

## Case Report

# Mandibular Incisor Extraction in Orthodontics: Case Reports

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## Abstract

The extraction of teeth for orthodontic purpose always has been a topic of immense debate. With regards to orthodontic treatment planning, the pendulum has, over the past century, been swinging back and forth with non extraction therapy at one end of the spectrum and the extraction of all four premolars at the other. An alternative orthodontic treatment modality involving the extraction of only a single mandibular incisor has gained popularity in the past few years. Presented here are three cases with different types of malocclusions treated by mandibular incisor extraction. In carefully selected cases, mandibular incisor extraction allows the clinician to achieve optimum results with the use of simple treatment mechanics.

**Keywords:** Orthodontics; Tooth extraction; Incisor

## Introduction

The decision of whether or not to extract teeth is one of the most crucial choices that the orthodontist has to make when planning a case. The extraction versus non extraction debate is perhaps the most lasting philosophic controversies in orthodontic practice with both biologic and mechanical ramifications. Traditionally, treatment planning in orthodontics has revolved around either a purely non extraction approach or an approach involving the extraction of all four first premolars. However, an alternative orthodontic treatment modality involving the extraction of only a single mandibular incisor has gained popularity in the recent past. Even though this approach was traditionally reserved for cases with an ectopically placed incisor or one with poor prognosis, it is now believed that mandibular incisor extraction in cautiously selected cases may allow the clinician to use simple treatment mechanics and achieve optimum results [1-4].

Cases that are ideal for treatment with single incisor extraction include those with minimal to moderate overbite and overjet, an acceptable soft tissue profile, a mandibular tooth material excess and minimal remaining growth potential [5,6]. Class III cases or those with an anterior cross bite or an edge-to-edge incisor relationship may be camouflaged by the removal of a lower incisor because some collapse of the lower arch may be acceptable in such instances [7,8]. Mandibular incisor extraction may not only reduce treatment time but may also provide a more stable result since no arch expansion is necessary and the intercanine width is minimally altered [9].

Mandibular incisor extraction is generally contraindicated in all cases requiring extractions in both arches with severe overbite and horizontal growth pattern, bimaxillary crowding, no tooth size discrepancy in the anterior teeth, anterior tooth size discrepancy due to narrow mandibular incisors and/or broad maxillary incisors, pronounced overjet and the cases where the diagnostic setup demonstrates that lower incisor extraction can result in excessive overbite.

We present here a report of three cases with different types of

malocclusions treated with single mandibular incisor extraction.

## Case 1

A 17 year old female reported to the orthodontic clinic with the chief complaint of irregular upper and lower front teeth. The patient's past medical and dental history were not contributory.

The patient presented with a convex facial profile, competent lips and relative facial asymmetry with deviation of chin to the left on closure and the tip of the nose deviated to the right (Figure 1). Intra-oral examination (Figure 2) revealed mild crowding in the maxillary arch and moderate crowding in mandibular arch. The maxillary left canine was in cross bite and the mandibular right canine was rotated



**Figure 1:** Case 1, Pre-treatment Extra-oral photographs.



**Figure 2:** Case 1, Pre-treatment Intra-oral photographs.

disto-lingually. The patient had an Angle's Class I molar relationship, an overbite of approximately 5mm and an overjet of 1.5mm.

Model analysis indicated a tooth size-arch length discrepancy of 3mm in the maxillary arch and 8mm in the mandibular arch. Bolton's analysis demonstrated a mandibular anterior tooth material excess.

The goals of orthodontic treatment for this case included the elimination of crowding in both arches, correction of the crossbite in the left canine region, and an improvement in the overbite while maintaining the overjet and the acceptable facial balance. Considering the above treatment objectives, it was planned to extract the right mandibular central incisor, which would help resolve the lower anterior crowding while maintaining the patient's acceptable soft tissue profile.

Due to the reduced overjet, treatment was initiated first in the maxillary arch with the placement of a 0.022" Pre-adjusted Edgewise appliance. Initial alignment and levelling was accomplished with the use of a 0.014" Nickel Titanium arch wire followed by 0.016" and 0.016"x 0.022" Nickel Titanium arch wires. A segment of compressed coil spring was placed to create space for alignment of the maxillary left canine. Once sufficient space had been created, a bracket was bonded to canine and ligated to alignment wire.

Alignment and levelling of the maxillary arch was completed five months into treatment. An overjet of 3mm had been achieved and sufficient space was now available for bonding the mandibular arch. The mandibular right central incisor was extracted and the lower arch was bonded. Alignment and levelling was achieved with the sequential use of 0.014", 0.016" and 0.016" X 0.022" Nickel Titanium arch wires. Once the arch was aligned, a 0.017" X 0.025" working arch wire was ligated and a segment of short elastomeric chain was used to close the remaining extraction space. After a period of seven months since bonding the lower arch, the extraction space had been closed and all mandibular teeth were well aligned. Finishing and detailing

was achieved with maxillary and mandibular 0.019" X 0.025" stainless steel archwires. The case was debonded after a total treatment period of 16 months. Post - treatment extra-oral and intra-oral photographs (Figure 3 and 4) demonstrated pleasing facial esthetics and a Class I mutually protected occlusion. A maxillary Hawley's retainer and a mandibular canine to canine bonded retainer were delivered and appropriate instructions were given.

## Case 2

A 17 year old female patient presented with the chief complaint of an unpleasant facial appearance and abnormally positioned front teeth. The patient's past medical, dental and family history were not contributory.

Clinically, the patient demonstrated a straight facial profile, a prominent lower lip, and relative facial asymmetry with deviation of chin to the left on closure (Figure 5). Intra - oral examination (Figure 6) revealed an anterior cross bite with moderate crowding in the maxillary arch and mild crowding in the mandibular arch. The maxillary canines were positioned labially, the lower midline was shifted to the left and the patient possessed a super class I molar relation on either side.

Model analysis revealed a tooth size - arch length discrepancy of 6mm in the maxillary arch and 4mm in the mandibular arch. Bolton's analysis revealed a mandibular anterior tooth material excess.

Goals of orthodontic treatment for this pseudo Class III case included the correction of the anterior cross bite, elimination of crowding in both the arches and the establishment of an acceptable overjet and overbite with pleasing facial esthetics. The available treatment options included a non-extraction treatment approach but this was considered inappropriate in lieu of the difficulty that might be encountered in achieving an acceptable overjet due to lower anterior tooth material excess and the slight mesio-occlusion. Considering the



Figure 3: Case 1, Post-treatment Extra-oral photographs.



Figure 4: Case 1, Post-treatment Intra-oral photographs.



Figure 5: Case 2, Pre-treatment Extra-oral photographs.



Figure 6: Case 2, Pre-treatment Intra-oral photographs.

above treatment objectives, extraction of one of the lower incisors was considered the favourable treatment option.

The mandibular left central incisor was extracted and treatment was initiated by the placement of a 0.022" Pre-adjusted Edgewise appliance in the maxillary and mandibular arches. A posterior bite block was built up with glass ionomer cement on the lower molars to relieve the occlusion. Initial alignment and levelling was achieved with maxillary and mandibular 0.014" Nickel Titanium arch wires followed by 0.016" Nickel Titanium arch wires. Three months into treatment, the bite had been jumped and the anterior crossbite was corrected. The glass ionomer cement bite block was removed and 0.016" X 0.022" Nickel Titanium archwires were ligated in both arches. These were followed by 0.017" X 0.025" stainless steel working arch wires and the remaining extraction space in the lower arch was closed with a segment of short elastomeric chain. Co-ordinated upper and lower 0.019" X 0.025" stainless steel arch wires were then placed for a period of 4 months and once satisfactory occlusal detailing had been achieved, the case was debonded. Post-treatment extra-oral & intra-oral photographs (Figure 7, Figure 8) revealed good facial balance and well aligned maxillary and mandibular arches. Retention was provided by using a lower canine to canine bonded retainer and a maxillary Hawley's retainer.

### Case 3

An 18 year old male patient reported to the orthodontic clinic with the chief complaint of irregular upper and lower front teeth. The patient's past medical and dental history were not contributory.

On clinical examination, the patient was found to have a convex facial profile and a relatively symmetrical face with competent lips (Figure 9). Intra-oral examination revealed moderate crowding in the maxillary and mandibular arches. The maxillary lateral incisors were palatally placed with the left lateral incisor in crossbite and the left canine was blocked out labially. The maxillary molars were found to

be mesio-palatally rotated and the patient had an end to end molar relationship (Figure 10) (*An end to end relationship happens when the cusps of the upper and lower permanent molars are on the same plane*).

Model analysis revealed a discrepancy of 8mm in maxillary arch and 7mm in the mandibular arch. The relatively small mesio-distal dimension of the maxillary lateral incisors contributed to a Bolton's mandibular anterior tooth material excess.

Treatment goals included relieving of crowding in both arches, correction of the crossbite in the left lateral incisor region, an improvement in the overjet and overbite and the establishment of a Class I posterior intercuspation. Considering the patient's soft tissue profile which demonstrated a prominent nose and deficient chin button, it was believed that premolar extractions would worsen the facial esthetics. The demonstrable mandibular anterior excess tilted the balance in favour of a treatment plan involving the extraction of one of the lower incisors.

Treatment was commenced with the extraction of the mandibular left central incisor and placement of a 0.022" Pre-adjusted Edgewise appliance in both the maxillary and mandibular arches. A quad helix appliance was cemented on to the maxillary first molars to regain some space by de-rotating the molars. 0.014" Nickel Titanium arch wires were ligated in both arches followed by 0.016" arch wires. Four months into treatment, the quad helix appliance was removed and 0.016" X 0.022" Nickel Titanium arch wires were placed in both arches. Once satisfactory alignment and leveling had been achieved, 0.017" X 0.025" stainless steel working archwires were ligated and the remaining extraction space in the lower arch was closed using a segment of short elastomeric chain. Co-ordinated 0.019" X 0.025" stainless steel finishing arch wires were now placed for a period of another 3 months. Once finishing and detailing had been achieved, the case was debonded and a maxillary Hawley's retainer was delivered along with a mandibular fixed bonded retainer. Post



Figure 7: Case 2, Post-treatment Extra-oral photographs.



Figure 8: Case 2, Post-treatment Intra-oral photographs.



Figure 9: Case 3, Pre-treatment Extra-oral photographs.



Figure 10: Case 3, Pre-treatment Intra-oral photographs.



Figure 11: Case 3, Post-treatment Extra-oral photographs.



Figure 12: Case 3, Post-treatment Intra-oral photographs.

treatment extra-oral & intra-oral photographs (Figure 11 and 12) demonstrated pleasing facial esthetics and a harmonious occlusion.

## Discussion

Jackson in 1905 was amongst the first to advocate lower incisor extraction to relieve mandibular crowding [9]. Although a number of cases treated with this treatment modality have been reported since then, the orthodontic extraction of a single mandibular incisor has had its own share of controversy. Proponents of this treatment philosophy believe that the deliberate extraction of a lower incisor in certain cases allows the orthodontist to improve the occlusion and dental aesthetics with a minimum of orthodontic manipulation. In patients with severely crowded mandibular arches, the removal of one or more mandibular incisor(s) is a logical alternative which may allow for increased stability of the mandibular anterior region without continuous retention [10].

Articulating six maxillary with five mandibular anterior teeth necessitates a visualization of the post treatment occlusion, and therefore specific criteria for case selection are essential. The three cases presented above reported with different types of malocclusions but each possessed a mandibular anterior tooth material excess with a moderate overbite and an acceptable soft tissue profile. Also, neither of the patients had any significant remaining growth potential. The extraction of a mandibular incisor in these cases provided a favorable treatment option and helped achieve optimum results.

Some important factors must always be taken into consideration before opting for such a treatment approach. One should perform a careful diagnosis using a diagnostic setup to analyze treatment goals and occlusal outcome. The short-term esthetic inconvenience of the extraction space should however be discussed with the patient before treatment. Following therapy, the maxillary midline occludes with the centre of the remaining mandibular central incisor, but this is not known to compromise esthetics or function. If properly indicated and carefully and appropriately conducted, lower incisor extraction can significantly contribute to the treatment of certain malocclusions and the pursuit of excellence in orthodontic treatment results, reflected in maximum function, esthetics and stability with the use of simple treatment mechanics.

## Conclusion

Three patients treated of different malocclusions with extraction of mandibular incisor illustrate some of the special considerations involved in this type of therapy. Although the indication of this type of extraction decisions is relatively rare, the possibility of incisor extraction should be a part of every clinician's portfolio of treatment techniques. If it is carefully planned and executed in the proper situation, incisor extraction can be an effective way of satisfying a particular set of treatment objectives.

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