

Common Reasons for Premolar Extractions In Children Of Age Between 12 To 18 Years - A Retrospective Study

Research Article

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Abstract

Planned extraction of permanent teeth for orthodontic purposes is a challenging factor for the stability of the treatment, and for successful esthetic and functional results. Dental extractions can also be due to caries, traumatic injuries and other periodontal conditions. The most common reasons for extracting permanent premolars needs further analysis. Hence a study was conducted to assess the common reasons for extraction of premolars among children between 12 to 18 years of age. A total of 86000 dental records were analysed from the records of patients attending the dental institute and based on inclusion and exclusion criteria the final study sample consisted of 100 patients who underwent premolar tooth extractions. Patient details, tooth extracted and the reasons for extraction of premolars were noted. Data was tabulated and subjected to Chi-square test in SPSS software. The most common reason for extraction of premolars among children between 12-18 years of age was orthodontic treatment. This was noticed predominantly in children who were females due to esthetic concerns.

Keywords: Extraction; Dental Caries; Malocclusion; Premolars.

Introduction

The main goal of the orthodontic treatment is to achieve the normal relationship of the teeth with facial structures. Angle stated that preservation of all dental structures was required to achieve facial balance. However, there can be little soft tissue constraints which limit the amount of alteration that can be corrected orthodontically, which needs extraction [1-3]. According to Little et al [4], in severe crowding cases which are greater than 9mm may require extensive orthodontic therapy with tooth extractions. There are many factors which require extraction of teeth for orthodontic therapy- Increased tooth size arch length discrepancy (crowding), open bite cases, impacted cases, supernumerary teeth, malformed teeth, cleft lip and palate cases. The decision to extract premolar teeth totally depends on cases, patient's medical history, attitude to treatment, oral hygiene status, and caries rate of the patients [5].

Extraction of permanent teeth at a younger age would be a complete loss forever. The lost tooth wouldn't be replaced by a succeeding tooth as in primary teeth [6]. The reasons for extraction vary from dental caries, unrestorable teeth, periodontal problems, traumatic dental injuries, root stumps, furcal involvement and also for orthodontic purposes. Absence of a permanent tooth would lead to space loss, supra eruptions, mesial migrations and also pose a threat to adjacent teeth. This would affect the functionality of the teeth, disruption in speech and also has an impact on mastication [7-9]. Extraction of permanent molars and incisors are commonly studied. There are minimal studies on the reasons for extraction of premolars. So the aim of the study was to assess the common reasons for extraction of premolars among children between 12 to 18 years of age.

Materials And Methods

This retrospective study was carried out in a hospital based uni-

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versity setting. This study was evaluated and ethically approved by an institutional ethical review committee (ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). Retrospective data collected from 9,000 case records from June 2019 to March 2020. Informed consent was obtained from the parents or guardian before starting the treatment. Inclusion criteria were patients aged from 12 to 18 years and patients who underwent permanent tooth extractions, extraction of premolars, complete records of the patient with fully filled case sheets and photographic evidence of extraction done. Exclusion criteria were patients aged above 18 years, incomplete data records, absence of photographic evidence of extraction and censored records.

Total cases acquired for this study were 100 which include patients who underwent premolar extractions. Selected cases were examined by two people: one researcher and one guide. Patient's case sheets were reviewed thoroughly. Cross checking of data including digital entry, removal of data records of the same patient involved in multiple extractions and intraoral photographs was done by an additional reviewer, and as a measure to minimise sampling bias, samples for the group were picked by the simple random sampling method. Digital entry of clinical examination and intraoral photographs were assessed. Reasons for premolar extraction were noted by a researcher, entered into Microsoft excel (MS Excel) and then transferred into Statistical Package for the Social Sciences (SPSS) Software for statistical analysis. A correlation test (Chi-square test) was done between gender and reason for premolar extraction. The difference was statistically significant

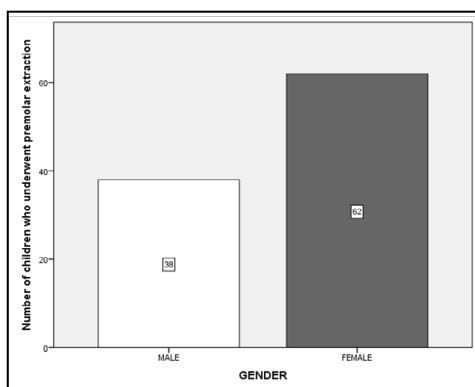
when the p-value was less than 0.05.

Results And Discussion

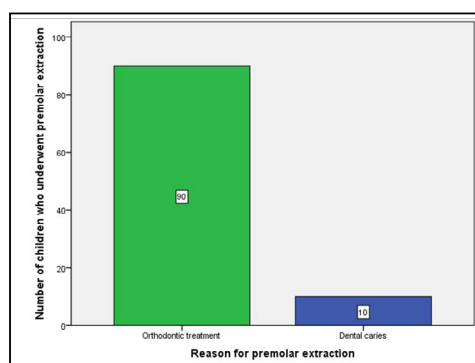
The final sample size consisted of 100 patients which includes 62 females and 38 males (Graph -1). This shows that most of the study participants were females who underwent premolar extractions. The main reason for premolar extractions in children aged between 12 to 18 for orthodontic treatment (90%) and premolar tooth extracted due to dental caries (10%). (Graph-2). Association between the reasons for premolar extraction and gender shows that 5% of female study participants extracted premolar due to dental caries, 5% of male study participants extracted premolar due to dental caries, 57% of female study participants extracted premolar for orthodontic treatment and 33% of male study participants extracted premolar for orthodontic treatment. Higher number of children who were females (57) extracted premolars for orthodontic reasons when compared to children who were males (33), which was statistically significant. ($p = 0.00$).

Results of the present study suggests the most common reason for extraction of premolars was orthodontic treatment which is more predominant in females. Though there are no studies for comparison, the reason for such a difference between the genders was because the adolescents who were females were more concerned on their esthetic appearances when compared to males. Extraction for orthodontic reasons will be governed by three factors such as condition of the teeth, positioning of crowding

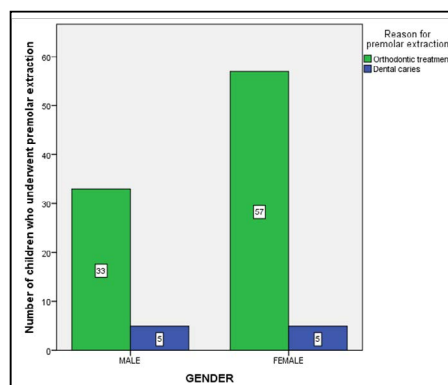
Graph 1. Bar graph represents the gender distribution of cases in children aged between 12 to 18 years who underwent premolar extractions. (Y-axis represents the number of children who underwent premolar extraction; X-axis represents gender of the patient; grey represents females; white represents males). Higher number of children who were females underwent extraction of premolars when compared to males.



Graph 2. Bar graph represents the reasons for premolar extraction in children aged between 12 to 18 years who underwent extraction of premolars. (Y-axis represents the number of children who underwent premolar extraction; X-axis represents the reason for premolar extraction; blue represents dental caries; green represents orthodontic treatment). The most common reason noticed for extraction of premolars was orthodontic treatment (90).



Graph 3. Bar graph represents the association between reasons for premolar extraction with gender of the child. X axis represents the gender of the child, Y axis represents the number of children who underwent premolar extraction. Higher number of children, both males and females, underwent premolar extraction due to orthodontic reasons (green color) rather than due to dental caries (blue color). However among them, a higher number of children who were females (57) extracted premolars for orthodontic reasons when compared to males (33). This difference was statistically significant. (Chi-square test; p-value = 0.00 - <0.05 - statistically significant).



and position of teeth. High grossly decayed teeth, fractured teeth, root canal treated teeth and teeth with large restorations are preferred for extraction over healthy teeth. Main consideration is the long term prognosis for the tooth rather than the appearance of the tooth. Crowding in one part of the arch is more readily corrected if extraction was done in that part than adjacent areas of arch. In case of incisor crowding, premolars were extracted as it is esthetic and occlusal balance is also maintained. First premolar is positioned in the centre of each quadrant, is usually near the area of crowding whether in the anterior or buccal segment. Hence, premolars are most commonly extracted for orthodontic treatment. Malaligned teeth which are difficult to align may often be the teeth of choice for extraction. The position of the apex of the tooth must be considered as it is difficult to move the apex than crown [7, 10].

Another interesting pattern was noticed during initial stages of data collection. Multiple premolar extractions were noticed in the same patient records. The data finalised for the study did not consider multiple extraction data of the same patient so as to eliminate bias. Extraction of all [4] premolars, either first or second, was the most common pattern noticed. This was due to the fact that balanced extractions could preserve the concept of facial symmetry. Certain sound healthy teeth may be extracted to facilitate proper alignment of other teeth in cases of severe arch length tooth material discrepancy. Such extraction of sound teeth for the purpose of orthodontic treatment is called therapeutic extraction. Wilkinson advocated extraction of entire 1s molars between the age of 8.5 years and 9.5 years as this prevents impaction of 3rd molars, relieves crowding in the arch, and helps in decreasing the incidence and occurrence of dental caries [7].

However we could not find any data on premolar extraction prior to 12 years of age. The concept of serial extraction was not noticed in the present sample population however this method would minimise the future orthodontic treatment duration. It could also be due to the fact that parents were reluctant for extraction of permanent teeth due to reasons other than pain or decay. Serial extraction is the planned and sequential extraction of certain deciduous teeth followed by removal of specific permanent teeth in order to engage the spontaneous correction of

irregularities [11-13].

Parents and children should work together to maintain good oral hygiene. Good attitude of parents reflects as a good oral health in children and vice versa [14-16]. Preservation of primary teeth in the dental arch is important to guide the eruption of the permanent teeth in the optimal position [17-19]. Grossly decayed primary teeth which are extracted before exfoliation causes space in the dental arch which causes malocclusion if space maintainer was not given [20, 21]. Bacteria play a vital role in the initiation and progression of pulpal and periodontal disease [22]. Untreated dental caries eventually lead to pulpitis and periapical periodontitis which is treated by means of root canal procedure or extracted leading to space loss and malalignment which would require orthodontic management [23, 24]. However maintenance of proper oral hygiene would minimise such complications and preserve the primary dentition minimising the orthodontic needs [25-28].

The strength of the study was that this was one of the few studies that assess the common reasons for extraction of premolars. Although this study has a high internal validity, the limitations of reduced sample size, geographic and ethnic limitations of the study sample would reduce the overall external validity of the study. However the future scope would be to perform the study with larger sample size and varied ethnicities to get a broader perspective on understanding.

Conclusion

Within the limitations of the present study, the most common reason for extraction of premolars among children between 12-18 years of age was orthodontic treatment. This was noticed predominantly in children who were females due to esthetic concerns.

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