

Class II Camouflage Treatment: Comparison Of Two Commonly Opted Extraction Protocols

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Abstract:

Introduction & objectives: Two most commonly opted extraction protocols for the camouflage treatment of class II malocclusion include extractions of all first premolars (U4/L4), or upper first and lower second premolars (U4/L5). The American Board of Orthodontics" (ABO-1998) introduced an index called the Objective Grading System (OGS) which assesses the final occlusion in first, second and third orders according to eight different components. The aim of the present study was to evaluate the treatment outcome of these two extraction protocols which are commonly opted for Class II cases by ABO-OGS.

Methodology: 110 orthodontic patients with Angle's Class II malocclusion were selected and equally divided into two groups: 55 patients were treated by extraction of all first premolars (U4/L4) and 55 patients were treated by extractions of upper first and lower second premolars (U4/L5). MBT 0.022" slot prescription was used for all patients. With the aid of an ABO measuring gauge and panoramic radiographs, the total OGS scores between the two groups were calculated and compared using Student t-test.

Results: The total OGS score was significantly less negative in the U4/L4 extraction group (-28.56 ± 3.16) as compared to the U4/L5 extraction group (-30.00 ± 2.82 , $P < 0.05$).

Conclusion: According to this study, the final occlusion and radiographical characteristics were more acceptable in the patients treated with extractions of all first premolars (U4/L4) than the patients treated with extractions of upper first premolar and lower second premolar (U4/L5).

Keywords: Class II malocclusion; ABO Objective Grading System; Extraction

I. INTRODUCTION

Due to the great work of Charles Tweed, the extraction therapy was accepted in the field of orthodontics as the need rather than an option for the orthodontic treatment. Since then, various extraction patterns have been followed in the routine orthodontic practice.

Angle's class II malocclusion is as one of the most frequently encountered problems in the orthodontic practice.

In general, class II malocclusion can be treated with or without extraction protocol depending on the case. Two most commonly opted extraction protocols for the treatment of class II malocclusion in contemporary orthodontics include extractions of all first premolars (U4/L4), or upper first and lower second premolars (U4/L5). Various factors that usually affect the clinician's decision regarding the selection of an ideal extraction protocol for the particular case are occlusal stability, dental arch characteristics and the effects of the

opted extraction protocol on the facial appearance as well as on the dentofacial complex.

In the past, various studies have been conducted to evaluate the effects of different extraction protocols on dentofacial complex and facial characteristics. Although there is a known paradigm shift towards the facial esthetic being the primary objective of orthodontic treatment, the creation of ideal dental and skeletal relationships must not be neglected for better stability of the results.

Out of all the quantitative indices available in the literature, the Peer Assessment Rating (PAR) index⁷ had widely been used for the evaluation of the post-orthodontic treatment outcome by various researches in the past. The “American Board of Orthodontics” (ABO-1998) introduced an index called the Objective Grading System (OGS) which evaluates post treatment dental casts and panoramic radiographs. It assesses the final occlusion in first, second and third orders according to 8 different occlusal and radiographic components.

To our knowledge, very few studies are available in the literature, in which the treatment outcome of the two most commonly used extraction protocols for the class II malocclusion-extractions of all first premolars (U4/L4) or upper first and lower second premolars (U4/L5), have been directly compared. Few studies have been conducted to compare treatment outcomes in class I malocclusion. The aim of the present study was to evaluate and compare the treatment outcome of these two extraction protocols which are commonly opted for Class II cases by ABO-OGS system.

II. MATERIAL AND METHODS

In this retrospective study, a total number of 110 patients with class II malocclusion were divided evenly into two groups: First group consisted of the patients treated with extractions of all first premolars (Group U4/L4) and another group included the patients treated with extractions of upper first and lower second premolars (Group U4/L5). MBT 0.022” slot prescription was used for all patients. The post treatment records (Dental casts and panoramic radiographs) were obtained from the Department of Orthodontics and Dentofacial Orthopaedics, JSS Dental College and Hospital, Mysuru.

The cases which were not considered in this study were: Non extraction cases, cases treated by functional appliance therapy and/or headgear therapy, cases treated by molar distalization, and the cases treated by any other extraction patterns as well.

For both the groups, treatment outcomes were evaluated by eight ABO-OGS variables: Alignment, Marginal ridges, Occlusal relationships, Buccolingual inclination, Overjet, Occlusal contacts, Interproximal contacts, and Root angulation. ABO Measuring Gauge introduced by ABO was used for the measurements.

In all cases, scores for each ABO-OGS variables were measured two times and the mean scores for each variable were taken for calculation. The data were analyzed using descriptive statistics and ‘t’ tests for independent samples.

III. RESULTS

The U4/L4 extraction group consisted of 55 patients: 23 were female and 32 were male patients and the U4/L5 extraction group consisted of 55 patients: 17 were female and 38 were male patients.

The statistical result of the study is shown in Table 1. The maximum negative score for U4/L4 extraction group and U4/L5 extraction group was -7.67 ± 1.25 and -8.09 ± 1.00 for the Alignment variable respectively. The minimum negative score for U4/L4 extraction group and U4/L5 extraction group was -0.73 ± 0.71 and -1.89 ± 0.85 for the Interproximal contact variable respectively. (Table 1)

The mean values of the variables like Marginal ridges, Occlusal relationships and Interproximal contacts were significantly higher in the U4/L5 group. The mean values of Overjet, Occlusal contacts and Root angulations were significantly higher in U4/L4 extraction group. (Table 1)

| Variables | U4/L4 Extraction Group | | U4/L5 Extraction Group | | P-Value (<0.05) |
|---------------------------|------------------------|------|------------------------|------|-----------------|
| | Mean | SD | Mean | SD | |
| Alignment | -7.67 | 1.25 | -8.09 | 1.00 | 0.056 |
| Marginal Ridges | -2.04 | 0.84 | -2.47 | 0.92 | 0.011 |
| Buccolingual inclinations | -6.67 | 1.17 | -7.05 | 1.10 | 0.080 |
| Overjet | -3.70 | 0.71 | -2.98 | 0.87 | 0.001 |
| Occlusal relationships | -1.62 | 0.53 | -2.27 | 0.73 | 0.001 |
| Occlusal contacts | -3.35 | 0.84 | -2.67 | 0.79 | 0.001 |
| Interproximal contacts | -0.73 | 0.71 | -1.89 | 0.85 | 0.001 |
| Root angulations | -2.78 | 0.74 | -2.56 | 0.86 | 0.155 |
| Total OGS score | -28.56 | 3.16 | -30.00 | 2.82 | 0.013 |

Table 1: Statistics for the ABO-OGS variables

The total OGS score was significantly less negative in the U4/L4 extraction group (-28.56 ± 3.16) as compared to the U4/L5 extraction group (-30.00 ± 2.82 , $P < 0.05$) (Fig 1)

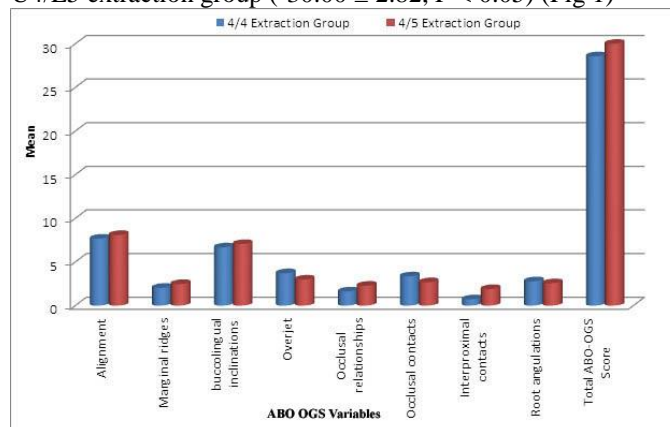


Figure 1

IV. DISCUSSION

Since the introduction of extraction therapy in the field of Orthodontics, the treatment planning in clinical orthodontics has reached a whole new level. Although many factors affect the clinician's decision regarding the appropriate treatment protocol, clinician's sound knowledge of the possible treatment outcome with the particular treatment protocol plays an important role in the treatment planning stage. The aim of the present study was to evaluate the treatment outcome of the two commonly opted extraction protocols in the treatment of Angle's Class II malocclusion by ABO-OGS system.

In the present study, U4/L5 extraction group showing a significantly higher negative mean score for Interproximal contact variable gives an idea of better interproximal contact between lower first molar and lower second premolar (U4/L4 extraction group) than the contact between lower first molar and lower first premolar (U4/L5 extraction group).

For the Overjet variable, U4/L4 extraction group showed a significantly higher negative score than the U4/L5 extraction group. Extraction of lower first premolars could have resulted in the more amount of retraction of lower incisors than in the U4/L5 extraction group. This could be the reason for increased post treatment overjet in the U4/L4 extraction group compared to U4/L5 extraction group.

A higher negative score in the mean value of alignment was observed in the U4/L5 extraction group, which was statistically non-significant. This could be due to the increased effectiveness of lower first premolar extraction protocol in decrowding of the lower incisor crowding, compared to lower second premolar extraction protocol.

Comparing the means of total OGS score of both the groups, one can conclude that post treatment occlusal and radiographical characteristics were more acceptable in the U4/L4 extraction group than in the U4/L5 extraction group, when evaluated through ABO-OGS. The shortcoming of this study could be the lack of consideration of the roles of gender and age in the treatment outcome.

Even if this study provides enough scientific evidences in proving U4/L4 extraction protocol as a better treatment option than the U4/L5 extraction protocol, in terms of occlusal characteristics, the debate not addressed in this study was choosing the better treatment option between all first premolars extraction protocol and two maxillary premolars extraction protocol for the class II camouflage treatment.

V. CONCLUSION

Within the limitation of the study, it can be concluded that The final occlusion and radiographical characteristics were more acceptable in the patients treated with extractions of all first premolars (U4/L4 extraction) than the patients treated

with extractions of upper first premolar and lower second premolar (U4/L5 extraction).

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