

Various reasons of mandibular incisor extraction in orthodontic patients

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Abstract

Introduction: Extraction of mandibular incisor is gaining importance while deciding the extraction pattern in cases with a stable Class I occlusion with mild crowding in the lower arch. Other considerations for single incisor extraction also appear when planning a case for orthodontic treatment. Hence, this study was conducted to determine the frequency of reasons most commonly seen in single incisor extraction cases reporting to Islamabad Dental Hospital.

Material and Methods: This descriptive retrospective cross-sectional study was conducted at The Department of Orthodontics, Islamabad Dental Hospital. Data of 92 patients out of 1100 cases, was collected from patient record files for demographic variables (Age, Gender), reasons of mandibular incisor extraction such as crowding, and periodontally compromised incisors before or during treatment and reduced overjet with residual premolar extraction spaces to be closed.

Results: Crowding was the most frequent reason for mandibular incisor extraction (67%), followed by reduced overjet during treatment (16%), periodontally compromised incisors before (12%) and during (4%) treatment.

Conclusions: Extractions of mandibular incisor were done as a result of a number of reasons, the most important being crowding in the lower arch. Loss of overjet to close the residual space while retracting maxillary incisors was another important factor seen followed by presence of periodontally compromised incisors.

Keywords: Mandibular arch crowding; periodontal health; esthetics; stability

Introduction

The idea of extraction for the purpose of orthodontic treatment is not a new philosophy. Camouflage orthodontic treatment can bring out perfection in treatment, provided the result is functionally and esthetically in harmony for each respective case and is according to soft tissue paradigm.

The planned extraction of lower incisor in certain cases allows the orthodontist to improve the occlusion and dental esthetics with minimum orthodontic intervention.

In planning orthodontic cases that include extractions, critical decision is to determine which teeth will be extracted. Several aspects must be considered, such as periodontal health, orthodontic mechanics, functional and esthetic alterations and treatment stability. Extraction of teeth has been used for decades to resolve dental crowding despite of controversies. Premolar extraction is the most common, but there are situations in which atypical extractions facilitate mechanics, preserve periodontal health and favor maintenance of facial profile. The extraction of lower incisor in selected cases, is an effective approach with greater post treatment stability.¹

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According to Kokich and Shapiro, the deliberate extraction of lower incisor in certain cases allows the Orthodontist to improve the occlusion and dental esthetics with a minimum orthodontic action.²

However lower incisor extraction should be avoided in cases with an excessive overbite and overjetbimaxillary crowding cases with no Bolton discrepancy in the incisors area and cases having large maxillary and small mandibular incisors.³

Material and Methods

The study was conducted at Department of Orthodontics, Islamabad Dental Hospital, Islamabad Medical and Dental College, Islamabad. All patients who reported to the Department from 2013 to 2017, and had complete record files were included in the sample. Patients who had an already missing mandibular incisor or getting re-treatment were excluded from the study. Data of 92 patients who had incisor extraction was collected through patient record files for demographic variables (Age, Gender), and reasons for mandibular incisor extractions such as crowding, periodontally compromised incisor before and during treatment, insufficient overjet during treatment were recorded on a proforma. The data was analyzed by SPSS version 20.0.

Results

The mean age of patients in this study was 20 years. There were 43 females and 49 males. The total sample consisted of 92 patients selected from 1100 orthodontics patients; who had extraction of single mandibular incisor in their treatment plan. Hence the percentage of incisor extraction in our study was 8.4%.

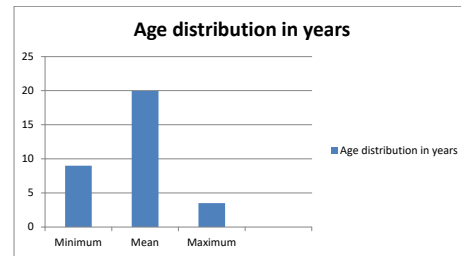


Figure 1: Age distribution graph of the sample

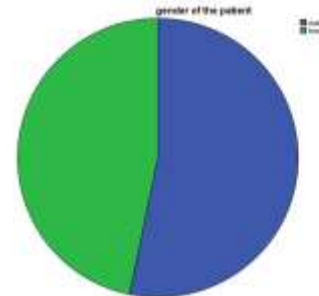


Figure 2: Gender wise distribution of the sample

When the various reasons for mandibular incisors were evaluated; in 62 of the patients the reason was crowding (67.4% of incisor extraction cases). The presence of periodontally compromised mandibular incisor was the reason of extraction in 11 of the patients (12%). Four patients (4.3%) developed a periodontally compromised mandibular incisor during the treatment thus the reason of extraction. While 15 patients reported single incisor extraction due to a decreased overjet during treatment (16.3%).

Table I: Different reasons for extraction of single mandibular incisor

	Frequency	Percent	Cumulative Percent
Crowding	62	67.4	67.4
Pre-treatment periodontally compromised	11	12.0	79.3
During treatment periodontally compromised	4	4.3	83.7
During treatment reduced overjet	15	16.3	100.0
Total	92	100.0	

Discussion

This study was carried out to determine the frequency of various indications for mandibular incisor extraction in Department of Orthodontics, Islamabad Dental Hospital.

The extraction of healthy teeth has been advocated as a treatment alternative for over a century in crowded and camouflage cases. Bourdet in 1757 recommended the removal of the premolars to relieve crowding while Hunter (1835) performed the first premolars extraction to allow incisors retraction in cases of protrusion. The concept of removing the lower incisor for the purpose of relieving the crowding was first introduced by Hahn in 1942.²

In the present study reasons for single incisor extraction evaluated were lower arch crowding, periodontally compromised incisor seen before or during treatment and insufficient overjet. Similar reasons have been evaluated by Kokich and Shapiro, according to whom indications for mandibular incisor extraction include loss of gingival tissue, normal maxillary dentition with good buccal inter-digitation and severe lower anterior crowding, lower anterior Bolton's excess of > 4mm, adult cases with mild to moderate class III malocclusion, ectopically erupted or supernumerary lower incisor, peg shaped upper lateral incisors.⁴

A Forty year review by Proffit on extraction frequencies showed that there was decline in extraction of all first premolars over the last twenty years. However it was found that the incidence of mandubular incisor extraction remained 1 in 6 overtime.⁵

The present study showed a frequency of 8.4 % incisors extraction. 67% Of incisors extraction were for the cases of mandibular incisors crowding. This was the highest frequency amongst all reasons for incisor extraction showing the major reason for incisor extraction in crowded mandibular anterior teeth. This is supported by the study of Afridi, Pasha and Mehmood⁵ who reported a high prevalence of mandibular incisor

crowding(85%) in Pakistani population. Uribe and Nanda⁷ also stated the fact that in cases where an orthodontist finds overcrowding in the lower arch, one of the alternatives is to extract the lower incisor. For taking the decision as to whether the central or lateral incisor should be removed some other factors are to be considered such as esthetics, position in the arch and proximity to the crowding. This is supported by a study of Zacchrisson⁸, who preferred removal of a lateral incisor because it is esthetically less noticeable. Miller et al⁹ also supported the extraction of a lateral incisor for esthetic reasons but also stated the facts that the incisor farthest outside the natural arch and closest to the crowding should be extracted.

Md.Nazmul in a case report about mandibular incisor extraction for management of class I malocclusion showed that one incisor extraction can be an effective treatment choice for appropriate malocclusion with a Bolton discrepancy in skeletal class I patients.¹⁰

The present study reported a frequency of 12% of a pre-treatment periodontally compromised incisor as another reason for its extraction. The extraction of a malformed or periodontally compromised tooth has also been supported by other studies.^{2,11-13} On the other hand Valinoti in his study discouraged the extraction of a periodontally compromised incisor. He stated that if the incisor is being extracted because of buccal gingival recession or presence of bone defect, the problem may persist.¹³ Periodontal problems may also arise if excessive orthodontic forces are applied for a prolonged period of time to a healthy or incisors at a risk of developing gingival issues. Age may play an important role in this regard. In the present study 4% of the cases had incisor extraction as a result of compromised periodontal health during treatment.

In Class II Div 1 cases with skeletal and dental malocclusions, having maxillary protrusion along with crowding or protrusion of the

lower incisors, many studies have indicated single incisor extraction. Mandibular single incisor extraction should be combined with maxillary premolar extractions in order to establish normal occlusion and overjet.^{2,4,15} The results of this present study also state that the second highest frequency of 16% is for extraction of the incisor to close the extraction spaces with insufficient Overjet during treatment.

In a recent systemic review on mandibular incisor extraction, it was shown that mandibular incisor extraction is a good choice when all conditions with regard to its indications are satisfied by patient.¹⁶ In 2015, Youssef J and Skuf Z presented missing or extraction of mandibular incisor in orthodontics revealing advantages, stability of result and clinical consideration on the extraction of mandibular incisor as additional option in correction of malocclusion.¹⁷

Beycan K and Acar A in their case report found that their patient had a stable occlusion after 5 years follow up. They concluded that careful planning for mandibular incisor extraction can be an effective treatment option that produces functional and esthetic results with minimum orthodontic intervention.¹⁸ Duron suggested lower incisor extraction as a therapeutic option that corrects problem quickly and effectively in mild lower arch crowding without compromising profile.¹⁹

A retrospective cross-sectional study at Aga Khan University Hospital, Karachi, Pakistan was conducted to investigate the occlusal outcomes of different treatment protocols in Class I patients. The occlusal corrections, as assessed through the percentages of improvement in PAR scores, were found to be comparable in patients treated with non extraction, premolars extraction, and mandibular incisors extraction.²⁰

Single incisor extraction has various advantages as well as disadvantages. A greater stability in the anterior region has been reported after mandibular single incisor

extraction. Lower incisor extraction is still considered an alternative treatment option as compared to premolar extraction. It is of utmost importance that a thorough clinical and radiographic examination is carried out and analysis of treatment goals, final occlusion, stability and esthetics is achieved before coming to the definitive treatment plan for a case.

Conclusions

1. Single incisor extraction has its merits and demerits depending on every case.
2. Most frequent cause of mandibular incisor extraction was crowding in the lower arch followed by reduced overjet during treatment to close the premolar extraction spaces.
3. Periodontally compromised lower incisor either before or during treatment were also seen as the third and fourth most frequent indications for incisor extraction.

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