

SINGLE LOWER INCISOR EXTRACTION IN ORTHODONTICS: A CASE REPORT

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ABSTRACT

Extraction of teeth in orthodontics is always a matter of controversy. In recent years, extraction of single mandibular incisor in orthodontic treatment is gaining popularity due to its simple mechanics and various long term advantages in mandibular crowding cases. Moreover, less visibility of the lower dentition during smile, specially in females, has supported this treatment option from an esthetic point of view. This article is presenting a case report of a 17 years old female orthodontic patient treated by single lower incisor extraction.

KEYWORDS

Extraction; incisor; orthodontics

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INTRODUCTION

In orthodontic treatment, extraction of healthy teeth is considered as a treatment alternative over a century. Bourdet, a disciple of Pierre Fauchard, recommended the removal of the premolars to relieve crowding in the year of 1757¹. But Hunter(1835)was first to extract the first premolars to allow incisor retrusion¹. Later in 1905, Jackson described a case where two lower incisors were extracted at different times to relieve the crowding². Hahn(1942) also advocated extraction of a mandibular incisor to get space for reduction of anterior crowding¹. Kokich and Shapiro (1984) pointed out the fact that deliberate extraction of a lower incisor in certain cases allows the orthodontist to improve occlusion and esthetics using minimum mechanics¹.

The extraction of the lower incisors constitutes a therapeutic alternative in treating certain situations:

1. Crowded lower anteriors with lack of space for one incisor³.
2. Moderate crowding in lower anterior region with good normal maxillary dentition, perfect buccal interdigitation, acceptable soft tissue profile, minimal to moderate over bite & overjet⁴.
3. Lower incisor with bone loss, periodontitis & fracture and ectopic position¹.
4. Class I cases with anterior dental cross bite due to lower anterior crowding and protrusion⁵.
5. Severe anterior tooth size discrepancy (greater than 4.5 mm)⁴ due to small upper or large lower anteriors.
6. Class III cases with minimal growth potential where retrusion of lower anteriors improves occlusion⁶.

But there are some clear cut contraindications:

1. 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.^{4,7}
2. Cases with “triangular” lower incisors and minimum crowding (less than 3 mm discrepancy), which should preferably be treated by stripping the incisors to prevent there opening of spaces and loss of interdental gingival papilla between the remaining incisors, which might compromise esthetics.⁷



Pretreatment extraoral photographs

3. Cases where the diagnostic setup demonstrates that lower incisor extraction can result in excessive overbite.⁸
4. Cases in which a high insertion of the lower labial frenum may cause gingival recession in the remaining incisors to be moved to the frenum area.⁸

CASE REPORT

Diagnosis and etiology:

A 17 years old female patient reported with the chief complaint of irregularly placed upper and lower front teeth. Her past medical, dental and family history was not contributory.

On extraoral examination, she was mesoprosopic with straight profile and a prominent nose. Her lips were potentially competent with interlabial gap of 4 mm.

On intraoral examination, all permanent teeth except the third molars were present. Her 11 and 21 were retroclined and 12 was proclined. 23 was

mesiolingually rotated. 15 was in scissorbite. There was severe crowding in lower arch with lingually blocked ectopically positioned 42 and distolingually rotated 31, 33 and 43. Molar relation was Angle's class I, canine relation was class I in right side and class III in left side, and incisors were in a class II div 2 pattern. There was deepbite of 7mm and 0mm of overjet. The lower arch midline was shifted to the right side by 3 mm.

Study model analysis revealed tooth size-arch length discrepancy of -1mm in maxillary arch (excess space of 1mm) and 8 mm in lower arch (8mm space deficiency in lower arch).

Bolton's anterior ratio was 80% indicating anterior tooth material excess in mandibular arch by 1.26 mm.

The cephalometric analysis showed skeletal Class I relation (ANB angle, 2°; Wit's appraisal, +1 mm). Analysis also showed that the patient had average growth pattern (FMA angle, 25°; Sn-GoGn angle, 31°; Y axis, 60°), retroclined upper incisors (1.NA, 18°; 1-NA, 2mm) and retroclined lower incisors (1.NB, 16°; 1-NB, 3mm, IMPA, 80°).



Pretreatment intraoral photographs



Pre-treatment Lateral Cephalogram



Pre-treatment OPG

TREATMENT GOALS

The goals of orthodontic treatment for this case included establishing proper overjet, reducing the deep bite, correction of all the rotations along with relief of the lower anterior crowding and correcting the scissor bite.

TREATMENT PLANNING

Considering the above treatment objectives, it was planned to extract the right mandibular lateral incisor followed by fixed mechanotherapy (Preadjusted Edgewise Appliance- MBT).

TREATMENT PROGRESS

Due to the deep bite and reduced overjet, treatment was initiated first in the maxillary arch with the placement of a 0.022" Pre-adjusted Edgewise appliance (M.B.T). Initial alignment and leveling was accomplished with the use of a 0.012"

Nickel Titanium (NiTi) arch wire followed by 0.016" NiTi. In 0.018" Stainless Steel (SS) wire a segment of compressed coil spring was placed to create space for alignment of the rotated 23 as well as to further procline 11 and 21. Upper arch leveling was done in 0.017"x0.025" SS with accentuated curve of spee.

Alignment and leveling 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. 42 was extracted and the lower arch was bonded. Alignment and leveling was achieved with the sequential use of 0.012", 0.016" and 0.017"x0.025" NiTi wires followed by 0.017"x0.025" SS wire. A segment of compressed coil spring was placed to create space for the alignment of the lingually tilted 45 and the bite was kept open till it was well aligned.

Once the arch was aligned, a 0.019" X 0.025" SS wire was ligated and a segment of short elastomeric chain was used to close the remaining space. After a period of nine months since bonding the lower arch,



Midtreatment intraoral photographs



Post-treatment extraoral photographs



Post-treatment Lateral Cephalogram



Post-treatment OPG



Post-treatment intraoral photographs

the remaining space had been closed and all mandibular teeth were well aligned. Finishing and detailing was achieved with maxillary and mandibular 0.014" stainless steel archwires. The case was deboned after a total treatment period of 18 months. Post-treatment extra-oral and intra-oral photographs demonstrated pleasing facial esthetics and a Class I mutually protected occlusion. Maxillary and mandibular canine to canine bonded retainers were delivered and appropriate instructions were given.

TREATMENT RESULTS

The final occlusion showed molar and canine Class I relationship with acceptable overjet and overbite. Upper and lower incisor alignment was accomplished (1.NA, 23°; 1-NA, 5mm; 1.NB, 26°; 1-NB, 5mm, IMPA, 91°). The scissor bite was also corrected and pleasing facial profile (E line to upper lip, -3mm; E line to lower lip, -1mm) was achieved.

DISCUSSION

According to Profit, mandibular incisor extraction comprised 20% of all the orthodontic extraction cases in 1950s, but was rarely used thereafter⁹. The reasons may be tendency for space to reopen in the extraction site, differences in color between lateral incisors and canines, increased overbite and overjet beyond acceptable limits, esthetic loss of interdental gingival papilla in the extraction area, partially inadequate occlusion and disturbed interocclusal relationship of anterior teeth.⁴

In spite of these limitations, it still holds various advantages:

- Maintains or reduces inter canine width.¹⁰
- Maintains the overall arch form, minimizing or preventing its expansion.^{4,7}
- Reduces retention time by increasing stability.^{4,7}
- Rapidly retracts anterior segments, if necessary.^{4,7}
- Reduces the risk of anchorage loss.^{4,7}
- Diminishes the need for elastic use-important for patients with behavioural disorders or non-compliant individuals.^{4,7}
- Enables easy alignment of the lower anterior teeth.⁴
- Improves facial profile by reducing the appearance of “mandibular protrusion.”¹¹

CONCLUSION

If properly indicated and carefully and appropriately conducted, lower incisor extraction can prove to be a therapeutic extraction opinion in certain malocclusions and with simple mechanics and torque control can aid in achieving a stable occlusion that is esthetic and in functional harmony.

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