

Aesthetic functional veneers in patients with habitual dysfunctions?

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_Presently, numerous options for non-preparation veneers are available on the market. These have been proven to be effective and serve as an excellent marketing tool in the dental practice specialising in aesthetics. However, these types of veneers are not applicable for patients with individual colour or shape requests or those suffering from a habitual dysfunction. For such patients, a standardised veneer preparation is generally excluded.

In such cases, an extensive functional analysis is indispensable for the preparation of the veneers in order to facilitate harmonious occlusion and, most importantly, to enable smooth articulation. The aim of each veneer case should always be to achieve health, aesthetics and longevity of the veneers while minimising the risk of fractures.

Accurate clinical examination and documentation of the basic functional parameters is essential in order to identify where overloading exists or where it can occur. State-of-the-art diagnostic instruments, like CADIAX and Free-corder, provide comprehensive functional analysis and are extremely helpful. The articulator is programmed according to the patient's articulation and allows the dental technician to reproduce functional occlusion surfaces corresponding to the natural dentition. Functional disorders resulting from imbalanced prosthetic treatment and dysfunction can be avoided.

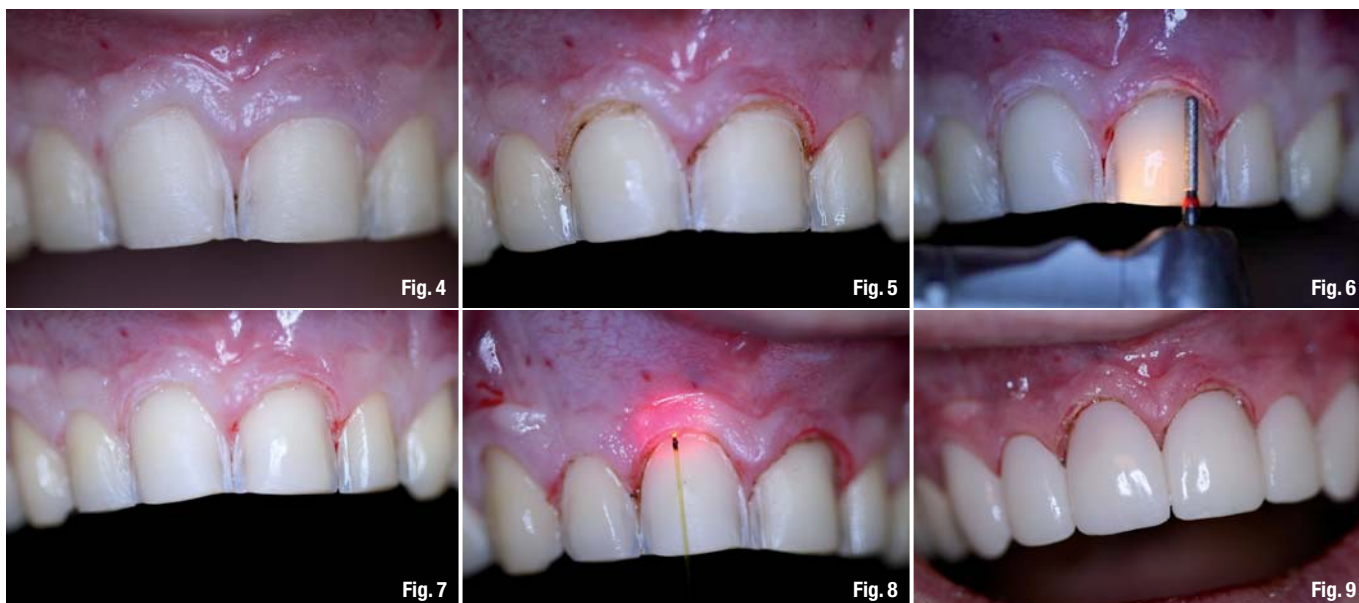
Smooth articulation should also be achieved in the molar region where old fillings, inlays/onlays or crowns may result in malocclusion and cause para-function. If necessary, retained wisdom teeth should be removed and orthodontic pre-therapies used to correct existing malfunctions. In addition, pre-prosthetic orthodontics may result in minor material removal in a planned preparation.

_Case study

The following case study demonstrates the interaction between aesthetics and function in the preparation of veneers in a patient with severely advanced habitual dysfunction. The patient also had severely damaged upper anterior teeth due to extreme latero-trusion habits.

Figs. 1–3_Initial situation with pronounced habitual dysfunction.





The case was documented according to the European Society for Cosmetic Dentistry (ESCD) guidelines as a requirement for obtaining certification as a specialist in Cosmetic Dentistry ESCD (these guidelines are available from the author upon request). An integral part of documentation is the use of identical camera settings for all photographs that have to be taken before and after any reconstruction.

In addition to the correction of the damage, the following were especially important to the patient: longevity of the reconstruction, ability to select shape and colour of the veneers, use of all-ceramics, minimally invasive preparation, and harmonious aesthetics. Furthermore, the patient desired a purely cosmetic optimisation of the lower central incisors with slight contouring and, if needed, BRITESMILE bleaching after the application of the upper veneers.

First, an aesthetic functional wax-up of the six upper teeth was created in order to facilitate optimal communication between patient, dentist and dental technician throughout each stage of the veneer preparation. The patient's history revealed that four premolars had been extracted in his youth, followed by orthodontic therapy. Over the years, all teeth had been treated conservatively and the wisdom teeth were well adjusted. All upper and lower premolars and molars had been treated with all-ceramic zirconia crowns. The patient did not desire a complete makeover with overbite reduction. Therefore, we focused on the design of perfect and fracture-free veneers for the mandibular central incisors. Thus, all interfering factors had to be minimised.

The aesthetic contouring of the lower central incisors naturally leads to a harmonious overall appearance. In addition, one of the main causes of veneer fracturing can be eliminated: patients with extreme mandibular mobility are able to shift into extreme areas of protrusion and latero-trusion, often going much beyond the cutting edge of the maxilla. However, fracturing and failure of a veneer are not merely caused by forward movement. Problems often occur during the backwards movement of the mandible when the teeth slide back into retrusion and become stuck and, owing to the extreme forces, a veneer fracture can result. These extreme retrusions can be imitated in the articulator only if the technician registers a bite situation of this position. If the technician only considers standard mandible movements, he will not be able to reach the extreme areas of the existing habitual dysfunction.

Fig. 4 Preparation without gingival correction.

Fig. 5 Crown elongation.

Fig. 6 Preparation.

Fig. 7 Final preparation.

Fig. 8 Sulcus demonstration with diode laser.

Fig. 9 Functional temporaries according to wax-up.

Patient-oriented articulation adjustments

Reference® SL

SKN	3 MM	5 MM	10 MM	TKN	3 MM	5 MM	10 MM
R INSERT	BLUE	BLUE	BLUE	R INSERT	WHITE	WHITE	WHITE
R ANGLE	51	53	-	R ANGLE	6	6	6
L INSERT	BLACK	BLACK	BLUE	L INSERT	WHITE	WHITE	WHITE
L ANGLE	41	47	-	L ANGLE	12	8	5
SEQUENTIAL	PROTRUSIVE			LATERAL RIGHT		LATERAL LEFT	
INSERT	ORANGE			ORANGE		ORANGE	

STANDARD DISTANCE 200 MM, CALCULATED AT 110 MM

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Fig. 10



Fig. 11



Fig. 12

Fig. 10_Veneers on the model.

Fig. 11_Bleaching.

Figs. 12 & 13a-d_New harmonised incisal guidance.

In such patients, the aim of the contouring should be the removal of all uneven surfaces that could cause dysfunction of mandible protrusions and retrusions. This must be done prior to the initial veneer preparation. All possible movements of the mandible in the palatal surfaces of the maxilla and beyond the incisal edge have to be marked accurately.

Owing to the clear overbite of 3 mm, the first step was to shorten the maxillary teeth sufficiently. This creates significantly less static leverage forces in the veneer, which is thus subsequently shorter, than in veneers with normal or greater length. Thus, even in habitual dysfunctions, a better force distribution can result within the veneer.

Figs. 14_Post-op situation from multiple angles.

Patients with extreme overbite and crowded anterior teeth are especially exposed to veneer

In order to achieve an optimal aesthetic result, crown elongation was performed during



Fig. 14

fractures. In such cases, orthodontic pre-treatment is often essential but refused by many patients. Should this be the case, all edges must be smoothed and rounded so that the veneers created subsequently have a chance of survival.

Thorough functional analysis and subsequent documentation were performed. The wax-up demonstrated that for the removal of the old vestibular composite reconstructions and for optimal veneer construction, this case required preparation in order to achieve an aesthetic result. The main concern in this case was to identify which basic static design possibilities were achievable.

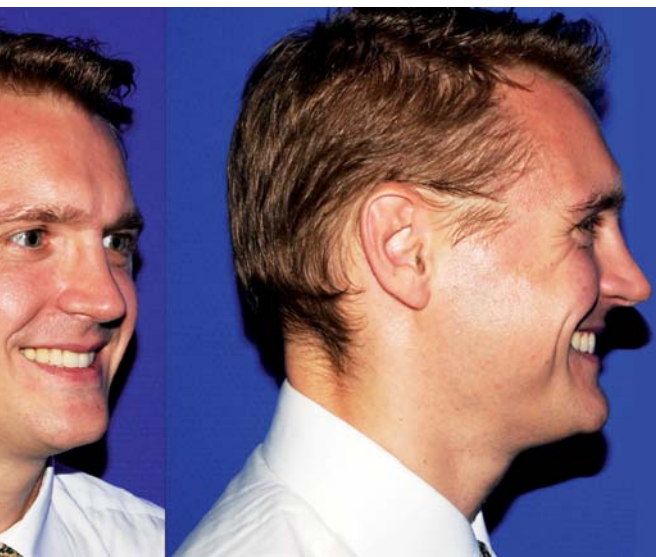
preparation using ELEXION's diode laser system. On the one hand, length disparities between the individual teeth can be balanced and on the other hand, a general lengthening of the clinical crowns of all the anterior teeth can be achieved to create a harmonious smile. These measures can always be carried out safely when a sufficient amount of attached gingival exists and an excision with subsequent relocation of the preparation edge does not lead to insufficient biological width.

In this case, a prominent mesio-proximal defect of the cervical aspect of tooth 11 led to a significant length disharmony of tooth 21. The teeth appeared to be of the same length after laser cor-

rection and were prepared accurately. For indexing, the preparation margin was exposed through minimal invasion using with the diode laser.

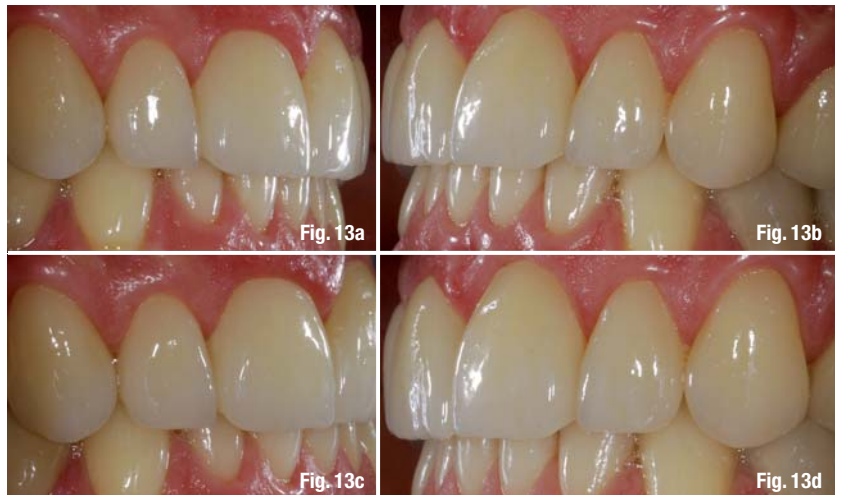
While preparing the temporaries, it has to be ensured that they support the healing of the gingiva after the excisions through optimal, anatomic convexity. The new outer contours created in the wax-up need to be considered and with the silicon key they may serve as model of the new contour and thickness of the temporaries. With this procedure, excellent healing results can be achieved that create optimal conditions for cementing. Photographs taken from all angles facilitate comparison with the initial situation and significantly aid the technician in creating the veneers. The more extensive and precise the photographs, the more accurately and beautifully the veneers can be prepared.

At this point, which technical parameters can be of use in patients with habitual dysfunctions?



For one, the above-mentioned static design data of the veneer length play a significant role. Protrusion and latero-trusion forces can easily be compensated when the sagittal incisor guiding angle is levelled. Optimal function surfaces can be created through fine adjustments. Thus, the result of the treatment is not only a careful alteration of the overbite-overjet relation, but also a fine adjustment of the pathological anterior and lateral guidance.

Furthermore, the selection and quality of the veneer ceramic plays a significant role. Ceramics that are more elastic and abrasion resistant should be preferred. In the present case, our team decided to use the following combination: initially



Ao+Pressbody was applied followed by multiple layers of Authentic. After the form of the veneers had been modelled, they were pressed and coated. The perfect result was achieved after four firings. The durability of the veneers is a significant advantage of this multiple-layering technique.

We were able to fulfil our patient's aesthetic and functional desires from try-in. The patient was highly enthusiastic and immediately approved of his improved smile. He was given a night guard to prevent possible problems due to bruxism. In our opinion, a night guard should always be used after the completion of reconstructions in habitual dysfunction cases, in order to protect the veneers.

Conclusion

Direct comparison of the preoperative and post-operative situations demonstrates the new, stress-free situation in the upper anterior teeth, which is the aim in patients with habitual dysfunction. Accurate planning and careful consideration of the veneer type—prepared or non-prepared—is highly recommended.

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