Gingival and Teeth Display in Relation to Gender at Rest and Smiling Position Among the Undergraduate Students of Dhulikhel Hospital – A Cross Sectional Study

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ABSTRACT

Introduction: The smile is one of the most important facial expressions for expressing joy, pleasure, mood and gratefulness. In the present research, we aim to investigate the maxillary anterior teeth and associated gingival display among the genders when the lips are at rest and during smiling.

Methods: A total of 284 undergraduate students of Kathmandu University School of Medical Sciences were selected as participants. Crown length, displayed portions of anterior teeth, and associated gingivae at rest and during smiling were measured using digital vernier calliper by two observers on the same patient. Student t test and ANOVA will be used comparison between amount of teeth displayed and gingival display at rest and during smiling. Statistical evaluation will be done using the statistical package for social sciences (SPSS 20.0), the level of significance set at *p*-value <0.05.

Results: The mean value of crown length in male for all maxillary anterior teeth are slightly higher than the corresponding length in female. There was no significant gender difference in the display of maxillary central incisors were recorded (p>0.001). There was a significant difference in tooth and gingival portion display with lips at rest between male and female(p<0.001).

Conclusions: This study at Dhulikhel Hospital found that males display more maxillary right lateral incisors at rest, while females show more maxillary left and right central incisors and more maxillary anterior teeth while smiling.These gender-specific differences are crucial for optimizing dental aesthetics and warrant further research.

Key words: Gingival display, Tooth display, Vernier calliper

INTRODUCTION

The smile is one of the most important facial expressions and essential for expressing joy, pleasure, mood and gratefulness.[1] The significance of face aesthetics, which has been demonstrated to have a significant impact on quality of life, is emphasized in contemporary dental literature.[2] According to some research, dental attractiveness influences face attractiveness, which is the key to social success.[3] Dental aesthetics improves psychological well-being, according to another study.[4] Aesthetic factors also becoming increasingly important in treatment programs as society's desire for an attractive, youthful, and healthy appearance grows. As a result, people seeking orthodontic treatment now prioritize smile aesthetics.[4,5] A

Conflict of Interest: None

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gingival smile is brought on by a number of factors, including higher overjet and overbite, increased interlabial space when at rest, high muscular ability to lift the superior lip when smiling, and maxillary vertical excess. The gingival smile appears to be unaffected by factors such as the length of the upper lip, the clinical crown, and the angles of the mandibular and palatal planes. On the other hand, gingival exposure may result from a short clinic crown and a short upper lip.[6]

Facial attractiveness and smile aesthetics are strongly related to each other. A smile is more than a form of communication which influences personality and individual performance in jobs and daily activities.[7] Beauty perception principles can also be applied to smile aesthetics. This study aims to evaluate the amount of tooth and gingival display on smile aesthetics in relation to gender.

METHODS

A Cross sectional study was carried out among the undergraduate students of Kathmandu University School of Medical Sciences, Dhulikhel Hospital after the ethical clearance from the Institutional Review Committee. A total of 284, with 142 each male and female with the inclusion criteria of presence of natural permanent anterior teeth. . Patients were excluded from the study if they included maxillary anterior teeth without caries, occlusal wear, periodontally compromised and malocclusion teeth.

The duration of study was 3 months (July 2024 to September 2024) after receiving Ethical approval from the institutional review committee (IRC) of Kathmandu University school of medical sciences (KUSMS) (IRC – KUSMS Approval No 171/24).

Sample size were calculated based on the study done, Al-Habahbeh et al[7], using formula, n=Z2 p(1-p)/d2, Where Z=static constant corresponding to level of confidence, p=expected prevalence and d= precision or margin of error. with 5% margin of error, at 95% confidence interval and Z=1.96 .

All the samples were examined by the investigator or co-investigators. Measurements were performed using an electronic digital caliper accurate to 0.01 mm (Mitutoyo Digital Caliper, Japan). Vertical measurement were done at the displayed buccal length of anterior teeth and exposed gingivae from the lower border of the upper lip to the incisal edge of the incisors of the tooth during smiling for the maxillary anterior teeth. The measurements were made on the buccal length of anterior teeth vertically from the lower border of the upper lip to the incisal edge of the incisors at the rest for the maxillary anterior teeth.

Student t test and ANOVA will be used comparison between amount of teeth displayed and gingival display at rest and during smiling. Statistical evaluation will be done using the statistical package for social sciences (SPSS 20.0), the level of significance set at *p*-value <0.05.

RESULTS

The comparison of mean values of crown length between male and female is shown in table 1.It is found that the mean value of crown length in male for all maxillary anterior teeth are slightly higher than the corresponding length in female.

There was a significant difference in tooth and gingival portion display with lips at rest between male and female($p<0.001$). Males displayed more of the maxillary right lateral imcisors whereas females displayed more of the maxillary left and right central incisor ($p<0.001$). On the other hand, no significant gender difference in the display of maxillary central incisors were recorded ($p>0.001$).

The median of buccal length of tooth and associated tooth and gingival display during smiling are both genders are shown in table 3.Females displayed more maxillary anterior teeth than males which showed a statistically significant difference ($p<0.001$).

Comparison of mean values of tooth (and gingival portion) display in mm between males and females while at rest and at smiling is shown in table 4.The tooth (and gingival portion) display were significantly higher in all anterior teeth during smile than at rest ($p<0.001$ each).

Number and percentage of participants displaying teeth (and gingival portion) while at rest and during smile is presented in table 5. In both genders, some portion of both right and left central incisors were displayed at rest and all maxillary anterior teeth were displayed during smile.

Table 1: Comparison of mean values of crown length in mm between males and females

Tooth number	Male (n=142)		Female (n=142)		t	P –Value*
	Mean	SD	Mean	SD		
Maxillary right central incisor	9.20	0.46	8.90	0.71	4.305	<0.001
Maxillary right lateral incisor	8.10	0.56	8.0	0.75	0.644	<0.001
Maxillary right canine	9.14	0.67	8.75	0.74	4.665	<0.001
Maxillary left central incisor	9.43	0.44	8.74	0.82	8.885	<0.001
Maxillary left lateral incisor	8.34	0.43	8.77	0.77	-5.704	<0.001
Maxillary left canine	8.94	0.65	8.77	0.80	1.972	<0.001

Table 2: Comparison of mean values of tooth (and gingival portion) display in mm between males and females while at rest

Tooth number	Male (n=142)		Female (n=142)		P –Value*
	Median	IQR	Median	IQR	
Maxillary right central incisor	2.37	1.65-3.20	2.63	2.0-3.63	0.060
Maxillary right lateral incisor	1.71	1.18-2.55	1.60	0.84-2.44	<0.001
Maxillary right canine	0	0-1.29	0	0-1.35	0.134
Maxillary left central incisor	2.31	1.55-3.10	2.52	2.0-3.51	0.432
Maxillary left lateral incisor	1.67	1.12-2.38	1.58	0.92-2.37	<0.001
Maxillary left canine	0	0-1.63	0	0-0.56	0.054

Table 3: Comparison of mean values of tooth (and gingival portion) display in mm between males and females while smiling

Tooth number	Male (n=142)		Female (n=142)		t	P –Value*
	Mean	SD	Mean	SD		
Maxillary right central incisor	7.82	2.32	8.64	1.99	-3.208	<0.001
Maxillary right lateral incisor	6.91	2.21	7.52	1.83	-2.534	<0.001
Maxillary right canine	6.58	2.30	6.89	1.89	-1.243	<0.001
Maxillary left central incisor	7.57	2.23	8.37	1.80	-3.337	<0.001
Maxillary left lateral incisor	6.91	2.20	7.39	1.66	-2.071	<0.001
Maxillary left canine	6.69	2.46	6.99	1.79	-1.177	<0.001

Table 4: Comparison of mean values of tooth (and gingival portion) display in mm between males and females while at rest and at smiling

Tooth number	Sex	At rest (n=142)		During smile (n=142)		P value*
		Median	IQR	Median	IQR	
Maxillary right central incisor	Male	2.37	1.65-3.20	7.57	6.37-9.33	<0.001
	Female	2.63	2.10-3.63	8.57	7.27-9.98	<0.001
Maxillary right lateral incisor	Male	1.78	1.19-2.55	6.53	5.33-8.50	<0.001
	Female	2.60	0.84-2.44	7.42	6.28-8.84	<0.001
Maxillary right canine	Male	1.74	1.19-2.18	6.53	4.80-8.34	<0.001
	Female	0	0-1.35	6.99	5.73-8.14	<0.001
Maxillary left central incisor	Male	2.31	1.55-3.11	7.28	5.99-9.29	<0.001
	Female	2.52	1.98-3.51	8.21	7.30-9.74	<0.001
Maxillary left lateral incisor	Male	1.73	1.21-2.43	6.47	5.29-8.26	<0.001
	Female	1.58	0.92-2.37	7.21	6.31-8.45	<0.001
Maxillary left canine	Male	1.70	1.32-2.77	6.40	4.76-8.56	<0.001
	Female	0	0-0.56	6.89	5.92-8.26	<0.001

Table 5: Number and percentage of participants displaying teeth (and gingival portion) while at rest and at smile (n=142 in each group)

	Sex distribution	Tooth (and gingival) display					
		Rt. CI	Rt. LI	Rt. Canine	Lt. CI	Lt. LI	Lt. Canine
At rest n (%)	Male	142 (100)	120 (84.5)	49 (34.5)	142 (100)	111 (78.2)	32 (22.5)
	Female	142 (100)	122 (85.9)	46 (32.4)	142 (100)	122 (85.9)	36 (25.4)
During smile n (%)	Male	142 (100)	142 (100)	142 (100)	142 (100)	142 (100)	142 (100)
	Female	142 (100)	142 (100)	142 (100)	142 (100)	142 (100)	142 (100)

DISCUSSION

The present study aimed to investigate the differences in gingival and teeth display at rest and during smiling between male and female undergraduate students of Dhulikhel Hospital. The results provide significant insights into gender-specific variations in dental aesthetics.

The study found a significant difference in tooth and gingival portion display at rest between males and females. Males exhibited a higher display of the maxillary right lateral incisors, whereas females showed more of the maxillary left and right central incisors ($p<0.001$). This gender disparity might be attributable to anatomical differences in lip positioning and dental arch forms between genders. The study indicated that the mean crown length for all maxillary anterior teeth was slightly higher in males compared to females. This aligns with previous studies that suggest males generally have larger teeth dimensions.[2,3,8]

A key finding was the significant gender difference in the display of maxillary anterior teeth during smiling. Females displayed more maxillary anterior teeth than males, showing a statistically significant difference ($p<0.001$). This could be influenced by the tendency for females to have a higher smile line, resulting in greater exposure of anterior teeth and gingiva. The tooth and gingival portion display were significantly higher in all anterior teeth during smiling than at rest ($p<0.001$ for each). This supports the understanding that dynamic facial expressions such as smiling can alter the visibility of dental and gingival structures, highlighting the importance of considering both static and dynamic conditions in aesthetic dental evaluations.[9]

These findings have important clinical implications for dental aesthetics and orthodontic treatments. Understanding the gender-specific differences in tooth and gingival display can help tailor dental procedures to achieve more harmonious and pleasing outcomes. Future research could explore the underlying anatomical and physiological factors contributing to these differences and extend the study to diverse populations for broader applicability.

CONCLUSIONS

This study investigated gender-specific differences in gingival and teeth display at rest and during smiling among undergraduate students of Dhulikhel Hospital. The findings revealed that males displayed more of the maxillary right lateral incisors at rest, while females showed more of the maxillary left and right central incisors. Additionally, females displayed significantly more maxillary anterior teeth during smiling compared to males. The mean crown length of all maxillary anterior teeth was slightly higher in males. These results highlight the importance of considering gender differences in dental aesthetics to achieve better clinical outcomes and suggest that future research should explore the underlying factors contributing to these variations.

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