Colouring and Shaping of Central Incisors

At the present time more and more patients make exigent demands in terms of the aesthetic aspect of dental structures. The use of up-to-date materials and technologies makes it possible to create high quality composite restorations for all classes of cavities. Over the past few years virtually all leading manufacturers have improved the characteristics of filling materials produced to a considerable extent. Consequently, the materials in question possess high physical, mechanical and aesthetic properties.

A representative of the new range of materials is a nano hybrid composite known as Grandio by VOCO, Germany. The material is meant for filling cavities of classes 1 to 5 according to Black, aesthetic filling of front teeth, correcting their shape and colour, splinting, restoring a tooth stump before crowning, producing inlays and veneers. Grandio is available in 15 colour shades and has the chameleon effect.

The following clinical example is used to demonstrate the effectiveness of using Grandio in aesthetic dentistry.

The aesthetic defect of the young patient’s incisors on Picture 1 resulted from dental chipping.

Dental plaque is removed off the whole tooth surface. The colour and the type of translucence are tested and
the colour field containing the sketch of mamelons and the translucent enamel layer (Picture 2).

The opaque Grandio composite is represented by colour OA2, while the enamel composites are represented by colours A1 and A2. The translucent layer (I) is observed on the whole of the vestibular surface and as a wide (1mm) layer along the cutting edge. On the left central incisor the distinct trace of mamelons can be seen. In accordance with the results of the examination, the planning for the size and shape of the restoration is carried out.

The odontometry consists in measuring the vertical as well as horizontal parameters of the partially preserved left incisor, which is done by application of a micrometer. The odontoscopy presupposes a description of the vestibular surface relief for the symmetrical and neighbouring teeth. Medial incisors are characterized by side attachment i.e. the medial angle is sharper than the distal one. On the vestibular surface of the 21 teeth there are three vertical elevations, the largest of which is the mesial one and all of which are separated from each other by furrows. The cutting edge has a slight hollow on the distal angle side.

The dissection of hard tooth tissues presupposes the slanting of the enamel from the chipping side towards the equator i.e. the gingival ridge. The size of the slant approximately equals to that of the defect and may be up to 3 mm high along the whole chipping. The sharp end is smoothed down by means of diamond dental drills, especially by cylinder- and cone-shaped ones.

Because the restorations of front incisors marked by carious cavities or crown fractures in the cutting edge area usually involves the use of parapulpal pins, two of them are set in the perigingival area of tooth 11 (Picture 3). The pin diameter depends on the thickness of dentine between the tooth cavity and the dentinoenamel junction and its length is relevant to the depth of the defect. In order to avoid the perforation of a tooth cavity or dental wall the pin is located in between the dentinoenamel junction and the tooth cavity, parallel to the tooth axis. Parapulpal pins are bent over by means of a pin bender so that their free ends should not be caught in the transparent area of the restoration i.e. towards the vertical axis and in the oral direction (Picture 4).

As the patient is young, the low-mineralized
Dentine is covered with Ionofil (VOCO, Germany) glass ionomer filling cement of chemical solidification (Picture 5). The Ecusit-Etch gel is next used to acid etch the prepared surface (Picture 6). In 30 seconds’ time the gel is washed off with a water jet and the surface gets dried with an oil free air jet until the enamel turns opaque. Afterwards universal adhesive is applied (Picture 7).

To neutralize the metallic colour the cannula pin gets covered with flowable opaque Grandio Flow – OA2. The flowable composite is spread all over the in surface with a thin instrument (a file or a reamer) so that no air bubbles should be left in the material. The area above the pin is then lit for 40 seconds (Picture 8).

The dentine structure base is modeled with the opaque Grandio OA2 composite. The quantity of the material used does not exceed the quantity of the dentine lost. The material is applied in layers no more than 2 mm thick and is lit for 40 seconds each (Picture 9). While the opaque layers are applied the proximal surface must keep a distance of 0.5 – 1 mm (type of enamel translucence) from the adjoining teeth.

Next the lower border of the opaque layer, represented by mamelons, is modeled. To form each prominence separate portions of the material are applied and later on deepened to the required level. The borders are smoothed down to imitate the pattern of the mamelons along the cutting edge, individually shaped as rounded petals (Picture 10). To emphasize the translucent edge between mamelons the incisial shade of the composite is selected (Picture 11).

The opaque base, which is meant to compensate for the dentine lost both in quantity and in shape, is covered with Grandio A1 in agreement with the colour samples selected previously (Picture 12). A thin layer of the material is applied and spread over with the help of a medium-size smoother (Picture 13).

To imitate the relief and the optics of the tooth it is necessary to restore the natural furrows and elevations. For this purpose a well-measured portion of the material is applied on to the vestibular surface and is carefully spread over with a smoother.

The composite is pressed on with a body of cone-shaped instrument to make hollows symmetrically to their location on the intact incisor (Picture 14). The
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Material is then hardened via exposure to halogen light.

The contact surfaces are also modeled with enamel shades of the composite, which is applied over the corresponding opaque layers and spread over with consideration for the individual type of enamel translucency. The area of mamelons, cutting edge and crown corners is also covered with the translucent composite after which the final lighting takes place.

Straight after the aesthetic restoration is completed it is manually treated to remove the upper hybrid layer and to contour the surface; the distal recess on the cutting edge is formed; occlusal contacts with antagonist teeth are checked on and polishing is done. The tooth is covered with a fluoride-containing preparation, the work is finished (Picture 15).

Next the patient must visit a dentist surgeon to undergo the shape correction of his gingival margin.

The completed step-by-step procedure described above may be used to demonstrate the creation of an aesthetic restoration of central incisors with the reconstruction of tooth optics, such as: translucency degree, mamelons and shades of colour typical of a particular patient’s teeth as well as modeling of the incisors shape, their cutting edge and surface relief. The aesthetic restorations created fit in with the patient’s natural teeth perfectly.

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