

Decision for Extraction As An Orthodontic Problem

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Abstract: *Extractions in orthodontics remains a relatively controversial area. It is not possible to treat all malocclusions without taking out any teeth. The factors which affect the decision to extract include the patient's medical history, the attitude to treatment, oral hygiene, caries rates and the quality of teeth. Extractions of specific teeth are required in the various presentations of malocclusion. In some situations in young patients, careful timing of extractions may result in spontaneous correction of the malocclusion. Certain malocclusions require orthodontists to be capable of establishing a diagnosis in order to determine the best approach to treatment.*

The purpose of this article was to present clinical case of adult male with bimaxillary crowding and discuss some diagnostic elements used in drawing up a treatment plan to support mandibular incisive extraction. All diagnostic elements have been highlighted. It is necessary to evaluate the patient's dental, facial and skeletal characteristics to establish a correct diagnosis and effective treatment plan to achieve a stabile occlusion and pleasant facial appearance.

Keywords: *Orthodontics, Tooth Extraction, Therapy*

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I. Introduction

According to Proffit, diagnosis is scientific procedure, but treatment plan has a subjective component (1). Its object is not a scientific truth, but plan how to maximize the benefit to the patient. The treatment plan may be less than optimal if it is too ambitious or doesn't take full advantage of the possibilities. When the diagnosis has been made, next step in planning process is list the possibilities for treatment of each of the problems, beginning with the highest priority. Each problem is considered individually and the total spectrum of treatment possibilities for that problem is examined. Which of the possible treatment approaches would be best for a specific patient, depends on the total picture for that individual. Several factors must be considered, like interaction, compromise, cost-benefit analysis. The first factor is interaction among possible solutions to the various patient's problems. Important interaction is relationship between horizontal and vertical changes in jaw position. We must do compromises in patients with many problems because it may not be possible to solve them all. This type of compromise has nothing to do with the clinician's skill, but it means that solving one problem has no effect on another or even makes it worse. Careful setting of priorities is always very important. The major goals in orthodontic treatment are ideal occlusion, excellent facial esthetics and stability of the results. If all of them can not be reached, those of greatest importance for the patient should be favored. In daily practice, achieving the ideal occlusion can compromise the facial esthetics and may be associated with instability after treatment. To overcome this, the orthodontist must emphasize one of the goals at the expense of the others. Angle, a century ago, solved this problem by focusing solely on the full teeth occlusion and declaring that esthetics and stability would take care of themselves, which is not a reality in practice. Sometimes ideal occlusion must be altered by extraction or otherwise, to gain an acceptable esthetics and stability. For some patient, placing the teeth in ideal facial esthetics may require permanent retention because they are not stable in that position or placing the teeth in position of maximum stability will compromise the facial appearance.

Cost/benefit analysis is related to difficulty of various treatment procedures compared with the benefit of them. This must be considered in both risk and cost to the patient, and not just the money, but also in time, cooperation, discomfort, aggravation etc. If the less risky and simpler procedures would provide the similar effect, we must favor them. Jaw surgery must rank higher in cost and risk than elastics and selective occlusal grinding. There are more other considerations that must be taken in consideration, like should visible orthodontic appliances be avoided because of the patient's vanity or treatment time be minimized because of possible periodontal disease. For rational answers must be considered the treatment possibilities. Substantial factor in planning treatment is specification of the treatment method, the mechanotherapy which will be use. The most serious errors are made when advantages and disadvantages of various possibilities are not taken in consideration.

In many cases, there is no enough space for alignment all teeth in the dental arch, so orthodontist need to extract some tooth. But, the role of extractions for orthodontic reason has been a controversial subject for over a century. Angle (2) believed that all 32 teeth could be accommodated in the jaws, in an ideal occlusion with the first molars in a Class I occlusion. Extraction was anathema to his ideals, as he believed bone would form around the teeth in their new position, according to Wolff's law (3). This was criticised by Case in 1911 who believed extractions were necessary in order to relieve crowding and aid stability of treatment (4). Two of Angle's students in the same time but in different countries, considered the need for extractions in achieving stable results. Tweed became disappointed in the results he was achieving and decided to re-treat a several patients who had suffered relapse following orthodontic treatment using extraction of four premolars (5). Achieved results, resulted in a change of the 1940s philosophy to extraction-based techniques. In Australia, Begg, studied Aboriginal skulls and noted a large amount of occlusal and more importantly interproximal wear and concluded that nonextraction treatment is unstable (6). He argued that premolar extractions were required in order to compensate for the lack of interproximal wear.

By the early 1960s, more than half the American patients undergoing orthodontic treatment had extraction of some teeth, usually but not always first premolars. Recently, the extraction debate has reopened and some orthodontists believe that expansion of the jaws and retraining of posture can obviate the need for extractions and produce stable results. But, if teeth are genuinely crowded and irregular, arch alignment can be achieved by one of the following: enlargement of the arch form, reduction in tooth size or reduction in tooth number. Arch expansion can be achieved by moving teeth buccally and labially but the long-term stability and whether bone grows as teeth are moved through cortical plates remain contentious issues. Increasing mandibular length to accommodate teeth relapses in nearly 90% of cases with resulting unsatisfactory anterior tooth alignment (7). Any lateral expansion across the mandibular canines decreases after treatment but this is also seen in those cases which have no orthodontic treatment. It was further recognised that mandibular anterior crowding is a continuing phenomenon seen in patients into the fourth decade and likely beyond (8). The degree of anterior crowding seen at the end of retention is variable and unpredictable.

Reduction in tooth size, particularly in the labial segments with interdental stripping, is another potential mechanism to relieve crowding, but only for minimal crowding. The reduction in tooth number is usually achieved with extractions in both side of the dental arch. A dogmatic approach is inadvisable and each case must be assessed on its merits (9). Some cases, especially where the crowding is mild may not need tooth removal but more sensible approach based on the requirements of the individual case. The decision on whether or not to extract teeth is based on an assessment of many factors including crowding, increased overjet, change in arch width, curve of Spee, anchorage requirements and other (10). It is important to consider the patient as a whole in treatment planning. Medical history, attitude to treatment, caries rate, oral hygiene, and the quality of the teeth are important. The quality and prognosis of the teeth should be carefully considered, as this may override other factors. Hypoplastic, heavily carious or restored teeth should generally be removed in preference to healthy teeth. Teeth of abnormal form or size may be considered for removal as they can look unsightly and be difficult to align.

Despite the factors discussed above, certain teeth are extracted preferentially for orthodontic reasons. A survey of extraction showed that first premolars were most commonly extracted (59%) followed by second premolars (13%). Permanent molars accounted for 19% of extractions (12% for first molars and 7% for second molars). Only 1% of patients had incisor extractions (11). The high percentage of premolar extractions is related to their position in the arch and the timing of their eruption. They are often ideal for the relief of anterior and posterior crowding. However, each patient should be seen as an individual. In general, removal of a lower incisor should be avoided, as the inter-canine width tends to decrease which can result in crowding developing in the upper labial segment or the overjet increasing. However, a number of situations do exist in which a lower incisor may be considered as part of an orthodontic treatment plan and fixed appliances are generally required in these cases. These include situations where a lower incisor is grossly displaced from the arch form or ectopic and space is required to align the teeth. This is best considered in adults and especially those who have good occlusion in posterior teeth. Treatment of Class I cases with moderate lower labial segment crowding of up to 5

mm, may be treated with lower incisor extraction. An undesirable side effect may be a slightly Class III buccal segment relation or an increase in overjet (12). Cases where a tooth size discrepancy exists, for example with missing upper lateral incisors may also benefit from the loss of a lower incisor. For every case a Bolton analysis, a measure of tooth size discrepancies, must be used to analyse the extent of the disproportion. A Kesling set up, an analysis on plaster model where the anterior teeth are sectioned and re-positioned in wax as a trial set up, having left out a one lower incisor, may be helpful in predicting the final outcome (13).

II. The Aim Of The Study

The aim of this study is to presented a case of adult patient, 29-year old male with Class I canine and molar relationship, with bimaxillary crowding, an anterior crossbite on 11 and 22, palatally erupted 22 and collapse of processus alveolaris in that part, traumatic abrasion on 41 (fig 1 a,b). Chief compliant was bed facial appearance and poor articulation. Extra-, intra-oral and gnathometric analysis of occlusion strongly points the need for extraction, as best way to provide maximum benefit and keep the transcanine teeth in normal and stabile occlusion. After X-Ray and observation of smiling, swallowing and speaking, it was decided to extract the mandibular right central incisor, for maintaining the good occlusion in posterior parts. Therapy plan was individual designed according to diagnosis and occlusal problems. Interdisciplinary team were involved. After parodontal therapy on both jaws, a 41 was extracted and fixed orthodontic appliances were placed in both jaws (SWA, Roth prescription). Despite of asymmetric lower incisor extraction, it was achieved well shaped dental arches, good appearance, stabile buccal occlusion. The active therapy lasted for 15 months, and the patient was in the retention phase with fixed appliances nine months (fig 2 a, b, c). After that, he is on retention with upper mobile retainer and lower fixed retainer (3 a, b, c, d, e).

Fig: 1a, b: Appearance of occlusion and dental arches before the beginning of the therapy (on dental casts)



Fig 2 a, b, c: Intra- and extraoral appearance of the patient on the end of the active phase of therapy, in phase of retention



Fig 3 a, b, c, d e: Intraoral appearance of the patient in phase of retention with upper mobile appliance and lower retainer



III. Conclusions

Any decision regarding the need for extraction of teeth during orthodontic therapy is not only dependent on the presence or absence of space in the dental arches. Other issues should be evaluated in order to achieve proper malocclusion correction, maintenance or improvement of facial aesthetics and result stability. In any malocclusion, and particularly in a borderline case, it is necessary to evaluate the patient's dental, facial and skeletal characteristics to establish a correct diagnosis and effective treatment plan. Issues to help make the right decision and to serve as qualitative guides are tooth-arch discrepancy, cephalometric discrepancy, facial profile, skeletal age and lack of growth, antero-posterior relationship, buccal interdigitation, dental asymmetry and compliance.

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