

## Indications for lower incisor extraction – A case series review

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### Abstract

Lower incisor extraction is a treatment regime since decades with its own advocates and opponents. Even though many pioneers and legends support lower incisor extraction therapy, there is still a dilemma in the orthodontic community which might be due to the fear of certain disadvantages such as formation of black triangles, midline discrepancy, loss of canine guidance, decrease in intercanine width and bite deepening. But proper case selection, treatment planning and treatment mechanics will produce stable and good results with lower incisor extraction therapy. In this article we are illustrating the specific indications of lower incisor extraction with the help of treated cases.

**Keywords:** Mandibular incisor, Extraction, Bolton discrepancy, Adult orthodontics, Black triangle.

### Introduction

The era of extraction had begun as early as in 1757, by Bourdet, a disciple of Pierre Fauchard where he extracted premolars to relieve crowding while Hunter in 1835 extracted the first premolars for retraction of proclined incisors.<sup>1</sup> Even though the charm of extraction therapy had decreased during the Angle's period, the pendulum has swung back and forth. Now it has reached a stand point where extraction of any teeth is warranted, until it meets the treatment goal, stability, final occlusion and aesthetic demands pertaining to individual cases. In view of this fact, lower incisor extraction becomes an alternative treatment for malocclusions that do not fit the conventional forms of extraction since it is more stable in the long term. This bloom in the favourability of lower incisor extraction has occurred in the light of various theories put forward by several authors. The phylogenetic studies of the mandible had shown that the tooth bearing portion has decreased during the course of evolution which in turn was supported by Bolk's fetalisation theory, according to which the masticatory apparatus comes to a standstill at a much less progressed stage in ancient man compared to the ancestors.<sup>2</sup> Moreover, Berger<sup>2</sup> stated that change over from labiodonty (edge to edge bite) to psalidodonty (scissor bite) is responsible for the high frequency of mandibular incisor crowding compared to maxillary incisors.

History has shown that as long back as 1904; Jackson<sup>3</sup> had illustrated a case where two mandibular incisors were removed to alleviate crowding. Similar cases were displayed by Milton Fischer<sup>4</sup> in 1940, where he demonstrated good stability even after four years without any retention protocol. To correct Class III malocclusions by lingual movement and elevation of the anterior teeth, Hahn<sup>1</sup> in 1942, advocated the removal of a mandibular incisor.

Riedel<sup>4</sup> (1992) in his ten year post retention studies have shown that in patients with severely crowded

mandibular arches, the removal of one or more mandibular incisors is the only logical alternative which may allow for increased stability of the mandibular anteriors without continued retention compared to premolar extraction cases.

Even though many pioneers and legends support lower incisor extraction therapy, there is still a dilemma in the orthodontic community which might be due to the fear of certain disadvantages such as formation of black triangles, midline discrepancy, loss of canine guidance, decrease in intercanine width and bite deepening. But proper case selection, treatment planning and treatment mechanics will produce stable and good results with lower incisor extraction therapy.

As the indications for incisor extraction are very specific and vast it is essential to understand the basics of this methodology.

### Indications

#### 1. Class I Malocclusion

- Tooth size anomalies due to Bolton's mandibular tooth material excess<sup>5</sup>
- Tooth size discrepancies due to deficient mesiodistal width, especially of upper lateral incisors<sup>6</sup>
- Ectopically erupted incisors<sup>5,8</sup>
- Severe tooth size discrepancies due to anomalies in number of anterior teeth<sup>9</sup>

#### 2. Class II Malocclusion

- Class II Division 1 skeletal and dental malocclusion<sup>10</sup>

#### 3. Class III Malocclusion

- Mild class III malocclusion with anterior cross bite<sup>11</sup>
- Mild class III malocclusion with edge to edge relationship and tendency towards anterior open bite<sup>12</sup>
- Non-surgical alternative in mild class III which requires mild overjet and overbite corrections

#### 4. Other Indications

- Periodontally compromised mandibular incisor<sup>13</sup>
- Adult orthodontics<sup>11</sup>
- Carious mandibular incisor<sup>14</sup>
- Cases requiring minimum profile change<sup>15</sup>
- Retreatment cases<sup>16</sup>
- Temperomandibular disorders<sup>15</sup>
- Minimal space requirement in the lower arch.

#### 1. Class I malocclusion

##### A. Excessive Mesiodistal Width of the Mandibular Incisors

###### Case 1

A 26 year old male reported with a chief complaint of irregularly placed lower anterior teeth (Fig. 1). He presented with a good profile and competent lips. The model analysis showed a Bolton's mandibular anterior excess of 4.6 mm. According to Bolton,<sup>18</sup> mandibular tooth size excess greater than 1.6 mm is considered significant and is handled in one of the three ways: interproximal reduction, lower incisor extraction, or restoration of upper anteriors. Since the discrepancy in the lower arch was more than that which could be resolved with slenderization and as the upper anteriors were in good proportion, it was decided to extract a mandibular incisor (42).



Fig. 1:

The post treatment overjet was a little more than the ideal (4 mm) and a compromise had to be reached as the patients profile was ideal. The case was finished in a short treatment time of 1 year and the ideal profile was maintained.

##### B. Deficient mesiodistal width, especially of the upper lateral incisors

###### Case 2

A 43 year old lady reported with a chief complaint of spacing in the upper anterior region (Fig. 2). The model analysis exhibited a Bolton discrepancy with anterior maxillary deficiency of 6.3 mm which was obviously due to the peg shaped upper lateral incisors. The presence of a mild incompetency required anterior retraction which in-turn required the creation of a larger

overjet. A routine premolar extraction would have led to a flattening of the profile and being an adult it would benefit to have minimum tooth movement within minimum treatment time. Considering these factors, it was decided on a lower incisor extraction so as to allow retraction and to facilitate lateral incisor build up.



Fig. 2:

An ideal overjet and overbite was achieved in the post treatment phase with positive changes on the profile and lips.

##### C. Ectopic Eruption of Incisors

Ectopic eruption of mandibular incisors pose various problems like trauma from occlusion, cross bites, transpositions and periodontal break down. If the upper and lower arches are ideally aligned and positioned, then extraction of these ectopically erupted mandibular incisors would be the ideal form of treatment.

###### Case 3

A 14 year old boy reported with the chief complaint of lower anterior crowding (Fig. 3). He presented with an ideal profile, Class 1 molar relation, nicely aligned upper arch and lingually blocked out 42. No other extraction protocol would have suited this situation best other than the extraction of the in standing 42. Both the arches were aligned, the bite was opened and the profile remained undisturbed.



Fig. 3:

## 2. Class II Malocclusions

Lower incisor extractions is ideally indicated in skeletal class II cases with full-fledged Angle's class II molar relation with an increased overjet and severe proclination. These incisor extractions are ideally coupled with upper arch bilateral bicuspid extractions. Lower incisor extractions usually help in minor decrowding and opening of the bite in these situations and the molar relation is maintained with an Angle's class II relation.

### Case 4

A male patient aged 16 years presented with a skeletal and dental class II relationship with an overjet of 10 mm, deep bite, with a convex profile and incompetent lips (Fig. 4). The lower arch was nicely aligned with mild proclination. The case was treated with upper bilateral first bicuspid extraction and a lower incisor extraction (41). The post treatment finished in an Angle's class II molar relation, ideal overjet, overbite, profile and lip competency.



Fig. 4:

## 3. Class III Malocclusions

In adult orthodontics, patients with very mild tendency for class III malocclusion or mild class III malocclusion with minor lower anterior crowding or edge to edge incisor relationships are candidates indicated for lower incisor extraction.

### Case 5

A 32 year old adult patient with a mild class III dental and skeletal relation exhibited an ideal profile (Fig. 5). An upper anterior crowding was observed with the upper lateral incisors in cross bite with a shallow overjet and overbite. The upper midline was shifted to the right and the space required was considerably excessive for a non-extraction approach. Thus, as an ideal profile was present and de-crowding in the upper arch was the prime concern, a unilateral extraction of 25 was carried out. The lower anteriors were near upright position and required mild retraction to create an ideal overjet, for which a lower incisor was, extracted (41).



Fig. 5:

In the post treatment, the profile remained unchanged while the upper arch crowding was relieved and the midlines corrected with ideal overjet. The upper molar, on the premolar extraction side, was mesialised to finish in a Angle's class II molar relation. The fractured upper central incisors are awaiting an incisal build up.

## 4. Other Indications

### A. Periodontally Compromised Mandibular Incisor

Malocclusions with a malformed or periodontally compromised mandibular incisor accompanied by gingival recession and bone loss, whose maintenance would not provide any benefit could be considered as a good indication for lower incisor extraction.

### Case 6

A 17 year old female patient with a good profile presented with a chief complaint of crowding of upper and lower anterior teeth. Intraorally, the lower incisor (41) was in a cross bite (Fig. 6) which resulted in a 40% bone loss due to trauma from occlusion. Apart from the compromised periodontal status the moderate crowding ideally led to the lower incisor extraction as treatment plan. The upper arch was treated with mild slendarization and the case finished with ideal overjet, overbite with no changes in the profile.



Fig. 6:

## B. Adult Orthodontics

In adult orthodontics where treatment period is of a major concern, mandibular incisor extraction is an ideal form of treatment. Treatment mechanics are also simple with reduced treatment time.

### Case 7

A 25 year old female patient with poor periodontal status, a mutilated dentition presented with severe upper anterior spacing with an ideal lower arch (Fig. 7). An overjet had to be created along with bite opening for upper anterior retraction. A single lower incisor extraction (41) served the purpose. The case was finished with ideal overjet, overbite with pleasing profile.



Fig. 7:

## C. Severe tooth size Discrepancies due to Anomalies in Number of Anterior Teeth

Anomalies in the number of upper anterior teeth can be due to various reasons such as congenitally missing teeth, trauma leading to fracture or grossly carious teeth beyond repair and finally unfavourably impacted teeth. Such cases would exhibit a Bolton discrepancy and is a good indication for lower incisor extraction therapy.

### D. Carious Mandibular Incisor

Occasionally orthodontists need to plan treatment for a patient with extensive caries or a pulpally involved mandibular incisor. In these situations, cases with minimum space requirement in the lower arch, an extraction of the involved incisor can be justified as no other healthy teeth are sacrificed.

### E. Retreatment Cases

Previous studies have shown that relapse of crowding occur mostly in the lower anterior region due to various reasons such as decrease in intercanine width, eruption of third molars, etc. Lower incisor extraction can be a compromised solution for treatment in such relapse situations.

### F. Temperomandibular Disorders

TMD cases can be due to discrepancy between centric occlusion and centric relation. In certain cases where the mandible positions anteriorly due to deprogramming splint therapy a decreased overjet results. In these situations, to attain an ideal overjet and stabilize the occlusion to the newly attained position of

the mandible, invariably, a small space requirement occurs in the lower arch. The lower incisor extraction could be the treatment of choice in these cases.

### Advantages

1. Reduces treatment time, especially if crowding is limited to the anterior region.<sup>18</sup>
2. Mechanotherapy is usually simplified.<sup>19</sup>
3. Decreases the amount of tooth movement when compared to other extractions.<sup>10</sup>
4. Diminishes the risk of anchorage loss since posterior segment is untouched without extraction.<sup>18</sup>
5. Mandibular incisor extraction causes only minimal changes in profile.<sup>10</sup>
6. Posterior occlusion is not disturbed.<sup>18</sup>
7. Especially helpful in adult orthodontics due to reduced treatment time.<sup>10</sup>

### DIS Advantages

1. The interproximal papillae may be sacrificed, which may lead to the development of open gingival embrasures or “black triangles” (Fig 8).<sup>20</sup>



Fig. 8:

2. A midline discrepancy is inevitable, though the lower midline is less visible in the frontal view.<sup>12</sup>
3. It can create a Bolton's tooth size discrepancy, especially if case selection is improper.<sup>19</sup>
4. It is of a temporary esthetic concern for the patient as the extraction site is visible during the initial period of treatment and until space closure.
5. It can create an uneven overjet.

### Conclusion

Mandibular incisor extraction is a good choice when all the conditions with regard to its indications are satisfied by a patient. Injudicious extraction without proper treatment planning should be avoided, as it may lead to excess over jet, overbite and occlusion which is not functionally stable. A proper diagnostic setup is always recommended before doing mandibular incisor extraction, so that a proper idea regarding the post treatment occlusion can be obtained. It is better to avoid incisor extraction if the diagnostic setup does not yield a satisfying post treatment occlusion. Negative results are mostly due to faulty case selection or faulty mechanics. Mandibular incisor extraction is a better choice to opt for, as the mechanics becomes simpler and good results are achievable in a short period of treatment time.

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