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Perception of the Aesthetic Component of Orthodontically Aligned Impacted Maxillary Canines

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Abstract

This study aims to evaluate and compare the perceptions of laypeople, general dentists, orthodontic residents, and experienced orthodontists regarding the aesthetic and gingival changes resulting from the orthodontic traction of impacted maxillary canines. A total of 40 Evaluators participated in this study. Evaluators were divided into 4 groups of 10 Laypersons, 10 General Dentists, 10 Orthodontic Residents, and 10 Orthodontists with a minimum of 5 years of experience. Evaluators were made to assess all 12 post treatment photographs and were given 1 minute to analyze gingival and aesthetic characteristics of maxillary canine in each photograph. Evaluators were instructed to mark the score on a 7-point Likert Scale. Statistical analysis was performed. The intergroup and intragroup comparison shows that the layperson has given an overall median score of 3.9 and the other three group of evaluators gave an overall median score of 4.4 for the five questions that was conducted in this study. The scoring difference among each group of evaluators were statistically not significant. The difference between the scores were not significant, this study has revealed that the orthodontists with experience were able to appreciate the micro and mini aesthetics of the canine more accurately than other groups followed by orthodontic residents, general dentist and lay person.

Keywords: Aesthetic Component, Gingival Characteristics, Maxillary Canine, Perception.

Introduction

The correct positioning and alignment of canines are paramount in establishing an aesthetically pleasing facial contour, a harmonious smile line, and optimal occlusion, particularly in the context of canine guidance or group function occlusion (1). Prevalence of impacted maxillary canines is relatively low, which ranges from 0.92% to 2.2% of the population, with a higher occurrence in females, at a ratio of 2:1, and generally positioned more palatally than being positioned labially, with a ratio of 2:1 or 3:1 (2-4). Even with this prevalence rate, the impacted maxillary canine poses many challenges, so it is important to address it. Previous studies suggested that an increased palatal width and anomalous lateral incisors may play a role in the development of palatal canine impaction. In contrast, the deficiency in arch length is considered the most prevalent cause of labially impacted canines (5, 6). Maxillary impacted canines exhibit various characteristics, including the type of impaction (unilateral or bilateral), location (palatal, buccal, or bicortical) (7-10), sectors of impaction, height (distance to the occlusal plane), and angulation (angles a and b) (11). These factors can complicate treatment decisions.

Various treatment options available for the patient are observation, interceptive treatment, surgical exposure followed by orthodontic alignment, autotransplantation of the canine, and extraction of the impacted canine. Among these, the most desirable mode of treatment is aligning the impacted canine with surgical exposure followed by orthodontic traction.[1] Maxillary canine impaction presents significant periodontal challenges for surgeons due to the attached gingival tissue in this region, which is vital for aesthetics and must be preserved during realignment (8, 9).

This study evaluates the perception of orthodontic treatment for impacted maxillary canines across different populations. Perception is important because just the appearance of an impacted canine clinically would be satisfactory from laypeople's perspective, whereas for the orthodontist, every treatment objective has to be satisfied. Although

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individuals may recognize their malocclusion characteristics, they often do not perceive a need for treatment as strongly as dental professionals do (12-17). Dentists and orthodontists tend to have a more critical perspective on malocclusions and are more likely to advocate for treatment, while laypeople might believe that the same malocclusion does not require intervention (18). This study is focused on assessing the various aesthetic and gingival considerations in patients with unilateral impacted maxillary canines treated with fixed appliances. This study highlights the perception of laypersons, general dentists, orthodontic residents, and orthodontists on whether the orthodontic traction of impacted canines brings out a favorable change to the aesthetic component of a smile.

Methodology

This was a cross-sectional, retrospective, and observational study. Ethical approval was obtained from the Institutional Ethics Committee of Sri Ramachandra Institute of Higher Education and Research under the following reference number. (Reference: CSP-III/24/APR/04/142). All intraoral post-treatment photographs were standardized using a DSLR camera (canon 1500D, ISO200, 1/250 and AI focus) mounted on a tripod under consistent lighting and positioning conditions. Images captured in the natural head position with maximum visibility of the upper arch and canine region. No digital editing or enhancement was applied to preserve clinical authenticity. Additionally, a pilot validation of the questionnaire and images was conducted with seven orthodontists to ensure clarity and relevance. Their feedback helped refine the instruction manual and pictorial aids provided to the evaluator groups. Post-treatment photographs of patients who were diagnosed with impacted maxillary canines and were treated with orthodontic traction were taken from the archives of the Department of Orthodontics and were utilized for this study.

To determine the required number of participants, a sample size calculation was performed. Referring to a similar study in the literature (19), a beta error of 0.8 and an alpha error of 0.05 were considered, resulting in a power of 80% for the sample size determination. A minimum of 40 evaluators and a patient sample of 12 patients who had undergone fixed orthodontic treatment were needed to ensure sufficient statistical power for all assessments.

The inclusion criteria were as follows: both genders, in the age group between 12-30 years, with unilateral impaction of the maxillary canine and had undergone fixed appliance therapy for the same. Patients who presented with erupted permanent maxillary canines, maxillary impacted canines treated with modalities other than orthodontic traction, and developmental syndromes and anomalies were excluded. Assessment of the achieved smile and gingival characteristics of impacted maxillary canine treated with orthodontic traction was observed as in Figure 1. The gingival margin and zenith and the contact area between the canine and adjacent tooth were the gingival characteristics assessed. Canine relationship, mesial tip, and position of canine according to the golden proportion were the smile characteristics assessed. A total number of 40 evaluators participated in this study. Evaluators were divided into four groups of 10 laypersons, 10 general dentists, 10 orthodontic residents, and 10 orthodontists with a minimum of five years of experience. Eligibility of the evaluator groups is mentioned below; individuals above the age of 18 years, who were pursuing their bachelor's degree, which was complete or incomplete, were eligible for the layperson group. For general dentists, the criteria were dentists in private practice for a minimum of three years. For orthodontic resident individuals undergoing a post-graduation course in the department of orthodontics. For orthodontists with a minimum of five years of experience, orthodontists working as academicians and those running private practices for a minimum of five years were eligible in this group. A Likert scale is a rating tool used to assess opinions, attitudes, or behaviors. It presents a statement or question followed by a set of five or seven response options, allowing respondents to select the option that best reflects their view. For gingival margin and gingival zenith, a score of 1 indicates that the gingival margin and gingival zenith of the canine are not ideal, and a score of 7 indicates that the gingival margin and gingival zenith of the canine are ideal. For contact area, a score of 1 indicates contact between the canine and adjacent tooth is not average, and a score of 7 indicates contact between the canine and adjacent

tooth is average. For canine relation, a score of 1 indicates that class I canine relation is not achieved, and a score of 7 indicates that class I canine relation is achieved. Canine has 8 degrees of mesial tip; a score of 1 indicates that the canine tip is not established, and a score of 7 indicates the canine tip is established. For the golden proportion, a score of 1 indicates that the position of canines deviates from the golden proportion, and a score of 7 indicates the canine position follows the golden proportion.

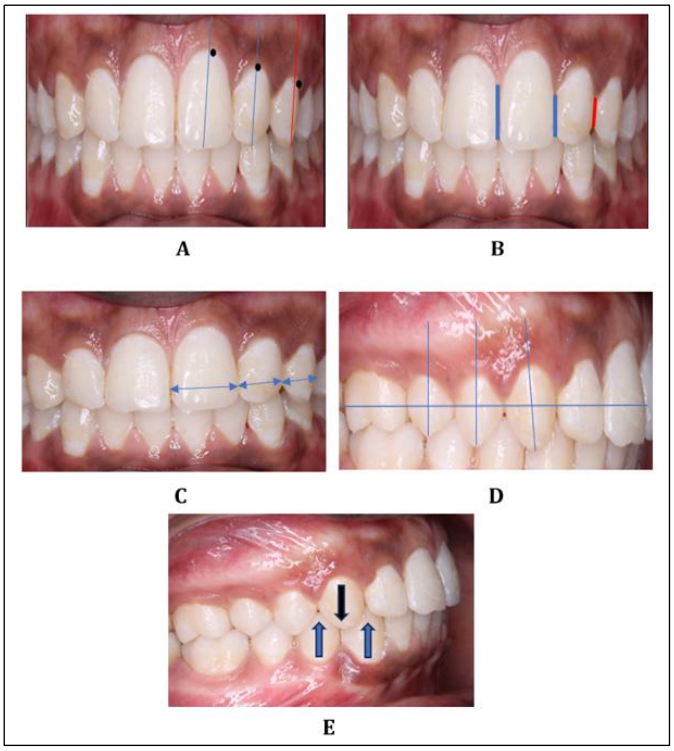

Figure 1: Gingival and Smile Characteristics Evaluated. (A) Gingival Margin of Canine is Similar to Central Incisor and Gingival Zenith Slightly Distal to Long Axis, (B) 0% Contact Area Between Lateral Incisor and Canine, (C) Position of Canine in Golden Proportion, (D) 8^0 Mesial Tip of Canine, (E) Class I Canine Relationship

Post-treatment intraoral photos of 12 patients were randomly arranged, and the following five questions for each patient with a total of 60 questions were answered by each evaluator. The post-treatment photographs were randomly arranged and judged by various evaluators using a 7-point Likert scale as in Figure 2. The evaluators were made to assess all 12 post-treatment photographs and were given 1 minute to analyze the maxillary canine in each photograph. The evaluator's first impression would be the final decision, and they were not allowed to change their decision. Along with the patient's post-treatment photographs, the evaluators were provided with the instructions on how to access each photograph and grading sheet on which the findings were recorded. The category of each evaluator was noted on the grading sheet.

This study consists of a series of questions related to smile and gingival characteristics: position of canine satisfies golden proportion, ideal mesial tip of canine is established, class I canine relation was achieved, gingival margin and gingival zenith are aesthetically pleasing, contact between canine and lateral incisor is average. These five questions were answered by each evaluator for each post-treatment photograph. Since it will be difficult for a layperson to understand the terminologies in the questions, we provided pictorial depictions and explanations for the following terms in their questionnaire: canine, golden proportion, mesial tip, gingival margin, gingival zenith, and class I canine relation.

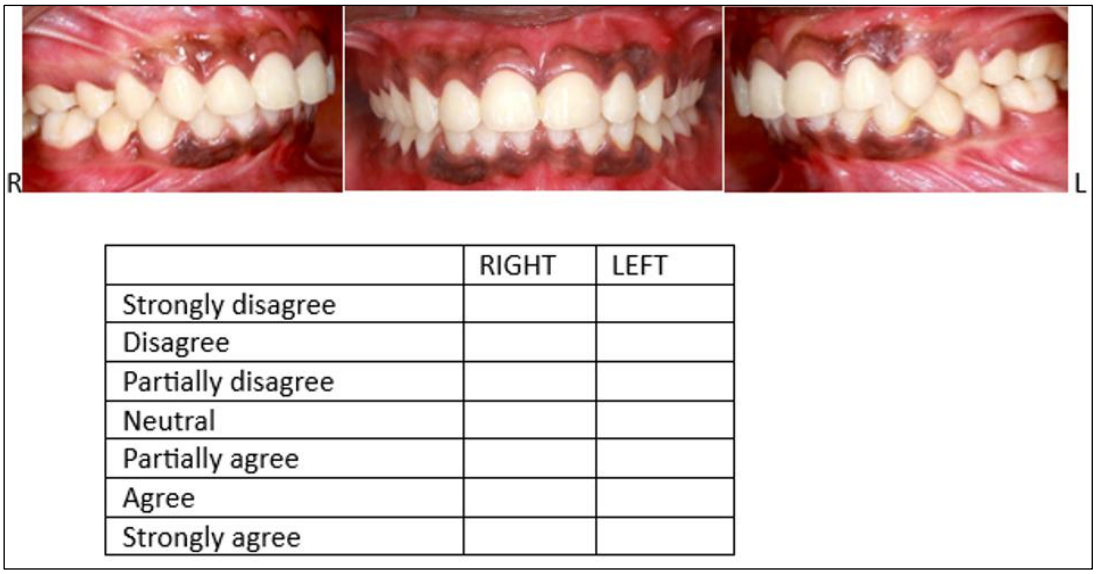

Figure 2: Likert Scale with Patient Post-Treatment Photo for Evaluation

With the help of these explanations, the evaluators were able to score each question with a better understanding of each criterion mentioned in the questionnaire.

The evaluators were instructed to mark the score on a 7-point Likert scale. A score of zero on the left end denotes that the compared photograph looks the same to the examiner, whereas a mark on the right end of the scale denotes that the compared photograph looks very different. The evaluators were asked to reassess and score each photograph on the Likert scale after two weeks to assess intra-examiner reliability. Statistical analysis, including non-parametric tests and intra-class correlation, was used to compare the side of the impacted maxillary canine with the adjacent side of the non-impacted canine for the group of subjects and agreement between the evaluators.

Statistical package for social sciences (SPSS) software was used to perform statistical analysis (version 20.0). Distribution of preferences between the post-treatment photograph was done using the chi-square test. Intra-group comparison of the Likert scores by the layperson, general dentists, orthodontic residents, and orthodontist for the aligned impacted maxillary canine was done using the analysis of Variance (ANOVA). Inter-group comparison of the Likert scores for the aligned impacted maxillary canine between the evaluator groups was done using the Kruskal-Wallis test with post hoc Bonferroni modification. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 40 evaluators have participated in this study; among them, 10 are laypersons, and the other 30 are part of the dental profession with varying levels of experience. The average age of laypersons was above 18 years, general dentists was between 25 and 28 years (mean age 26.5 years), orthodontic residents was between 26 and 29 years (mean age 27.5 years), and orthodontists with a minimum of five years of experience was between 35 and 57 years (mean age 46 years).

The intragroup median values and intergroup comparison of the Likert scoring for the position of canine in golden proportion show that the layperson and general dentists have given a median score of 3.6 and 3.7, respectively, while the orthodontic residents and orthodontist with experience have given a median score of 4.4 and 4 as in Table 1 and Figure 3. The intragroup median values and intergroup comparison of the Likert scoring for the mesial tip of the canine show that the layperson and general dentists have given a median score of 3.7 and 4, respectively, while the orthodontic residents and orthodontist with experience have given a median score of 4 and 4.2 as in Table 2 and Figure 3.

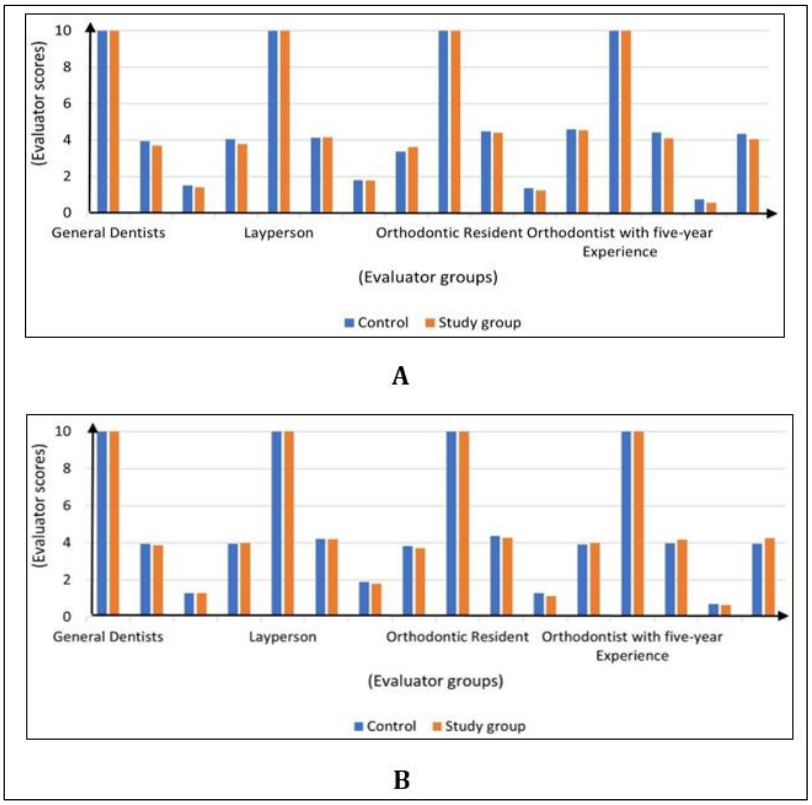

Figure 3: Bar Graph for Participant Scores Regarding. (A) Position of Canine in Golden Proportion, (B) Mesial Tip of Canine

Table 1: Score Values Given for Photographs by the Evaluator Groups Regarding Position of Canine in Golden Proportion

Group		Control	Study Group
General Dentists	No of evaluators	10	10
	Mean	3.95	3.69
	Std. Deviation	1.50	1.41
	Median	4.04	3.79
Layperson	No of evaluators	10	10
	Mean	4.13	4.15
	Std. Deviation	1.80	1.77
	Median	3.37	3.62
Orthodontic Resident	No of evaluators	10	10
	Mean	4.49	4.40
	Std. Deviation	1.37	1.23
	Median	4.58	4.54
Orthodontist with five-year Experience	No of evaluators	10	10
	Mean	4.42	4.09
	Std. Deviation	0.74	0.55
	Median	4.33	4.04
Chi-Square		110.66	77.33
p-value		0.102	0.5

Table 2: Score Values Given for Photographs by the Evaluator Groups Regarding Mesial Tip of Canine

Group		Control	Study group
General Dentists	No of evaluators	10	10
	Mean	3.94	3.87
	Std. Deviation	1.29	1.28

	Median	3.95	4.00
Layperson	No of evaluators	10	10
	Mean	4.21	4.20
	Std. Deviation	1.89	1.80
	Median	3.83	3.70
Orthodontic Resident	No of evaluators	10	10
	Mean	4.38	4.28
	Std. Deviation	1.28	1.13
	Median	3.9	4.00
Orthodontist with five-year Experience	No of evaluators	10	10
	Mean	3.97	4.18
	Std. Deviation	0.71	0.65
	Median	3.95	4.25
Chi-Square		84.00	82.00
p-value		0.301	0.356

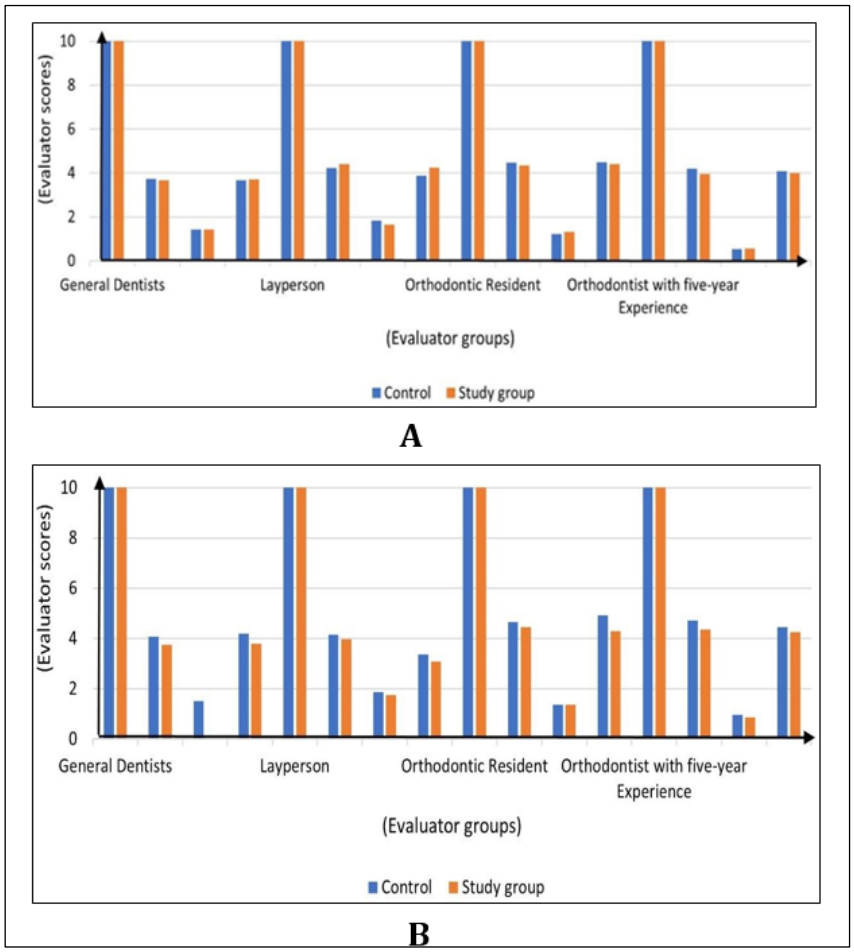

Figure 4: Bar Graph for Participant Scores Regarding. (A) Gingival Margin and Gingival Zenith, (B) Class I Canine Relation

The intragroup median values and intergroup comparison of the Likert scoring for the gingival margin and gingival zenith show that the layperson and general dentists have given a median score of 4.2 and 3.7, respectively, while the orthodontic residents and orthodontist with experience have given a median score of 4.4 and 4 as Table 3 and Figure 4. The intragroup median values and intergroup comparison of the Likert scoring for the Class I canine relation show that the layperson and general dentists have given a median score of 3 and 3.7, respectively, while both orthodontic residents and orthodontists with experience have given a median score of 4.2 as in Table 4 and Figure 4.

Table 3: Score Values Given For Photographs by the Evaluator Groups Regarding Gingival Margin and Gingival Zenith

Group		Control	Study Group
General Dentists	No of evaluators	10	10
	Mean	3.72	3.66
	Std. Deviation	1.43	1.42
	Median	3.66	3.70
Layperson	No of evaluators	10	10
	Mean	4.22	4.40
	Std. Deviation	1.84	1.66
	Median	3.87	4.25
Orthodontic Resident	No of evaluators	10	10
	Mean	4.47	4.35
	Std. Deviation	1.22	1.32
	Median	4.50	4.41
Orthodontist with five-year Experience	No of evaluators	10	10
	Mean	4.20	3.96
	Std. Deviation	0.55	0.57
	Median	4.08	4.00
Chi-Square		100.00	88.00
p-value		0.161	0.361

Table 4: Score Values Given for Photographs by the Evaluator Groups Regarding Class I Canine Relation

Group		Control	Study Group
General Dentists	No of evaluators	10	10
	Mean	4.08	3.75
	Std. Deviation	1.51	1..39
	Median	4.20	3.79
Layperson	No of evaluators	10	10
	Mean	4.15	3.97
	Std. Deviation	1.87	1.76
	Median	3.37	3.08
Orthodontic Resident	No of evaluators	10	10
	Mean	4.65	4.45
	Std. Deviation	1.37	1.36
	Median	4.91	4.29
Orthodontist with five-year Experience	No of evaluators	10	10
	Mean	4.72	4.36
	Std. Deviation	0.96	0.86
	Median	4.45	4.25
Chi-Square		94.00	88.00
p-value		0.366	0.206

The intragroup median values and intergroup comparison of the Likert scoring for the contact between the canine and adjacent teeth show that the layperson and general dentists have given a median score of 3.6 and 3.9, respectively, while the orthodontic residents and orthodontist with experience have given a median score of 4.3 and 4.2 as in Table 5 and Figure 5. The intragroup comparison shows that the layperson has given a median score of 3.9, and the other three groups of evaluators gave a median score of 4.4 for the five questions that were conducted in this study.

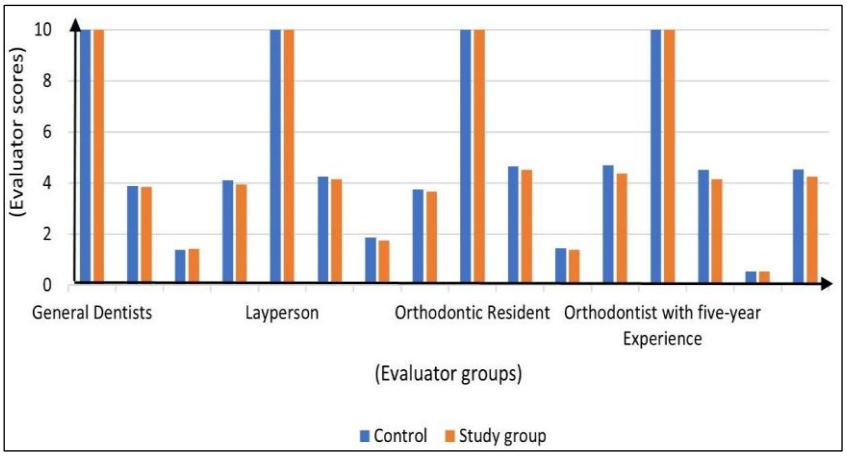

Figure 5: Bar Graph for Participant Scores Regarding Contact between Canine Adjacent Tooth

Table 5: Score Values Given for Photographs by the Evaluator Groups Regarding Contact between Canine Adjacent Tooth

Group		Control	Study Group
General Dentists	No of evaluators	10	10
	Mean	3.89	3.85
	Std. Deviation	1.39	1.43
	Median	4.12	3.95
Layperson	No of evaluators	10	10
	Mean	4.25	4.16
	Std. Deviation	1.88	1.75
	Median	3.75	3.66
Orthodontic Resident	No of evaluators	10	10
	Mean	4.65	4.51
	Std. Deviation	1.45	1.38
	Median	4.70	4.37
Orthodontist with five-year Experience	No of evaluators	10	10
	Mean	4.51	4.16
	Std. Deviation	0.54	0.53
	Median	4.54	4.25
Chi-Square		92.00	84.53
p-value		0.189	0.211

For the control group photographs, the overall comparison of ANOVA test results evaluated with post hoc shows p-values of 0.8, 0.87, 0.65, 0.67, and 0.64 for the following questions: The position of the canine satisfies the golden proportion, the ideal mesial tip of the canine is established, the gingival margin and gingival zenith are aesthetically pleasing, a Class I canine relation was achieved, and contact between the canine and lateral incisor is average, which was statistically not significant as mentioned in Table 6.

Table 6: Post Hoc Test Results among Layperson, General Dentist, Orthodontic Residents and Orthodontist with at Least Five-Year Experience for Photographs of Control Group

			Post Hoc			Overall comparison (ANOVA)
			Mean Difference	St. Error	P value	P value
Position of canine in	Layperson vs	General Dentist	-.18333	.63113	0.991	0.809
		Orthodontic Resident	-.54167	.63113	0.826	

golden proportion		Orthodontist with five-year experience	-.47500	.63113	0.875	
Mesial tip of canine	Layperson vs	General Dentist	-.27500	.60880	0.969	0.871
		Orthodontic Resident	-.44167	.60880	0.886	
		Orthodontist with five-year experience	-.03333	.60880	1.000	
Gingival margin and gingival zenith	Layperson vs	General Dentist	-.50000	.60319	0.840	0.658
		Orthodontic Resident	-.75000	.60319	0.604	
		Orthodontist with five-year experience	-.48333	.60319	0.853	
Class I canine relation	Layperson vs	General Dentist	-.06667	.65726	1.000	0.677
		Orthodontic Resident	-.56667	.65726	0.824	
		Orthodontist with five-year experience	-.64167	.65726	0.764	
Contact between canine and lateral incisor	Layperson vs	General Dentist	-.35833	.62778	0.940	0.640
		Orthodontic Resident	-.75833	.62778	0.626	
		Orthodontist with five-year experience	-.62500	.62778	0.753	

For the study group photographs, the overall comparison of ANOVA test results evaluated with post hoc shows p-values of 0.8, 0.9, 0.56, 0.64, and 0.75 for the following questions: The position of the canine satisfies the golden proportion; the ideal mesial tip of the canine is established; the gingival margin and gingival zenith are aesthetically pleasing; class I canine relation was achieved; contact between the canine and lateral incisor is average, which is also statistically not significant as mentioned in Table 7. The difference in the intergroup and intragroup scoring of the control and study group photographs for all five questions among the four groups of evaluators was statistically not significant.

Table 7: Post Hoc Test Results Among Layperson, General Dentist, Orthodontic Residents and Orthodontist with at Least Five-Year Experience for Photographs of Study Group

			Post Hoc			**Overall comparison (ANOVA)**
			Mean Difference	**St. Error**	**P value**	**P value**
Position of canine in golden proportion	Layperson vs	General Dentist	-.45833	.59050	0.865	0.809
		Orthodontic Resident	-.70833	.59050	0.631	
		Orthodontist with five-year experience	.40000	.59050	0.905	
Mesial tip of canine	Layperson vs	General Dentist	-.32500	.57638	0.942	0.900
		Orthodontic Resident	-.40833	.57638	0.893	

		Orthodontist with five-year experience	-.30833	.57638	0.950	
Gingival margin and gingival zenith	Layperson vs	General Dentist	-.73333	.58701	0.600	0.563
		Orthodontic Resident	-.68333	.58701	0.653	
		Orthodontist with five-year experience	-.30000	.58701	0.956	
Class I canine relation	Layperson vs	General Dentist	-.22500	.61929	0.983	0.640
		Orthodontic Resident	-.70000	.61929	0.674	
		Orthodontist with five-year experience	-.61667	.61929	0.753	
Contact between canine and lateral incisor	Layperson vs	General Dentist	-.31667	.60589	0.953	0.751
		Orthodontic Resident	-.66667	.60589	0.692	
		Orthodontist with five-year experience	-.31667	.60589	0.953	

Discussion

This study evidently shows that orthodontic traction of impacted maxillary canines helped in achieving the following: The visibility of the canine was 62% that of the lateral incisor, which satisfies the golden proportion; a positive 8% mesial tip of the canine was established; the gingival margin and gingival zenith were in level with that of the central incisor, which is aesthetically pleasing; there was a class I canine relation; and there was an ideal 30% contact between the canine and lateral incisor.

Smile aesthetics pertains to the visual attractiveness of a person's smile, influenced by factors like tooth alignment, color, shape, and the overall balance of facial features. A previous study had concluded that the mouth contributes the most to facial attractiveness (20). A crucial component of smile aesthetics is the canines, often regarded as the cornerstones of a smile. It helps to define the contour of the face. Their position contributes to the overall symmetry and balance of the smile. Canines support the lips, impacting the appearance of the smile, which can also affect the fullness and curvature of the smile line. The shape and size of canines contribute to the aesthetic harmony of the smile. Well-proportioned canines enhance the overall appearance and can make the smile look more youthful (21). The study's purpose is to reveal the perception of laypersons, general dentists, orthodontic residents, and orthodontists on whether the orthodontic traction of impacted canines brings out a favorable change to the aesthetic component of a smile.

The most challenging part to address is whether the perception of facial beauty is influenced by individual sensory experiences, or is there a universal standard shared by everyone? As in, does facial beauty reside in the features of the face itself, or does our enjoyment of it also rely on our personal ideas, emotions, and judgments, which are closely tied to our sensory experiences? In general, asymmetric changes in teeth are perceived as less attractive by both dental professionals and the layperson. While dental professionals may find symmetric changes unattractive, the layperson often fails to recognize some of these symmetric alterations (22-25).

There are many challenges faced by orthodontists while aligning an impacted canine, like the position and orientation of the canine, the risk of root resorption in adjacent teeth, function, and aesthetics. One of the main challenges is the duration of orthodontic traction for maxillary impacted canines, which is primarily influenced by the patient's gender, the presence of bilateral impaction, bicortical impaction of the canines, and their proximity to the midline. All these mentioned factors may extend the duration of orthodontic

traction by several months (3). Though the treatment duration is prolonged due to the impaction, it is necessary to achieve proper occlusion, temporomandibular relation, and smile aesthetics (26).

Maxillary canine impaction poses significant challenges pertaining to the periodontal health for surgeons due to the presence of attached gingival tissue in this area, which plays a crucial aesthetic role and should be preserved during realignment. The use of gingivectomy and apically raised flap for the surgical exposure of impacted tooth must be carefully considered during the preoperative phase, as it can lead to aesthetic complications following surgical and orthodontic treatments. Patients should be informed that the treatment of dental impaction involves specific procedures and considerations, which may vary depending on the type and severity of the impaction. And also, the resulting outcomes need to be monitored even after therapy is completed, through regular check-ups and follow-up visits (8, 9, 27).

Since patients will be undergoing treatment with different orthodontic appliances during surgical and orthodontic procedures, they should be educated on the best dental brushing techniques and the use of auxiliary oral hygiene tools to prevent potential gingival inflammation caused by plaque buildup (26, 27). Monitoring probing depth and gingival recession during and after surgical and orthodontic treatments is essential, as these factors may signal periodontal disease. Annual evaluations can help identify early signs of disease in all treated teeth (27).

We evaluated the perception of micro and mini esthetics of the orthodontically treated impacted maxillary canines among four different groups of evaluators. The parameters assessed were the position of the canine, the ideal mesial tip of the canine, the gingival margin and gingival zenith, the canine relation, and the contact between the canine and lateral incisor. The intergroup and intragroup comparisons show that the orthodontists with experience were able to score the aesthetic and gingival factors more accurately than the other three groups of evaluators. Aesthetic perception is not solely influenced by dental parameters but also by psychosocial factors such as age, self-esteem, and media influence. Adolescents and young adults, in particular, are more likely to be influenced by social media portrayals of ideal smiles. Moreover, individuals with higher self-esteem may have a more favorable view of their own dental appearance regardless of clinical alignment (28-30). These factors may have affected the scoring patterns observed in the layperson group and should be considered when interpreting subjective esthetic evaluations.

A previous study has shown that the orthodontists had a lower threshold for identifying unilateral crown length discrepancies as unattractive compared to both general dentists and laypeople. Specifically, orthodontists considered a 0.5-mm discrepancy in central incisor crown length to be unattractive, while the layperson and general dentist groups only found it unattractive at a threshold of 1.5 mm (31). These results are similar to those results obtained from this study. Studies have shown that perceptions of dental esthetics can significantly differ based on observer expertise. Orthodontists and dental professionals demonstrated more critical and discriminating aesthetic evaluations compared to laypersons, showing statistically significant differences in VAS scores (32). Previous studies found that aligned maxillary canines were perceived as the most aesthetic treatment outcome by all rater groups, including orthodontists, general dentists, patients, and parents (33). These findings support the present study's inclusion of varied evaluator groups and help validate the use of the Likert scale for assessing esthetic perception post-alignment of impacted canines.

The comparable median scores among evaluator groups suggest that the orthodontic alignment of the impacted maxillary canine was successfully achieved, meeting both gingival and aesthetic treatment goals. The study highlights differences in dental aesthetic perceptions between professionals and the public, with orthodontists, general dentists, and laypeople identifying varying degrees of aesthetic concerns. Furthermore, the findings indicate that dentists may have an advantage in guiding treatment recommendations, likely due to their clinical expertise and familiarity with orthodontic outcomes. The finding that laypersons and general dentists rated aligned impacted canines favorably suggests that public perception may support orthodontic alignment over extraction or prosthetic alternatives. This can influence treatment planning by encouraging clinicians to consider patient-centered esthetic

satisfaction as a valuable treatment outcome. Shared decision-making may benefit from acknowledging that even impacted teeth can achieve acceptable esthetic standards following proper traction and alignment.

Conclusion

- Scores given by all groups were similar and not statistically significant.
- This shows that the orthodontically aligned impacted maxillary canine was able to meet all the treatment objectives.
- However, the orthodontist group with a minimum of five years of experience were able to appreciate the micro and mini aesthetics of the canine more accurately than other groups followed by orthodontic residents, general dentist and lay person.

Managing severely impacted canines is a complex process that necessitates collaboration among various clinicians. Hence, it becomes essential that we should provide the patient with an optimal treatment plan based on scientific rational in order to obtain the ideal outcome**.**

Limitations and Future Scope

The retrospective design limited control over photographic consistency and smile dynamics. Additionally, the evaluators were not matched for cultural background or gender, which could influence perception. Future studies should aim to include a longitudinal study design and more diverse patient cohort, consider pre- and post-treatment comparisons, and investigate cross-cultural variations in esthetic perception. Incorporating digital smile design or AI-based objective evaluation may further enhance the reliability of such assessments.

Abbreviations

ANOVA: Analysis of Variance, SPSS: Statistical Package for Social Sciences.

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Author Contributions

Nivedha Ramachandran: Conceptualization, Data curation, Investigation, Methodology, Resources, Project administration, Validation, Visualization, Writing – original draft, review, editing, Haritha Pottipalli Sathyanarayana: Conceptualization, Data curation, Investigation, Methodology, Resources, Project administration , Writing – original draft, review, editing, Vignesh Kailasam: Resources, Conceptualization, Data curation, Investigation, Methodology, Project administration, Validation, Visualization , Writing – original draft, review, editing.

Conflict of Interest

The authors declare that they have no competing interests.

Ethics Approval

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