate the tooth in one treatment step with both the correct convex shape and a smooth surface. At the same time, the chair time was correspondingly short as for a routine operation.

In the case described here, the use of a desensitising agent as a dressing as well as additional rinsing and drying were essential in order to avoid postoperative sensitivity.

A neutrally coloured glycerine gel (Comed) was used during the light-curing of the composite restorations in order to prevent the formation of an oxygen inhibition layer. An oxygen inhibition layer in connection with a composite is a thin, adhesive film around 50 µm thick which forms on the surface of a restoration if it does not cure completely. This oxygen inhibition layer forms when the composite comes into contact with oxygen during the curing. For this reason, the oxygen-impenetrable protection gel can be used to prevent exposure of the composite surfaces to oxygen. As the glycerine slightly increases the distance between the tip of the light-curing device and the restoration, each of the restorations where the shade A3 is used is initially light-cured for 20 s with the LED curing light (light intensity > 1,000 mW/cm²). The curing time is extended by a further 10 s in order to balance out the effect of the greater distance. The glycerine gel was removed with the water jet prior to the finishing and polishing. This produced a harder composite surface, which was easier to finish.

Alternatively, it would have also been possible to leave a little excess material and remove the uncured oxygen inhibition layer in the course of the finishing. Ultimately,

the smoothly finished surface contributes to avoiding future accumulation of plaque, caries and discolouration. It will also ease teeth cleaning for the patient.

- **Particular advantages of VOCO products used**

VisCalor bulk – This particularly innovative material was employed as a deep bulk filling in the first right upper premolar in one treatment step. The corresponding dispenser (VisCalor Dispenser, VOCO) warms the material to 65 °C in just 30 s and keeps it warm for 2.5 minutes. When using pre-warmed composite caps, the user may feel under pressure to complete the step in time before the material hardens. In contrast, VisCalor bulk allows sculpting of the restoration without any time restrictions. In addition, the thermoviscous composite can also be polished without any problems.

GrandioSO Light Flow (VOCO) – The user-friendly tip made application of the material easy and there was no formation of bubbles thanks to the good adaptation.

Conclusion

- **Patient satisfaction**

5/5 for a pain-free procedure

User satisfaction: Subjectively only 4/5, as the dentist is self-critical of not having changed the isolation of the operating site in the form of a rubber dam in order to cover the gingiva papilla between teeth 12 and 13 as well.



Fig. 1: Clinical situation before treatment



Fig. 2: Preparation of the cavity



Fig. 3: Isolation of the teeth with rubber dam



Fig. 4: Etching of teeth with 37% phosphoric acid



Fig. 5: Cavity following etching, rinsing and drying



Fig. 9: Application of the bulk filling into the cavities prior to sculpting



Fig. 6: Application of desensitising agent as dressing



Fig. 10: Sculpting of the restorations



Fig. 7: Application of the adhesive into prepared cavities



Fig. 11: Application of a glycerine gel to prevent formation of an oxygen inhibition layer



Fig. 8: Application of a flowable composite as a liner



Fig. 12: End result following finishing and polishing

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Anterior tooth restorations with the thermoviscous composite VisCalor

Dr. Hanke Faust (Germany)

Introduction

Direct restorations in the anterior and posterior regions should be as uncomplicated, reliable and functionally flawless as possible for the dentist and the patient alike. However, the treatment of carious lesions must also take cost-efficiency into consideration. The ideal handling properties of the novel VisCalor thermoviscous composite in terms of adaptation and sculpability deserve a particular mention in this context. Thermoviscous composites are particularly suitable for the minimally invasive treatment of hard-to-reach cavities and deep preparations, meaning aesthetic restorations in the anterior and posterior regions can also be performed without any difficulties. VisCalor complements the existing, thermoviscous VisCalor bulk version, which comes up against its limits in aesthetic zones due to its higher translucency.

Case study

• Medical history

A 68-year-old male patient came into the practice for a routine annual check-up. The patient did not display any clinical indications for treatment but expressed the desire to have the anterior restorations in the maxilla, which were already 20 years old according to his medical history, replaced as soon as possible for aesthetic reasons. Various treatment alternatives were discussed with the patient. He was advised against prosthetic rehabilitation with indirectly manufactured ceramic crowns or veneers, due to minor substance defects. In contrast, direct conservative treatment with the novel nanohybrid composite VisCalor and the assistance of thermoviscous technology (TVT), proved to be the optimal solution. It was thus also possible to take the patient's expectations of a quick, cost-effective and still aesthetically pleasing long-term restoration into consideration.

• Findings and diagnosis

From a clinical perspective, teeth 13 to 23 displayed insufficient composite resin fillings with marginal gap formation and discolourations (Fig. 1). Due to the patient's age, there were also minor vestibular recessions with non-irritated gingiva. All teeth were vital with Grade I mobility and showed no sensitivity to percussion. Only tooth 11 had been stabilised approximately two years beforehand and adhesively splinted to tooth 21 with a palatally fixed splint (GrandTEC glass fibre strand, VOCO).

After detailed briefing of the patient regarding the upcoming adhesive composite restorations, an appointment was made for the treatment.

Treatment

First, the VisCalor composite caps (shades A1, A2, A3, A3.25 and B1) and Futurabond U (VOCO) as the universal adhesive were prepared for use on the patient. As the multishade technique was to be applied in this case, in order to achieve optimal results in the aesthetic zone, both the Caps Warmer (VOCO) and the VisCalor Dispenser (VOCO) were used.

Following administration of a local anaesthetic, the surfaces of the teeth to be treated were cleaned with the fluoride-free prophylaxis paste Cleanic (KERR GmbH). Using a minimally invasive approach, the existing fillings and all carious areas could then be removed under relative isolation using diamond and rose burs and the cavities subsequently excavated (Fig. 2). The tooth shade was determined on the wet tooth prior to insertion of the rubber dam.

Absolute isolation with a rubber dam, ligatures and wedges was performed in such a way as to minimise the risk of gingival injury to the greatest extent possible (Fig. 3). The patient's ability to breathe freely through the nose was ensured at all times during the restorative treatment. The operating site was isolated from contamination at all times. To protect the pulp, an indirect capping procedure was performed on tooth 23 by applying Kerr Life (KERR GmbH, Biberach) in the cavity above the pulp roof.

Next, the total etch technique was performed in the enamel/dentine region. This was done by first applying 35% phosphoric acid in gel form (Vococid, VOCO) to the enamel for 15 s, and then also applying it to the dentine region for a further 15 s (Fig. 4).

The phosphoric acid gel and the detached elements were sprayed with a mixture of air and water for 20 s. The cavities were then dried carefully with oil-free compressed air (Fig. 5).

The dual-curing *SingleDose* Futurabond U (VOCO) version was used to achieve as high adhesion values to the enamel and dentine as possible – for a durable, gap-free bond between the hard tissue and composite. This was done by activating it first and then rubbing it into the dental hard tissue with the microbrush, for 20 s (Fig. 6). Studies have shown that it is possible to achieve higher adhesion values with the total etch technique than with the self-etch technique (Ahmed et al., 2018; Torres, 2013). Following drying of the solvent with oil-free air for 5 s, the adhesive was cured for 10 s with the curing light (Fig. 7). The resin tags extending into the dentinal tubules following the polymerisation assist with adhesion and reduce postoperative sensitivity (Toshniwal et al., 2019; VOCO GmbH, 2017).

Before the composite can be introduced in the cavity, the complete and gap-free coating of the cavity with the adhesive must be verified on the basis of its significant sheen. In order to avoid postoperative sensitivity, the adhesive can once again be applied to matt and exposed surfaces, if required.

In this case, the Caps Warmer (VOCO) and the VisCalor Dispenser (VOCO) were used to apply the VisCalor. The Caps Warmer (VOCO) was heated to 68 °C around 30 minutes prior to the beginning of the application. The Caps Warmer (VOCO)

allows the simultaneous warming of four individual caps and two hand instruments. Accordingly, the required caps in the shades A1, A3, A3.5 and B1 were warmed in the Caps Warmer (VOCO) for 3 minutes before the application.

The warming time of the caps for VisCalor in programme 1 is 30 s, with the result that the heated material in the caps is ready for application after just a short time thanks to the VisCalor Dispenser (VOCO). The narrow tip of the cap allows for a targeted, precise and highly accurate application. Use of the Dispenser allows an initial layer to be introduced rapidly as a base, even across multiple cavity floors (shade A3). The supplementary shades from the Caps Warmer (VOCO) were then used for the further customised layering to achieve optimal aesthetic results. The maximum layer thickness for VisCalor is 2 mm (Fig. 8).

The warmed material can be optimally applied and adapted to the cavity, so that there is no need for a liner or a flow composite. In addition, VisCalor displays outstanding sculptability after cooling (Fig. 9).

The curing is performed with a conventional curing light (1,200 mW/cm²) for 10 s each time, during which the light aperture should be positioned as close to the surface of the composite as possible.

Once all the fillings were placed and cured using the multiple-layer and multishade technique, the correct shape and surface of the restorations were verified, as the application of composite following removal of the rubber dam should be avoided under all circumstances (Fig. 10).

The finishing was first performed using rotary red-ring and yellow-ring diamond burs. The polishing was then completed with highly flexible polishing wheels and strips, with a coarse to extra-fine grit size (Super-Snap, SHOFU Dental GmbH, Ratingen). The occlusion and articulation were also checked in this step (Figs. 11 and 12).

The high-gloss polishing was performed with diamond-impregnated Dimanto (VOCO) polishers, at a speed of 5,000 rpm with water jet cooling and reduced application pressure. Finally, the teeth were polished using the CleanJoy fine (VOCO) polishing paste, also applying light pressure (Fig. 13).

Result

The final result of the anterior restorations in this case study is exceptionally satisfactory (Fig. 14). The starting situation prior to the beginning of treatment revealed insufficient and discoloured fillings in the region of teeth 13 to 23. The choice of the novel composite VisCalor and the use of the thermo-viscous-technology (TVT) made it possible to achieve a highly aesthetic and substance-preserving rehabilitation directly and in just one session. A before-and-after comparison reveals considerable improvement in both shape and shade. A customised, aesthetic and natural appearance was visible immediately after the high-gloss polishing and fluoridation with Bifluorid 10 (VOCO).

Discussion

The basic concept for the present treatment was, first, to use a minimally invasive approach and, second, to only use one composite system to the extent possible – in other words, to avoid the separate use of liners or flow composites as is standard practice for deep cavities. The patient's request for a quick, cost-effective and "invisible" aesthetic solution also needed to be taken into account.

The thermo-viscous-technology (TVT) allows, through heating of the material to approximately 68 °C, for the optimal application and adaptation of a filling material that is initially flowable and subsequently packable in comparison to the use of conventional composites (Braun, 2019; Yang et al., 2020). As investigations have shown, both the change in the material properties and the thermal influence on the tooth and pulp can be considered harmless. The natural blood flow means only minimal heat reaches the pulp tissue (VOCO, 2019).

The material is suitable for all indications in the anterior, posterior as well as aesthetic regions. It offers the combined properties of the flow behaviour of a flowable composite directly during application, together with the sculptability of a packable composite following a short cooling phase to body temperature. It thus assumes the role of a universally applicable composite and is indicated, in particular, for retentive areas and very deep cavities as well as for cavities that are poorly accessible either visually or manually (Federlin et al, 2017; Manhart et al, 2017). As a result of the initially increased flow properties, the reduced viscosity means it is possible to do without a liner in the form of a flow composite.

The material's special properties also support minimally invasive dentistry.

Important aspects of the use of a composite, within the scope of restorative treatment, are its easy application and the constantly reproducible use in the sense of avoiding errors, as well as minimal material and time requirements. In comparison, VisCalor offers very low shrinkage of 1.4 %, which ensures long-term success and the avoidance of microleakages. The excellent sculptability and adaptation, as well as the simple polishability of the material, make for convenient handling and contribute to an aesthetically and thoroughly presentable restoration. The minimal extra time and organisational requirements for fillings with a thermoviscous composite are negligible in comparison with the standard adhesive composite technique (Manhart et al, 2021; Gernhardt et al, 2020), as this is more than compensated for by the elimination of the separate flow composite and liner components. Both the Caps Warmer (VOCO), which is particularly recommendable when employing the multishade technique, and the VisCalor Dispenser (VOCO, for example, for bulk fillings), provide two different options as well as one additional time-saving option for heating composites.

Conclusion

The patient was also very satisfied with the result as it was possible to avoid both time-consuming and cost-intensive measures. The excellent physical properties will contribute to the long-term success of the restoration and thus also to the patient's long-lasting satisfaction.

The new VisCalor is particularly recommendable as it is a user-friendly, efficient and highly aesthetic material. The cost-benefit analysis is clearly in favour of the benefits, thanks to time and material savings. In addition, the added value can be found in the material's simple application and sculptability. The material characteristics of VisCalor satisfy all expectations for an ultra-modern restorative composite.



Fig. 1: Clinical starting situation with insufficient restorations in frontal view



Fig. 2: View following minimally invasive excavation and preparation



Fig. 3: Inserted rubber dam (absolute isolation)



Fig. 4: Total etch technique employed on the cavities



Fig. 5: Etched and dried cavities prior to application of the adhesive



Fig. 6: Application of Futurabond U (VOCO) with the microbrush (VOCO)



Fig. 7: Polymerisation of the adhesive



Fig. 8: Initial layer, tooth 13 to 11



Fig. 9: Sculpting of the composite with a Heidemann spatula



Fig. 13: Final polishing of tooth and restoration surfaces



Fig. 10: Finished layered restorations, tooth 13 to 23



Fig. 14: Final restoration with VisCalor



Fig. 11: Surface contouring with polishing wheel (coarse)



Fig. 12: Restoration prior to high-gloss polishing

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The thermoviscous composites VisCalor bulk and VisCalor deliver outstanding results in routine dentistry

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Introduction

Bulk-fill composites with thermoviscous properties (VisCalor bulk, VOCCO) are a new development in modern restorative dentistry. They satisfy the demands on affordable materials used to produce restorations without the requirement to employ the time-consuming incremental techniques with multiple individual layers. The following clinical case describes a good result in the heavily loaded posterior masticatory region. Even the aesthetics could be improved with the use of the new thermoviscous composite material employing the incremental layering technique: VisCalor bulk (VOCCO).

Case description

Medical history

A 22-year-old female patient presented at our dental practice with complaints in the area of the upper left jaw. She reported hypersensitivity to cold “in the area of the back teeth”. There was pressure pain in the region of the muscles when she bit down and problems cleaning the interdental spaces of some molars & premolars with subsequent bleeding. The patient requested treatment of the issues. Her medical history did not reveal any indications of systemic diseases.

Findings and diagnosis

The intraoral investigation using a caries probe, supported by magnification with the aid of a dental operating microscope (DOM), allowed clinically identification of primary caries located distopalatally in tooth 26.

The X-ray examination also revealed undermining secondary caries extending in a mesio-occlusal direction beneath the amalgam filling in tooth 26. Despite the unpleasant hypersensitivity to cold, tooth 26 displayed a sensitivity reaction

without signs of hyperaemia in the pulp vitality test with the aid of cold spray and no noticeable reaction in the percussion test.

A diagnosis of deep dental caries (ICD10 > K02.1) was made for tooth 26, Class II according to Black, with preserved dental pulp vitality.

Treatment

Following briefing of and obtaining of consent from the patient, local anaesthetic with 4% articaine and the addition of 1/100,000 adrenaline as a vasoconstrictor (Ubistesin forte 4%, 1.7 ml, 3M ESPE) was injected above tooth 26. The shade was determined against the wet tooth and then the operating site isolated with a rubber dam to ensure the cavity remained dry. This corresponds to the principles of treatment with adhesive materials. Following careful removal of the old amalgam filling and excavation of the caries with round tungsten carbide burs, the preparation margins were smoothed with a fine diamond bur. A wooden wedge was inserted between teeth 25 and 26 so as to create the space required for a matrix via separation, which allowed mesial delimitation of the cavity. The wedge also displaced the gingival tissue so as to prevent any bleeding. A sectional matrix ring (V3 Sectional Matrix System, Triodent) was introduced to hold the matrix securely in place and fix it in such a way that the best use could be made of the anatomical features. Although the plan was to use a self-etch adhesive, the tooth enamel was etched for approx. 20 s and the dentine for max. 15 s with a 35% phosphoric acid gel (Vococid, VOCCO) so as to increase the surface area prior to the bonding. Following suctioning off of the gel, the area was rinsed thoroughly for 15–20 s with an air-water jet in order to remove the acid and precipitation residues.

Residual moisture on the etched surfaces was removed gently with an oil-free air jet. In order to prevent contamination with saliva, the patient was asked not to close her mouth.

A light-curing, nanoparticle-reinforced self-etch adhesive (Futurabond M+, VOCO) was then applied in order to be able to achieve a bonding layer with a long-lasting marginal seal between the dental hard tissue and the subsequent light-curing restorative material. Futurabond M (VOCO) can be considered extremely safe in this respect as it tolerates a certain amount of residual moisture: The adhesive was rubbed into the etched dental hard tissue for approx. 20 s using a disposable application brush (Single Tim, VOCO). It is also possible to use ultrafine micro applicators (Sky Dental Supply) in this step to ensure that the adhesive layer coats even very narrow areas of cavities. Following careful rubbing of the adhesive into the tooth surface, the solvent was then carefully removed from the bond with dry, oil-free compressed air for at least 5 s until a shiny, immobile film became visible. The adhesive was then cured for 10 s with a curing light.

1st composite layer: In order to guarantee the marginal integrity, a particularly flowable material (GrandioSO Heavy Flow, VOCO) was used first to fill the space between the matrix and the tooth exceptionally precisely. The thin application tip of the GrandioSO Heavy Flow (VOCO) makes it easy to reach the narrow areas in particular without impeded vision when applying the composite material. However, in order to reduce the number of working steps and speed up the procedure, the unique properties of the thermoviscous composite VisCalor bulk mean it could also be applied directly.

2nd composite layer: The use of the wedge, matrix and sectional matrix ring allowed reconstruction of the mesial wall of tooth 26 in just one step, converting the cavity from Class II to Class I (VisCalor). This permitted creation of sufficient contact between teeth 26 and 25 to prevent impaction of food debris during occlusion and allow easy cleaning of the interdental spaces. The best contact point design can be achieved if the interdental slope is shaped with a thin instrument and the restorative material pressed against the matrix with a thicker instrument.

3rd composite layer: VisCalor bulk can be used in increments of up to 4 mm layer thickness for the larger areas requiring filling.

Final composite layers to recreate aesthetics: VisCalor can be used to reproduce both the functional anatomy for chewing and the natural aesthetics as well as a dazzling smile for the patient. The final layer was cured under glycerine gel and then finished and polished with carbide finishing burs (Hager & Meisinger GmbH, Germany), Arkansas stones (Brasseler Inc., USA) and Occlubrushes (Kerr Dental, Germany).

Results

The results of the restoration in tooth 26 were extremely satisfying from both a functional as well as an aesthetic perspective. The patient was also delighted by the improvement in hygiene made possible by the appropriate redesign of the interdental space.

Discussion

Once the diagnosis had been made, the patient was briefed and advised. Tooth 26 should be restored directly and treated with a thermoviscous restorative material. Composite materials in combination with the adhesive technique are the method of choice in modern dentistry for direct restorations, as their mechanical, biological and aesthetic properties are far superior to those of amalgams and glass ionomer cements. The greatest advantage of composites is the simple performance of the individual increments, as the restorative material can be adapted step by step to any and all minimally invasive preparations. Checking of the occlusion and articulation conditions prior to treatment makes it possible to avoid considerable subsequent adjustments, which can be very disappointing. The new, innovative thermoviscous materials VisCalor bulk and VisCalor offer a flowable consistency during application and can be sculpted immediately afterwards – thermoviscous materials unite these two property in one product.

1: Simple and precise application of the material in a deep or narrow cavity is possible without any problems whilst the material is flowable. The flowability is achieved through warming and maintained for a short period of time as long as the cap remains in the VisCalor Dispenser (VOCO).

2: Adaptation of the individual layers to the unique anatomy of the tooth and sculpting of the restoration are possible once the consistency of the material becomes more viscous as it cools down. The application in increment thicknesses of 4 mm represents a time-saving advantage when treating deep cavities with VisCalor bulk. As soon as a core has been estab-

lished with VisCalor bulk it is possible to switch to VisCalor to achieve an aesthetic result, as VisCalor is available in a variety of shades. VisCalor is applied in increment thicknesses of 2 mm. The light-curing of the final layer under translucent glycerine gel ensures that the oxygen inhibition layer of the composite is also cured and thus facilitates polishing.

VisCalor is therefore not intended for application in bulk increments, rather particularly suitable for aesthetic restorations. VisCalor seems easier to polish as it was possible to produce a high-lustre surface subjectively quicker.

Carbide finishing burs and non-diamond-coated Arkansas stones were used to remove excess material and for the final polishing, as they leave the surface of composite restorations evenly smooth without damaging the restoration. In contrast, polishing pastes would become trapped in small rough areas and polishing instruments would be too aggressive on the surface. The final step of the polishing consists of the use of rotary Occlubrushes (or alternatively goat's hair polishing brushes) coated with polishing paste in order to achieve a polished surface, which also prevents the accumulation of plaque.

Conclusion

New thermoviscous composites like VisCalor bulk and VisCalor, which are flowable during application and packable during the anatomical sculpting of the restoration, offer time savings, comfort and reliability when producing direct restorations without the formation of bubbles or gaps. Provided all the demands on adhesive dentistry are satisfied, restorations with VisCalor bulk and VisCalor offer dentists long-lasting results with excellent aesthetics.

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Fig. 1: Situation before treatment (inadequate amalgam filling) without rubber dam



Fig. 2: Situation before treatment with rubber dam in situ



Fig. 3: Final preparation of tooth 26 following excavation of the existing filling



Fig. 4: Sectional matrix ring, matrix and interdental wedge for separation in situ



Fig. 5: Situation following acid-etch of dental hard tissues



Fig. 9: Situation following finishing and polishing of the final restoration with their natural appearance



Fig. 6: A 1st composite layer of GrandioSO Heavy Flow (VOCO) in the cavity as the base below the filling



Fig. 7: A 2nd composite layer for creation of an aesthetically pleasing mesial wall with VisCalor (photo taken after removal of ring, wedge and matrix)



Fig. 8: The cavity was filled with VisCalor bulk. For a natural and aesthetic result, the final increment was made with the universal composite VisCalor.



VisCalor bulk

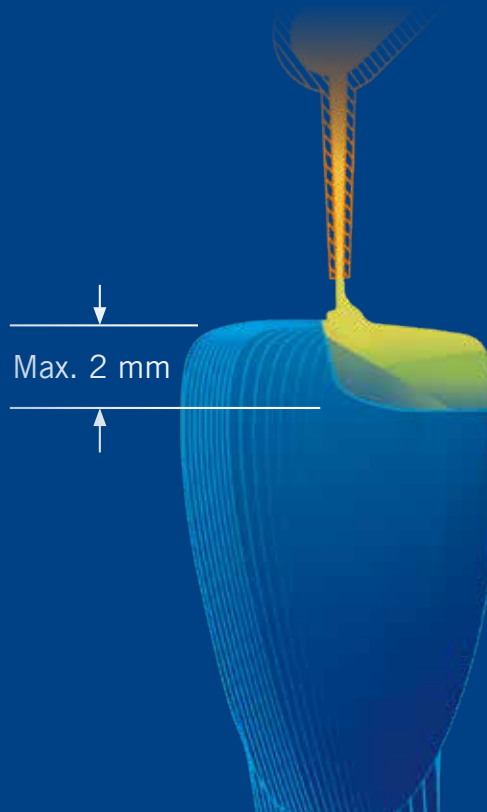
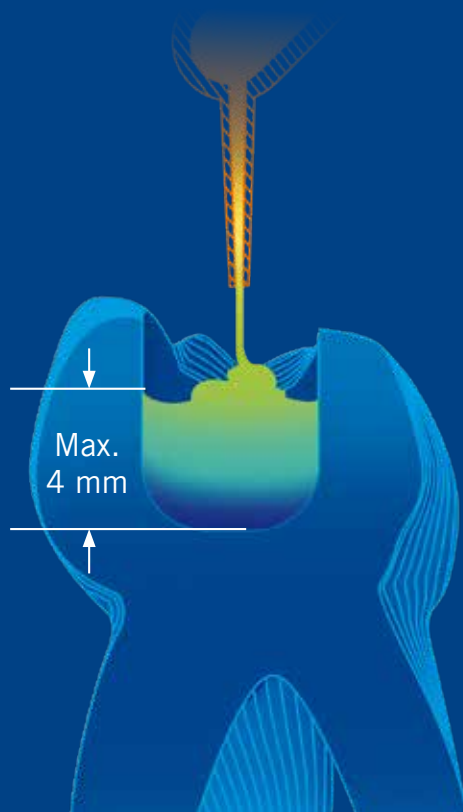
“The viscosity change of the material from flowable to packable during one working step is certainly to be classified as a worldwide innovation. VisCalor bulk is an easy to handle filling material. It is efficient for the dentist as it enables short treatments. With a volume shrinkage of only 1.44 Vol.-% and a shrinkage stress of 4.6 MPa VisCalor bulk shows lower shrinkage values than conventional bulk-fill composites after warming.”

Gianfranco Roselli, DDS

VisCalor

“The new universal VisCalor is highly recommended as it is a user-friendly, efficient and aesthetic therapy at affordable prices. The practice of standard adhesive restorative therapy is still applicable. The user will immediately recognise the added value in the easy applicability of the material through the thermo-viscous-technology in the form of the outstanding application and sculptability.”

Dr. med. dent. Hanke Faust



VisCalor bulk

Thermoviscous bulk-fill composite

REF 6062 Set VisCalor Dispenser
Caps 80 × 0.25 g (16 × universal, 16 × A1, 16 × A2, 32 × A3),
VisCalor Dispenser

REF 6063 Set Caps Warmer,
Caps 80 × 0.25 g (16 × universal, 16 × A1, 16 × A2, 32 × A3)
Caps Warmer



	universal	A1	A2	A3
Caps 16 × 0.25 g	6065	6066	6067	6068



VisCalor ^{NEW}

Thermoviscous universal composite

REF 6106 VisCalor – Set VisCalor Dispenser,
Caps 80 × 0.25 g (16 × A1, 16 × A2, 32 × A3, 16 × A3.5), shade guide,
VisCalor Dispenser

REF 6107 VisCalor – Set Caps Warmer,
Caps 80 × 0.25 g (16 × A1, 16 × A2, 32 × A3, 16 × A3.5),
shade guide, Caps Warmer

REF 6108 VisCalor – Set + Bond
Caps 80 × 0.25 g (16 × A2, 16 × A3, 16 × A3.5, 16 × OA2,
16 × incisal), shade guide,
Futurabond U *SingleDose* 20 pcs.

REF 6110 VisCalor – Shade guide



	A1	A2	A3	GA3.25	A3.5	A4	B1	B2	incisal	OA2	BL
Caps 16 × 0.25 g	6113	6114	6115	6116	6117	6118	6119	6120	6121	6122	6123



High quality and durable

- Optimal flowing to margins and undercut areas
- Excellent physical properties

Unique and innovative

By pre-warming, the material is flowable during application and can be sculpted immediately afterwards (thermo-viscous-technology)

Efficient

- Combines 2 viscosities in one material ▶ no material change and less stock keeping
- No overlaying necessary

Excellent handling

Bubble-free application with a narrow and long cannula

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