

Shining results

Minimally invasive and aesthetic restorative treatment

Authors_Dr Monica Basile & Michele Temperani, Italy



structure is paramount. For this purpose, procedures have to be planned in detail by the dental team, consisting of the dentist and dental laboratory technician.

_An uncommon preoperative situation

The 30-year-old patient was dissatisfied with his smile and requested that we correct his front teeth (Fig. 1). The problem was evident at speaking distance from the patient. The overall appearance of the dentition was marred by gaps between the teeth (diastema) and the unusual shape of the upper lateral incisors (Fig. 2). A panoramic scanning dental X-ray revealed the failed development of teeth #12 and 22 (Fig. 3). As a result, the canines had moved into the position of the lateral incisors. In the past, the appearance of both canines had been slightly adjusted to that of the incisors. Moreover, it is important to note that the dental arch featured two deciduous canines.

_What patients want

The patient let us know exactly what he wanted and did not want. Today's patients are usually knowledgeable and well informed. They clearly express their ideas and demand tailor-made solutions. This particular patient had been searching for a suitable and non-invasive treatment for quite a long time. Previous treatment plans had incorporated the removal of the two deciduous teeth and replacing them with implants. However, the patient did not agree with this solution. He wanted to keep his natural teeth until they fell out of their own accord, even though the lifespan of these teeth was limited. Until this time, however, the patient wanted to have a gap-free and even-looking anterior dentition, in other words, an attractive smile. We were unable to predict the survival rate of the deciduous teeth on the basis of the X-rays. Nevertheless, a thorough examination showed that they were still securely in place. Furthermore, there were no signs of periodontal disease. The patient was fully aware of the limited lifespan of the deciduous teeth and asked for a reversible solution in order to prevent the existing tooth structure from being permanently damaged. He wanted to make sure that further treatment in

Fig. 1 The 30-year-old patient was dissatisfied with the appearance of his smile.

Fig. 2 The gaps in the front row of teeth and the unusual shape of the upper lateral incisors bothered the patient.

_With the availability of a wide range of innovative restorative materials, the aesthetic demands of patients can be met efficiently and effectively by the collaborative efforts of practised dental teams. As the technology behind these materials has become increasingly sophisticated, clinical cases that were considered to be challenging previously can now be treated without having to compromise on aesthetics or remove healthy dental tissue. We describe our approach to cases such as these in the following article.

Flawless teeth are associated with good health and vitality. A bright smile radiates self-confidence and heightens a person's attractiveness. State-of-the-art aesthetic dentistry can achieve small wonders in this respect. The shape and colour of teeth, as well as their length and position, can be adjusted. Nevertheless, in all these treatments, preservation of healthy tooth

Fig. 3 A panoramic scanning dental X-ray revealed that teeth #12 and 22 had failed to develop.





Fig. 4 A diagnostic wax-up and a silicone matrix were fabricated.

Fig. 5 The silicone matrix was used to produce a mock-up of the restoration.

the future would be possible without having to make functional or aesthetic compromises.

Planning the correct way

As usual, we documented the preoperative situation with photographs. In addition, we determined the where and how of the restorative procedure on the basis of working models. Our aim was to produce an appearance that would meet the requirements of the patient. A diagnostic wax-up was produced and a silicone matrix was created in the dental laboratory, taking into account the clinical requirements and the technical limitations (Fig. 4). In cases such as this one, the materials that are selected for the treatment are an important component of the treatment plan. As a result, it must be clear at the beginning of the clinical procedure what should be done ideally and what can be accomplished from a practical point of view. In this case, the corresponding information was transferred to the clinical situation by means of a direct mock-up, which was produced on the basis of the previously

fabricated silicone matrix (Fig. 5). Therefore, a composite resin was applied to teeth #14 and 24. The size of the two deciduous teeth was increased and the appearance of the existing canines was transformed with the composite resin to look like lateral incisors (Fig. 6). Even though the proportions of the central incisors were not yet in harmony with the overall appearance, the patient was satisfied with the aesthetics of the try-in of this minimally invasive solution.

Implementation

The final restorative procedure involved ten teeth. With the mock-up as a reference, the shape, size and minimal thickness of the restorations were established. Measures were taken to ensure the predictability of the quality and control of the technical and clinical aspects of the procedure (Figs. 7 & 8). On the basis of the wax-ups fabricated on the working models, six very thin veneers (facial) were planned for teeth #14, 24, 53, 63, 11 and 21. The veneers were so thin that the teeth did not require



Fig. 6 The finished mock-up (composite resin). The patient was satisfied with the prospective result.

Fig. 7 Reference patterns of the mock-up were fabricated for the permanent restoration...

Fig. 8 ...and the necessary volume and the minimal thickness were established.

Fig. 9 The prepared teeth.



Fig. 10_The restorations were modelled in the dental laboratory and...

Fig. 11_...reproduced with pressed ceramics.



Fig. 10

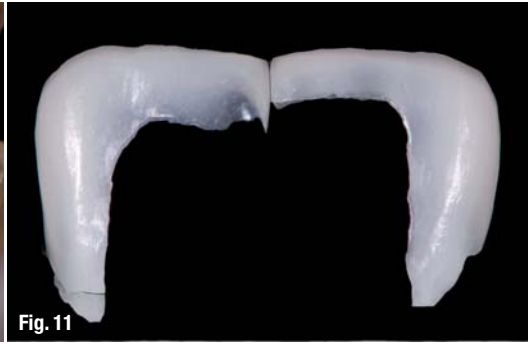


Fig. 11

preparation. Teeth #12 and 22 were prepared for two conventional veneers. They were the only two teeth that required the removal of 0.6 mm of the dental enamel. Furthermore, mesial micro-preparation of teeth #41 and 31 was planned with the aim of augmenting these teeth with the corresponding veneers. Despite the smallness of this corrective step, it served to close what the patient considered to be an unattractive gap in the lower jaw (Fig. 9).

Skill and precision

This case required utmost skill and precision. The restoration involved six very thin non-prep veneers (Fig. 10). Moreover, two veneers had to be fabricated for teeth with micro-preparation (the deciduous canines were only ground on the distal side to remove 0.3 mm of the dental enamel), as well as two veneers for teeth that had been reduced by 0.6 mm. We decided to use IPS e.max Press lithium disilicate glass-ceramic (Ivoclar Vivadent) to produce the ten restorations. This material is used to fabricate

monolithic restorations, which are characterised by high strength (400 MPa) and exceptional aesthetics. We used the new IPS e.max Press Value ingots for the veneers on the central incisors and the two deciduous teeth. The brightness of restorations can be carefully controlled with this material. As a result, smooth integration into the existing dentition is ensured (Fig. 11). In the present case, the high translucency of this material enabled us to lengthen the edges of the central incisors. Therefore, the proportions of the teeth were more balanced, which enhanced the patient's smile. Instead of a Value ingot, an IPS e.max Press Opal ingot was used to construct the lower incisors. In contrast to the shades of the Value ingots, these blocks are opalescent and the level of this optical property can be adjusted as necessary (Fig. 12). Furthermore, these materials are characterised by their ability to match the shade of the underlying tooth structure. As a result, certain physical properties, such as brightness and opalescence, which are often difficult to reproduce, can be faithfully imitated or even enhanced.



Fig. 12



Fig. 13



Fig. 14



Fig. 15

Figs. 12–14_The material used for the film-thin veneers (IPS e.max Press) enabled utmost translucency to be achieved and the opacity to be adjusted according to the requirements.

Fig. 15_Some of the veneers were much thinner than a fingernail.

In order to improve the appearance of the canines and make them look like lateral incisors, we also used the press technique, but combined it with the cut-back technique. Owing to the shallowness of the preparation, a very delicate framework was required. Therefore, we chose a highly translucent ingot (IPS e.max Press HT, shade BL3) for this purpose. The pressed substructure was subsequently built up with IPS e.max Ceram using the conventional layering method (Fig. 13). If the relationship between a monolithic restoration and the supporting dental tissue is incorrect in the anterior region, it may be difficult to adjust the shade satisfactorily. In other words, if little natural tooth structure is available for the shade adjustment, the restoration may lack sufficient brightness and it may fail altogether. Therefore, the aim in the case described was to remove as little tooth structure as possible.

A steady hand

It is thoroughly understandable that the dental practitioner was slightly apprehensive when she opened the packet from the laboratory, as the delicate veneers were much thinner than a fingernail (Figs. 14 & 15). The subsequent challenge was to place these restorations precisely. The teeth, with the exception of the two permanent canines and the minimally prepared deciduous canines, had not been ground. As a result, there were no clear references for the placement of the veneers. Nevertheless, the OpraStick (Ivoclar Vivadent) proved to be a useful placement tool. This disposable auxiliary aid allowed the individual restorations to be handled without the risk of dropping or breaking them. Another important aspect of the treatment was that the dental technician was on hand to offer invaluable advice on the positioning of the restorations he had fabricated.

In addition, the cementation material selected was decisive for the successful shade adaptation of the restoration. In accordance with the recommendations for cementing restorations that are thicker than 1.5 mm, a dual-cure adhesive luting composite (Variolink II, Ivoclar Vivadent) was used to place the faced crowns. First, a suitable cement shade was established with the help of the special try-in pastes. Next, the ceramic restorations were etched with hydrofluoric acid and the enamel areas were conventionally conditioned. Monobond Plus (Ivoclar Vivadent) was used to condition the restorations, which were subsequently placed with the adhesive luting composite. Furthermore, at the try-in, the flowable composite Tetric EvoFlow (Ivoclar Vivadent) was chosen to cement the eight veneers. The flowability of the product was enhanced by warming it at 37°C for 20 minutes before application. Each individual veneer was placed under the



Fig. 16



Fig. 17

watchful eyes of the dental technician and only polymerised once it was correctly in place on the tooth.

Conclusion

The subsequent working steps were carried out with the same care as cementation. Excess cement was removed completely and all the necessary checks, such as the occlusion in lateral and vertical movements, were carried out. Although aesthetics played an important part in the treatment plan, functional aspects were not ignored in any way. Even though the ceramics and cements used are by far stronger and more adaptable to natural dentition than the materials used in the past, their function has to be checked nevertheless to avoid any undesirable consequences. The effect of the restorations immediately following cementation and at the one-week and one-month recall satisfied everyone involved. The materials we had selected allowed us to offer the patient minimally invasive treatment and highly aesthetic results (Figs. 16 & 17).

Editorial note: A complete list of references is available from the publisher.

Fig. 16 _ View of the restorations one week after their placement.

Fig. 17 _ Successful aesthetic results were achieved with minimally invasive treatment.

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Dr Monica Basile

Viale Morgagni Giovan Battista, 1
50134 Florence
Italy

studio@spinbas.191.it



Michele Temperani

Via Livorno, 54/2
50142 Florence
Italy

lab@temperani.191.it