Vitique – the resin cement of choice in modern day dentistry

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Introduction

The practice of fixed prosthodontics has changed significantly with the introduction of modern techniques and materials. Adhesive resin systems are examples of these changes that have led to the popularity of bonded ceramics and resin-retained fixed partial dentures. With the increasing demand for high-end esthetic treatments for anterior teeth restorations, the need for a good esthetic cementation system comes in play in modern day dentistry. Today's dentist has the choice of resin cements or a water-based luting agent (eg. Zinc phosphate, zinc polycarboxylate, or glass ionomer) for each clinical situation.
Resin cements have become popular, primarily because they have addressed the disadvantages of solubility, lack of adhesion, compressive strength and microleakage in some classes of luting agents. Table 1 summarizes three material classes and some of their properties.

Table 1: Comparison of three luting agents

Property	Zinc Phosphate	Glass Ionomer	Adhesive Resin
Film thickness (μm)	<25	<25	>25
Working time (min)	1.5-5	2-3.5	0.5-5
Setting time (min)	5-14	6-9	1-1.5
Compressive strength (MPa)	62-101	122-162	179-255
Elastic modulus (GPa)	13.2	11.2	4.5-9.8
Pulp irritation	Moderate	High	High
Solubility	High	Low	Very low
Microleakage	High	Low to very high	Very low
Removal of excess	Easy	Medium	Difficult
Retention	Moderate	Moderate-to-high	High

Modified from Rosenstiel SF et al. Contemporary fixed prosthodontics. 2nd ed. St Louis: Mosby

Vitique, the dental industry's premier esthetic cementation system, comes with unparalled colour command system. It is a new, highly esthetic radiopaque luting cement based on composite that can be used either light or dual cure, thanks to its DMG-patented application system.

Composition

Vitique is a barium glass in a Bis-GMA based matrix of dental resins with additives, catalysts and pigments. The catalyst paste contains benzoyl peroxide. The filler volume is 67% by weight = 46% by volume (0.02-4 µm).

The try-in paste contains silica gel and matched pigments in water-soluble polyglycol matrix. It presents as a yellowish viscous liquid with a weak ester-like smell.

Ideal Properties

Biologic properties

The biocompatibility of resin cement is related to its degree of conversion and complaints of sensitivity may be due to incomplete polymerization of the resin cement.[1,2]

It has been found that polymerization of light-activated composite luting agents cannot be accomplished predictably through a pre-processed resin restoration exceeding 2mm in thickness with light exposure of 90 seconds or less, [3] so a self- or dual-cure product should be chosen for adhesively cemented inlays.

In the dual cure version of Vitique, the Cata-lock syringe containing the catalyst paste is clipped onto the base syringe and is affixed with the appropriate mixing tip. This allows automatic mixing of the cement to an optimum quality. The advantage is that it reduces the risk of post-operative sensitivity after cementation. The Smartmix-Tip also allows convenient direct application of the material to the tooth surface.

There have been no systemic side-effects to date from Vitique. In singular cases, hypersensitivity to components of the material cannot be excluded.

Microleakage

Microleakage of organisms around dental restorations has been implicated in adverse pulpal response and hence reduced restoration longevity.[4] Vitique, being an adhesive resin system, has reduced microleakage in in vitro[5] and also in vivo[6] testing, whereas nonadhesive resins have increased microleakage compared with traditional cements[7].

Mechanical properties

With respect to properties like flexural strength, diametral tensile strength, modulus of elasticity, fracture toughness and hardness testing, Vitique, being a filled resin luting agent, has a compressive strength >230MPa, generally exhibits higher values in comparison to traditional and unfilled resin cement.

Some luting agents are markedly affected by change in temperature. This may be of clinical significance as laboratory testing is generally conducted at room temperature (23°C), whereas the materials are required to function at 37°C. Vitique's decomposition temperature is at >60°C.

The effect of luting agents on casting retention has been assessed with in vitro studies. Adhesive resins such as Panavia (J. Morita USA Inc., Tustin, Calif.) have shown increased retention when compared with zinc phosphate, glass ionomer, or conventional resin cements.[8] Vitique, being a resin cement, also has the same qualities.

Adhesive resin luting agents have the potential to improve the performance of post and core restorations and laboratory studies have shown improved retention. However, different products have been found to give different retention values.

All- ceramic restorations have become increasingly popular because of their outstanding esthetics and the availability of higher strength materials. Resin-bonding, provides much better retention than conventional cements, [9] and also appears to provide strengthening.

Esthetic properties

The esthetic properties of Vitique resin cement are of considerable significance with the increasing use of translucent ceramic restorations, especially for anterior restorations. This is where Vitique has an edge over other resin cement systems.

Colour stability

Vitique's eight try-in and permanent cement shades are perfectly matched. So the shade the practitioner sees with the try-in is exactly what he/she sees in the permanent restoration. Vitique's try-in paste in catalyst shade also gives the exact simulation of shade change.

Radiopacity

Vitique is radiopaque which enables the practitioner to distinguish between a cement line and recurrent caries, as well as detect cement overhangs.[10]

Working properties

Film thickness, viscosity.

The film thickness of the luting agent can directly affect long term clinical success. Generally, resin cement has higher viscosity (>25 µm) compared to zinc phosphate and glass ionomer (<25 µm). As film thikkness increases, the tensile bond strength of cements decreases. Vitique has a film thickness of ≤19 µm, thus having an upper edge over other resin cements.

Versatility

Vitique can be used either in light cure or dual cure mode for each given clinical situation. Its working time of > 2min in dual cure allows easy manipulation by the practitioner during cementation and final setting of 40s ecs allows fast removal of excess cement during cementation.

Conclusion

Vitique is especially useful because of its versatility, ease of use and accuracy. Its 8 shades variability allows flexible selection for different clinical situations. With that, the practitioner has the ability to control the predictability of the esthetic results using Vitique try-in paste. Thus high quality esthetic treatments can be consistently achieved.

Vitique is versatile because it can be used as either light or dual cure for each given clinical situation. By having two different catalyst consistencies (high or low viscosity), Vitique gives the operator the advantage of flexibility during cementation.

During cementation of veneers, Vitique has a special veneer-tip for direct application when light-cured only. For dual cure, Vitique has the Cata-lock syringe which is easy to assemble and allows automatic mixing and direct application. All these give the operator the

advantage of easy usage over other cementation systems.
Vitique is also calibrated to Contax (DMG) which provides excellent adhesion without etching.
The most important advantage of Vitique resin cement over other systems is its accuracy. Its exact match of cement and try-in gives a reliable preview for the practitioner. Also, its special try-in paste in the shade of the catalyst gives an exact simulation of shade change. Last but not least, being radiopaque, Vitique gives a good X-ray visibility. Vitique is the resin cement of choice for today's esthetic dentistry.

REFERENCES

1. Caughman WF, Caughman GB, Dominy WT, Schuster GS. Glass ionomer and composite resin cements: effects on oral cells. J Prosthet Dent 1990;63:513-21.
2. Darr AH, Jacobsen PH. Conbersion of dual cure luting cements. J Oral Rehabil 1995;22:43-7.
3. Breeding LC, Dixon DL, Caughman WF. The curing potential of light activated composite resin luting agents. J Prosthet Dent 1991;65:512-8.
4. Bergenholtz G, Cox CF, Loesche WJ, Syed SA. Bacterial leakage around dental restorations: its effect on the dental pulp. J Oral Pathol 1982;11:439-50.
5. White SN, Furuichi R, Kyomen SM. Microleakage through dentin after crown cementation. J Endod 1995;21:9-12.
6. White SN, Yu Z, Tom JF, SangsurasakS. In vivo microleakage of luting cements for cast crowns. J Prosthet Dent 1994;71:333-8.
7. Mash LK, Beninger CK, Bullard JT, Staffanou RS. Leakage of various types of luting agents. J Prosthet Dent 1991;66:763-6.
8. Ayad MF, Rosenstiel SF, Salama M. Influence of tooth surface hardness and type of cement on retention of complete crowns. J Prosthet Dent 1997;77:116-21.
9. Michelini FS, Belser UC, Scherrer SS, De Rijk WG. Tensile bond strength of gold and porcelain inlays to extracted teeth using three cements. Int J Prosthod 1995;8:324-31
10. Goshima T, Goshima Y. Radiographic detection of recurrent carious lesions associated with composite restorations. Oral Surg 1990;70:236-9.

Case History

A 30 year old male presented with an old PFM crown #21. Tooth was prior root canal treated. He requested for change because of poor anterior esthetics. (Fig 1)
PFM crown #21 removed. Tooth preparation done and to be restored with Cerec Procad (Sirona) ceramic crown. (Fig 2)
Trial cement selection using Vitique try-in paste to confirm anterior esthetics for crown #21. (Fig 3)
Tooth surface treated with Contax Primer and Bond (DMG) prior to cementation. (Fig 4)
Final shade selection using Vitique (Wei,) for cementation. (Fig 5)
Crown margins polished and occlusion checked. Patient pleased with anterior esthetics. (Fig 6)


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