New materials for a classic indication
Characteristics of all-ceramic restorations using Variolink Esthetic

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Metal-based single crowns are normally sealed using a zinc phosphate cement. Ceramic materials have led to a change in the luting material being used for this indication. Zinc phosphate cements are seen as classic luting materials for the cementation of metal-ceramic crowns. Along with all-ceramic materials, glass-ionomer cements (GIC) and resin-modified glass-ionomer cements (RMGIC) were introduced. Generally, luting cements are expected to meet certain requirements. They should provide an optimum bond to the tooth structure and restoration material. They must not be soluble in water. They should be suitable for application in thin coatings and they should offer long-term stability. This is in contrast to the properties of classic cements, which are water soluble and do not establish an adhesive bond to the enamel or dentin (zinc phosphate cements) or establish only a minimally adhesive bond and only to the dentin (GICs and RMGICs). Nonetheless, these cements show reasonable survival rates if used for the appropriate indication even if they involve certain limitations.

Problem I: opacity
The opacity of the luting material is a critical issue in all-ceramic crowns as well as ceramic inlays and onlays. Almost any colour can theoretically be reproduced with ceramics by exploiting their natural translucent properties. Using an opaque luting material appears to be counterproductive in achieving this. Further critical issues are the limitations involved in the anterior region and the location of the cement line in the visible area in inlays and onlays. For instance, if a tooth is restored with a veneer, the basic shade of the tooth is maintained. Only the enamel is replaced, usually by using a translucent ceramic; that covers the natural dentin. In such a case, it is essential to use a translucent luting material to achieve a favourable result.

Problem II: adhesion
The comparatively low bond strength of conventional cements is also problematic. Classic preparations around the teeth create a high degree of friction and retention. However, the retention is significantly reduced in partial crowns, veneers or onlays. It is therefore advisable to use a luting material that is capable of providing a strong adhesive bond. Both problems led to the widespread use of composite luting materials. Perhaps their only disadvantage is the removal of excess material. These luting materials are not water-soluble, hard and solid and they have a high adhesive strength, which makes excess removal difficult. Early luting composites were equipped with a self-cure mechanism. Users had to wait a few minutes until the composite was almost fully set before they could remove the excess material. This period of time was risky because of the moisture in the mouth. Blood or saliva could come into contact with the non-polymerized composite and cause damage.

Dual-curing luting composites
These issues led to the rise of dual-curing composites for the cementation of all-ceramic crowns. Dual-curing luting composites are usually delivered in double-push syringes with a mixing tip. During extrusion, the base and catalyst are automatically mixed. The material can be applied directly. The main advantage is that the curing process can be accelerated with light and excess material can be easily removed. At the same time, the self-cure mechanism ensures a reliable cure, even with relatively thick or opaque ceramic layers. Nonetheless, there are some situations in which excess material cannot be removed at all easily because the setting reaction takes place too quickly or the material does not cure down to the depth of the composite layer. After one second of light curing, the surface is set and excess can be broken off, but the material is still paste-like at the interface to the crown or tooth. The state of the art luting composites such as Variolink Esthetic contain the newly developed initiator Ivocerin photoinitiator. This photoinitiator needs fewer photons to initiate the setting reaction. Excess can be polymerized en bloc and pulled off as a “ring” in one go with no uncured material left in touch with the tooth or crown (see Fig. 9). In addition, the luting composite does not contain amine, which is another advantage. Amine may be implicated in a potential discolouration of the cement line over time.

One material—five shades
Variolink Esthetic is based on the Veneer Shade concept. The shades are classified according to the effect to be achieved with the cement. Five shades are available: Lights, Light, Neutral, Warm and Warm+. In this way, the shade spectrum ranges from an opaque white tone (Light+) to an opaque yellow brownish shade (Warm+). In between lie shades such as a coconut water white and a neutral tone (very translucent) and a warm tone (comparable to A3). In addition, the luting composite is available in an LC (light-curing) and a DC (dual-curing) version. The LC version is designed for relatively thin restorations such as inlays, onlays and veneers. The DC version is suitable for more extensive and opaque restorations. The luting composite is used in conjunction with the light-curing single-component يتم ملاحظة أن المادة المذكورة في البداية كمادة لثبات الأسنان تتميز بمقاومة للماء. كما أنها ملائمة للاستخدام على الأسطح العريضة. ومع ذلك، يمكن رفع الامكانيات عند استخدام المواد المذكورة. وفيما يتعلق بال oranmentation of metal-ceramic crowns. Today, the material is stained and glazed (Fig. 4). In addition, the luting composite is suitable for relatively thin restorations such as inlays, onlays and veneers. The DC version is available in an LC (light-curing) and a DC (dual-curing) version. The DC version is designed for relatively thin restorations such as inlays, onlays and veneers. The DC version is suitable for more extensive and opaque restorations. The luting composite is used in conjunction with the light-curing single-component تطبيق مادة ثابتة للأسنان، والتي يتم استخدامها على السطح الشiras بشكل مناسب. ومع ذلك، يمكن رفع الامكانيات عند استخدام المواد المذكورة. وفيما يتعلق بال oranmentation of metal-ceramic crowns. Today, the material is stained and glazed (Fig. 4). In addition, the luting composite is suitable for relatively thin restorations such as inlays, onlays and veneers. The DC version is available in an LC (light-curing) and a DC (dual-curing) version. The DC version is designed for relatively thin restorations such as inlays, onlays and veneers. The DC version is suitable for more extensive and opaque restorations. The luting composite is used in conjunction with the light-curing single-component
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Conclusion
The cementation methods used in conjunction with all-ceramic materials have changed for single-crown restorations. Variolink Esthetic is a protagonist of the latest generation of luting composites. Excellent bond strength values coupled with user-friendly handling characteristics and highly esthetic properties make this material an asset in day-to-day dental restorative care.

Fig. 13a and b: X-ray control image before and after the treatment

Fig. 12a and b: Lateral and occlusal view of the completed restoration

VladMiVa—success comes with persistence

By VladMiVa
VladMiVa, a large Russian holding company that unites a number of Belgorod-based companies and is invested in the development and manufacturing of materials, tools and equipment for dentistry, cele-

Prof. Chuev, tell us the story of how your enterprise began?
Prof. Chuev: The critical moment when people are “on the edge” is often a decisive moment. Someone drops his hands and someone starts to act despite of their fears, difficulties and an uncertain future. In 1993, the state funding for the laboratory that I directed was stopped, but our developments were of an applied nature, so we could try to find use for them. I decided to create a commercial enterprise, invested my own savings in it and convinced almost all my colleagues to stay and work with me. Our first development was very successful. In the same year, 1993, we received a silver medal from the USSR Exhibition of Achievements of the National Economy for the technology we developed to manufacture amalgam fillings. The next important step was the development of a technology for the production of dental cements for the Voronezh-based enterprise, Raduga-R. Our first success inspired our small team.

VladMiVa consists of a group of companies. What kind of companies are they and which idea unites them?
We very quickly realised that focus-

How about your employees today? How do you solve their social problems?
Today, our companies employ a total
of 400 people of different professions. Of course, like any other company, we experience a shortage of skilled employees, such as technologists, but this does not diminish the quality of our work. We value each of our employees. Even in the most difficult times of crisis, we do not delay the payment of wages. We also never refuse payments on sick leave or on paid leave. We have developed a corporate program of material assistance to employees who are in difficult socio-economic situations. All our employees also receive dental care on preferential terms. We have also built a new plant with a work environment that meets all the modern requirements of labour protection.

For 25 years, we have formed corporate traditions, such as joint holidays and excursions where the families of our employees participate and we can enjoy children's performances and competitions. We try to create a comfortable environment for all our people. We have built a chapel, planted flowers and always aim to provide good production and living conditions. We respect our veterans. We also love our city Belgorod and participate in its development.

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In 2011, our production received a Certificate of Compliance with the requirements of International Standards (ISO9001:2008). Later, we obtained the right to label our products with the mark of European conformity (CE), which means compliance with EU standards. In 2014, JSC «VLADMIVA» became one of the first 25 enterprises that have the right to label their products as “Russian nanotechnological products”, which is a confirmation of the high quality of our products.

Out of our three hundred products, more than 190 are in demand on the foreign market. In Russia, we have to overcome the phenomenon of “Westernism” in dentistry and persuade consumers through systematic participation in exhibitions, conferences and seminars that “Made in Russia” means quality.

We are always pleased to offer to Russian dentists a large selection of dental materials, including prophylactic, restorative or treating materials, as well as materials for paediatric dentistry, biomaterials for the regeneration of bone tissue and various tools, of excellent quality, at a reasonable price.