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ORIGINAL ARTICLE

Analysis of Smile Characteristics in Dental students of Lahore Medical and Dental College, Lahore

SAHID NAEEM[1], WARDA AMJAD[2], MAHAM NAYYAR[3], HIRA JAVAID SUKHERA[4], MUHAMMAD ABUBAKAR[5], AHMAD NAVEED VIRK[6], KHEZRAN QAMAR[7]

[1]*Professor, Department of Prosthodontics, Lahore Medical and Dental College Lahore.*
[2,3,4,5,6]*Dental Surgeon, Dept of Prosthodontics, Lahore Medical and Dental College, Lahore.*
[7]*Professor, Department of Prosthodontics, Lahore Medical and Dental College, Lahore*
Correspondence to Dr. Sajid Naeem, E mail: Prostho.doc21@gmail.com Ph # 03004245331

ABSTRACT

Aim: To evaluate different smile characteristics among dental students and find out gender- based association.
Study design: Cross sectional observational study.
Place and duration: Prosthodontic Department of Lahore Medical And Dental College, Lahore, from 1st Jan 2022, till 1st April 2022.
Methodology: A total of 260 dental students were assessed for smile characteristics i.e.; smile line, smile arc, labiodental relationship and number of teeth visible during posed smile.
Result: The smile line frequently observed was average smile line 52.7% followed by gummy smile line 22.3%. More male participants had average smile line whereas gummy smile line was frequently found in females. Frequently observed smile arc was consonant 63.1% followed by flat arc 22.3% and least observed arc was reverse 14.6%. Most of the participants display second premolar to second premolar teeth during posed smile 41.9%. Female display teeth up to first molar 51.5% and males up to second premolars 48.7%. Labiodental relationship frequently observed was the relation of the lips not touching the incisors 54.2%. Gender based difference with respect to smile line, smile arc, and number of displayed teeth was significant $p<0.05$, however labiodental relationship was insignificantly found among gender $p> 0.05$.
Conclusion: Restorations in esthetic zone should be carried out considering smile characteristics like smile arc, smile line, labiodental relation and teeth display. Gender dimorphism should be considered as an important factor that can influence the esthetic outcome of restorations.
Keywords: Gum display, Labiodental relation Smile line, smile arc, smile design, tooth display,

INTRODUCTION

Esthetic and cosmetic dental procedures demand thorough evaluation of parameters that affect dentofacial balance and esthetic out comes.[1] Pretreatment planning, workup, and proper diagnosis is mandatory for achieving optimum results[2]. Smile is one of the components of the face that makes a person looks beautiful and attractive. Smile not only adds to facial beauty and influence social interaction but also helps in personality development of an individual.[3] In Prosthodontic rehabilitation procedures restorations should be carried out keeping in mind various parameters of smile that vary person to person and depict the esthetic outcome of a procedure[4].

Smile can be voluntary or posed or it can be involuntary or spontaneous[5]. Neurological control of muscles play role in different smile expression[5,6]. Numerous smile parameters can influence natural smile process such as smile line, teeth display, smile arc, labiodental relation of lip[7,8,9]. Besides these components' other parameters like gingival show, facial and dental midline symmetry has impact on pleasing smile[7,9,10]. All these parameters can be studied alone but in terms of harmony and symmetry these are related to each other and considered as a unit[7,9]. In smile makeovers and cases where anterior teeth need rehabilitation all these parameters should be carefully studied.[11] It has been documented in the dental literature that there is a factor of ethnicity that these characteristics show variations with[11]. Western dental literature shows many studies on such subjects where studies carried out on topics like smile characteristics[12]. Unfortunately, very less data is available on these topics in Pakistani population[12]. The current study was carried out in dental students of private dental college and results can be helpful for the practitioners as they can use them as a guide whenever planning restorations in high esthetic zones. The objective of the study was to evaluate different smile characteristics among dental students and find out gender- based association.

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METHODOLOGY

It was a cross sectional observational study that was conducted in Prosthodontic department of Lahore Medical and Dental College from 1st January 2022 till 1st April 2022. A total of 260 dental students were selected for the study. 128 males and 132 females were included within age ranged from 19 to 26 years. Students' selection was done by non-probability purposive sampling. All the participants had anterior 6 teeth in both the arches that were caries free. Those without periodontal problems and gingival diseases, spacing between teeth, tooth surface loss and crowding were included in the study. Exclusion criteria was set and all subjects having history of trauma of teeth lip and oral cavity were excluded. Those participants with congenital anomalies, orthodontic intervention and surgical intervention were not selected. Ethical clearance was obtained from College Ethical Committee. After taking informed consent participant were asked to sit on dental chair in comfortably upright position. Two examiners assessed the smile characteristics and observations were recorded. For smile characteristics evaluation following smile attributes were observed i.e.,

- Smile line: It is the elevated upper lip while smiling and its relation with maxillary anterior teeth. Its three types are high smile line i.e., showing maximum teeth height and gingiva during posed smile. Average smile line exposing maxillay anteriors with interproximal gingival levels. Low smile line exposes less than 2/3 of teeth[14,15].
- Smile arc: It is the relation between anterior teeth curve and curve of upper border of lower lip. Its three types are consonant arc where both curves are parallel with each other. Non consonant smile has two sub types: Flat where maxillary teeth curve is flat in relation with upper border of lower lip. Reverse type where maxillary teeth curves are reverse in relation with lower lip[16].
- Labiodental relation: It is the relation of lower lip with maxillary anteriors. This relation can be slight touching of lower lip, not touching and covering the teeth[15].

- Number of displayed teeth: During posed smile teeth display seen up to canines, first premolars, second premolars, first molars and second molars[13].

Participants were asked for posed smile and observations were noted. The data was entered and analyzed in SPSS version 21. Frequency and percentages were calculated. Chi square test was used to find-out the association between the qualitative variables with gender. Statistical significance level was set to 0.05.

RESULTS

A total of 260 participants were included, out of which 128(49.2%) were males and 132(50.8%) were females. Age of the participants ranged from 19 till 26 years with mean age 22.81±SD 2.087. The smile line frequently observed was average smile line 137(52.7%) followed by gummy smile line 58(22.3%), Table I. Gender based association was found to be significant. More male participants had average smile line whereas gummy smile line was frequently found in females (Table I).

Frequently observed smile arc was consonant 164(63.1%) followed by flat arc 58(22.3%) and least observed arc was reverse 38(14.6%). The gender-based difference was found to be significant i.e.; p<0.05 (Table II). Consonant type was frequently found in both genders i.e.; males 81(63.3%), females 83(62.2%) (Table II).

Most of the participants display second premolar to second premolar teeth during posed smile 109(41.9%) followed by display of teeth from first molar to first molar 107(41.2%). Table III. Number of teeth display with respect to gender was significant P<0.05 where female display teeth up to first molar 68;51.5%and males up to second premolars 62;48.7% (Table III).

Labiodental relationship frequently observed was the relation of the lips not touching the incisors. 141(54.2%) followed by sight touching of lip to the incisors 90(34.6%) (Table IV). Gender based difference with respect to labiodental relationship was insignificantly; p> 0.05 existed (Table IV).

Table I: Gender based association of smile line type, N=260

Gender	Smile line types			Total
	Gummy	Average	Low	
Male	20(15.6%)	62(48.4%)	46(35.9%)	128(49.2)
Female	38(28.8%)	75(56.8%)	19(14.4%)	132(50.8)
Total	58(22.3%)	137(52.7%)	56(25.0%)	260(100.0)

P value 0.00

Table II: Gender based association of smile arc type, N=260

Gender	Smile line types			Total
	Consonant	Flat	Reverse	
Male	81(63.3%)	28(21.9%)	19(14.8%)	128(49.2%)
Female	83(62.9%)	30(22.7%)	19(14.4%)	132(50.8%)
Total	164(63.1%)	58(22.3%)	38(14.6%)	260(100%)

P value 0.98

Table III: Gender based association with number of displayed teeth while posed smiling, N=260

Gender	Teeth display					Total
	3-3	4-4	5-5	6-6	7-7	
Male	2(1.6%)	15(11.7%)	62(48.7%)	39(30.5%)	10(7.8%)	128(49.2%)
Female	1(0.8%)	8(6.1%)	47(35.6%)	68(51.5%)	8(6.1%)	132(50.8%)
Total	3(1.2%)	23(8.8%)	109(41.9%)	107(41.2%)	18(6.9%)	260(100%)

P value 0.01

Table IV: Gender based association of labiodental relation, N=260

Gender	Labiodental relation			Total
	Not-touching	Slight touching	Covered	
Male	70(54.7%)	41(32%)	17(13.3%)	128(49.2%)
Female	71(53.8%)	49(37.1%)	12(9.1%)	132(50.8%)
Total	141(54.2%)	90(34.6%)	29(11.2%)	260(100%)

P value: 0.47

DISCUSSION

Patients requiring replacement of anterior teeth demand esthetically pleasing restorations. It is therefore essential to evaluate various characteristics of smile while planning dental procedures. The current study attempted to highlight few characteristics of posed smile in Pakistani population. The posed smile is reproducible hence employed in the study.

Smile line is an important character that should be carefully assessed as gummy smile exposes the restoration margins[13]. If the precise recording of smile line is not considered a key step while planning the restorations then teeth can have compromised esthetics[16]. Inadequacies in restorations can jeopardize not only esthetics but also affects the social wellbeing of a patient.[14] Average smile line was frequently observed in our participants 52.7%. In the current study only 15.6% males had gummy smile whereas it accounts for about 28.8%smile line in females. The present study state that the low smile line is the second most observant smile line in case of males 35.9%. Tjan[15] and coworkers and Nold[17] and coworkers observed similar findings in their respective studies. Tjan[15] in contrast to the observations of the current study stated that the gummy smile line was the least observant line in their study. Likewise, Mehwish[11] and coworkers reported gummy smile line to be the least common characteristic. In contrast Nold[17] and coworkers reported low smile line to be the least common. The current study reported a significant difference with respect to gender. In agreement Tjan[15] and Nold[17] respective studies found the same results. In contrast Mehwish[11] and coworkers reported insignificant gender- based difference. The difference of the findings could be explained on the bases of racial, genetical and population difference in different parts of the world[13].

Smile arc has various definitions in different fields of dentistry such as Prosthodontics, Cosmetics dentistry and Orthodontics[18]. The present study was conducted keeping in view the definition given by Sarver[18]. According to the literature the consonant smiles are said to be pleasing ones as compared to non-consonants smile arcs[16]. Majority of the participants 63.1% possessed consonant smile type in the present study. The least common observation was the reverse type. In concordance with the results few other studies reported consonant smile type to be the frequently observed type[15,17,19]. Statistically insignificant difference was seen in the current study with respect to the gender. Mehwish[11] and coworkers and Nold[17] and coworkers in contrary reported the opposite finding. However, Maulik[20] and coworkers in accordance with the results of current study reported significant findings. The current study found 63.1% participants with consonant, 22.3% with flat and only 14.6% participants possessing reverse smile arc. Maulik and Nanda[20] observed 49% flat smile arc followed by consonant 40% whereas reverse arc was only 10%. The difference in the observations could be due to the methodology difference in both studies as in current study posed smile was employed and in their study video filming of orthodontically managed and non-orthodontically managed patients was done.

Most of the participants had labiodental relation not touching the incisor edges i.e., 54.2% followed by slight touching 34.6%, whereas covered type was rarely seen 11.2%. The gender difference association was found to be insignificant. In concordance with the findings of the recent study Mehwish[11] and coworkers and Nold[17] and coworkers reported the similar findings however in contrast Tjan[15] reported significant difference. They observed touching type of labiodental relation to be the frequent finding moreover significant gender- based difference in their

respective studies. Dong[21] and coworkers stated that the esthetics can be better obtained in those whose teeth are not covered or slightly covered by lower lip as compared to those with covered lips. The results of the current study suggest that teeth display up to premolars during posed smile was frequently seen in our population followed by the display up to molar. Mehwish[11] Tjan[15] and coworkers found teeth display up to first premolars. Similarly, Dong[21] and Maulik[20] and coworkers reported teeth display up to second bicuspid. Significant gender- based difference was observed in the current study. Female displayed teeth show up to first molars and males up to second premolars. In contrast Mehwish[11] and coworkers documented more teeth show in males and display up to molars and stated this difference to be insignificant.

The current study reported various characteristics of smile in dental students of a college in second largest city of the country but still these results can't be generalized to the whole population as racial and genetical factors play their role. Other limitation of the study was its small sample size and sampling technique. It is thus recommended that more such studies are to be carried out in different provinces keeping in mind the ethnic and racial diversities. The findings of the study are helpful in planning esthetic restorations and fulfilling patient's esthetic needs**.**

CONCLUSION

Restorations in esthetic zone should be carried out considering smile characteristics like smile arc, smile line, labiodental relation and teeth display. Gender dimorphism should be considered as an important factor that can influence the esthetic outcome of restorations.

Authors/contribution: Sajid Naeem: Manuscript final reading/Design research, **Khezran Qamar:** Statistical analysis, **Hira Javaid Sukhera:** Conceived idea, **Muhammad Abubakar:** Data collection, **Ahmad Naveed Virk:** Manuscript writing, **Maham Nayyar:** Literature review, **Warda Amjad:** Data collection
Conflict of interest: Nil

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