

# Mandibular incisor extraction treatment in Angle's Class I malocclusion with peg-shaped maxillary lateral incisors

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## ABSTRACT

Accurate diagnosis and treatment planning are essential for obtaining ideal treatment result in cases involving mandibular incisor extraction. This case report describes a 15-year-old female with balanced soft-tissue profile, peg-shaped maxillary lateral incisors, and moderate mandibular anterior crowding treated with a mandibular incisor extraction. Ideal overbite and overjet were achieved. "Black triangle" formation was avoided due to the bodily movement of mandibular incisors and the use of uprighting springs for ideal axial inclination of mandibular incisors. A mandibular incisor extraction can be an effective treatment option in carefully selected clinical situations.

**Key words:** Angle's Class I malocclusion, mandibular incisor extraction, peg-shaped maxillary lateral incisors

## INTRODUCTION

Mandibular incisor extraction is one of the treatment alternatives for tooth-size-arch-length discrepancy or anterior crowding in mandible. A deficiency in the mesiodistal width of the maxillary anterior teeth in the presence of moderate mandibular arch crowding opens up the possibility of a mandibular incisor extraction as one of the treatment options.<sup>[1]</sup> However, closure of the mandibular incisor extraction space can result in an excessive overjet in the absence of any Bolton discrepancy. This case report describes a 15-year-old female treated with a mandibular incisor extraction. Ideal treatment goals were achieved without an increased overjet due to thorough diagnosis and use of appropriate mechanics [Figures 1 and 2].

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## CASE REPORT

### Etiology and Diagnosis

The patient had a mesiofacial face type with competent lips, no mentalis muscle strain, and no significant facial asymmetries [Figure 1]. Intraorally, she had Angle's Class I molar relationship bilaterally, 2 mm overjet, and 30% overbite. Maxillary midline was coincident with the facial midline while the mandibular midline was off to the left side by 2 mm [Figures 1 and 2]. Peg-shaped maxillary lateral incisors were noted on both sides. Anterior Bolton ratio was found to be 90%. A 1 mm space requirement in the maxillary arch and a 6 mm space requirement in the mandibular arch were found on the study model analysis.

No abnormalities were noted on the panoramic radiograph [Figure 3]. Clinical examination did not reveal any temporomandibular joint problem. Periodontal health was found to be within normal limits. Cephalometric measurements

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reflected a Class I skeletal relationship between maxilla and mandible. The maxillary and mandibular incisors were minimally retroclined over the basal bone [Figure 4 and Table 1].

**Alternative Treatment Plans**

The patient’s chief concern was “my teeth are crooked.” Treatment alternatives for this case were (1) nonextraction approach involving “opening up” of space for the cosmetic build-up of both maxillary lateral incisors and relieving mandibular crowding by interproximal reduction or (2) extraction of mandibular left central incisor without any cosmetic build-up of maxillary lateral incisors.

Due to the patient’s parents’ opposition to cosmetic build-up of peg-shaped maxillary lateral incisors, extraction of mandibular left central incisor was offered as a treatment plan option. This treatment plan was selected by the patient and her parents.

**Treatment Progress**

After the extraction of mandibular left central incisor, preadjusted fixed appliances (0.022 × 0.028 inches, MBT system®) were placed in both arches. Initial leveling and alignment were carried out with 0.014 and 0.018 nitinol wires. The archwires were subsequently changed to 0.020 × 0.020 BioForce®, 0.019 × 0.025 nickel titanium, and 0.019 × 0.025 stainless steel. Elastomeric chain was used to close the extraction space in the mandibular arch. Complete space closure was achieved within

9 months of initiation of the treatment. Uprighting springs were placed in the brackets of mandibular right central incisor and mandibular left lateral incisor to achieve mesial root movement and root parallelism of these teeth.

Detailing bends in 0.018 stainless steel wires, coordinated archwires, and settling elastics were used to gain maximum intercuspation. The orthodontic appliances were removed after 18 months of the treatment. Retention protocol in mandibular incisor extraction cases involves the use of bonded lingual

**Table 1: Pretreatment and posttreatment lateral cephalometric analysis data**

Measurement	Pretreatment	Posttreatment
SNA angle (°)	78.5	79.5
SNB angle (°)	76	76
ANB angle (°)	2.5	3.5
Wits appraisal (mm)	-3.5	-4
FMA (°)	28	30
SN-GoGn (°)	38	38
Upper incisor to NA (mm)	5	4
Upper incisor to NA (°)	21	21
Lower incisor to NB (mm)	6	6
Lower incisor to NB (°)	24	26
IMPA (°)	88	89
Interincisal angle (°)	132	130
Upper lip to E line (mm)	0	-1
Lower lip to E line (mm)	4	3

ANB – A point, nasion, B point; FMA – Frankfort mandibular plane angle; Gn – Gnathion; Go – Gonial; IMPA – Incisor to mandibular plane angle; NA – Nasion point A; NB – Nasion point B; SN – Sella nasion; SNA – Sella nasion point A; SNB – Sella nasion point B



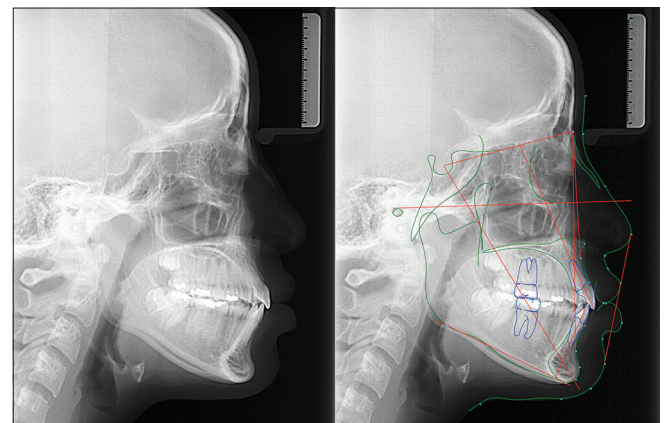
**Figure 1: Pretreatment facial and intraoral photographs**



**Figure 3: Pretreatment panoramic radiograph**



**Figure 2: Pretreatment dental casts**



**Figure 4: Pretreatment lateral cephalogram and tracing**



retainers along with removable retainers such as Hawley retainers and Essix retainers. A mandibular lingual retainer was bonded on all mandibular anterior teeth, and a maxillary lingual retainer was bonded on all maxillary incisors. Fixed retention was supplemented with the use of removable maxillary and mandibular Hawley retainers.

### Treatment Results

The patient's chief concern of crowding was resolved while ideal overbite and overjet were achieved. A Class I molar and canine relationship were established with satisfactory interdigitating of posterior teeth [Figures 5 and 6]. The center of the mandibular right central incisor was established as the new mandibular dental midline which was coincident with the maxillary dental midline. No root resorption was noticed, and the periodontal tissues remained healthy during treatment. Satisfactory root parallelism was achieved as noted on the posttreatment panoramic radiograph [Figure 7]. No temporomandibular joint problems were noted.

Soft-tissue profile, upper lip position, and lower lip position did not change significantly [Figures 8, 9 and Table 1]. Cephalometric evaluation revealed that the maxilla and mandible did not exhibit any significant change in the anteroposterior, vertical, and transverse planes of space. The maxillary incisors showed minimal extrusive movement. Maxillary and mandibular incisors maintained their position



Figure 5: Posttreatment facial and intraoral photographs



Figure 7: Posttreatment panoramic radiograph

in the anteroposterior dimension as compared to their pretreatment position [Figure 9]. Treatment results were stable at 1 year retention stage [Figure 10].

### DISCUSSION

Some of the diagnostic criteria listed in orthodontic literature for a mandibular incisor extraction are Class I malocclusion without skeletal discrepancies, minimal growth potential, balanced soft-tissue profile, minimal overbite, minimal crowding in the maxillary arch, and existing Bolton and tooth-size-arch-length discrepancy  $\geq 4\frac{1}{2}$  mm.<sup>[2-5]</sup> Mandibular incisor extraction may also be considered when the patient has congenitally missing or peg-shaped maxillary lateral incisors and moderate mandibular anterior crowding.<sup>[6,7]</sup> All of the above diagnostic criteria were present in our patient, which helped us achieve a successful treatment outcome.

Loss of the interdental papillae between the mandibular incisors leading to the development of "black triangles" has been reported as an unwanted side effect of a mandibular incisor extraction.<sup>[8,9]</sup> However, this side effect was not noticed in our patient due to the ideal axial inclination of the mandibular incisors [Figures 5 and 7]. Use of root uprighting springs on the mandibular right central incisor and mandibular left lateral incisor helped us achieve this goal.

Uribe and Nanda described the case selection and mechanics of orthodontic treatment involving mandibular incisor extraction.<sup>[10]</sup> To prevent excessive lingual tipping of incisors and canines,

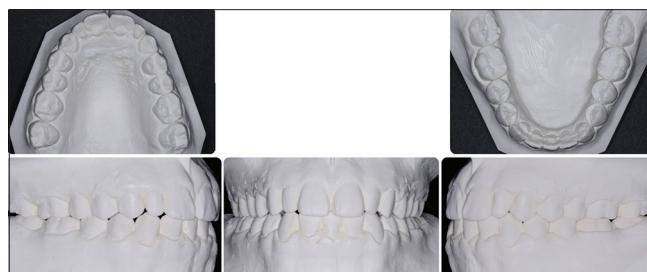


Figure 6: Posttreatment dental casts

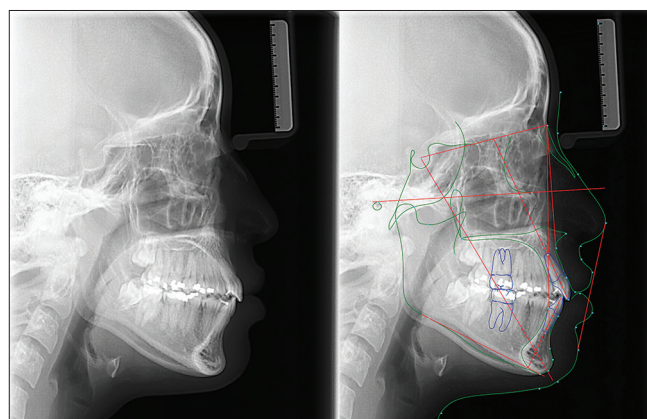
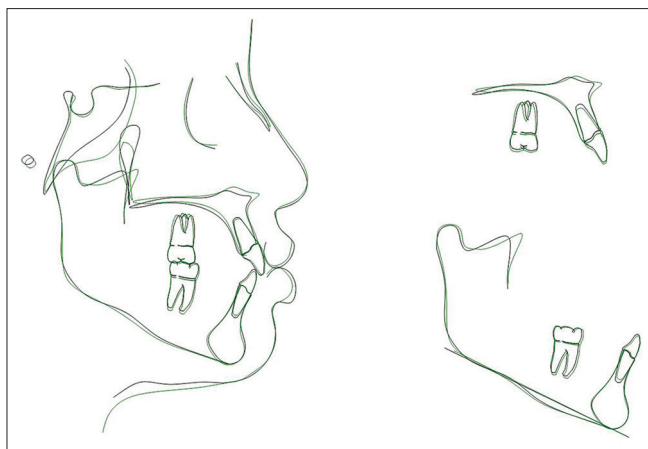


Figure 8: Posttreatment lateral cephalogram and tracing



**Figure 9:** Superimposition

they recommended the use of a largest possible rectangular wire to fill the bracket slot during extraction space closure. We used a 0.019 × 0.025 stainless steel archwire to accomplish bodily movement of mandibular incisors into the extraction site. This also helped to avoid the formation of a “black triangle” by displacing the contact between the mesial surfaces of the mandibular incisors in a gingival direction.<sup>[10]</sup>

## CONCLUSIONS

Extraction of a mandibular incisor can be an effective treatment choice for a Class I malocclusion with peg-shaped maxillary lateral incisors and Bolton discrepancy. Successful treatment outcome can be achieved if all the appropriate diagnostic criteria are taken into consideration before formulating the final treatment plan.

## Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.



**Figure 10:** One-year retention facial and intraoral photographs

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## Conflicts of Interest

There are no conflicts of interest.

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