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Proud of our History, Looking Forward to the Future

Challenging, but far from impossible

Correcting a hypodontia of the maxillary lateral incisors

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If lateral incisors are missing, the classic treatment option would involve two implants placed in the position of the missing teeth. However, this is only possible if the clinical situation allows for such a procedure. In this article, the authors describe a treatment concept which can be applied if the initial situation is not optimal.

In this day and age, looking attractive is considered an indicator of social success. As a result, more and more

patients want a "perfect" smile and sparkling white teeth. The media play a major role in this, by placing the images of beautiful people with flawless teeth and an air of success on the cover pages of large magazines.

Initial situation

Our patient also came to the practice with the wish to have a "perfect" smile. The clinical situation, however, was anything but perfect. The patient suffered from hypodontia, ie the lateral incisors had failed to develop (Fig 1). Furthermore, the teeth were severely stained. Another complicating factor was that tooth 13 was in a central position between teeth 14 and 11 (Fig 2). As an extended treatment time was not an option for the patient, a protracted orthodontic treatment was ruled out. Also if such an approach had been pursued, an esthetically satisfying outcome would have been very difficult to achieve without modifying the other anterior teeth.

Planning the restoration

The planning phase is an important part of the restorative process, as it allows us to achieve the desired esthetic outcome on the basis of a clear sequence of working steps. It also enables us to pursue an anticipative approach in most cases, rather than having to react to unexpected situations.



Fig 1: Labial view of the initial situation



Fig 2: Occlusal view of the initial situation

Thanks to this targeted method, compromises in terms of the treatment outcome that could emerge during the restorative process are eliminated.

In the case described here, the main problem was the lack of space in the first quadrant; tooth 13 was located in the position of tooth 12 (see Fig 2). After an extensive planning stage and discussions with the patient and the dental technician, we chose to fabricate two bridges and one crown, made with the highstrength lithium disilicate (LS2) glass-ceramic material IPS e.max® Press.

We decided to place the distal portion of the cervical preparation margin of tooth 13 below the gingiva

(Fig 3), in order to reduce the size of the tooth neck and therefore to make the gap appear larger. The

mesial area of tooth 14 was rather large, which is why we were able to remove some of the enamel without being too invasive.

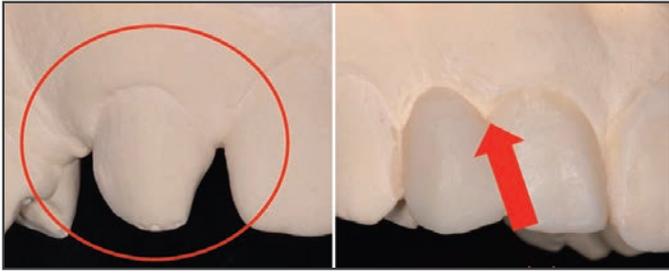


Fig 3: A wax-up provides a good opportunity to explore the given situation on the model. In this case, the cervical area of tooth 13 was critical.



Fig 4: The situation after tooth whitening



Fig 5: The silicone key was also used to check the preparations.



Fig 6: The finished preparations prior to impression-taking

With this preparation concept, enough room was created to accommodate the restoration in the first quadrant. As an alternative, the teeth could have been slightly repositioned towards the vestibular aspect. In the second quadrant, a reverse situation was found: The gap was too spacious in order for an esthetic reconstruction of tooth 22 to be integrated. The central incisors were somewhat more prominent and straight and had a beautiful shape.



Fig 7: The direct temporary restoration



Fig 8: Prior to seating the final restoration

This was a sound starting point for a beautiful, harmonious outcome. The wax-up was designed in accordance with the planned reconstruction. Prior to preparation, the teeth were bleached (Fig 4).

Clinical procedure

Except for tooth 13, all teeth were vital. In order to transform this tooth into a lateral incisor, pulp extirpation was performed. The root canal was filled with a glass fibre-reinforced post (FRC Postec® Plus) luted with Variolink® II composite material. After the application of a total-etch adhesive (Excite®), the core was built up as required with composite material (MultiCore® Flow light).

The periodontal soft tissue was protected during the subsequent preparation procedure by means of retraction cords (No. 000). First, the tooth with a straight tooth axis was ground. This preparation then served as a reference for the other teeth that were to be ground. In order to ensure even preparation, the diagnostic wax-up was used as a basis. Three silicone patterns were prepared from this wax-up: One was used for the fabrication of direct temporaries and the remaining two were cut open in a sagittal and vertical direction in order to ensure that enough space was available for the final restorations with an adequate thickness (Fig 5).

The preparation margins were created close to the gingival margin. Tooth 13 was an exception, as the preparation extended below the gingiva line. It was thanks to this measure that the canine was converted into a lateral incisor and thus sufficient space for an adequately sized bridge pontic was made available. Before an impression of the prepared teeth was taken (Fig 6), the dentin tubules were sealed with an adhesive (Excite®) in order to avoid contamination of the dentin tissue and postoperative sensitivities.

Conventional impressions were taken. In order to provide the patient with a temporary restoration, we fabricated a provisional on the basis of the wax-up. The Telio® CS material is a self-curing composite material in paste form which can be used for the direct fabrication of temporary restorations. After removing the impression, we applied a layer of adhesive to the tooth substance and isolated it with glycerin gel before fabricating the temporaries. Finally, the temporary restoration was seated (Fig 7). If vital teeth are treated, it is advisable to leave the temporary restoration in the patient's mouth for no longer than a month. Even if the fit of the temporaries is excellent, contamination of the dentin must be prevented. In case of decementation, the preparation has to be cleaned again and another layer of ExciTE has to be applied.

Fabrication in the dental lab

The treatment plan encompassed a bridge restoration for the teeth 14 to 12 and one for teeth 21 to 23 and

a single crown for tooth 11. The restorations were fabricated with IPS e.max Press lithium disilicate allceramic. As the frameworks that were fabricated were to be veneered in a subsequent step, we chose IPS e.max Press LT ingots (LT = Low Translucency) in the shade A1. In order to achieve an esthetic outcome and to create a lifelike vestibular transition, the connectors of the bridge pontics were positioned more towards the lingual aspect. The importance of the connectors must not be underestimated, and the durability of a restoration must not be compromised for esthetic reasons.

Seating the restoration

After removing the temporary restoration, we conditioned the prepared teeth appropriately (Fig 8). During try-in, the ceramic restorations were checked with regard to esthetics, phonetics and function.

After the application of hydrofluoric acid to etch the inner aspect of the ceramic and the subsequent

silanization with Monobond Plus, the restorations were ready for adhesive cementation. For this procedure, we used the transparent version of the dual-curing Variolink II composite system. In this way, the shade of the preparations could be optimally utilized and lifelike adaptation was achieved. Due to the translucency of the restorations and the cementation materials, the final outcome showed a vital appearance (Fig 9).

Because we used IPS e.max Press material in the "LT" (Low Translucency) level and IPS e.max® Ceram material in the shade A1, the patient obtained brilliant white teeth as requested. It was possible to give the

patient his smile back after many years of having suffered because of the unattractive appearance of his teeth (Fig 10). The images of the seated restorations show their outstanding integration into the surrounding tooth structure. Thanks to IPS e.max®, all teeth feature an outstanding luminosity. This material shows exceptional biomimetic behaviour, which allows dental professionals to create lifelike restorations (Fig 11).



Fig 9: The all-ceramic system we used (IPS e.max) offers excellent possibilities to achieve lifelike adaptation of ceramic restorations.



Fig 10: The seated restorations made the patient smile.



Fig 11: Thanks to the IPS e.max ceramic system, we were able to achieve an esthetic outcome in spite of the challenging initial situation.

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- Q1.) During the initial clinical assessment the patient presented with dental hypodontia, which teeth had failed to develop.
- Q2.) Extended treatment time was not an option for the patient therefore what action was ruled out?
- Q3.) After discussion with the patient and dental technician during the planning phase about the lack of space what restorative action was pursued?
- Q4.) How was the non vital tooth 13 transformed into a lateral incisor?
- Q5.) With the exception of tooth 13 where were the preparation margins created?
- Q6.) How was contamination of the dentin tubules and postoperative sensitivities avoided?
- Q7.) Which translucency and shade of IPS e.max Press ingots were chosen?
- Q8.) How were the connectors positioned to achieve an esthetic outcome without compromising the durability?
- Q9.) Prior to adhesive cementation how was the inner fit surface of the ceramic prepared and conditioned?
- Q10.) To achieve a vital appearance at the final outcome which adhesive cementation was used?

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