Original Article

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Outcome of MBT and Standard Edgewise Techniques in Treating Cl I Malocclusion

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ABSTRACT

Statement of the problem: The aim of this study was to compare the treatment outcome of CL I malocclusion patients treated by two methods, including Standard Edgewise and MBT.

Materials and Methods: Thirty subjects (23 boys and 7 girls) with an age range between 14–19 years were included in each group. The patients had Cl I malocclusion and were treated through Non-Ext strategy. Pre- and post-treatment records were assessed using the grading system of the American Board of Orthodontics (ABO). Eight parameters were measured three times and the mean of the three measurements was recorded. Finally, the score of each parameter as well as total score of all parameters (ABO score) were compared between groups by t-test.

Results: Improvement in ABO score between the two groups did not show significant differences. However, in details of post-treatment occlusion, such as buccolingual inclination, there was a significant difference between groups (P=0.014).

Conclusion: Efficiency of two methods was favorable and post-treatment ABO score in both groups had improved significantly relative to pre-treatment. There were differences between the two groups in establishment of details of occlusion.

Keywords: Dental Occlusion, Standard edgewise, MBT, ABO.

INTRODUCTION

Since the introduction of the edgewise system by Angle at the beginning of 19th century, several techniques have been developed.[1–5] Contemporary fixed appliances are predominantly variations of the edgewise appliance system. The straight wire appliance (SWA) was introduced by Lawrence Andrews in 1970 with the aim of having an orthodontic fixed appliance that would enable the clinician to achieve the "Six Keys" of normal occlusion in the vast majority of cases in an efficient and reliable manner.[6] It has been claimed that more recent SWA techniques enable the clinician to reach the final ideal result easier and faster.[4,7] The aim of this study was to compare the efficacy of standard edgewise and MBT techniques by using ABO grading system.

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MATERIALS AND METHODS

This quasi-experimental study was performed on the patients of two private clinics, who were treated by two different practitioners (each practitioner used one system and had at least 5 years of experience in orthodontic practice). The inclusion criteria was Cl I malocclusion without any previous orthodontic treatment that could be treated without extraction. The brackets used for treatment were stainless steel and had a slot of 0.022 inch (AO Corporation, California, USA). Each group consisted of 30 patients aged 14–19 and matched sex (23 girls, 7 boys). The required records, including dental casts and panoramic radiographs, were collected before and after treatment. The records were evaluated according to 8 parameters of ABO grading system (including alignment, marginal ridges, buccolingual inclination, occlusal contacts, interproximal contacts, overjet, occlusal relationship and root angulation). All the evaluations were conducted by the same operator blindly. Each measurement was repeated 3 times and the mean of scores considered as the final score. Additionally, the sum of scores (ABO score) were calculated for each group. According to the ABO grading system, any deviation from the ideal condition was considered as a negative score. If the sum of ABO score was lower than -30, treatment quality was considered unacceptable. First, 7 parameters were measured by ABO ruler (Figure 1) on the dental models, and the last parameter was measured on the panoramic radiograph. Finally pre- and post-treatment scores and also pre-post changes were assessed using t-test.

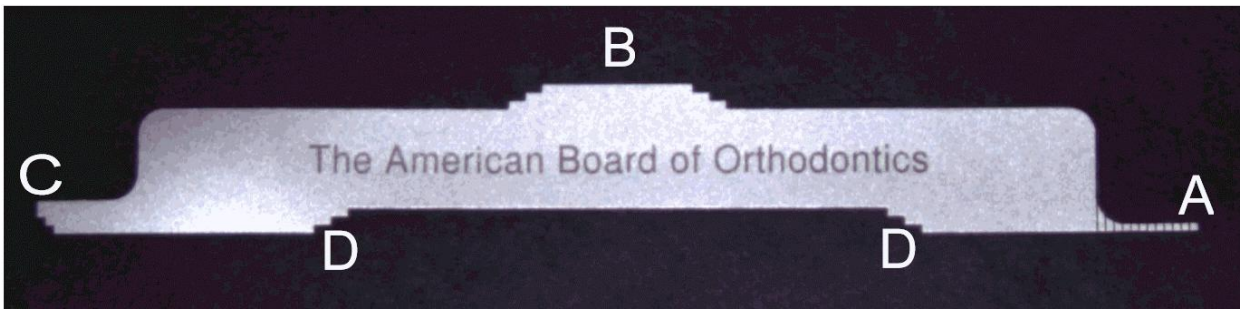

Figure 1. ABO measurement gauge.

For evaluation of reliability of measurements, two parameters of interproximal contacts and root angulation were selected randomly and measured 3 times in 30 patients. Intraclass correlation coefficients (ICC) were 0.9571 (95% CI: 0.9775–0.9231) and 0.9390 (95% CI: 0.9720–0.8872), respectively.

RESULTS

The mean age (SD) in the MBT group was 15 (16.5). The mean treatment duration was 26 and 24 months for the standard and MBT groups, respectively. Assessment of post-treatment parameters showed a statistically significant difference in buccolingual inclination criteria (P=0.047).

Post-treatment relative to pre-treatment results showed significant changes in both groups.

Table 1.Comparison of pre-post changes of parameters between two groups

parameters	Groups	Pre.Tx.(Mean±SD)	Post.Tx.(Mean±SD)	Comparison of pre-post changes (percent) (p value)
Alignment	Standard	-7.8±1.5	-2.6±1.1	0.543
	MBT	-7.6±1.3	-2.1±1.1	
Marginal ridges	Standard	-4.9±1.5	-1.9±1.3	0.993
	MBT	-6.6±1.4	-2.6±1.5	
Buccolingual Inclination	Standard	-7.0±1.3	-3.5±1.2	0.048
	MBT	-7.1±1.2	-2.8±1.2	
Overjet	Standard	-5.4±1.5	-1.4±0.9	0.117
	MBT	-4.7±1.7	-2.0±1.5	
Occlusal contacts	Standard	-10±1.4	-4.0±1.6	0.093
	MBT	-10.9±1.7	-3.7±1.3	
Occlusal relationship	Standard	-6.5±1.3	-2.9±1.2	0.633
	MBT	-7.2±1.4	-2.9±1.4	
Root angulation	Standard	-7.9±0.9	-3.5±1.1	0.229
	MBT	-8.3±1.1	-4.1±1.3	
ABO score	Standard	-50.2±4.5	-20.0±3.8	0.860
	MBT	-51.5±3.8	-20.4±3.7	

Discussion

The chief aim of the present study was to evaluate the quality of treatment in patients treated with standard edgewise and MBT technique. Although there are some indices in orthodontics for assessing the result of treatment,(8–10) the ABO grading system (objective grading system) was selected for this study due to its simplicity; furthermore, it is newer compared to other systems and has been used in many studies.(11–15) The results of the present study revealed a significant difference (P=0.047) between post-treatment buccolingual inclination. The MBT group showed better buccolingual inclination (-2.8±1.2) relative to the standard group (-3.5±1.2). The probable reason is related to prefabricated and pre-adjusted torque in the slot of MBT brackets, resulting in more precision and more symmetric inclination in posterior teeth. This is similar to the results of a study of Kattner and Shneider, who found better posterior angulation and inclination in Roth group compared to standard edgewise group.(16)

There were no significant differences between other post-treatment parameters. The lowest post-treatment difference was in post-treatment occlusal relationship and ABO score (P=0.978 and P=0.940). Comparison of pre-post changes in ABO parameters showed no significant differences. The greatest difference was in occlusal contacts (P=0.093). This means that with the MBT technique, the clinician might have greater ability in establishing good occlusal contacts. Regarding the root angulation parameter, the standard technique showed better performance

(Table 1). The reason might be related to easier positioning of standard brackets because of loss of angulation in the base of brackets. The two techniques showed the same ability to improve post-treatment ABO score compared to pre-treatment. The mean treatment time for the MBT group was two months shorter than that of the standard group, with no statistically significant differences. Therefore, it appears that the quality of orthodontic treatment results is almost practitioner-related completely (not technique-related). Finally, under identical conditions, it appears that MBT technique may help clinicians achieve final occlusion in shorter time and easier manner in some aspects, such as buccolingual inclination, compared to standard edgewise.

Conclusion

1. Significant differences were found in post-treatment buccolingual inclination. This criterion was more acceptable in the MBT group.
2. Finally the ABO score was the same in both post-treatment and pre-post changes.
3. It seems that with more experienced practitioners the method of treatment is not a significant factor in the quality of treatment.

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