Lower incisor extraction in an Angle class I malocclusion: A case report

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Abstract

Introduction: The extraction of a lower incisor is a not often used orthodontic solution that could equally give satisfactory results in selected cases.

Materials and methods: Here a case of a 16 years old female, Angle class I malocclusion, is presented. The case was treated through the extraction of a lower central incisor in order to establish a correct dental alignment and occlusal relationship between dental arches. Model cast analysis of Total, anterior Bolton and Mc Corke index were performed to sort out dental discrepancy components.

Results and discussion: The case was successfully solved and completed through the only extraction of a mandibular incisor providing more evidence that is still a valid and not obsolete therapeutical path leading to a better stability of the results since its minimal impact on intercanine transverse diameters, as brought by other studies.

Conclusions: Mandibular incisor extraction can be an effective solution for crowding, in selected cases. An accurate diagnosis and treatment planning is necessary to achieve an ideal intermaxillary occlusion and satisfactory facial esthetics. The choice of this alternative therapeutic option is based on the study of the degree of crowding, tooth size discrepancy, the presence of pathologic condition, overjet, skeletal growth pattern, vertical overbite and age of the patient. Thus leading to relapsing results since intercanine diameter is preserved.

Introduction

Lower incisor extraction in orthodontic treatment is rare. Even though this therapeutic option was abandoned for years for more conservative approaches, it is necessary in dental crowding dental basal discrepancy or to correct malocclusions in the sagittal and transverse plane and to restore dental arch symmetry. hence several indication to establish dental proportion, balance previous or planned extractions for therapeutic or pathological reasons. Several factors need to be investigated, such as:

- dental-basal discrepancy
- sagittal occlusal dental or skeletal discrepancy
- deviation of the midline due to dental or skeletal causes
- dental discrepancy in frontal sector
- previous loss of dental elements
- dental anomalies of place, number (agenesis, supernumerary) and morphology
- presence of pathological processes on dental elements or poor periodontal conditions

Primary it has to established how much the solely dental rather than skeletal component affect the malocclusion outcomes. This previous listed criteria has to considered when evaluating and planning a therapeutic treatment in single cases.

Materials and methods:

A 16 years old female underwent a pure orthodontic treatment based on the extraction of a central mandibular incisor followed by the alignment, leveling and transverse/sagittal/occlusal intermaxillary relationship of dental arches.

The case presented in this article is a Angle class I in both left and right side of canines and molars, the midline was deviated, overjet and overbite were positive, up to 3.5mm and a dental crowding in the lower arch was present (Figure 1-2-3). Transverse and sagittal skeletal and dental diameters and relationship were almost correct.

Figure 1-2-3. Pre treatment occlusal vertical and sagittal dental arch relationship.

The Bolton index analysis on model cast through the use of a calibrated compass was performed. This index evaluates the proportion between the sum of mesial distal diameters of maxillary and mandibular tooth size from molar to molar (counting twelve elements) or from canine to canine (counting six elements). The latter one is specific of the anterior region (mean value 77.2 ± 0.22 %) whereas considering total Bolton index may lead to errors. In fact, a higher value of normal Bolton index ( > 91.3± 0.26 %) can be related to larger shape (altered morphology or size) of mandibular compared to maxillary or viceversa.

A more specific and detailed index is the Mc Corke index that evaluates only the incisal proportion.
mandibular on maxillary mesial-distal diameters (counting 4 elements) to better estimates the necessity and the quantity of dental mass reduction required through stripping or in more severe cases through tooth extraction. taking in exam this index helps to underline dental discrepancy of the posterior rather than anterior region when comparing total Bolton to anterior Bolton and Mc Corke index. The mean value of Mc Corke index is 73 %, in the presented case was found to be 84% with tooth size excess of mandibular incisors. Therefore a minimal expansion in the upper arch was required combined to the solely extraction of a central mandibular incisor to solve the case.

Post-treatment images (figure 4- 5) shows a optimal correction of vertical and sagittal incisal relationship, overbite and overjet were easily and quickly corrected. Total orthodontic treatment lasted 16 months through the application of self-ligating MBT technique. Optimal periodontal condition with gingival countouring was obtained without any root tipping or crown inclination on the 3.1 extractive site. No loss of the interdental gingival papillae was observed.

Figure 4-5. Post treatment occlusal, sagittal and vertical intermaxillary relationship.

Figure 6-7. Pre-treatment and post-treatment comparison.

Results and Discussion

Orthodontic treatment trends tend to be more conservative, alternative planning including extractions to solve problems of negative space discrepancy has to take critical decision to determine which teeth will be extracted. Several aspects must be taken into account, such as periodontal health, functional and esthetic alterations, and treatment stability. Despite controversies, extraction of teeth to solve dental crowding is a therapy that has been used for decades mainly concerning first premolars followed by second premolars, and molars extractions even though there are situations in which atypical extractions as in case of agenesia, supernumery altered teeth facilitate mechanics, preserve periodontal health and improve the facial profile, which tends to unfavorably change due to facial changes with age. The extraction of a mandibular incisor, is an effective approach, and literature describes a greater post-treatment stability when compared with premolar extractions\[1,4,5,6\]. Cases have to be selected since esthetics may be compromised by mandibular incisor extraction but it was also proven to assure a superior posttreatment stability compared with premolar extractions.

Mandibular incisor extraction is not a common procedure since it has its disadvantages as: increase in overbite, increase in overlap, reopening of the extraction space, unsatisfactory posterior occlusion, recurrence of mandibular crowding, and loss of esthetics of the interdental papilla. On the other hand, the advantages are the maintenance of intercanine distance diameter, considerable reduction in treatment time, and better long-term alignment stability superior to the one achieved in premolar extraction cases\[7,8\].

This article reports the clinical case of a patient with Angle Class I malocclusion and upper and lower anterior crowding, harmonious and balanced facial profile. Therefore there was no need for other more complicated options that would be likely considered as an overtreatment. The molars and premolars were well occluded, and dental discrepancy was mainly concentrated in the anterior region of the lower dental arch having compared both total and anterior Bolton index. The central left incisor (3.1) was selected to be extracted being in the most ectopic position even if its periodontium was not compromised. The extraction was combined with interproximal stripping in the upper and lower arches. Such approach provides to restore a stable and balanced functional occlusion with maintained facial esthetics proportion and periodontal health. It was reported that the extraction of one mandibular incisor can lead to satisfactory treatment results in adults with mild Class III malocclusion\[2,3\] and reduced overbite, mild Class II and Class I malocclusions particular when coupled with a large mandibular intercanine width and minor crowding, and some mandibular tooth size excess.

Conclusions

In carefully selected cases, single lower incisor extraction can be an effective alternative, especially where not great dental movements are required since facial esthetics and intermaxillary and dental spatial proportion are good. Lower incisor extraction in orthodontic treatment was considered to be a very rare modality of orthodontic treatment because few patients satisfies standard criteria for such treatment, as including the study of . degree of crowding, tooth size discrepancy, pathologic condition, vertical overbite, sagittal incisal relationship, skeletal growth pattern and age of the patient. Proper diagnosis and treatment planning are essential to accomplish good occlusion and facial esthetics. This article present a case of class I malocclusion treated with mandibular incisor extraction with satisfactory results. Hence, lower
incisor extraction can be an effective treatment option in borderline cases with mild dental (not skeletal) crowding in lower arch. This approach assures minimal alteration of mandibular arch form that is a key factor to obtain long term stable results.

References

Illustrations

Illustration 1

Figure 1. Pre treatment occlusal dental arch relationship.

Illustration 2

Figure 2. Pre treatment vertical dental arch relationship.
Illustration 3

Figure 3. Pre treatment sagittal dental arch relationship.

Illustration 4

Figure 4. Post treatment occlusal and sagittal intermaxillary relationship.
Illustration 5

Figure 5. Post treatment vertical intermaxillary relationship.

Illustration 6

Figure 6. Pre-treatment and post-treatment comparison.
Illustration 7

Figure 7. Pre-treatment and post-treatment comparison.