



Case Report

Mandibular Single Incisor Extraction with Mini-Implants Supported Space Closure - A Case Report

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ABSTRACT

There are various techniques and treatment plan in orthodontics depending on the diagnosis and patient point of view. In this article, a case report is presented with one mandibular incisor extraction and using orthodontic mini – implants in the maxillary arch for the treatment of a 22 year-old male with a Class I malocclusion on right side and missing maxillary left first molar with spacing in the maxillary and mandibular arch and retained deciduous maxillary left canine. In this case spacing was present both the arches, mandibular tooth-size excess, increased overjet, missing maxillary left right molar, retained deciduous maxillary left canine indicated the extraction of one mandibular incisor to achieve a proper treatment objective.

Keywords: Mandibular incisor extraction, Bolton discrepancy, Mini – implants.

INTRODUCTION

One of the most critical decisions depends on the diagnosis of the case depending on the soft tissue paradigm and later in treatment planning whether to extract teeth or not and which tooth to extract if extraction therapy is planned. The orthodontic treatment has swung from a predominantly non-extraction philosophy in the early 1900s from the Angle's era, toward a more extraction-oriented therapy in the middle of the century, and now back toward a non-extraction emphasis.^[1] Selecting the

best treatment is often difficult, and all guidelines do not apply to every case.^[2] Treatment by extraction of one single mandibular incisor is not popular in the orthodontic profession despite the apparent advantages of the extraction in the region of crowding.^[3,4] Disadvantages of single incisor extraction are increase in overbite and overjet, space reopening, partly unsatisfactory posterior occlusion, recurrence of crowding in the remaining three incisors, and unaesthetic loss of the

interdental papillae in the mandibular anterior region.^[5,6]

According to Owen,^[1] patients who are suitable for single lower incisor extractions usually fit the following diagnostic pattern: Class I molar relationship, moderately crowded lower incisors, mild or no crowding in the upper arch, acceptable soft-tissue profile, minimal to moderate overbite and overjet, no or minimal growth potential, and missing lateral incisors or peg shaped laterals. Several authors^[7,8] have emphasized that case where a tooth-size discrepancy (measurable mandibular Bolton excess) exists, for example with upper peg shaped laterals or missing upper lateral incisors may represent good indications for extraction of one mandibular incisor. Some authors have remarked that cases with Class III tendency could be another indication for incisor extraction, because some collapse of the lower arch may be acceptable or even desirable in such instances.

Screws have many advantages e.g. ease of implantation and removal, low cost, possible immediate loading and possible placement in most areas of the alveolar bone.^[8,9]

CASE REPORT:

A 22-year-old male patient came for orthodontic treatment with the chief complaint of forwardly placed upper and lower anterior teeth. Review of the patient's medical, dental, and family histories revealed no significant findings and no growth potential. Extra oral examination revealed a convex profile, deep mentolabial sulcus and average facial pattern (Fig 1).

Intra oral examination revealed spacing in the maxillary and mandibular arches , increased overjet and overbite , missing maxillary left first molar, retained maxillary deciduous canine on the left side,

Class I molar relation on the right side (Fig 2).



Fig 1: Extra oral photographs.



Fig 2: Intra oral photographs.

Pretreatment panoramic radiograph and lateral cephalograms (Fig 3) confirmed the clinical findings.



Fig 3: Pre treatment Lateral cephalogram.

Treatment objective:

The goals of orthodontic treatment for the patient were to (1) eliminate the

spacing in the maxillary and mandibular arches; (2) correct the maxillary dental midline discrepancy; (3) establish canine guided occlusion, (4) to achieve normal overjet and overbite; (5) provide for a more regular alignment of the maxillary and mandibular teeth for aesthetics, function and hygiene; (6) compensate for the relative excess mandibular Bolton's tooth ratio with the removal of one mandibular incisor

Treatment Alternative

Considering all aspects related to this case in detail two treatment options were presented to the patient. The first option involved retaining the deciduous left maxillary canine incisors and only space closure in both upper and lower arch without any retraction and correction of proclination. The second option was extraction of maxillary left deciduous canine and single lower incisor extraction and space closure in

the maxillary arch with orthodontic mini – implants assisted retraction to reduce overjet and overbite. This would allow easy resolve the proclination and space closure both in the maxillary and mandibular arch. The patient chose the second option.

Treatment Progress

The mandibular right lateral incisor was extracted, and treatment started with a fixed appliance in the lower and upper arches (Straight Wire 0.022”, MBT Setup). Initial levelling was accomplished with the use of nickel titanium archwires over 4 months. (Fig 4).

After initial levelling orthodontic mini implants were placed in the upper arch on either side to close space distal to canine along with elastomeric chain and to act as anchorage on the side of missing left molar (Fig 5).



Fig 4: Initial levelling and alignment.



Fig 5: Implants placed in the maxillary arch with the help of grid for accurate placement of orthodontic mini-implants.

In the lower arch, segments of elastomeric chain were used at the onset of treatment to close the extraction space. Compensating bends were placed in the lower archwire to prevent excessive crown tipping at the extraction site. After 9 months

(from the time of placing full appliances) all teeth were aligned and the extraction space was closed (Fig 5).

Orthodontic mini –implants were removed in the upper arch after space closure. For the remaining 7 months,

.019x.025-inch rectangular stainless steel wires were used for torque corrections, paralleling the roots, and detailing the occlusion. After satisfactory interdigitation was achieved, the fixed appliances were removed. Fixed retainers along with removable Hawleys retainer were given with instructions.



Fig 5: Space closure.

DISCUSSION

A class I malocclusion with a significant mandibular tooth-size excess and good posterior occlusion can frequently be treated by extracting one mandibular incisor depending on the cases is considered in the literature.^[10] A mandibular tooth-size excess greater than 1.6 mm, as determined by the Bolton analysis,^[11] is considered significant and can be treated by slenderization, extraction, or restoration. The decision to extract should be supported by initial records, diagnostic wax set-up and various clinical aspects. Information such as Bolton analysis, shape of maxillary incisor crowns especially peg laterals and amount of interproximal enamel is also important.^[12]

Reidel^[10] has suggested that in patients with severely crowded mandibular arches, the removal of one or more mandibular incisor(s) is the only logical

alternative which may allow for increased stability of the mandibular anterior region without continuous retention.^[13]

Recently, dental implants, screws, and miniplates have been developed to obtain absolute anchorage without patient cooperation.^[14,15] Mini-implants can provide stable bony anchorage and overcome problems of anchorage loss during extraction space closure. Application of bony anchorage also makes teeth move more efficiently, without depending on patient cooperation and thereby reducing treatment duration. Many studies have shown that mini-implant anchorage achieves better control in both the anteroposterior and vertical directions than does traditional extraoral anchorage during treatment of maxillary dentoalveolar protrusion.^[16,17] In our case as maxillary left first molar was missing we had to place orthodontic mini implants to provide anchorage for space closure and help preventing tipping of maxillary left second molar into missing maxillary left first molar space if this tooth was considered as anchorage and complicate treatment for prosthesis for missing maxillary left first molar.

CONCLUSION

In this case one single mandibular incisor extraction can be an effective treatment choice for a malocclusion with a Bolton discrepancy and various other aspects considered during diagnosis. However, several factors must be considered before making the final treatment planning.

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