

ADHESIVE RECONSTRUCTION IN HELP OF THE ORTHODONTIC TREATMENT

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SUMMARY

The use of contemporary composite materials for shaping and restoring of the teeth combined with orthodontic treatment gives great possibilities for dental treatment.

The aim is to present authors' clinical experience of esthetic reconstruction of distances between the teeth after orthodontic treatment with brackets, by correcting the form and size of these teeth.

Application of direct composite restorations (light-curing hybrid material Gradia Direct Anterior, GC) according suitably chosen four clinical cases after orthodontic treatment, has been demonstrated. Color photos were taken before and after reconstruction of the tooth form and outlines.

Closing distances between teeth by enlarging tooth size is suitable only when an esthetic shape and size of the reconstructed teeth is expected. This way of reconstruction has the following advantages: the esthetic results are excellent, it preserves the Class I ratio of the canines and particular height and inclination of the upper incisors in treatment with premolar extraction only in maxilla and prevents prosthetic treatment in the anterior teeth.

Contemporary treatment trends focus the attention to the utmost preservation of tooth structures and esthetic restoration. Direct composites as combination of esthetics and longevity are widely spread in dental practice.

The use of contemporary composite materials for shaping and restoring of the teeth combined with orthodontic treatment gives great possibilities for dental treatment.

The normal occlusal ratio in sagittal dimension (Class I in the canines) and vertical dimension (1/3 overjet of the incisors in the front) is achieved by ratio between the sum of the widths of the upper and lower incisors 1,35 or 4:3 by Tonn (1). Sometimes this normal ratio cannot be achieved by orthodontic treatment.

Diversions are due to two main reasons: lack of tooth structure and increased size of the front part of dental arc. This is the time when the adhesive reconstruction of teeth comes to help the orthodontic treatment.

The **aim** of the article is to present our clinical experience of esthetic reconstruction of distances between the teeth after orthodontic treatment with brackets, by correcting the form and size of these teeth.

MATERIAL AND METHODS

Application of direct composite restorations according suitably chosen clinical cases after orthodontic treatment with brackets, has been demonstrated. The esthetic restorations were made directly after abrading of the enamel surfaces with a diamond bur, etching technique for 20 seconds and application of the adhesive and composite material.

We have chosen light-curing micro-fine hybrid restorative material with a preliminary polymerized filling **Gradia Direct Anterior, GC**, which is indicated for direct restorations, veneers and closing of diastema. This material with micro particles of 0,8 μm is used, because of its' good abrasion stability, stable color, "chameleon-effect" and acceptable price. The restorations were done by one operator. Color photos were taken before and after reconstruction of the tooth form and outlines. The finished restorations were assessed according the following parameters: color, translucency, opacity, polishing, anatomic form, outlines and inter proximal contacts. Assessment of the direct restorations was made right after the reconstruction and for a period of one to six months.

RESULTS

The represented patients were with narrow teeth, necessity of diastema closing in the anterior teeth or missing upper second incisors after orthodontic treatment with brackets. By means of direct adhesive technique we achieved correction of diversions from the form and size of tooth crowns, reshaping of inter proximal contours and contacts. Also in a case of hypodontia of the maxillary lateral incisors, directly was changed the canine form in a way that resembles the lateral incisors. Of extreme importance was the fact that composite reconstructions should serve for retention of the achieved results in the orthodontic treatment.

CASE No. 1

A.Z., 19-year old female student with hypodontia of the maxillary lateral incisors had irregular spaces between the upper central incisors and the canines in the right and left side after the orthodontic treatment. The space between right teeth was 2 mm and between the left – 1,5 mm. The central incisors are with rectangular shape (figure 1).

We used adhesive technique for increasing the size

and contouring the maxillary central incisors by **Gradia Direct Anterior** special inside shade AO3, standard shade A2 and special outside shade NT on the distal part of the labial and palatal tooth surface by means of multilayer adhesive technique without a silicone key. During the second visit the upper canines were reshaped by layering **Gradia** until the shape of lateral incisor was reached. Part of their labial and palatal surfaces left uncovered by the material. The finishing and polishing was done in the routine way with fine diamond burs with red and yellow signs, polishing silicone rubbers and abrasive discs Soft-Lex, 3M-ESPE (figure 2).

Figure 1 – before reconstruction



Figure 2 – after reconstruction



Figure 3 – a month after reconstruction



CASE No. 2

A.K. 16-years old male student with irregularly wide spaces between the maxillary second incisors and the canines. The right distance was 1,2 mm and the left – 0,8 mm. The photos in figures 4, 5, 6 show the patient right after removing the brackets. Two days later was made the esthetic enlargement of the size of the crowns of the maxillary lateral incisors, re-contouring and creating the side contact with the upper canines (figure 7, 8, 9). Shades AO3, A2 and NT of **Gradia Direct Anterior** were used on the labial-distal-lingual surfaces of the maxillary lateral incisors.

Figure 4 – before correction of 12



Figure 5 – before correction of 22



Figure 6 – palatal view before reconstruction of 12 and 22



Figure 9 – after reconstruction of 22



Figure 7 – palatal view after reconstruction of 12 and 22



CASE No. 3

K.M. 15-years old male student with spaces between the upper lateral incisors and the canines. The esthetic re-shaping of the distal part of the second incisors with 0,5-1 mm and reconstruction of the fractured incisive edge of tooth 12 is achieved with shades AO3, A3 and A2. The photos show dental condition right after the esthetic reconstruction (figure 10, 11, 12, 13) and six months later (figure 14, 15).

Figure 10 - front view after reconstruction of 12 and 22



Figure 8 – after reconstruction of 12



Figure 11 – palatal view after reconstruction of 12 and 22



Figure 12 – after reshaping of 12



Figure 13 – after reshaping of 22



Figure 14 – 6 months later



Figure 15 – 6 months later



CASE No. 4

S.T. 30-years old female had spaces between 13 and 15, 23 and 25, 25 and 26, 33 and 35, 45 and 46 after accomplished orthodontic treatment during which one permanent premolar of each side of both arks was extracted. Figures 16 and 17 show the teeth right after removing of the brackets. Reconstruction of the teeth, restricting spaces over 1 mm, was recommended. Reshaping was done on: the distal surface and the distal part of the incisive edge of 13, 23 and 33, the medial surfaces, labial, lingual and occlusal surfaces of 15, 25 and 35. Failed composite distal-occlusal restoration on 25 was changed achieving the aproximal contact with 26 in this way (figure 18). The tooth crowns were restored with **Gradia Direct Anterior** shades AO3, A3, A2 and transparent NT.

Figure 16 – front view after bracket removing



Figure 17 – 13 and 15 after bracket removing



Figure 18 – reconstruction of distance between 23-25 and 33-35



Figure 19 - reconstruction of distance between 13-15



DISCUSSION

Diversions from the normal occlusion after orthodontic treatment are due to hard tissue lack and increased size of the anterior part of dental ark. There is a lack of dental structures in:

- microdontia, which usually affects the upper lateral incisors;
- hypodontia;
- proportionally sized maxillary incisors, but not in harmony with the width of the lower anterior teeth (diversion of the index by Tonn).

In such cases there are small diastemas and spaces. When the shape and size of the incisors, predominantly the lateral one, don't necessitate prosthetic reconstruction, and the occlusal ratio of the molars is normal, esthetic and functional tooth reconstruction with composite can be done.

One of the common reasons for size enlargement of the front part of the tooth ark is protrusion of the anterior teeth. Pathologic protrusion occurs when there are such habits as irregular swallowing, periodontal diseases, sucking of the thumb, etc. Specific cause for protrusion is forceful protrusion of the maxillary anterior teeth in the cases of orthodontic treatment without extracting teeth in the lower jaw and extraction of the upper premolars. Usually for finding place for the lower anterior teeth there is need of protrusion in the lower front teeth. This can be achieved by preliminary protrusion of the upper anterior teeth. Consequently diastema and spaces between teeth open. After their closing, between the four incisors there are spaces left between lateral incisors and the canines. The existing Class I ratio in the canines must be preserved.

The upper incisors in some cases and indications (the overjet is becoming less or there is an unesthetic view of the incisors) it's very suitable to enlarge the size of the lateral incisors and canines by closing the spaces between the teeth (1).

Closing diastemas between teeth by enlarging tooth size is suitable only when an esthetic shape and size of the reconstructed teeth is expected. This way of reconstruction

has the following advantages:

- the esthetic results are excellent, when there are particular indications,;
- it prevents prosthetic treatment in the anterior teeth and all the accompanying disadvantages;
- it preserves the Class I ratio of the canines and particular height and inclination of the upper incisors in treatment with premolar extraction only in maxilla.

One of the great challenges in the contemporary restorative dentistry is achievement of well balanced harmony in teeth. High esthetics can be achieved by exact adaptation of the color, hue, opalescence and the smoothness of the material surface, longevity of the color and integrity of the restoration.

In the presented clinical cases a multi layering multi shade technique was used in order to eliminate the possibility of light passing through the relatively transparent standard shades of **Gradia Direct Anterior**, where should be achieved perfect imitation of the totally missing tooth structure. Moreover we tried to achieve deep and esthetic view of the restorations.

In recent years clinical observations confirm the stability of the adhesive materials in relation to their shape and color and their ability not to harm the gingiva (2, 3). 89% of investigations show satisfactory esthetics of the composite restorations for reconstruction of the tooth shape and position in a five year period. The rest of them need change because of failure in their anatomic shape and to some extent because of color discrepancy. Not all cases can be with longitudinal guarantee because of changes in the tooth shape and wearing and fracture of the restorative material (2). Recently there are several published cases of direct composite restoration of different discrepancies in the tooth form, reconstruction of tubercles or for compensating the space between the central incisors and the teeth next to them, when the lateral incisors miss(3).

The color photos may be an assessment for the results of color, translucency and opacity, as the differences between the assessments made by color photographs and the direct clinical examination are not statistically considerable. Direct clinical assessment of the polishing of the composite restoration is more exact than the indirect assessment (3).

Shape and size of some permanent teeth and the spaces existing between them, can be changed due to the adhesive qualities of the direct composite materials and their proved esthetics. The balance between science and practical precision is equal to the art which must turn the smile on the face of our patients.

CONCLUSIONS

Direct composite restorations are effective for esthetic reconstruction in the anterior part of dental ark.

In case of some indications after orthodontic treatment with fixed appliances, correction of the shape and size of the permanent teeth restricting left spaces and diastemas, can be made by using direct composites. Advantages:

- in suitable indications an excellent esthetic result can be achieved;
- preservation of Class I occlusion in the canines and suitable height and inclination of the maxillary incisors in treatment with premolar extractions only in the upper jaw, is achieved;
- retaining of the results after orthodontic treatment;
- prevention prosthetic treatment in the anterior region.

The already presented clinical cases demonstrate that reconstruction of permanent teeth with direct composite materials gives good results and stability of the longitudinal orthodontic treatment.

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