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Transmigration of Permanent Canines in South Indian population – A Radiographic Prevalence Study

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ABSTRACT

Aim: To evaluate the total prevalence of transmigrated mandibular permanent canines seen among the South Indian population using panoramic radiographs.

Methods: A retrospective collection of panoramic radiographs of 425 patients from 2022 to 2023 was done. The age of the patients ranged from 15 to 35 years. There were 209 males and 216 females. The criteria for diagnosing transmigrated canine as given in the literature was used to rule out the presence of transmigrated canine. The data obtained was tabulated, and descriptive statistical analysis was performed to estimate the total prevalence.

Results: Among the total of 425 radiographs of the patients evaluated, transmigrated permanent mandibular canines were detected in 8 patients (8/425), showing a 1.88% prevalence. 2.31% of females were affected with transmigration of canines compared to males, having 1.43%. When laterality affected with canine transmigration was estimated, about 75% were detected on the left side, with 25% found on the right. No bilateral presentation of transmigration was observed.

Conclusions: 1.88% of Indian patients exhibited transmigrated canines. Although the frequency of its occurrence is low, dental practitioners should be aware of its existence among the Indian ethnic population to reach at early diagnosis, to render appropriate treatment, and also to avoid complications arising from untreated or undiagnosed transmigrated canines.

Keywords:

Impacted canine; Transmigration; Indian population; Radiographic survey; Unusual dental phenomenon

Introduction

Permanent mandibular canines are teeth of interest to all dental professionals, including all specialities. Permanent canines are most commonly found associated with different dental anomalies or conditions or phenomena such as 'canine impaction,' 'canine ectopic eruption,' 'canine agenesis,' 'canine transmigration,' 'canine transposition,' and 'canine supernumerary' [1-4]. Among these, the transmigration of permanent canines is an uncommon dental condition related to the tooth eruption phenomenon. This clinical entity is characterized by intraosseous movement of the impacted canine from its original position

and crossing the dental midline and found in the contralateral dental arch [5]. The most commonly affected teeth in transmigration are the mandibular canines [6-8]. However, there are some clinical case presentations showing maxillary canine transmigration [9- 12]. Canine transmigration is always an asymptomatic condition accidentally detected following a routine radiographic survey taken for another dental purpose. Cone beam computerized tomography helps to provide specific information about their position, relationship with adjacent structures, and associated pathology. The etiology of this disease has been related to several causes. Literature shows only case reports among different ethnicities [13,14].

But unfortunately, fewer prevalence studies are showing its exact prevalence, type of transmigration, laterality, associated symptoms, and treatment provided [14-20]. Therefore, to evaluate the prevalence of mandibular permanent canines in the context of the South Indian population, the present research investigation was carried out.

Materials and Methods

A retrospective collection of panoramic radiographs of 425 patients who visited the private dental clinic for dental treatment during the period from 2022 to 2023 was done. The age of the patients ranged from 15 to 35 years. The panoramic radiographs were taken for dental treatment purposes.

There were 209 males and 216 females. Radiographs of good quality were considered, and blurred radiographs were excluded to avoid radiographic misinterpretation. Before performing the research study, patient consent was taken to use radiographs for the study. The total prevalence, prevalence of unilateral or bilateral presence, type of the transmigration, gender predilection, and right or left side presence of transmigrated canine was estimated.

Statistical Analysis

The collected data was subjected to statistical analysis using descriptive statistics.

Results

Among the total of 425 radiographs of the patient evaluated, transmigrated permanent mandibular canines were detected in 8 patients (Figures 1-3). Therefore, the prevalence documented was 1.88% (8/425). About 2.31% of females were affected with transmigration of canines compared to males having 1.43%. When laterality affected with canine transmigration was estimated, about 75% were detected on left side with 25% found on the right. No bilateral presentation of transmigration was observed. (Table 1, 2 and 3)

Table 1: Total prevalence of Transmigrated permanent mandibular canines

Total no of patients examined	**425**
No of transmigrated mandibular permanent canines found	**8**
Percentage	**1.88%**

Table 2: Gender wise distribution of permanent mandibular canines transmigrated

Gender	**Prevalence (No & Percentage)**
Male	**3 (1.43%)**
Female	**5 (2.31%)**

Table 3: Arch-wise distribution of Transmigrated permanent mandibular canines

Laterality	**Prevalence (No & Percentage)**
Right (Unilateral)	2 (25%)
Left (Unilateral)	6(75%)
Bilateral	0 (0%)

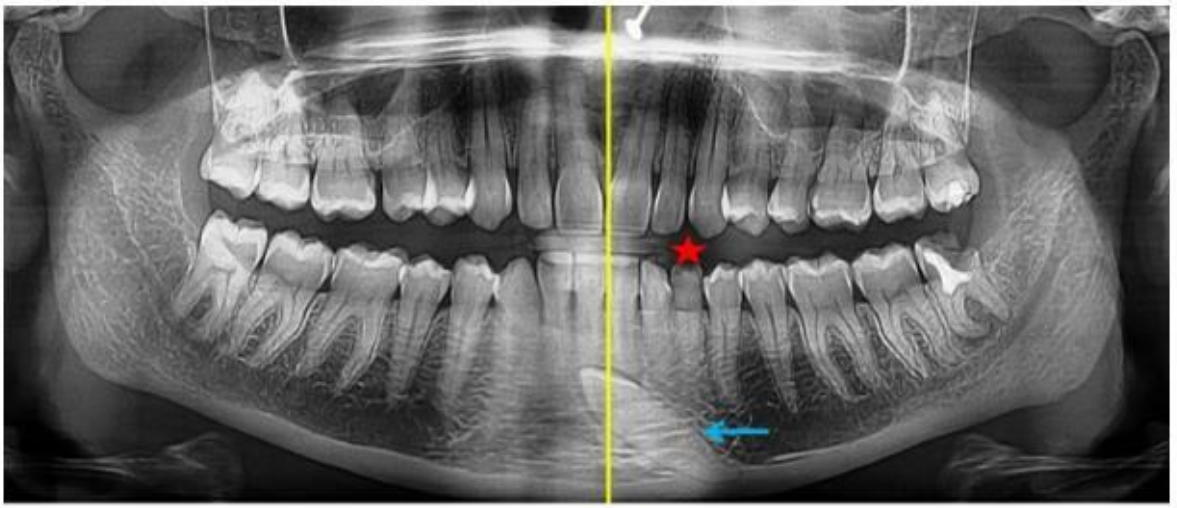

Figure 1: Radiograph showing transmigrated left canine (Type I) (blue arrow) and retained primary left canine (red star)

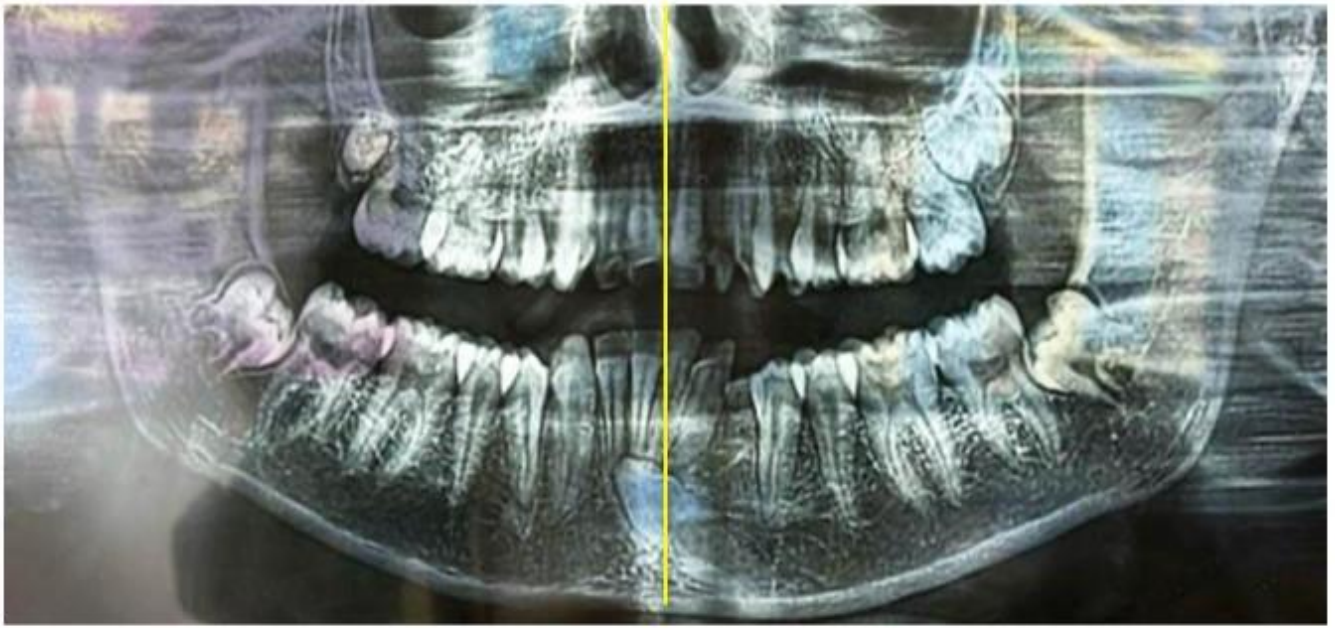

Figure 2: Type I Left canine transmigration

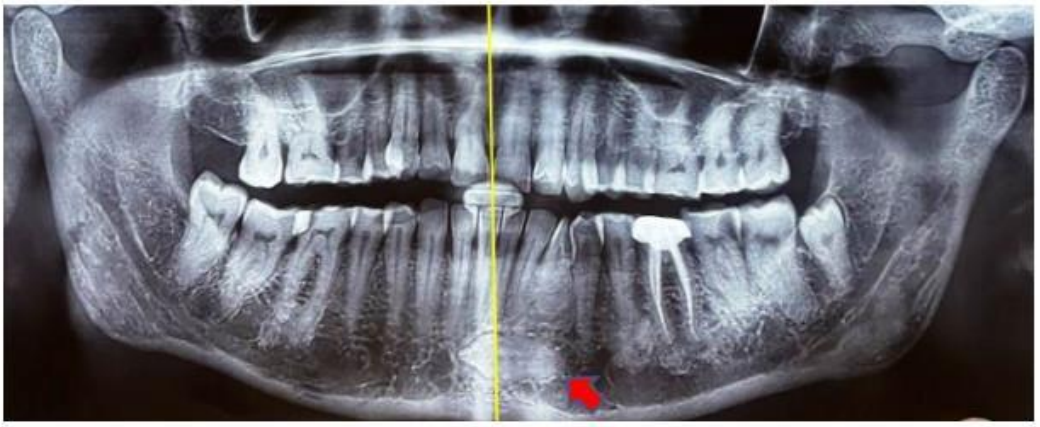

Figure 3: Type II canine transmigration (Red arrow)

Discussion

Mandibular canine impaction and transmigration are rare dental variations and conditions. Due to different positions and angulations oriented in the lower jaw, impacted permanent mandibular canines lose their ability to erupt and tend to transmigrate. A deep quest of literature about mandibular canine transmigration revealed scanty prevalence studies in the dental science [1-3]. Only case reports and case series along with review of literature have been published [4-11]. As a result, it is difficult for the dental practitioner to extract reliable data concerning epidemiological features and diagnostic protocols for transmigrated mandibular canine teeth. In order to overcome these epidemiologic limitations, the aim of the present study was to estimate the prevalence of transmigrated mandibular canines in a sample of the South Indian pediatric and orthodontic population referred to the private dental clinic between January 2023 and December 2023. In the present study, among the total of 425 radiographs of the patient evaluated, transmigrated permanent mandibular canines were detected in 8 patients (Figures 1-3). Therefore, the prevalence documented was 1.88% (8/425) showing variation in prevalence value compared with other studies [1-3]. About 2.31% of females were affected with transmigration of canines compared to males having 1.43%. When laterality affected with canine transmigration was estimated, about 75% were detected on left side with 25% found on right. No bilateral presentation of transmigration was observed.

A recent systematic analysis of transmigrated mandibular canines during the period from 2010 to 2020 exhibited that a total of 503 transmigrated mandibular canines were reported from 53 articles from 19 different countries [1]. Based on the number of articles published, India was in the top position with 22 publications followed by Turkey with eight publications. Based on the number of transmigrated mandibular canines reporting, Turkey ranked the list with 167 teeth, followed by Poland with 99 canines. The frequency of canine impaction in the mandible ranges from 0.92% to 5.1%, based on the results of this study, whereas that of canine transmigration ranged from 0.1% to 0.3% [1].

The quest for literature also reveals that canine transmigration is almost limited to the mandible [3,6,7]. Only fewcountable numbers of individual cases are showing maxillary canine transmigration [4-7]. There is one Indian publication showing maxillary incisor transmigration [12].

Another study carried out by Agastsra [3] evaluated the epidemiology of impacted and transmigrated mandibular canines in a large orthodontic population referred to the University of Turin. Authors used panoramic radiographs, intraoral photographs, and dental casts of 2119 patients referred to the Department of Orthodontics at the University of Turin, Italy, between 1995 and 2022. These patients were divided into two groups. Group A included 1479 patients found in the Dental School archive before 2017, more specifically between 1995 and 2017. These patients were examined in order to calculate the prevalence of impacted and transmigrated mandibular canines. From 2017 to 2022, the records of 640 new patients were examined (GROUP B) in order to calculate the incidence of these occurrences. The results of the investigation showed that the prevalence of mandibular canine impaction in Group A was found to be 1.7%, with a total of 25 patients having mandibular canine impaction. A prevalence of 0.3% was found for mandibular canine transmigration (Group A). In Group B, the incidence of mandibular canine impaction was found to be 2%, with a total of 13 patients with mandibular canine impaction. Mandibular canine transmigration was found in 1 of 640 participants (Group B). From this investigation, authors finally concluded as twenty-five of 1479 patients had impacted mandibular canines, resulting in a prevalence value of 1.7% [3]. The incidence was found to be 2%, with 13 of 640 patients having impacted mandibular canines. Therefore, these results showed higher prevalence and incidence rates of mandibular canine impaction when compared with previously published data [1-3, 14-20].

Kour et al [17] recently conducted a retrospective study to evaluate the prevalence of impacted and transmigrated mandibular and maxillary canines in orthodontic patients.

Demographic details regarding age, gender, and place of

residence were collected from the patients. Evaluation of sample radiographs on the standard light box was performed to collect data regarding impacted and transmigrated canines. Prevalence of impacted canine of 2.46% was found. Impacted canine prevalence of 1.53% and 2.85% was reported in males and females, respectively. Only two female patients had transmigrated mandibular impacted canines. This finding was found contrast with the present study where females frequency was high. Comparison of arch showed a statistically significant higher prevalence in the maxillary arch, which was 1.54%, and in the mandibular arch, it was 0.92%. This study reported significantly more unilateral impactions than bilateral impactions.

In another systematic review performed by Dalessandri et al [1], it was evident that, the incidence of canine impaction in the mandible ranged from 0.92 to 5.1%, while that of canine transmigration ranged from 0.1 to 0.31%. Various etiologies may play a role, including odontomes (20%) and lateral incisor anomalies (16%). Surgical extraction (89 per cent in some studies) and orthodontic traction (20–32 per cent) are the most commonly used treatment strategies, with the latter showing a failure rate of 17 per cent in two studies [2]. In this review authors included a total of 13 studies published between 2001 and 2015 which met all the eligibility criteria. The sample size in these studies ranged from 14 to 112873 teeth, while their methodological quality ranged from low to medium [2]. Other studies revealed a prevalence of mandibular canine impaction of 0.92–1.35% and the prevalence of mandibular canine transmigration has been found to be 0.1–0.76% [1-3, 14-20]. Mupparapu has given classification system for transmigrated mandibular canines [13]. There are no such classification criteria mentioned in the literature for maxillary canines. The reason for this is due to less frequency of maxillary canine transmigration documented in the literature.

Conclusion

The development and occurrence of transmigration of mandibular permanent canine teeth is a rare finding and always detected following routine radiographic examination. Further epidemiologic studies including large sample size and including different ethnic population across the globe is highly warranted to draw out clear and precise clinical presentation, classification system and diagnostic as well as therapeutic guidelines pertaining to transmigration of permanent mandibular canine teeth.

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