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# Root morphology of maxillary and mandibular third molars - A potential cause for trans alveolar extractions

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ABSTRACT

Maxillary and mandibular third molars with dilacerated root forms and curvature play a significant role in the treatment planning regarding whether the tooth can be extracted normally or go for trans alveolar extraction. The aim of this study is to assess the association of root curvature and trans alveolar extraction of upper and lower third molars. Preoperative assessment reduces the surgical difficulty and is fundamental for treatment planning and extraction of impacted third molars. We reviewed the case records of the patients who underwent trans alveolar extraction and analysed the data of 94 patients from June 2019 to March 2020 and was tabulated in excel. The data analysis was done in SPSS by IBM, and output was generated as bar charts. In this study, we observed that out of the total 94 trans alveolar extraction performed, 50% of the incidence was below 45 years out of which dilacerated roots were present in 28.7% cases. Results were tabulated and represented as bar charts.so within the limitations of the study we observed that root morphology did not have a significant role in deciding about the treatment whether the teeth will go for open or transalveolar extraction.

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## INTRODUCTION

Surgical removal of mandibular third molars is one of the most common surgical events (Renton *et al.*, 2001). That is why in spite of the diversified demand of practice, many dental surgeons will need to face the problem of removal of impacted mandibular third molars (Akinwande, 1991). Both the patients and dentist must therefore have scientific evidence-based information answering the estimated level of the surgical difficulty of every case (Santamaria and Arteagoitia, 1997; Jain *et al.*, 2019). Generally, the third molar eruption is between the ages of 17 and 21 (Jesudasan *et al.*, 2015). Administration of proper dental care to patients must be based on precise recognition of oral lesions (Kumar and Rahman, 2017). Third molars are the most common teeth that are getting impacted among all molars. The reason for the extraction could be due to impaction or the potential complications causing damage to the adjacent teeth or the involved

tooth itself. Impaction is a cessation of an eruption of a tooth caused by a physical barrier or ectopic positioning of a tooth (Rao and Kumar, 2018). An impacted tooth is one that is partially erupted or unerupted and which will not assume a normal arch relationship with other teeth and tissues (Harsha, 2014; Christabel *et al.*, 2016). Alterations in the morphology of permanent teeth following trauma to their predecessors is a challenging task for diagnosis, and it may require advanced imaging techniques (Mahesh *et al.*, 2014; Patturaja and Pradeep, 2016).

Developmental dental anomalies are an important category of dental morphological variations. Abnormalities in the size of the tooth, and shape, and the structure is a result of disturbances, while impaction of tooth results from disturbances during development in the eruption pattern of permanent dentition (Harini and Don, 2019). It leads to difficulty in mastication, speech, and swallowing (Patil *et al.*, 2017; Packiri, 2017). The physiology of root formation and tooth eruption is a complex process. The root formation is initiated by the derivatives of the enamel organ (Pulikkotil *et al.*, 2018). Failure in invagination of these derivatives may result in morphologically disturbing roots. The tooth development begins at about the sixth week of intrauterine life and occurs in several stages (Jeevanandan *et al.*, 2012). Dilaceration is a rare disturbance in traumatized permanent teeth and constitutes about 3% of the total injuries to the developing teeth (Marimuthu, 2018). It is defined as an angulation or sharp bend or curve in the linear relationship of the crown of a tooth to its root (Sharma, 2014).

Studies which deal with the pattern and etiology of trauma vary from place to place based on the region, laws enforced, and attitude of the people in that region (Kumar and Sneha, 2016; SanthoshKumar, 2017). Etiology is multifactorial and has a psychological component involved (Kumar and Sneha, 2016). Bruxism can affect both Temporo Mandibular Joint (TMJ) and masticatory muscles. Bruxism destroys healthy dentition, exacerbates periodontal disease, causes Temporo Mandibular Disorder (TMD) and ultimately leads to headaches and facial pain (Kumar, 2017). Dental anxiety and anxiety-related avoidance of dental care create significant problems for patients and dental practitioners. Patients with dental fear tend to go to the dentist only when there is pain. This, in turn, results in exacerbation of their anxiety (Rahman and SanthoshKumar, 2017). It was found that dental anxiety was ranked fifth among the most commonly feared situations (Abhinav *et al.*, 2019). Pharmacologic modalities like sedation can be used for reducing anxiety and pain related to the treatment in indicated patients (SanthoshKumar, 2017; Abhinav, 2019).

Peterson et al. defined transalveolar extraction as the surgical or open extraction technique that was fractured during the routine extraction of teeth and cannot be extracted by the closed method for a variety of reasons (Peterson, 2012). The main objective of the study is an assessment of curvature of upper and lower third molars and their prevalence for trans alveolar extraction.

## MATERIALS AND METHODS

The present study was carried out in the Department of oral and maxillofacial surgery after receiving ethical clearance from the Institutional Review Board of the institution. Incomplete data was managed by excluding the data without notes. Data were retrieved from the case records of patients who visited the Department of oral and maxillofacial surgery from June 2019 to March 2020 at a Dental College and Hospital. Out of the 325 patients whose data was obtained, only 94 who fulfilled the inclusion and exclusion criteria were included in the study. Data were statistically analysed using SPSS version 20.0. The Chi-square test values were used to compare data and distributions at a 0.05 level of statistical significance. All retrospective studies arising from the Dias Data set between 01 June 2019 and 31 march 2020 will be covered by the following ethical Approval number. SDC/SIHEC/2020/DIASDATA/0619-0320.

## RESULTS AND DISCUSSION

In this study, we observed that out of the total 94 trans alveolar extraction cases, 50% of patients were below 45 years. Gender wise; males are 45.7%, and females are 54.27%. (Figure 1), The X-axis represents gender and the Y-axis represents the number of patients. The graph shows a higher percentage of female participants with 54.2%(51)compared to males with 45.7% (43). Blue bar represents male distribution and red bar represents female distribution.from the table it is evident that the distribution of females is more when compared to males

In this study, all the patients were divided into 5 age groups as follows:

In the age group of 18-25 years,18 patients were included, in the 25-35years age group, there were 36 patients included, in the 35-45 years age group there were 24 patients, and in 45-55 years there were 12 patients, only 4 patients have been enrolled in 55 and above age groups. Results showed that the pres-

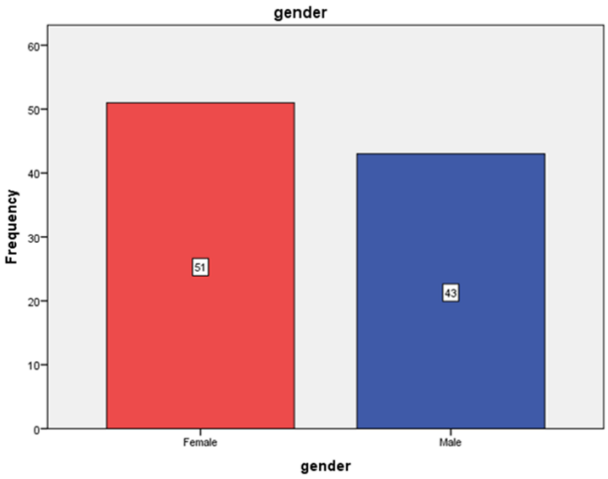


**Figure 1: The distribution of study participants based on gender.**

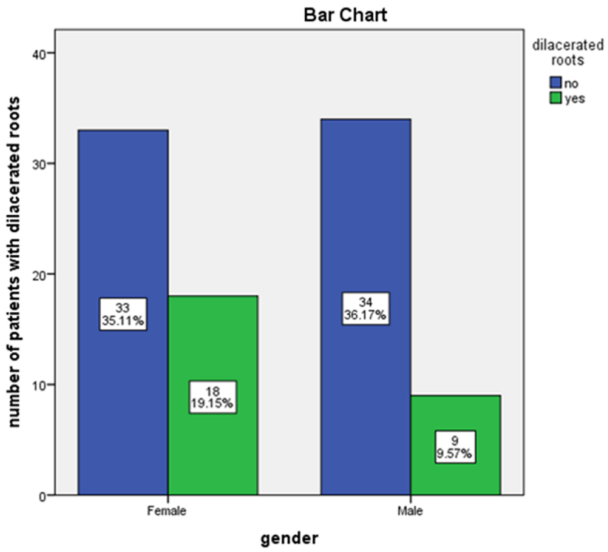


**Figure 2: The correlation between Gender.**

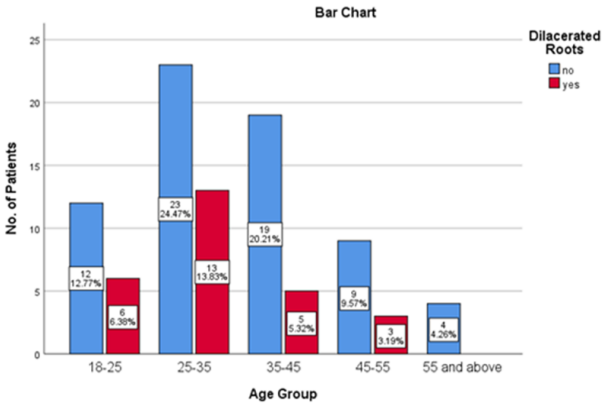


**Figure 3: The association between age groups and no. of dilacerated roots.**

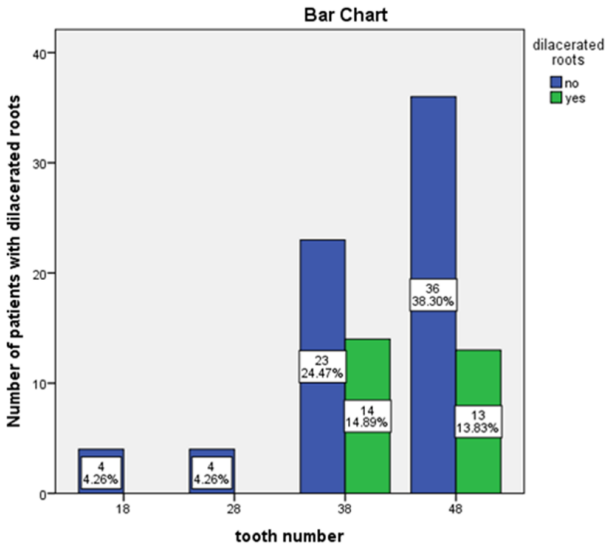


**Figure 4: The correlation between tooth number and no. of patients with dilacerated roots.**

ence of dilacerated roots leading to trans alveolar extraction was more common in the age group of (25-35), and the least common was in the age group of 55 and above. Tooth number;18=4.3%, 28=4.3%, 38=39.4%,48=52.1%. Pertaining to the presence or absence of dilacerated roots - Present= 28.75%, absent = 71.3%.

### Association of dilacerated roots with gender

Results obtained shows that females have more predilections than males. (X-axis) and the Y-axis represents no. of patients with dilacerated roots. Blue colour denotes the absence of dilacerated roots, Green colour bar denotes the presence of dilacerated roots and the blue bar represents the absence of dilacerated roots. From the table, it is evident that the prevalence of dilacerated roots is more among females, but it is not statistically significant. Chi-square test is done, p-value -0.125 (>0.05), which shows that the finding is not significant statistically (Figure 2). Yamokha et al. showed that angled roots occur more frequently in women with incomplete impact than in those with full eruption. Female gender has a high prevalence of having dilacerated roots (Yamaoka, 2001). Taurodontism, dilacerations and supernumerary teeth were more common in men, while impacted teeth, microdontia and gemination were more common in women. The prevalence of dental anomalies was higher in patients under 20 years old compared with those over 20 years (Kumar, 2020).

A. Dilaceration of the roots was the most prevalent (16.48%) (Figure 4) encountered followed by peg-shaped lateral incisors (7.41%) and congeni-

tally missing teeth (4.07%). X-Axis represents tooth number with the Presence or Absence of dilacerated root and Y-axis represents no. of patients. Blue colour denotes Absence of dilacerated roots. Green colour denotes the presence of dilacerated roots. It is evident from the graph that tooth number 38 is more prevalent with the presence of dilacerated roots (14.89%).

Chi-square test was done which revealed P-value - 0.184 (<0.05) statistically not significant.so the teeth number, whether it is any third molars, does not have a statistically significant relationship with a patient with dilacerated root (Bhuyan, 2017).

Chi-square test applied which showed that the resultant p-value was 0.125 (*p* value>0.05) therefore, it is statistically not significant. Our study showed that the insignificant association might be due to the reduced sample size. Study results showed that gender doesn't play a significant role in the etiology of transalveolar extraction.

**Association of dilacerated roots with age**

In this study, all the patients were divided into 5 age groups as follows:

In the age group of 18-25, there were 18 patients reported 25-35, there were 36 patients reported, in the 35-45 age group there were 24 patients and 45-55 there were 12 patients only 4 patients had been enrolled in 55 and above age groups. Results showed that the presence of dilacerated roots leading to trans alveolar extraction was more common in the age group of (25-35), and the least common was in the age group of 55 and above (Figure 3), The X-axis represents the age group with the presence or absence of dilacerated roots and Y-axis represents, no. of patients.

Blue colour denotes the absence of dilacerated roots and Red colour denotes the presence of dilacerated roots. From the graph, it is evident that the dilacerated root is more in the 25-30years age group [13.83%]. Chi-square test done, P-value - 0.467 (p > 0.05), Hence statistically not significant. Study results are in coincidence with previous literature. Emre bodrumullu et al. showed that angled roots occur more frequently in women with incomplete impaction then in those with full eruption.

He showed that root dilaceration was more frequent in the 36 to 45 years of age, but no significant difference was found between the age groups for root dilaceration (Bodrumlu *et al.*, 2013). Chi-square test was applied, which showed that the resultant p-value is 0.467 (*p* value>0.05) therefore statistically, the finding is not significant, which may be due to lesser sample size. The results obtained in this study showed that there is no significant role for age in the transalveolar extraction.

**Association of teeth number with dilacerated roots**

In the present study, dilacerated roots were found only in 38 and 48 (Figure 4). The oldest and most proposed etiology for dilaceration in trauma to the deciduous tooth when a calcified segment of the underlying permanent tooth (Yassin and Rihani, 2006). Our study shows that there is no significant value. Chi-square test applied, which showed that the resultant p was 0.184 (*p* value>0.05) therefore, not statistically significant. Study results imply that dilacerated roots of upper third molars don't play a significant role in the reasons for transalveolar extraction of the same. This can be due to the reduced sample size.

**Limitation of this Study**

The limited population was covered. It was a Unicentred study. Other indicative factors for transalveolar extractions and postoperative complications were not noted.

**Future scope of the study**

A study with a larger sample size representative of the different sections of people with varying root morphologies will help us in acquiring baseline data of South Indian Population.

## CONCLUSION

Therefore, root morphology has a pivotal role in deciding the treatment plan for oral surgical procedures. We observed in our study, that root morphology did not have a significant role in deciding the treatment which contradicts the existing literature, but this may be due to less sample size and lesser duration of the study and also may be due to advances in surgical treatment techniques.

**Conflict of Interest**

The authors declare that they have no conflict of interest for this study.

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