

An Analysis of Smile Line Among Dental Students of Sankalchand Patel University, North Gujarat: A Cross-Sectional Survey

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ABSTRACT

Background: An attractive smile helps win elections, and a beautiful smile sells products for companies whose subliminal message in advertising is “look better, feel younger.”

Material and Method: In this study, total 210 dental students, age ranging from 20 to 25 years, were included as participants. Participants were asked to smile and photographs were taken by mounted Digital single lens reflex camera to evaluate smile line or upper lip line.

Results: Out of 210 dental students, average lip line was found in 118(56.19%), high lip line in 68(32.38%), low lip line in 24(11.42%) subjects.

Conclusion: Excessive gingival display was more acceptable as aesthetic for female students, whereas lower excessive gingival display was more acceptable for male. Average smile line is more common in Dental students of North Gujarat. Higher smile patterns are common in female while lower smile patterns are more common in male.

Keywords: Smile line, Esthetics, Dental students, Cross-sectional survey.

INTRODUCTION

Orofacial esthetics refers to effective facial expressions, such as smiling and speaking. Controlling factor for tooth and gingival display are movements of the lips. Person's psychosocial well-being depends on dentofacial appeal and smile. The 'smile line' is used as a parameter to analyze and categorize a person's smile.^[1] Smiling is a standout amongst the most critical facial expressions and it is known as a nonverbal parameter of correspondence and communicating joy.^[2] A delightful smile involves a harmonious relationship among the teeth, the gingival scaffold and the lip frame work.^[3] According to Frush and Fisher, the concept of smile line has been defined as 'the harmony between the

curvature of the incisal edges of the maxillary anterior teeth and the upper border of the lower lip' [4].

“Smile composition” is framed by the lips, the arrangement of the teeth and the visible gingiva is controlled by the outline of the lips and the height of the smile line. A smile line which displays the entire length of the teeth and some part of gingival tissue is associated with youth. In contrast, a smile line which displays only a portion of the teeth results in a less youthful smile. Participants with their entirely displayed teeth along with some gingival display are recognized as having most esthetic smile. Based on the parameters lip line height and tooth display

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smile line can be classified as a high, average and low smile line.^[5]

The ability to smile has been learned by humans as part of their evolution. According to Ackerman, macro aesthetics of a smile might be dependent on the facial type.^[6] There are many studies in the literature to evaluate smile line and also its importance in facial esthetics. However, no existing study was found to evaluate smile line of North Gujarat Dental students. Therefore, this cross sectional survey was designed to evaluate smile line of North Gujarat students. The suggested null hypothesis was that there existed no difference between smile line among dental students of Sankalchand Patel University.

MATERIAL AND METHODS

A cross-sectional survey was conducted in Narsinhbhai Patel Dental College and Hospital, Sankalchand Patel University, Visnagar, North Gujarat. In this study, total 210 dental students (Under graduate, interns & Post graduate students), age ranging from 20 to 25 years, were included as participants according to inclusion criteria of the study. The participants were selected randomly.

Inclusion criteria

1. No missing maxillary and mandibular anterior teeth, complete dentate arch with clinical presence or absence of third molars
2. Presence of natural maxillary anterior teeth in good alignment.

Exclusion criteria

1. Participants who had undergone any restoration by a complete veneer crown, partial veneer crown, crown buildup on the anterior maxillary natural teeth.
2. Accentuated facial asymmetry in superior anterior teeth
3. Participants with anterior teeth fractures, subjects with incisal wear of maxillary anterior teeth.
4. Participants with absence of any previous orthodontic treatment.
5. Abrasion, attrition, erosion or gingival recession.
6. Gingival hyperplasia

7. History of facial trauma or plastic surgery in the face.
8. Participants who refuse to give inform consent

The participants were informed about the study through printed participant information sheets and consent from all included participants was obtained. For recording the smile line, each participant was requested to present his or her full smile a few times, and photographs were taken when the subject successfully repeated the full smile line.^[7]

A standardized photographic procedure was used to obtain images of the smiling face and was done as follows: Each subject was made to sit upright on a chair with the occlusal plane of the maxillary teeth parallel to the floor and with gray background.^[8] Standardized photographs of smiling face were taken for each subject. For each photograph, standardized distances (portrait: 100 cm, smile photograph 12 cm) were used Digital single lens reflex camera (Canon EOS 550D) mounted on a tripod was adjusted individually, parallel to the inter-pupillary line according to the position of the subject's smiling face and the teeth (**Figure: 1**). Subjects ask to smile and photograph taken by mounted digital single lens reflex camera to evaluate smile line or upper lip line. The images were then transferred in "Image Ready" computer software.



Fig 1: Standardize photographic technique.

Two classification concepts were used: A 3-grade scale, and a 4-grade scale.^[5]

According to the 3-grade scale, a lip line height that showed less than 75% of the tooth was visually classified as a low smile line. A lip line height that showed 75% to 100% of the tooth and less than 1

mm of gingival display was visually classified as an average smile line. A lip line height that showed the total cervico-incisal length of a tooth and a continuous band of gingiva (minimum 1 mm) was visually classified as a high smile line.

In the 4-grade scale, a gummy smile line was added as the fourth category. Based on the results of perception studies in which smile line heights displaying more than 4 mm of gingiva were perceived as less attractive, a lip line height that showed more than 4 mm of gingiva was classified as a gummy smile line. **(Figure: 2)**



Fig 2: Gummy smile

The analyses were done in the software by evaluating the gingiva visibility between the zenith of the gingiva of maxillary central incisor and the inferior border of the maxillary lip.

RESULT

In this study, a total of 210 dental students participated. The demographic characteristics are represented in Table 1.

Table 1: Demographic characteristics.

Participants	No. Of participants [n]	Age group
Male	94	20-25
Females	116	20-25

Table 1 shows demographic characteristics out of 210 dental students total 94 participants were male dental students and 116 were female dental students and age range from both male and female dental students were 20-25 years.

Table 2: Frequency distribution of smile line among Dental students.

Study variable	Frequency	Precentages
Average lip line	118	56.19%
High lip line	68	32.38%
Low lip line	24	11.42%

Chart 1: Frequency distribution of smile line of Dental students.

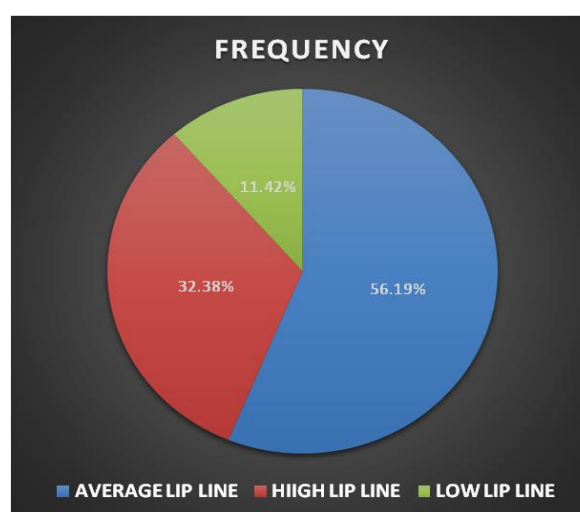


Table-2 and Chart 1 represented Frequency distribution of smile line in Dental students. (High lip line, Average lip line & Low lip line). Out of 210 participants, 118 participants shows Average lip line (56.19%) **(Figure-3)**, 68 participants shows High lip line (32.38%) **(Figure-4)** and 24 participants shows Low lip line (11.42%) **(Figure-5)**. This study is a descriptive study so no need to statistical analysis.



Fig 3: Average lip line.



Fig 4: High lip line.



Fig 5: Low lip line.

DISCUSSION

Smile attractiveness and facial attractiveness appear strongly connected to each other. The fact is that in social interaction, one's attention is mainly directed toward the mouth and eyes of the speaker's face. The essentials of an esthetically pleasing smile involve the relationships between the three primary components: The teeth, the lip framework, and the gingival scaffold.^[1,7] Ackerman et al. proposed a method to digitally measure the smile characteristics of the dental patients. Specifically, when the "posed smile" is measured; by definition, the posed smile is voluntary and not elicited by an emotion.^[8]

Low smile lines are more prevalent in males while high smile lines are more common in females which also matches with the present study. **(Figure: 3,4,5).**^[9,10,11] According to Desai et al. height of the smile line changes with age^[3]. They found that no participant in the 15 to 19 years age group had a low smile line, while no subject in the 50-and-over age group revealed a high smile line. Results of the present study also matches with the same study as

result shows age group between 20 to 25 years shows maximum Average smile line with 56.19% [N=118] and minimum Low lip line with 11.42% [N=24].

Moore et al.^[12] also studied the influence of buccal corridors on smile attractiveness with lay persons as judges. They found that broad smiles were rated best, followed by medium-broad ones, medium ones, and medium-narrow ones and narrow smiles were rated least attractive. According to author, both men and women preferred minimal buccal corridors. A similar study conducted by Dunn et al.^[13] also corroborated these findings.

The smile arc is the relationship between a hypothetical curve drawn along the edges of the maxillary anterior teeth and the inner contour of the lower lip in the posed smile.^[14] The most common smile arc is the convex smile arc and the maximum amount of tooth exposure is in a convex smile type. Teeth length plays an important role in facial contouring and it should be taken into consideration for esthetic makeover of a patient. An esthetically pleasing smile also depends on the amount of gingival visibility (gingival display). Thus, in the present study analysis was done by "Image Ready" software for evaluating the gingiva visibility between the zenith of the gingiva of maxillary central incisors and the inferior border of the maxillary lip.

George D et al.^[15] suggested that excessive gingival display in maxillary arch will be more acceptable as aesthetic for females, whereas lower excessive gingival display will be more acceptable for male.^[15] The result of the present study also matches with the same study as High smile line is found more in female compared to male whereas low smile line is found more in male compared to female. According to inclusion criteria of the study the selected age group is 20-25 years dental students. Only 11.42% students evaluated with low lip line which reflects in the present study result.^[9,10,11]

Our findings suggests that a high smile pattern can be considered a female young patient. In the present study half of the young female participants exposed their gums while smiling, and a low smile pattern can be considered a male young patient. Within the consideration of present study, evaluating the smile line will helpful in improving the esthetic value of

future restorations. There are many factors which will take into the consideration for prosthetic rehabilitation (teeth arrangement, facial esthetics, smile designing, restorative procedures, etc.), Smile line is one of these important factor.

Few limitations of the study are that it evaluated only North Gujarat Dental students. Sample size evaluation is also small and only dental students were evaluated. In the present study age group selection was restricted to only 20-25 years and only smile line evaluation was done.

Future studies need to be done on larger population. Further studies should not restricted to only one region, multi-centric evaluation has to be done and it should include younger to geriatric participants.

In future researcher should have interest in evaluating midline evaluation, Vertical Dimension changes during smile, lip-teeth relationship, Age related changes in Smile, No. of teeth displayed during smile, etc. although smile line is one of the important factor for esthetics.

CONCLUSION

Within the limitation of the cross-sectional survey, it can be concluded that,

- There is scientific evidence that a certain smile line is the most common parameter which can be applied for treatment planning purposes.
- Smile line will help in Prosthetic rehabilitation (teeth arrangement, restorative procedures, smile designing, etc.)
- Average smile line is more common in Dental students of North Gujarat.
- Higher smile patterns are more common among female patients, and lower smile patterns are more common among male patients.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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