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Smile Designing: The Inside Story

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Abstract
Smile is a greater recommendation than any letter of introduction. A statement that is true nowadays where attractive people have a much better chance of being successful. Dentists and orthodontists can greatly contribute to augmenting patient's smile, appearance and consequently self-confidence. People with a normal dental appearance are judged more socially attractive over many personal characteristics than those with malocclusions. Those with poor dental esthetics have been linked to lack of self-confidence and are thought to be disadvantaged in social, educational and occupational settings. The role of orthodontist should be all commitments and dedication to enforced knowledge and skill to engineer the beautiful smile and no injury or improper procedure to the stomatognathic or orodental structure.

Keywords: Buccal corridor; Gummy smile; Malocclusion; Orthodontics; Smile index

Introduction:

Human face is a magnificent creation of the evolution and a spontaneous or cordial smile is the gift of the nature. A lovely smile offers a feel good sensation to the recipient and the owner draws a special attraction and attention. So, smile is important in the society. According to oxford dictionary, smile is the expression on the face when one is happy, amused etc, in which corner of mouth turned upwards. A beautiful smile is composed of three different components- a full component of upper and lower teeth with normal size, shape, color and in normal occlusion; the two jawbones are placed in the face in normal proportion and position in relation to the cranial base and; the facial soft tissue is normal in form and function [1] (Figs. 1 & 2).

Fig 1. Ideal Smile

Fig 2. Unesthetic Smile

Creating an ideal smile may require orthodontics, orthognathic surgery, periodontal surgery, cosmetic dentistry, oral surgery, plastic surgery and also the expertise of a dental technician. One of the most important criteria to be kept in the mind of the clinician is the patient's chief complaint and whether he or she can achieve the patient's desired final result. Next comes a thorough review of the patient's medical and dental history, a comprehensive dental examination, including proper radiographs, evaluation of the muscles and temporomandibular joint (TMJ). This will include proper photos that are taken with a digital SLR camera with a macro lens that include: full face photos; 1:2 lip at rest or repose photos; anterior and lateral photos and/or video of the patient smiling naturally, dynamically as well as an exaggerated smile; 1:2 retracted anterior and lateral views; retracted views occlusally; 1:1 retracted views of the anterior dentition. The clinician should also acquire impressions (whether digital or analog) as well as a facebow and a bite registration in centric relation, so that the case can be properly mounted and articulated on a semi-adjustable articulator. All of this are critical information for the clinician to properly evaluate and create a treatment plan and thus treat the patient appropriately.

Tooth-Number And Position:

Presence of teeth is important for a good smile but it is not the whole of the smile. Normal occlusion is a pre-requisite for an attractive smile. The relation between the upper and lower teeth in static position (maximum inter-cuspation in the posterior teeth in closed mouth position) or functional position of mandible is known as occlusion. According to Edward H. Angle, the father of Orthodontics, normal occlusion means the tip of the mesio-buccal cusp of upper 1st permanent molars occludes in the buccal groove of 1st permanent lower molar [2]. The upper permanent canine occludes in between the lower canine and 1st premolar. In the incisors region there is 2mm overlap of upper incisors and 2mm horizontal separations of the incisors (overbite) in normal occlusion [2]. Upper and lower midline in dental arch should coincide. The dental midline is also same to that of skeletal midline. Another consideration in the relationship of tooth position is what is called the "buccal corridor" [3]. Buccal corridor is the space situated in the corner of the mouth in a smile position and is a dark, triangular space, Orthodontist refer buccal corridor as negative spaces which can be corrected by transverse expansion of the arches. But in photography, this dark space presents a contrast with the white teeth and is accepted as attractive to the society.

Tooth-Size And Morphology:

Tooth size and morphology should be normal. In developmental anomaly like cleft lip and palate, the shape and size of the anterior teeth is also affected usually. A normal mesio-distal width of a permanent upper central incisor is 9mm, lateral incisors 7.5mm,whereas in lower teeth the size are 6mm and 6.5mm respectively [4]. Average maxillary incisor display in male is ≈ 1.90 mm and in female it is ≈ 3.4mm [5]. Sometime to close the gap in between the upper teeth to create a good smile, cosmetic build up is done on normal sized tooth, in this case the gap may be closed but the tooth size is increased and the smile will be funny. Consideration should be taken of how the incisal edge position relates to the inter-pupillary line in a parallel plane [6] Sometimes to correct protruding upper teeth, the incisal edges are grinded off, this result in shorter vertical height of the tooth, loss of incisal edge, thereby loss of proper function and esthetic as well.

Facial Proportions:

A basic overall assessment of the smile begins from an outside-in approach including facial proportions[7], evaluation of the facial esthetics in the vertical and horizontal planes, assessment of the patient's facial thirds and whether there are any disproportions present between the superior, middle and lower thirds (Figs 3-5). It is important to look for asymmetries in the facial features starting from the facial midline and how it intersects with the dental midline as well as assessment of the patient's inter-pupillary line and occlusal planes as well as the relation to the horizon.

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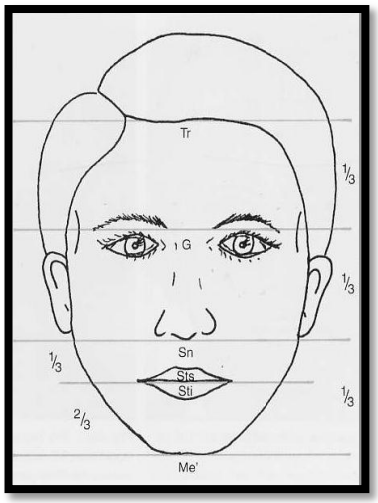

Fig. 3

Fig.4

Figures 3 and 4 show ideal facial proportion being divided into three equal parts and Figure 5 shows mid facial proportion i.e. upper portion is 45% and lower is 55%.

Fig. 5

Upper Lip Length And Position:

Overall lip mobility is the measure of the lips at rest to the furthest location when the patient smiles spontaneously and is directly related to the upper lip length [8]. It is obtained by first assessing the upper lip length and amount of tooth that is displayed at rest and then reassessing again at the farthest position. Males on an average show upper lip length of 23 mm, while in females it is 20mm, who have an average of 1.5 mm of higher lip line, and thus show more tooth structure at rest [9]. Short lip length tends to be unaesthetic but considered normal in adolescent because lip length continues to increase even after the vertical growth of maxilla is completed. The average lip mobility in general is 7-8 mm, with females showing slightly more lip elevation than males and thus more tooth structure during smiling. Overall symmetry of the patient's lip mobility must be evaluated also as there is a significant portion of the patient population (8.7-22%) [10, 11] that has asymmetry of the movement of upper and lower lips upon smiling and at rest. This can cause more tooth and/ or gum to be displayed on one side versus the other, creating a disharmony in the overall smile of the patient (Fig. 6).

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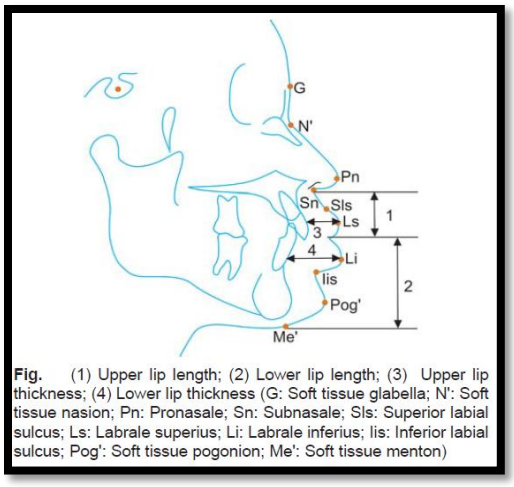

Fig. (1) Upper lip length; (2) Lower lip length; (3) Upper lip thickness; (4) Lower lip thickness (G: Soft tissue glabella; N': Soft tissue nasion; Pn: Pronasale; Sn: Subnasale; Sls: Superior labial sulcus; Ls: Labrale superius; Li: Labrale inferius; Iis: Inferior labial sulcus; Pog': Soft tissue pogonion; Me': Soft tissue menton)

Fig. 6

NOSE – LIP – RELATION:

There are so many lines to define the relation. Charles H. Ricketts "E" line is very simple to examine. "E" stands for esthetic. It runs from the tip of the nose to the most prominent point of the soft tissue chin. In normal face, the lips just touches the line (Figs 7 & 8).

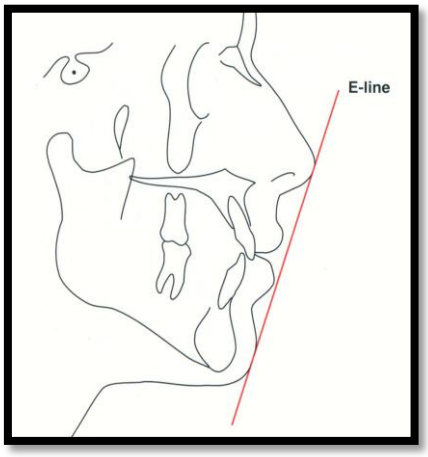

Fig.7

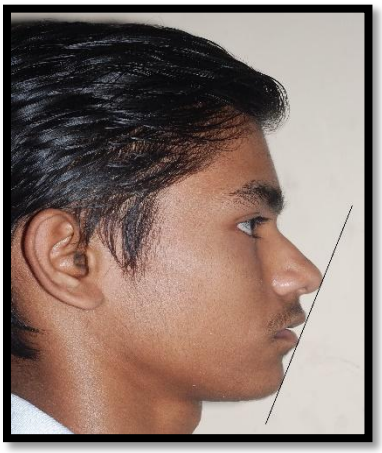

Fig. 8

Jaw Bone- Size And Position:

In case of depressed maxilla, a larger mandible or a bimaxillary protrusion a good smile cannot be achieved by only making a normal tooth to tooth relation. In such cases we have to restore the normal nose, lip and chin relation besides establishing normal occlusion. Orthognathic surgery or surgical correction of size and shape of the jaws is required along with pre or post-surgical orthodontics.

Smile Index And Smile Arc:

Ackermann and Ackermann developed a ratio, called smile index which is described as the area formed by the vermilion border of the lips during social smile (Fig. 9). It is calculated as-

Smile index = inter commissural width/inner labial gap.

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Fig. 9

Smile arc is the relationship between the curvatures of the incisal edge of the maxillary incisors, canine and lower lip (Fig.10). Ideally maxillary incisal edge curvature is parallel to the curvature of the lower lip creating a more youthful smile. The smile arc can get flatter during treatment of orthodontic procedure, if not done properly and in anterior fixed prosthodontics with improper design of the prosthesis.

Fig. 10

Discussion:

It is important to remember that during smiling, it is not only the teeth that matters but several other factors come into play like the language of the eye, tuning of the facial muscles, balance of the lips and the personality. So a multi-disciplinary approach should be employed to achieve the goal. A thorough history taking to reach the root cause of the etiology, detailed evaluations of the anatomic landmarks followed by diagnosis and proper treatment plan will definitely bring success.

Cephalometric radiograph analysis reveals the relation of the maxilla and mandible in respect to the cranial base. Study model of the maxilla and mandible will reveal the dental irregularities like crowding, spacing, rotation, hypoplasia, proclination, etc while facial photograph analysis in standard method will give us the facial height, lip length, thickness, nose-lip-chin relation, incisal display, etc.

To improve the smile status in a face with crooked teeth and dento-facial orthopedic problems, the orthodontist must consider the following points- good lip support, well aligned, leveled set of teeth with normal size, shape and color, optimal gingival exposure which is healthy, pink in color and well contoured around the neck of the teeth. In adults with skeletal disproportion in the jaws, orthognathic surgery should be undertaken with pre and post-surgical orthodontics to create a normal face first.

Conclusion:

This article attempts to provide an idea of smile designing along with the host of assessments and evaluations that need to be carried out in order to obtain an ideal smile for the patients. Smile designing sometimes needs an interdisciplinary approach.

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