An analysis of the components of a human smile

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The Ideal Smile

Whilst the old saying 'beauty is in the eye of the beholder' may be true, patients are increasingly becoming aware that a powerful smile is a true asset. But what makes the 'ideal smile'? Once I revert to my younger self starting dental school, I could probably reel off an answer along the lines of 'well aligned, white and clean teeth.' However, a definition such as this lacks depth and insight. Now that I have been through four years of clinical training and performed procedures such as composite restorations, denture fabrication and crown/bridge work in the anterior dental aesthetic zone, I have gained an in depth appreciation of how several factors must be considered during appraisal of anterior dental aesthetics.

This essay aims to describe the key factors, which must be considered and assessed when creating the 'ideal smile', such as facial, gingival and dental aesthetics. It must be remembered that there is difficulty in defining an 'ideal smile' as there is significant variation between individuals and populations.

As patients have increasing aesthetic demands, it is imperative that we are understanding their needs, communicating effectively and delivering on their needs and desires. Every patient that we treat has a unique set of characteristics, desires and priorities and the superimposition of a standard, pre-designed 'ideal smile' will not be acceptable. In this regard, it is right of dental professionals to address individual components for discussion. However, the end result of any procedure such as this lacks depth and insight. In order to achieve optimal smile aesthetics, the commissural line (between the corners of the mouth during smiling), occlusal plane and interpapillary line should all coincide [6].

The smile arc, that is the semi-circle demonstrated when the upper incisal edges come into close proximity with the lower lip border in the posed smile, is an important factor in smile aesthetics. It should not be over or under pronounced. Through the aging process, the incisal edges of the maxillary anterior teeth often get flattened and less well defined through tooth wear or modified tooth eruption results [7].

From an orthodontic viewpoint, the alignment of the maxillary teeth is more important than that of the mandibular dentition. The midlines of maxillary and mandibular arches fail to align in around 75% of the US population. The buccal corridor, space between the lining of the vestibule and the buccal surfaces of posterior teeth, should be evident so that the teeth are separated from the corners of the mouth [8].

The gingival architecture forms the soft tissue framework around each individual tooth. The gingiva should be coral pink in colour and provide firm texture. The attached gingiva can be either smooth or stippled in appearance. The gingival tissues play a significant factor in the appearance and aesthetic value of the smile, especially in high lip line patients where gingival tissues are exposed to an ever-greater degree. In the healthy periodontium, the spaces under the contact areas are filled with healthy interdental papilla, which ensures there are no black triangles that will compromise the aesthetic power of the smile.
Tooth Shape and Colour

Tooth morphology is a fusion of square, oval and triangular shapes, where square teeth have straight and parallel mesial and distal borders, oval teeth have curved mesial and distal borders and triangular teeth have marked line angles and significant degrees of convergence from incisal to cervical regions [9]. Frush and Fisher’s [10] theory of morphopsychology placed aesthetic smile design on a rational footing by suggesting that the shape and form of teeth are linked with a patient's age, sex and personality. They described that young patients will have sharp incisal edges and their upper central incisors will have more prominence, whereas older patients will have worn-out and bluntly defined incisal edges. For female patients, a curved and rounded tooth form would be more appropriate; in the same manner as clearly defined, sharp, angled tooth forms would suit the male patient. It is important to understand the nature and personality of the individual patient when restoring tooth form [11].

Patients are beginning to appreciate the importance of tooth colour when committing to dental treatment plans. The physical characteristics of light should be considered when restoring/mimicking actual tooth structure: factors such as opacity, translucence, reflectance and fluorescence should all be assessed.

The colour of an individual tooth can be split into three critical components. Value is defined as the luminosity of the colour/degree of greyness and is considered to be the most clinically important element of shade result. The second most important factor is considered to be chroma: the saturation/dominance of the colour (hue). Hue is defined as the wavelength of coloured light transmitted as the actual colour of the tooth and is considered least important due to the relative low concentrations of hue in actual tooth shade [12]. The shades of maxillary anterior teeth pass through a slight progression from cervical margin to incisal edge, as well as from one tooth to the next. Upper central incisors are known to be the brightest and lightest individual teeth, which also help to dominate the smile [13]. The upper lateral incisors have relatively close hue values to that of the centrals, but differ in that they have lower value properties. Canines hold the greatest degree of chroma and have the lowest value properties. The premolars hold value properties similar to the lateral incisors but will appear lighter than the canines [14]. When assessing an individual tooth, the middle third portion of the tooth is generally the brightest, whereas older patients will have worn-out and bluntly defined incisal edges. For female patients, a curved and rounded tooth form would be more appropriate; in the same manner as clearly defined, sharp, angled tooth forms would suit the male patient. It is important to understand the nature and personality of the individual patient when restoring tooth form [11].

The long axis of the upper central incisor should be aligned with the dental midline. The upper lateral incisor should be slightly more mesially tipped towards the midline and the upper canine should be tipped more distally to an even greater degree, allowing for the achievement of an aesthetically pleasing smile [2].

The connector rule of 50:40:30 applies in the areas where two teeth appear to be contacting. The connector space between the upper centrals should be 50% the length of the upper central crown. In the same manner, the connector space mesial to the upper lateral should be 40% of the length of upper lateral crown and mesial to the canine should be a 30% connector space [18]. The incisal embrasures should increase in size and volume from midline distally, to give the impression of sharp and clearly defined teeth [19-21].

Conclusion

Every tooth has its own anatomy and attention should be paid to the surface texture, colour, tooth form and alignment in the arch. Heavy surface textures will create multiple zones of reflection and deflection, creating a youthful appearance.

Society pays more attention to looking and feeling youthful and patients are starting to desire bright and white smiles. The dental profession is entrusted with the task of creating beautiful smiles and whilst the technology/techniques are being continuously developed and adapted, the basic principles of what constitutes the 'ideal' smile, will likely remain the same. The individual components that have been discussed need to be integrated together in a holistic approach to evaluate a smile, accounting for the micro and macro aesthetic componentry. However, above all, the 'ideal' smile in all cases can only be defined as one which has matched and exceeded both patient and clinician expectations and desires and an 'ideal' smile may somewhat vary from individual to individual and from population to population.

References
