

A Comparative Analysis of the Effects of Upper Lip Length, Age and Gender on Maxillary Anterior Teeth Display and Smile Line

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Abstract

Aim: The aim of this study is to assess the relationship between lip length, smile line, and the extent of anterior tooth visibility in different age group and different gender.

Materials and methods

A total of 180 Indian participants of age group between 18 to 47 were enrolled in this study. The participants were asked to relax the lip and lip length was measured using modified flexible millimeter scale measuring from subnasale to stomion superius and categorized into normal short and long. Similarly maxillary incisor visibility was observed at rest. Smile line was observed by posed smile and categorized into high average and low. The data obtained were then analyzed with SPSS software.

Results: Among 60 participants (52.2% females, 47.8% males), normal lip length was most common (53.9%) followed by long (26.1%) and short (20%), while low (35.6%), average (35%), and high (29.4%) smile lines were observed; significant differences in lip length distribution were found across age groups and genders ($p < 0.05$), with younger participants (18-27 years) showing greater maxillary incisor and canine exposure compared to older age groups, whereas smile line distribution between males and females was not statistically significant ($p > 0.05$).

Conclusion: The present study concludes that lip length and maxillary anterior tooth exposure are significantly influenced by age and gender. Lip length increases with advancing age, resulting in reduced maxillary anterior tooth display, particularly canine visibility. Smile line, however, shows no significant association with age or gender. These findings highlight the importance of considering age-related soft tissue changes during esthetic dental treatment planning.

Keywords: Maxillary Anterior, Smile Line, Lip Length

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INTRODUCTION

Prosthetic dentistry, a part of restorative care, focuses on restoring the stomatognathic system by addressing occlusion, esthetics, phonetics, function, and overall dental form. Among the parts of dental rehabilitation, anterior teeth are especially important because they affect facial appearance, speech, and chewing. Esthetic results are a key concern for both clinicians and patients during the restoration process. When all upper front teeth are missing, the clinician must rebuild a natural-looking dentition. This is best done by referring to the patient's previous teeth or by using tooth placement models from people with similar age, sex, ethnicity, and facial features [1].

Speech assessment is a well-established method for evaluating anterior tooth positioning during complete denture construction. Specific phonetic sounds, including "Z," "S," "F," and "V," provide clinically useful indicators of whether the maxillary incisors are correctly placed in the vertical dimension. As a general clinical guideline, the

incisal edges of the central incisors are positioned roughly 2 mm inferior to the upper lip's vermilion border when the lips are at rest. This measurement, however, is not absolute and may vary based on individual patient factors such as age, biological sex, and the length of the upper lip [2].

Frush and Fisher described the "smile line" as a key guide for establishing the vertical position of maxillary teeth in complete denture fabrication. They observed that the maxillary central incisors are generally longer than the adjacent teeth, and that the arrangement of anterior teeth should harmonize with the curvature of the lower lip during smiling. Similarly, Boucher emphasized the significance of phonetics, particularly labiodental sounds, in determining the vertical placement of maxillary anterior teeth. He noted that during the pronunciation of "F" and "V" sounds, the maxillary central and lateral incisors make contact with the lower lip, and stressed the importance of assessing anterior tooth display both during function and when the lips are at rest [3,4].

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The smile line is defined as the position of the inferior border of the upper lip during smiling, which influences the extent of visibility of the teeth and gingival tissues at the interface of hard and soft structures. Smiles are generally classified into posed and unposed types. A posed smile is a voluntary and controlled expression, often deliberate in nature, and is therefore considered static and reproducible. In contrast, an unposed smile arises spontaneously in response to emotions such as happiness; it is dynamic, involuntary, and cannot be maintained for long. Posed smiles may be further subdivided into strained and unstrained types, with the strained smile producing the maximum elevation of the upper lip. Tjan et al. classified the smile line into three categories: high, average, and low. A high smile line is characterized by the display of the full cervico-incisal length of the maxillary anterior teeth along with a continuous band of gingiva. An average smile line shows approximately 75-100% of the maxillary anterior teeth with only the interproximal gingiva visible. In contrast, a low smile line reveals less than 75% of the anterior teeth and is not associated with any gingival display [5].

The resting position of the lips and the degree of lip mobility during smiling play an important role in determining the extent of tooth and gingival exposure from rest to a full smile. Tjan et al. further described the concept of an "optimum smile" as one that displays the complete clinical crowns of the six maxillary anterior teeth along with the premolars in frontal view. A smile line is generally considered acceptable when it is positioned within 2 mm apical to the gingival zeniths of the maxillary central incisors [2,5].

Lip length plays a crucial role in determining smile dynamics, the extent of incisor display, and the overall balance of the facial profile. It varies with factors such as age, gender, and ethnic background, making its assessment important for accurate diagnosis and effective orthodontic treatment planning. Several studies have also shown that soft tissue characteristics exhibit significant variation among different populations [6].

MATERIALS & METHODS

A total of 180 participants, comprising staff and patients of Maitri Dental College, were included in the study. The purpose of the research, which focused on evaluating the smile line through measurements of upper lip length and photographic assessment of the lower part of the face, was clearly explained to all potential participants. Informed consent was obtained from each individual prior to their inclusion in the study.

The selected subjects were informed about the study, and written informed consent was obtained prior to participation. The subjects were then divided into three groups based on age. Group 1 consisted of 60

male and female patients within the age range of 18 to 27 years. Group 2 consisted of 60 male and female patients within the age range of 28 to 37 years. Group 3 consisted of 60 male and female patients within the age range of 38 to 47 years.

All measurements were recorded by a single examiner for consistency. Participants were instructed to sit upright in a dental chair without head support. Each individual was asked to pronounce the word "emma" and then relax their lips and lower jaw.

A modified flexible millimeter ruler of Natraj 621 (15cm) was used to measure the vertical distance stomion superius (lowest point at the centre of lip) at rest to the incisal edge of the maxillary right central incisor. The same procedure was followed to measure the positions of the maxillary left central incisor as well as the left and right maxillary canines. Lip length was measured using a modified flexible scale, extending from the subnasale (base of the nose) to the stomion superius (the lowest point at the center of the upper lip). Based on the measurements, lip length was categorized as follows:

For females, 18-22 mm was considered normal; measurements below 18 mm indicated a short lip, while those above 22 mm indicated a long lip. For males, 20-24 mm was considered normal; values below 20 mm will be classified as short, and those above 24 mm as long lips.

To elicit a maximum smile, light-hearted jokes were shared with participants during casual conversations with the examiner, ensuring that subjects were unaware their smiles were being evaluated.

Smile lines were categorized into three types: high, average, and low. A high smile line revealed the entire cervico-incisal length of the maxillary anterior teeth along with a contiguous band of gingiva. An average smile line displayed 75-100% of the maxillary anterior teeth and only the interproximal gingiva. A low smile line showed less than 75% of the anterior teeth with no gingival display. All assessments were carried out by a single examiner to maintain consistency.

The data collected were then sorted based on age and sex and subsequently analyzed using SPSS software.

Inclusion Criteria: Participants were included in the study if they were willing to participate voluntarily and were between 18 and 46 years of age. Individuals with no history of craniofacial trauma, surgery, or dental rehabilitation were considered eligible. Participants were also required to have no anterior teeth malocclusion and to present with a healthy periodontium or a reduced but still healthy periodontium. Individuals with congenital anomalies were excluded from consideration. In addition, participants were required to have at least six contiguous anterior maxillary teeth of acceptable

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quality, evenly distributed between the left and right sides.

Exclusion Criteria: Participants were excluded from the study if they had missing teeth that could be visible during smiling or if they exhibited excessive dental attrition. Individuals with a history of lip surgery or cosmetic lip enhancement were also excluded. Additional exclusion criteria included lip asymmetry, the presence of craniofacial syndromes, and the presence of dental prostheses involving the teeth specified in the inclusion criteria. Participants undergoing active orthodontic treatment were also excluded from the study.

RESULTS

Study participants were categorised in different age groups ranging from 18-27yrs group to 38-47yrs age group. Equal no. of participants were taken from each age group (60). 52.2% of total study participants were female as compared to 47.8% male participants. Lip length was categorised in normal, long and short categories. 53.9% were normal followed by long (26.1%) and short (20%).

Smile line was also categorised in average, high and low categories. 35.6% were of low smile line category followed by average (35%) and high (29.4%).

In age group (18-27yrs) 70% participants had normal lip length which was highest as compared to 8.3% long lip length participants which were least in this age group. Similar results were seen in 28-37 yrs group in which 53.3% had Normal type lip length followed by short(30%) and then long (16.7%). But in 38-47 yr age group 53.3% had long lip length followed by Normal (38.3%) and then short (8.4%). These differences were statistically significant as shown in Table 1. ($P < 0.05$).

The table 1 presents the frequency and percentage of participants with long, normal, and short lip length across the three age groups (18–27 years, 28–37 years, and 38–47 years). A statistically significant association was observed between age group and lip length (Chi-square test, $\chi^2 = 39.09$, $p = 0.0001$). The majority of participants in the 18–27 years age group had normal lip length, whereas long lip length was more prevalent in the 38–47 years age group.

In the 18-27 years age group, 22 participants (36.7%) exhibited an average smile line, 18 participants (30.0%) had a high smile line, and 20 participants (33.3%) showed a low smile line. In the 28-37 years age group, 21 participants (35.0%) presented with an average smile line, 18 participants (30.0%) had a high smile line, and 21 participants (35.0%) demonstrated a low smile line. In the 38-47 years age group, 20 participants (33.3%) had an average smile line, 17 participants (28.4%) exhibited a high smile line, and 23 participants (38.3%) showed a low smile line as shown in table 2.

Distribution of smile line types (average, high, and low) among different age groups (18–27, 28–37, and 38–47 years). Data are presented as number (n) and percentage (%). The association between age groups and smile line was analyzed using the Chi-square (χ^2) test. A P value < 0.05 was considered statistically significant. In this table, the association was not statistically significant ($P = 0.986$).

Overall, among the total sample of 180 participants, 63 individuals (35.0%) exhibited an average smile line, 53 individuals (29.4%) demonstrated a high smile line, and 64 individuals (35.6%) had a low smile line. The chi-square test revealed a value of 0.352 with a p-value of 0.986, indicating that there was no statistically significant association between age group and type of smile line as shown in table 2. 59.6% of the total female participants had normal type lip length followed by long (30.8%) and short type (9.6%) whereas in males, 47.7% were of normal type followed by short (31.4%) and long (20.9%). These differences were statistically significant as shown in Table 3 ($P < 0.05$).

Distribution of lip length (long, normal, and short) according to sex (male and female). Data are presented as number (n) and percentage (%). The association between sex and lip length was analyzed using the Chi-square (χ^2) test. A P value < 0.05 was considered statistically significant. A statistically significant association was observed ($P = 0.001^*$). 36.2% of the total female participants had Average and low smile line followed by high smile line (27.6%) whereas in males, 34.9% were of low type followed by Average (33.7%) and High (31.4%). These differences were statistically not statistically significant as shown in Table 4 ($P > 0.05$). Distribution of smile line types (average, high, and low) according to sex (male and female). Data are presented as number (n) and percentage (%). The association between sex and smile line was analyzed using the Chi-square (χ^2) test. A P value < 0.05 was considered statistically significant. No statistically significant association was observed ($P = 0.856$).

In female participants, highest mean exposure of right incisor visibility was in 18-27 yrs age group (4.19 mm) whereas the least exposure was in 38-47 yrs group (2.97 mm) This was statistically significant. ($p < 0.05$). Similar results were seen for left incisor visibility. For right canine visibility highest mean exposure of right canine visibility was in 18-27 yrs age group (.86 mm) whereas the least exposure was in 38-47 yrs group (1 mm) This was statistically significant. ($p < 0.05$). Similar results were seen for left canine visibility as shown in table 5.

Maxillary anterior tooth exposure (right and left incisors and canines) according to age groups (18–27, 28–37, and 38–47 years). Values are presented as mean \pm standard deviation (SD). Differences among age groups were analyzed using one-way ANOVA.

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A P value < 0.05 was considered statistically significant. Statistically significant differences were observed for incisor visibility (P = 0.025*) and canine visibility (P = 0.0001*).

For right incisor visibility, the mean difference between the 18-27 years and 28-37 years age groups was 0.485, which was not statistically significant (p = 0.289). However, a statistically significant difference was observed between the 18-27 years and 38-47 years age groups, with a mean difference of 1.223 (p = 0.007). The comparison between the 28-37 years and 38-47 years groups showed a mean difference of 0.737, which was not statistically significant as shown in table 6 (p = 0.126).

Similarly, for left incisor visibility, the mean difference between the 18-27 years and 28-37 years groups was 0.485 and was not statistically significant (p = 0.289). A significant difference was found between the 18-27 years and 38-47 years groups with a mean difference of 1.223 (p = 0.007). The difference between the 28-37 years and 38-47 years groups was 0.737 and did not reach statistical significance as shown in table 6 (p = 0.126).

For right canine visibility, the comparison between the 18-27 years and 28-37 years groups showed a statistically significant mean difference of 0.532 (p = 0.0001). A significant difference was also observed between the 18-27 years and 38-47 years groups, with a mean difference of 0.765 (p = 0.0001). However, the difference between the 28-37 years and 38-47 years groups was 0.233 and was not statistically significant as shown in table 6 (p = 0.097).

A similar pattern was observed for left canine visibility. The mean difference between the 18-27 years and 28-37 years groups was 0.532, which was statistically significant (p = 0.0001). The difference between the 18-27 years and 38-47 years groups was

0.765 and was also statistically significant (p = 0.0001). However, the comparison between the 28-37 years and 38-47 years groups showed a mean difference of 0.233, which was not statistically significant as shown in table 6 (p = 0.097).

Post hoc multiple comparison of tooth visibility (right and left incisors, right and left canines) among different age groups. The table depicts the mean differences between age groups along with their corresponding p-values (Sig.). A statistically significant difference was observed in right and left incisor visibility between the 18-27 years and 38-47 years age groups (p = 0.007). For right and left canine visibility, significant differences were noted between 18-27 years vs 28-37 years and 18-27 years vs 38-47 years (p = 0.0001). No statistically significant differences were found between 28-37 years and 38-47 years for any of the variables (p > 0.05).

In male participants, (18-27 yrs age group) 56.5% participants had normal lip length which was highest as compared to 13% long lip length participants which were least in this age group. In 28-37 yrs group in which 48.5% had short type lip length followed by Normal (39.4%) and then long (12.1%). But in 38-47 yrs age group 50 % had Normal lip length followed by long (36.7%) and then short (13.3%). These differences were statistically significant as shown in table 7 (P<0.05).

Distribution of upper lip length (long, normal, and short) among different age groups (18-27, 28-37, and 38-47 years). Data are presented as number (n) and percentage (%). The association between age groups and upper lip length was analyzed using the Chi-square (χ^2) test. A P value < 0.05 was considered statistically significant. A statistically significant association was observed (P = 0.014*).

Table 1: Types of Lip Length in Different Age Groups

Age groups	Lip length			Total	X ² value	P value
	LONG	NORMAL	SHORT			
18-27 yrs	5	42	13	60	39.09	0.0001*
	8.3%	70.0%	21.7%	100.0%		
28-37yrs	10	32	18	60		
	16.7%	53.3%	30.0%	100.0%		
38-47 yrs	32	23	5	60		
	53.3%	38.3%	8.4%	100.0%		
Total	47	97	36	180		
	26.1%	53.9%	20.0%	100.0%		

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Graph 1. Types of Lip Length in Different Age Groups

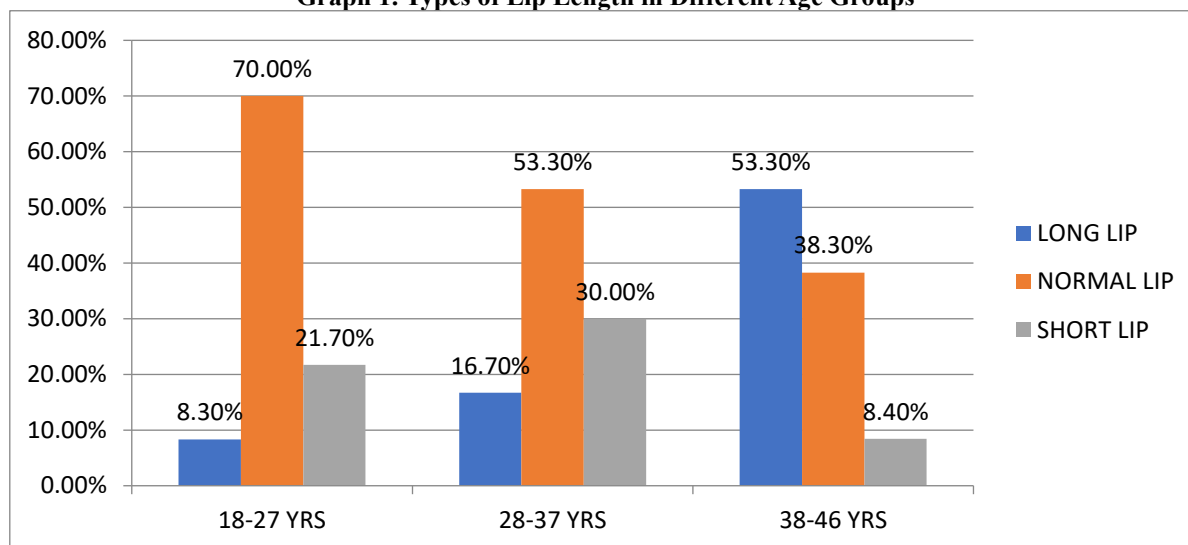


Table 2: Types of Smile Line in Different Age Groups

Age groups	Smile line			Total	X ² value	P value
	Average	High	Low			
18-27 yrs	22	18	20	60	.352	.986
	36.7%	30.0%	33.3%	100.0%		
28-37yrs	21	18	21	60		
	35.0%	30.0%	35.0%	100.0%		
38-47 yrs	20	17	23	60		
	33.3%	28.4%	38.3%	100.0%		
Total	63	53	64	180		
	35.0%	29.4%	35.6%	100.0%		

Table 3: Types of Lip Length According to Gender

Sex	Lip length			Total	X ² value	P value
	Long	Normal	Short			
Female	29	56	9	94	13.56	.001*
	30.8%	59.6%	9.6%	100.0%		
Male	18	41	27	86		
	20.9%	47.7%	31.4%	100.0%		
Total	47	97	36	180		
	26.1%	53.9%	20.0%	100.0%		

Table 4: Types of Smile Line According to Gender

Sex	Smile line			Total	X ² value	P value
	Average	High	Low			
Female	34	26	34	94	.31	.856
	36.2%	27.6%	36.2%	100.0%		
Male	29	27	30	86		
	33.7%	31.4%	34.9%	100.0%		
Total	63	53	64	180		
	35.0%	29.4%	35.6%	100.0%		

Table 5: Distribution of Mean Exposure of Maxillary Anterior Teeth According to Different Age Groups in Female Participants

Maxillary anterior	Age groups	N	Mean exposure	Std. Deviation	F value	P value
Right incisor visibility	18-27 yrs	37	4.19	1.713	3.840	.025*
	28-37 yrs	27	3.70	2.198		

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	38-47 yrs	30	2.97	1.474		
	Total	94	3.66	1.852		
Left incisor visibility	18-27 yrs	37	4.19	1.713	3.840	.025*
	28-37 yrs	27	3.70	2.198		
	38-47 yrs	30	2.97	1.474		
	Total	94	3.66	1.852		
Right canine visibility	18-27 yrs	37	.86	.673	18.873	.0001*
	28-37 yrs	27	.33	.480		
	38-47 yrs	30	.10	.305		
	Total	94	.47	.617		
Left canine visibility	18-27 yrs	37	.86	.673	18.873	.0001*
	28-37 yrs	27	.33	.480		
	38-47 yrs	30	.10	.305		
	Total	94	.47	.617		

Table 6: Post-Hoc Multiple Comparison Test

Dependent Variable	(I) age grp	(J) age grp	Mean Difference (I-J)	Sig.
Right incisor visibility	18-27yrs	28-37yrs	.485	.289
		38-47yrs	1.223*	.007*
	28-37yrs	38-47yrs	.737	.126
Left incisor visibility	18-27yrs	28-37yrs	.485	.289
		38-47yrs	1.223*	.007*
	28-37yrs	38-47yrs	.737	.126
Right canine visibility	18-27yrs	28-37yrs	.532*	.0001*
		38-47yrs	.765*	.0001*
	28-37yrs	38-47yrs	.233	.097
Left canine visibility	18-27yrs	28-37yrs	.532*	.0001*
		38-47yrs	.765*	.0001*
	28-37yrs	38-47yrs	.233	.097

Graph 2. Post-Hoc Multiple Comparison Test

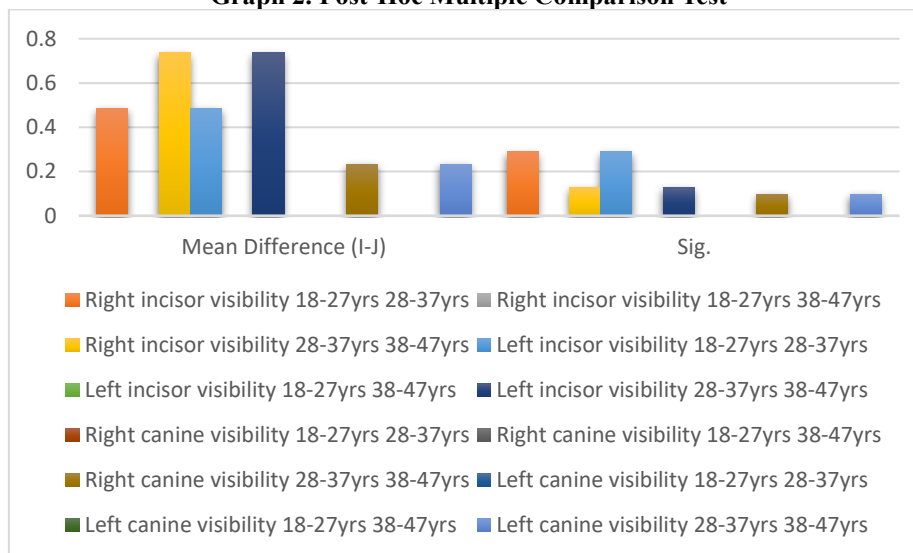


Table 7: Distribution of Types of Lip Length According to Age Groups in Male

Age groups	Upper lip length			Total	X ² value	P value
	Long	Normal	Short			
18-27yrs	3	13	7	23	12.53	0.014*
	13.0%	56.5%	30.4%	100.0%		
28-37yrs	4	13	16	33		

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	12.1%	39.4%	48.5%	100.0%		
38-47yrs	11	15	4	30		
	36.7%	50.0%	13.3%	100.0%		
Total	18	41	27	86		
	20.9%	47.7%	31.4%	100.0%		

DISCUSSION

The present study was undertaken to evaluate the distribution of lip length, smile line, and maxillary anterior tooth exposure in relation to age and gender. In contemporary dental practice, esthetics has become a primary concern, and a clear understanding of soft tissue dynamics is essential for accurate diagnosis and treatment planning. Parameters such as lip length, smile line, and anterior tooth display form the foundation of smile analysis and have been reported to vary with age and gender in previous literature.

Age and Gender Distribution of the Study Population: A total of 180 participants were included in the study and were equally distributed among three age groups (18-27 years, 28-37 years, and 38-47 years), ensuring uniform representation and minimizing age-related bias. The study population also demonstrated a near-equal gender distribution, with 52.2% females and 47.8% males, allowing for reliable gender-based comparisons.

Distribution of Lip Length: The overall findings revealed that normal lip length was the most prevalent (53.9%), followed by long (26.1%) and short lip length (20.0%). A statistically highly significant association was observed between age and lip length ($p = 0.0001$). Younger individuals predominantly exhibited normal lip length, whereas a marked increase in long lip length was noted in the older age group (38-47 years).

These findings are in agreement with previous studies, which report an increase in upper lip length with advancing age. Such changes can be attributed to age-related alterations in perioral soft tissues, including reduced muscle tone, decreased elasticity, and gravitational effects, all of which contribute to elongation of the upper lip [7,8].

Age-wise Distribution of Lip Length According to Gender: In female participants, a highly significant association was found between age and lip length ($p = 0.0001$), with younger females predominantly showing normal lip length and older females exhibiting increased prevalence of long lip length. A similar trend was observed among male participants, where a statistically significant association was also noted ($p = 0.014$).

These findings are consistent with previous reports highlighting sexual dimorphism in facial soft tissues. Variations in lip morphology between males and females may be attributed to differences in facial growth patterns, hormonal influences, and soft tissue characteristics [9]. Notably, short lip length was

more common in younger males, while long lip length increased with age in both sexes.

Distribution of Smile Line: The analysis of smile line distribution showed that average (35.0%) and low (35.6%) smile lines were nearly equally prevalent, followed by high smile line (29.4%). No statistically significant association was found between age and smile line ($p = 0.986$), nor between gender and smile line ($p = 0.856$).

These findings suggest that smile line remains relatively stable across different age groups and between genders. While some studies have reported variations, others indicate that smile line is largely influenced by individual anatomical and neuromuscular factors rather than demographic variables alone [10].

Gender-wise Distribution of Lip Length: A statistically significant difference was observed in lip length distribution between males and females ($p = 0.001$). Females predominantly exhibited normal lip length, whereas males showed a higher prevalence of short lip length. This observation aligns with previous studies that demonstrate sexual dimorphism in lip morphology and facial soft tissues. Differences in lip thickness, muscle activity, and facial proportions between genders may account for this variation [11].

Maxillary Anterior Tooth Exposure in Females: Among female participants, a statistically significant reduction in maxillary incisor visibility was observed with increasing age ($p = 0.025$). Post hoc analysis revealed significantly greater incisor exposure in the 18-27 years group compared to the 38-47 years group. Additionally, canine visibility showed a highly significant decrease with age ($p = 0.0001$).

These findings are in agreement with existing literature, which consistently reports reduced anterior tooth display with advancing age. This reduction may be attributed to elongation of the upper lip and decreased lip mobility, resulting in diminished exposure of maxillary anterior teeth during smiling.

Maxillary Anterior Tooth Exposure in Males: In male participants, incisor visibility demonstrated a decreasing trend with age; however, this difference was not statistically significant ($p = 0.091$). In contrast, canine visibility showed a highly significant reduction with age ($p = 0.0001$). This indicates that age-related changes in tooth display are more pronounced for canines than incisors in males. Similar observations have been reported in

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previous studies evaluating anterior tooth visibility across different age groups [1].

Smile esthetics has important psychological and social implications. An attractive smile is often associated with positive social perception, increased self-confidence, and improved interpersonal interactions. Dental appearance can significantly influence how individuals are perceived in terms of attractiveness, social competence, and personality traits. Individuals with well-aligned and esthetically pleasing smiles are generally viewed more favorably than those with visible dental irregularities. Consequently, there is a growing demand for dental treatments aimed at enhancing smile esthetics. This increasing emphasis highlights the importance of understanding the anatomical and functional determinants of smile characteristics in clinical practice [12-15].

CONCLUSIONS

The present study concludes that lip length and maxillary anterior tooth exposure are significantly influenced by age and gender. Lip length increases with advancing age, resulting in reduced maxillary anterior tooth display, particularly canine visibility. Smile line, however, shows no significant association with age or gender. These findings highlight the importance of considering age-related soft tissue changes during esthetic dental treatment planning.

REFERENCES

1. Patel JR, Prajapati P, Sethuraman R, Naveen YG: A comparative evaluation of effect of upper lip length, age and sex on amount of exposure of maxillary anterior teeth. *J Contemp Dent Pract.* 2011, 12:24-29. 10.5005/jp-journals-10024-1005
2. Al-Juboori MJ, Al-Juboori AJ, Wen TM, Ting J, Chui LS, Hoe TM.: The relationship between the lip length and smile line in a Malaysian population: A cross-sectional study. *Dent Oral Craniofac Res.* 2017, 3:1-5. 10.15761/DOCR.1000208
3. Frush JP, Fisher RD: How dentogenics interprets the personality factor. *J Prosthet Dent.* 1956, 6:441-449. 10.1016/0022-3913(56)90089-0
4. Boucher CO: Arrangement of teeth. In: Swenson MG, editor. *Swenson's complete dentures* St Louis (MO): C.V. Mosby. 1970:155-210.
5. Tjan AHL, Miller GD: The JGP. Some esthetic factors in a smile. *J Prosthet Dent.* 1984, 51:24-28. 10.1016/S0022-3913(84)80097-9
6. Rimal U: Lip length and its correlation among different age group and gender in Nepalese Population. *Orthodontic Journal of Nepal.* 2021, 10.3126/OJN.V11I12.43272
7. Manjula WS, Sukumar MR, Kishorekumar S, Gnanashanmugam K, Mahalakshmi K: Smile: A review. *Journal of Pharmacy & Bioallied Sciences.* 2015, 7:271-5. 10.4103/0975-7406.155951
8. Singh B, Ahluwalia R, Verma D, Grewal SB, Goel R, Kumar PS: Perioral age-related changes in smile dynamics along the vertical plane: a videographic cross-sectional study. *Angle Orthod.* 2013, 83:468-75. 10.2319/061212-488.1
9. Drummond S, Capelli J Jr: Incisor display during speech and smile: Age and gender correlations. *The Angle. Orthodontist.* 2016, 86:631-637. 10.2319/042515-284.1
10. Cunha J, Fernandes GVO, Fernandes JCH, Lopes PC, Rio R: The Interference of Age and Gender on Smile Characterization Analyzed on Six Parameters: a clinical-photographic pilot study. *Medicina (Kaunas).* 2023, 59:595. 10.3390/medicina59030595
11. Miron H, Calderon S, Allon D: Upper lip changes and gingival exposure on smiling: vertical dimension analysis. *Am J Orthod Dentofacial Orthop.* 2012, 141:87-93. 10.1016/j.ajodo.2011.07.017
12. Henson ST, Lindauer SJ, Gardner WG, Shroff B, Tufekci E, Best AM: Influence of dental esthetics on social perceptions of adolescents judged by peers. *Am J Orthod Dentofacial Orthop.* 2011, 140:389-395. 10.1016/j.ajodo.2010.07.026
13. Afroz S, Rathi S, Rajput G, Rahman SA: Dental esthetics and its impact on psycho-social well-being and dental self confidence: a campus based survey of north Indian university students. *J Indian Prosthodont Soc.* 2013, 13:455-60. 10.1007/s13191-012-0247-1
14. Militi A, Sicari F, Portelli M, Merlo EM, Terranova A, Frisone F: Psychological and social effects of oral health and dental aesthetic in adolescence and early adulthood: an observational study. *Int J Environ Res Public Health.* 2021, 18:9022. 10.3390/ijerph18179022
15. Horn S, Matuszewska N, Gkantidis N, et al.: Smile dimensions affect self-perceived smile attractiveness. *Sci Rep.* 2021, 11:2779. 10.1038/s41598-021-82478-9