



Full Length Review Article

SYNESTHETIC DENTISTRY

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ABSTRACT

Beauty is appreciated by stimulating the higher senses of sight and sound and has mystified both scientist and artist since the ancient Egyptians some 5000 years ago. Beauty is all about perspective or point of view. The same thing which is beautiful in one's eyes, could be viewed as an ugly thing in another's. Understanding patient's perceptions of their dental appearance is an important aspect of patient management which may assist dentist in planning treatment that are acceptable to the patient leading to higher level of patient satisfaction. It is very important to dentist to have some understanding about the psychology of human being. We certainly can be pushed by our patients to offer the services that they want, but we are the ones who maintain the professional knowledge about what's safe, appropriate, and will be maintained long term as well as what might do harm rather than good. This article redresses this balance by emphasizing the artistic nature of dentistry and rationalizing the criteria that constitute artistic perception.

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INTRODUCTION

The concept of synesthetics encompasses both the time-arts such as music, theatre, literature and film, as well as space-arts such as paintings, sculpture and architecture¹. Dentistry is often described as a fusion of art and science. While the scientific aspect is well documented, the artistic component is nebulous and often subject to interpretation. The use of the word "aesthetic" as a description of artistic dentistry is essentially flawed. While it forms part of artistic concepts, aesthetics is not the quintessential description of what constitutes art or its perception by the human brain. Take an easy example, some would find an actor/ actress very pretty or handsome, while some would surely do possess a different view. How you would analyse, interpret or evaluate one thing, it is dependant on the individual that would build ones perception. Everybody's perception is different more or less, and that's why, beauty has apparent appeal. Certain body modification practices, such as neck elongation or tooth filing, may appear strikeexotic, we must realize that we modify our own bodies in countless ways. People may seek to control, "correct" or "perfect" some aspect of their appearance or to use their bodies as a canvas for creative self-expression.

While some seek to improve their body-image, this is not necessarily a motivating factor for everyone who engages in body modification. Additionally, some attempts at body modification can also have unintended negative consequences that might ultimately damage self-esteem (Edison's Dream of a New Music, 1913).

What is Synesthesia

Synesthesia is derived from the greek word synandesthesia, syn = together andesthesia = sensation, which means union of senses or a feel good factor. Synesthesia is governed by neuron pathways in our brain that descide how we percieve the beauty. Synesthesia simply means combining senses. In other words, instead of merely seeing a color, a synesthete might actually hear and see it. Instead of merely hearing a symphony, a synesthete might actually taste and hear it. Though there was some awareness of synesthesia in European artistic circles between 1880 and 1925 and later, it is only now being intensively studied worldwide; research is still in its infancy. Synesthesiais a condition in which stimulation of one sense also evokes another sensory pathway in the brain. It is involuntary, automatic (consistent and permanent). It can be cross-modal and inter-modal(=cross-sub-modal). It is highly memorable. It is paired with emotion/mood. It is most often unique to one person, but similarities exist between the

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synesthetic types. The synesthetic phenomena is an extension of perception rather than a limitation, as in color blindness. It is directional, from one modality to another (Carpenter, 2001).

Forms of Synesthesia

According to current statistics, approximately four per cent of the population has one or more of the over 60 forms. Some common types include colored graphemes, colored days of the week, colored months of the year, and colored sounds. Rarer ones include scents that have sounds or words that have flavors. Synesthesia comes in various forms, but one of the most common forms is known as grapheme-color synesthesia, which simply means that individual symbols for numbers sometimes even texture, shape, or gender. Therefore, a Grapheme-Color synesthete might view the letter "G" as being tall and lanky, having the color blue and being male—along with other possible attributes. Other forms of Synesthesia include Number Form Synesthesia, which allows some to actually map out mathematical problems as shapes, and Sound-Color Synesthesia, which causes the synesthete to not only hear a symphony, but to also experience an automatic light show accompanying it. Lexical Gustatory Synesthesia is quite fascinating as it allows the synesthete to associate taste with spoken language so that words can literally leave a bad taste in your mouth (Cooper, 2007).

Edison's Teeth: Touching Hearing

The mouth presents a particularly complex and fascinating tactual landscape, in terms of the different shapes and textures which cooperate to produce sound. The role of the teeth in the mouth is particularly striking. Teeth seem alien elements within the mouth, their hardness and impersonality making them seem older, stranger and less truly of oneself than the fleshier, more elastic and more sensitive portions of the mouth, especially the mouth's most mobile element, the tongue, which is so continuously at risk from the teeth's harsh. Language is born, not with the accession to the symbolic order, but with the growth of the teeth. Adult words, as opposed to the toddler's shrieking, lisping and gurgling, can be formed in one's mouth only when there are teeth to capture them and chop them up (Edison's Dream of a New Music, 1913).

Biological basis of Synesthesia

The prevalent theory as to why this occurs is that the neuron pathways in our brain can experience "cross-talk" if the inhibitions imposed upon these wirings are not in place to prevent this sort of mix-up. In other words, the pathways in our brain, though blocked in most people, can sometimes open up and allow cross-sensory interaction. Therefore, an accident, such as an impact to the head, or a defect of some kind, is sometimes the precursor to this kind of condition. In fact, some have concluded that this can be replicated by drug-abusers, and that "existing connections become used in a way that's neurochemically altered for a few hours (Carpenter *et al.*, 2001).

In brain there are three parts

- Brain stem - involuntary activity centre
- Cerebral cortex - logic centre
- Limbic system - emotion centre from a psychological aspect, the right and left brain hemispheres are

responsible for different cerebral activities. For a right-handed person, the left side of the brain, controlling the right part of the face, is responsible for cognitive, computational and practical activities, while the right side (controlling the left part of the face) for creative and conceptual ideas (Figure 1). A sentimental social disaster may result in sagging (reduced muscle and skin tonicity) to the left facial middle third (ascribed to emotions and feelings), which could be compensated by providing appropriate anterior teeth in the maxillary anterior right sextant.

Synesthetic Dentistry

Relevance of synesthesia in dentistry is two fold-

- Artistic perspective
- Psychological perspective

Artistic perspective of synesthetic dentistry

Aesthetics is neither an art nor a science, but a fusion of the two. Ancient Greeks postulated basic concepts in an endeavour to quantify beauty, including the Divine Proportion, symmetry, unity and harmony. Fundamental aesthetic principles are based on Greek and Roman mathematics, nevertheless, artists conceived aesthetics for creating pleasing paintings that touched our inner souls. One can undoubtedly decipher the dichotomy of aesthetics, attracting endless debate by both scientific and artistic communities. It is necessary to define fundamental guidelines, which contribute to aesthetic appraisal that is colour, form and lines, Divine Proportion, symmetry, Unity and Harmony.

Colour, form and lines

For the purpose of dentistry, a few essential principles require consideration. Firstly, in any composition, colour is the predominant force, taking precedence over form, angles and lines. The difficulty assessing the value (brightness component) for a shade prescription is because the eyes are distracted by the colour (hue and chroma components) of the tooth. Secondly, any form can be created from the three basic shapes of a circle, triangle and square. These geometric shapes were, and are, associated with religious, mystical and esoteric connotations. For example, in ancient times, the triangle stood for impending danger, a symbol that is used today for warning signs on roads. The circle represented celestial spirituality, inferring tranquillity and egalitarianism, while a square denoted sturdiness, after the solid base of the Egyptian pyramids (Hegelm 1905).

Divine proportion

Proportion in a composition is analogous to harmonies in music. When proportions of even harmonies on a musical scale are adjusted equally on both sides, the result is a rhythmic and harmonious auditory perception. Similarly, repeated or recurring ratios in the visual arena are viewed as artistic and aesthetically pleasing, e.g. the repeated width ratios of the maxillary anterior teeth (Plato).

The Gestalt Principle

This theory combines the above principles of aesthetics in a coherent and logical manner. Dr Max Wertheimer initiated the

Gestalt theory of psychology in Germany around 1912, and put its definition is "the whole is different from the sum of its parts". For example, the teeth, made of organic and inorganic matter, have a profound impact on an individual's personality and well-being, which is significantly remote from the substance from which they are constructed. In concurrence with the Pragnanz law, the Gestalt theory implies that the mind organises the outside world so that it can come to terms with it. This involves creating meaning, stability, balance and security. These concepts allow the observer to achieve a better object-background. Relationship by encapsulating the following four constituents:

- Proximity
- Similarity
- Continuity
- Closure

Incorporating the above entities in a composition results in stability and harmony. Also, applying the above four constituents for an aesthetic makeover creates a good Gestalt, enhancing psychological appraisal (Lombardi, 1973).

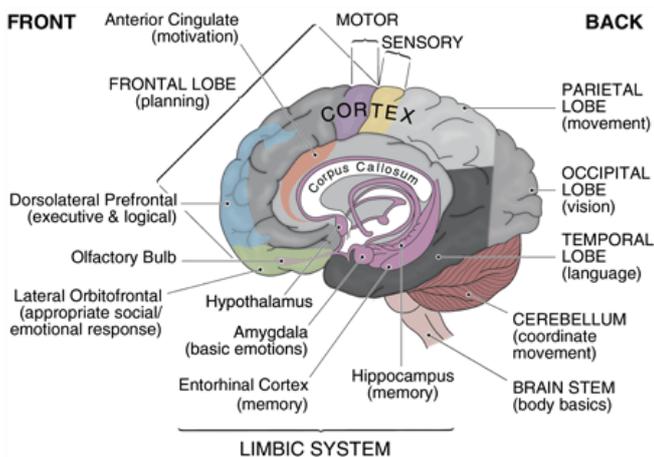


Figure 1. Showing The Different Lobes Of Brain Related To Motor And Sensory Functions

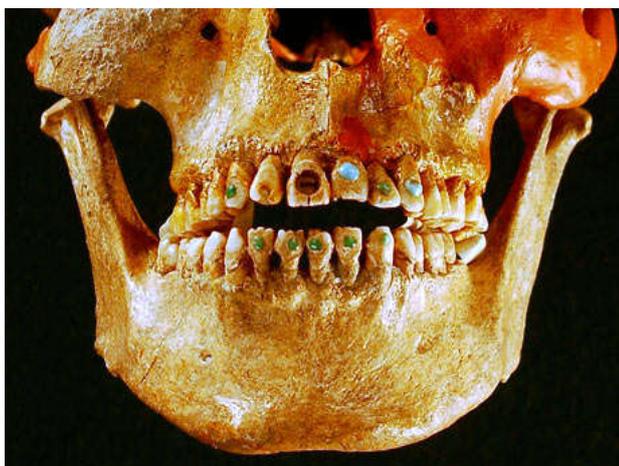


Fig. 2. 2000 year old Mayan skull provides some of the best evidences that jadeite inlays were used for cosmetic rather than functional purposes

Psychological perspective of synesthetic dentistry

Philosophers studying the concept of self conclude that although self-esteem develops throughout life, it is our

experiences during childhood that play a great role in the later years, as we build an image of self from experiences in different situations and with different people. The ‘psychosocial impact’ of bad dentition is a phenomenon that may provoke an emotional reaction manifested as insecurities related to appearance, inhibition in social contacts, feelings of unhappiness and comparison of self with others. The phrase "beauty lies in the eyes of beholder" point to the most important fact that different people find different sights as pleasing or beautiful. Thus the beauty is something that exists in the mind of the person seeing it. Thus the word eyes has been used here figuratively to represent the mind and feelings of the person seeing - the beholder.

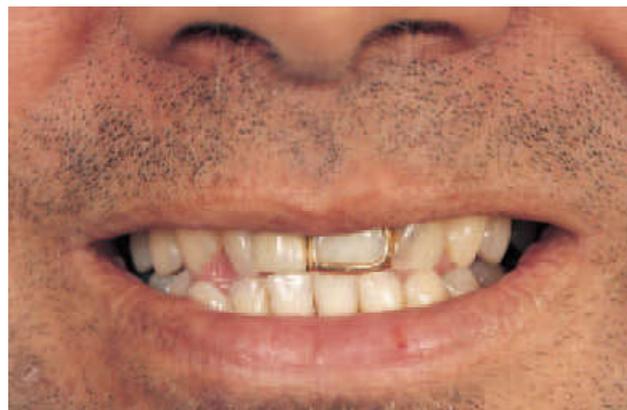


Fig. 3. In some African cultures, anterior gold dental prostheses signify prosperity



Fig. 4. Fashion trends influence provision of oral jewelers

Physiognomy

The facial perspective is the deciding factor for whether a treatment is a success or failure. The reason is that from this view, the patient, his/her family and friends make a physiognomic judgement regarding an individual's character. Physiognomy is the art of judging an individual's character or personality by the appearance of their face. Physiognomy plays a part in assessing people, the teeth, which are important facial landmarks, must also sway our judgement. This is termed "dentofacial physiognomy". In Asian and Chinese societies, the number, size, colour and type of dental restorations are deciding factors of an individual's status and even destiny. In the developing world, missing incisors are synonymous with poverty and despair, while discoloured teeth portend disaster and misfortune. Another example is that Africans regard having anterior yellowgold prostheses as a sign of prosperity e.g. precious stones embedded into anterior teeth. In the USA, for example, a bright white smile signifies

affluence, youth, health, and promote career progression. While in Europe, less emphasis is placed on a 'plastic' smile for a fulfilling life. These trends are simply indigenous aspects of two cultures; neither is right nor wrong, but merely different (Hassin, 2000). The relevance of this discussion on dentofacial physiognomy is to raise cultural awareness of ethnic minorities among dental health providers. Offering ethnic minority patients dental restorations based on Western mores will alienate them from their culture and standing in community. And this will ultimately deter these patients from seeking further dental care for themselves and their families (Armstrong, 1990; McGarth, 2002).

Uninfluenced by the esthetic standards set by society, many individual want to change their appearance to emulate their chosen leaders. General social attitudes profoundly influence an individuals idea of what is attractive, "natural", "beautiful", "good looking" hold different thing with in the population. Humans have been tattooing skin, filing teeth, and festooned with ornaments since prehistoric times: sometimes to stand out, sometimes to blend into a group. The 5000+ year old Ice Man (Oetzi) uncovered in the Alps has tattoos that may have telegraphed identity or magical thinking, or worked to relieve, physically or psychosomatically, his local aches and pains. Today, tattoos have proliferated. While rationales can be as varied as the designs, all tattoos modify self-esteem as well as bodies. Like cosmetics, tattoos are prosthetic, since like an artificial limb they make up for something felt to be missing or inadequate. We're always devising ways to enhance parts of our bodies, from diets and wigs to a Michael Jackson makeover. Once we're self-aware, there's really no such thing as a wholly "natural" body. We compete with others and ourselves to envision a more perfect us (Jerff Greenberg *et al.*).

Conclusion

Personal aesthetic perceptions of the dentofacial complex and the associated psychosocial impact are of great consequence to dental patients. The face is the most readily apparent feature and thus is said to be the most important physical characteristic in the development of self-image and self-esteem, as positive social interactions have been shown to result in better interpersonal relationships and more self-confidence. We have to judge what a patients's need are, whether they're more psychological and not necessarily physical needs, such as decaying tooth or periodontal diseases, and we have to measure just how important the need for improved esthetics is.

It's some time an ethical dilemma for many dentist who are trained in functions, occlusion, and well fitting "conventional" restorations to suddenly switch over to a patients 'mindset' of wanting an attractive "synesthetic" restorations. These are tough time that we face, in a competitive, demand dentistry word in which patients are requesting specific treatments. If the clinician uses esthetically (scientific) and synesthetically (artistic) based approach to diagnose and treat the restorative dental problem then the outcome of the treatment will be appreciated by both clinician and the patient conciously an subconsciously. However, the ultimate result is heavily dependent on the clinician's creativity and artistic input.

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