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ORIGINAL ARTICALE

# THE EFFECT OF CHIN POSITION ON FACIAL PROFILE ATTRACTIVENESS AND HARMONY IN AMONG ORTHODONTISTS, DENTISTS AND LAYPEOPLE: AN OBSERVATIONAL STUDY

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## ABSTRACT

**Background:** One of the most important goals of orthodontic and orthognathic surgery treatment on the profile region is to improve facial aesthetics. Because orthodontics primarily affects the face, we focus on the chin. The aim of this study was to evaluate the effects of chin position on facial profile attractiveness and harmony among laypeople, dentists and orthodontists.

**Material and methods:** A digital portrait of adult woman was generated by artificial intelligence (AI) for the study. The image was digitally altered using Adobe Photoshop to create 7 images, and presented to 40 orthodontists, 40 dentists, and 40 laypeople for evaluation of their perception of facial profile attractiveness on a visual value rating scale.

**Results:** The study results showed that in images 1 through 7, where the chin moved in the sagittal plane, statistically significant differences were found between the study groups, with the exception of images 1, 5, and 6 in question 1, and images 3, 4, and 5 in question 2, and images 1, 3, 4, 5, and 7 in question 3.

**Conclusions:** Laypeople, dentists and orthodontists rated the retrusive chin as more attractive than the protrusive of the chin.

***Keywords****:* Aesthetics; Perception; Chin protrusive, Chin retrusive.

## INTRODUCTION

The diagnosis and treatment plan for orthodontics depend on the arrangement and coordination of the soft tissue complex between the various components of the craniofacial complex to improve attractiveness [1,2]. Aesthetics is an important factor in implementing a treatment plan. Therefore, it is very important for orthodontists to know and visualize the expected treatment outcomes for facial attractiveness, which is the goal of the patient at the end of orthodontic treatment [3,4]. There is a literature review of several orthodontic studies that emphasize the need to establish attractiveness criteria [5,6], but this principle does not apply to everyone, due to differences in facial pattern, race, gender, and age. The sagittal prominence of the mandible, when viewed from the side profile, is also important in attractiveness, and the average value of the parameter varies according to age, gender, and race [7,9].

Using traditional techniques for measuring facial morphology and its relationship to soft tissues, such as photographs, silhouettes, and line drawings, gender differences were primarily related to the size and timing of growth. There are few studies in the literature that evaluate overall facial shape in terms of age-related changes and sexual dimorphism. This may be due to inconsistent results due to methodological differences [10, 11]. To address these difficulties, newer techniques, such as digital photography, have been developed to provide a more practical understanding of facial aesthetics compared to older methods, as changes in profile are related to soft tissue features. However, the main drawback of this method is the potential for inaccurate predictions, given the heterogeneity of orthodontic patients, due to their diverse genetic and ethnic backgrounds, and therefore attempts to limit them to a homogeneous template. [12]

Therefore, the goal should be acceptable and reasonable results according to common criteria for evaluating patients through orthodontics' interpretation of aesthetic harmony only. This necessitates investigation into the

perception of the laypeople and professionals regarding facial attractiveness and beauty in their daily lives. A few researchers have reported general agreement between orthodontists and laypeople, while others point to differences in the perception of specialists and the laypeople regarding facial aesthetics. Controversy still exists in literatures regarding whether the laypeople and professionals agree in their perceptions of facial attractiveness.[13-15]

Attractiveness plays a significant role in an individual's life. It can lead to influence that accumulates over time, leading to social benefits, including increased self-confidence. In contrast, unattractive individuals may lose influence over time, leading to social deprivation. [16] For these reasons, beauty is a major motivational factor behind seeking facial cosmetic surgery, dental treatments, and/or orthodontics. [17] Therefore, it is important to link patient preferences and needs with aesthetic attributes as perceived by the laypeople and dental practitioners.

Several studies have assessed the general public's and/or dental practitioners' perceptions of specific facial aesthetic characteristics, including facial profile,[18]vertical facial proportions,[19,20,] and facial symmetry[21,22]. In line with this, a recent systematic review[23] sought to summarize studies that evaluated the general public's and/or dental practitioners' perceptions of various facial aesthetic criteria. They searched for articles that evaluated facial beauty criteria, including facial shape, height, and symmetry. To date, no study has been conducted collectively assessing the perception of the most important facial features (facial symmetry, dental symmetry, and vertical proportions) by the laypeople and various dentists. Therefore, the objective of this study was to evaluate the effects of chin position on facial profile attractiveness and harmony among laypeople, dentists and orthodontists.

## MATERIAL AND METHODS

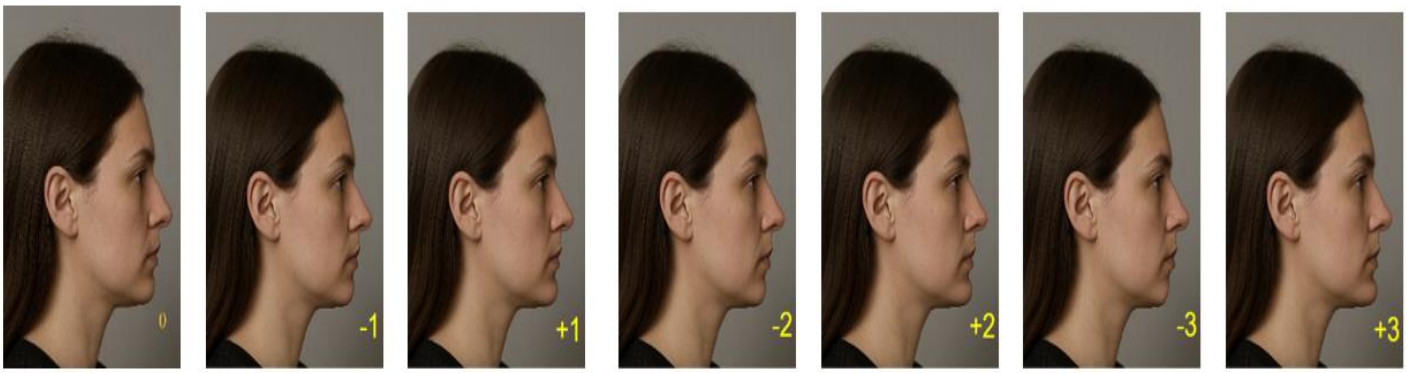
This study was conducted by the Department of Orthodontics, Faculty of Dentistry, Sana'a University. The sample size was 120 participants after obtaining informed consent from each participant in the questionnaire according to Helsinki's rules, which divided them into three equal groups. The first group included 40 laypeople, the second group included 40 dentists, and the third group included 40. orthodontists Photographs were used on A4 glossy paper. To determine attractiveness, an ideal facial portrait (Figure 1) was created using AI, and edited by Adobe Photoshop CS3 (Adobe Systems Inc.), which was subsequently modified to create seven images with different chin positions. The chin position ranged from (-3mm to +3mm). The ideal facial profile was modified to shift the mandibular prominence by 1, 2, and 3 mm, retracting and protruding. Each image was randomly assigned a number to reduce bias. Each photograph was printed on A4-sized glossy paper and presented to participants in random order. Each participant was given a questionnaire to rate each photograph within 30 seconds for each, from most attractive to least attractive, on a scale of (1 to 5), symmetry or harmony (1 to 3), and chin position (1 to 3).

Questionnaires for each image, participants answered.

**Statistical Analyses:**

The three groups were compared in terms of mean chin position, attractiveness score and facial harmony.

Data of rankings by the 120 evaluators for the 7 altered images of the female subject was recorded as per the protocol of the study. The data collected in the process were scrutinized, coded and entered into IBM SPSS Statistics 27, SPSS analyzed.




**Figer 1.** Ideal facial portrait was created using AI and Adobe Photoshop CS3 (Adobe Systems Inc.), seven images with different chin positions.

## RESULTS

The results of the one-way ANOVA revealed a statistically significant difference between the groups in some of the measured variables (P<0.05). This indicates that group membership had a significant effect on participants' responses. (Table:1,3&5)

To further explore these differences, a post hoc analysis using the Tukey HSD test was conducted. The analysis showed that there were statistically significant mean differences between specific pairs of groups in several questions. For instance, in Q1 a significant difference was found image (4) between Dentist and Orthodontic also between Laypeople and Dentist, with dentist and laypeople reporting higher mean scores (Mean difference= .025, P<0.05). Table: 2,4&6) However, no significant differences were found between other group comparisons in the remaining questions (P>0.05), suggesting that the observed differences were limited to specific areas.

**Table 1. Q1 in 7 images. (ANOVA)**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Image 1 Q1 | Between Groups | 1.017 | 2 | .508 | .795 | .454 |
| | Within Groups | 74.775 | 117 | .639 | | |
| | Total | 75.792 | 119 | | | |
| Image 2 Q1 | Between Groups | 4.017 | 2 | 2.008 | 5.468 | .005 |
| | Within Groups | 42.975 | 117 | .367 | | |
| | Total | 46.992 | 119 | | | |
| Image 3 Q1 | Between Groups | 6.350 | 2 | 3.175 | 6.299 | .003 |
| | Within Groups | 58.975 | 117 | .504 | | |
| | Total | 65.325 | 119 | | | |
| Image 4 Q1 | Between Groups | 5.400 | 2 | 2.700 | 5.651 | .005 |
| | Within Groups | 55.900 | 117 | .478 | | |
| | Total | 61.300 | 119 | | | |
| Image 5 Q1 | Between Groups | 3.217 | 2 | 1.608 | 2.179 | .118 |
| | Within Groups | 86.375 | 117 | .738 | | |
| | Total | 89.592 | 119 | | | |
| Image 6 Q1 | Between Groups | 1.517 | 2 | .758 | 1.793 | .171 |
| | Within Groups | 49.475 | 117 | .423 | | |
| | Total | 50.992 | 119 | | | |
| Image 7 Q1 | Between Groups | 6.017 | 2 | 3.008 | 11.016 | .000 |
| | Within Groups | 31.950 | 117 | .273 | | |
| | Total | 37.967 | 119 | | | |

**Table 2. (Tukey HSD test)**

**Multiple Comparisons**

| Dependent Variable | | | | Mean Difference | Std. Error | Sig. | 95% Confidence Interval Lower Bound | Upper Bound |
|---|---|---|---|---|---|---|---|---|
| Q1 | Tukey HSD Image 1 | 1 | Dentist | .125 | .179 | .764 | -.30 | .55 |
| | | | Orthodontic | -.100 | .179 | .842 | -.52 | .32 |
| | | 2 | Laypeople | -.125 | .179 | .764 | -.55 | .30 |
| | | | Orthodontic | -.225 | .179 | .421 | -.65 | .20 |
| | | 3 | Laypeople | .100 | .179 | .842 | -.32 | .52 |
| | | | Dentist | .225 | .179 | .421 | -.20 | .65 |
| Q1 | Tukey HSD Image 2 | 1 | Dentist | .025 | .136 | .981 | -.30 | .35 |
| | | | Orthodontic | -.375* | .136 | .018 | -.70 | -.05 |
| | | 2 | Laypeople | -.025 | .136 | .981 | -.35 | .30 |
| | | | Orthodontic | -.400* | .136 | .011 | -.72 | -.08 |
| | | 3 | Laypeople | .375* | .136 | .018 | .05 | .70 |
| Q1 | Tukey HSD Image 3 | 1 | Dentist | -.475* | .159 | .009 | -.85 | -.10 |
| | | | Orthodontic | -.500* | .159 | .006 | -.88 | -.12 |
| | | 2 | Laypeople | .475* | .159 | .009 | .10 | .85 |
| | | | Orthodontic | -.025 | .159 | .986 | -.40 | .35 |
| | | 3 | Laypeople | .500* | .159 | .006 | .12 | .88 |
| | | | Dentist | .025 | .159 | .986 | -.35 | .40 |
| Q1 | Tukey HSD Image 4 | 1 | Dentist | -.450* | .155 | .012 | -.82 | -.08 |
| | | | Orthodontic | .000 | .155 | 1.000 | -.37 | .37 |
| | | 2 | Laypeople | .450* | .155 | .012 | .08 | .82 |
| | | | Orthodontic | .450* | .155 | .012 | .08 | .82 |
| | | 3 | Laypeople | .000 | .155 | 1.000 | -.37 | .37 |
| | | | Dentist | -.450* | .155 | .012 | -.82 | -.08 |
| Q1 | Tukey HSD Image 5 | 1 | Dentist | .175 | .192 | .635 | -.28 | .63 |
| | | | Orthodontic | .400 | .192 | .098 | -.06 | .86 |
| | | 2 | Laypeople | -.175 | .192 | .635 | -.63 | .28 |
| | | | Orthodontic | .225 | .192 | .473 | -.23 | .68 |
| | | 3 | Laypeople | -.400 | .192 | .098 | -.86 | .06 |
| | | | Dentist | -.225 | .192 | .473 | -.68 | .23 |
| Q1 | Tukey HSD Image 6 | 1 | Dentist | .250 | .145 | .202 | -.10 | .60 |
| | | | Orthodontic | .025 | .145 | .984 | -.32 | .37 |
| | | 2 | Laypeople | -.250 | .145 | .202 | -.60 | .10 |
| | | | Orthodontic | -.225 | .145 | .273 | -.57 | .12 |
| | | 3 | Laypeople | -.025 | .145 | .984 | -.37 | .32 |
| | | | Dentist | .225 | .145 | .273 | -.12 | .57 |
| Q1 | Tukey HSD Image 7 | 1 | Dentist | .475* | .117 | .000 | .20 | .75 |
| | | | Orthodontic | .475* | .117 | .000 | .20 | .75 |
| | | 2 | Laypeople | -.475* | .117 | .000 | -.75 | -.20 |
| | | | Orthodontic | .000 | .117 | 1.000 | -.28 | .28 |
| | | 3 | Laypeople | -.475* | .117 | .000 | -.75 | -.20 |

*. The mean difference is significant at the 0.05 level.

**Table 3. Q2 in 7 images. (ANOVA)**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Q21 | Between Groups | 34.067 | 2 | 17.033 | 17.251 | .000 |
| | Within Groups | 115.525 | 117 | .987 | | |
| | Total | 149.592 | 119 | | | |
| Q22 | Between Groups | 12.917 | 2 | 6.458 | 5.566 | .005 |
| | Within Groups | 135.750 | 117 | 1.160 | | |
| | Total | 148.667 | 119 | | | |
| Q23 | Between Groups | 10.617 | 2 | 5.308 | 5.408 | .006 |
| | Within Groups | 114.850 | 117 | .982 | | |
| | Total | 125.467 | 119 | | | |
| Q24 | Between Groups | 4.550 | 2 | 2.275 | 1.743 | .180 |
| | Within Groups | 152.750 | 117 | 1.306 | | |
| | Total | 157.300 | 119 | | | |
| Q25 | Between Groups | 3.267 | 2 | 1.633 | 1.578 | .211 |
| | Within Groups | 121.100 | 117 | 1.035 | | |
| | Total | 124.367 | 119 | | | |
| Q26 | Between Groups | 10.617 | 2 | 5.308 | 3.659 | .029 |
| | Within Groups | 169.750 | 117 | 1.451 | | |
| | Total | 180.367 | 119 | | | |
| Q27 | Between Groups | 20.417 | 2 | 10.208 | 7.044 | .001 |
| | Within Groups | 169.550 | 117 | 1.449 | | |
| | Total | 189.967 | 119 | | | |

**Table 4. Tukey HSD test**

**Multiple Comparisons**

| Dependent Variable | | | | Mean Difference | Std. Error | Sig. | 95% Confidence Interval Lower Bound | Upper Bound |
|---|---|---|---|---|---|---|---|---|
| Q2 | Tukey HSD 1 | 1 | Dentist | -1.250* | .222 | .000 | -1.78 | -.72 |
| | | | Orthodontic | -.950* | .222 | .000 | -1.48 | -.42 |
| | | 2 | Laypeople | 1.250* | .222 | .000 | .72 | 1.78 |
| | | | Orthodontic | .300 | .222 | .371 | -.23 | .83 |
| | | 3 | Laypeople | .950* | .222 | .000 | .42 | 1.48 |
| | | | Dentist | -.300 | .222 | .371 | -.83 | .23 |
| Q2 | Tukey HSD 2 | 1 | Dentist | -.625* | .241 | .029 | -1.20 | -.05 |
| | | | Orthodontic | -.750* | .241 | .007 | -1.32 | -.18 |
| | | 2 | Laypeople | .625* | .241 | .029 | .05 | 1.20 |
| | | | Orthodontic | -.125 | .241 | .862 | -.70 | .45 |
| | | 3 | Laypeople | .750* | .241 | .007 | .18 | 1.32 |
| | | | Dentist | .125 | .241 | .862 | -.45 | .70 |
| Q2 | Tukey HSD 3 | 1 | Dentist | -.175 | .222 | .710 | -.70 | .35 |
| | | | Orthodontic | -.700* | .222 | .006 | -1.23 | -.17 |
| | | 2 | Laypeople | .175 | .222 | .710 | -.35 | .70 |
| | | | Orthodontic | -.525 | .222 | .051 | -1.05 | .00 |
| | | 3 | Laypeople | .700* | .222 | .006 | .17 | 1.23 |
| | | | Dentist | .525 | .222 | .051 | .00 | 1.05 |
| Q2 | Tukey HSD 4 | 1 | Dentist | -.200 | .255 | .714 | -.81 | .41 |
| | | | Orthodontic | -.475 | .255 | .155 | -1.08 | .13 |
| | | 2 | Laypeople | .200 | .255 | .714 | -.41 | .81 |
| | | | Orthodontic | -.275 | .255 | .531 | -.88 | .33 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 3 | Laypeople | .475 | .255 | .155 | -.13 | 1.08 |
| | | | Dentist | .275 | .255 | .531 | -.33 | .88 |
| Q2 | Tukey HSD 5 | 1 | Dentist | .000 | .227 | 1.000 | -.54 | .54 |
| | | | Orthodontic | .350 | .227 | .277 | -.19 | .89 |
| | | 2 | Laypeople | .000 | .227 | 1.000 | -.54 | .54 |
| | | | Orthodontic | .350 | .227 | .277 | -.19 | .89 |
| | | 3 | Laypeople | -.350 | .227 | .277 | -.89 | .19 |
| | | | Dentist | -.350 | .227 | .277 | -.89 | .19 |
| Q2 | Tukey HSD 6 | 1 | Dentist | .175 | .269 | .793 | -.46 | .81 |
| | | | Orthodontic | .700* | .269 | .028 | .06 | 1.34 |
| | | 2 | Laypeople | -.175 | .269 | .793 | -.81 | .46 |
| | | | Orthodontic | .525 | .269 | .130 | -.11 | 1.16 |
| | | 3 | Laypeople | -.700* | .269 | .028 | -1.34 | -.06 |
| | | | Dentist | -.525 | .269 | .130 | -1.16 | .11 |
| Q2 | Tukey HSD 7 | 1 | Dentist | .875* | .269 | .004 | .24 | 1.51 |
| | | | Orthodontic | .875* | .269 | .004 | .24 | 1.51 |
| | | 2 | Laypeople | -.875* | .269 | .004 | -1.51 | -.24 |
| | | | Orthodontic | .000 | .269 | 1.000 | -.64 | .64 |
| | | 3 | Laypeople | -.875* | .269 | .004 | -1.51 | -.24 |
| | | | Dentist | .000 | .269 | 1.000 | -.64 | .64 |

*. The mean difference is significant at the 0.05 level.

**Table 5. Q3 in7 Images. (ANOVA)**

| | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Q31 | Between Groups | 2.117 | 2 | 1.058 | 1.129 | .327 |
| | Within Groups | 109.675 | 117 | .937 | | |
| | Total | 111.792 | 119 | | | |
| Q32 | Between Groups | 8.117 | 2 | 4.058 | 3.754 | .026 |
| | Within Groups | 126.475 | 117 | 1.081 | | |
| | Total | 134.592 | 119 | | | |
| Q33 | Between Groups | 4.017 | 2 | 2.008 | 1.770 | .175 |
| | Within Groups | 132.775 | 117 | 1.135 | | |
| | Total | 136.792 | 119 | | | |
| Q34 | Between Groups | .117 | 2 | .058 | .106 | .899 |
| | Within Groups | 64.250 | 117 | .549 | | |
| | Total | 64.367 | 119 | | | |
| Q35 | Between Groups | 25.350 | 2 | 12.675 | 1.712 | .185 |
| | Within Groups | 866.350 | 117 | 7.405 | | |
| | Total | 891.700 | 119 | | | |
| Q36 | Between Groups | 2.317 | 2 | 1.158 | 3.462 | .035 |
| | Within Groups | 39.150 | 117 | .335 | | |
| | Total | 41.467 | 119 | | | |
| Q37 | Between Groups | .350 | 2 | .175 | .710 | .494 |
| | Within Groups | 28.850 | 117 | .247 | | |
| | Total | 29.200 | 119 | | | |

**Table 6. Tukey HSD test**
**Multiple Comparisons**

| Dependent Variable | | | | Mean Difference | Std. Error | Sig. | 95% Confidence Interval Lower Bound | Upper Bound |
|---|---|---|---|---|---|---|---|---|
| Q3 | Tukey HSD 1 | 1 | Dentist | .150 | .216 | .768 | -.36 | .66 |
| | | | Orthodontic | .325 | .216 | .294 | -.19 | .84 |
| | | 2 | Laypeople | -.150 | .216 | .768 | -.66 | .36 |
| | | | Orthodontic | .175 | .216 | .699 | -.34 | .69 |
| | | 3 | Laypeople | -.325 | .216 | .294 | -.84 | .19 |
| | | | Dentist | -.175 | .216 | .699 | -.69 | .34 |
| Q3 | Tukey HSD 2 | 1 | Dentist | -.525 | .232 | .066 | -1.08 | .03 |
| | | | Orthodontic | .050 | .232 | .975 | -.50 | .60 |
| | | 2 | Laypeople | .525 | .232 | .066 | -.03 | 1.08 |
| | | | Orthodontic | .575* | .232 | .039 | .02 | 1.13 |
| | | 3 | Laypeople | -.050 | .232 | .975 | -.60 | .50 |
| | | | Dentist | -.575* | .232 | .039 | -1.13 | -.02 |
| Q3 | Tukey HSD 3 | 1 | Dentist | -.400 | .238 | .217 | -.97 | .17 |
| | | | Orthodontic | -.025 | .238 | .994 | -.59 | .54 |
| | | 2 | Laypeople | .400 | .238 | .217 | -.17 | .97 |
| | | | Orthodontic | .375 | .238 | .261 | -.19 | .94 |
| | | 3 | Laypeople | .025 | .238 | .994 | -.54 | .59 |
| | | | Dentist | -.375 | .238 | .261 | -.94 | .19 |
| Q3 | Tukey HSD 4 | 1 | Dentist | -.050 | .166 | .951 | -.44 | .34 |
| | | | Orthodontic | -.075 | .166 | .893 | -.47 | .32 |
| | | 2 | Laypeople | .050 | .166 | .951 | -.34 | .44 |
| | | | Orthodontic | -.025 | .166 | .988 | -.42 | .37 |
| | | 3 | Laypeople | .075 | .166 | .893 | -.32 | .47 |
| | | | Dentist | .025 | .166 | .988 | -.37 | .42 |
| Q3 | Tukey HSD 5 | 1 | Dentist | -.975 | .608 | .249 | -2.42 | .47 |
| | | | Orthodontic | .000 | .608 | 1.000 | -1.44 | 1.44 |
| | | 2 | Laypeople | .975 | .608 | .249 | -.47 | 2.42 |
| | | | Orthodontic | .975 | .608 | .249 | -.47 | 2.42 |
| | | 3 | Laypeople | .000 | .608 | 1.000 | -1.44 | 1.44 |
| | | | Dentist | -.975 | .608 | .249 | -2.42 | .47 |
| Q3 | Tukey HSD 6 | 1 | Dentist | -.075 | .129 | .831 | -.38 | .23 |
| | | | Orthodontic | .250 | .129 | .134 | -.06 | .56 |
| | | 2 | Laypeople | .075 | .129 | .831 | -.23 | .38 |
| | | | Orthodontic | .325* | .129 | .035 | .02 | .63 |
| | | 3 | Laypeople | -.250 | .129 | .134 | -.56 | .06 |
| | | | Dentist | -.325* | .129 | .035 | -.63 | -.02 |
| Q3 | Tukey HSD 7 | 1 | Dentist | -.025 | .111 | .972 | -.29 | .24 |
| | | | Orthodontic | .100 | .111 | .641 | -.16 | .36 |
| | | 2 | Laypeople | .025 | .111 | .972 | -.24 | .29 |
| | | | Orthodontic | .125 | .111 | .500 | -.14 | .39 |
| | | 3 | Laypeople | -.100 | .111 | .641 | -.36 | .16 |
| | | | Dentist | -.125 | .111 | .500 | -.39 | .14 |

*. The mean difference is significant at the 0.05 level.

## DISCUSSION.

Aesthetic harmony and attractiveness are highly subjective and contentious issues, as what appeals to a specialist based on their experience and training may not be what the laypeople believe. Therefore, this discrepancy in opinion can lead to dissatisfaction among the laypeople, dentists, and orthodontists with treatment outcomes. Therefore, orthodontists and patients must agree on a plan to address patients' facial aesthetic concerns, facilitating the process of consensus. Our study aimed to determine the position of the chin and its attractiveness and symmetry among the laypeople, dentists, and orthodontists. In our study, there was a discrepancy in opinions regarding chin retraction, attractiveness and harmony between dentists and orthodontists, as well as between the laypeople and orthodontists. This is consistent with Mahmoudzadeh et al. comparison of preferences between the laypeople and orthodontists in Iranian society. They found that a straight appearance was more attractive to orthodontists, while patients rated a receding lower jaw as more attractive. Meanwhile, Jordanians preferred an orthodontic appearance for both males and females [25]. In the UAE and Saudi Arabia, both orthodontists and laypeople rated the straight profile as the most attractive, while Saudis rated the receding profile as the least acceptable [26,27]. Similarly, Brazilians preferred the straight profile, and the Class III profile was the least attractive among laypeople [28]. A study was conducted to determine visual interest in profiles among the Chinese population and found that the degree of mandibular prominence attracted the greatest attention to the lower face [29]. Education level should also be considered; a study by Falkensammer et al. concluded that orthodontists were more sensitive to profiles than laypeople and oral and maxillofacial surgeons [30]. Like other facial features, it is generally accepted that chin prominence has a range of natural variations. It is not simply an individual preference but also depends on the gender, age, ethnicity, and educational background (orthodontists vs. the laypeople) of the judges. A review of the literature reveals several reported methods for assessing chin prominence [31]. However, Arroyo et al. concluded that neither method can be considered ideal [31]. Therefore, the most accurate assessment may depend on the surgeon's experience, clinical capabilities, and patient desires. Nini et al. also analyzed a potentially effective method for assessing the extent of chin augmentation or retraction required [32]. The limitation of this study was a small sample size. Therefore, we suggest conducting another multi-centric study with larger groups size.

## CONCLUSION

Laypeople, dentists and orthodontists feel that retrusive chin as more attractive than the protrusive of the chin.

## DECLARATIONS

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**Competing Interests**

The authors have no competing interests to declare.

**Ethical Approval**

The study was approved by the appropriate ethics committee and conducted according to relevant guidelines and regulations.

**Informed Consent**

Not applicable.

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