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AESTHETICS-DENTAL STRUCTURE PRESERVATION AND RESTORATION METHOD

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Abstract

Knowing the shape, position and size of the teeth is the key to success in fixed prosthodontics. Color is often considered the most important factor in the aesthetic result, but the perfect shade on the wrong shape always leads to disaster. Some teeth, namely the most protruding in the mouth, are of major importance at first sight. Prosthetic restorations of front teeth made of dental porcelain manage in most cases to restore, due to the qualities of the materials used, the natural appearance and natural beauty of the teeth, creating the impression of vitality, translucency and volume. Due to its privileged position on the maxillary dental arch, the maxillary front group of teeth poses an aesthetic challenge to any dentist when it comes to its prosthetic restoration.
Keywords*: fixed prosthodontics; prosthetic restorations; aesthetics;*

Introduction

Aesthetics is defined as *'the science of beauty in nature and the arts'.* Although easily accepted, such an interpretation contradicts a number of famous statements voiced by titans of the world cultural heritage: Plato - *'beauty is virtual',* Hegel - *'beauty cannot be an exact science'* or Leonardo de Vinci - *'human beings are the sensitive vector that gives life to essential beauty'.*

The perception process represents the organization of sensory data received, transmitted and processed intellectually, elaborating a response as a result of their corroboration with the results of previous experiences interpreted unconsciously [1-3].

Visual perception is a prerequisite for aesthetic appreciation, in the same way that visual analysis is a routine component of regular clinical examination nowadays. Smile, as a primitive and at the same time essential form of human communication, appears very early in the course of a child's development. The possibilities that the adult has to show a pleasant smile depend directly on the quality of the dental elements involved in this smile.

In this context, the harmony of facial features, determined by the configuration and morphological integrity of the skeleton and soft parts, is decisively influenced by the appearance of frontal dental arches [4,5].

It is important to know the anatomy of each tooth, as the front teeth on the upper jaw have some distinctive features that are worth mentioning. The central incisors have three incisal lobes when they erupt, which flatten over time; the marks that define the edges between the separated lobes remain on the oral surface. The mesial edge of the tooth is straight, forming a contact area and not a point of contact. The lateral incisors are a smaller version of the central incisors;

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however, they have more marked concavities in the cervical third, and therefore they seem closer. Pathological changes in such a visible area undoubtedly have essential implications and meanings for a balanced and harmonious life of any individual, also having serious consequences on his/her social inclusion and interpersonal relationships [6].

As early as they erupt on the arches or, most frequently, after their eruption, front teeth may acquire a series of conditions that induce physiognomic dysfunction by altering the qualities that define their aesthetic specificity: *shape, size, number, position or color* (Fig.1).

Fig. 1. Different aspects of aesthetic specificity [7]

Current aesthetic dentistry makes it possible to treat an extremely wide range of clinical conditions by therapeutic means applied exclusively in the dental office, in the absence of any input from the dental laboratory [8].

Upper jaw canines are very protruding, their unsuccessful restoration leading to aesthetic failures. Their length is about the same as that of central incisors, but the central lobe is much more prominent, the most prominent in that cervical region. The incisal part has a strong palatal direction, which persists even when the function or parafunction alters the incisal part. The most apical point of the gum is distal to the axis of the teeth, on the upper jaw central incisors and on the canines. The upper jaw lateral incisors and lower jaw incisors have the highest and lowest gingival point, respectively, which is located along the axis of the teeth.

Aging is a biological process of the whole body that follows a stage of development, being the last stage of biomorphosis [9].

Modern gerontology does not consider aging as a disease or as a unitary, biological phenomenon. An increasing amount of knowledge has been accumulated about biological aging in recent decades. It does not occur in all individuals in the same way, but is specific to each individual; it is often very difficult to distinguish between the pathological processes and the normal aging phenomenon.

One should note, however, the involvement of aging in oral pathology as well as the involvement of pathology in the phenomenon of oro-facial aging, with repercussions on the functionality of the stomatognathic system and hence on the physiognomic appearance [10].

The restoration of the physiognomic function of the stomatognathic system in the most successful way has been and still is a major concern of any dentist. This is justified by the patient's concern for his/her physiognomic appearance, regardless of his/her age.

The shape and position on the arches of the teeth contribute to the externalization of the human personality. Thus, square or rectangular front teeth, with abraded, angular incisal edges, give the face a *new masculine appearance*, while oval front teeth, with round incisal edges, give a *feminine note* to one's appearance. Incisors with a flat vestibular face indicate old age and intense activity of the oro-facial muscles, while incisors with a convex vestibular face express vitality, youth and indicate a reduced activity of the oro-facial muscles (Fig. 2).

Fig. 2. The shape and position of the teeth according with patient`s age [11]

Man is a social being. Life in society has helped him to discover the physical, mental, and moral qualities of his fellow beings, to analyze them, and to set assessment criteria for what is good and what is bad, what is beautiful, and what is unpleasant in the appearance of those around him. One of these criteria is the harmony of features and the beauty of human face.

However, the terms *'beautiful'* and *'pleasant'* do not have an absolute general meaning: the meaning varies according to the way the individual lives and is educated throughout his life.

The human face is not the same in all individuals and it is definitely not the same in all human races [12].

Facial features are the result of man's biological adaptation over time to his environment, and geographical, social and economic conditions, which come up during the different stages of his development. Each of these factors leaves its mark on his facial configuration, thus contributing to the formation of physiognomic features that distinguish individuals from each

other. Words like *'beautiful', 'aesthetic'* or *'physiognomic'* are used when assessing an individual's facial features.

Face physiognomy – distinct function of the stomatognathic system, depends on the morphological configuration of the bony skeleton of the face, jaws, dental arches and soft parts covering this skeleton, as well as the position on the arch of the front teeth. The color of the skin, the different protrusions and depressions, the show of shadows – they all contribute to the harmony of the face, to a pleasant or unpleasant facial expression [13].

Facial expression is not static; it varies with the action of the underlying muscles and the symmetry of their contraction. Under the influence of the contractions of the oro-facial muscles and of the muscles moving the lower jaw during mastication, speech and other actions involving these muscles, appearance - *facial physiognomy* - changes constantly with age. The physiognomy of the face has a well-defined functional role, of exteriorization, of communication of emotions and as such it is one of the basic functions of the stomatognathic system – *the physiognomic function* [14].

The incisal edge of the upper front teeth - especially of the front upper teeth - may or may not come into contact with the occlusion plane or may exceed it. Each of these situations gives the individual a particular physiognomic appearance. When the incisal edge exceeds the occlusion plane, the teeth achieve a lower convexity that gives the individual a youthful and good mood appearance. When the incisal edge reaches the occlusion plane, the teeth contribute to a harsh, austere appearance. When the incisal edge does not come into contact with the occlusion plane, due to the length of the canines, the individual looks old, in a bad mood, sad and generally in a much more negative psychological condition (Fig. 3.).

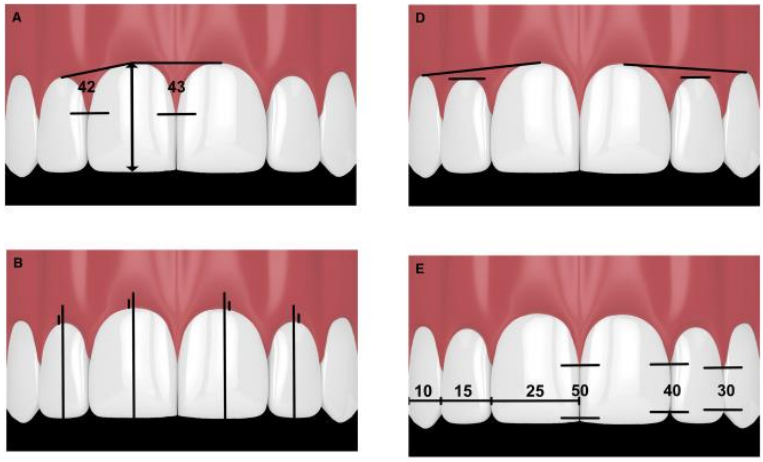

Fig. 3. Aspects of aesthetic armony of frontal teeth [15]

Most diseases of the stomatognathic system have an important influence on facial expression, which, combined with the involution changes occurred, further disrupt the individual's physiognomic appearance. Dental crown lesions, front teeth edentulism, partial extensive edentulism accompanied by lower jaw shrinkage and by mandibulo-cranial malpositions, as well as subtotal and total edentulism disturb face physiognomy.

Dental, periodontal and prosthetic treatments are often mainly aimed at improving the individual's physiognomic appearance. Therefore, an intervention is required whenever there is a disorder in the restoration of normal function [16].

The intervention of the dentist for the sole purpose of improving the patient's physiognomic appearance would not be justified if we did not acknowledge the distinct functional role of physiognomy in all the functions of the stomatognathic system, as well as the negative influence it may have on the neuro-psychological state of the elderly, when disrupted.

We may therefore conclude that this is another reason why physiognomy should be regarded as a distinct function, along with the other functions of the stomatognathic system and why it should be restored, regardless of the patient's age.

The patient's facial aesthetics assessment and restoration should represent a major concern for any dentist, being one of the major criteria for therapeutic success.

Dento-facial aesthetics is currently considered the fourth dimension in clinical dentistry. Together with the biological, functional and mechanical factors, the aesthetic factor significantly contributes to the success of the clinical outcome. After about half a century of pioneering work, dento-facial aesthetics could be considered a true dental specialty.

Nowadays, countless debates have been recorded in literature, as we face a real avalanche of information, not so much about its novelty, but especially about its place on the borderline between art and science.

Aesthetics seems have a certain supremacy over the other dental disciplines, as it addresses all of them and particularly as it is aimed at achieving satisfying results for both the dentist and the patient [17].

Narrowing the scope of action of dento-facial aesthetics, an action that takes place according to well-established criteria, we find that most of them may be accounted for in the field of dental prosthetics. The number of cases of elderly people with deficient rehabilitation of their physiognomic appearance due to the non-observance of basic principles and requirements of restoration of the physiognomic function increases with the patients' ages, which determined us to study this problem.

There are many factors involved in changing the physiognomic function in the elderly, and they often pose problems in restoring the physiognomic function, which is why they must be known.

The advantage of dentists nowadays lies in their ability to make decisions that have predictable and long-term results.

Dental aesthetics has always been an integral part of practical dentistry despite the fact that it has only enjoyed objective critical analysis for about a decade. In the beginning, aesthetics was seen as an art - synonymous with subjective, romantic and sentimental sensations. At the time when the fundamentally aesthetic principles were based on Greek and Roman mathematics, painters used to study aesthetics in order to create their paintings, which reflected the depths of our soul [18].

One could talk endlessly about the two sides of dental aesthetics - scientific and subjective. It is difficult to distinguish between the different components of dental aesthetics because they all are closely interrelated and interdependent.

As early as the Hellenic and Egyptian Empire, connections have been established between the shape and color of teeth, concepts that were later retackled during the Renaissance.

Firstly, in any composition color is fundamental and dominates shape, angles and lines. The difficulty of choosing the degree of brightness, which is part of the shade of white, of choosing the hue of color or saturation, is due to the eyes that are focused on the characteristics of colors. Secondly, any shape can be created from three basic shapes (circle, triangle, square).

These geometric shapes have religious, mystical and esoteric origins. For example, in Antiquity the triangle was a sign of the approach of a danger, a meaning preserved until today. The circle represents the heavenly spirit that renders equality and purity. The square represents power and stoicism, which is associated with the eternal base of the Egyptian pyramids.

The upper front teeth (maxillary incisors) combine in themselves all the basic geometric shapes and extremely well-known connections have been established between the basic shape and its psychological meaning (square teeth - balance, stability, oval - femininity, fragility, etc.).

The line can also be seen where it does not exist - the incisal edge of the upper front teeth is often perceived as an incision surface, although in reality it does not exist. The direction of the line can create an optical illusion. The vertical lines on the vestibular surfaces of the incisors make the tooth look longer, while the clear horizontal lines make it look shorter and wider. There have been many controversies regarding the divine proportion or golden ratio.

The proportion in a composition is similar to the harmony of a piece of music. For instance, when proportion is observed in a sequence of musical notes, harmony is born, the result being a rhythmic and harmonious melody.

Similarly, when visual proportions are repeated and are identical in a visual field, they are perceived as something artistic or as something artistically pleasing. The ancient Greeks searched for methods to measure the beauty of the human body so that painters and sculptors could more easily reproduce it in their works of art. Their goal was to define a simple, mathematical principle that could render beauty and harmony.

Pythagoras suggested the use of the golden number, represented by a Greek symbol Δ [(Δ5-1):2)]. The symbol Δ is equivalent to 0.618 and has been called the Divine Proportion or golden ratio. Objects or beings that fit this ratio were considered carriers of natural beauty.

It would be interesting to mention that several types of beauty have been defined: natural, absolute or subjective.

Absolute beauty may be defined as follows: if two objects (one having the Divine Proportion and the other not having it) are shown to a group of people, than 99% of those people will indicate the one having the divine proportion as the beautiful one.

Subjective beauty depends to a great extent on the psychological factor.

The golden ratio has been exemplified in thousands of ways - the beauty of the human face is attributed to the fact that it is subject to 0.618.

The ancient Greeks were the ones who discovered the basic principles of aesthetics: divine proportion, symmetry, composition, harmony. For individualism and beauty, the periodicity and repetition of the same proportion may be more important than the proportion itself. The 0.618 ratio is an ideal of beauty and yet other ratios - 0.577 or 0.8 - are considered just as aesthetic, provided that they are repeated with a certain periodicity in a single composition.

Symmetry may be static or dynamic. Static symmetry is noticeable when repeating the proportion in moving or animated objects - flowers.

The ArtDeco current of 1930 is a classic example of the use of dynamic symmetry. Dynamic symmetry has been a link between nature, buildings, and the work of art since ancient Greece. The analysis of Greek architecture shows us a series of identical proportions that are also repeated in nature.

Therefore, geometry alone is not enough. In defining beauty, dynamic symmetry must also be taken into account (Fig. 4).

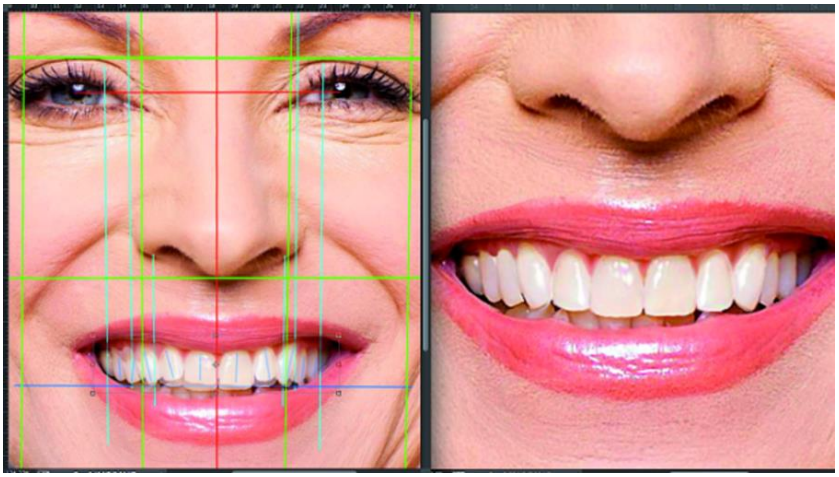

Fig. 4 Aspects of divine proportion [18]

Compared to divine proportion and dynamic symmetry, integrity in a composition can decisively influence the overall impression by introducing the dominance of an element, considered a 'key' element. For example, it is important to note that the teeth are placed at precise intervals. Architecture defines the location that is both functional and aesthetic. For instance, the incisors are placed according to a certain principle and proportion that is repeated not only for the external beauty but also for accurate functioning when the lower jaw moves.

Aestheticians talk about the existence of two main visual forces. The first type of force of attraction (amazement) is responsible for integrity and harmony, as in the case of two parallel objects or as in the case of a frame that highlights an object by surrounding it. From this point of view, the lips are like a teeth frame [19,20].

The second force is that of rejection (division) which causes strain and interest - for example objects that divide each other perpendicularly or in half. The forces of rejection are necessary to cancel the monotonality in a composition and to create diversity [21-23].

The balance between these two forces brings equality and stability. This principle may be compared to a scale on which the weight is divided equally on both plates. It is necessary for the forces to be in balance in order to restore equality and balance.

The dominant point in a composition must be the main one and stand out. This is achieved by position, size or color.

In a composition, an object larger than the others will be dominant and will render the volume. In dentistry, there are two types of dominance: *unitary*, related to separate objects, for example the upper central incisors, which distinguish themselves by their width and volume; *segmental*, which is most often chosen by patients and represents the dominant of a group of objects in a composition, for example the group of the 6 upper front teeth [24-26].

The color of the object is another component of the dominant factor especially if it is involves the use of reciprocal, complementary colors. The resemblance is responsible for the shape, color, position and linear angles of the object. For instance, teeth with similar shape and color, which are correctly aligned, are similar, hence pleasing to the eye.

Continuity gives us as an example the development of similar proportions from the upper central incisors to the canines [27-29].

Completion is another very important principle for the conception of beauty and for the study process. The phenomenon of 'Gestalt' as a union between the aesthetic principles and the psychology of the human brain has also been referred to in the past. Thus, it has been found that a certain union, repetitiveness and grouping can stir the interest for a composition. When the purpose or periodicity is not finished, then short-term memories will be dominant, which in turn disappear after 24 hours. As a result, the human brain remains in a state of confusion and cannot find a solution to the problem. It ignores the stages so as not to enter a state of stress or mental concentration and the object is forgotten [30].

Prosthetic restoration by fixed means most often requires the solidarity of a high number of teeth to solve biomechanical problems due to the amplitude of the edentulous space. The occlusion forces acting on a fixed denture are transmitted through the dental bridge to the abutment teeth which, in turn, place a strain on the periodontal support structures.

The process is influenced by a number of variables, such as the nature of the occlusion, the extent of the edentulism, the periodontal support surface and the health of the periodontium, which can influence the length of the life of both the denture and its abutment teeth.

Occlusal overload may be due to the exaggerated flexion of the dental bridges with high amplitude, being known that it varies with the cube of the length of the dental bridge.

Conclusions

According to Pius Servien, 'one must undoubtedly be born for both science and art'. In addition to thorough medical and specialized knowledge, this requires learning the precepts of ethics and morality in general, as well as a far-reaching intellectual horizon.

Above all, the doctor must cultivate his/her aesthetic sensitivity, taste and artistic refinement. How else could he/she get closer to better understand the state of abnormality, the state of disease, which disturbs the beauty and harmony of a healthy human body?

The clinical outcome supports the conclusion that the efficacy of the rehabilitation treatment does not differ significantly from that of other conservative therapies or any other treatment.

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