



TOOTH EXTRACTION; FREQUENCY IN ORTHODONTIC TREATMENT

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INTRODUCTION

A successful orthodontic treatment is based on vigilant diagnosis and treatment planning. This involves several intricate decisions in which extraction of certain teeth may be included. The removal of permanent teeth for orthodontic reasons has been a hot topic of debate in the past and continues to be of interest even today.¹

Edward Angle condemned tooth extraction on the basis that extraction eliminates the possibility of achieving optimal occlusion or optimal esthetics.² Calvin Case, however, supported tooth extractions considering them necessary for correcting facial abnormalities owing to exaggerated dental or maxillary protrusion.³ Even today, there is a considerable controversy concerning extraction

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ABSTRACT... Introduction: The extraction of permanent teeth for orthodontic reasons has been a hot topic of debate in the past and continues to be of interest even today. There is a considerable controversy concerning extraction as a treatment adjunct which sometimes reaches to the intensity of sacred beliefs. **Objective:** The aim of this study was to report the frequency of tooth extraction and its pattern in Pakistani orthodontic patients. **Study Design:** Descriptive cross-sectional. **Setting:** Armed Forces Institute of Dentistry (AFID), Rawalpindi. **Period:** 1st July 2012 to 30th June 2014. **Material & Methods:** The study sample consisted of 489 patients reporting to the orthodontic department at AFID. Patients between the age of 7 – 21 years were selected. Patients being treated with the extraction of permanent teeth (excluding third molars) were included in this study. Data was analyzed using SPSS version 24. Descriptive statistics were calculated. **Results:** A total of 296 patients did not require any extraction. The remaining 193 patients required and experienced extraction of permanent teeth as part of their orthodontic treatment plan resulting in an over-all extraction frequency of 39.5%. Most of the extracted teeth were first premolars especially from the upper arch. Association of extraction status (extraction vs non-extraction) with gender was found to be statistically insignificant ($p = 0.393$). **Conclusion:** There is a moderate frequency of extraction in the orthodontic patients with less than half of the total patients requiring extraction as part of their treatment.

Keywords: Tooth extraction, Orthodontics, Epidemiology

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as a treatment adjunct which sometimes reaches to the intensity of sacred beliefs.

An accurate diagnosis and effective treatment plan, based on detailed dental, facial and skeletal assessments, is a mandatory prerequisite for the decision of tooth extractions.⁴ Historically, reported extraction rates for orthodontic treatment have varied widely from less than 25% of patients to more than 80%.^{1,5} A multi-year comparative study was published by Profit⁶ in 1994, tabulating the extraction frequencies in an American university orthodontic clinic in 1953, 1963 and 1993. It showed a dramatic 40% rise and fall in extraction rates during that period. Data derived from surveys of practicing orthodontists have been shown to have significant inaccuracies.¹

For this reason, data generated from institutions where many patients are treated using a variety of treatment philosophies are preferred because they can provide more meaningful epidemiologic information.

Given the variety of individual orthodontic practices today, it is important to understand extraction frequency as a function of patient demographic and diagnostic parameters that might influence the decision to extract. This article reports on the frequency of tooth extraction especially first premolars among a sample of Pakistani orthodontic patients.

METHODOLOGY

The study sample consisted of 489 patients from orthodontic practice carried out at AFID. Patients between the age of 7 – 21 years were selected. All the patients were examined and diagnosed. Orthodontic treatment using removable appliances was planned and initiated. Extraction of permanent teeth excluding third molars was included in this study and categorized as follows:

1. Extraction of first premolars from both arches
2. Extraction of first premolars from maxillary arch only
3. Extraction of first premolars from mandibular arch only
4. Extraction of teeth other than first premolars from maxillary or mandibular arch

Data was analyzed using SPSS version 24 (SPSS, IBM Corp, NY, USA). Descriptive statistics were analyzed. Categorical variables like gender and extraction status were reported in terms of frequencies and percentages. Post stratification Chi Square-test was used for effect modifiers such as gender and p value <0.05 was taken as significant.

RESULTS

Out of 489 subjects, 171(34.9%) were male and 318 (65.1%) were female. A total of 296 patients did not require any extraction. The remaining 193 patients required and experienced removal of permanent teeth as a component of their orthodontic treatment plan resulting in an over-all extraction frequency of 39.5% (Table-I). Most of the extracted teeth were first premolars especially from the upper arch (Table-II). Other teeth including lower central and lateral incisor, upper second premolars and lower second premolars constituted 8.3% of the total extraction cases. Association of extraction status (extraction vs. non-extraction) with gender was not found to be significant ($p = 0.393$) (Table-III).

Extraction Status	Frequency	Percentage
Non - Extraction	296	60.5%
Extraction	193	39.5%

Table-I. Frequency of tooth extraction during orthodontic treatment

Tooth Extracted	Frequency	Percentage
All First Premolars	61	31.6%
Maxillary First Premolars only	106	54.9%
Mandibular First Premolars only	10	5.2%
Other teeth	16	8.3%

Table-II. Frequency of extraction of different teeth during orthodontic treatment

DISCUSSION

The present study reported the frequency of tooth extraction required during orthodontic therapy. Majority (65%) of the subjects in the study were females, indicating a higher incidence of malocclusion among the females. This finding compares favorably with those of Jackson et al.¹

Extraction Status	Gender		Total	P Value
	Male	Female		
Extraction	59	134	193	0.393
Non-Extraction	112	184	296	
Total	171	318	489	

Table-III. Stratification of extraction status with respect to gender

Who also reported a higher frequency (58%) of females in their study. A higher (56%) percentage of female participants was also reported by Dardengo et al.⁴

In the present study, the frequency of tooth extraction as a component of orthodontic therapy was 39.5%. Similar results have been reported by Jackson et al¹ who reported a frequency of 37.4% of orthodontic treatment with extractions around the year 2000 which subsequently decreased to 25% in the following years. These findings are also endorsed by those of Khan et al⁷ who found a 41.5% frequency of extraction in the local population. A slightly higher frequency of 45.8% of extraction during orthodontic treatment has been reported by Dardengo et al⁴ in the population of Rio de Janeiro. In contrast, a very high frequency (61.2%) of extraction during orthodontic treatment was reported by Thirunavukkarasu et al.⁸ in the Malaysian population. The difference can possibly be attributed to the difference in ethnicity.

Majority of the teeth extracted in the present study were maxillary first premolars with a frequency of 54.9% followed by the extraction of all upper and lower first premolars (31.6%). Quite opposite results were reported by Dardengo et al⁴ and Janson et al⁵ who found a greater frequency of extraction of all first premolars and a lesser frequency of extraction of maxillary first premolars alone. Removal of permanent maxillary premolars appears to be extremely beneficial in cases of Class II malocclusion. Orthodontic therapy involving extraction of only maxillary premolars has a greater success rate in comparison to extraction of all premolars. Moreover, such a treatment approach also requires a shorter time to treat the aforementioned cases.⁹ The findings of the present study, however, differ from those of Profit W R⁶ who found an extraction frequency of 28% in the year 1993. This difference can be explained by the difference in selection criteria where Profit considered only first premolar extractions while this study included all kinds of extractions except permanent third molars.

No significant difference was found for frequency of extraction among males and females ($p =$

0.393). In both genders, non-extraction cases more common. Similar results were found by Dardengo et al who did not find any significant association between extraction status and gender.⁴ Although the differences was not statistically significant, the frequency of extractions in female subjects was slightly greater (42.2%) than that in the male subjects (34.5%). These findings are substantiated by those of Peck and Peck¹⁰ who reported a higher number of extractions for female subjects (44%), and a relatively low frequency of extractions (39%) for the male subjects. Recent studies, however, report a lower frequency of tooth extractions in females owing to the growing concern about esthetics. Extraction is succeeded by a retraction of anterior teeth that results in reduced profile convexity and deepened of facial grooves.⁴

Since the early 20th century, following the concepts presented by Angle and Case, orthodontists the world over have been debating about non-extraction treatments versus extraction-based orthodontic therapy. These arguments have extended over the last century and may remain unresolved in the future as well. The choice “to extract or not to extract” during orthodontic therapy relies with the treating orthodontist. In certain subjects, such as borderline cases, similar results can be achieved with both extraction-based and non-extraction treatment philosophies. However, in other cases, results may be severely compromised if required extractions are not carried out.

CONCLUSION

Based on the restrictions of this study, the following inferences can be drawn:

1. Frequency of tooth extractions during orthodontic therapy observed in the present study was 39.5%.
2. In most of the cases, maxillary first premolars were the only extracted teeth with a frequency of 54.9%.
3. No significant difference for extraction frequency was found between males and females.

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*Life is like photography –
develop from the negatives.*

– Unknown –

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4	Usman Ahmed	Manuscript Writing.	
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