Original Research

Assessment of Facial Esthetics among Non Dental Professionals, Orthodontists And Orthodontic Postgraduates : A Cross Sectional Study

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ABSTRACT

Background: The aim of the present survey is to understand the subjective preference of non-dental professionals (NDP's) with five parameters which can be modified by an orthodontist and compare it with the perception of orthodontists and orthodontic postgraduates. Four standard photographs of facial esthetics of 2 young woman were digitally modified using software and divided into 5 parameters (Asymmetry, nasolabial angle, smile, vertical facial height, profile). NDP's differ from the subjective preference of orthodontist and postgraduates respectively.

Methods: A picture-based questionnaire survey edited in Adobe software was conducted for all the groups using google forms. Survey rendered 418 responses overall. The overall statistics was done using SPSS 22.0 version.

Results: NDP's prefer 0 mm of facial asymmetry, 80° nasolabial angle, 0 and 2 mm of gingival exposure during smile, 1:1.14 ratio of middle to lower 1/3rd, 10° of convexity angle.

Conclusion: NDP's, orthodontist and orthodontic postgraduates differ in their perception of facial esthetics.

Keywords: Survey, Non dental professional, Orthodontist, Orthodontic postgraduate, Photographs, Facial asymmetry, Nasolabial angle, Smile, Vertical facial height, Profile.

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INTRODUCTION

Beauty is in the eyes of the beholder. Facial attractiveness plays an important role in social interaction and personality development[1]. Theories of attractiveness suggest that a person's physical appeal can influence how others judge and treat them, and this perception is highly subjective. There have been significant findings indicating relationships between self-perceived attractiveness of smiles and personality traits such as neuroticism, self-esteem, and dominance[2]. Facial appearance plays a crucial role in shaping how individuals perceive themselves and how they are perceived by society. Especially, the nose, lips and chin with their prominent central position capture the attention of the observer and influence perception[3]. If structural asymmetries, such as deviations of the chin and nose, affect the perception of smile beauty, then any preoperative diagnosis for rehabilitative treatments, whether orthodontic or prosthetic, should include a thorough analysis of facial structures[4]. It's crucial to consider individual preferences alongside their underlying demographic, geographic, and ethnic dynamics.[5]

Recently there is a paradigm shift towards soft tissue improvement especially in adolescents and young adults. The motive for an orthodontist to treat them depends on the improvement of their overall soft tissue contours including frontal asymmetries, nasolabial angle, vertical lower 3rd of the face, smile and sagittal profile. Thereby the aim of the present survey is to understand the subjective preference of non-dental professionals with these five parameters which can be modified by an orthodontist and compare it with the perception of orthodontists and orthodontic postgraduates.

MATERIALS AND METHODS

STUDY DESIGN

This was a Pan–Indian image based online survey for assessing the facial esthetics among non-dental professionals (NDP), Orthodontists and Orthodontic postgraduates. A pre structured, self-administered, picture-based questionnaire was primarily edited using Adobe photoshop 2020 v210.2.57 (×64) software and designed using Google forms. It was disseminated among non-dental professionals, orthodontists and orthodontic postgraduates through several social media forums. Anonymity was ensured and no personal identifications were collected. The survey rendered 418 responses. This data was analyzed using the percentages of the total and Chi- Square test.

This survey consisted of 12 questions divided into 6 sections.

    a)   Demographic details

    b)   Asymmetry (Frontal asymmetry)

    c)   Side view – Upper lip (Nasolabial angle)

    d)   Smile (Gingiva, tooth exposure during smile)

    e)   Height of the face (Vertical proportions)

    f)   Side view – Relation of chin to the lips (Sagittal proportions)

ELIGIBILITY CRITERIA

INCLUSION CRITERIA

1) Non dental professionals

2) Qualified Orthodontists

3) Orthodontic postgraduates

4) Above 18 years of age

EXCLUSION CRITERIA

1) General dentist

2) Undergraduate students

3) Postgraduates from other dental specialties other than orthodontics

4) Orthodontic patients

5) Persons related to an orthodontist

6) Below 18 years of age

PHOTO MANIPULATION

Four standard photograph of facial esthetics of 2 young woman were digitally modified using Adobe photoshop software program (2020 v210.2.57 (×64)). Five photographs, one is the standard and other four are its modified analogues, represent one group for specific esthetic trait. People participating in the study were requested to select the pictures that looked GOOD, AVERAGE and BAD according to them. The photographs within each group were arranged randomly and differently in each groups. The above mentioned manipulation involved 5 facial components. (1) Facial asymmetry: Photograph of a woman with a pleasant face where midsagittal plane was coincident with the soft tissue pogonion point of the chin. Manipulation limited to soft tissue pogonion point to produce a progressive facial asymmetry of 2mm, 4mm, 6mm, 8mm [Figure 1].

(2) Relation of the upper lip : Photograph of a woman with an average nasolabial angle of 90º. Manipulation limited to the nasolabial angle to produce both regressive and progressive angulations of severely acute(60º), acute (80º), obtuse(100º), severely obtuse(120º) [Figure 2].

(3) Smile : Photograph of a woman with a pleasant smile with ideal gingival (2mm) and incisal exposure. Manipulation limited to the upper lip and gingiva to produce both progressive and regressive corrections of high smile line (5mm of gingiva), moderately high smile line (0mm of gingiva), moderately low smile line(5mm of upper incisors), low smile line (3mm of upper and 5mm of lower incisors) [Figure 3].

(4) Height of the face : Photograph of a woman with average frontal facial height (1:1:1) matching the rule of thirds. Manipulation limited to the upper, middle and lower one third of face from trichion to soft tissue Menton to produce both progressive and regressive / corrections of increased (1:1:1.28), moderately increased (1:1:1.14), decreased (1:1.14:1), moderately decreased (1:1.14:0.9) [Figure 4].

(5) Relation of chin to lip : Photograph of a woman with a straighter profile was taken for assessment of both segments(Class II and Class III (10° of convexity angle)) [Figure 5A,B]. Manipulation limited to the chin to

produce both progressive and regressive corrections of Severe convex (35°) and concave (-15°), Moderately convex (30°) and concave (-10°), Mild convex (25°) and concave (0°), Slight convex (20°) and concave (5°).

FIGURE 1: PHOTO MANIPULATION FOR ASYMMETRY
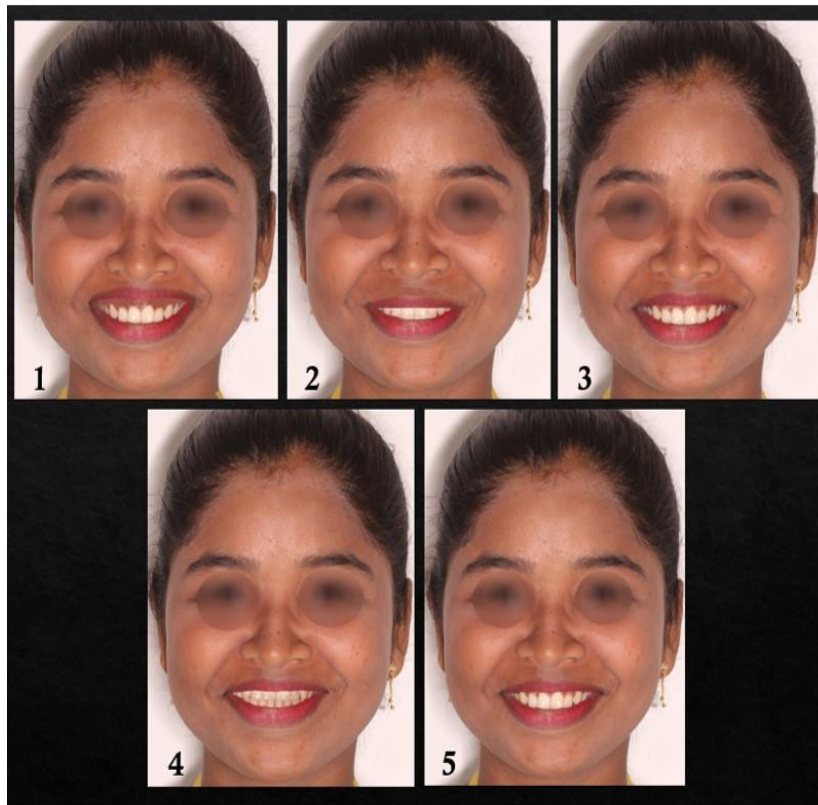

FIGURE 2: PHOTO MANIPULATION FOR SIDE VIEW – UPPER LIP

FIGURE 3: PHOTO MANIPULATION FOR SMILE LINE

FIGURE 4: PHOTO MANIPULATION FOR VERTICAL PROPORTIONS

FIGURE 5A: PHOTO MANIPULATION FOR PROFILE PROPORTIONS (CLASS II)

FIGURE 5B: PHOTO MANIPULATION FOR PROFILE PROPORTIONS(CLASS III)

The edited and manipulated photos were coalesced in separate segments and distributed via google forms. The following question was

"Which of the following numbered image is **GOOD, AVERAGE** and **BAD**".

SAMPLE SIZE ESTIMATION

The sample size was calculated based on a study by Alhammadi et al[6] with an effect size of 0.192, an alpha-type error of 0.05 and a power of 0.80. Sample size was calculated using G*Power software (3.1.9.3 for Macintosh; Heinrich Heine, Universität Dusseldorf, Dusseldorf, Germany). The results demonstrated the need for a minimum of 330 samples (66 samples per group).

## VALIDITY AND RELIABILITY OF THE QUESTIONNAIRE

The face validity of the questionnaire was evaluated. Cronbach's alpha test was done to measure the reliability and it gave a score of 0.994 which indicated good reliability.

STATISTICAL ANALYSIS

Data collected was sorted and entered in MS excel sheet and analyzed by using SPSS 22.0 version. Frequency statistics of each variable was performed and frequency distribution and percentage of each item of the questionnaire was calculated. Mean and standard deviation of knowledge level score was derived. Chi-square test of proportion was performed to analyze the significant difference between the parameters. All statistical tests were performed at 95% confidence intervals, keeping the mean difference significant at the 0.05 level.

RESULTS

A total of 418 professionals participated in this study. Out of this, 36% were Non – dental professionals, 16% were orthodontists, 16% were 1st year postgraduates, 16% were 2nd year postgraduates and 16% were 3rd year postgraduates respectively [Graph 1]. Gender wise 48% of males participated and 52% of females had participated [Graph 2]. People aged 18 – 30 years were the major population amounting to 81% [Graph 3].
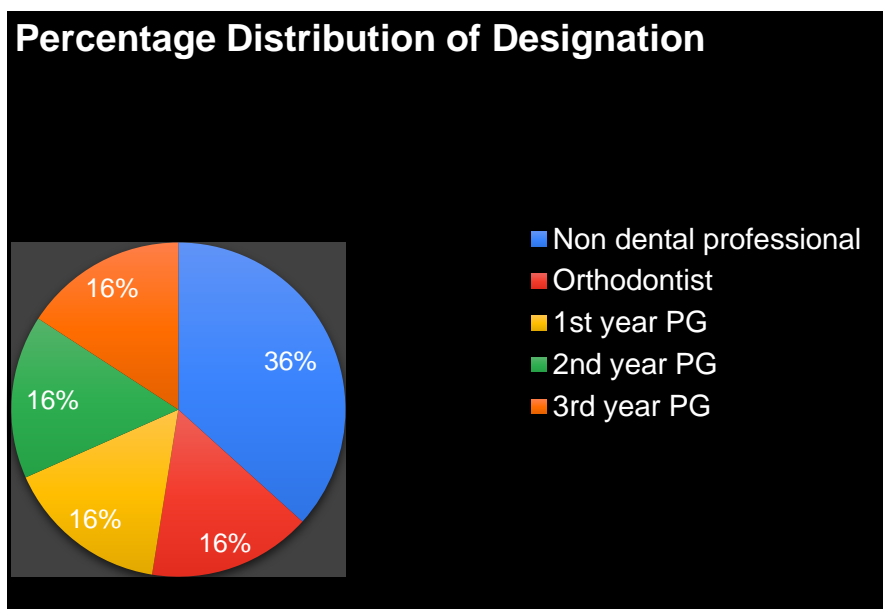
GRAPH 1: PERCENTAGE DISTRIBUTION BASED ON DESIGNATION
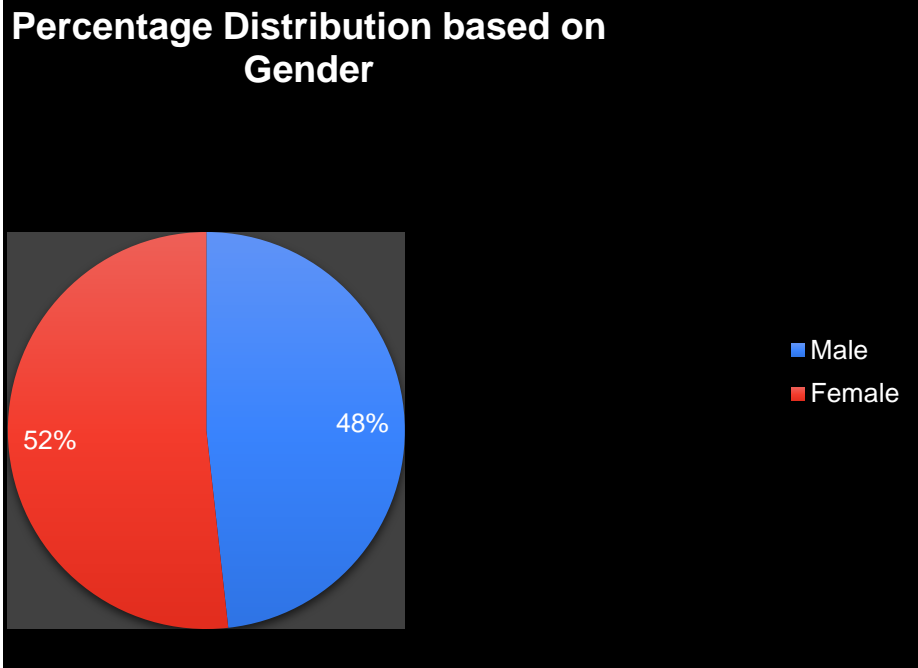
GRAPH 2: PERCENTAGE DISTRIBUTION BASED ON GENDER
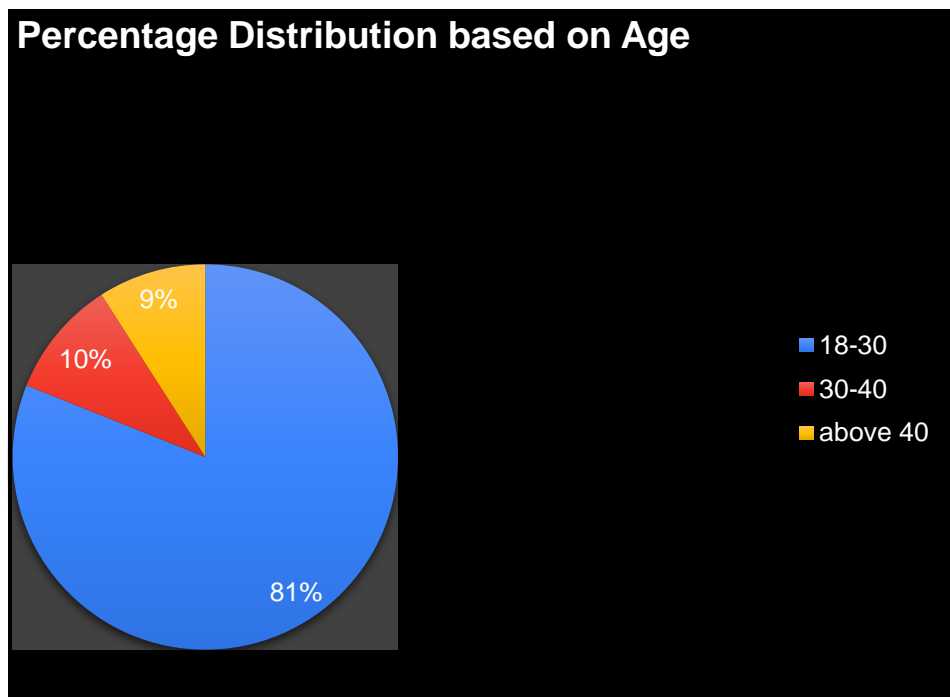
GRAPH 3: PERCENTAGE DISTRIBUTION BASED ON AGE

S.NO	SECTIONS	PICTURE	MODIFICATIONS	CATEGORY
1	FACIAL ASYMMETRY	NO:1	6mm of chin asymmetry	AVERAGE
		NO:2	2mm of chin asymmetry	AVERAGE
		NO:3	0mm of chin asymmetry	GOOD
		NO:4	4mm of chin asymmetry	AVERAGE
		NO:5	8mm of chin asymmetry	BAD
2	NASOLABIAL ANGLE	NO:1	60°	AVERAGE
		NO:2	90°	GOOD
		NO:3	100°	AVERAGE
		NO:4	80°	AVERAGE
		NO:5	120°	BAD
3	SMILE	NO:1	5mm Gingival exposure	BAD
		NO:2	5mm Upper incisors exposure	AVERAGE
		NO:3	2mm Gingival exposure	GOOD
		NO:4	3mm Upper incisors, 5mm Lower incisors exposure	AVERAGE
		NO:5	0mm Gingival exposure	AVERAGE
4	VERTICAL PROPORTIONS	NO:1	1.4:1 (Middle: Lower)	AVERAGE
		NO:2	1:1.14 (Middle: Lower)	AVERAGE
		NO:3	1:1.28 (Middle: Lower)	AVERAGE
		NO:4	1:1 (Middle: Lower)	GOOD
		NO:5	1.14:0.9 (Middle: Lower)	BAD
5	CLASS II PROFILE	NO:1	20° Convexity angle	AVERAGE
		NO:2	25° Convexity angle	AVERAGE
		NO:3	10° Convexity angle	GOOD
		NO:4	30° Convexity angle	AVERAGE
		NO:5	35° Convexity angle	BAD
6	CLASS III PROFILE	NO:1	10° Convexity angle	GOOD
		NO:2	-15° Convexity angle	BAD
		NO:3	-10° Convexity angle	AVERAGE
		NO:4	+5° Convexity angle	AVERAGE
		NO:5	0° Convexity angle	AVERAGE

TABLE 1: MODIFICATIONS OF THE PICTURES WITH CATEGORIES

| CATEGORY | DESIGNATION | OPTIONS | | | | | CHI SQUARE | P VALUE |
		1	2	3	4	5		
GOOD	NDP	15 (9.8%)	48 (31.3%)	72 (47%)	14 (9.1%)	4 (2.6%)	69.545	0.001**
	Orthodontist	2 (3.0%)	8 (12.1%)	56 (84.8%)	0 (0.0%)	0 (0.0%)		
	1st year PG	3 (4.5%)	16 (24.2%)	47 (71.2%)	0 (0.0%)	0 (0.0%)		
	2nd year PG	0 (0.0%)	14 (21.2%)	52 (78.7%)	0 (0.0%)	0 (0.0%)		
	3rd year PG	1 (1.5%)	6 (9.0%)	57 (86.3%)	2 (3.0%)	0 (0.0%)		
	Total	21	92	284	16	4		
AVERAGE	NDP	24 (15.7%)	55 (36.0%)	43 (28.1%)	28 (18.3%)	3 (2.0%)	89.505	0.001**
	Orthodontist	1 (1.5%)	55 (83.3%)	7 (10.6%)	2 (3.0%)	1 (1.5%)		
	1st year PG	3 (4.5%)	43 (65.2%)	12 (18.2%)	8 (12.1%)	0 (0.0%)		
	2nd year PG	0 (0.0%)	51 (77.3%)	13 (19.7%)	2 (3.0%)	0 (0.0%)		
	3rd year PG	4 (6.1%)	55 (83.3%)	6 (9.1%)	1 (1.5%)	0 (0.0%)		
	Total	32	259	81	41	4		
BAD	NDP	24 (15.9%)	9 (5.9%)	12 (7.8%)	19 (12.4%)	89 (58.1%)	64.541	0.001**
	Orthodontist	0 (0.0%)	1 (1.5%)	0 (0.0%)	5 (7.6%)	60 (90.9%)		
	1st year PG	3 (4.5%)	1 (1.5%)	0 (0.0%)	6 (9.1%)	56 (84.8%)		
	2nd year PG	1 (1.5%)	1 (1.5%)	0 (0.0%)	4 (6.1%)	60 (90.9%)		
	3rd year PG	3 (4.5%)	1 (1.5%)	2 (3.0%)	1 (1.5%)	59 (89.4%)		
	Total	31	13	14	35	324		

TABLE 2: FACIAL ASYMMETRY

RESULTS FOR FACIAL ASYMMETRY

Non dental professionals **(47%)** (NDP) prefer 0mm of facial asymmetry over other options. This option was also mostly perceived as good among 3rd year postgraduates **(86.3%).** NDP's **(58.1%)** perceived 8mm of facial asymmetry as bad over other options. This option was mostly perceived as bad among orthodontists and 2nd year postgraduates **(90.9%) [Table 2].**

47% of NDP's, **84.8%** of orthodontists, **71.2%** of 1st year postgraduates (PG's), **78.7%** of 2nd year PG's and **86.3%** of 3rd year PG's have selected the correct option (**OPTION 3**) for GOOD category which has got 0mm of facial asymmetry.

36% of NDP's, **83.3%** of orthodontists, **65.2%** of 1st year PG's, **77.3%** of 2nd year PG's and **83.3%** of 3rd year PG's have selected the correct option (**OPTION 2**) for AVERAGE category which has got 2mm of facial asymmetry.

58.1% of NDP's, **90.9%** of orthodontists, **84.8%** of 1st year PG's, **90.9%** of 2nd year PG's and **89.4%** of 3rd year PG's have selected the correct option (**OPTION 5**) for BAD category which has got 8mm of facial asymmetry.

CATEGORY	DESIGNATION	OPTIONS					CHI SQUARE	P VALUE
		1	2	3	4	5		
GOOD	NDP	15 (9.8%)	54 (35.3%)	26 (17.0%)	55 (36.0%)	3 (2.0%)	102.472	0.001**
	Orthodontist	1 (1.5%)	54 (81.8%)	2 (3.0%)	9 (13.6%)	0 (0.0%)		
	1st year PG	0 (0.0%)	40 (60.6%)	2 (3.0%)	24 (36.4%)	0 (0.0%)		
	2nd year PG	0 (0.0%)	50 (75.8%)	6 (9.1%)	10 (15.2%)	0 (0.0%)		
	3rd year PG	1 (1.5%)	59 (89.4%)	1 (1.5%)	5 (7.6%)	0 (0.0%)		
	Total	17	257	37	103	3		
AVERAGE	NDP	19 (12.4%)	58 (37.9%)	29 (19.0%)	43 (28.1%)	4 (2.6%)	137.387	0.001**
	Orthodontist	0 (0.0%)	8 (12.1%)	48 (72.7%)	10 (15.2%)	0 (0.0%)		
	1st year PG	2 (3.0%)	21 (31.8%)	12 (18.2%)	30 (45.5%)	1 (1.5%)		
	2nd year PG	2 (3.0%)	10 (15.2%)	10 (15.2%)	44 (66.7%)	0 (0.0%)		
	3rd year PG	3 (4.5%)	5 (7.6%)	34 (51.5%)	24 (36.4%)	0 (0.0%)		
	Total	26	102	133	151	5		
BAD	NDP	27 (17.6%)	7 (4.6%)	11 (7.2%)	14 (9.2%)	94 (61.4%)	49.46	0.001**
	Orthodontist	8 (12.1%)	1 (1.5%)	0 (0.0%)	2 (3.0%)	55 (83.3%)		
	1st year PG	13 (19.7%)	0 (0.0%)	1 (1.5%)	4 (6.1%)	48 (72.7%)		
	2nd year PG	19 (28.8%)	0 (0.0%)	0 (0.0%)	1 (1.5%)	46 (69.7%)		
	3rd year PG	5 (7.6%)	3 (4.5%)	0 (0.0%)	0 (0.0%)	58 (87.9%)		
	Total	72	11	12	21	301		

TABLE 3: UPPER LIP (SIDE VIEW)

RESULTS FOR UPPER LIP (SIDE VIEW)

Non-dental professionals **(35.3%)** prefer 80° of nasolabial angle over other options whereas orthodontists and postgraduates prefer 90° of nasolabial angle. NDP's **(61.4%)** perceived 120° of nasolabial angle as bad over other options. This option was mostly perceived as bad among orthodontists and 2nd year postgraduates **(90.9%)** **[Table 3].**

35.3% of Non dental professionals (NDP), **81.8%** of orthodontists, **60.6%** of 1st PG's, **75.8%** of 2nd year PG's and **89.4%** of 3rd year PG's have selected the correct option (**OPTION 2**) for GOOD category which has got 90 degrees of nasolabial angle.

19.0% of Non dental professionals (NDP), **72.7%** of orthodontists, **18.2%** of 1st year PG's, **15.2%** of 2nd year PG's and **51.5%** of 3rd year PG's have selected the correct option (**OPTION 3**) for AVERAGE category which has got 100 degrees of nasolabial angle.

61.4% of Non dental professionals (NDP), **83.3%** of orthodontists, **72.7%** of 1st year PG's, **69.7%** of 2nd year PG's and **87.9%** of 3rd year PG's have selected the correct option (**OPTION 5**) for BAD category which has got 120 degrees of nasolabial angle.

| CATEGORY | DESIGNATION | OPTIONS | | | | | CHI SQUARE | P VALUE |
		1	2	3	4	5		
GOOD	NDP	25 (16.3%)	28 (18.3%)	47 (30.7%)	6 (3.9%)	47 (30.7%)	103.976	0.001**
	Orthodontist	3 (4.5%)	2 (3.0%)	49 (74.2%)	0 (0.0%)	12 (18.2%)		
	1st year PG	0 (0.0%)	3 (4.5%)	36 (54.5%)	2 (3.0%)	25 (37.9%)		
	2nd year PG	0 (0.0%)	0 (0.0%)	44 (66.7%)	0 (0.0%)	22 (33.3%)		
	3rd year PG	0 (0.0%)	1 (1.5%)	48 (72.7%)	1 (1.5%)	16 (24.2%)		
	Total	28	34	224	9	122		
AVERAGE	NDP	18 (11.8%)	41 (26.8%)	51 (33.3%)	14 (9.2%)	29 (19.0%)	104.993	0.001**
	Orthodontist	2 (3.0%)	3 (4.5%)	13 (19.7%)	1 (1.5%)	47 (71.2%)		
	1st year PG	0 (0.0%)	10 (15.2%)	23 (34.8%)	3 (4.5%)	30 (45.5%)		
	2nd year PG	1 (1.5%)	4 (6.1%)	21 (31.8%)	0 (0.0%)	40 (60.6%)		
	3rd year PG	1 (1.5%)	4 (6.1%)	15 (22.7%)	2 (3.0%)	44 (66.7%)		
	Total	22	62	123	20	190		

BAD	NDP	45 (29.4%)	18 (11.8%)	11 (7.2%)	72 (47.1%)	7 (4.6%)	86.168	0.001**
	Orthodontist	50 (75.8%)	4 (6.1%)	1 (1.5%)	9 (13.6%)	2 (3.0%)		
	1st year PG	40 (60.6%)	3 (4.5%)	0 (0.0%)	23 (34.8%)	0 (0.0%)		
	2nd year PG	41 (62.1%)	1 (1.5%)	0 (0.0%)	24 (36.4%)	0 (0.0%)		
	3rd year PG	52 (78.8%)	4 (6.1%)	1 (1.5%)	9 (13.6%)	0 (0.0%)		
	Total	228	30	13	137	9		

TABLE 4: SMILE

RESULTS FOR SMILE

Non dental professionals **(30.7%)** prefer 0mm and 2mm of gingival exposure during smile over other options. 2mm of gingival exposure during smile was mostly perceived as good among orthodontists **(74.2%).** NDP's **(47.1%)** perceived 3mm of upper and 5mm of lower incisal exposure during smile as bad over other options. 5mm of gingival exposure during smile as a bad option was mostly perceived among 3rd year postgraduates **(78.8%) [Table 4].**

30.7% of Non dental professionals (NDP's), **74.2%** of orthodontists, **54.5%** of 1st year PG's, **66.7%** of 2nd year PG's and **72.7%** of 3rd year PG's have selected the correct option (**OPTION 3**) for GOOD category which showed 2mm of gingiva during smile.

19.0% of Non dental professionals (NDP), **71.2%** of orthodontists, **45.5%** of 1st year PG's, **60.6%** of 2nd year PG's and **66.7%** of 3rd year PG's have selected the correct option (**OPTION 5**) for AVERAGE category which showed 0mm of gingiva during smile. 33.3% of NDP's had selected (OPTION 3) for AVERAGE category which showed 2mm of gingiva during smile.

29.4% of Non dental professionals (NDP), **75.8%** of orthodontists, **60.6%** of 1st year PG's, **62.1%** of 2nd year PG's and **78.8%** of 3rd year PG's have selected the correct option (**OPTION 1**) for BAD category which showed 5mm of gingiva during smile.

CATEGORY	DESIGNATION	OPTIONS					CHI SQUARE	P VALUE
		1	2	3	4	5		
GOOD	NDP	22 (14.4%)	48 (31.4%)	41 (26.8%)	37 (24.2%)	5 (3.3%)	129.765	0.001**
	Orthodontist	3 (4.5%)	11 (16.7%)	4 (6.1%)	48 (72.7%)	0 (0.0%)		
	1st year PG	0 (0.0%)	19 (28.8%)	4 (6.1%)	37 (56.1%)	6 (9.1%)		
	2nd year PG	0 (0.0%)	5 (7.6%)	3 (4.5%)	55 (83.3%)	3 (4.5%)		
	3rd year PG	2 (3.0%)	8 (12.1%)	4 (6.1%)	51 (77.3%)	1 (1.5%)		
	Total	27	91	56	228	15		
AVERAGE	NDP	18 (11.8%)	48 (31.4%)	42 (27.5%)	36 (23.5%)	9 (5.9%)	141.025	0.001**
	Orthodontist	1 (1.5%)	11 (16.7%)	9 (13.6%)	10 (15.2%)	35 (53.0%)		
	1st year PG	1 (1.5%)	8 (12.1%)	15 (22.7%)	16 (24.2%)	26 (39.4%)		
	2nd year PG	1 (1.5%)	9 (13.6%)	0 (0.0%)	9 (13.6%)	47 (71.2%)		
	3rd year PG	2 (3.0%)	8 (12.1%)	6 (9.1%)	7 (10.6%)	43 (65.2%)		
	Total	23	84	72	78	160		
BAD	NDP	62 (40.5%)	15 (9.8%)	29 (19.0%)	17 (11.1%)	30 (19.6%)	73.976	0.001**
	Orthodontist	49 (74.2%)	2 (3.0%)	3 (4.5%)	1 (1.5%)	11 (16.7%)		
	1st year PG	48 (72.7%)	2 (3.0%)	10 (15.2%)	3 (4.5%)	3 (4.5%)		
	2nd year PG	49 (74.2%)	1 (1.5%)	13 (19.7%)	1 (1.5%)	2 (3.0%)		
	3rd year PG	55 (83.3%)	2 (3.0%)	5 (7.6%)	1 (1.5%)	3 (4.5%)		
	Total	263	22	60	23	49		

TABLE 5: HEIGHT OF THE FACE

RESULTS FOR HEIGHT OF THE FACE

Non dental professionals **(31.4%)** prefer 1:1.14 ratio of middle to lower 3rd over other options whereas orthodontists and postgraduates prefer 1:1 ratio. NDP's **(40.5%)** perceived 1.14:0.9 ratio of middle to lower 3rd as bad over other options. This option was mostly perceived as bad among 3rd year postgraduates **(83.3%)** **[Table 5].**

24.2% of Non dental professionals (NDP), **72.7%** of orthodontists, **56.1%** of 1st year PG's, **83.3%** of 2nd year PG's and **77.3%** of 3rd year PG's have selected the correct option (**OPTION 4**) for GOOD category which showed 1:1 ratio of middle to lower 3rd.

5.9% of Non dental professionals (NDP), **53.0%** of orthodontists, **39.4%** of 1st year PG's, **71.2%** of 2nd year PG's and **65.2%** of 3rd year PG's have selected the correct option (**OPTION 5**) for AVERAGE category which showed 1.14:0.9 ratio of middle to lower 3rd.

40.5% of Non dental professionals (NDP), **74.2%** of orthodontists, **72.7%** of 1st year PG's, **74.2%** of 2nd year PG's and **83.3%** of 3rd year PG's have selected the correct option (**OPTION 1**) for BAD category which showed 1.4:1 ratio of upper to lower 3rd .

CATEGORY	DESIGNATION	OPTIONS					CHI SQUARE	P VALUE
		1	2	3	4	5		
GOOD	NDP	50 (32.7%)	20 (13.1%)	72 (47.1%)	10 (6.5%)	1 (0.7%)	69.395	0.001**
	Orthodontist	11 (16.7%)	1 (1.5%)	54 (81.8%)	0 (0.0%)	0 (0.0%)		
	1st year PG	21 (31.8%)	1 (1.5%)	44 (66.7%)	0 (0.0%)	0 (0.0%)		
	2nd year PG	14 (21.2%)	0 (0.0%)	52 (78.8%)	0 (0.0%)	0 (0.0%)		
	3rd year PG	6 (9.1%)	2 (3.0%)	57 (86.4%)	1 (1.5%)	0 (0.0%)		
	Total	102	24	279	11	1		
AVERAGE	NDP	58 (37.9%)	43 (28.1%)	40 (26.1%)	10 (6.5%)	2 (1.3%)	69.498	0.001**
	Orthodontist	46 (69.7%)	12 (18%)	8 (12.1%)	0 (0.0%)	0 (0.0%)		
	1st year PG	33 (50.0%)	16 (24.2%)	17 (25.8%)	0 (0.0%)	0 (0.0%)		
	2nd year PG	48 (72.7%)	6 (9.1%)	12 (18.2%)	0 (0.0%)	0 (0.0%)		
	3rd year PG	55 (83.3%)	8 (12.1%)	3 (4.5%)	0 (0.0%)	0 (0.0%)		
	Total	240	85	80	10	2		
BAD	NDP	9 (5.9%)	16 (10.5%)	19 (12.4%)	25 (16.3%)	84 (55.3%)	80.282	0.001**
	Orthodontist	0 (0.0%)	1 (1.5%)	1 (1.5%)	3 (4.5%)	61 (92.4%)		
	1st year PG	0 (0.0%)	1 (1.5%)	0 (0.0%)	4 (6.1%)	61 (92.4%)		
	2nd year PG	0 (0.0%)	1 (1.5%)	0 (0.0%)	3 (4.5%)	62 (93.9%)		
	3rd year PG	1 (1.5%)	2 (3.0%)	3 (4.5%)	3 (4.5%)	57 (86.4%)		
	Total	10	21	23	38	325		

TABLE 6: CLASS II PROFILE

RESULTS FOR CLASS II PROFILE

Non dental professionals **(47.1%)** prefer 10° of convexity angle over other options. This option was mostly perceived as good among 3rd year postgraduates **(86.4%).** NDP's **(55.3%)** perceived 35° of convexity angle as bad over other options. This option was mostly perceived as bad among orthodontists **(92.4%)** too **[Table 6].**

47.1% of Non dental professionals (NDP), **81.8%** of orthodontists, **66.7%** of 1st year PG's, **78.8%** of 2nd year PG's and **86.4%** of 3rd year PG's have selected the correct option (**OPTION 3**) for GOOD category which had 10 degree of convexity angle.

37.9% of Non dental professionals (NDP), **69.7%** of orthodontists, **50.0%** of 1st year PG's, **72.7%** of 2nd year PG's and **83.3%** of 3rd year PG's have selected the correct option (**OPTION 1**) for AVERAGE category which showed 20 degree of convexity angle.

55.3% of Non dental professionals (NDP), **92.4%** of orthodontists, **92.4%** of 1st year PG's, **93.9%** of 2nd year PG's and **86.4%** of 3rd year PG's have selected the correct option (**OPTION 5**) for BAD category which showed 35 degree of convexity angle.

CATEGORY	DESIGNATION	OPTIONS					CHI SQUARE	P VALUE
		1	**2**	**3**	**4**	**5**		
GOOD	NDP	122 (79.7%)	7 (4.6%)	12 (7.8%)	10 (6.5%)	2 (1.3%)	37.218	0.001**
	Orthodontist	62 (93.9%)	2 (3.0%)	0 (0.0%)	1 (1.5%)	1 (1.5%)		
	1st year PG	64 (97.0%)	1 (1.5%)	1 (1.5%)	0 (0.0%)	0 (0.0%)		
	2nd year PG	66 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)		
	3rd year PG	63 (95.5%)	1 (1.5%)	1 (1.5%)	1 (1.5%)	0 (0.0%)		
	Total	377	11	14	12	3		
AVERAGE	NDP	16 (10.5%)	21 (13.7%)	20 (13.1%)	79 (51.6%)	17 (11.1%)	74.734	0.001**
	Orthodontist	0 (0.0%)	3 (4.5%)	3 (4.5%)	57 (86.4%)	3 (4.5%)		
	1st year PG	1 (1.5%)	1 (1.5%)	0 (0.0%)	55 (83.3%)	9 (13.6%)		
	2nd year PG	1 (1.5%)	0 (0.0%)	1 (1.5%)	58 (87.9%)	6 (9.1%)		
	3rd year PG	2 (3.0%)	2 (3.0%)	3 (4.5%)	55 (83.3%)	4 (6.1%)		
	Total	20	27	27	304	39		

BAD	NDP	8 (5.2%)	74 (48.4%)	50 (32.7%)	9 (5.9%)	12 (7.8%)	
	Orthodontist	0 (0.0%)	58 (87.9%)	6 (9.1%)	0 (0.0%)	2 (3.0%)	
	1st year PG	0 (0.0%)	49 (74.2%)	14 (21.2%)	2 (3.0%)	1 (1.5%)	73.863
	2nd year PG	0 (0.0%)	60 (90.9%)	4 (6.1%)	0 (0.0%)	2 (3.0%)	
	3rd year PG	3 (4.5%)	55 (83.3%)	6 (9.1%)	0 (0.0%)	2 (3.0%)	
	Total	11	296	80	11	19	0.001**

TABLE 7: CLASS III PROFILE

RESULTS FOR CLASS III PROFILE

Non dental professionals **(79.7%)** prefer 10° of convexity angle over other options. This option was mostly perceived as good among 2nd year postgraduates **(100%).** NDP's **(48.4%)** perceived -15° of convexity angle as bad over other options. This option was mostly perceived as bad among 2nd year postgraduates **(90.9%) [Table 7].**

79.7% of Non dental professionals (NDP), **93.9%** of orthodontists, **97.0%** of 1st year PG's, **100%** of 2nd year PG's and **95.5%** of 3rd year PG's have selected the correct option (**OPTION 1**) for GOOD category which showed 10 degree of convexity angle.

51.6% of Non dental professionals (NDP), **86.4%** of orthodontists, **83.3%** of 1st year PG's, **87.9%** of 2nd year PG's and **83.3%** of 3rd year PG's have selected the correct option (**OPTION 4**) for AVERAGE category which showed 5 degree of convexity angle.

48.4% of Non dental professionals (NDP), **87.9%** of orthodontists, **74.2%** of 1st year PG's, **90.9%** of 2nd year PG's and **83.3%** of 3rd year PG's have selected the correct option (**OPTION 2**) for BAD category which showed -15 degree of convexity angle.

DISCUSSION

Non – dental professionals are more inclined than general dentists, orthodontists, or oral surgeons to assign normal ratings to profile drawings [7]. Non-dental professionals were also less stringent in their evaluations of the aesthetic qualities of photographs depicting dentition compared to general dentists and orthodontists[8] . Level of education of the non-dental professionals do not have consistent impact on dental and facial aesthetic perception. Males are consistently less critical than females in evaluating the same photograph. They appear to evaluate their anterior dental arrangement from a full facial view in a mirror. That should also be taken into account when discussing aesthetic considerations[9].

FACIAL ASYMMETRY

According to Cochrane et al[10] laypersons tend to concentrate on other extrinsic facial features such as shape and size of chin and nose, hair colour, style etc. which can influence perception. Non dental professionals were able to perceive even 2mm of chin deviation in our study. Most of the dental practitioners were found to perceive facial asymmetry between 0-6mm while laypersons (Non dental professionals) perceived between 2-

6mm which is synchronous with our study[6]. McAvinchy et al[11] reported that laypersons perceived if facial asymmetry was 3 – 8mm while orthodontist perceived it abnormal between 2-5mm. Ker et al[12] argued that maximum allowed deviation from the facial midline by experts were 2.9mm. Laypersons did not find chin deviations of less than 6mm[13]. Laypeople, patients and clinicians found 5mm of asymmetry imperceptible. Majority found 10mm asymmetry unacceptable and needing surgery[14]. Both laypersons and clinicians perceived a deviation of chin greater than 6mm as asymmetry.

NASOLABIAL ANGLE

Non dental professionals advocated slightly acute nasolabial angle to be attractive and severely obtuse nasolabial angle to be least attractive in our study. Japanese orthodontists and young adults prefer a more retruded lip position than average[15]. Noopur et al[16] concluded that both orthodontist and laypersons chose profiles having normal nasal tip, average nasolabial angle which is not in synergy with our study as our study warranted a more acute nasolabial angle. Studies[17] found more obtuse nasolabial angle to be more attractive due to higher nose tips. Studies[18] also concluded that a more advanced Sn (Subnasale) point would be perceived more attractive.

SMILE ATTRACTIVENESS

Non dental professionals prefer both 0mm and 2mm of gingival exposure as most attractive in our study. Moore et al[19] suggested that males and females rated smile attractiveness similarly. All raters in this study were less sensitive to a change of 1mm in amount of gingival display. A 2mm of gingival display or more were considered unattractive by all groups which is sin synergy with our study. Hunt et al[20] reported gingival display of more than 2mm was considered least attractive. Kokich et al[21] reported that gingival display during smiling was not noticeable by general practitioners or laypeople until it was at least 4mm.

VERTICAL FACIAL HEIGHT

Non dental professionals from our study preferred a slightly increased lower facial height compared to others. Dental practitioners preferred average vertical facial height compared to others according to Yin et al[22]. Most of the laypersons preferred an average lower facial height according to Yin et al[22]. Abu arquoub et al[23] found average and reduced lower facial height was the preferred profile in their study. Increased lower facial height was least attractive for both male and female patients according to Desmit et al[24]. A class I skeletal pattern with reduced lower facial height was found to be the most preferred according to Arqoub et al[23]. Shorter faces appear more to females due to tiny and soft features[25].

PROFILE

Non dental professionals preferred straighter profile over other variables in our study. According to Torsello et al[26], chin protrusion is the one that can negatively affect the outcome of profile attractiveness. These modifications were also perceived to be detrimental for original profile. A compensatory lip protrusion is accepted and encouraged with chin protrusion which is followed in our study[27]. Participants favored slightly convex and moderately convex profile according to Alhammadi et al[6] which is not in synchrony with our study. Yin et al reported that 85% of laypersons preferred the straighter facial profile, while rest favored a convex profile. Kerr and O donnel et al , Phillips et al[28] have rated subjects with Class I profiles more attractive than those with class II or class III. Abu Arquoub et al found class II profiles to be less attractive than class III profiles. Japanese and Asian communities did not prefer class III profiles with mandibular prognathism[29] .

CONCLUSION

NDPs, orthodontists, and postgraduates differ in their perceptions of facial esthetics. All groups—non-dental professionals (NDPs), orthodontists, and postgraduates—concur that 0 mm of facial asymmetry is considered good, and 8 mm is deemed bad. Additionally, they agree that a convexity angle of 10 degrees is favorable, indicating a straighter profile, while -15 degrees (concave) and 35 degrees (convex) are viewed as unfavorable.

In contrast, significant differences arise in their assessments of other parameters. NDPs view the nasolabial angle of 80 degrees as good and 120 degrees as bad, while orthodontists and postgraduates prefer 90 degrees and disapprove 120 degrees. Furthermore, NDPs favor 0 and 2 mm of gingival exposure and find 3 mm of upper and 4 mm of lower incisor exposure unfavorable during a smile, whereas orthodontists and postgraduates prefer 2 mm and disapprove 5 mm of gingival exposure. Lastly, while NDPs favor a slightly increased lower third ratio (1:1.14) and disapprove a decreased lower third ratio (1.4:1), orthodontists and postgraduates prefer equal middle and lower thirds (1:1) and similarly disapprove a decreased lower third ratio (1.4:1).

CONFLICT OF INTEREST

The authors declare no conflict of interest.

FUNDING

This study received no external funding.

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