

Dentofacial analysis in North Indian females

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ABSTRACT

The study comprised of dentofacial analysis of 200 North Indian Females. Prior informed written consent for this study was obtained. The exclusion and inclusion criteria for the subjects were predefined. The purpose of the study was to analyze the esthetic components of the smile, evaluating the relationship between the curve formed by the incisal line of the anterior superior teeth and the curve of the inferior lip, the touch of this incisal line on the inferior lip, the teeth displayed during smile, the relationship between the facial midline with the arch midline and compared the data with the previous studies. This standard may serve as a guideline for restoration or enhancement of esthetic and plastic surgery for smile of north Indian females which will enable the surgeon to offer a better cosmetic result. Photographs were taken (Smile) using digital camera. Results show that a typical or average smile has following characteristics -The alignment of upper incisal edge to lower lip is convex, Gingiva does not show (except interproximal gingiva) , no. of teeth displayed during smile is 8-10 , midline from philtrum passing through the centre of central incisors and there is no visible bilateral negative space. So, smile is esthetic in North Indian Females.

Key words: Dentofacial analysis, Smile, North Indian females, cosmetic surgery, lip.

INTRODUCTION

Dentofacial attractiveness is particularly important for the psychosocial well being of an individual. Good appearance is not only considered a vanity sign, but literally a need because when a person senses happiness, pleasure or humor, a smile develops. The smile constitutes an important component in the presentation of a human being favouring his or her social acceptance. People with a normal dental appearance are judged socially more attractive as compared to those with malocclusions. It would be useful to describe some desirable characteristics of the smile, which help to achieve optimum result in surgical and aesthetic oral rehabilitation. This study formulates a standard position of upper and lower lip during active smile which may serve as a guideline for restoration or enhancement of aesthetic and plastic surgery. The lips and their relationship with the position of anterior teeth considerably affect a person's smile and facial aesthetics in general¹. The aesthetics is the pleasant sensation of beauty in the nature². Smile analysis is performed mainly in the frontal view.

Lips form the frame of the smile. There are differences in not only what various groups consider aesthetic but also in what is considered aesthetic for different subjects according to their age, sex and race. Evidence suggest that the esthetic components for different sexes, races, and ages are not entirely the same. Age also has an effect on the architecture of a smile because with age the upper lip tends to conceal more of the maxillary incisors, with a concomitant greater degree of mandibular incisor display³. Lip coverage of the maxillary incisors tends to increase with age, and therefore the percentage of high

smile may be greater among youngs and smaller among older adults ⁴. This progressive change is caused by the effects of gravity on upper and lower lip positions.

MATERIAL AND METHODS

The present study was conducted on 200 north Indian females chosen by simple random method (aged between 18 to 40 years), having full dentition. Eruption of last molar was ignored in classifying person with full dentition as 3rd molar eruption is variable) ⁵. Those with anomalies, malformation, deformities, inflammation, trauma and surgical scars (operations for cleft lip) of or around lips were excluded. A written consent of all the subjects was obtained after explaining the contents of the study to them. In each subject, the position of upper and lower lip was recorded during smile. Instrument used for the study is Canon Digital Camera 10 Mega pixel & 10 times optical magnification. The study was based on the parameters suggested by Patnaik *et al* ⁶.

A beautiful and esthetic smile has following vital parameters.

- Position of upper lip - while smiling, upper lip should be neither too high so that to expose the upper gums, nor too low so as to cover more than half of upper teeth. It should be ideally covering not more than 1/4 th of teeth (Figure 1).
- Alignment of upper incisal edge to lower lip - The best position is a convex curve downwards, but it may be straight or even concave downwards (Figure 2).
- Tooth-lower lip position - The teeth may be just touching the lower lip or there may be a slight gap (Figure 3).
- Number of teeth exposed during full smile - The teeth may be canine to canine (6 teeth exposed); premolar to premolar (8-10 teeth exposed); molar to molar (16 teeth exposed) (Figure 4).
- Midline relationship of central incisors to philtrum - A midline through philtrum should ideally pass through the center of the central incisors .However, it may pass right or left of the center of central incisors (Figure 5).
- Bilateral negative space - Under normal condition, there is little space visible between angles of mouth & teeth while smiling (Figure 6).

Figure 1 - Position of upper incisal edge to lower lip in females



Convex smile Concave smile Straight smile

Figure 2 - Position of upper lip while smiling in females



Average Low High Average, covering 1/4 upper lip

Figure 3 - Tooth lower lip position while smiling in females



Touch Not touch Slightly covered

Figure 4 - No. of teeth exposed during smile in females**Figure 5 - Midline relationships of central incisors to philtrum while smiling in females****Figure 6 - Bilateral negative space while smiling in females**

DISCUSSION

1. ALIGNMENT OF UPPER INCISAL EDGE TO LOWER LIP

Table 1: Comparison of various positions of alignment of upper incisal edge to lower lip while smiling of present study with earlier reported data

Position	Present study (North Indian) [n(%) 200 females]	Tjan et al (American) [n(%) 247 females]	Kaur et al (Punjabi) [n(%) 350 females]	Al johany et al (Celebrities) [n(%) 50 females]
Convex	117 (58.5%)	212(85.77%)	59.5%	39 (78%)
Concave	4 (2%)	2(0.6%)	11.5%	0 (0%)
Straight	79 (39.5%)	33(13.56%)	29%	11 (22%)

Esthetically, convex smile is one of the criteria of best smile. In present study, 58.5% female subjects showed convex smile, 39.5% females showed straight smile & 2% females showed concave smile as shown in table 1. Tjan et al reported that most subjects (85.77% in females) had a convex smile. Hence, according to Tjan et al only minority of cases (13.56% females) had a straight smile and concave incisal curvature was practically nonexistent in their study (0.6% in females) ⁷. This study also coincided with the findings of Kaur et al & Al johany et al study on Punjabi females & on female celebrities respectively ^{8,9}. In all studies most of the subjects have convex smile. So, smile was esthetic in north Indian females.

2. POSITION OF UPPER LIP WHILE SMILING

Table 2: Comparison of various positions of upper lip while smiling of females of present study with previous studies

Position	Present study (North Indian) [n(%) 200 females]	Tjan et al (American) [n(%) 247 females]	Kaur et al (Punjabi)[n(%)) 350 females]	Al johany et al (Celebrities) [n(%) 50 females]
Average	110(55%)	182(73.71%)	65.5%	40 (80%)
High	31 (15.5%)	34(13.79%)	22.5%	10 (20%)
Low	59 (29.5%)	31(12.50%)	12.0%	0 (0%)

According to literature we consider the ‘average smile’ is one of the criteria of best smile. Peck et al revealed that gingival smile was a more common characteristic of females⁴. They found that women show on average, 0.7mm of gingiva during smile. This again indicated that smile was more esthetic in females. Acc. to table 2, maximum number of subjects had ‘Average’ type of smile, after that ‘High’ type and least number of subjects had ‘Low’ type of smile. Present study coincided with previous studies of Tjan et al, Kaur et al and Al johany et al^{7,8,9}. Their studies had also the same pattern of variabilities of position of upper lip while smiling. In female celebrities no subject had ‘Low’ type of smile.

3. TOOTH - LOWER LIP POSITION

Table 3: Comparison of various Tooth - lower lip positions while smiling of females of present study with earlier reported data

Positions	Present study (North Indian) [n(%) 200 females]	Tjan et al (American) [n(%) 247 females]	Kaur et al (Punjabi) [n(%)350 females]	Al johany et al (Celebrities) [n(%)50 females]
Touching	70 (35%)	124(57.89%)	50.3%	17 (34%)
Non touching	97 (48.5%)	59(27.63%)	30.3%	21 (42%)
Slightly covered	33 (16.5%)	31(14.47%)	19.4%	12 (24%)

Morley stated that for a smile to be esthetically pleasant the incisal curve do not touch the inferior lip¹⁰. Acc. to Patnaik et al in esthetic smile it may touch or it may not touch the inferior lip³. In present study, teeth were just touching the lower lip in 35% of females & non touching in 48.5% in females as shown in table 3.

The teeth were just touching the lower lip in 35% of North Indian females and 57.89% of American females of Tjan et al study, 50.3% in Punjabi females of Kaur et al & 34% in celebrities of Al johany et al^{7,8,9}. Non- touching in 48.5% of North Indian females, 27.63% of American females, 30.3% in Punjabi females & 42% in celebrities. Percentage of subjects with maxillary incisal curvature slightly covered by lower lip was comparable between all studies. This indicated that smile was esthetic in North Indian females and also in celebrities.

4. NO. OF TEETH DISPLAYED DURING SMILE

Table 4: Comparison of no. of teeth displayed during smile in females of present study with earlier reported data

Parameter	Positions	Present study (North Indian) [n(%) 200 females]	Al johany et al (Celebrities) [n(%)50 females]
No. of teeth exposed during smile	6	41 (20.5%)	-----
	8	141 (70.5%)	4 (8%)
	10	16 (8%)	30 (60%)
	12	02 (1%)	12 (24%)

In present study, around 20.5% showed 6 teeth but 70.5% females showed 8 teeth during smile. 8% females showed 10 teeth as shown in table 4. On comparing results of present study with previous studies (table 4), 8 teeth displayed during smile in 70.5% females in present study as compared to 8% in celebrities in Al johany et al study. While 60% celebrities displayed 10 teeth and 8% of present study females displayed 10 teeth. On the other hand only 1% of present study females displayed 12 teeth while 24% of celebrities displayed 12 teeth. It may be due to that celebrities are more conscious about their smile. Smile exercises were effective to improve the esthetic level of the smile if exercises were continuously done¹¹. Less no. of teeth visible in case of North Indian females (present study), may be due to shy nature of Indian women so, that fewer teeth were exposed by them during smile. The esthetics of the smiles are affected by upper lip position, upper lip curvature, the parallelism of the anterior Incisal curve with lower lip and the no. of teeth displayed in the smile⁹.

5. MIDLINE RELATIONSHIP OF CENTRAL INCISOR TO PHILTRUM

Table 5: Comparison of midline relationship of central incisor to philtrum during smile of females of present study with earlier reported data

Positions	Present study (North Indian) [n(%) 200 females]	Al johany et al (Celebrities) [n(%)50 females]
Straight	159 (79.5%)	32 (64%)
Right	6 (3%)	11 (22%)
Left	35 (17.5%)	7 (14%)

79.5% female subjects of present study showed midline passing through centre of central incisors, while 17.5% showed left deviation and rest showed right deviation (table 5). This study did not agree with Al johany et al study on celebrities⁹. In their study 64% showed midline passing through centre of central incisors, more subjects showed right deviation i.e.22% while 14% showed left deviation. This indicated that smile was esthetic in north Indian females.

6. BILATERAL NEGATIVE SPACE

Table 6: Bilateral negative space while smiling of present study

Bilateral negative space	Present study(North Indian) [n(%)200 females]
q NORMAL	190 (95%)
q INCREASE	10(5%)

No bilateral negative space was visible in 95% of females (table 6). From assessable literature no authentic work on bilateral negative space had been available.

It is concluded that an average smile exhibited approximately full length of maxillary anterior teeth, has the incisal curve of the teeth parallel to the inner curvature of the lower lip, has the incisal curve of the upper incisors touching or not touching the lower lip, displays the six upper anterior teeth and premolars, midline coincided with a harmonious balance of the smile, no bilateral negative space was visible. It is inferred from the present study that smile is more esthetic in North Indian females.

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