User report

Multifunctional curing light: for a smart workflow in filling therapy

Composite fillings are part of the daily routine in almost every general dental office. The right materials and equipment are very important for achieving the best clinical results. In addition to the composite materials, a powerful curing light is needed. Dr. Alessandro Devigus from Bülach, Switzerland had the opportunity to test the new SmartLite® Pro from Dentsply Sirona extensively in his practice. Its special feature: the curing light is multifunctional and can be used with a second attachment for caries detection. He uses a case to describe his experience.

In my practice in Bülach where I have been working for 30 years, I specialize in digital and esthetic dentistry. This means composite fillings are one of my standard treatments. Fewer patients come to the practice with large defects today than before – they take good care of their teeth and have small lesions treated promptly with minimally invasive methods.

The treatment that is used depends mainly on the size of the defect. The priority is to preserve as much tooth structure as possible. This means that primary treatment is generally with an adhesive composite and secondary treatment with ceramic restorations (inlays, partial crowns).

In my practice, I use a universal composite for anterior and posterior teeth; one-shade concepts have proven valuable because I have a small selection of basic colors with which I can achieve different shades thanks to the chameleon effect. I also use these composites for the adhesive cementation of ceramic restorations – it requires some effort, but the clinical results are perfect.

Polymerization is crucial for success

When using filling materials, it is essential to use a curing-light. Light polymerization is actually one of the key factors for the quality of direct and indirect restorations, as studies have shown [1, 2]. A committee of experts addressed this topic six years ago and presented their results in a consensus statement that includes basic recommendations for the purchase and use of a curing light [3]. The experts noted five main criteria: quality testing of the units by independent institutions, light intensity, beam profile and active curing diameter as key parameters, as well as optimal curing times.

The curing time is indeed a very important factor. When curing light manufacturers speak of a five second curing time, I am skeptical, because cycles from 10 to 20 seconds are typical in dentistry. For some materials, however, up to 40 seconds are needed [2]. The exact time ultimately depends on the composite used and the size and depth of the surface to be cured. This makes it all the more important that the lights are flexible in this respect.

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Trend to multifunctionality

In my view, the differences between curing lights are not so big anymore, but there is a new trend – more and more frequently, curing lights can do more than just curing. One example of this is the SmartLite® Pro from Dentsply Sirona that can be purchased with an additional probe for caries detection. This is a very useful feature, especially in filling therapy being in general a caries treatment and complements X-ray findings. The technology of transillumination that it uses can be a supplementary diagnostic aid for diagnosing approximal and occlusal caries, detecting dental calculus, assessing discolored edges of composite fillings, and assessing fractured teeth [4].

I have both of the SmartLite® Pro attachments in my practice for testing. The first thing you notice is the attractive design. The curing light is comfortable to hold and it is very easy to change the probes. Its light intensity of 1,250 mW/cm^2 is in the middle range of the required 1,000 to 1,500 mW/cm^2 intensity. It is crucial that the curing light has a very homogeneous beam profile so light is applied evenly to all areas. This ensures the intensity reaches not only the center of application, but the entire area to be cured. Users receive two batteries with the curing light that can be charged separately in the charging station. The technology used enables fast charging times and high capacity. One new feature is the radiometer, a photocell, that is built into the charging base and is used for monitoring performance. Colored LEDs let users know the curing light has sufficient irradiance. The SmartLite® Pro has curing cycles of 10 seconds. This is certainly sufficient for routine work – somewhat more flexibility would be a bonus in my workflow.

The following case describes routine treatment with SmartLite® Pro.

Case history

A patient (female, 32 years old) came to my practice with insufficient fillings at teeth 24, 25, and 26 (Fig. 1). The X-ray image showed there were already abnormalities under the fillings (Fig. 2). Using the caries detection transillumination probe of the SmartLite® Pro, I was able to visualize the situation well. The shading also clearly showed caries developed under the filling of tooth 24 (Fig. 3). In the session described below, teeth 24 and 26 were treated. Both teeth were prepared with a diamond bur to completely remove the caries (Fig. 4). I then used the powder jet to thoroughly clean the cavities (Fig. 5a and 5b).

Before putting in the fillings, sectional contoured matrices with flexible interdental wedges were placed. I used the wedges to adapt the matrices to the tooth (Fig. 6). This was followed by etching with phosphoric acid (37%) for around 15 seconds (Fig. 7) and the application of an adhesive (Fig. 8). For curing, I then used the curing attachment of the SmartLite® Pro for the first time (Fig. 9).

Following this, a light-curing, radiopaque universal composite was applied and sculpted (Fig. 10); every layer was cured for 10 seconds (Fig. 11). I removed the approximal excess with a fine Sof-Lex™ Disk (3M) (Fig. 12) and adapted the occlusal contacts with a small diamond bur. I also recontoured the filling at this point to give it a very natural shape (Fig. 13). After polishing, the outcome was highly esthetic (Fig. 14a and 14b).

Conclusion

The SmartLite® Pro is a modern curing light that optimally meets the requirements for state-of-the-art filling treatment. The special feature is that the entire tooth is covered by the LED lights. I use the curing light for filling treatment and for the adhesive cementation of ceramic restorations. The optimal caries detection probe proves to be very efficient – a separate device is no longer needed. The modular concept whose beginnings we see here is set to be the standard of the future and new developments will be exciting.

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IMAGES

Fig. 1: Initial situation with insufficient fillings at teeth 24, 25, and 26.

Fig. 2: X-ray imaging of the initial situation.

Fig. 3: The tip of the caries detection attachment illuminates the interdental spaces for easy visualization of the insufficient fillings and the caries below.

Fig. 4: After preparation of teeth 24 and 26.

Fig. 5a: Cleaning the cavities with the powder jet.

Fig. 5b: Cleaned cavities.

Fig. 6: Interdental wedges and sectional contoured matrices: wedges for adapting the matrices.

Fig. 7: Etching with phosphoric acid 37% for 10-15 seconds.

Fig. 8: Application of the adhesive system.

Fig. 9: Curing the adhesive using the SmartLite® Pro curing light.

Fig. 10: Application of the composite.

Fig. 11: Curing with the SmartLite® Pro.

Fig. 12: Removal of the approximal excess with a Sof-Lex™ Disk.

Fig. 13: Recontouring the surfaces.

Fig. 14a: Outcome after polishing.

Fig. 14b: The final result.