 DOI: 10.18231/2455-6785.2016.0014

Lower incisor extraction as an orthodontic treatment option: A case report

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Abstract

Incisor extraction in orthodontics treatment has been one of the options since there are very few patients who are considered for such treatment. Proper and detailed diagnosis should be done so that good results can be obtained. A case report of a 20 year old female is presented who has Class II, Division 1 malocclusion with crowding in the lower arch.

Keywords: Mandibular Incisor Extraction Orthodontics, Crowding.

Introduction

Resolving arch length deficiencies with extraction as an option presents a challenge to the orthodontist. Many orthodontists have treated at least one patient in whom a lower incisor was either missing or so seriously damaged by injury or disease that its removal presented the best prospect for the patient. These experiences make one well aware of the unfavourable anterior tooth size discrepancy that may exist in such cases, and the difficulties that this presents in achieving a good occlusal result. In some cases, however, the extraction of lower incisor may help the orthodontist to produce enhanced functional occlusal and cosmetic results achieving a good occlusal result. In this article, a case in which treatment plan included extraction of one lower incisor is presented.

Traditionally, lower incisor extraction was usually used for an ectopically placed incisor or an incisor having poor prognosis. However, in today's spectrum of treatment options available, single incisor extraction when done on carefully selected cases, will help to obtain optimum results with usage of simple treatment mechanics.[1-4]

Cases generally considered for lower single incisor extraction treatment modality include:

- mild to moderate overjet & overbite,
- pleasant soft tissue profile
- a Boltons discrepancy with mandibular tooth material excess
- Minimum amount of growth remaining.[5,6]
- Class III cases with anterior cross bite or an edge-to-edge incisor relationship.[7,8]

This treatment option decreases treatment time & also provide stable results as arch expansion is not required and intercanine width is minimally changed.[9]

Contraindication for mandibular incisor extraction include:

- Cases in which extraction is required in both arches in addition to deepbite with a horizontal growth pattern
- Bimaxillary protrusion cases,
- no tooth size discrepancy in the anterior teeth

Case

A 20-year-old female reported with the chief complaint of irregularly placed upper & lower front teeth. She had mesoprosopic facial form with a mildly convex profile & competent lips (Fig. 1). Intra-oral examination revealed crowding with upper and lower anterior teeth with lingually placed 32 & retroclined upper incisors. Rotation were present with 12,31,32. Molar & Canine relationship was class I on right & Class II on left. She had class II division 1 subdivision malocclusion. There was 3mm overjet and 5mm deep bite with lower midline shifted to left by 1mm (Fig. 2). Visual treatment objective (VTO) was positive (Fig. 3). Cephalometric analysis revealed class II skeletal base with horizontal growth pattern (Fig. 4).

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Model analysis presented a space deficiency of 3 mm & 7mm in the upper arch & lower arch respectively. Good oral hygiene was present. Attrition was present with lower anteriors.

The treatment objectives of for this case included the relieving the crowding in both arches, correction of deep bite & the overjet, maintaining class I canine & molar relation on left & achieving class I canine and molar relation on right and improving the facial balance. Considering these objectives, position of right mandibular central incisor, its rotation gingival condition, & Bolton's discrepancy, it's extraction was planned which would resolve the lower anterior crowding. Flavio Uribe and Ravindra Nanda, suggest that extraction of a lower lateral incisor is generally preferred as it is less visible in the aesthetic zone.[9,10] The incisor that is farthest outside from the natural arch and closest to the crowding is usually selected for extraction. Therefore, lower left lateral incisor was selected for extraction .Further bite jumping would improve the deep bite correction as well as correct molar & canine relation as well as improve soft tissue profile. Upper crowding was minimal, hence, proclination and arch development was sufficient in achieving good esthetic results.

Treatment Plan comprised of

- Extraction of 32
- Fixed mechanotherapy with 0.022 MBT followed by
- Bite jumping with fixed functional appliance.

Retention Strategy: Fixed upper and lower retainer & Removable anterior inclined plane with upper.

Treatment progress: Lower lateral incisor was referred for extraction. Treatment was initiated with bonding of 0.022" Pre-adjusted Edgewise appliance (Fig. 6). Alignment and levelling was done using 0.014"NiTi arch wire by 0.018", 0.016"x 0.022", 0.019 x 0.025"& 0.021 x0.025Nickel Titanium arch wires. Once alignment was done, 0.019 x 0.025"& 0.021 x0.025" Stainless steel wire was placed or adequate torque expression. After that, Forsus bite jumping appliance was placed with asymmetric advancement (Fig. 7) for 9 months for achieving ideal buccal occlusion followed by which finishing & detailing was done (Fig. 8). Total treatment duration was 24 months. Bonded canine to canine permanent retainer was placed in both arches. Additionally, upper removable anterior inclined plane and lower removable Hawley's retainer was delivered to the patient as a part of the retention plan.

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Treatment Results: Buccal corridor space eliminated. Consonant smile obtained. Good improvement in profile obtained (Fig. 9). Decrowding with good alignment of teeth and mandibular spaces were completely closed. Ideal buccal occlusion with class I molar and canine

relation achieved. Good cusp to fossa occlusion was achieved. Alignment of both arches has been achieved. Good correction of overjet & overbite was present at end of treatment. The upper midline centered on the middle of the lower incisors (Fig. 10).

Fig. 9

Fig. 10

Cephalometric Values Pre-treatment (Fig. 4) & Post treatment (Fig. 10)			
Measurement	**Norm**	**Pre-treatment**	**Post-treatment**
Maxillary components			
SNA	82°	79°	78°
N-A Perp	0.4±1mm	-3mm	-4mm
Mandibular Components			
SNB	80°	74°	75°
Maxillomandibular relationship			
ANB	2°	5°	3°
AO-BO	0	3mm	0mm
Facial Growth Pattern			
SN.GoGn (°)	32°	21°	21°
FMA(°)	25°	22°	25°
Maxillary dentoalveolar components			
Mx1.NA (°)	22°	18°	30°
Mx1-NA (mm)	4mm	5mm	7mm
Mandibular dentoalveolar components			
Md1.NB (°)	25°	19°	34°
Md1-NB (mm)	4mm	4mm	7mm
IMPA(°)	95	94°	108°
Overbite (mm)	2mm	5mm	2mm
Interincisal angle			
UI to LI (Angle)	130°	139°	110°
Soft Tissue components			
Nasolabial angle (°)	102±8°	105°	106°
Upper lip to E (mm)	0±1 mm	-4mm	-4mm
Lower lip to E (mm)	2±1 mm	-3mm	-2mm

Discussion

Extractions have traditionally been used as an important method to gain space in orthodontics. Jackson in 1905 the first to advocate lower incisor extraction to relieve mandibular crowding.[11] Removal of lower incisor often helps to be beneficial in severe crowding which also increases stability in the anterior region.[12] A very careful & accurate case selection is necessary to visualize the post-treatment occlusion when six maxillary upper teeth will be occluding with five mandibular lower the case presented, reported with Boltons anterior tooth material excess in the mandibular arch with deep bite. Also, the patient didn't have much growth remaining. Hence this extraction decision helped to achieve optimum results.

One of the oldest controversies in orthodontic practice is the extraction versus non extraction. It is not a usual practice to treat malocclusions asymmetric extractions. However, in certain situations, the treatment objectives should be adjusted according to the patient need, even with less ideal final occlusion. Extraction of 1st or 2nd premolars are generally used for Tooth-size-arch-length discrepancy, or crowding. Extraction of 1st or 2nd molars are used as an alternate option. Lastly,

incisor extractions have been used I the mandibular anterior crowding.

Treating this patient with extractions in both arches might have resulted in compromised facial balance & a non-extraction option would have resulted in gingival recession of the mandibular anteriors. The extraction of a mandibular incisor had the added benefit of both treatment options while minimizing disadvantages.
Advantages included:

- Extraction space adjacent to the area of crowding can be conveniently used to relieve it.
- This treatment option reduces crowding maintaining the intercanine width, which on other hand, post-retention and maturational studies[13-16] indicate a reduction in mandibular intercanine width over time. Non-extraction & premolar extraction treatment results in increased intercanine width in the lower arch.
- Improved mandibular anterior root parallelism and a reduction in the root proximity.

The may be a short-term aesthetic inconvenience of the extraction space which should be informed & discussed to the patient before treatment. Post treatment, the maxillary midline occludes with the centre of the remaining mandibular central incisor, but this is does not hamper esthetics or function. A commn side effect of this incisor extraction is formation of black triangles or open gingival embrasures.

Conclusion

Lower incisor extraction, should be present in every orthodontists' portfolio of treatment options when conditions in relation to its indications are satisfied by a patient. Accurate diagnosis & judicious treatment planning should be done. Though lower single incisor extraction is rarely indicated it oes help this case help to achieve optimum dental results using simple treatment mechanics.

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