This article has a dual objective. It is intended to show:
– the aesthetic performance of microhybrid composites with nanoparticles,
– the possibility of making it a realistic option to use them clinically in general practice.

The new composite materials currently available on the market enable us to produce invisible restorations in the anterior sector. To obtain such a result, layering has to be performed according to a well codified protocol [1-6] but a certain amount of familiarisation with the technique is also required. **Aesthetic integration of the restoration basically depends on whether the three parameters of shape, colour and finishing line are adhered to.**

Among the latest generations of microhybrid composites with nanoparticles – such as Miris (Coltène/Whaledent), Enamel HFO Plus (Bisico), Ceram-X Duo (De Trey Dentsply) – we decided in this article to present clinically the “latest addition” to the dental market, Miris 2 (Coltène/Whaledent), based on clinical illustrations of the anterior sector (Fig. 1 to 21) and the posterior sector (Fig. 22 to 39).

The dual objective of this article is not only to present the aesthetic possibilities of this type of material but also, and above all, to show that it is possible to make clinical use of such materials a realistic option in general practice.
Case studies
Anterior sector: case studies of G. Tirlet

Case study 1 (Fig. 1 to 6)

This patient, who has anterior diastemas between his central incisors and his lateral incisors, attended a consultation to find out the possible aesthetic treatments currently available that would be capable of restoring his anterior proximal contacts. A relatively large proximal space is observed, particularly in sector II.

Given the current state of development of microhybrid composites (Miris® 2), it seemed quite natural to offer this young patient a layering treatment that would not only be aesthetic but also ultra-conservative. In fact, no preparation was done apart from slight surfacing work on the proximal enamel of 12 and 22, using a diamond bur. In a second clinical phase, micro-abrasion was performed on 11 and 21 (Opalustre, Bisico) at the patient's request.

Final clinical view after simplified layering with two materials: a dentin material S2 and an enamel WR (the treatment session lasted 45 minutes).

This left lateral view shows the characteristics and optical qualities of the material as well as its excellent biomimetic behaviour.

Final vestibular view after two micro-abrasion sessions. Whitish spots were removed by a combination of mechanical and chemical treatment typical of micro-abrasion treatment (18% hydrochloric acid plus pumice, Opalustre, Bisico).
This adolescent consulted because of a legitimate aesthetic complaint regarding tooth 11. Taking account of various systematic clinical factors (related to the patient and the clinical situation) and particularly in view of the patient’s young age, a layering treatment seemed appropriate. In this kind of clinical situation, however, it may be widely debated whether a layering treatment is indicated in comparison with a bonded ceramic veneer. Bearing this in mind and given that the layering would be fairly complex to perform in this situation, the risk/cost/benefit ratio of this therapeutic solution appeared to favour a different treatment strategy. In particular, the scope for re-intervention with the composite, together with the patient’s young age, pointed very strongly towards this treatment choice, provided of course that clinical follow-up was set up.

A wax-up of 11 is done and a palatal silicone key is prepared directly on the model in order to record the morphology of its palatal surface and to act as a “customized” matrix during layering.

The choice of dentin is usually made at the junction between the cervical and middle third, in this case on tooth 21 (S1 is to be used).
Case studies
Anterior sector: case studies of G. Tirlet

Case study 2 (Fig. 7 to 21)

12. The enamel is selected by matching with the coronal third of the 21 (here WR).

13. Afterwards the dentin sample (S1) can easily be inserted into the enamel sample (WR) with a drop of glycerine or water being placed between the two. At this stage, the enamel/dentin combination is tried in order to check the choice of shade.

14. The silicone key is tried in before the operating field is put in place. This makes it very easy to identify the changes of shape indicated by the wax-up.

15. Placement of the operating field and trial of the silicone key, which must be positioned without any interference. A small amount of vestibular preparation is carried out as the lingual position of the incisor means this can actually be minimized.

16. Treatment of the entire vestibular surface with orthophosphoric acid.

17. After application of the bonding system (7), the lingual wall of enamel (WR) is mounted with the aid of the silicone key, then cured.
In this more complex layering technique, an axial silicone key of the wax-up was also recorded, acting as a reference in the vestibular-lingual direction when mounting the dentin and enamel materials.

Clinical view under a rubber dam at the end of layering. The final aesthetic result cannot be assessed at this stage because of the dehydration of the neighbouring teeth. This view simply shows how the dentin and enamel materials have been distributed and the effects of how they are arranged.

Specific, fairly complex work on the surface condition (micro-geography and macro-geography) is done just after removal of the operating field, using fine-grit diamond instruments (Komet, Diatech). The surface topography brings out horizontal and vertical striae which are obtained by small sweeping movements of the working tip of the instrument.

Final view of the restoration at one week, following polishing and glazing of the material.
Case studies
Posterior sector: case studies of N. Lehmann

Case study 3 (Fig. 22 to 31)

22
A patient with a carious lesion on 26. After analgesia, an operating field is placed around the sector concerned.

23
Occlusal clinical view of the cavity after curettage of the carious lesion. The enamel edges of the cavity are regular and rounded by using a fine-grit diamond bur.

24
Conditioning of the dental tissues is done by application of a self-etching enamel-dentin bonding system (7).

25
The bonding system is cured.

26
A thin layer of liquid composite is placed in the base of the cavity. This material reduces the contraction stress at the tooth/material interface induced by future application of the restorative composite.
Case studies
Posterior sector: case studies of N. Lehmann

Case study 3 (Fig. 22 to 31)

27 to 29
The dentine composite (S3 was used) is applied incrementally. The increments of material are applied so that they predict the final anatomy of the restoration.

30
One layer of enamel composite (NR) is applied. Final sculpting of the restoration is made considerably easier if the layers of dentin composite initially applied were correctly positioned.

31
Final clinical view of the restoration. Characterisation of grooves was carried out (with the “gold” effect - material) in order to optimise integration of the restoration. Careful polishing and shining were performed with Comprepol, Composhine and Brushine cups (Diatech).
After conditioning of the dental tissues by application of a bonding system, the first stage of the restoration is to create the mesial proximal wall, thereby transforming the cavity from class 2 to class 1.

Clinical view after application of layers of dentin (S2) and enamel material (WR). The different increments of material were applied according to the same procedure as that described in case study 3.
Case studies

Case study 4 (Fig. 32 to 39)

View after grooves have been characterised in the restoration with the “gold” effect material.

Final clinical view after removal of the operating field, polishing and occlusion check of the restoration.

Conclusion

It is clear from the case studies presented here that this latest generation of composite (for example Miris® 2) can be used to create composite restorations and thereby ultimately achieve highly satisfactory aesthetic integration. This is partly due to the diversity of enamel and dentin materials available, which meet the requirements for the diverse clinical situations encountered. This characteristic entirely justifies these materials being included in the family of microhybrid composites with nanoparticles used for biomimetic purposes.

References