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Choice of treatment options for Class II Div II cases in young adults by orthodontists: An original research

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***Abstract*---**Aim: The purpose of the present research was to assess the choice of treatment utilized by orthodontists in class II div.II malocclusion in case of young adults. Methodology: 8 questions were asked to 50 orthodontists during a survey regarding the treatment options in cases of class II div. II. They were asked about various appliances used as well as relapses in relation to these cases. Descriptive statistical analysis was carried out using standard deviation, mean etc. The result was considered statistically significant when p value was <0.05. Results: Around 64.5% of participants faced

problems like crowding of the anterior teeth as the major challenge followed by aberrant molar relationships, overbite depth, retroclination of maxillary incisors, and hypodivergent facial pattern of patients. 22 months is the average time the orthodontists (58%) remove the fixed appliances and follow them with retainers. 71% of participants feel that class II div. II relapse much more often as compared to class II div. I cases. 13.6% of orthodontists relied majorly preferred interdental stripping and tooth contouring. Conclusion: Surgical orthodontics is not preferred by the orthodontists in our study and class II div. II cases shows more relapses.

***Keywords*---**Class II division 2 malocclusion; deep overbite, Orthodontic anchorage techniques.

Introduction

Class II Subdivision may be defined as the one with Class II molar relationship only on one side of the dentition. Class II Subdivision malocclusions have characteristics of both Class I and Class II. Class II Subdivisions feature distal molar occlusion on one side and Class I molar occlusion on the contra-lateral side. The disagreement in molar relationships between each side results in asymmetric occlusal relationship and midlines. For clarity, the term subdivision refers to the Class II side. Class II subdivisions are estimated to account for up to 50% of all Class II malocclusions and are among the most common dental asymmetries in the orthodontic population.[1]Class II Subdivision malocclusions can involve skeletal asymmetries, dentoalveolar asymmetries, functional shift due to occlusal interferences or temporomandibular joint disorders (disk displacement & pathology). Janson et al,[2] evaluated three types of Class II Subdivision malocclusion and defined Type 1 as the one with coinciding maxillary dental midline with the facial midline and deviation of the mandibular midline toward the Class II side. It is created by the distal positioning of the mandibular first molar on the class II side. Frequency of occurrence is 61.36%. Type 2 characterizes deviated maxillary dental midline away from the Class II side and coincident mandibular midline with the facial midline. It is created by mesial positioning of maxillary molar on class II side. Frequency of occurrence is 20%. Combination type involves deviation of the maxillary and mandibular dental midlines from the facial midline in opposite directions with the frequency of occurrence of about 20%.[2] Factors like early loss of a primary second molar on one side with unilateral loss of leeway space, premature exfoliation of primary canines, ankylosed primary molars, ectopic eruption of maxillary first molars, congenitally missing teeth, supernumerary teeth, caries with loss of interproximal tooth structure, tooth size discrepancy, excess spacing, asymmetric crowding are important in aetiology of subdivision malocclusions. The source of the subdivision must be determined to know if the asymmetry is skeletal, dental, or possibly a combination of both; maxillary arch, mandibular arch or both. If it is dental related, then orthodontics alone should suffice. Even after correct diagnosis, treatment can be difficult because it often involves asymmetric extractions and asymmetric mechanics. It is imperative to ascertain whether a dental midline deviation is due to buccal segment asymmetry or whether it is primarily due to

uneven crowding in the arches.[3] It is now imperative to state that subdivision involves a wide array of malocclusion that may involve a simple unilateral buccal segment asymmetry, dental in origin to a more severe complete arch skewing that may be skeletal in origin. Thus, the spectrum of subdivision would involve an incessant combination of vast aetiological aspects that may individually or in combination with other contributing factors complicate the diagnosis and treatment strategies applicable in each patient. The asymmetries of skeletal origin may be more critical and might demand an extensive surgical intervention. Nevertheless, the non-surgical approaches reprimand a thorough understanding of these malocclusions in order to reach to an appropriate diagnosis that would lead to the most pertinent and validate treatment decisions. Treatment of an adult Class II patient requires careful diagnosis and a treatment plan involving esthetic, occlusal, and functional considerations.[4] The treatment objectives must include the chief complaint of the patient, and the mechanics plan should be individualized based on the specific treatment goals.

Aim Of The Present Study

The purpose of the present research was to assess the choice of treatment utilized by orthodontists in class II div.II malocclusion in case of young adults.

Methodology

A questionnaire survey was conducted amongst 50 orthodontists who has more than 5 years of clinical experience. Out of 50, around 15 were female specialists and age variation from 30-50 years. The survey was formatted in an open-ended format in English language and were emailed to the participants. 8 questions were asked regarding the treatment options in cases of class II div. II. They were asked about various appliances used as well as relapses in relation to these cases. (Table 1) The data was entered in MS excel spreadsheet and then subjected to statistical analysis using SPSS 25.0. Descriptive statistical analysis was carried out using standard deviation, mean etc. The result was considered statistically significant when p value was <0.05.

Results

The survey data showed that mean age of orthodontists was 39 years. It was observed that around 73% of orthodontists It was observed that around 43% of orthodontists had around 1-2 class II div.II cases per week. Pretreated NiTi wires and followed by class II elastics were commonly (95.3%) used for treating these cases ($P=0.019$). Around 64.5% of participants faced problems like crowding of the anterior teeth as the major challenge followed by aberrant molar relationships, overbite depth, retroclination of maxillary incisors, and hypodivergent facial pattern of patients. 22 months is the average time the orthodontists (58%) remove the fixed appliances and follow them with retainers. 71% of participants feel that class II div. II relapse much more often as compared to class II div. I cases. 13.6% of orthodontists relied majorly preferred interdental stripping and tooth contouring. Only 34% of orthodontists suggest surgical orthodontic procedures like Bilateral sagittal split osteotomies. Around 37% of

orthodontists prefer mandibular teeth extraction also along with maxillary premolars for conducting the treatment. (Table 2)

Discussion

A successful treatment concept can be derived based on the above considerations about the appearance of class II malocclusion. The key is the reconstruction of the occlusal plane and the correct positioning of the upper first molars in the center of force while establishing physiological compensation curves of Spee and Wilson. Class II subdivision is a heterogeneous group of malocclusions and cannot be considered as a discrete entity to be treated with predefined specific strategies. The discrepancy may be present in the maxilla, mandible or in both the arches. Alaviet al [5] and Rose et al [6] observed that Class II subdivisions result mainly from asymmetry of the mandibular first molars, by distal positioning of the mandibular molars on the Class II side. Jansonet al [7] concluded that asymmetric antero-posterior relationships in Class II Subdivision malocclusion were mainly dentoalveolar. Class II Subdivision malocclusion does not present skeletal asymmetries in relation to normal occlusion. Azevadoet al [8] concluded that subdivision was primarily dentoalveolar with minimum skeletal involvement. According to Sanders et al8, the components contributing to an asymmetric antero-posterior relationship in a Class II Subdivision malocclusion are multifactorial. According to them, the etiology of Class II Subdivision malocclusion is primarily due to an asymmetric mandible that is shorter and positioned posteriorly on the Class II side. Also, mesial positioning of the maxillary first molar on the Class II side without skeletal asymmetry was the second contributing factor and distal positioning of the mandibular first molar on the Class II side was the third contributing factor. Most of the orthodontic treatment strategies were originally grounded on the imperialistic approach of the ones who developed them. Yet the better understanding of the various clinical situations have provoked the new era of Evidence based orthodontics. This not only marks the clarity in the vision of the orthodontists in terms of diagnosis but also the definitive protocols in varying spectrum of malocclusions. Class II subdivision has always been a source of dilemma due to heterogeneity of the subgroups that it covers and only the clear understanding of each subtype would lead to the successful treatment. Various types as instituted by Jansonet al have described with their treatment options to provide a more practical approach to deal with these efficiently.[7] Class II division 2 malocclusion is characterized with retroclined incisors and deep overbite, some authors believed Class II division 2 malocclusion and deep incisal overbite would resulting in disk displacement and caused posterior condylar positioning. Pullinger[10] found the association between nonconcentric condylefossa relationships and abnormal temporomandibular joint function. Stamm[11] has found the measurement approximately 7^{o} higher angle of the condylar path inclination (CPI) in asymptomatic Class II division 2 malocclusion cases with Computer-Aided Axiography. The Class II division 2 malocclusion group rotated to a significantly higher angle in protrusive and mediotrusive movements and showed longer condylar path lengths than the control group. Anders[12] also found increased mobility in mandibular protrusion and a somewhat steeper condylar path in young patients and concluded that the results collaborate the concept of functional TMJ adaptation to incisor inclination and speak for early uprighting of maxillary incisors. Class II division 2

malocclusion is considered to be difficult to treat and is prone to relapse. A meta-analysis of 322 studies by Millett et al[13] found that highly biased prospective and retrospective evidence apparently favored non-extraction treatment and indicate that overbite correction is reasonably stable in the short term. In our study, most of the orthodontists observed that rate of relapses is higher in class II div. II cases as well as mostly they advise extractions more to create space for orthodontic teeth movement. Very less percentage of the specialists advise surgical orthodontics, possibly due to patient demotivation, increased cost etc.

Conclusion

Treatment of Class II, division 2 malocclusion in adults is always challenging. Applying sound biomechanical principles to execute the mechanics plan is the surest way to achieve predictable results with minimal side effects. Surgical orthodontics is not preferred by the orthodontists in our study and class II div. II cases shows more relapses.

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TABLES

Table 1- Questionnaire used in the present research

S. No.	Questions
1	How many class II div. II cases on an average do you get in your clinical practice every week?
2	Which material arch wires do you prefer for treatment?
3	What all issues do you face in treating class II div. II cases?
4	When do you advise removal of fixed appliances in these cases ?
5	How frequently do you get relapses in these cases?
6	Do you advise interdental stripping and tooth contouring over extractions to attain more space?
7	How often do you suggest surgical orthognathic surgeries?
8	How often do you advise mandibular teeth extraction?

Table 2- Quantitative data in the present research

Q. No.	Mean ± SD	P value
1	2.45±2.03	1.04
2	1.09±0.37	0.019
3	Crowding-2.11±1.99 Deep bite-3.6±3.001 Other issues-3.7±3.5	0.23
4	2.45±1.78	0.87
5	1.98±1.02	0.056
6	4.17±3.87	1.45
7	2.19±1.23	0.209
8	2.55±1.73	1.22