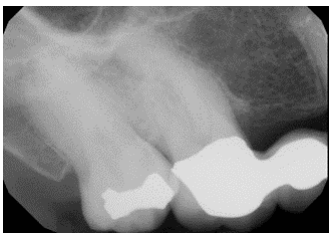
SILMET

Case Study Collection

Volume 3

How to Sandwich Glass Ionomer
Dr. Lev Nudelman



Core Build Up
Dr.Trevor Andrews

Bulk Fill Composite in Pediatric Dentistry
Dr. Marta Giménez

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Silmet: Pioneering Excellence in Dental Restorative Materials

Silmet has established itself as a leader in the dental industry by manufacturing versatile and high-quality restorative materials. From our modest beginnings, we have grown into a renowned brand recognized for our advanced manufacturing systems and unwavering commitment to quality and innovation.

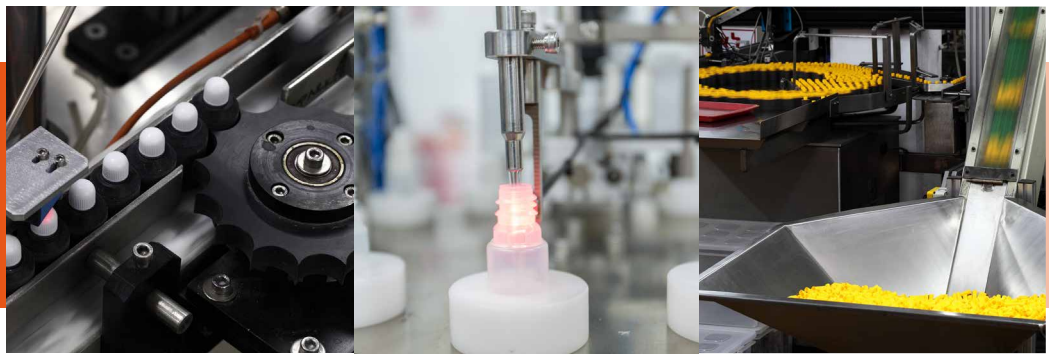
Our comprehensive product line includes state-of-the-art composites, cements, and adhesives designed to meet the diverse needs of dental professionals worldwide.

We are excited to present our latest collection of dental case studies, showing impressive results achieved using Silmet's restorative materials. These case studies highlight how our products work seamlessly to create durable, natural-looking restorations that enhance both function and aesthetics, meeting latest new standard in restorative dentistry.

This curated collection spans a wide range of clinical scenarios, from routine fillings to complex rehabilitations. Each case demonstrates the versatility, durability, and aesthetic excellence of our restorative materials, empowering dentists to deliver optimal patient outcomes and achieve superior results, transforming smiles and enhancing patient satisfaction.

By sharing these real-world examples, we aim to provide valuable insights into the practical applications of our products, helping dental professionals make informed decisions about their restorative material choices. These case studies not only showcase the technical strengths of Silmet's materials but also illustrate their significant impact on clinical success, and overall satisfaction.

As you explore this collection, you will discover how Silmet's restorative materials meet the evolving demands of modern dentistry. Each case study underscores our ongoing commitment to advancing dental care through innovative material science. These success stories stand as a testament to our dedication to excellence and our passion for supporting the dental community.



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Endodontically Treated Resin Inlay
A clinical case report using ProFil™ and ProFil™ Bulk resin technology

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Introduction

A tooth that requires endodontic treatment is commonly a tooth that has lost a large volume of tooth tissue and is heavily restored. These teeth are often more prone to fracture. The selection of the right material depends on type of restoration and the retentiveness of the tooth preparation. The availability of adhesive techniques has increased the clinician's repertoire in terms of restoring teeth. Adhesive restorations are gaining more popularity due to their conservative nature.
Choosing the optimal restoration for a root filled tooth requires consideration of a number of interrelated factors.
The following objectives should be considered:

- Prevention of microbial leakage into the root canal system.
- Restoration of form, occlusal stability and adequate contact points with the neighboring teeth.
- Restoration of function.
- Protection of the residual tooth structure against further tissue loss and fracture.
- Maintenance of health of the marginal periodontal tissues.
- Optimal aesthetics.

Case Study

History

Patient:

57 years old, Female.
Smokes.
Does not consume alcohol.

Dental History:

Oral condition: The patient has good oral condition without active caries or periodontal disease. She performs very good plate control and refrains from sugary foods. She brushes teeth with a manual brush and also uses the interdental brush and floss. Toothpaste used is based on sodium fluoride and MFP.

Extra oral information:

The patient has facets of tear and wear due to bruxism, uses relaxing plate during sleep.
Physical condition: no particularities reported.

Treatment

Treatment plan:

Carry out restoration in endodontically treated tooth.
Cavities cleaning.
Dentin sealing.
Buildup using Adhesive technique with bulk resin.

Treatment performed:

- Applying rubber dam isolation.
- Removing the provisional sealing from the tooth.
- Brush with pumice stone.
- Total etch with 33% phosphoric acid.
- Placement of first layer of ***ProLink***™ adhesive on denitn.
- Placement of second layer of ***ProLink***™ adhesive on enamel and dentin.
- Light cure for 20 sec.
- Make build up with dual cured ***ProFil***™ ***Bulk*** Resin and light cure for 40 sec.
- Cavity carving for inlay.
- Impression taking with silicon by addition of antagonist.
- Inlay with ***ProFil***™ Resin for posteriors in various shades.
- Polishing.
- Mouth fitting and occlusal adjustment.
- Smoothing the surface to create the lowest roughness and a high surface polish.

Images of treatment procedure

Fig. 1: Isolation of the operating field, extraction of caries and passage of pumice stone with brush prior to the adhesive technique.

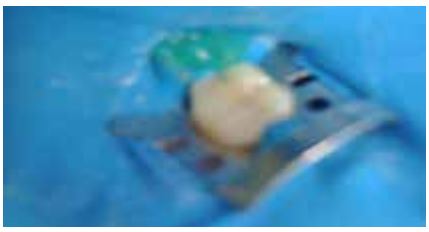


Fig. 2: Etching with Phosphoric acid 33% applied to the tooth for 30 seconds. followed by spray wash for 30 seconds and dry.

Fig. 3: Placement of ***ProLink***™ Adhesive in 2 layers; First layer on dentin and second layer on enamel. Light cure.

Fig. 4: Build up using ***ProFil***™ ***Bulk*** resin. Filling the entire cavity for future carving. Light cure for 40 sec.

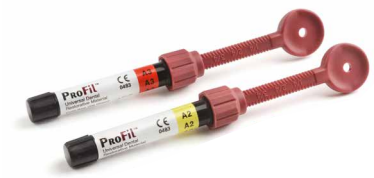
Fig. 5: Carving the cavity of later imprinting. Formation of inlay.

Fig. 6: Cementation of inlay, using ***ProFil***™ Composite and adhesive. Followed by curing. Finishing with polishing and occlusion adjustment.

Products used in the procedure

ProFil™ Bulk

Dual cure bulk fill composite.
- Designed for direct restorations.



ProFil™

Universal dental composite.
– Designed for simpler, more esthetic restorations.

ProLink™

Single step dental adhesive.
- Delivers outstanding shear bonding values to dentin, enamel & all popular composites.

Conclusions

Adhesive techniques allow the clinician to add to existing, residual tooth tissue and do not require creation of macro mechanical retention; this permits preservation rather than removal of hard tooth structure. Composite resin is frequently used for the direct restoration of both anterior and posterior root filled teeth, as well as being used as a core material, luting cement for posts and for indirect restorations also. Its use permits conservation of dentine and facilitates adhesive bonding to the radicular and root dentine.
The development of self-adhesive resins and bulk-fill materials has provided greater applicability to the restoration as well.

ProFil Bulk™ composite is recommended because of its high fracture resistance and ease of application. The bulk-fill technique is a good alternative treatment option to incremental filling, offering reduced restoration time. This material flows well onto the cavity floor and the cavity walls and optimally wet the interior line and point angles ofthe preparations. Bulk-fill composite materials allow a single layer thickness of 4-5 mm due to optimized depth of cure.
ProLink™ provides adequate retention for composite resins. In addition to withstanding mechanical forces, and particular shrinkage stress from the lining resin composite, it is able to prevent leakage along the restorations' margins.
ProFil™ composite offers the benefits superior physical properties, ability to polymerize on demand, availability in wide range of shades and good adhesion to the dental hard tissues.

The success and longevity of endodontically treated teeth rely on treatment quality and proper coronal restoration to maintain the tooth's function, form, and aesthetics.

> ***I have been using these products for about 10 years; where I have obtained excellent results in terms of durability, quality of finish, high success rate in resin inlays and maintaining an excellent price-quality ratio.***

Dr. Pablo .A.Calzolari DDS | Pergamino Argentina

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Restoration of Teeth Before Implantation and Prosthodontic Treatment A clinical case report using ProGlass™ Nine for treatment of deep dentin caries

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Introduction

Deep carious lesions cause pulpal inflammation, if not managed, they may result in pulp necrosis and involvement of the periradicular tissues. A selective caries removal strategy is recommended when treating deep caries in asymptomatic and symptomatic teeth. This technique requires the removal of all demineralized and bacteria-contaminated dentin in a manner that preserves hard tissue and retains teeth long term.
The tooth must be restored with a material that promotes a good seal, preventing bacterial growth from affecting the tooth that remains in the decayed tissue. GICs can provide a long-lasting seal through chemical adhesion that deprives the remaining bacteria of externally sourced nutrients.
The use of GICs is essential in this technique, because the demineralized dentine can be remineralized through an ion exchange process with the cement.
As GICs can be placed in proximity to the pulp without the risk of inducing inflammation, there is no need for the placement of any liner unless there is direct pulp exposure.

Case Study

History

Patient:
36 years old male.

Dental History:
Oral condition: An old restoration with poor marginal adaptation on distal and occlusal surfaces of tooth #15

Extra oral information:
Asympotomatic.
Patient came to our clinic for restoration of teeth before implantation and prostodontic treatment.

Treatment

Treatment plan:
Extraction of tooth #14 due to deep subgingival destruction.
Implantation and making metal ceramic crown.
Removal of old restoration of tooth #15.
Endodontic retreatment of tooth #16 and placement of metal ceramic crown.
This case study details restoration using GIC.

Treatment performed:

- Radiographs for provisional clinical diagnosis.
- After infiltration anesthesia with 0.5 ml of 4% Articaine solution, we cleaned tooth # 15 with brush and oil-free paste (Cleanic).
- Rubber dam was applied and the caries cavities were preparated by burs in speed-increasing handpiece.
- Sectional matrices, interproximal wedges and ring were applied.
- Cotton pad with 2% chlorhexidine solution was placed in the cavity for 1 minute.
- We placed BioMTA liner on the bottom of deep caries cavity.
- A capsule of GIC (***ProGlass™ Nine***) was mixed in RotoMix for 25 seconds and caries cavities were filled with it simultaneously.
- After 5 minutes we checked occlusion with Bausch articulation paper and made finishing and polishing of restoration using Sof-lex discs and silicone polishers.

Images of treatment procedure

Fig. 1: Pre Op, old restoration with poor marginal adaptation on distal and occlusal surfaces of tooth.

Fig. 2: Caries cavity in tooth prepared for restoration.

Fig. 3: Capsule of ***ProGlass™*** Nine in RotoMix.

Fig. 4: Filled caries cavity, restoration complete.

Products used in the procedure

ProGlass™ Nine

Packable glass ionomer cement.

- Condensable viscosity.
- Has high fluoride release which minimizes the need for undercuts.
- Excellent chemical bonding, no etching & excellent marginal seal.
- Premeasured capsule eliminates errors in powder/liquid ratio.
- Angled nozzle acts as syringe for direct placement into the cavity.

Conclusions

GICs play an important role in both preventive and restorative dentistry. They can be considered as a reservoir of fluoride in the mouth. GICs can be used as a therapeutic coating to protect tooth surfaces against caries and contribute to the preservation of tooth structure by aiding the remineralisation process and providing a long-term seal. The clinical importance is that GICs adhere chemically to enamel and dentine. The initially hydrophilic and acidic properties of GICs result in excellent marginal adaptation at the tooth–restoration interface. As a result of the ion-exchange layer, the GIC can exhibit antibacterial and bio-interactive properties when placed on carious dentine.

ProGlass™ Nine is recommended because of its strength, rigidity and fluoride dispensing properties of silicate particles along with the biocompatibility and adhesive properties of a polyacrylic acid. The cement's adhesion, based on an ion exchange mechanism with the dental tissue, is particularly advantageous.

The treatment principles of deep caries include stopping the caries process, promoting pulp defensive response and giving priority to the preservation of pulp.

> ***ProGlass Nine is very suitable for this kind of treatment because of minimal pulp irritation, good marginal seal and high wear resistance.***

Prof. Alexandr Butvilovsky & Kirill Kostyuchenko | Prof. Department of Endodontics & student dental faculty of BSMU

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Bulk fill Composite in Pediatric Dentistry
A clinical case report using ProFil™ Bulk in mesial and distal caries

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Introduction

Pediatric dentists encounter challenges related to patient compliance, limited working time and material handling. The restoration of primary teeth can be technically difficult, given that they are so much smaller than permanent teeth.
It is important to use esthetic restorative materials with adequate strength & durability and shorter chair time. Composites are ideal due to their optimal esthetics, fracture strength and wear resistance. Their incremental application is recommended to decrease polymerization shrinkage stress and achieve adequate mechanical properties.
However, it has shortcomings such as the possibility of void formation between increments, bond failure between increments, difficult application in small cavities with limited access and increased chair time due to incremental application and separate polymerization of each layer.
Bulk-fill composites overcome these limitations as they can be applied into the cavity as bulk with minimal polymerization shrinkage during curing. Bulk-fill composites do not need incremental application. Thus, they simplify the restorative procedure and decrease the duration of treatment.

Case Study

History

Patient:
8 years old girl.

Dental History:
Oral condition: This was a repeat visit. The patient has discolored enamel, cavities, and pain usually typical with dental caries. The caries were detected clinically by visual inspection and probing (tactile).
Following examination, we identified mesial caries and distal caries in the temporary tooth (63 and 64).

Extra oral information:
This clinical case presented a challenge in treatment method (sitting time) since the patient, due to her age, could not stay still for long in the dental chair. It was unlikely that the patient could tolerate a lengthy treatment.

Treatment

Treatment plan:
The treatment method selected was sealing with a bulk fill composite. Since sitting time was a crucial factor, the products selected for treatment were a Dual Cure fill composite (***ProFil™ Bulk***) with self etch adhesive (***ProLink™ SE***) and etch phosphoric acid. (***ProEtch™***).

Treatment performed:
Tooth preparation:
- A local anesthesia was given to numb the tooth and surrounding tissue.
- Isolation with a rubber dam and correct removal of caries.
- Acid etching (***ProEtch™***) of the enamel.
- Placing bands to avoid adhesion with the neighboring pieces.
- Use of a dentin adhesive (***ProLink™SE***).
- Application of bulk material (***Profil™ Bulk***) into the cavity, in order to overcome challenges such as void formation and contamination risk between the layers, as well as difficulty in the placement of layers in the small cavities.
- Occlusion check.
- Finishing & polishing using ***ProFil™ Finishing Kit*** high-speed fine diamond burs.
- Advice on a good tooth brushing routine, oral health & dietary recommendations.

Images of treatment procedure

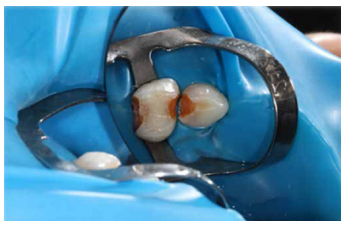

Fig. 1: Isolation with rubber dam (caries interproximal & interproximal on surface of tooth).

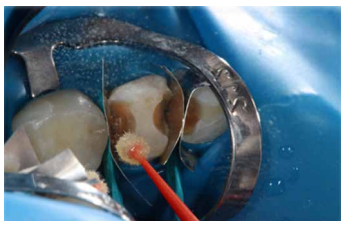

Fig. 2: Application or ***ProEtch™*** (37% phosphoric acid) & ***ProLink™ SE*** (dentin/enamel bonding agent).

Fig. 3: Restoration buildup with single layer of ***ProFil™ Bulk*** (bulk fill composite).

Fig. 4: Restoration complete, finish & polish with ***ProFil™ Finishing kit.***

Products used for procedure

ProFil™ Bulk

Dual cure bulk fill composite.

- Compatible with all methacrylate-based bonding agents.
- Superior compressive strength.

ProLink™ SE

Self etch adhesive.

- Super quick.
- Low film thickness.

ProEtch™

37% phosphoric acid.

- High viscosity.

ProFil™ Finishing kit

High speed fine diamond burs.

- Autoclavable.
- No need for disk, paste or polisher.

Conclusions

Materials ideal for this type of treatment in a pediatric patient require quality, esthetics and predictability. The ideal treatment proceeds as quickly as possible while providing results that will last as long as necessary to prevent further treatment. Successful restoration of primary teeth is dependent on accurate diagnosis, experience of the caries process, knowledge of dental materials and treatment choice.

The additional etching of enamel and/or dentin with ***ProEtch™*** reduces the amount of microleakage. We chose to use the self etch system since it is ideal for pediatric patients - fast, simple, and reliable. There is no "wash/dry" step. The treatment process is shorter so the working time is decreased.

The bonding procedure using ***ProLink™ SE*** is simple with relatively short clinical application time ideal in treating pediatric patients.

ProFil™ Bulk is a choice material for the restoration of primary teeth because of its ease of placement, adaptability, optimal mechanical properties and low polymerization shrinkage.

ProFil™ Finishing kit ensures restoration longevity. It is convenient to use and provides a natural looking smooth and contoured surface.

The surface finish of a restoration has implications on oral health, function and aesthetics Therefor it is critical for the long term success of the restoration. Surface roughness due to improper finishing and polishing of dental restorations can results in excessive plaque accumulation, gingival irritation, increased surface staining and poor esthetics of restored teeth.

> ***ProFil™ Bulk is ideal for pediatric dentistry since in just 1 application we can fill the entire cavity and polymerize 100% .***

Dr. Marta Giménez, DMD | Barcelona, Spain

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Coronary Microfiltration in Temporary Dentition Comparison of three GICs featuring ProGlass™ Nine

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Abstract

The microleakage is defined as the microscopic gap that is clinically undetectable in which fluids and bacteria pass between the restoration and cavity wall. In temporary dentition, the chosen material for the treatment of carious lesions is the high viscosity glass-ionomer, however, these are susceptible to show microfiltration.

The aim of this study is to compare the marginal coronary microleakage between glass ionomers: Ketac Molar (3M ESPE), Fuji IX (GC Corporation) and ***ProGlass™ Nine*** (SILMET) in temporary dentition under similar conditions controlled using scanning electron microscopy. The methodological design corresponds to a quasi-experimental in vitro study done in 45 temporary second molars, prepared and filling with three different glass ionomers. The samples were observed by scanning electron microscopy; and then analyzed with ImagenJ software to measure the gap dimensions in the biomaterial-substrate interface, finally, the results were analyzed in the software Stata/IC 13.0 using the T-Student test. Findings suggest that the mean value about microleakage dimensions was 252.000 ± 242.000 for Ketac Molar group, 245.000 ± 516.000 for Fuji IX group and 366.000 ± 269.000 for ***ProGlass™ Nine*** group, not showing statistically significant differences. In all, Glass ionomer cement that shows less frequency of microleakage is Ketac Molar, while Fuji IX show gaps of lesser dimension, nevertheless, for the objective purpose of this study it is possible to conclude, there are no statically significant differences between the groups analyzed.
Keywords: Microleakage, glass ionomer, primary teeth, scanning electron microscopy

Products Used

Fuji IX (GC Corp.)

ProGlass™ Nine (SILMET)

Ketac Molar (3M ESPE)

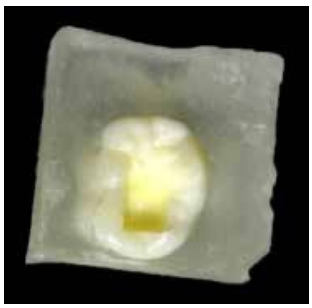
Conclusion

Although the handling of ionomers in in vitro studies is carried out in ideal conditions the results of the investigations show some degree of microfiltration. However, in clinical practice the use of them is hindered by several factors that can generate this phenomenon. So its use represents a certain level of complexity to which the professional must overcome, taking into account total knowledge about its indications, limitations and protocols to follow in order to be able to ensure the achievement of therapeutic success, always considering that even if the dentition be temporary, solutions must be permanent.

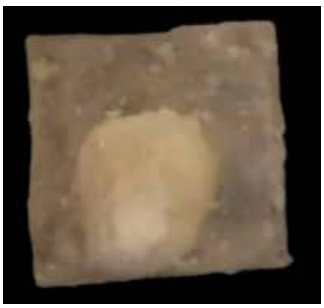
Photographs

Sample consisting of temporary second molars (n=45).

Piece placed in acrylic matrix.



Cavity conformation.

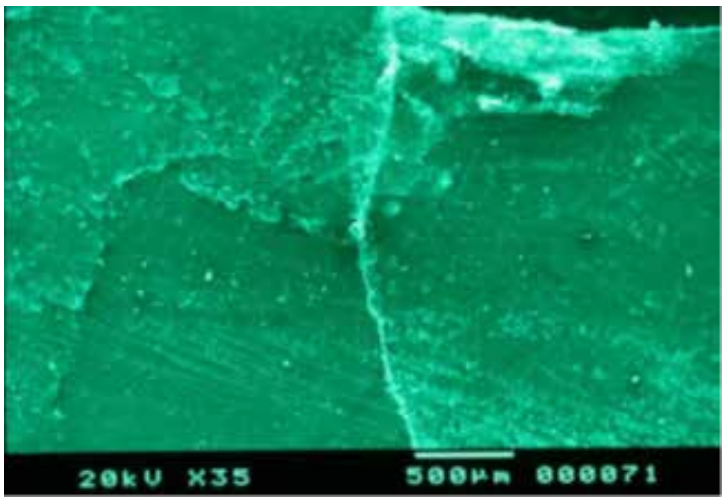


Restored piece.

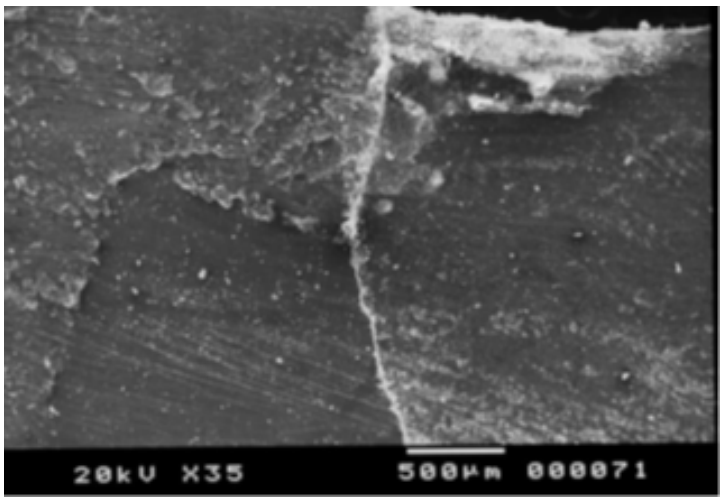
JEOL JFD Freeze Drying Chamber – 300.

Samples in drying process.

Metal coating chamber. (Magnetron Sputter Coater) JEOL JFC – 1200.



Unmodified microphotography.



Contrasted grayscale microphotography.

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How to Sandwich Glass Ionomer
A clinical case using ProBase™ as liner-base

Dr. Lev Nudelman

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Introduction

The so-called "sandwich" of glass ionomer, dental adhesive and composite resin was proposed as an effective technique for both anterior and posterior resin based restorations creating the optimal combination of desirable properties in a restoration. Two variations of this type of restoration exist: the open and closed sandwich. In a closed sandwich, the dentin is covered with a resin modified glass ionomer (RMGI) lining cement. The liner is completely covered with the restorative material. In the open sandwich technique, RMGI is used to replace the dentin and also to fill the cervical part of the box, which results in a substantial part of the glass ionomer cement being exposed to the oral environment.

The growing evidence that glass ionomers have a key role in maximizing the success of composite resins, especially in posterior stress bearing situations, has led to a resurgence of the sandwich technique for improving the service life of composite restorations.
The sandwich technique is the restoration of choice when proximal gingival margins extend beyond the cementoenamel junction.

Case Study

History

Patient:
Adult Female.

Dental History:
Oral condition: We noticed a resin sealant on tooth No. 34 (placed many years prior) that was breaking down.
There was also some staining and incipient decay present on the occlusal surfaces of tooth No. 33 and 35.

Extra oral information:
Patient came to our clinic for routine 6-month hygiene appointment.

Treatment

Treatment plan:
A closed sandwich technique was chosen because of the depth of the lesion and its proximity to the pulp providing a sound impermeable seal to isolate the deep affected dentin.

Treatment performed:
- Removal of the caries and preparation of the cavity.
- Placement of a polyacrylic acid (cavity conditioner) on the dentin tooth structure where the RMGI is to be applied.
- Rinsing away the Polyacrylic acid after 10 seconds.
- lightly drying the tooth.
- A single increment of ***ProBase***™ (RMGI) is placed over the dentin. The layer extends onto the interproximal cavosurface enamel and/or cementum margin.
- Polymerizaton using ***SecuraLight***™ LED light cure device.
- The entire RMGI cavity is then etched with ***ProEtch***™ 37% phosphoric acid in preparation for the composite resin restoration to improve micromechanical bond to composite.
- Application of a thin layer of ***ProLink***™ Adhesive.
- When the restoration retention area lies primarily within dentin, a second layer of ***ProLink***™ Adhesive is applied.
- The first increment of ***ProFil***™ composite resin is applied.
- The final occlusal increment is shaped into the correct occlusal form,using composite instruments.

Images of treatment procedure

Fig. 1: Placement of cavity conditioner on the enamel and dentin tooth structure.

Fig. 2: A single increment of ***ProBase™*** (RMGI) is placed over the dentin.

Fig. 3: After polymerization, the entire cavity is etched with ***ProEtch™*** 37% Phosphoric acid and a thin layer of ***ProLink™*** Adhesive is applied.

Fig. 4: The first increment of ***ProFil™*** Composite resin is placed.

Fig. 5: The final occlusal increment is shaped into the correct occlusal form using composite instruments.

Fig. 6: Completed RMGI sandwich restoration on the premolar.

Fig. 7: Completed restorations display the appropriate physiological contours.

Products used in procedure

ProBase™

Light cure, glass ionomer liner/base.

- for use under any kind of restorative material.
- Perfect choice for isolating and protecting dentin.
- Fluoride release.

ProLink™

Single step dental adhesive.

- Reduced polymerization shrinkage.
- Increased adhesion & durability.

SecuraLight™

LED light cure device.

- Ergonomically designed for user's comfort and flexibility.

ProEtch™

37% phosphoric acid.

- High viscosity.

ProFil™

Universal dental composite.

- Fast placement technique, easy to apply & sculpt.
- High strength & wear resistance.

Conclusions

Today, restorative dentistry emphasizes minimally invasive approaches to care. This encompasses prevention, remineralization, and when needed, adhesive restorations. These approaches lessen the chance for subsequent adverse outcomes, including the advancement of tooth decay, pulpal involvement, and tooth fracture. As dentists, our goal is to have the knowledge of various dental products to select the best material for any given scenario. Resin-modified glass ionomer restorations are ideally suited for use in the treatment of patients who are at high risk for caries.

> ***ProBase™ is the perfect liner/base solution to help protect dentin. It exhibits excellent mechanical and esthetic properties. Featuring strong adhesion to dentin and excellent mechanical properties.***

Dr. Lev Nudelman

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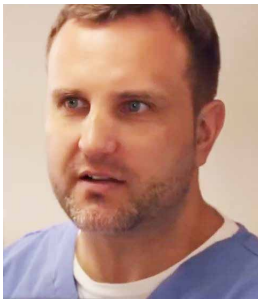
Core Build Up
A clinical case report using ProFil™ Bulk and ProLink™ Universal



Dr.Trevor Andrews

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Introduction

Core build up involves using a composite or build up material to rebuild the structural foundation of an extensively damaged or decayed tooth. The core build up fills in gaps left by gross amounts of decay or damage, providing a more stable base for a crown to be placed on top. Typically, before preparation and restoration with a crown, the existing defective restoration needs to be replaced or the missing tooth structure needs to be rebuilt so that the crown preparation can fulfill the retentive needs of the crown to be placed. The universal bonding provides a suitable bond to wet and dry dentin with reduced postoperative sensitivity and appropriate marginal integrity. The advantage of universal bonding agent is its compatibility with any etch method (total etch, self etch, selective etch).

The benefit of dual-cure resin materials is the ability to bulk fill the core build-up material and/or lute an opaque restoration while minimizing the risk of light attenuation that would disrupt the setting of the deepest portions of the resin material. The following objectives should be considered.

The primary purpose of a core build- up is to replace enough missing tooth structure to permit the creation of ideal retention and resistance form in the crown preparation. While many modern ceramics can be adequately bonded directly to the defective area, it is often advantageous to create an idealized crown preparation using a core material.

Case Study

History

Patient:
Adult male.
Does not consume alcohol.
Does not smoke.

Dental History:
Oral condition: The patient has no other active caries or periodontal disease. He brushes teeth with a manual toothbrush using Colgate Total with FL. He flosses and uses mouthwash.

Extra oral information:
Tooth #1 - Recurrent decay existing amalgam restoration, fractured distal marginal ridge.
Sympotomatic pain on chewing and thermal sensitivity.

Treatment

Treatment plan:
Crown with core build up.

Treatment performed:
- Radiographs for provisional clinical diagnosis.
- Tooth #1 Removal of existing amalgam filling and recurrent decay.
- Etch with Phosphoric acid , rinse and dry.
- Placement of ***ProLink™ Universal*** Adhesive.
- Air dry solvent.
- Light cure.
- Placement of core buildup using ***ProFil™ Bulk***.
- Light cure.
- Tooth prepped for full coverage zirconia crown.

Images of treatment procedure

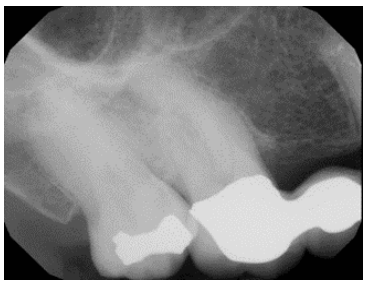

Fig. 1: Pre PA.

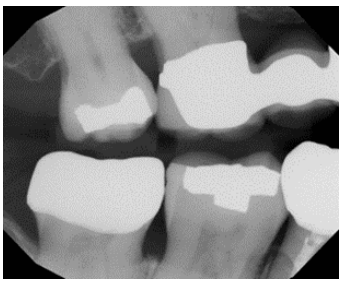

Fig. 2: Pre BW.

Fig. 3: Pre Op.

Fig. 4: Post Op.

Products used for procedure

ProFil™ Bulk

Dual cure bulk fill composite.

- High translucency which increases depth of polymerization.
- Short working time.

ProLink™ Universal

8th generation all in one universal bond.

- For direct & indirect restoratives in all cure modes and any etching techniques.

Conclusions

Teeth requiring a full crown are often severely damaged, with large structural loss. The low amount of remaining tooth tissue represents a major restorative challenge for the practitioner to ensure the best possible longevity of both the restoration and the tooth. The classical restorative strategy, consists of preparing a core build-up, with or without a root canal post, followed by the placement of a full crown. A core build up serves as the substructure for the crown, ensuring it is well-supported and retained over the years.

ProFil Bulk™ composite is recommended since its stackable consistency allows it to be placed without fear of flow away from the cavity margins, yet its viscosity permits easy adaptation to the preparation cavity walls, margins, and matrix band. ***ProFil™ Bulk*** combines both chemical and light-cure mode to enable the surface of restorations to be light-cured for polishing, while the full depth of the restoration will be chemically-cured over time.
ProLink™ Universal is a combination of self etch primer and bonding agent. This ensures simplification of the application procedure and reduced manipulation time. Clinically, this is the easiest method, and bond strengths is exceptionally high.

Dual cure materials have been recommended for core build ups as they allow to bulk fill the foundation restorations (cores) with adequate working and setting time, while reducing the effect of light attenuation on the depth of cure and hence the mechanical properties of the material.
The main advantage of bulk-fill composites is their translucency, which increases the depth of polymerization from 1–1.5 mm to 3–5 mm with a shorter working time.

When ***ProFil Bulk***™ is used together with ***ProLink***™ ***Universal*** it provides versatility and streamlines the core build up procedure.

> ***I'm using ProFil™ Bulk for buildups since I like the handling properties and strength. Regular core buildup tends to be too viscous and doesn't adapt or adhere well to the tooth, while regular flow is typically not dual cure and also is not viscous enough or have the compressive strength that the bulkfill flow has.***

Dr.Trevor Andrews DDS | USA

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Comparison of the Degree of Powder to Liquid Ratio Variation in Capsulated GICs Featuring ProGlass™ Nine

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N. Noordien (BChD, PDD)

The aim of this study was to assess the accuracy of the capsulated glass ionomer materials received from the dental material manufacturers. This was achieved by the comparison of the liquid to powder content as well as the variation of liquid to powder ratio of three capsulated glass ionomer restorative cements.
Abbreviations and acronyms: GICs: Glass ionomer cements, Chemfil Rock: CR, ProGlass Nine: PGN, Ketac Molar Aplicap: KMA, standard deviation (SD).

Introduction

The liquid to powder ratio that clinicians maintain for GICs are pivotal to the strength and longevity of dental restorations.
The favorable properties include the bond strength to moist tooth structure, thermal compatibility and the anti-cariogenic properties due to a release of fluoride. GICs can be technique sensitive and some key disadvantages may include low early strength and moisture sensitivity during setting. The setting process of conventional GICs are characterized by an acid base reaction between the liquid and the powder. Therefore, the liquid/powder ratios play an important role.
Initially GICs were hand mixed and articles related to the clinical manipulation by clinicians based on powder variation have been well documented. Clinicians often mix GICs to a lower powder to liquid ratio than the manufacturers recommendation. This has an affect not only on the physical properties of the material but also alter the setting time. This leads to a weaker material. A decrease in powder liquid ratio may hinder the physical properties of the material and acid erosion of the restoration is more likely to occur. This is a problem considering that the higher caries risk patient is especially indicated for a GIC. The material manufacturers launched the GICs in a pre-packed capsulated form in an attempt to maintain the physical properties and decrease operator variation in mixing the GICs.

Materials & methods

The liquid and the powder in the GIC capsules were assessed and compared to the corresponding samples from the same manufacturer. This was done to assess the accuracy and variability of the liquid and powder as received from the material manufacturer. Three GIC materials used regularly in the dental faculty were assessed. Chemfil Rock (DeTrey, Dentsply, Konstanz, Germany, Lot: 1310002003, 2016/08), ProGlass Nine (Silmet, Or-Yehuda, Israel, Lot:1791022-A3, 2015/0400), Ketac Molar Aplicap (3M ESPE, Minnesota, USA, Lot: 472606-A3, 2014/09).

Specimen preparation: There were three test groups of GICs materials selected for powder/liquid determination for the GIC material capsules (Fig. 1). Fifteen samples were prepared for each of the three materials tested under standardized laboratory conditions.
A single operator performed the weight determination of the liquid, followed by the powder weight determination at a constant room temperature (23±1°C) with a relative humidity of 50±5%. The powder and the liquid were weighed on a desktop chemical scale (Ohaus Precision Standard, Model TS400D, Ohaus Corp, Florham Park, N.J, USA). Three identical pieces of filter paper 10mm wide and 10mm long (70mm circle filter paper, Schleichter & Schüll, Germany, Lot:311608) of a known weight was used to absorb all the liquid from the liquid holding chamber.

Fig. 1: Chemfil Rock GIC capsule.

Fig 2: ProGlass Nine GIC capsule.

Fig 3: Ketac Molar GIC capsule.

Results

KMA had the lowest average liquid (0.085g) and powder (0.288g) content with the results of the 15 KMA capsules closely grouped together. A statistical difference (P<0.001) was noted between the mean values of the liquids (CR, PGN, KMA), although the individual values had a wide spread. The powder variation was very small based on the spread. A statistical difference exists (P<0.0001) between the means of the recorded powder weights of CR (0.45g), PGN (0.37g) and KMA (0.29g).

Figures & tables

Material	Powder		Liquid	
	Mean	SD	Mean	SD
CR	0.4548	0.017	0.1145	0.0291
PGN	0.3695	0.0146	0.0928	0.0254
KMA	0.2885	0.0078	0.0852	0.0011
p-value	<0.0001	0.0227	0.0002	<0.0001

Table 1: Mean & standard deviation values of the liquid and powder of the three GICs.

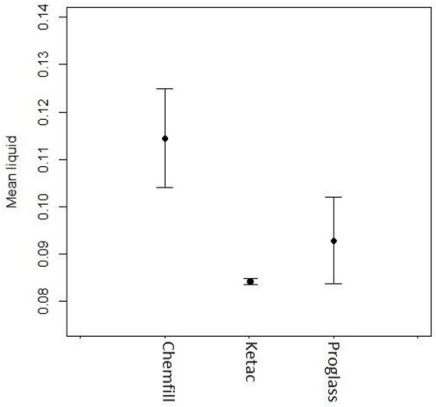

Fig. 2: Mean value of the liquid for the three GICs materials.

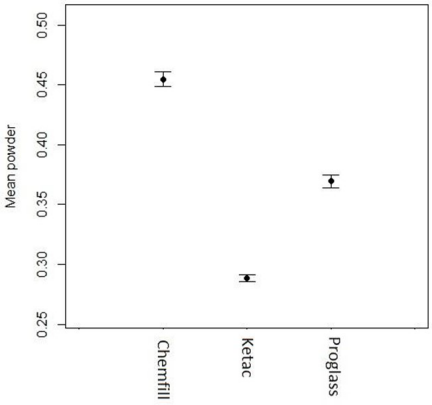

Fig 3: Mean value of the powder for the three GICs.

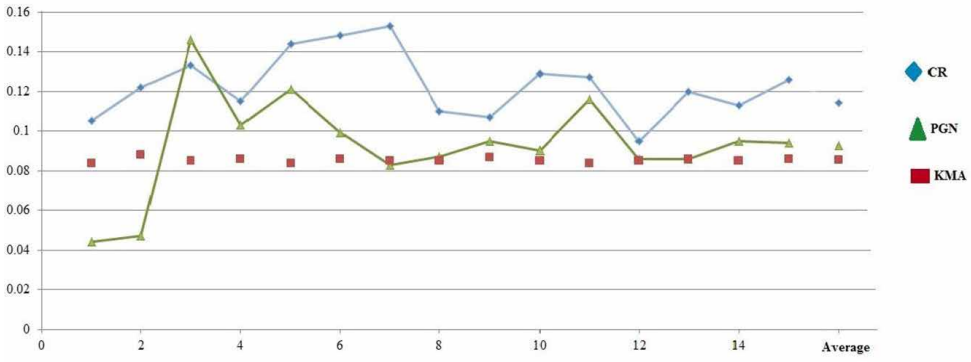

Fig. 4: Scatter diagram of the 15 individual liquid weights.

Discussion

It is imperative that the correct liquid powder relationship is maintained for GIC materials since the material has to resist the stresses that occur in posterior teeth. These stresses are countered by the material's compressive strength and the elastic modulus. The decrease in the volume of the liquid phase could have various reactive possibilities with the powder and therefore alter the compressive strength and the elastic modulus. In the first instance the acid component could be normal and the water content decreased. Secondly the water content could be normal and the acid content decreased. Thirdly a combination of acid and/or water concentrations could vary.
When the clinician mixes the GI capsules in the amalgamator at the appropriate speed the first stage of the setting reaction starts. The first stage of the liquid powder mixing is the water and polycarboxcylic acid that hydrate the glass particle as well as the polycarboxcylic acid crystals in the powder. Under ideal circumstances there is an exchange of protons from the glass filler particle causing the release of the cations (Zn2+, Ca2+, Al3+, Sr2+). While these cations are released from the glass particle the water in the liquid cause the polycarboxcylic acid in the liquid and powder phase to neutralize and form a COOH- molecule. The initial cations (Zn2+, Ca2+, Al3+, Sr2+) that were released from the glass particle will cross link ionically to the COOH- resulting in the "salt bridge" formation.

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