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RESEARCH ARTICLE

PATTERN OF PERMANENT FIRST MOLAR TOOTH LOSS AMONG CHILDREN AGED 6 TO 14 YRS IN PATNA, BIHAR – A RETROSPECTIVE STUDY

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ABSTRACT

Introduction: Permanent first molar is the first tooth to erupt in the oral cavity when the child is about six years old. It stays in the mouth for longer period and plays an important role in the growth and development of the jaw and occlusion which subsequently maintain the overall health of the dentition. Loss of this tooth due to either caries or periodontitis at the very early stage of life leads to progressive destruction of remaining teeth. **Materials & Methods:** A retrospective cross sectional study was conducted at Department of pediatric dentistry Buddha institute of dental sciences & hospital in Patna, Bihar (India) to find out the demographic pattern and reasons for the loss of permanent first molar tooth in children. The data were procured from hospital records of all children aged 6 to 14 yrs who had visited the Paediatric dentistry department between the year 2013 and 2015. **Results:** A total of 292 first permanent molar were extracted among children over a period of 2 years (2013- 2015). It is found that majority of the mandibular left 1st permanent molar (155 or 53.08%) were extracted followed by mandibular right 1st permanent molar (64 or 21.92%) where as only (40 or 13.7%) upper right 1st permanent molar & 33 (11.3%) upper left 1st permanent molar were extracted. The results showed that the mandibular arch is more prone to tooth loss due to caries. **Conclusion:** It was concluded that Left mandibular permanent first molar is the most common tooth among the first molars to show high mortality rate. Majority of the permanent first molar tooth loss is seen after the age of 10 yrs. The percentage of permanent first molar tooth loss increases with increasing age.

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INTRODUCTION

Early tooth loss creates masticatory problems and end up with poor aesthetics which affect the quality of life of any population. It is generally believed that tooth loss in young adults is mainly caused by dental caries; whereas periodontitis, as a cause of tooth loss, become more prominent after the age of 35 to 40 years (Richards, 2005; Chestnutt, 1993 and Reich, 1993). Surveys on the causes for tooth loss in many countries have been conducted and have produced some controversy regarding the main reason for tooth loss. Many studies suggested the reasons to such tooth loss are the dental caries, periodontitis, orthodontics, trauma and prosthetic treatments (Bratu, 2005; Chafaie, 1999 and Morita, 1994). Dental caries is a multi-factorial disease involving various factors such as diet,

microorganisms, tooth morphology, saliva as well as genetic pre-disposition. Apart from these, other related factors such as social, environmental and cultural factors are also responsible for the loss of Permanent first molar (FPM) tooth. Permanent first molar usually erupt when a child is about six years of age. They are considered to be the most important permanent teeth because of their numerous roles in the development and maintenance of the occlusion (Răducănu, 2002 and Druo, 1998). The important role of these teeth in the correct development of the adult dentition can be compromised by their vulnerability to dental caries and developmental structural defects which, without treatment, can lead to their progressive destruction. The first permanent molar tooth has been quoted as the most caries-prone tooth in the permanent dentition (Skeie, 2006). Understanding the pattern and the causes for tooth loss in a population is important for the development of dental health services. Surveys to determine the reasons for tooth extraction have been carried out in many countries. Most

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of these surveys were similar as they investigated the amount of tooth loss, the reasons behind extraction, and the distribution of tooth loss according to age, gender and tooth type.^{10,11} Oral health surveys gives an idea about the population’s oral health status, treatment needs as well as provides baseline information to establish oral health plans as per the actual needs of their population (Oral health surveys basic method, 1997). Despite the significant improvements that have been made in oral health, tooth loss still remains a dental public health problem. Tooth loss is the basic indicator of failure or success in the dental community health programs (Brodeur, 1996). The motives of the present study is to find out the pattern of permanent first molars tooth loss among children aged 6 to 14 yrs in Patna, Bihar (India) through retrospective method.

MATERIALS AND METHODS

This is a retrospective, cross- sectional study. Hence all the data were procured from the hospital records maintained at Department of pediatric dentistry Buddha institute of dental sciences & hospital in Patna, Bihar (India). All children older than six years and younger than fifteen years who had undergone extraction of at least one permanent first molar

were included in the study. Finally, 292 children aged 6 to 14 years were selected for final analysis. Prior to scheduling the survey, official permission was obtained from head or concerned authority of the Buddha institute of dental sciences & hospital. The proposed study was reviewed by the ethical committee of Buddha institute of dental sciences and hospital. A specially designed data sheet was prepared to note down all the required and relevant general information like age, gender and site of the extracted tooth. The data collected from patient’s record were tested statistically. The chi-square test (χ^2) was used for the assessment of differences among different groups (Age, Gender and Site) and p-value of less than 0.05 was considered as statistically significant.

RESULTS

In the present study a total of 292 first permanent molars were extracted among children over a period of 2 years (2013-2015). It is found that majority of the mandibular left 1st permanent molar (155 or 53.08%) were extracted followed by mandibular right 1st permanent molar (64 or 21.92%) where as only 40 (13.7%) upper right 1st permanent molar & 33 (11.3%) upper left 1st permanent molar were extracted (Figure 1). In the present study majority (27.74%) of the 1st permanent molar

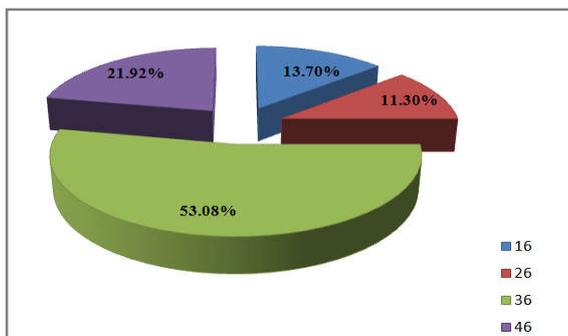


Fig. 1. Site distribution of permanent first molars mortality

<i>Tooth no. 16</i>	<i>Maxillary Right permanent first molar tooth</i>
<i>Tooth no. 26</i>	<i>Maxillary Left permanent first molar tooth</i>
<i>Tooth no. 36</i>	<i>Mandibular Left permanent first molar tooth</i>
<i>Tooth no. 46</i>	<i>Mandibular Right permanent first molar tooth</i>

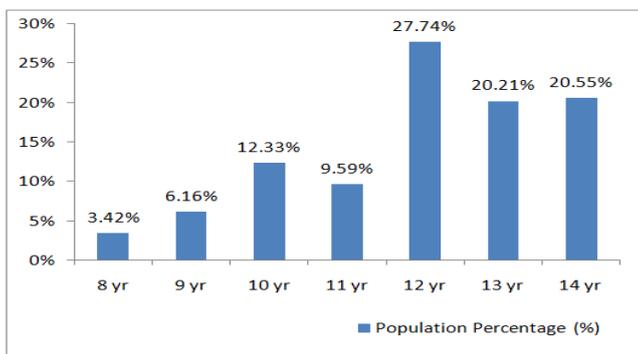


Fig. 2. Association between the first permanent molar mortality and age of patients

Table 1. Association between the 1st permanent molar mortality and gender of patients

Gender	Permanent First Molar				Total
	16 (Right maxillary)	26 (Left Maxillary)	36 (Left mandibular)	46 (Right mandibular)	
Male	25 (8.56%)	20 (6.85%)	92 (31.51%)	38 (13.01%)	175 (59.93%)
Female	15 (5.14%)	13 (4.45%)	63 (21.58%)	26 (8.90%)	117 (40.07%)
Total	40 (13.70%)	33 (11.30%)	155 (53.8%)	64 (21.92%)	292 (100%)

$\chi^2 = 0.986$ (non significant)

extraction were seen in the children aged 12 years followed by 14 years old children (20.55%) and 20.21% in 13 years old. First permanent molar tooth loss is found very minimal at the age of 8 years (3.42%) and none of the children aged 6-7 years had 1st permanent molar extractions because the 1st permanent molar erupts around 6-7 years of age (Graph 2). In the present study, majority of 1st permanent molar mortality is found among males (59.93%) than female (40.07%). It has been found that the majority of males (31.51%) and females (21.58%) had their lower left 1st permanent molar extracted followed by lower right 1st permanent molar tooth (13.01% among males and 8.90% among females) (Table 3).

DISCUSSION

In the modern era one may feel blasphemous in a state of being lost Permanent first molar tooth at a point when the whole world viewing health convincingly as multi-dimensional element. This is so because the permanent first molar teeth are considered to be most important teeth in the dentition and they formed the pillar of the developing occlusion. Majority of the chewing processes are completed by this set of teeth. So, losing this tooth means a potential blow in the normal physiological activity of the oral cavity. Many studies (Kalyanpur, 2011) proved that the permanent first molar tooth being the first permanent tooth to erupt is exposed early to various kinds of micro-organisms and is more prone to tooth decay. Beside caries the other reasons for the extraction of Permanent first molar tooth are, periodontal disease, impaction, orthodontic reasons and for prosthetic purposes (Gossadi, 2015 and Baginska, 2014). Some studies suggested that periodontal diseases are the most common reason for tooth extraction, while others reported that deep carious lesions are highly linked with tooth extraction.^{16,17} Based on these studies, one can conclude that teeth extractions generally occur in older adults due to advanced periodontal diseases and in adolescents and children they generally occur due to incurable caries.¹⁸ Cliff of realization regarding the importance of this tooth will not be achieved unless proper survey is done among the young generation with appropriate motivation.

The present study was conducted as an attempt to assess the prevalence of loss of permanent first molar tooth using the records of all patients who had visited in the department of oral surgery of Buddha Institute of dental science and hospital (Patna) The results showed that the mandibular arch is more prone to tooth loss due to caries (Figure 1). This can be logically explainable as the Mandibular first molar possesses developmental grooves and pits which favor food lodgement and provides good environment for bacterial activity. The result is similar to the study done by Al-Emran in 1994 among Saudi Arabian school children. However their predilection is mostly on the right side (Al-Emran, 1990). Most of the permanent first molar extraction was seen after 10 years because the tooth is exposed to the oral environment for 3-4 years in oral cavity after eruption and would have exposed to acidic challenge in the oral environment for longer period (Graph 2). The result of present study in terms of age is similar to the study done in Romanian children by Raducanu *et al* (Răducanu, 2002) in 2009. Although Table-2 showing increasing pattern of PFM tooth loss with age among children but theoretically with an increase in age, the incidence of periodontal disease also increases, while the prevalence of caries reduces due to stabilisation of oral hygiene and nutrition habits (Preethanath,

2010). Here the main cause of tooth loss among children was seen to be caries. In the present study, majority of first permanent molar mortality is found among males (Table 3) which is not similar to the study done in Sri Lankan population (Ekanayaka, 1984) and a study done by Kalyanpur and Prasad (Kalyanpur, 2011) in Dharwad (2011). Study of the data presented in the Table-3 leads to the conclusion that no significant difference in the mortality of Permanent first molar appears to exist between the gender. This conclusion is because of equal numbers of years of accumulated post-eruptive tooth age. In this part of the world male child are inclined to more care and are favored to receive sweets and chocolates compared to girl child. And thus incidentally exposed to cariogenic diet hence resulted in tooth loss due to untreated caries. Though the sample size was small but picture regarding the loss of permanent first molar is clearly explained the alarming rate of caries incidence and lack of education among the parents of the children regarding the prevention of tooth loss. Motivation and social messages regarding prevention of tooth loss should be done religiously.

Summary and Conclusion

From this cross sectional study, it can be concluded that:

1. Left mandibular permanent first molar is the most common tooth within the type trait of first molar to show high mortality rate.
2. Although not significant, the males are more prone to PFM tooth loss compared to females.
3. Majority of the PFM tooth loss is seen after the age of 10 yrs.
4. The percentage of PFM tooth loss increases with increasing age.

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