MACROESTHETIC ELEMENTS OF SMILE; A REVIEW ARTICLE

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Abstract
Smile esthetics is a subjective phenomena which has individual variations. However there are certain dental characteristics that are considered to have influence over one's smile esthetics. The role of an orthodontist is to incorporate these elements to achieve a balanced smile for the patient. Smile designing is an elaborate subject which includes facial esthetics, gingival esthetics, microesthetics and macroesthetics. This article reviews the various elements of macroesthetics which should be considered while treating the patient.
Key Words: Esthetics, Macroesthetic, Microesthetic, Smile.

INTRODUCTION

The word 'esthetics' is derived from Greek, which translates as 'perception'. Esthetics or beauty has two main dimensions to it: objective and subjective1. Objective esthetics is based on the intrinsic characteristics of the object being perceived that makes it praiseworthy. Subjective esthetics on the other hand is based on the others who are contemplating it.[1,2] Subjective esthetics has a varied with individual perception and cannot have a single definition to it, so it is based on several studies on group of people and by different group of people. Esthetics varies with ethnicity, race and gender.

Smile is considered to be an essential facial expression that plays an important role in social interactions. The aim of orthodontic treatment is not merely the correction of dentition but to achieve a favourable esthetics of face. Esthetically pleasing smile enhances attractiveness thus contributes in boosting one's confidence. For the same reason, smile analysis and designing have become main elements orthodontic treatment planning in recent times.[3]

THE SMILE

A smile is a complex gesture formed in two stages, by raising the lip to the nasolabial fold followed by further elevating the lip by three muscle groups.[4]

ANATOMY OF THE SMILE

The soft-tissue characteristic of the smile consists of lip dimensions, distance between the commissures, gap between the lips, smile index, and the gingival features(FIG 1).

Artists use the eye unit theory suggested that the distance between the base of the nose and the lower border of the lower lip is same as one eye (length of the individual's eye), which remain constant whether at rest or during a smile.[5]

Figure 1: Anatomy of the smile

ELEMENTS OF SMILE DESIGN

The smile designing elements includes face characteristics, gingiva, microesthetics and macroesthetics. The aim is to understand all the factors that contribute to an individual's esthetics and to apply them clinically to an achievable limit.

Facial esthetics

Facial and muscular characteristics are important criteria for smile evaluation and vary from patients to patients. Photographic analysis can be utilized for determination of various features of smile during smiling as well as during speaking. Various norms of symmetry of face are intricately examined and included in the problem list.

Gingival esthetics

Healthy gingiva is essential for esthetic smile that involves various aspects of gingiva including its color and texture. Amount of gingival show also affects the esthetics. Little gingival exposure contributes to youthful smile while too much exposure is not acceptable and is not esthetically pleasing.

Microesthetics

Microesthetics involves the individual tooth characteristics like tooth anatomy, location, translucency patterns, lobe development and incisal haloing. For better esthetics microesthetic elements must not be overlooked while treating the patient orthodontically.

Macroesthetics

When individual teeth are considered as a single unit and contribute to esthetics as a group then it is regarded as macroesthetics.[6] Macroesthetics attempt to evaluate the relationships of anterior teeth to each other as well as with their surrounding soft tissues. Orthodontists bring about major changes in the macroesthetics of the patients.

The following macroesthetics elements are considered during smile designing:

Midline

Midline is an important aspect of an esthetic treatment plan which is regarded to be the focal spot of smile easily recognizable by the patient if off centered. Midline is

viewed in reference to the facial midline which is decided by two soft tissue landmarks; nasion and base of the philtrum.
The goal of treatment is to achieve coincident upper and lower dental midlines which are in coincidence with facial midline for better esthetics as well as functional purpose.[7-11]
The midline between centrals should not be angulated to the facial midline. Axial midline angulations of 10° or greater require orthodontic intervention for esthetic correction.

Incisal embrasures
The gaps between the edges of the teeth are called as incisal embrasures and holds important role in smile esthetics. The dimensions of these spaces which includes volume and size is least in the midline and tends to increase on going away from the midline.[12]

Connectors
It is a large, broad area where two adjacent teeth seem to touch. For better esthetics, connecting area between anterior should follow the rule of 50-40-30.[13]

Symmetry
Symmetry is considered to be an essential component of dental esthetics.[14] There are two types of symmetry: horizontal and radiating. Dentition follows radiating symmetry where the design starts from the centre point and both the sides are mirror images.[15]

Axial Inclination of Teeth
The long axis of the tooth inclines towards the midline and this tipping towards the midline increases as the distance from the centre point increases.

Shade Progression
The shade and color patterns of upper teeth follow a progressive pattern with maxillary centrals being the lightest and canines having the greater saturation than other anteriors.[16]

Tooth shape and harmony
The tooth form of maxillary central incisor should be identical to the individuals facial outline upside down as stated by Williams.[17]

Teeth shown in a smile
The teeth display during smile consists of anterior six teeth along with first and second premolars.

Teeth reveal
It refers to the amount of tooth material that's shown in different views and lip position. It is discussed under various parameters as follows-

M-position: By asking the patient to utter letter "M" the minimum teeth reveal is assessed. The maxillary incisor display decreases as the patient ages.

Upper lip position: An average smile involves 75 % to 100 % of maxillary teeth display. A high smile shows total length of upper anterior as opposed to low smile display which involves less than 75% of teeth display. More tooth display is perceived as more youthful while less tooth display makes the face look old.

Upper lip curvature: Upward lip curvature means that the corner of the mouth is higher than the midpoint of the lower margin of the upper lip. Straight lip curvature means that the corner of the mouth and the midpoint of the lower margin of the upper lip are on a straight line. Downward lip curvature means that the corner of the mouth is lower than the midpoint of the lower margin of the upper lip. Upward and straight smiles are more esthetic than the downward smile.

Lower lip position: The relationship between upper anterior teeth and lower lip is of three types. The maxillary incisors can be slightly enveloped by lower lip.(Fig.2) The upper anterior just contacting the lower lip(Fig.3) and the third situation where there is no contact between upper anterior and lower lip.(Fig4). The latter two are more esthetically pleasing than slightly covered smiles.


Figure 2: Straight Smile Arch


Figure 3: Concave Smile Arch


Figure 4: Convex Smile Arch

Smile line or smile arc
Smile lines are of three types, straight, parallel and reverse.. In straight smile line edges of upper anterior are in straight line. In parallel smile line the edges of upper

anterior follow the upper border of the lower lip In reverse smile line edges of upper anterior are in curved relationship with upper border of lower lip.[18,19,20]
Intercommissure line, Maxillary incisors display and lower lip framing
During full smile, the maxillary incisor display below the intercommisural line (a line drawn through the corners of the mouth) should be between 75 – 100% for youthful smile.[21]

Vestibular space
In patients with narrow dental arch from have dark spaces between teeth and corner of mouth, referred as deficient vestibular reveal and have negative effect on esthetics.[22]

CONCLUSION
There is no "ideal" smile that can be applied to all so the goal is to achieve a balanced smile which is in coherence with an individual face. To achieve this balanced smile various elements of microesthetics as well as macroesthetics must be applied. The mechanotherapy to align the teeth must incorporate these factors for an esthetic outcome of the treatment.

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