Original Research

Assessment of different tooth extraction in patients undergoing orthodontic treatment

Pawan Deep Singh

Tutor, Dept. of Orthodontics & Dentofacial Orthopaedic, Swami Devi Dyal Dental College & Hospital, Panchkula, Haryana, India

ABSTRACT:
Background: Malocclusion is a term to define the irregularity of the teeth in relation to the two dental arches. The present study was conducted to assess different tooth extraction in patients undergoing orthodontic treatment. **Materials & Methods:** 252 patients who underwent fixed orthodontic treatment of both genders were enrolled. Case history sheet was evaluated and factors such as type of tooth extraction, arch etc. was recorded. **Results:** Out of 252 patients, males were 110 and females were 142. Age group 15-17 years had 25 males and 38 females, 17-19 years had 40 males and 50 females and 19-21 years had 45 males and 54 females. The difference was non- significant (P> 0.05). Tooth extracted was maxillary first premolar in 35%, maxillary second premolar in 15%, mandibular first premolar in 20%, mandibular second premolar in 6%, maxillary canine in 2% and mandibular canine in 1% patients. The difference was significant (P< 0.05).30% males and 49% females underwent extraction. The difference was significant (P< 0.05). **Conclusion:** Maximum extractions were done in females as compared to males. Most commonly extracted tooth was maxillary first pre-molar in both genders.
Key words: fixed orthodontic, Malocclusion, tooth extraction

INTRODUCTION
Malocclusion is a term to define the irregularity of the teeth in relation to the two dental arches. Malocclusion can develop in growing children oftentimes it is hereditary. In normalcy, malocclusion is not considered as a life- threatening problem, but it can cause serious oral health problems.[1] In additionto this, malocclusion is ranked third among the worldwide dental public health priorities, as it is the third highest frequency in oral pathologies and second-ranked in the prevalence of dental caries and periodontal disease.[2]

Tooth extraction is one of the dental treatments which should be considered the final option. A decrease in the number of teeth may result in poor dietary habits and deterioration of quality of life. The number of extracted teeth can serve as an indicator for socioeconomic status or oral hygiene level. Extraction of permanent teeth is performed for several reasons including dental caries, periodontal disease, orthodontic reasons, impactedteeth, failed dental treatment and other reasons.[3]

The decision to extract teeth or not and the number of teeth to be extracted can influence the final result of orthodontic treatment, including esthetics, occlusion, satisfaction of patients and their families, as well as the treatment time. For many years the extraction decision has instigated much discussion and controversies, often linked to personal preferences than scientific criteria.[4] In the last decades, Orthodontics has experienced conceptual and technological changes influenced by dominant trends in each time. Extraction orthodontic treatment, as an actual and accessible alternative therapy also seems to be susceptible to moments of transition.[5] The present study was conducted to assess different tooth extraction in patients undergoing orthodontic treatment.

MATERIALS & METHODS
The present retrospective study comprised of 252 patients who underwent fixed orthodontic treatmentof both genders. The consent was obtained from all enrolled patients.

Data such as name, age, gender etc. was recorded. Case history sheet was evaluated and factors such as type of tooth extraction, arch etc. was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

Total- 252		
Gender	**Males**	**Females**
Number	110	142

Table I shows that out of 252 patients, males were 110 and females were 142.

Table II: Age wise distribution of patients

Age group (years)	Male	Female	P value
15-17	25	38	0.05
17-19	40	50	0.94
19-21	45	54	0.82

Table II shows that age group 15-17 years had 25 males and 38 females, 17-19 years had 40 males and 50 females and 19-21 years had 45 males and 54 females. The difference was non- significant (P> 0.05).

Table III: Type of tooth extraction

Tooth type	Percentage	P value
Maxillary first premolar	35%	0.05
Maxillary second premolar	15%	
Mandibular first premolar	20%	
Mandibular second premolar	6%	
Maxillary canine	2%	
Mandibular canine	1%	

Table III, graph I shows that tooth extracted was maxillary first premolar in 35%, maxillary second premolar in 15%, mandibular first premolar in 20%, mandibular second premolar in 6%, maxillary canine in 2% and mandibular canine in 1% patients. The difference was significant (P< 0.05).
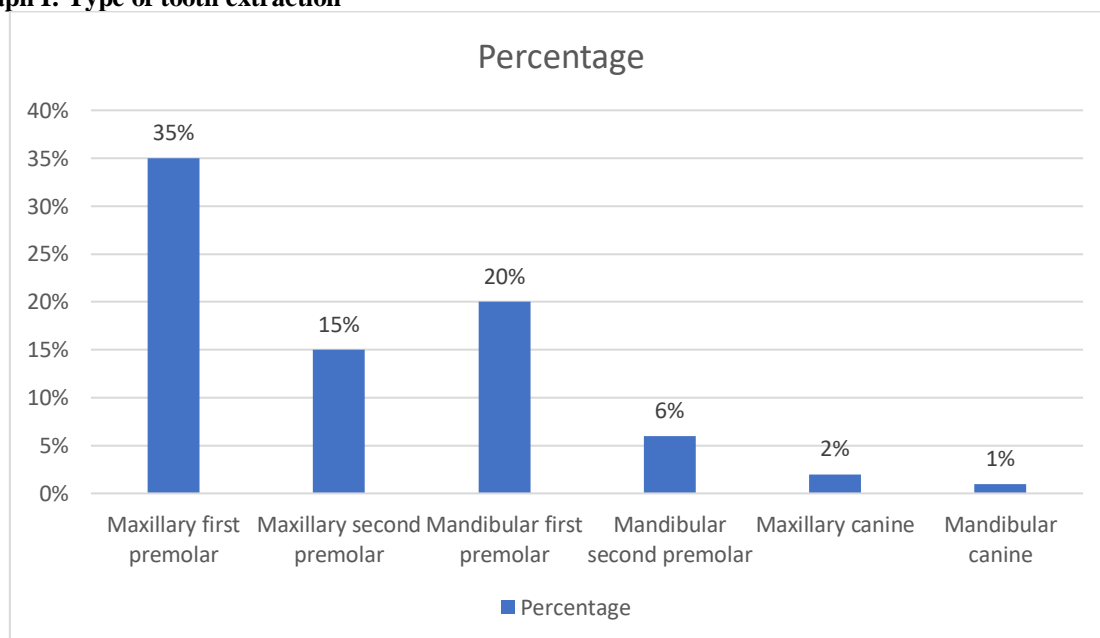
Graph I: Type of tooth extraction

Table IV: Prevalence of tooth extraction and gender

Gender	Percentage	P value
Male	30%	0.05
Female	49%	

Table IV shows that 30% males and 49% females underwent extraction. The difference was significant (P< 0.05).

115

DISCUSSION

Orthodontic treatment aims to straighten teeth into normal occlusion and it is well indicated in unfavourable or interrupted development of occlusal.[6] This malocclusion requiresorthodontic treatments such as removable or fixed orthodontic appliances, aligners, extractions and surgical treatment.[7] Orthodontic treatment generally begins at 12-14 years of age because permanent teeth have erupted among the children. Teeth extraction in orthodontics has been controversial since the turn of the century. This is because non-extraction therapy has been significantly preferred by most clinical practice in recent years.[8] Several philosophical shifts were attributed to this, such as research on post-retention studies showed less efficacy of extraction over non-extraction approach in crowding teeth with the respect of long- term stability and good alignment.[9,10] The present study was conducted to assess different tooth extraction in patients undergoing orthodontic treatment.

We found that out of 252 patients, males were 110 and females were 142.Balakrishna RN et al[11] found that over a period of 10 months 5935 patients underwent extraction. Mean age of the patients was 19 +- 5.2 years. Among the patients, 3125 patients were male and 2055 patients were female.Among the different age groups used in this study(1-10 years, 11-20 years,21-30 years), patients in the age group 21-30 years underwent most number of extractions(2505) followed by 1-10 years(2077) and 11-20 years (1355). Other variables like site, causes, socioeconomic status were not included in this study. A statistical analysis for correlation was done by Pearson's correlation method and it was found that there was no significant correlation between age,gender and prevalence of extraction of teeth.

We found that age group 15-17 years had 25 males and 38 females, 17-19 years had 40 males and 50 females and 19-21 years had 45 males and 54 females. Janson et al[12]evaluated all orthodontic treatment planning in order to investigate extraction and non-extraction protocol frequencies selected at each considered period.The sample comprised 3,413 records of treated patients and was evaluated according to the protocol choice, divided into 10 groups: Protocol 0 (non-extraction); Protocol 1 (four first premolar extractions); Protocol 2 (two first maxillary and two second mandibular premolars); Protocol 3 (two maxillary premolar extractions); Protocol 4 (four second premolars); Protocol 5 (asymmetric premolar extractions); Protocol 6 (incisor or canine extractions); Protocol 7 (first or second molar extractions); Protocol 8 (atypical extractions) and Protocol 9 (agenesis and previously missing permanent teeth). These protocols were evaluated in seven 5-year intervals: Interval 1 (1973 to 1977); Interval 2 (1978 to 1982); Interval 3 (1983 to 1987); Interval 4 (1988 to 1992); Interval 5 (1993 to 1997); Interval 6 (1998 to 2002); Interval 7 (2003 to 2007). The frequency of each protocol was compared between the seven intervals, using the proportion test ($P < 0.05$).The results showed that 10 protocol frequencies were significantly different among the 7 time intervals.

We found that tooth extracted was maxillary first premolar in 35%, maxillary second premolar in 15%, mandibular first premolar in 20%, mandibular second premolar in 6%, maxillary canine in 2% and mandibular canine in 1% patients. Koruyucu et al[13] investigated the principal reasons for extraction in children aged between 3-8 years.A total of 1405 (16 permanent, 1389 primary) extractions were performed in 825 (362 female, 463 male) of the patients. Patient's mean ages 6.5±1.36. Reasons for extractions were; caries:72.8%, orthodontics: 0.2%, trauma: 5.9%, periodontal: 0.2%, eruption: 14.9%, treatment failure:1.7%, other reasons: 4.05%.The mean df, dfs, DMF, DMFS scores were found respectively 5.41±3.2, 9.45±7.0, 0.52±1.0, 0.68±1.6.The results of this study indicate that caries is the main reason for extraction in 3-8 years old children. This result may be due to a lack of oral hygiene habits in children aged 3-8.

We found that 30% males and 49% females underwent extraction. Shukri NMM et al[14]investigated the prevalence of children undergoing orthodontic extraction below 18 years of age. Data collection was done in a private dental university setting. Out of 1500 patients, 375 orthodontic patient records were selected by reviewing the case sheets. A total of 375 patients below 18 years of age had undergone orthodontic treatment. 23.3% of them underwent therapeutic extraction prior to the orthodontic treatment and the remaining 76.8% were not. Females (66.7%) had a higher proportion of having orthodontic extraction than male (33.3%). The common age group seen in patients with orthodontic extraction was 15-18 years and both upper and lower arches were preferred the most for extraction. Statistically significant differences between gender and orthodontic treatment showed a higher proportion of female patients were associated with orthodontic extraction.

The limitation the study is small sample size.

CONCLUSION

Authors found that maximum extractions were done in females as compared to males. Most commonly extracted tooth was maxillary first pre-molar in both genders.

REFERENCES

1. Little RM, Wallen TR, Riedel RA. Stability and relapse of mandibular anterior alignment-first premolar extraction cases treated by traditional edgewise orthodontics. Am J Orthod. 1981;80:349–365.
2. Glenn G, Sinclair PM, Alexander RG. Non-extraction orthodontic therapy: Posttreatment dental and skeletal

stability. Am J Orthod Dentofacial Orthop. 1987;92:321-328.

3. Osborn WS, Nanda RS, Currier GF. Mandibular arch perimeter changes with lip bumper treatment. Am J Orthod Dentofacial Orthop. 1991;99:527–532.

4. Krishnan R, Shukri MM. Fluoride, fluoridated toothpaste efficacy and its safety in children-Review. International Journal of Pharmaceutical Research. 2018;10. 16. Cetlin NM, Ten HA. Nonextraction treatment. J Clin Orthod. 1983;17:396–413.

5. Kuthy RA, Antkowiak MF, Clive JM. Extractions prior to comprehensive orthodontic treatment in the mixed dentition. Pediatr Dent. 1994;16:211–216.

6. Ravikumar D, Jeevanandan G, Subramanian EMG. Evaluation of knowledge among general dentists in treatment of traumatic injuries in primary teeth: A cross-sectional questionnaire study. Eur J Dent. 2017;11:232-237.

7. Weintraub JA, Vig PS, Brown C, Kowalski CJ. The prevalence of orthodontic extractions. Am J Orthod Dentofacial Orthop. 1989;96:462–466.

8. Mtaya M, Brudvik P, Astrøm AN. Prevalence of malocclusion and its relationship with socio-demographic factors, dental caries, and oral hygiene in 12- to 14-year-old Tanzanian schoolchildren. Eur J Orthod. 2009;31:467–476.

9. Jeevanandan G. Kedo-S paediatric rotary files for root canal preparation in primary teeth-Case report. J Clin Diagn Res. 2017;11:03–05.

10. Karaiskos N, Wiltshire WA, Odlum O, Brothwell D, Hassard TH. Preventive and interceptive orthodontic treatment needs of an inner-city group of 6- and 9-year-old Canadian children. J Can Dent Assoc. 2005;71:649.

11. Balakrishna RN. A Retrospective Study on Extraction of Teeth in Patients Under 30 Years Age. PalArch's Journal of Archaeology of Egypt/Egyptology. 2020 Nov 28;17(7):924-33.

12. Janson G, Maria FR, Bombonatti R. Frequency evaluation of different extraction protocols in orthodontic treatment during 35 years. Progress in orthodontics. 2014 Dec;15(1):1-7.

13. Koruyucu M, Bayram M, Bekiroglu N, Seymen F. Reasons for tooth extraction in 3-8 year-old Turkish children. Oral Health and Care. 2017;2(1):1-4.

14. Shukri NMM, et al. Prevalence of Children Undergoing Orthodontic Extraction below 18 Years of Age: A Retrospective Study. Ann Med Health Sci Res. 2021;11:452-458.