



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 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 dental fissure sealants should be encouraged to prevent caries. Thus, the preservation of the natural dentition should be the ultimate goal of the dental professionals.



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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 Gurunathan, 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 between them (Sanya *et al.*, 2004; Kashif *et al.*, 2014; Gurunathan 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 (Somasundaram *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.

MATERIALS AND METHODS

The current study was a comparative, descriptive and retrospective study where the required data of the patients reported to the dental institution with root stumps of permanent teeth was collected by reviewing patients records and analysing the data of 86000 patients. The study was set in a University which predominantly consists of the South Indian Population. The pros of the study was that it included a varied population and had the ability to perform preference analysis. The cons were that it had a very limited geographic area of coverage and small sample size. The ethical approval of the current study was obtained from the institutional ethical board (Ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). The selection of patients was from the list of paediatric out-patients of age group 6 to 18 years, who visited the clinics from June 2019 to March 2020 complaining of tooth pain. The data was obtained for the Dental Information Archiving Software, which is a database of all treatments done to children who visited the pediatric department of the dental hospital with dental needs. The total sample size obtained from the data was 450. The inclusion criteria was all patients of 6 to 18 years of age whose clinical examination revealed root stumps of permanent teeth. Exclusion criteria were all incomplete and censored data. The data was cross verified using photographs and reviewed by an additional reviewer to minimize error. The final sample size was found to be 417. The data has high internal validity and low external validity. The data was entered in a methodical manner and was tabulated in Microsoft excel sheet. The tabulated data was imported to SPSS software (IBM) for statistical analysis.

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 per-

manent 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 ($p > 0.005$).

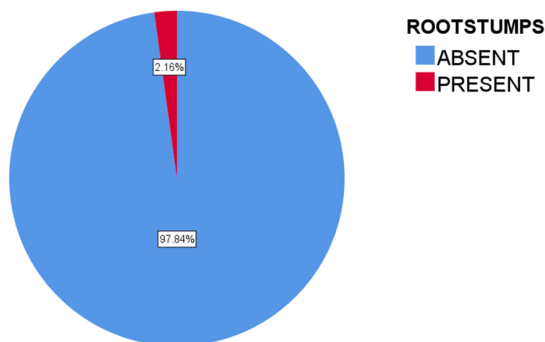


Figure 1: Pie chart depicting prevalence of root stumps of permanent teeth in pediatric patients.

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

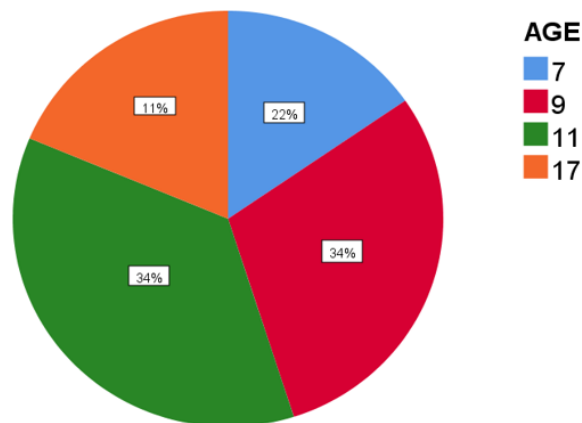


Figure 2: Pie chart depicting the prevalence of root stumps of permanent teeth among different age groups.

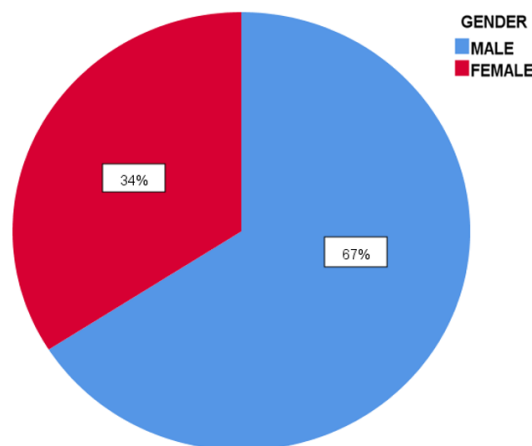


Figure 3: Pie chart depicting prevalence of root stumps of permanent teeth between different genders.

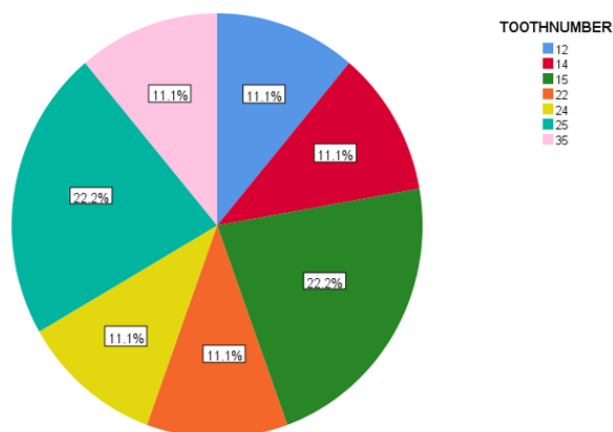


Figure 4: Pie chart depicting prevalence of root stumps of permanent teeth among different tooth numbers.

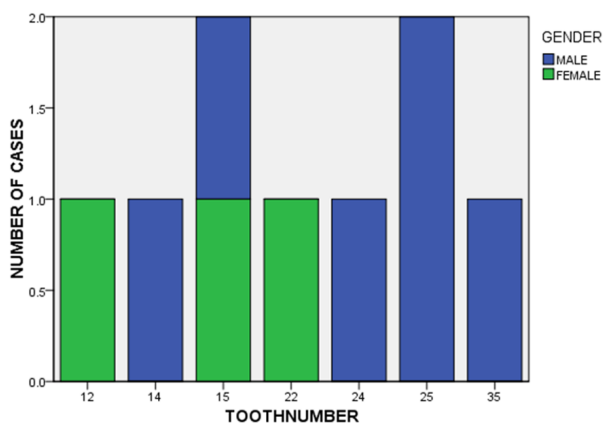


Figure 5: Bar graph depicting the correlation between gender of the patient and the tooth number of root stumps of permanent teeth.

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 Shanmugaavel, 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, I. 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.

CONCLUSION

Within the limits of the current study, it was found that root stumps were more common among 9 and 11 years of age. Maxillary 2nd 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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REFERENCES

- Adeyemo, W. L., Oderinu, H. O., Oluseye, S. B., Taiwo, O. A., Akinwande, J. A. 2009. Indications for extraction of permanent teeth in a Nigerian Teaching Hospital: A 16-year follow-up study. *Nigerian Quarterly Journal of Hospital Medicine*, 18(3):128-132.
- Afridi, S. H., Rehman, B., Din, Q. U. 2010. Causes of tooth extraction in oral surgery: an analysis of 400 patients reporting to Khyber College of Dentistry. *JPDA*, 19(2):17-21.
- Aishwarya, A., Gurunathan, D. 2017. Stress level in dental students performing pedodontic procedure. *J Adv Pharm Educ Res*, 7(1).
- Brown, L. J., Wall, T. P., Lazar, V. 1999. Trends in untreated caries in permanent teeth of children 6 to 18 years old. *The Journal of the American Dental Association*, 130(11):1637-1644.

- Caldas, A. F., Marcenés, W., Sheiham, A. 2000. Reasons for tooth extraction in a Brazilian population. *International Dental Journal*, 50(5):267–273.
- Christabel, S. L. 2015. Prevalence of Type of Frenal Attachment and Morphology of Frenum in Children, Chennai, Tamil Nadu. *World Journal of Dentistry*, 6(4):203–207.
- Downer, M. C. 1991. The improving dental health of United Kingdom adults and prospects for the future. *British Dental Journal*, 170(4):154–158.
- Filstrup, S. L., Briskie, D., Fonseca, M. D., Lawrence, L., Wandera, A., Inglehart, M. R. 2003. Early childhood caries and quality of life: child and parent perspectives. *Pediatric Dentistry*, 25(5):431–440.
- George, B., Saravanan, S., John, J., Arumugham, I. 2011. Prevalence of permanent tooth loss among children and adults in a suburban area of Chennai. *Indian Journal of Dental Research*, 22(2):364.
- Govindaraju, L. 2017. Effectiveness of Chewable Tooth Brush in Children-A Prospective Clinical Study. *Journal of clinical and diagnostic research*, 11(3).
- Govindaraju, L., Jeevanandan, G., Subramanian, E. M. G. 2017a. Clinical evaluation of quality of obturation and instrumentation time using two modified rotary file systems with manual instrumentation in primary teeth. *Journal of clinical and diagnostic research*, 11(9).
- Govindaraju, L., Jeevanandan, G., Subramanian, E. M. G. 2017b. Comparison of quality of obturation and instrumentation time using hand files and two rotary file systems in primary molars: A single-blinded randomized controlled trial. *European Journal of Dentistry*, 11(03):376–379.
- Govindaraju, L., Jeevanandan, G., Subramanian, E. M. G. 2017c. Knowledge and practice of rotary instrumentation in primary teeth among Indian dentists: A questionnaire survey. *Journal of International Oral Health*, 9(2):45.
- Gurunathan, D., Shanmugaavel, A. K. 2016. Dental neglect among children in Chennai. *Journal of Indian Society of Pedodontics and Preventive Dentistry*, 34(4):364.
- Hicks, M. J., Flaitz, C. M. 1993. Epidemiology of dental caries in the pediatric and adolescent population: a review of past and current trends. *The Journal of Clinical Pediatric Dentistry*, 18(1):43–49.
- Jeevanandan, G. 2017. Kedo-S Paediatric Rotary Files for Root Canal Preparation in Primary Teeth – Case Report. *Journal of Clinical and Diagnostic Research*, 11(3):3–5.
- Jeevanandan, G., Govindaraju, L. 2018. Clinical comparison of Kedo-S paediatric rotary files vs manual instrumentation for root canal preparation in primary molars: a double blinded randomised clinical trial. *European Archives of Paediatric Dentistry*, 19(4):273–278.
- Kashif, M., Mehmood, K., Ayub, T., Aslam, M. 2014. Reasons and patterns of tooth extraction in a tertiary care hospital-A cross-sectional prospective survey. *J Liaquat Uni Med Health Sci*, 13(03):125–154.
- Lakshmanan, L., Mani, G., Jeevanandan, G., Ravindran, V., Ganapathi, S. E. M. 2020. Assessing the quality of root canal filling and instrumentation time using kedo-s files, reciprocating files and k-files. *Brazilian Dental Science*, 23(1).
- Mahajan, N., Bansal, S., Goyal, P., Chawla, R. 2015. Esthetic rehabilitation of severely mutilated primary incisors by using glass impregnated post: A case report. *Pediatric Dental Journal*, 25(1):29–33.
- Marcus, S. E., Drury, T. F., Brown, L. J., Zion, G. R. 1988. Tooth Retention and Tooth Loss in the Permanent Dentition of Adults: United States. *Journal of Dental Research*, 75(2_suppl):684–695.
- Mathur, M. N., Nath, S. 1968. Tooth mortality. An analysis of extraction cases. *Journal of the Indian Dental Association*, 40(8):213–215.
- Moghe, G., Mauli, S., Thomas, A., Obed, V. A. 2013. Bridging the Gap: Addressing Challenges toward Improvement of Cleft Teamwork in a Tertiary Care Center in North India: A Pilot Study. *The Cleft Palate-Craniofacial Journal*, 50(4):473–480.
- Murray, H., Clarke, M., Locker, D., Kay, E. J. 1997. Reasons for tooth extractions in dental practices in Ontario, Canada according to tooth type. *International Dental Journal*, 47(1):3–8.
- Nair, M., Jeevanandan, G., Vignesh, R., Subramanian, E. 2018. Comparative evaluation of post-operative pain after pulpectomy with k-files, kedo-s files and mtwo files in deciduous molars -a randomized clinical trial. *Brazilian Dental Science*, 21(4):411.
- Oginni, F. O. 2005. Tooth loss in a sub-urban Nigerian population: causes and pattern of mortality revisited. *International Dental Journal*, 55(1):17–23.
- Ong, G., Yeo, J.-F., Bhole, S. 1996. A survey of reasons for extraction of permanent teeth in Singapore. *Community Dentistry and Oral Epidemiology*, 24(2):124–127.
- Packiri, S. 2017. Management of Paediatric Oral Ranula: A Systematic Review. *Journal of Clinical and Diagnostic Research*, 11(9):6–9.
- Panchal, V., Jeevanandan, G., Subramanian, E. G.

2019. Comparison of instrumentation time and obturation quality between hand K-file, H-files, and rotary Kedo-S in root canal treatment of primary teeth: A randomized controlled trial. *Journal of Indian Society of Pedodontics and Preventive Dentistry*, 37(1):75.
- Phipps, K. R., Stevens, V. J. 1995. Relative Contribution of Caries and Periodontal Disease in Adult Tooth Loss for an HMO Dental Population. *Journal of Public Health Dentistry*, 55(4):250–252.
- Ramakrishnan, M., Bhukri, M. 2018. Fluoride, Fluoridated Toothpaste Efficacy And Its Safety In Children Review. *International Journal of Pharmaceutical Research*, 10(4):109–114.
- Ravikumar, D., Jeevanandan, G., Subramanian, E. M. G. 2017. Evaluation of knowledge among general dentists in treatment of traumatic injuries in primary teeth: A cross-sectional questionnaire study. *European Journal of Dentistry*, 11(02):232–237.
- Sanya, B. O., Ng'ang'a, P. M., Ng'ang'a, R. N. 2004. Causes and pattern of missing permanent teeth among Kenyans. *East African Medical Journal*, 81(6):322–325.
- Sheiham, A. 2005. Oral health, general health and quality of life. *Bulletin of the World Health Organization*, 83(9):644.
- Somasundaram, S., Ravi, K., Rajapandian, K., Gurunathan, D. 2015. Fluoride content of bottled drinking water in Chennai. *Tamilnadu Journal of Clinical and Diagnostic Research: JCDR*, 9(10):32–36.
- Subramanyam, D., Gurunathan, D., Gaayathri, R., Priya, V. V. 2018. Comparative evaluation of salivary malondialdehyde levels as a marker of lipid peroxidation in early childhood caries. *European Journal of Dentistry*, 12(01):067–070.
- Suk, V. 1919. Eruption and decay of permanent teeth in Whites and Negroes, with comparative remarks on other races. *American Journal of Physical Anthropology*, 2(4):351–388.
- Susin, C., Haas, A. N., Opermann, R. V., Albandar, J. M. 2006. Tooth Loss in a Young Population from South Brazil. *Journal of Public Health Dentistry*, 66(2):110–115.