

AESTHETIC TEETH RESTORATION IMPROVEMENT

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The aim of the investigation was to develop the technique of aesthetic teeth restoration improvement in hard tissue pathology treatment.

Materials and Methods. The transparency and color of anterior intact teeth (incisors and cuspids) in 300 patients aged 25–65 years in different polyclinics of Nizhny Novgorod were studied. The patients were divided into three age groups (100 patients in each group): 25–40 years, 41–55 years and 56–65 years. The teeth color was determined by SHADE EYE NCC (Japan) and a self-design device.

Conclusion. The development of the technique of aesthetic teeth restoration improvement using complementary examination tools enables to restore teeth most precisely and therefore, according to high standards.

Key words: aesthetic teeth restoration; dental form; tooth color; transparency of hard tooth tissues.

The improvement of the quality of service is one of the highest priorities of dentistry development. An important aspect in achieving the quality of aesthetic restorations is the adequacy of the choice of technology for their restoration. The variety of “authoring” techniques, appearing of new restorative materials have led to the fact that it is very difficult for a dentist to choose a right unified system for implementing his goal [1–3].

Aesthetic restoration of teeth is a relatively new trend in dentistry, in which except for treatment of defects of dental hard tissues, the restoration of individual and anatomical form, function of teeth and dental system as a whole being included too [4]. Aesthetic requirements for these services by patients are very high, resulting in an urgent need for the development and integration of adequate methods for aesthetic restoration taking into account clinical and functional outcomes. This issue is relevant both from scientific and practical points of view [5–8].

The aim of the investigation was to develop a method of improving the quality of aesthetic dental restoration in the treatment of diseases of hard tissues. To accomplish the task, the main issue was the following: the use of additional devices for aesthetic dental restorations.

Materials and Methods. To address this issue there were used: 1) the measurement unit for determining the color SHADE EYE NCC (Shofu Inc., Japan), and 2) a lamp Demetron Shade Light (USA), 3) a device designed to determine the color of the teeth [9], 4) Nikon camera COOLPIX S8000 (Japan) in black and white and color photography, and 5) curing light with a blue glow (USA), 6) veneers caliper and caliper. The transparency and color of the front group of intact teeth (incisors and canines) were studied using these devices in 300 patients aged 25–65 years in various clinics of Nizhny Novgorod. Patients were divided into three age groups of 100 people each: 25–40 years, 41–55 years and 56–65 years. The age of

patients was limited to 65 years, as a person over the age of 65 years is more in need of orthopedic treatment.

To determine the color of the tooth we have chosen not subjective but objective method:

We used shadowless lamp Demetron Shade Light (Fig. 1), the instrument for determining the color SHADE EYE NCC (Fig. 2), and a device for determining the color developed by us [9] (Fig. 3).



Fig. 1. Demetron Shade Light Lamp

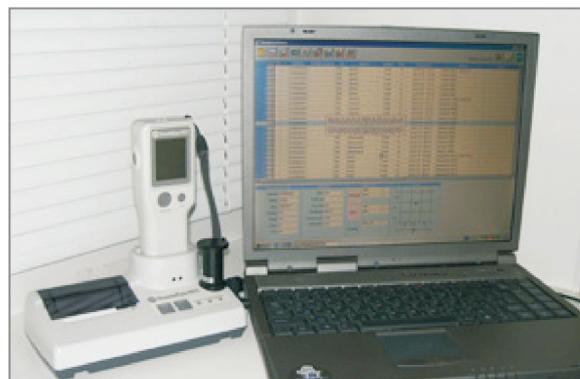


Fig. 2. Shade taking device SHADE EYE NCC

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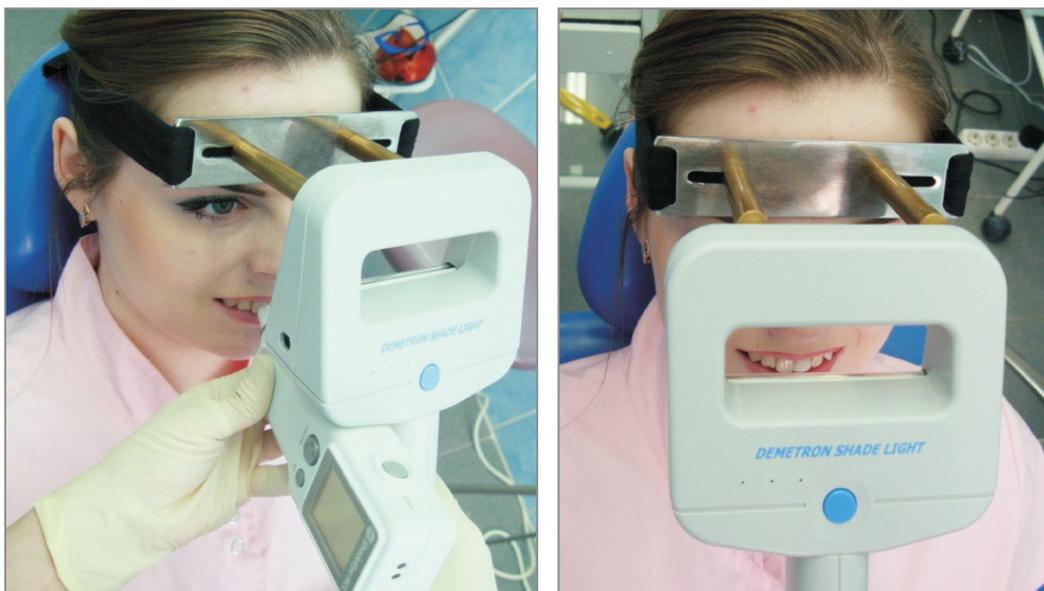


Fig. 3. Device for measurement tooth colour

The shape of the teeth was studied with a veneers calipers and caliper, 4 front upper incisors were studied. These teeth as an element of a smile reflect the personality of an individual at a specific dental pattern. The shape, length and width of the upper front teeth are the subject of mathematical, physiological and psychological interpretations [10] and often coincide with the shape of the face.

Transparency has been studied in a dental chair using

a dental mirror and a lamp, dental unit and camera Nikon COOLPIX S8000 in black and white and color photography, followed by editing with the program Photoshop CS5. Illuminating teeth with crowns with curing light with a blue glow was carried out as an additional method of investigation

Results and Discussion. The study of teeth transparency in all groups of patients (See Table, Fig. 4) allowed to combine the data within the classification of hard tissues transparency:

1. Opaque teeth (they have a uniform structure, of very bright texture).

2. Partially transparent teeth (glass cover of the cutting edge as a thread)

a) Clear cutting edge with severe mamelons;

b) edge without mamelons.

3. Full transparency of 1/2 of the lateral surfaces and the cutting edge, (a dull gray cutting edge and the proximal (contact) surface looks like a gray glass band around the tooth having thickness of about 1.5–2 mm. At this, approximal surface in bright light changes considerably.

In our study, there were three groups, but they differed from the classical classification [11] in that group 2 contained two subgroups. The results of the study of commensurability of the face shape and four maxillary incisors have allowed to identify six types of faces: square, triangular, trapezoidal, oval (ovoid), oval-triangular, rectangular and they conform to the shape of the teeth (Fig. 5).

Level of teeth transparency in different age groups of patients, %

Sort of transparency	25-40 years old	41-55 years old	56-65 years old
Opaque teeth	24	78	83
Transparent cutting edge with mamelons	38	18	15
Equally transparent cutting edge without mamelons	29	3	2
Full transparency	9	1	0

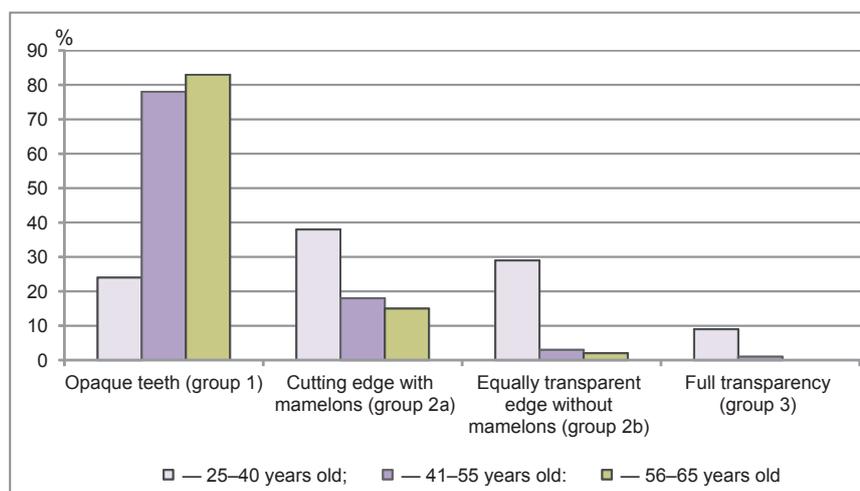


Fig. 4. Results of transparency study



Fig. 5. The shape of the first incisor conforming the type of face

The first type is found in 19% of cases (Fig. 6), it has a square shape, the parallel of medial and distal contact surfaces being noted throughout the height of the tooth of the clinical crown. Lines drawn from the cheek bone toward the corners of the lower jaw are also parallel.

The second type occurs in 10.1% of cases, the teeth — of a conical or triangular shape. The lines that form contact surfaces converge. Lines drawn from the cheek bone toward the corners of the lower jaw also converge.

The third type — a trapezoidal face, is an intermediate form between the first and second type and occurs in 30% of cases.

The fourth type — an oval (ovoid) face is found in 12.9% of cases when the outer contours of the teeth and face are oval in shape.

The fifth type — a triangular-oval face, is an intermediate form too, and it is found in 15.4%.

The sixth type — a rectangular face, is found in 12.6% of cases.

The study of symmetry of teeth color of the left and right half of the jaw is an integral part of a complete study of the individual characteristics of the teeth. It often happens that the color of the performed restoration harmonizes with the color of the teeth in the denture, as a result the patient is not satisfied with the work performed and the color of the teeth is one of the causes of conflict between the patient and the dentist [3, 10, 12, 13]. According to the literature review [14–17] in the survey (polling) 162 dentists and 178 dental technicians it was found that 37% of them consider definition of the color of teeth to be problematic, 58% of them

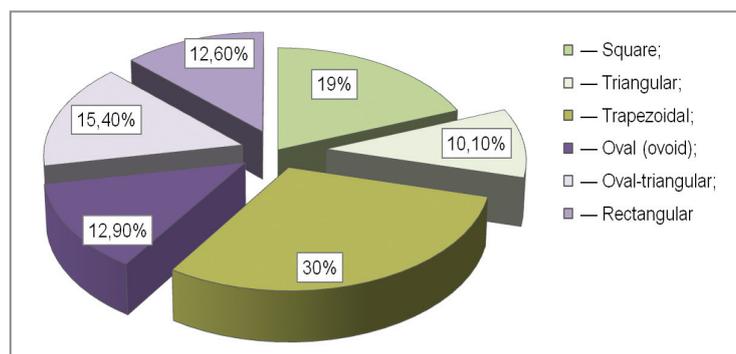


Fig. 6. Commensurability of face shape and four incisors of the upper jaw

determine the color of the teeth correctly in most cases, and 5% — are always satisfied with the results of their work.

In our study, with a statistical reliability ($p \leq 0.5$), it is determined that there is no 100% of symmetry of the teeth of the left and right sides of the upper jaw. This is due to the presence of teeth having discoloration because of caries complications (Fig. 7) or the presence of non-carious lesions on the vestibular surface of the front group of the teeth (Fig. 8).

Thus, our results suggest that the teeth of each patient have individual characteristics and therefore the work on art restoration requires a highly skilled specialist, the use of exclusive techniques and advanced structural and auxiliary materials. Using new data from the study of transparency, shape and color of teeth and using additional methods of examination, it is possible to facilitate the performance and improve the quality of restoration. Today's patients are



Fig. 7. Discoloration of tooth enamel 1.1



Fig. 8. Hypoplasia of teeth 2.1

aware of the possibilities of aesthetic dentistry and expect that they will receive good results due to the restoration.

Conclusion. The development of the method of improving the method of teeth aesthetic restorations using additional resources of examination allows performing restoration work with the greatest accuracy, and therefore the highest quality.

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