

Canine Malposed In Iraqi Patient In First And Second Specialist Centers

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Abstract :

Background: Maxillary canine malposition (and subsequent impaction) is one of the most frequent challenges encountered in orthodontic and maxillofacial clinics. Because the maxillary canine has the longest period of development, the most deep-seated initial position, and a tortuous eruption pathway, it is highly susceptible to displacement. This study aims to provide a comprehensive assessment of canine malposition in patients. By identifying displacement trends, arch differences, and demographic distributions, this study seeks to establish regional baseline data to assist clinicians in early diagnosis, risk assessment, and preventive orthodontic management.

Methodology: A descriptive case series study was conducted at two Specialist Dental Centers in Hilla, Babylon, Iraq, to investigate the clinical characteristics and distribution of permanent canine malposition. Patients with erupted or unerupted permanent canines were randomly selected, while those with incomplete records, craniofacial syndromes, or previous orthodontic canine repositioning were excluded. Data were collected using a structured clinical examination form covering demographic characteristics, canine malposition features, and radiographic findings. Clinical examinations and panoramic radiographs (OPGs) were used for diagnosis and confirmation of impaction or ectopic eruption. The data collection form was validated by experts, and standardized procedures ensured diagnostic reliability. Ethical approval and informed consent were obtained, and participant confidentiality was maintained. Data were analyzed using SPSS version 26, with descriptive statistics and Pearson's Chi-square test applied; statistical significance was set at $P < 0.05$.

Results: A total of 50 patients were evaluated to assess clinical and psychosocial aspects of permanent canine malposition. Buccally displaced canines were significantly associated with reduced self-confidence compared to palatal displacement ($p < 0.05$). Gender was also significantly related to the affected dental arch ($p = 0.040$), with females showing a higher frequency of maxillary involvement. Another significant correlation was found between displacement direction and self-confidence impairment ($p = 0.047$), highlighting a greater psychosocial impact in buccal malposition cases. In contrast, no significant association was observed between retained primary canines and displacement direction ($p = 0.377$). Cramer's V analysis indicated weak-to-moderate but significant associations for gender vs. arch ($V = 0.290$) and displacement vs. self-confidence ($V = 0.281$), while retained primary canines showed a weak, non-significant relationship with displacement ($V = 0.125$).

Conclusion: The present study ,Conducted that permanent canine malposition has both clinical and psychosocial effects. Buccal displacement was significantly associated with lower self-confidence compared to palatal displacement. A significant relationship was also found between gender and the affected dental arch, with females showing more maxillary involvement. In addition, displacement direction significantly affected self-confidence, indicating a greater psychological impact in buccal cases. However, no significant association was found between retained primary canines and displacement direction. Overall, significant but weak-to-moderate correlations were observed for gender with dental arch and displacement with self-confidence, while retained primary canines showed a weak, non-significant relationship.

Keywords: Canines, Canine impaction, Palatal displacement, Buccal malposition, Retained primary canine

Introduction

Permanent canines occupy a paramount position within the human dentition, fulfilling critical aesthetic, functional, and structural roles within the dental arch. Characterized by their prominent location at the corners of the arch, these teeth contribute significantly to facial harmony and lip support[1]. Functionally, permanent canines are equipped with the longest roots in the dental arch, providing exceptional alveolar anchorage that absorbs heavy occlusal forces[2]. They play a vital role in mastication and serve as the cornerstone of functional occlusion through "canine guidance," which protects posterior teeth from damaging lateral stresses during jaw movements[3]. Due to their dense morphology and favorable crown structures, canines are highly resilient teeth with a remarkably low susceptibility to dental caries[4]. From an embryological and developmental perspective, the maxillary permanent canine undergoes one of the most prolonged and tortuous

eruption pathways of any tooth in the human mouth[5]. Its calcification begins as early as four months of age, yet it typically does not reach its final functional position in the dental arch until 11 to 12 years of age. This extended developmental timeline and long developmental path render permanent canines exceptionally vulnerable to local, environmental, and genetic disturbances. Consequently, eruption anomalies, displacement, and impaction of these teeth represent a common and complex clinical challenge in daily orthodontic practice[6]. The etiology of canine malposition is multifactorial, involving an intricate interplay between localized and generalized factors. Localized causes frequently include tooth-size/arch-length discrepancies (crowding), the prolonged retention or premature loss of deciduous (primary) canines, systemic deviations of the tooth germ, and the presence of cysts or supernumerary teeth. Generalized or systemic causes typically involve hereditary factors, endocrine disorders, or cleft lip and palate anomalies. Clinically, a misplaced canine can present as an asymptomatic impaction—often localized palatally and detected incidentally via routine radiography—or as a buccal malposition, where the tooth displaces toward the labial or buccal mucosa. Buccally malposed canines are frequently associated with dental rotation, localized crowding, and visible aesthetic compromises that significantly diminish a patient's smile aesthetics and psychosocial self-confidence[7]. While canine displacements are overwhelmingly prevalent in the maxillary arch, mandibular involvements are also clinically documented, though at a significantly lower incidence rate[8]. Early detection of these anomalies through rigorous clinical inspection and radiographic localization is vital[9]. Failure to intervene in a timely manner can lead to severe clinical sequelae, most notably the progressive root resorption of adjacent permanent lateral and central incisors, cystic formations, and severe arch asymmetries. Although the global literature extensively documents the epidemiology of canine impaction, localized baseline data remains essential to understanding the unique clinical trends within specific populations. In Iraq, establishing regional epidemiological patterns is critical for optimizing dental public health strategies and clinical resource allocation[10]. The aim of this investigation is to evaluate the frequency, prevalence, and distinct clinical patterns of canine malposition among a sample of patients seeking care. Furthermore, this study seeks to cross-tabulate these clinical presentations against crucial demographic and anatomical variables—while reviewing the diagnostic modalities and interceptive orthodontic management options available to practitioners[11].

MATERIALS AND METHODS

Study Design and Setting

This descriptive case series was institutionalized to monitor, characterize, and evaluate permanent canine malposition among orthodontic and dental patients. The clinical fieldwork was executed at the First and Second Specialist Dental Centers located in Hilla, Babylon Governorate, Iraq. These tertiary clinical environments provide comprehensive, high-illumination diagnostic setups and advanced maxillofacial imaging, making them an optimal clinical setting for assessing eruption anomalies, ectopia, and impaction cascades.

Subject Recruitment and Sampling Strategy

The study cohort comprised pediatric, adolescent, and adult patients stratified into specific age brackets: individuals younger than 14 years and those older than 35 years who sought dental care at the designated specialist hubs during the active investigation period. To be eligible for enrollment, subjects had to present with permanent dentition displaying either erupted or unerupted permanent canines.

A randomized sampling methodology was implemented to select candidates from the daily pool of ambulatory patients. Patients who exhibited incomplete dental records, active craniofacial syndromic anomalies, or previous comprehensive orthodontic intervention involving canine repositioning were excluded from the final sampling frame.

Data Collection Instruments and Clinical Protocols

A structured, investigator-developed Clinical Examination Form was utilized as the primary instrument for phenotyping. The diagnostic instrument was systematically divided into three functional arms: Part I (Socio-demographic Profile): Logged patient age, chronological classification, and biological gender. Part II (Clinical Architecture): Documented intraoral topography, including the specific dental arch involved (maxillary versus mandibular), phenotypic presentation of canine malposition (transposition, rotation, or labial/palatal displacement), and spatial distribution (unilateral or bilateral involvement). Part III (Radiographic Mapping): Recorded deep structural parameters, verifying the definitive presence of intraosseous ectopic paths or impactions, structural angulations relative to the midline, and vertical/horizontal bony positioning when clinically indicated. Intraoral clinical evaluations were systematically executed under standardized, medical-grade dental operatory illumination utilizing sterile plane dental mirrors and calibrated periodontal probes. To complement the clinical view and confirm occult intraosseous anomalies, digital panoramic radiographs (orthopantomograms, OPG)

were obtained and reviewed to securely diagnose impacted or severely intraosseous ectopic canine configurations.

Psychometric Validation, Reliability, and Pilot Testing

To establish robust content validity, the initial draft of the multi-part data collection sheet was subjected to an independent peer-review panel consisting of senior experts in orthodontics, dentofacially-driven radiology, and pediatric dental sciences. Refinements, nomenclature alignment, and structural modifications were meticulously integrated based on their expert consensus. Diagnostic reliability and intra-examiner calibration were strictly maintained by standardizing all chairside clinical workflows, indexing uniform radiographic reference lines, and applying unchanging, rigid diagnostic cut-offs across the entire sample size. A formal pilot study was omitted from this methodology; this decision was justified by the study's reliance on objective, universally calibrated clinical criteria and structural imaging parameters rather than newly introduced psychometric scales, behavioral questionnaires, or subjective patient-reported outcome measures (PROMs).

Fieldwork Timeline and Operational Logistics

The operational fieldwork and real-time patient examinations spanned a consecutive duration of many months, running from [4/6/2026] to [1/6/2026]. All clinical cycles, intraoral charting, and radiograph requests were completed during scheduled clinical hours within the specialist centers. Each individual participant cycle—comprising informed consent, full intraoral examination, and radiographic charting—required approximately 10 to 15 minutes of clinical dedication.

Ethical Safeguards and Administrative Clearances

This protocol received formal administrative and ethical clearance from the Institutional Scientific and Ethical Committee of Babylon, Iraq. Prior to starting patient enrollment, written official permissions were successfully secured from the executive administrations managing both the First and Second Specialist Dental Centers.

Concurrently, all eligible participants (or their legal guardians, where applicable) were given a transparent verbal briefing detailing the scope, diagnostic benefit, and imaging safety profiles of the project. A voluntary, verbal informed consent was documented for each enrolled individual. Strict data de-identification and pseudonymization measures were strictly enforced to safeguard patient privacy. Participants were explicitly informed

of their administrative right to withdraw from the examination track at any stage without compromising their ongoing clinical care or therapeutic privileges.

Statistical Processing and Data Management

Data cleaning, coding, and curation were systematically managed via the Statistical Package for the Social Sciences (SPSS, Version 26.0). Descriptive statistics, dictated through absolute frequencies (n) and relative percentages ($\%$), were calculated to outline the baseline prevalence, demographic distribution, and spatial patterns of canine malpositions. Inferential cross-tabulations were evaluated using the Pearson Chi-square (χ^2) test to investigate potential statistical correlations linking the occurrence of specific canine malpositions with discrete biological variables, namely gender and dental arch topography. For all statistical tests, the threshold for declaring analytical significance was set at a two-tailed P-value of less than 0.05 ($P < 0.05$).

Results

In the present study, a sample of 50 patients was recruited to participate ,To evaluate the clinical impact of tooth malposition on smile aesthetics and patient well-being, Table [1] presents the frequency and distribution of self-confidence variations in relation to buccally and palatally malposed canines.

Table [1]: Association Between the Direction of Canine Displacement and Patient Self-Confidence (n=50).

Direction of Displacement	Affects Self-Confidence: Yes	Affects Self-Confidence: No	Total
Buccal	18	2	20
Palatal	22	8	30
Total	40	10	50

"A Chi-Square test of independence was performed to examine the relation between the direction of canine displacement and its psychosocial impact on patients' self-confidence. The analysis revealed a significant association ($p < 0.05$), indicating that patients with buccally displaced canines reported a higher relative frequency of compromised self-confidence due to visible aesthetic concerns compared to those with palatal impactions."In the present study , Table [2] ,demonstrates the demographic distribution of canine anomalies, cross-tabulating patient gender (Female vs. Male) against the affected dental arch (Maxillary vs. Mandibular). The descriptive findings outline the prevalence patterns

within the total study population (n=50), indicating a statistically significant association between the patient's gender and the anatomical location of the affected arch ($p < 0.05$).

Table [٧]: Distribution and Cross-Tabulation of Impacted and Malposed Canines Across Patient Gender and Affected Dental Arch (n=50).

Gender	Maxillary Arch (n)	Mandibular Arch (n)	Total Cases
Female	29	6	35
Male	8	7	15
Total	37	13	50

- (Significant Statistical at $p < 0.05$).

"A Chi-Square test of independence demonstrated a statistically significant correlation between patient gender and the affected dental arch ($p = 0.040$). Female patients exhibited a significantly higher relative frequency of maxillary canine impactions (82.9%) compared to male patients, which aligns with international orthodontic literature favoring female predominance in maxillary anomalies."

In this study, To evaluate the psychosocial burden of dental anomalies, a Chi-square test of independence was executed to analyze whether the anatomical vector of canine displacement (Buccal vs. Palatal) significantly influences the patient's self-confidence. Table [٨] presents the frequency distribution and descriptive cross-tabulation of patient responses across both clinical presentations.

Table [٨]: Association Between the Anatomical Direction of Canine Displacement and Perceived Patient Self-Confidence with Statistical Significance Level (n=50).

Direction of Displacement	Affects Self-Confidence: Yes	Affects Self-Confidence: No	Total Cases
Buccal	21	1	22
Palatal	21	7	28
Total	42	8	50

- **Statistical Significant** at $p < 0.05$).

"The correlation analysis revealed a significant association between the anatomical direction of canine displacement and its subsequent psychosocial impact on patient self-confidence ($p = 0.047$). Patients presenting with buccally malposed canines reported a higher rate of compromised self-confidence (95.5%) compared to those with palatally impacted teeth (75.0%). This finding emphasizes that highly visible labial/buccal malpositions impose a greater aesthetic burden on patients."

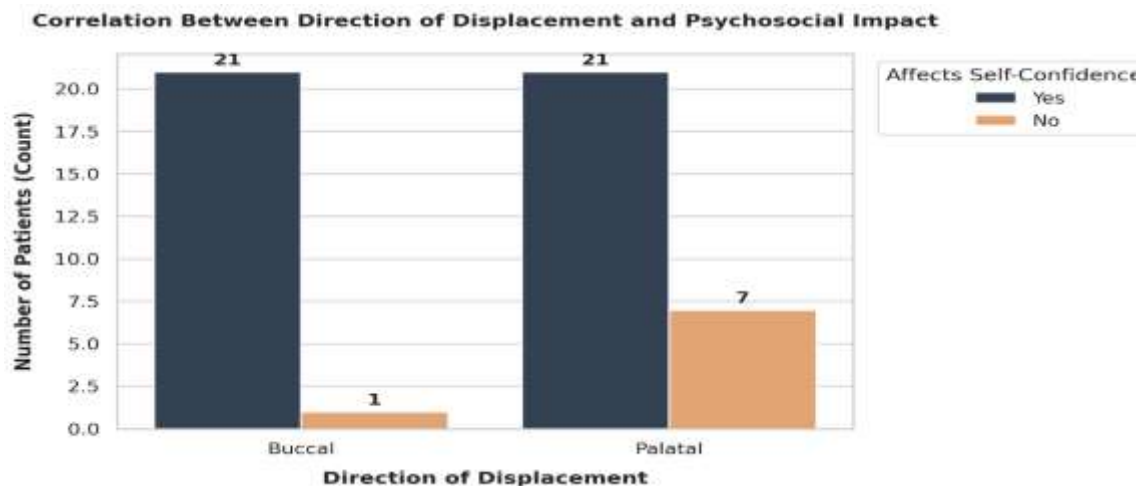


Figure [^]: Comparison of psychosocial impact levels (compromised self-confidence) distributed by buccal and palatal canine malpositions,

Correlation Between Retained Primary Canines & Displacement Direction

To determine whether the prolonged retention of the deciduous predecessor acts as a localized etiological factor that drives the permanent canine toward a specific ectopic eruption path, a Chi-square test of independence was performed. This analysis evaluates

the correlation between the presence of a retained primary canine and the resulting anatomical vector of displacement (Palatal vs. Buccal). Table [٤] presents the frequency distribution and cross-tabulation descriptive data examining the interplay between these two critical clinical variables.

Table [٤] Distribution of Palatal and Buccal Permanent Canine Displacements Based on the Presence of Retained Primary Canines.

Retained Primary Canine	Palatal Displacement (n)	Buccal Displacement (n)	Total Cases
Yes	23	15	38
No	5	7	12
Total	28	22	50

- **Statistical Result:** (Not Statistically Significant, $p > 0.05$).

"An assessment of the association between the retention of primary deciduous canines and the permanent canine's displacement direction yielded no statistically significant correlation ($p = 0.377$). Although retained primary canines were highly prevalent in the overall sample (76.0%), they accompanied both palatal (60.5%) and buccal (39.5%) anomalies without showing a statistically significant preference for either path of eruption."

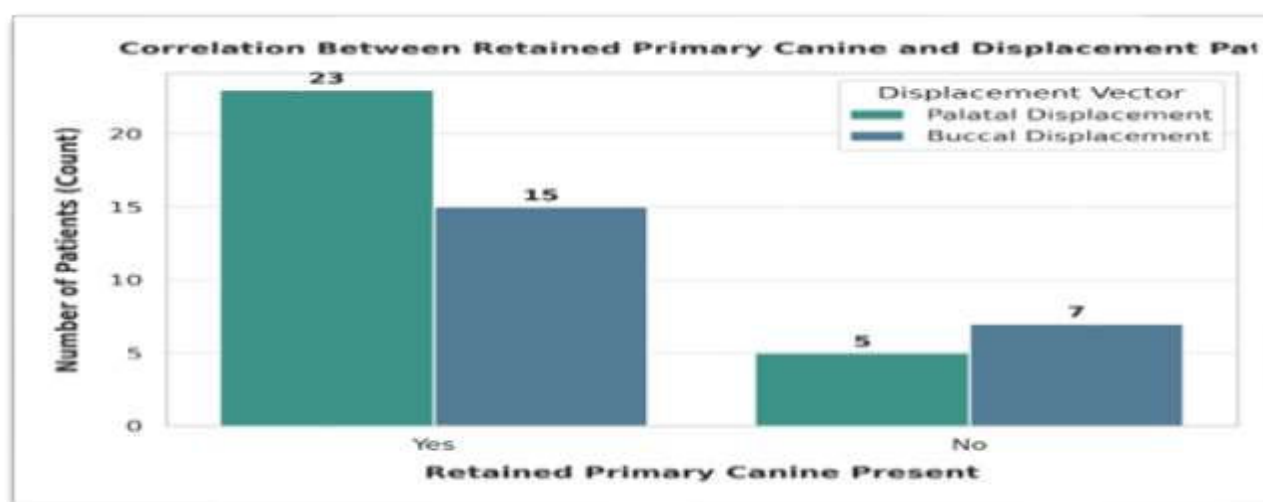


Figure [۲]: Comparison of canine displacement patterns (palatal vs. buccal) in patients with and without retained primary deciduous canines.

To provide a comprehensive statistical overview of the studied variables, Table [۳] synthesizes the results of the Chi-square tests of independence executed across the key clinical parameters. This summary details the correlation strengths using Cramer's V alongside their respective significance levels (p-values) to distinguish between statistically significant associations and non-significant clinical observations.

Table [۳]: Correlation Strengths (Cramer's V) Across Different Clinical and Demographic Variables (n=50).

Correlated Pair of Variables	Statistical Test	Correlation Strength (Cramer's V)	Significance Level (p-value)
Gender and Affected Arch	Chi-Square	0.290	0.040 (Significant)
Displacement Direction times and Self-Confidence	Chi-Square	0.281	0.047 (Significant)
Retained Primary Canine ,times and Displacement	Chi-Square	0.125	0.377 (Non-Significant)

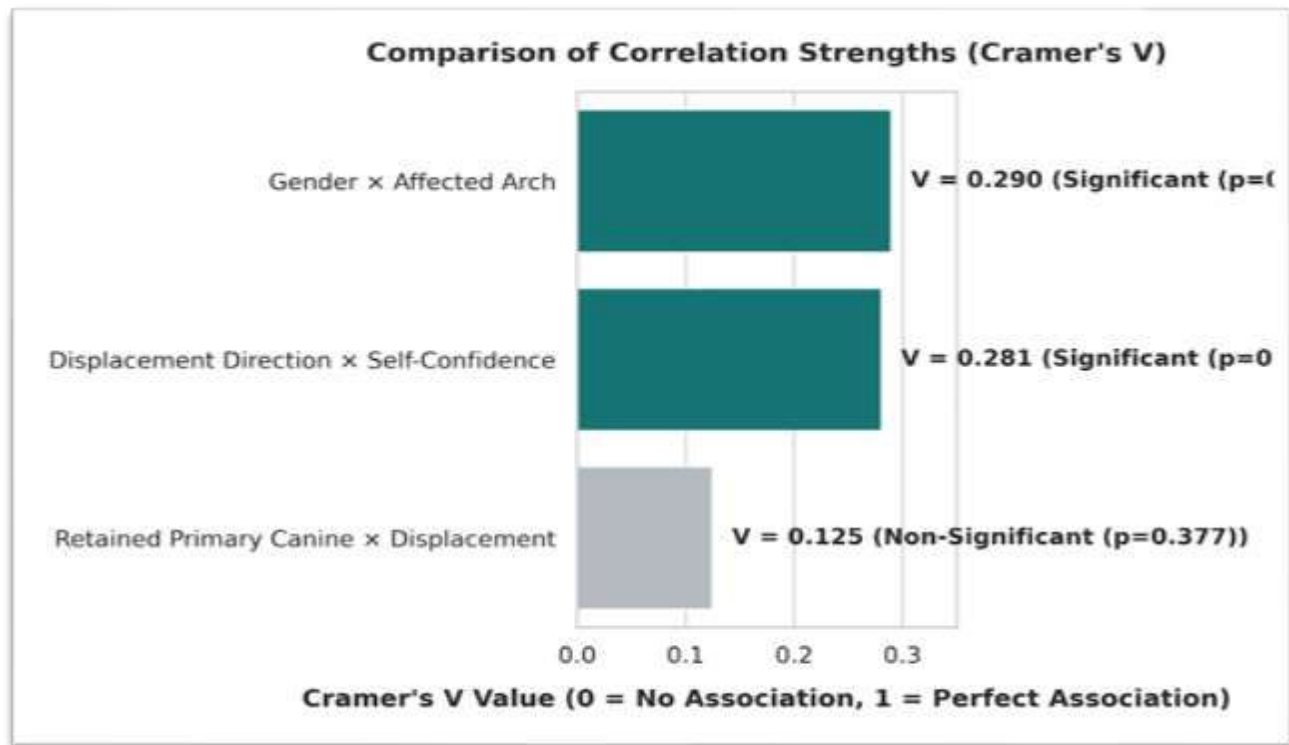


Figure [۳]: Comparison of Cramer's V values representing the association strengths between different pairs of studied clinical variables.

Discussion

The present study demonstrated a significant association between the direction of canine displacement and patient self-confidence. Individuals with buccally displaced canines reported a greater negative impact on self-confidence compared with patients exhibiting palatal displacement. This observation may be explained by the increased visibility of buccally erupted canines during speech and smiling, making the esthetic defect more apparent to both patients and observers.

These findings are consistent with recent studies emphasizing the psychosocial consequences of visible dental irregularities. [12], reported that anterior dental malpositions significantly affect facial attractiveness and self-esteem, particularly among adolescents and young adults. Similarly, [13], found that visible malocclusions negatively influence social interactions and perceived quality of life, highlighting the importance of esthetic concerns in orthodontic patients.

Regarding the association between gender and the affected dental arch, the current study revealed a significantly higher prevalence of maxillary canine anomalies among female

patients. This finding agrees with reports by [16] and [13], who documented a female predominance in maxillary canine impactions. Several authors have suggested that genetic predisposition, craniofacial growth patterns, and differences in dental arch dimensions may contribute to this distribution.

The present investigation also evaluated the relationship between retained primary canines and the direction of permanent canine displacement. Although retained deciduous canines were highly prevalent among the study population, no statistically significant association was detected with either palatal or buccal displacement. This result supports the findings of [17] and [13] and [18], who concluded that retained primary canines may represent a consequence rather than a primary etiological factor of ectopic eruption. Other factors such as genetic influences, guidance theory defects, and localized developmental disturbances may play a more important role in determining the final eruption pathway. The Cramer's V analysis indicated weak-to-moderate association strengths among the statistically significant variables. The strongest association was observed between gender and affected arch ($V = 0.290$), followed closely by displacement direction and self-confidence ($V = 0.281$). These findings suggest that although statistically significant relationships exist, canine anomalies are multifactorial conditions influenced by a combination of biological, genetic, environmental, and psychosocial determinants. Similar conclusions were reported in recent orthodontic literature, where moderate effect sizes are commonly observed despite statistically significant associations. Overall, the present findings reinforce the growing evidence that impacted and malposed canines are not merely anatomical abnormalities but conditions with substantial psychosocial implications. Early diagnosis and timely orthodontic intervention may therefore contribute not only to improved dental function and esthetics but also to enhanced psychological well-being and quality of life among affected patients.

Conclusion

Permanent canine malposition was significantly associated with reduced patient self-confidence, particularly in cases of buccal displacement due to its greater esthetic visibility. Female patients showed a higher prevalence of maxillary canine anomalies, while no significant relationship was found between retained primary canines and the direction of permanent canine displacement. These findings indicate that canine malposition is a multifactorial condition with important psychosocial consequences, highlighting the value of early diagnosis and timely orthodontic management to improve both esthetic outcomes and quality of life.

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Authors' contributions

All authors contributed to the study conception, design, data analysis, and manuscript preparation, and approved the final manuscript.

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Conflicts of interest

The authors declare that they have no conflicts of interest related to this work.

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