Long-term documentation of an 11-year old restoration

A case of complex aesthetic and functional rehabilitation using glass-ceramic materials

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Resin-bonded single-tooth glass-ceramic restorations such as veneers and onlays have been routinely used for many years in dentistry. Nonetheless, their use for complex rehabilitations such as in patients with generalised hard-tissue defects, for example, is still much debated. These concerns are increasingly being resolved in view of the beneficial preliminary results reported in controlled clinical studies and the experiences gained in specialist practices.

It is essential for the long-term and reliable application of this method to accurately coordinate the stages between the dentist and technician and allow the patient to be actively involved. These stages consist of a careful treatment planning process, including a study wax-up/mock-up (aesthetic evaluation), an adequate pretreatment phase, including a functional evaluation, selection of the correct materials, combined with a preparation and placement technique appropriate for the materials selected, and implementation of an adequate occlusal design. This case report first describes the use of glass-ceramic restorations for the complex rehabilitation of a patient with extensive loss of tooth structure and then evaluates the restorations after they have been in situ for more than 11 years.

Clinical situation and treatment

A 40-year-old female presented at the practice requesting restoration of her dentition, which was severely worn. She said that she had become aware of an untoward change in her anterior teeth and in the fullness of her lips, particularly evident in photographs of herself.

The clinical findings and dental history showed large and, at times, extensive destruction of her tooth structure, as well as extensive changes in the proportion and exposure of dentine owing to a reduction in VDO. When we recorded her dental history, she told us that she had become aware of an unoriental change in her anterior teeth and in the fullness of her lips, particularly evident in photographs of herself.

A functional analysis of the dentition did not reveal anything unusual. However, the loss of canine guidance and the emergence of anterior and posterior group guidance were conspicuous (Figs. 2a & b). The particular challenges we had to overcome in her case were the high complexity of the rehabilitation, the patient’s request for a prompt and minimally invasive improvement of her situation, the need for creating an appropriate tooth morphology and therefore for reconstructing the VDO, as well as the permanent placement of the restorations on damaged tooth structure.

Fig. 1: Pre-op situation shows a severely affected aesthetic appearance owing to a loss of the VDO and the formation of a reverse smile line resulting from an extensive loss of tooth structure.—Fig. 2a: Lateral view from the left during dynamic occlusion: traumatic contacts during functional movement had led to extensive loss of enamel and exposure of dentine.—Fig. 2b: Frontal view at protrusion: traumatic contacts had led to substantial changes in the morphology of the teeth.—Fig. 3a: Pre-op situation: mandibular anterior teeth showing substantial changes in proportion and exposure of dentine owing to a reduction in VDO.—Fig. 3b: Lateral view from the right during dynamic occlusion: loss of canine guidance and severe destruction of maxillary and mandibular anterior teeth.—Fig. 4: Onlays made of leucite-reinforced glass-ceramic (IPS Empress Esthetic). The minimum layer thickness of the occlusal surface was 1.5 mm.
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Fillings were placed on the teeth, some of which were severely damaged, with help of an adhesive composite system (Syntact and Tetric tavoCeram, both Ivoclar Vivadent) prior to planning of the permanent restoration. This way, we were able to better assess the severity of the destruction and obtain a better idea of where the potential preparation margins would be located. In order to achieve an aesthetic and functional rehabilitation, we had to create an adequate tooth morphology on the basis of a suitable width-length relationship of the teeth, establish an anterior canine-protected dynamic occlusion and rebuild the VDO.

The destructive processes to which the damaged teeth had been exposed had to be stopped and a stable occlusion had to be created. The patient wanted a long-lasting rehabilitation based on a minimally invasive procedure and tooth-coloured restorations. The final restoration would include adhesively bonded glass-ceramic veneers and onlays. Glass-ceramic crowns would be used for those teeth that were severely damaged (teeth #13–23). Glass-ceramic onlays based on lithium disilicate (IPS e.max Ceram, both Ivoclar Vivadent) were used for the maxillary anterior region, which showed a high degree of tooth destruction (large composite fillings, Figs. 3a). In the mandibular anterior region, glass-ceramic veneers layered on refractory dies (IPS d.SIGN, Ivoclar Vivadent) were placed (Fig. 3b).

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Conclusion

Given the enamel-like properties of the glass-ceramic material, the minimally invasive methods used for this case provided a long-lasting approach to restoring the function, aesthetics and biomechanics of the dentition while minimising the damage to the biological structures.

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