Prevalence of Root Stumps of Permanent Teeth in Pediatric Patients

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ABSTRACT
Tooth loss is the terminal event in the life of a tooth and is a frequent episode in individuals who are uncared for and have neglected oral hygiene. Tooth loss has various ill effects on an individual such as impairment of masticatory function, bad phonetics, unpleasant aesthetics, TMJ disorders, psychological issues, social withdrawal which results from decrease in confidence level. It is evident that caries and periodontitis are the most common causes for tooth loss with caries being the commonest between them. Neglected oral health may result in caries progression, which will lead to formation of root stumps. The aim of the study is to find the prevalence and incidence of root stumps of permanent teeth in pediatric patients. The study was performed under a university setting where the data of patients with root stumps of permanent teeth was collected by reviewing patients records and analysing the data of 86000 patients. The collected data was compiled, reviewed, tabulated and entered in SPSS software for statistical analysis. The study shows that only 2% were extractions of root stumps of permanent teeth. Extraction of root stumps of permanent teeth were more prevalent in patients of 9 and 11 years of age (34%) with a female predilection with most common teeth being the maxillary second premolar (22.2%). This study indicates the negligence of parents regarding the oral health of the children and provides insight on parents’ care towards the oral health of the child. Preventive measures such as topical fluoride application and usage of denial fissure sealants should be encouraged to prevent caries. Thus, the preservation of the natural dentition should be the ultimate goal of the dental professionals.

INTRODUCTION
Tooth extraction is one of the skilled dental procedures routinely carried out in dental practice since centuries. The young dental practitioners of this era demand to know various reasons for tooth extractions and the changing trends in the reasons of extractions. Tooth loss is the terminal event in the life of a tooth and is a frequent episode in individuals who are uncared for and have neglected oral hygiene (Mathur and Nath, 1968; Panchal et al., 2019). Tooth loss has various ill-effects on an individual such as the impairment
of masticatory function, bad phonetics, unpleasant aesthetics, TMJ disorders, psychological issues and social withdrawal which results in decrease in confidence level (George et al., 2011; Govindaraju, 2017). During the past few decades, the extent of tooth loss has found to be declined considerably in many countries, particularly among younger age groups (Downer, 1991; Marcus et al., 1988).

Common reasons for extraction of teeth includes dental caries (Aishwarya and Gurunanathan, 2017; Panchal et al., 2019) and its sequelae (which is pulpitis and periapical infections), periodontal diseases, malpositioned or impacted teeth, tooth fracture, retained deciduous teeth, supernumerary teeth, orthodontic treatment, prosthetic considerations, and preparation for radiotherapy (Oginni, 2005; Christabel, 2015; Packiri, 2017). It is also evident that caries and periodontitis is the most common cause for tooth loss (Adeyemo et al., 2009; Afridi et al., 2010; Govindaraju et al., 2017b), with caries being the commonest among them (Sanya et al., 2004; Kashif et al., 2014; Gurunanathan and Shanmugaavel, 2016). According to study conducted by Phipps et al. and Murray et al. (Phipps and Stevens, 1995; Murray et al., 1997) markedly higher numbers of teeth are lost majorly due to periodontal reasons when compared to dental caries (Ravikumar et al., 2017; Lakshmanan et al., 2020) in the United States and Canada while Ong et al. (Ong et al., 1996) found that both dental caries and periodontal reasons equally accounted for tooth loss in Asian population.

Neglected oral health may result in caries progression, which will lead to formation of root stumps (Somamudaram et al., 2015; Jeevanandan, 2017; Jeevanandan and Govindaraju, 2018). Root stumps are partial root structures whose crown is crumbled due to caries progression (Subramanyam et al., 2018; Lakshmanan et al., 2020). Treatment of severely mutilated teeth is mostly extraction (Govindaraju et al., 2017c; Nair et al., 2018; Lakshmanan et al., 2020). Other treatment options may include intra canal post and biological restoration of severely mutilated anteriors (Mahajan et al., 2015; Govindaraju et al., 2017a). The aim of the current study is to find the prevalence and incidence of root stumps of permanent teeth in paediatric patients as indication of the negligence of oral health are providing an insight on parents’ care towards the oral health of the child.

**RESULTS AND DISCUSSION**

In the current study among the 417 cases, there were 9 cases (2%) for which extraction of root stumps of permanent teeth were done, while the rest of the extraction were done for other reasons (98%). (Red: extractions of root stumps of permanent teeth; Blue: extractions done for other reasons) Among the data collected only 2% of the cases were extractions of root stumps of permanent teeth (Figure 1). Root stumps of permanent teeth were most commonly found in patients of 9 and 11 years of age (33%). 2 cases were in patients of 7 years of age (22.2%) and 1 case in patients of 17 years of age (11.1%). (Blue: 7 years; Red: 9 years; Green: 11 years; Orange: 17 years). The pie chart shows the prevalence of root stumps of permanent teeth among different age groups and indicates that prevalence of root stumps of permanent teeth were common in patients of 9 and 11 years of age (34%) (Figure 2). There is a male predilection...
(67%) indicating that root stumps of permanent teeth were more common in males than in females (33%). (Blue: Males; Red: Females). It is evident that 67% of patients with root stumps of permanent teeth were males [Figure 3]. Root stumps of the maxillary second premolars were commonly extracted (22.2%). (Blue: 12; Red: 14; Green: 15; orange: 22; Yellow: 24; Turquoise: 25; pink: 35). The pie chart shows the prevalence of root stumps of permanent teeth among different tooth numbers and higher prevalence was noticed with maxillary second premolars (22.2%) [Figure 4]. (X-axis: tooth number; Y-axis: number of cases. Blue: males; Green: Females.) Higher number of children who were males had root stumps pertaining to permanent teeth. (Chi-square test value; p-value = 0.345; hence not significant). The correlation between the gender of the patient and tooth number of root stumps of permanent teeth is shown in Figure 5. The chi-square test value for the same was found to be statistically insignificant (p > 0.005).

Figure 1: Pie chart depicting prevalence of root stumps of permanent teeth in pediatric patients.

Figure 2: Pie chart depicting the prevalence of root stumps of permanent teeth among different age groups.

Figure 3: Pie chart depicting prevalence of root stumps of permanent teeth between different genders.

Figure 4: Pie chart depicting prevalence of root stumps of permanent teeth among different tooth numbers.

Figure 5: Bar graph depicting the correlation between gender of the patient and the tooth number of root stumps of permanent teeth.

General health cannot be attained and maintained
without oral health. The mouth is considered the mirror of the body and the gateway to good health. Dental caries is a public health problem which affects pre-school and high-school children throughout the world causing pain, chewing difficulties, speech problems, general health disorders, psychological problems, and lower the quality of life (Filstrup et al., 2003; Sheiham, 2005). Dental caries is the most common dental disease affected in children and adolescents (Govindaraju et al., 2017a,b,c; Jeevanandan and Govindaraju, 2018). Permanent teeth with deep pits and fissures have a higher risk of caries than smooth tooth surfaces (Hicks and Flaitz, 1993). Loss of teeth reflects a major public health problem in many developing countries (Caldas et al., 2000; Susin et al., 2006). Root stumps are fractured teeth which occur after the crown of the tooth is completely broken off or rotten away. Though various types of oral health maintenance materials (Somasundaram et al., 2015; Govindaraju, 2017; Ramakrishnan and Bhukri, 2018; Subramanyam et al., 2018) have been used and countless numbers of dental health information programs have been conducted in schools and other settings, instilling behavioural changes is not possible until they are not aware of the importance of oral health. Thus the attainment of good oral health is based upon good dietary habits and oral hygiene practices (Moghe et al., 2013). Developing countries, such as India face many challenges in rendering oral health needs of children, especially in rural populations. Oral health of children is largely affected by parental dental knowledge, attitude, cultural beliefs and awareness of diet and oral practices. Knowledge and awareness are important for changes in behaviour, including behaviour related to health and disease prevention.

Prevalence of root stumps was found to be 2% [Figure 1]. This may be attributed to the high cariogenic diet and poor oral hygiene which might cause gross decaying of teeth (Gurunathan and Shanmuugaavel, 2016). Early prevention, less cariogenic diet and proper oral hygiene of teeth will lead to lesser teeth destruction and thus reduce the risk prevalence of root stumps. Root stumps were commonly found in patients of age 9 and 11 years (33%) and least common in patients of 17 years of age (11.1%) [Figure 2]. Brown, L. J et al., 1999 had reported that carious teeth were common in patients of 6 to 11 years of age (Brown et al., 1999). Our study shows a male predilection (67%) [Figure 3], while a study conducted by Suk V shows that females are prone to have carious teeth (Suk, 1919). This may again be due to the high cariogenic diet and poor oral maintenance which leads to the gross decay of teeth (Ramakrishnan and Bhukri, 2018). Root stumps of maxillary second premolar (22.2%) were found to be more common when compared to other teeth [Figure 4] but Study conducted by Suk V shows that the permanent maxillary first molars are the most common teeth to be decayed (Suk, 1919). The correlation between gender of the patient and tooth number of root stumps of permanent teeth is shown in Figure 5. The chi-square test value for the same was found to be statistically insignificant (p>0.005).

The limitation of the current study is that there was a limited demographic data to select subjects from. Studying a greater population with bigger sample size and varied ethnic groups would provide better results.

CONCLUSIONS

Within the limits of the current study, it was found that root stumps were more common among 9 and 11 years of age. Maxillary 2ⁿ premolars were the most commonly involved teeth and was more prevalent among children who were males.

Conflict of interest

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

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