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How to successfully model posterior composites using the right instruments

Composite restorations in posterior teeth have become the first choice for medium and small cavities. The success of these restorations resides upon the layering technique, not only because of the superior aesthetics that can be achieved, but also because shrinkage of composite resins can be compensated for by doing so.

In the following description of a clinical case, the authors give advice on how the use of the right materials and techniques will enable high-quality results in daily work, both aesthetically and clinically. The article particularly emphasizes the importance of using the right kinds of instruments at different stages of the procedure, as the quality of the work and chair-time can be greatly affected by the correct choice of instruments. With this in mind, a set of innovative instruments for aesthetic layering, LM-Arte instruments from Style Italiano, has been developed in cooperation with the Finnish instrument manufacturer LM-Instruments.

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Style Italiano is a group of Italian and Spanish dentists specialized in aesthetic dentistry. Group members give lectures around the world on aesthetic dentistry and the composite layering technique.

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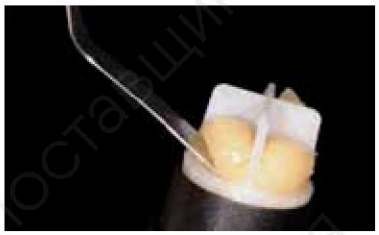
Clinical case



1. Clinical presentation of the initial case, a fracture in the distal area and an old restoration are evident.



2. Rubber dam placement with the aid of the "Applica" instrument. The cavity was prepared afterwards.



3. The composite can be taken out of the syringe delicately and in very small increments.

A young male patient came to the practice with a fractured composite in the distal cusp of the first left molar. An old composite restoration was evident and some decay was found in the gingival marginal area (picture 1).

In addition, an examination revealed gingivitis and plaque in this area probably due to food impaction in the fractured zone. The decision to restore was taken immediately after examination.

A rubber dam seal is necessary to ensure optimal bonding. The isolation was carried out carefully, especially at the gingival margin. A thin spatula (LM-Arte Applica) was used to push the rubber dam gently into the gingival sulcus, the area to be treated was rinsed with plenty of water, and then thoroughly dried to detect any leakage. The cavity was prepared under complete isolation, and all the caries removed from the distal and mesial walls (picture 2).

The cavity was carefully cleaned before applying the bonding agent. The enamel was etched for 15 seconds, the bonding agent applied for 20 seconds, and then the excess blown off. The bonding agent was light cured for 60 seconds. The fine head of the Fissura instrument (LM-Arte Fissura), which is so flexible that it does not damage the bonding layer during use, is ideal for detecting the complete polymerization of the bonding layer. The Fissura instrument was also used to apply flowable composite to the floor of the cavity; its fine tip allows precise placement of the flowable composite.

A circular matrix, wooden wedges and a ring were carefully placed to conform the shape of the restoration and contact points. The matrix was adapted to achieve a rounded shape on the palatal wall.

With the "Applica" spatula a small increment of opaque dentine (A4 dentine) was taken out of the syringe (picture 3) and carried to the margin of the cavity. This spatula is also suitable for transporting and shaping the composite. The Applica instrument is a flexible spatula that can be used to gently smooth the composite in the cavity (picture 4).

To ensure complete adaptation and to eliminate bubbles, this increment is gently but firmly adapted with the "Condensa" instrument (picture 5). The rounded points of this instrument permit delicate adaptation without creating bubbles. After conforming the gingival area, an enamel increment is placed and treated the same way, adapting the material closely to the walls of the matrix, both ridges are formed separately (picture 6).



4. The first increment of composite is placed on the gingival margin.



5. Condensing composite in the gingival marginal areas.



6. Building up the proximal walls and ridges.

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The contour of the proximal ridges is defined with the tip of the "Applica" in order to give a rounded natural shape (picture 6). Prior to polymerization, the composite is pushed against the matrix to ensure that no material tearing occurs during the modeling stage.

With very tiny increments, the enamel layer is placed cusp-by-cusp, in order to avoid contraction and to be able to model more precise shapes as the composite will not slump.

These increments are carried to the cavity with the "Applica" spatula and shaped with the thick part of the "Fissura" instrument, which serves as a probe to define the fissure (picture 9), as a sharp point to define cusps and as a spatula to model the ridges and slopes.

For the final stages of the occlusal modeling, the development of the slopes and secondary fissures are crucial for the correct aesthetics and function.

Slopes must have a precise shape, if they are too deep they will look unnatural and will accumulate debris, but if they are very flat they will not permit adequate function. The use of the "Condensa" instrument permits modeling sharp, but rounded slopes and secondary fissures with its fine tip (picture 10) and, if sharper structures are required, the thick head of the "Fissura" is suitable for modeling this.

We have highlighted during the layering stage the need for modeling sharp and narrow fissures, this will create a natural appearance to the restoration.

After stratifying the enamel layer, it is time to fill up the space we left for the fissures with super colours (dark stains) imitating especially the neighbouring teeth.

With the finest tip available, and specially designed for this purpose, we carry a small amount of dark brown stain to the cavity, to fill up the fissure and model it, thereby obtaining very natural features.



7. Proximal walls and ridges are conformed one-by-one to ensure a precise shape.



8. The composite is adapted again to avoid marginal leakage.





9. Defining the path of the fissure in the dentine, cusps and modeling slopes and the marginal ridge.



10. Correct angulation of the instrument to model slopes.

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11. Stains placed and modeled in situ.



12. Removing invisible excess from the cervical areas, where adapting the instrument is essential for efficiency. The instrument penetrates without harming the soft tissues.



13. The finished restoration after rubber dam removal.

Light cured stains are not only useful for characterization, they help as well with two functions. First of all it seals any gaps we left in the fissure area and second as an aging indicator, as stains tend to disappear slightly over time.

After polymerization, it is common to observe excess material, especially bonding agents and some composite overhangs in the proximal areas and in the cervical areas (picture 12).

For this purpose we use a specially designed instrument, "Eccesso", which is fine enough to penetrate into the proximal areas and resistant enough to not be flexible and dangerous.

An excellent restoration must be highly polished, to obtain optimal aesthetics and a long lasting result (picture 13).

Colour-coded instruments are a great advantage in our daily work, including helping to create a protocol for our methods and teaching assistants, students and ourselves a repeatable method, and always keeping in mind what will be the next step. Naming the instruments helps as well.

Conclusions

The authors believe that procedure times are inevitably linked to certain obligatory steps (preparation, bonding, build-up with small quantities of composite in order to reduce shrinkage, correct curing times for each layer of material). Nevertheless, with the instruments and guides that have been presented in this article, the layering technique can be key to the long-term success of the restoration from both a clinical and aesthetic point of view. This enables the clinician to avoid short-term disappointments that require re-facing and a waste of time.

Acknowledgements

The authors wish to express their heartfelt gratitude to the following people: Dr A Putignano for his valuable help in the design of the instruments, Dr G Paolone (Rome) for his help in compiling the bibliography, and Mr D Rondoni (Savona) for his precious collaboration in analyzing the composite.

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