

GINGIVAL RECESSION IN DISIMPACTED CANINES - A RETROSPECTIVE STUDY

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ABSTRACT:

Multidisciplinary management is essential when the canine fails to erupt on time. This requires combined surgical and orthodontic intervention. Good periodontal status is necessary for the positive outcome of treatment. Hence the objective of this study was to evaluate the incidence of gingival recession in disimpacted canines. A retrospective study was conducted. Data collection was done through reviewing 86000 patients who had visited a hospital in Chennai from June(2019) to March(2020). A total of 6 patients who had undergone disimpaction of canine were evaluated. Data such as age, gender, site of impaction, presence of gingival recession were noted. The data was analysed statistically through IBM SPSS software. The study group belonged to the age group ranging 13-21. Disimpaction was performed higher among males(66.6%) compared to females. Among the samples, about 57.14% of canines were palatally impacted. No gingival recession was seen in the study sample. The incidence of gingival recession in the disimpacted canines was not statistically significant and did not reach clinical significance due to very less sample size.

KEYWORDS:

Disimpacted canine, Gingival recession, Incidence, Orthodontic management, Periodontal status

INTRODUCTION:

Impaction is a retardation or halt in the normal eruption of the tooth. This can be due to various factors including delayed eruption and primary retention. A canine is considered to be impacted when eruption is interrupted after the root development or when the contralateral root is erupted for at least 6 months with complete root formation(Lindauer *et al.*, 1992). A variety of factors including localised, systemic and genetic, cause interference in the eruption process which may be delayed or complete failure of eruption(Suri, Gagari and Vastardis, 2004)

Prevalence of the maxillary impacted canines is reported to vary from 0.9% to 2.2% and mostly in ectopic position(D'Amico *et al.*, 2003). The proper localisation of the impacted tooth, surgical technique, orthodontic movement/traction force, access and direction for the application of orthodontic forces plays a vital role in determining success of the treatment(Bishara and Ortho, 1992).

Impacted canines are brought into occlusion by surgically exposing the canine either through open approach or closed approach. Though open surgical approach provides increased access and observation to the orthodontist, it is more prone to comprise periodontal status compared to closed surgical techniques(Vanarsdall and Corn, 2004).

The surgical approach should however focus on preserving soft tissue recession and bone loss on the unerupted teeth by combined management of orthodontics and periodontics(Zachrisson and Zachrisson, 1972).

After exposure through surgery, traction is applied in order to move the tooth in any desired direction with a force ranging from 10 to 100g(Proffit, Fields and Sarver, 2006). Following traction, they require extensive treatments which includes rotation, uprighting and occasionally root torque. These forces could have an effect on periodontal status of the disimpacted tooth.

Many studies investigated the periodontal status of disimpacted canines following surgical orthodontic treatment. A study by Frank et al(Frank and Long, 2002) reported greater pocket depth and significantly lower crestal bone height in the impacted canines compared to controls. However, a study by Bass et al(Bass, 1967) stated there was no significant difference in periodontal status between impacted canines and non treated canines.

Previously our team has conducted numerous cross sectional studies(Felicita, Chandrasekar and Shanthasundari, 2012; Rubika, Felicita and Sivambiga, 2015; Pandian, Krishnan and Kumar, 2018), clinical trials(Dinesh et al., 2013; Jain, Kumar and Manjula, 2014; Felicita, 2017b; Samantha et al., 2017; Vikram et al., 2017), in-vitro studies(Ramesh Kumar et al., 2011; Kamisetty et al., 2015; Sivamurthy and Sundari, 2016), case reports(Felicita, 2017a; Felicita and Sumathi Felicita, 2018), literature reviews(Krishnan, Pandian and Kumar S, 2015; Viswanath et al., 2015) over the past 5 years. Now we are focussing on epidemiological studies. Hence in this retrospective study, we studied the incidence of gingival recession in disimpacted canines.

MATERIALS AND METHODS:

Sampling:

This study was conducted in a university setting. The study samples were chosen from the patients visiting a hospital in Chennai from June(2019) - March(2020).

Data collection:

The retrospective study was carried out among patients of all ages who had undergone disimpaction of canines. Data collection was done through reviewing records of 86000 patients between June(2019) - March(2020). Data such as age, gender, site of impaction, presence of gingival recession were noted. The data were cross verified with intraoral photographs.

Inclusion criteria:

Patients who had undergone disimpaction of buccally or palatally impacted canines and in under orthodontic management were included in this study.

Exclusion criteria:

Cases that require premolar extraction and patients with ankylosis were excluded from this study. Incorrect and censored data were also excluded.

Ethical approval:

Ethical clearance was obtained from the Institutional Ethical Committee and Scientific Review Board (SRB) of the University(SDC/SIHEC/2020/DIASDATA/0619-0320).

Data analysis:

The data collected was entered in an Excel sheet. Data analysis was done through frequency tests using SPSS software.

RESULTS AND DISCUSSION:

A total of 6 patients underwent disimpaction and orthodontic management from June(2019) to March (2020). Among them, 66% of the patients were males and 40% were females(Graph 1).

All patients belonged to age groups ranging 13-21(Graph 2). In this study, 50% of disimpacted teeth were maxillary right canines (13), 33% were maxillary left canines(23) and 16% of the disimpacted teeth were mandibular right canines(43)(Graph 3). Among them 57.14% of the canines were palatally impacted and 42.86% of the canines were buccally impacted(Graph 4). Higher incidence of palatal impaction(28.57%) was reported in both genders and buccal impaction was seen relatively lesser among females(14.29%). However, this finding was not statistically significant(Graph 5).

No gingival recession was seen in the study population. In our study, 3 canines were disimpacted through open flap technique (50%) and 3 were disimpacted through closed flap technique.

Alignment of disimpacted canines by the means of surgical exposure of the impacted teeth followed by the use of fixed orthodontic appliances is the common method of treatment for these cases. This process requires increased force which is applied through fixed appliances may cause chronic inflammation of the periodontal margin (Zachrisson and Zachrisson, 1972; Frank and Long, 2002) which may induce major periodontal diseases at later age.

Relocation of the impacted canines in the dental arch through the surgery involves two techniques: open and closed techniques. The closed technique involves surgical uncovering of the tooth and bonding an attachment onto the exposed tooth. The palatal flap is then repositioned and sutured. Orthodontic traction is applied after the initial healing. Open technique involves surgically uncovering the canine tooth, but instead of bonding an attachment on the exposed tooth at the time of the surgery, a window of tissue is removed from around the tooth leaving it exposed. Then the tooth is left to erupt naturally, or an orthodontic attachment is placed to enable the tooth to be moved into the dental arch (Levin and D'Amico, 1974). Many studies have reported that impacted canines with apically positioned flap or open technique had decreased duration of initial alignment and reduced risk of ankylosis but had periodontal impacts compared to closed technique(Becker et al., 2016; Incerti-Parenti et al., 2016; Cassina, Papageorgiou and Eliades, 2018; Mummolo et al., 2018).

In the present study, within the span of 9 months, 6 patients have undergone disimpaction of canines and its orthodontic management. Permanent maxillary canines are the second most frequently impacted teeth with the prevalence rate of 1-2% in the general population. The incidence of canine impaction is more common and twice than that of mandibular canine impaction(Bass, 1967).

Canines are considered to be the cornerstones of mouth as they are essential in mastication of food(Nelson, 2014). Maxillary canines are known to be the tooth with a long span of eruption. Any displacement or hindrance from its normal path causes the impaction of canines(Brook, 2009). In the present study, the prevalence of impacted maxillary canines was 83.3% and mandibular canines was 16.7%. Previous study by Thilander et al(Thilander and Myrberg, 1973) reported that incidence of maxillary canine impaction was about 20 times higher than that of mandibular canine impaction.

In the present study, unilateral canine impaction was more prevalent among the study population. This is in accordance with several studies by Aydin et al(Aydin, Yilmaz and Yildirim, 2004), Sajnani et al(Sajnani and King, 2014) and Nagpal et al(Nagpal *et al.*, 2009). However a study by Bass et al(16) reported that bilateral impaction of canines were more usual than unilateral impaction.

In the present study, palatal impaction was more prevalent compared to buccal impaction. A study by Peck et al(Peck, Peck and Kataja, 1994) reported higher prevalence of palatal impaction in European population. However some previous studies reported higher prevalence of buccal impaction in Asian populations(Zhong *et al.*, 2006; Kim, Hyun and Jang, 2012). In another study by Ericson et al reported that 50% of the ectopically positioned canines were in palatal position, 39% in buccal position and 11% in apical to adjacent incisors(Ericson and Kuroi, 1988). The prevalence and incidence is contrary with different populations.

In the present study, there was no presence of gingival recession in the disimpacted canines. This is in accordance with studies conducted by Parkin et al(Parkin *et al.*, 2013) and Bollero et al(Bollero *et al.*, 2017) who reported no significant differences in periodontal status of disimpacted canines without any incidence of gingival recession. However, a study by Zasciurinskiene et al(Zasciurinskiene *et al.*, 2008) showed incidence of gingival recession with less mean values and insignificant differences with control teeth. A study by Sorel et al(Sorel and Glez, 2010) reported the similar findings with the incidence of gingival recession.

Limitations:

The study has several limitations. Since this is a retrospective study, the sample size is very less and is limited to certain geographical locations. Hence, cohort studies with larger sample size with inclusion of other parameters such as probing depth, bleeding index, gingival width etc. should be carried out for future scope.

CONCLUSION:

Within the limitations of this study,the incidence of gingival recession was not seen among the patients who had undergone canine disimpactions. Delayed eruption of canine is one of the most common problems addressed during orthodontic treatment. A well planned multidisciplinary approach is necessary for the successful outcome of such cases. Since the study contains less sample size, cohort study including larger geographical location is needed to infer the effect of disimpaction.

AUTHOR'S CONTRIBUTION: All authors contributed to the design and implementation of the research, analysis of the results and to the writing of the manuscript.

CONFLICT OF INTEREST:

The authors declared that they have no conflicts of interest.

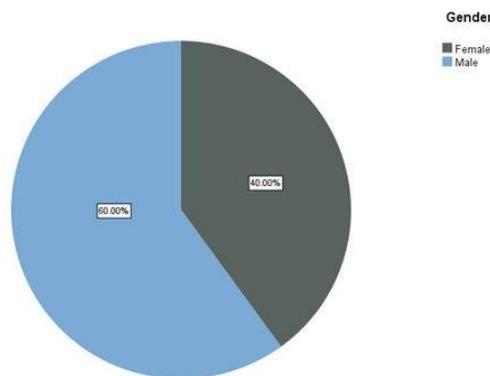
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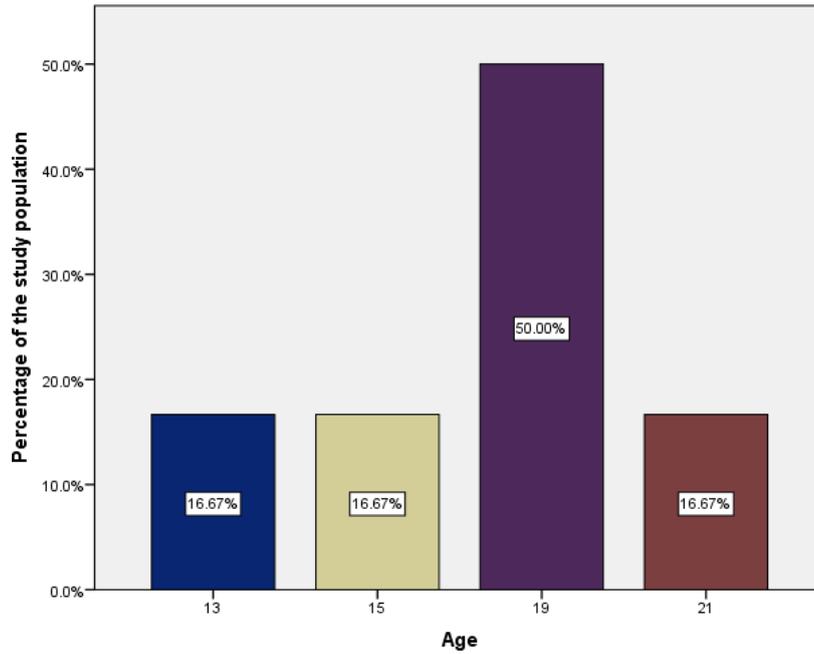
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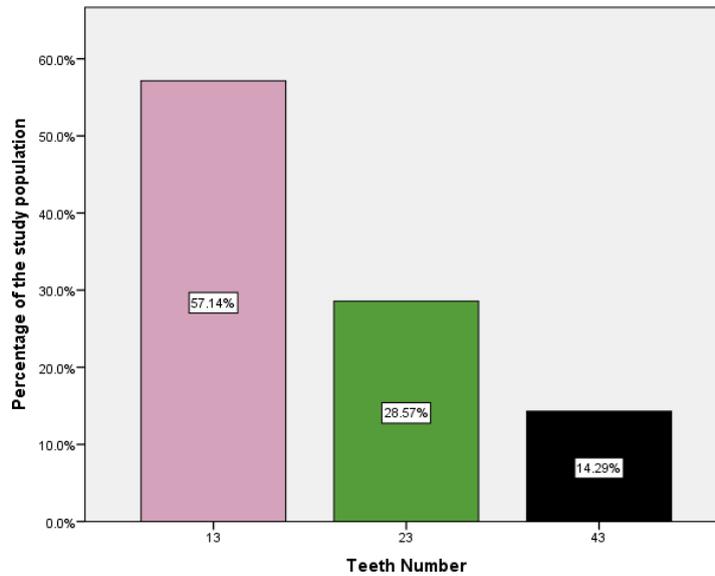
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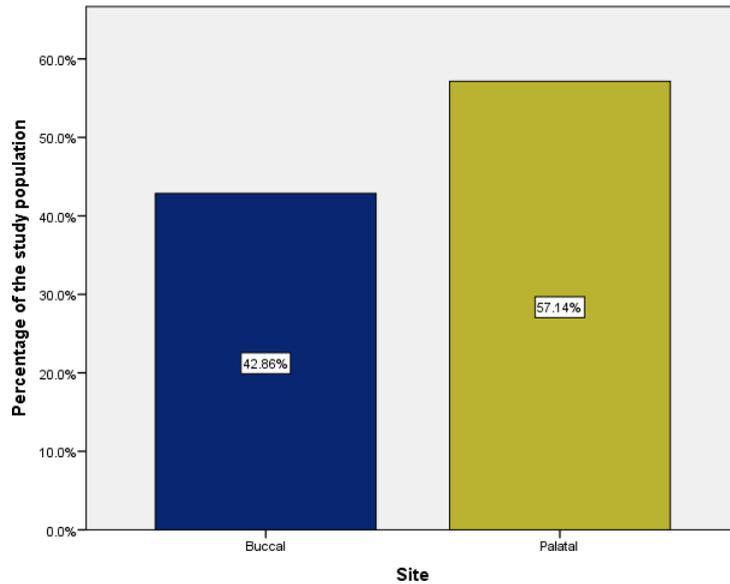
Graph 1: Pie chart shows the distribution of the study population based on gender. Canine disimpaction was done more on males(60% -blue) than females(40% - grey).



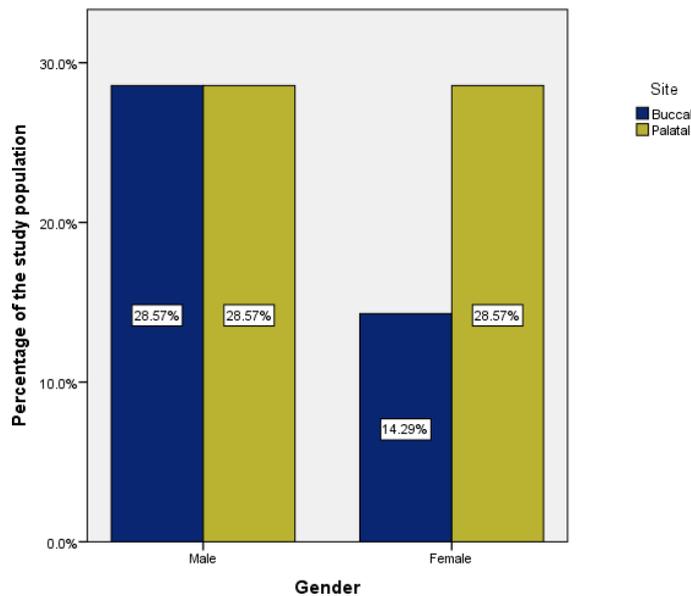
Graph 2: Bar chart shows the distribution of the study population based on age group. X-axis shows the age distribution and Y-axis shows the distribution of the study population in percentage. Majority of the study population who had undergone canine disimpaction treatment belong to 19 years(40% - violet).



Graph 3: Bar chart shows the distribution of the study population with disimpacted canines based on tooth number. X-axis shows the teeth number and Y-axis shows the distribution of the study population in percentage. Majority of the study population underwent disimpaction in 13(57.14% - pink)



Graph 4: Bar chart showing the distribution of the study population based on the site of canine impaction. X-axis shows the site of canine impaction and Y-axis shows the distribution of the study population in percentage. Majority of the study population had impacted canines in the palatal aspect(57.14% - yellow).



Graph 5: Bar chart showing the distribution of the study population who had undergone canine disimpaction based on gender associated with the site of impaction. X-axis shows the gender distribution and Y-axis shows the distribution of the study population in percentage based on the site of canine impaction. Higher incidence of palatal impaction(28.57% - yellow) was reported in both genders and buccal impaction was seen relatively lesser among females(14.29% - dark blue). However, this finding was not statistically significant (Chi square test; $\chi^2=0.194$, $df=1$, $pValue=0.659(>0.05)$)