



Original Article

Gender Identification Based on Dental Micro-Esthetics: A Study of Dental Professionals' Perceptions

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ABSTRACT

Dental micro-aesthetic traits are linked to gender-specific features in dentistry, but their reliability for gender identification remains controversial. **Objectives:** To assess the correlation between accurate gender identification and micro-aesthetic dental traits through the evaluation of frontal intraoral photographs by observers, specifically dental undergraduates, graduates, and postgraduates. **Methods:** A cross-sectional study was conducted at Lahore Medical and Dental College (June 2024 to May 2025) with 376 participants (99% response rate). Participants evaluated 10 anonymous frontal intraoral photographs for gender identification via a questionnaire. Descriptive statistics, chi-square tests, and logistic regression analyzed associations between accuracy and clinical experience (>3 vs. ≤3 years), using SPSS version 25.0. Photographs were selected for variability in micro-aesthetic traits. **Result:** The mean accuracy score was 5.38 ± 1.72 out of 10, with 58.8% scoring 4–6. Accuracy varied significantly (23.94% for Q8 to 70.21% for Q3, $p < 0.05$). Males had higher accuracy of achieving correct answers ($p = 0.033$), indicating that males were more likely to score above the median score of 5. Experienced clinicians prioritized tooth size ($p = 0.005$) and triangular canines ($p = 0.017$). Logistic regression showed experience-based differences in the correct identification of specific female photographs (OR = 0.564 for Q7, $p = 0.033$; OR = 2.583 for Q9, $p < 0.001$). **Conclusions:** Dental micro-aesthetic traits provide only moderate accuracy for gender identification due to considerable overlap and observer bias. Targeted education on trait variability is recommended.

INTRODUCTION

The study of dental morphology for gender determination has gained traction in recent years, offering applications in both forensic and clinical dentistry. Tooth morphology plays a key role in smile aesthetics and overall facial harmony. Treatment planning now increasingly considers societal standards of beauty—such as balance, proportion, and harmony—framed through macro-esthetic, mini-esthetic, and micro-esthetic elements. Dental micro-esthetics focus on tooth shape, size, color, alignment, gingival characteristics, and texture, which collectively

influence smile attractiveness [1-3]. A key question is whether mini-aesthetic traits exhibit sexual dimorphism. The "theory of temperament" suggests that tooth shape may reflect emotional characteristics, such as sanguine (dynamic) or melancholic (sensitive), though its clinical validity is debated [2]. Gender-based stereotypes often associate women with rounded, ovoid teeth and men with angular, square forms, influencing dental education and prosthetic design, despite studies finding no consistent biological correlation between tooth morphology and

gender [2, 4]. Specific micro-aesthetic features have been frequently investigated in relation to gender differentiation and aesthetic perception. Tooth size is generally larger in male than in female, with canines often regarded as the most sexually dimorphic teeth, although overlap limits their diagnostic value [5]. In addition, the morphology of the maxillary central and lateral incisors has also been examined, with males more frequently presenting larger crown dimensions in height and width compared to females, though variability remains substantial. Tooth color also contributes to esthetic perception, with female dental students more often preferring lighter shades, while male dental students tend to report a higher need for orthodontic treatment and ceramic veneers [6]. The presence of anterior restorations has also been noted in desired treatments, particularly tooth-colored restorations among students from lower-income households, though mismatched color or contour has not been explicitly identified as reducing esthetic acceptance. Other features, such as alignment and gingival display, significantly influence attractiveness ratings. Incisal alignment plays a critical role, as midline deviations combined with gingival display reduce esthetic scores, whereas coincident midlines yield higher ratings across both dentists and laypersons [7]. In a Romanian sample, gingival exposure between 0–3 mm was most frequently selected by dentists as ideal for an esthetic smile (70.4%), while excessive gingival exposure (median 4 mm) was considered the least attractive [8]. Gingival pigmentation significantly influences smile esthetics, with laypersons often rating smiles with less pigmentation as more attractive, potentially differing from dental professionals' more critical assessments [9]. In contrast, soft tissue features, such as lips and gingiva, play a critical role in gender differentiation, as deep learning analyses of intraoral photographs reveal that these features are more distinguishable than hard tissue features like teeth for identifying gender differences [10]. While oral hygiene conditions are not directly addressed in gender differentiation studies, Zhou et al. further demonstrated that gender-related morphological differences are more pronounced in the mandibular region compared to the maxillary region [10]. Oral pigmentation and dental conditions—including caries, crowding, missing teeth, and restorations—also reduce esthetic acceptance, with dental professionals being more critical than laypersons. Calheiros-Lobo et al. showed that dental professionals more accurately identify morphological anomalies like lateral incisor agenesis than laypeople, implying that training enhances sensitivity to aesthetic traits [11]. Negruțiu et al. stated that gingival exposure significantly affects smile perception, with varying preferences noted

between dentists and laypersons [8]. However, Mahn et al. reported gender misidentification based on presumptions about tooth shape, such as rounded being feminine or squarish being masculine, highlighting the unreliability of morphology alone [4]. Najafi et al. additionally highlighted how different professional roles assess gingival display and midline discrepancies, reflecting varying degrees of aesthetic awareness [7]. Despite these associations, significant gaps remain in the literature. Results vary across populations and are often shaped by cultural expectations. Tooth morphology alone has shown only moderate predictive accuracy for gender identification, with some studies reporting results close to chance [4]. Due to these limitations, it is necessary to investigate not only biological dimorphism but also how dental professionals perceive and utilize these micro-aesthetic traits in practice. This study WAS designed to enhance dental education by determining whether specific morphological features should be prioritized in didactic and clinical training as gender-specific traits. Since gender-specific dental characteristics are not universally consistent—male may present with rounded teeth and female with squarish ones—overreliance on these distinctions could lead to misjudgments.

Moreover, little is known about how reliably dental professionals at different training levels can identify gender based on these traits alone. This uncertainty highlights a gap between theoretical assumptions and practical perception in dentistry. This study aimed to assess the correlation between accurate gender identification and micro-aesthetic dental traits through the evaluation of frontal intraoral photographs by dental undergraduates, graduates, and postgraduates.

METHODS

This cross-sectional descriptive study was conducted from June 2024 to May 2025 in Lahore Medical and Dental College, Lahore. The study was approved by the college's Institutional Review Board, LMDC/FD/1549/23. The study population consisted of dental professionals, including dental undergraduates, graduates, and postgraduate trainees, who evaluated anonymous frontal intraoral photographs to determine the gender of the photographs based on dental micro-esthetics. Participants were eligible if they were aged 20–30 years and provided informed consent. Those with previous training in forensic odontology were excluded. The study utilized a non-probability convenience sampling method. The study utilized a non-probability convenience sampling method. The single-proportion formula $n = Z_{1-\alpha/2}^2 p(1-p) / d^2$, where p was the anticipated proportion, d was the margin of error, and $Z_{1-\alpha/2}$ the standard normal value for a two-sided 95% confidence level. Using $p=0.538$ (frequency of correct

identification), $d=0.05$, and $Z=1.96$, the required sample was $n=382$ [2]. Allowing for a 5% non-response/dropout, the adjusted target was 402 participants. The questionnaire used in this study was adapted from Qali et al. which assessed gender identification using intraoral photographs [2]. The adapted tool retained the core structure of Qali et al. (10 anonymized frontal intraoral photographs) but was expanded with additional demographic and clinical experience items to suit our educational context [2]. Face and content validity were established by subject experts, who reviewed all items for relevance and clarity. The questionnaire was pilot-tested on 20 dental professionals; minor wording changes were made based on their feedback. Internal consistency reliability was assessed using Cronbach's alpha and showed acceptable values ($\alpha \geq 0.71$). The final questionnaire consisted of four sections: (1) demographic data (age, gender), (2) current academic level (undergraduate, graduate, postgraduate) and years of clinical experience, (3) 10 unlabeled frontal intraoral photographs in which participants selected whether each dentition was male or female, and, (4) 10 statements on morphological features distinguishing male and female dentitions that participants reported using in routine practice. Section 3- Gender-identification photographs: 10 anonymized frontal intraoral photographs of maxillary and mandibular anterior teeth (5 male and 5 female dentitions), cropped to show only teeth and gingiva, were presented in random order to the participants. For each photograph (Q1-Q10), participants answered the question: "In your opinion, this dentition belongs to:" with response options "Male" and "Female." Each correct response was scored as 1 and each incorrect response as 0, giving a total accuracy score ranging from 0 to 10, where higher scores indicate greater accuracy. For interpretation, scores of 0-3 were classified as low accuracy, 4-6 as moderate accuracy, and 7-10 as high accuracy. Section 4- Morphological feature use: Ten items addressed, which micro-aesthetic features participants routinely use to distinguish male from female dentitions in everyday practice. Items covered the following features: tooth color, tooth size, pigmentation of mucosa, canine shape, incisal alignment, incisal crowding, presence of diastema, anterior restorations, poor oral hygiene, and maxillary central/lateral crown morphology. Each statement was phrased in the form "I use [feature] to help differentiate between male and female dentitions" and rated on a 3-point Likert scale (agree, neutral, disagree). All participants provided informed consent before enrollment, with the right to withdraw from the study at any time. The survey was distributed both physically within the department and digitally through online platforms. Participants had seven days to complete the questionnaire, with a reminder sent after one week for non-

respondents. Once collected, the data were entered into SPSS statistical software for analysis. Data were analyzed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., NY, USA). Descriptive statistics (frequencies, percentages, means, and standard deviations) were computed for participant characteristics and questionnaire responses. For the 10-item accuracy score, scores 0-3 was classified as low, 4-6 as moderate, and 7-10 as high accuracy. For inferential analyses, the total accuracy score was further dichotomized at the median (≤ 5 vs. >5) to create a binary accuracy variable. Chi-square tests were used to examine associations between this dichotomized accuracy variable and categorical participant characteristics (gender, age group, qualification, and clinical experience). For questionnaire photograph-specific performance, the proportion of participants who correctly identified each photograph (Q1-Q10) was calculated. Two-sided binomial tests against a 50% expected accuracy (chance level) were used to obtain p-values, and 95% confidence intervals were computed for each proportion. For each of the 10 photographs in the questionnaire, separate binary logistic regressions were performed with clinical experience (>3 years vs. ≤ 3 years) as the dependent variable and correct/incorrect responses for each intraoral photograph as independent variables. Thus, for each photograph, a 2×2 contingency structure (correct vs. incorrect by >3 vs. ≤ 3 years of experience) underpinned the odds ratios. Odds ratios (ORs) with 95% confidence intervals (CIs) and p-values were reported. Associations between clinical experience (>3 vs. ≤ 3 years) and responses to each of the 10 morphological feature items (agree, neutral, disagree) were also examined using chi-square tests of independence.

RESULTS

A total of 376 responses were received, giving a response rate of 94%. 190 (50.5%) undergraduates, 131 (34.8%) graduates, and 55 (14.6%) postgraduates. Out of the total participants, 258 (68.6%) were female, and 118 (31.4%) were male. The mean age of participants was 24.05 ± 2.83 years. 290 (77%) participants had 3 years or less of clinical experience, and 86 (23%) had more than 3 years' experience. The average mean score of correct answers of the participants was 5.38 ± 1.72 (range 0-10). Using the predefined categories, 56 (14.9%) had low accuracy (scores 0-3), 221 (58.8%) had moderate accuracy (scores 4-6), and 99 (26.3%) had high accuracy (scores 7-10). Overall, when dichotomized at the median, 189 (50.3%) participants scored 5 or less, and 187 (49.7%) scored more than 5. The results present the distribution of participant characteristics according to accuracy scores dichotomized at ≤ 5 and >5 . Chi-square test for gender showed a significant association, $p=0.033$, indicating that

males are more likely to score above the median score of 5 (Table 1).

Table 1: Association Between Participant Characteristics and Dichotomized Accuracy Score

Variables	Low Accuracy (>5), n (%)	High Accuracy (>5), n (%)	p-value
Gender			
Male	50 (42.4%)	68 (57.6%)	0.033*
Female	139 (53.9%)	119 (46.1%)	
Age			
20-25 Years	138 (50.2%)	137 (49.8%)	0.910
26-30 Years	51 (50.5%)	50 (49.5%)	
Qualification			
Undergraduate	98 (51.6%)	92 (48.4%)	0.582
Graduate	62 (47.3%)	69 (52.7%)	
Postgraduate	29 (52.7%)	26 (47.3%)	
Clinical Experience			
≤3 Years	147 (50.7%)	143 (49.3%)	0.665
>3 Years	42 (48.8%)	44 (51.2%)	

*Indicated statistical significance at $p \leq 0.05$

The study shows accuracy for each photograph (Q1-Q10). Q1-Q10 correspond to the 10 anonymized frontal intraoral photographs (5 male and 5 female dentitions) presented in random order, and the accuracy reported for each item represents the proportion of participants who correctly identified the sex of that specific photograph. The proportion of correct responses, 95% confidence intervals, and two-sided binomial test p-values against a 50% chance level are reported. All p-values were < 0.05 , indicating that the accuracy for each photograph differed significantly from random guessing. Accuracy varied across photographs, being highest for Q3 (70.21%), Q4 (66.76%), and Q10 (65.69%), and lowest for Q8 (23.94%). The "Correct Answer" column specifies the true gender of each anonymized photograph (5 male, 5 female in random order) (Table 2).

Table 2: Accuracy for Gender Identification for Each Photograph (Q1 to Q10)

Question	True Gender of Dentition in the Photograph	Correct Responses, n (%)	Incorrect Responses, n (%)	95% CI for % Correct	p-value v/s 50% Accuracy*
Q1	Female	236 (62.77%)	140 (37.23%)	57.9-67.7	$< 0.001^*$
Q2	Male	153 (40.69%)	223 (59.31%)	35.7-45.7	$< 0.001^*$
Q3	Male	264 (70.21%)	112 (29.79%)	65.6-74.9	$< 0.001^*$
Q4	Female	251 (66.76%)	125 (33.24%)	62.0-71.5	$< 0.001^*$
Q5	Male	218 (57.98%)	158 (42.02%)	53.0-63.0	0.002*
Q6	Female	224 (59.57%)	152 (40.43%)	54.6-64.6	$< 0.001^*$
Q7	Female	212 (56.38%)	164 (43.62%)	51.3-61.4	0.015*
Q8	Male	90 (23.94%)	286 (76.06%)	19.6-28.3	$< 0.001^*$
Q9	Female	149 (39.63%)	227 (60.37%)	34.7-44.6	$< 0.001^*$
Q10	Female	247 (65.69%)	129 (34.31%)	60.9-70.5	$< 0.001^*$

*Two-sided binomial test against 50% expected accuracy (chance

level). *Indicates the statistical significance with p -value < 0.05 . Note: Each item (Q1-Q10) corresponds to one anonymous intraoral photograph depicting either a male or a female dentition, not both. The column "True gender of dentition in photograph" therefore reflects the actual gender of the dentition shown to participants. Percentages represent the proportion of participants who correctly identified that gender.

Separate binary logistic regression models were performed with clinical experience (> 3 years vs. < 3 years) as the dependent variable and correct/incorrect response for each photograph as the predictor. Only Q7 and Q9 emerged as significant. Participants who correctly identified the female dentition in Q7 had 43.6% lower odds of having > 3 years of clinical experience (OR = 0.564, 95% CI 0.333-0.954, $p = 0.033$). In contrast, those who correctly identified the female dentition in Q9 had 2.58 times higher odds of having > 3 years of experience (OR = 2.583, 95% CI 1.522-4.384, $p < 0.001$). These odds ratios are based on 2×2 tables of correctness (correct vs. incorrect) by experience group. The 10 morphological feature items corresponded directly to the questionnaire statements "I use -feature- to help differentiate between male and female dentitions" (rated agree/neutral/disagree). Their endorsement frequencies and the chi-square tests for differences by clinical experience are summarized. Overall, tooth size was the most frequently endorsed feature, followed by maxillary central/lateral crown morphology and mucosal pigmentation. Chi-square analysis indicated that features such as size, triangular canines, incisal alignment, incisal crowding, diastema, anterior restorations, and poor oral hygiene were used differently by clinicians, indicating that clinical experience shapes which specific cues clinicians rely on for gender judgements. In contrast, broader characteristics such as tooth color, mucosal pigmentation, and maxillary crown morphology were endorsed by all participants, suggesting that these cues are viewed as relevant by all clinicians (Table 3).

Table 3: Prominent Features Used to Distinguish Between Male and Female Dentition

Morphological Feature	Agree, n (%)	Disagree, n (%)	Neutral, n (%)	Chi-Square (Clinical Experience)
Tooth Color	127 (33.8%)	118 (31.4%)	131 (34.8%)	$\chi^2 = 3.274$, $p = 0.195$
Size	274 (72.9%)	26 (6.9%)	76 (20.2%)	$\chi^2 = 10.573$, $p = 0.005^*$
Pigmentation of Mucosa	213 (56.6%)	42 (11.2%)	121 (32.2%)	$\chi^2 = 0.429$, $p = 0.807$
Triangular Canines	195 (51.9%)	57 (15.2%)	124 (33.0%)	$\chi^2 = 8.169$, $p = 0.017^*$
Incisal Alignment	153 (40.7%)	82 (21.8%)	141 (37.5%)	$\chi^2 = 6.245$, $p = 0.044^*$
Incisal Crowding	89 (23.7%)	142 (37.8%)	145 (38.6%)	$\chi^2 = 22.374$, $p < 0.001^*$
Incisal Diastema	101 (26.9%)	136 (36.2%)	139 (37.0%)	$\chi^2 = 6.473$, $p = 0.039^*$

Anterior Restoration	107 (28.5%)	158 (42.0%)	111 (29.5%)	$\chi^2 = 17.213$, $p < 0.001^*$
Poor Oral Hygiene	139 (37.0%)	128 (34.0%)	109 (29.0%)	$\chi^2 = 10.586$, $p = 0.005^*$
Maxillary Central/ Lateral Crown	215 (57.2%)	46 (12.2%)	115 (30.6%)	$\chi^2 = 2.152$, $p = 0.341$

* Indicates statistical significance at $p \leq 0.05$

DISCUSSION

The results of this study offer significant insights into the capacity of dental professionals and students to identify gender using dental micro-aesthetic traits, highlighting both the potential and limitations of these features in clinical and forensic dentistry. With a mean accuracy score of 5.38 ± 1.72 for gender identification from 10 intraoral photographs, the findings determined moderate success, with notable inconsistencies in accuracy across photographs. This variability indicates that some dental images presented clearer gender-specific cues, while others were ambiguous, underscoring the challenges of relying on micro-aesthetic traits for gender determination. A significant association between participant gender and accuracy ($p = 0.033$) indicated that male were more likely to score above the median (5 marks), which is in contrast to Alam *et al.* who stated that females were more likely to notice aesthetic impacts [3]. Social media significantly influences female patients' perceptions of dental aesthetics, with increased exposure to dental content on platforms like Snapchat and Instagram driving a preference for aesthetic treatments such as bleaching and veneers [12]. Cheng *et al.* found gender-based differences in aesthetic perception, with female laypeople showing a stronger preference for parallel smile arcs and reduced gingival and incisor display, suggesting differing aesthetic sensitivities compared to male participants and professionals [13]. This pattern suggests that gender identification accuracy is shaped not only by dental morphology but also by participants' preconceived concepts of gendered aesthetics, potentially reinforced through dental training or cultural influences on facial profile preferences [14, 15]. Clinical experience variably affected performance. Logistic regression showed that correct identification of Q7 (female) was associated with lower odds of having >3 years of experience (OR = 0.564, $p = 0.033$), suggesting subtler cues in Q7 challenged experienced clinicians reliant on features like canine size [5, 6]. In contrast, Q9 likely included clearer cues, such as gingival exposure or tooth alignment, which more experienced clinicians were trained to recognize with greater precision [8, 16]. The results demonstrated that experienced clinicians prioritized tooth size and canine morphology for gender identification, consistent with forensic evidence showing significant sexual dimorphism in canine dimensions and ridge prominence [5, 17]. Less

experienced participants may rely on general esthetic features such as tooth color and alignment, findings consistent with El Mourad *et al.* who reported that dental students often focus on these aspects in self-assessments of their own smiles.[6] However, such features may be less useful for gender identification tasks that require attention to more sexually dimorphic traits [6, 16]. These findings have important implications for dental education. The moderate accuracy (58.8% scoring 4–6) and reliance on gendered stereotypes suggest that current curricula may overemphasize simplistic morphological associations, such as rounded teeth for female and angular teeth for male [2, 4]. Dental training should incorporate modules on sex and gender differences in oral health, recognizing that both biological and sociocultural factors influence oral health outcomes and care-seeking behaviors [18]. Addressing cognitive biases is also critical, as participants' perceptions may be shaped by assumptions rather than objective evidence [19]. Nakhpaksirat *et al.* stated that targeted interventions like workshops and reflective case discussions help dental students transition to independent practice by equipping them with skills to recognize and manage cognitive biases, thereby promoting evidence-based clinical decision-making [19]. Furthermore, incorporating advanced visual aids like intraoral scans, as demonstrated by Schulz-Weidner *et al.* and Menon and Kumar, forensic techniques such as 3D scanning, can enhance training by improving students' ability to interpret subtle aesthetic and morphological cues [20, 21]. In forensic dentistry, the study highlights the limitations of using dental micro-aesthetics for gender identification. Ajmal *et al.* confirmed sexual dimorphism in canine morphology but noted trait overlap, reducing reliability, as seen in the low accuracy for Q8 [5]. This aligns with findings from Viciano *et al.* and Heng *et al.* which highlight that while odontometric analysis and dental morphology display measurable dimorphism, significant trait variability necessitates the use of multimodal methods, including advanced imaging, to improve the accuracy of sex estimation [22, 23]. Stojilković *et al.* highlight that dental aesthetics significantly impact psychosocial well-being and self-esteem, with varying perceptions of traits like tooth alignment or color influencing personal and social confidence.[24] This psychosocial dimension, as noted by Campos *et al.* underscores the need for dentists to consider how patients' aesthetic perceptions may influence the interpretation of dental traits in gender identification [25]. Advanced imaging like CBCT and OPG has been evaluated for forensic sex estimation, with CBCT offering higher accuracy due to its 3D visualization of dental and craniofacial structures, though limited by cost and accessibility [26]. Integrating dental traits with other forensic markers, such as cranial features, could enhance

gender determination.

This study was single center with a limited sample size and used only intraoral photographs, which may not capture the full spectrum of dental micro-aesthetic traits. Participant performance may have been influenced by prior training, personal biases, and cultural perceptions of aesthetics, limiting generalizability. Future research should involve larger, multicenter samples, including advanced imaging techniques (e.g., CBCT, 3D scans), and integrating multimodal forensic markers to improve the accuracy and reliability of gender identification from dental traits.

CONCLUSIONS

This study showed that dental professionals and students moderately succeeded in identifying gender using tooth shape and size. They correctly identified gender in about half the intraoral photographs, with accuracy varying widely from low to high. Male participants generally performed better than female participants, suggesting that personal biases may influence how dental features are interpreted. Experienced professionals focused on tooth size and canine shape, but accuracy depended on trait clarity, while less experienced dentists relied on less reliable features like tooth color. These findings show that dental features can help identify sex, but are not always dependable due to overlapping traits and individual biases.

Authors' Contribution

Conceptualization: MIR, NF

Methodology: AFB

Formal analysis: MUDA, UWJ, SRK

Writing and Drafting: AFB, AAB

Review and Editing: AFB, MUDA, UWJ, MIR, NF, AAB, SRK

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

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REFERENCES

- [1] Alam MK, Alanazi NH, Alanzi TM, Alrwuili SM, Alazmi MS, Alruwaili AM et al. Microesthetics in Orthodontics: A Systematic Review and Meta-Analysis. *Journal of Orthodontic Science*. 2023 Nov; 12(1): 78. doi: 10.4103/jos.jos_84_23.
- [2] Qali M, Alsaraf S, Alsaegh H. Gender Determination Through Dental Morphology: A Cross-Sectional Study. *Cureus*. 2024 Oct; 16(10). doi: 10.7759/cureus.71073.
- [3] Alam MK, Alsharari AH, Shayeb MA, Alogaibi YA. Macroesthetics in Orthodontics–A Systematic Review and Meta-Analysis. *Journal of Orthodontic Science*. 2025 Mar; 14(1): 12. doi: 10.4103/jos.jos_11_24.
- [4] Mahn E, Walls S, Jorquera G, Valdés AM, Val A, Sampaio CS. Prevalence of Tooth Forms and Their Gender Correlation. *Journal of Esthetic and Restorative Dentistry*. 2018 Jan; 30(1): 45-50. doi: 10.1111/jerd.12341.
- [5] Ajmal MA, Roberts TS, Beshtawi KR, Raj AC, Sandeepa NC. Sexual Dimorphism in Odontometric Parameters Using Cone Beam CT: A Systematic Review. *Head and Face Medicine*. 2023 Mar; 19(1): 6. doi: 10.1186/s13005-023-00352-7.
- [6] El Mourad AM, Al Shamrani A, Al Mohaimeed M, Al Sougi S, Al Ghanem S, Al Manie W. Self-Perception of Dental Esthetics among Dental Students at King Saud University and Their Desired Treatment. *International Journal of Dentistry*. 2021; 2021(1): 6671-112. doi: 10.1155/2021/6671112.
- [7] Najafi HZ, Estedal T, Saki M, Azadi M. Perception of Discrepancy in the Upper Midline Position in Conjunction with the Gingival Display According to Various Occupations in Iran. *Korean Journal of Orthodontics*. 2023 May; 53(3): 163-74. doi: 10.4041/kjod22.164.
- [8] Negruțiu BM, Moldovan AF, Staniș CE, Pusta CT, Moca AE, Vaida LL et al. The Influence of Gingival Exposure on Smile Attractiveness as Perceived by Dentists and Laypersons. *Medicina*. 2022 Sep; 58(9): 1265. doi: 10.3390/medicina58091265.
- [9] Raj P, Nagesh S, Boyapati R. Impact of Gingival Pigmentation on Laypersons' Perception of Smile Aesthetics: An Observational Study. *Exploration of Medicine*. 2025 Jan; 6: 1001274. doi: 10.37349/emed.2025.1001274.
- [10] Zhou Y, Jiang F, Cheng F, Li J. Detecting Representative Characteristics of Different Genders Using Intraoral Photographs: A Deep Learning Model with Interpretation of Gradient-Weighted Class Activation Mapping. *BioMed Central Oral Health*. 2023 May; 23(1): 327. doi: 10.1186/s12903-023-03033-8.
- [11] Calheiros-Lobo MJ, Calheiros-Lobo M, Pinho T. Esthetic Perception of Different Clinical Situations of Maxillary Lateral Incisor Agenesis According to Populations with Dental and Non-Dental Backgrounds: A Systematic Review and Meta-Analysis. *Dentistry Journal*. 2023 Apr; 11(4): 105. doi: 10.3390/dj11040105.

- [12] Baik KM, Anbar G, Alshaiikh A, Banjar A. Effect of Social Media on Patient's Perception of Dental Aesthetics in Saudi Arabia. *International Journal of Dentistry*. 2022; 2022(1): 4794497. doi: 10.1155/2022/4794497.
- [13] Cheng JH, Hsu YC, Lee TY, Li RW. Factors Affecting Perception of Laypeople and Dental Professionals Toward Different Smile Esthetics. *Journal of Dental Sciences*. 2023 Apr; 18(2): 739-46. doi: 10.1016/j.jds.2022.11.030.
- [14] Reddy H, Singla R, Singla N, Natarajan M, Singhal DK. Esthetic Preferences of Orthodontists, General Dentists, and Laypersons for Indian Facial Profiles: A Cross-Sectional Study. *F1000Research*. 2024 Sep; 12: 953. doi: 10.12688/f1000research.138742.2.
- [15] Althagafi N. Esthetic Smile Perception among Dental Students at Different Educational Levels. *Clinical, Cosmetic and Investigational Dentistry*. 2021 May: 163-72. doi: 10.2147/CCIDE.S304216.
- [16] Mazur M, Jedliński M, Westland S, Pirolì M, Luperini M, Ndokaj A et al. Tooth Colour and Facial Attractiveness: Study Protocol for Self-Perception with A Gender-Based Approach. *Journal of Personalized Medicine*. 2024 Mar; 14(4): 374. doi: 10.3390/jpm14040374.
- [17] Dumančić J, Scott GR, Savić Pavičin I, Anić-Milošević S, Medančić N, Brkić H. Canine Crown Sexual Dimorphism in A Sample of the Modern Croatian Population. *Dentistry Journal*. 2023 Jul; 11(7):175. doi: 10.3390/dj11070175.
- [18] Lipsky MS, Su S, Crespo CJ, Hung M. Men and Oral Health: A Review of Sex and Gender Differences. *American Journal of Men's Health*. 2021 May; 15(3): 15579883211016361. doi: 10.1177/15579883211016361.
- [19] Nakhapaksirat D. Evaluation of Teaching Cognitive Bias to Dental Students During the Transition to Independent Dental Practice. *Journal of Dental Education*. 2025 Jul; 89(7): 1127-35. doi: 10.1002/jdd.13811.
- [20] Schulz-Weidner N, Gruber M, Schraml EM, Wöstmann B, Krämer N, Schlenz MA. Improving the Communication of Dental Findings in Pediatric Dentistry by Using Intraoral Scans as a Visual Aid: A Randomized Clinical Trial. *Dentistry Journal*. 2024 Jan; 12(1): 15. doi: 10.3390/dj12010015.
- [21] Menon PA and Kumar NA. Recent Advances in Forensic Odontology: An Overview. *Journal of Forensic Science and Medicine*. 2021 Jul; 7(3): 105-8. doi: 10.4103/jfsm.jfsm_41_20.
- [22] Viciano J, Tanga C, D'Anastasio R, Belcastro MG, Capasso L. Sex Estimation by Odontometrics of Nonadult Human Remains from A Contemporary Italian Sample. *American Journal of Physical Anthropology*. 2021 May; 175(1): 59-80. doi: 10.1002/ajpa.24132.
- [23] Heng D, Manica S, Franco A. Forensic Dentistry as an Analysis Tool for Sex Estimation: A Review of Current Techniques. *Research and Reports in Forensic Medical Science*. 2022 Dec: 25-39. doi: 10.2147/RRFMS.S334796.
- [24] Stojilković M, Gušić I, Berić J, Prodanović D, Pecikozić N, Veljović T et al. Evaluating the Influence of Dental Aesthetics on Psychosocial Well-Being and Self-Esteem Among Students of the University of Novi Sad, Serbia: A Cross-Sectional Study. *BioMed Central Oral Health*. 2024 Feb; 24(1): 277. doi: 10.1186/s12903-024-04002-5.
- [25] Campos LA, Costa MA, Bonafé FS, Marôco J, Campos JA. Psychosocial Impact of Dental Aesthetics on Dental Patients. *International Dental Journal*. 2020 Oct; 70(5): 321-7. doi: 10.1111/idj.12574.
- [26] Sharma D, Gupta S, Koshy G, Sharma V, Hooda A. Role of Cone Beam Computed Tomography and Orthopantomogram in Sex Estimation: A Systematic Review. *Egyptian Journal of Forensic Sciences*. 2025 May; 15(1): 35. doi: 10.1186/s41935-025-00449-x.