

Comparing the Rate of Relapse with Damon Q Brackets and Conventional Brackets In Extraction Cases

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ABSTRACT

Aim: The present study was conducted to compare the rate of relapse with DAMON Q and conventional MBT brackets in extraction cases.

Materials and methods: The first group (Group A) consisted of 10 patients who had undergone treatment with Ormco Damon Q Brackets. The second group (Group B) consisted of 10 patients who had undergone treatment with Conventional Brackets (MBT). Complete records including plaster models were taken before treatment (T1), immediately after treatment (T2), six months after treatment (T3). The following variables were measured: inter canine width, inter molar width, arch length, irregularity index. The following measurements were made on each dental cast with 150 mm of Vernier calliper (work zone). Width of the arches in canine and premolar region were measured with the Vernier calliper from the tip of the facial cusp of one premolar or canine, across the dental arch to the corresponding point on the homologous tooth. Arch length was measured in the maxilla and mandible from mesiolingual surface of first molar to mesial surfaces of central incisors. The mandibular irregularity index was measuring the displaced contact points of the anterior teeth as described by Little.

Results: The overall rate of relapse using Damon Q Group and Conventional MBT Group were similar. There were highly significant differences in the amount of relapse in lower arch length between Damon Q and MBT systems during 6 month of post retention.

Conclusion: Mandibular incisor irregularity was increase in postretention period (0.823) showing relapse in irregularity index in lower arch treated by Damon system. Total lower arch length was increased in cases were treated by Damon SL brackets(0.86 mm) showing relapse in arch length. During post retention period.

Keywords: Evidence, Implantology, Periodontal disease.

INTRODUCTION

It is difficult to imagine that there was a period in Orthodontics before the invention of brackets. Yet this was the situation when Edward Hartley Angle developed and perfected treatment procedures with his "E" arch, which expanded the dental arches. During this time he also advocated the pre-

treatment extraction of teeth and devised methods to close extraction spaces sans brackets.

The Damon self-ligating bracket (Ormco, Glendora, Calif) was developed as an integral component of a low-friction appliance. Damon SL in 1996, Damon 2 in 2000, Damon 3 in 2004, Damon 3MX in 2005 and Damon Q in 2009 were developed based on the

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theory “Low Friction and Light Forces Produced More Biologically Stable Results” by Dwight Damon in 1990's. It has been suggested that the low-level friction associated with this bracket encourages more rapid levelling and alignment, allowing longer appointment intervals and reducing overall treatment time. Damon Q brackets are more secure and more comfortable for the patient when opened and closed, immune to the effects of calculus accumulation.

The stability of aligned teeth is variable and unpredictable. Numerous studies have been done to assess the amount and type of relapse seen postretention in orthodontically treated cases. Purpose of this study is to compare the rate of relapse with Damon Q and conventional bracket in extraction cases.

MATERIALS AND METHOD

The first group (Group A) consisted of 10 patients who had undergone treatment with Ormco Damon Q Brackets. The second group (Group B) consisted of 10 patients who had undergone treatment with Conventional Brackets (MBT). Complete records including plaster models were taken before treatment (T1), immediately after treatment (T2), six months after treatment (T3).

Inclusion Criteria

1. Patient older than 12 years
2. Patients wearing Hawley retainer both upper and lower dental arch post treatment.
3. Patients with Extraction of 1st premolar.
4. Patients with Class 1 molar relationship
5. Patients with Permanent dentition

Exclusion Criteria

1. Patients with second premolar extraction.
2. Medically compromised patients.
3. Patients with Hypodontia ,Oligodontia
4. Patients with Hypothyroidism
5. Patients with Cleft-lip/palate

The following variables were measured: inter canine width, inter molar width, arch length, irregularity index. The following measurements were made on each dental cast with 150 mm of Vernier calliper (work zone). Width of the arches in canine and premolar region were measured with

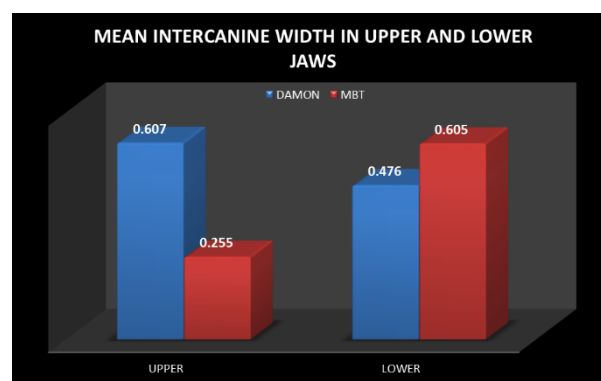
the Vernier calliper from the tip of the facial cusp of one premolar or canine, across the dental arch to the corresponding point on the homologous tooth. Arch length was measured in the maxilla and mandible from mesiolingual surface of first molar to mesial surfaces of central incisors. The mandibular irregularity index was measuring the displaced contact points of the anterior teeth as described by Little

RESULTS

A total of 20 patients who reported to the Department of orthodontics and dentofacial orthopaedics, coorg institute of dental sciences, virajpet seeking treatment for their dentofacial deformity were enrolled for the study. The twenty patients were divided into two groups. The first group comprised of ten patients who were treated with the Damon Q Self Ligating Brackets and the other ten in the second group were treated with the Conventional MBT Brackets. These patients were explained about the protocol, its advantages and limitations of the procedures and written consent was obtained from them before starting the treatment.

Table 1: Comparison of Mean inter-canine width in upper and lower jaw with in DAMON Q and MBT in post treatment and after 6 month of retention period

Inter canine width		Mean	Standard deviation	t	P VALUE
Upper	Damon	0.6070	0.66222	-1.443	0.166 (N.S)
	MBT	0.2550	0.39593		
Lower	Damon	0.4760	0.72499	0.200	0.105 (N.S)
	MBT	0.6050	1.90125		



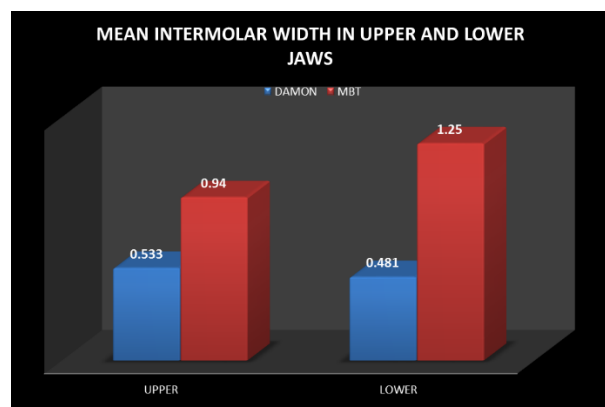
Graph 1: Comparison of Mean inter-canine width in upper and lower jaw with in DAMON Q and MBT in

post treatment and after 6 month of retention period.

Interpretation: No significant difference was observed for overall rate of relapse in intercanine width between Damon and Conventional given by a P value 0.166 and 0.105 in both jaw simultaneously. The mean for Overall rate of relapse in upper jaw in Damon was .0607(± 0.6622) and for conventional 0.0255 (± 0.39593), while rate relapse in lower jaw in Damon was 0.476(± 0.72499) and for conventional 0.605 (± 1.90125). There was small significant difference in rate of relapse showing upper arch between Damon and MBT.

Table 2: Comparison of Mean inter-molar width in DAMON Q and MBT post treatment and 6 month of retention period.

Intermolar width		Mean	Standard deviation	t	P VALUE
Upper	Damon	0.5330	1.05603	0.725	0.478 (N.S)
	MBT	0.9400	1.42624		
Lower	Damon	0.4810	1.27693	0.942	0.358 (N.S)
	MBT	1.2500	2.24249		



Graph 2: Comparison of Mean inter-molar width in DAMON Q and MBT post treatment and 6 month of retention period.

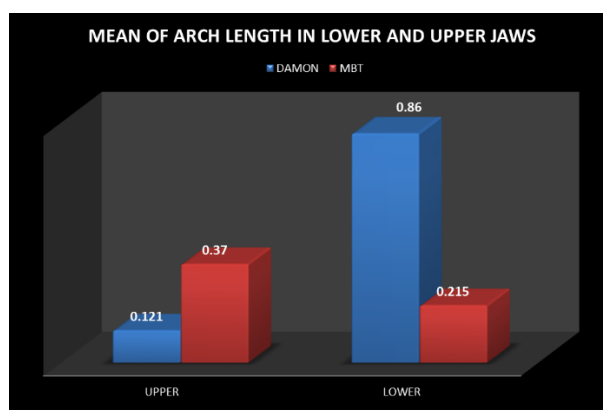
Interpretation: No significant difference was observed for overall rate of relapse in inter-molar width between Damon and Conventional given by a P value of 0.478 and 0.358 in both jaw simultaneously. The mean for Overall rate of relapse in upper jaw in Damon was .533(± 1.05603) and for

conventional 0.94 (± 1.42624), while rate relapse in lower jaw in Damon is 0.481(± 1.27693) and for conventional 1.25.

Table 3: Comparison of Mean arch length between Damon Q and MBT post treatment and 6 month of retention period.

Arch length		Mean	Standard deviation	t	P VALUE
Upper	Damon	0.1210	1.05491	1.100	0.286 (N.S)
	MBT	0.3700	0.93862		
Lower	Damon	0.8600	3.04633	1.082	0.001 (H.S)
	MBT	0.2150	0.77352		

Graph 3: Comparison of Mean arch length between Damon Q and MBT post treatment and 6 month of retention period

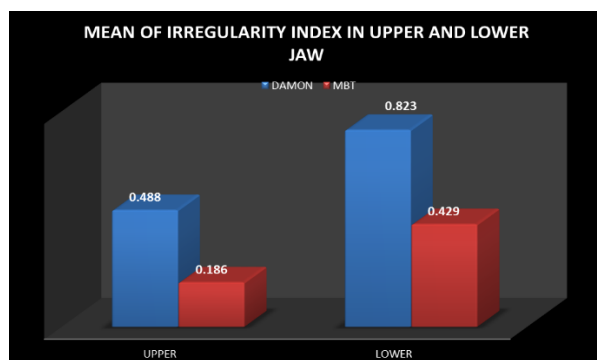


Significant difference was observed for overall rate of relapse in arch length between Damon and Conventional given by a P value of 0.286 and 0.001 in both jaw simultaneously. The mean for Overall rate of relapse in upper jaw in Damon was 0.1210(± 1.05491) and for conventional 0.3700 (± 0.93862), while rate relapse in lower jaw in Damon was 0.8600 (± 3.04633) and for conventional 0.2150 (± 0.77352).

Table 4: Comparison of Mean irregularity index between Damon Q and MBT post treatment and 6 month of retention period.

Irregularity index		Mean	Standard deviation	t	P VALUE
Upper	Damon	0.4880	0.66099	2.445	0.025 (S)
	MBT	0.1860	0.56816		
Lower	Damon	0.8230	0.82649	1.338	0.103 (N.S)
	MBT	0.4290	0.42956		

Graph 4: Comparison of Mean irregularity index between Damon Q and MBT post treatment and 6 month of retention period.



Interpretation:. Significant difference was observed for overall rate of relapse in between Damon and Conventional given by a P value of 0.025 and 0.103 in both jaw simultaneously. The mean for Overall rate of relapse in Damon was $0.488(\pm 0.66099)$ and for conventional $0.186(\pm 0.56816)$ in upper jaw, While rate relapse in lower jaw in Damon is $0.823(\pm 0.82649)$ and for conventional $0.429(\pm 0.42956)$.



Fig 1: Damon Q Bracket and Conventional MBT Bracket.



Fig 2: 150mm Work zone Digital Caliper.



Fig 3: Measurements taken using 150mm Digital Caliper (Workzone)

DISCUSSION

The Damon self-ligating bracket was developed as an integral component of a low-friction appliance. It has been suggested that the low-level friction associated with this bracket encourages more rapid levelling and alignment, allowing longer appointment intervals and reduced overall treatment time. Efficiency of treatment mechanics is a major focus in modern orthodontics.

Stability of the denture after treatment" is one of the original and most desirable goals of orthodontic therapy. The orthodontist's goal is for the patient to have a satisfactory occlusion and alignment of the teeth many years post retention. However, relapse is an inevitable outcome of combined action of many factors, so how to maintain the stability of teeth become urgent problems to orthodontists.

The stability of aligned teeth is variable and unpredictable. Numerous studies have been done to assess the amount and type of relapse seen postretention in orthodontically treated cases. Relapse occurs when the teeth move toward their original positions shortly after the appliances are removed. Therefore, while relapse may explain some of the post-treatment changes, the tendency for the teeth to crowd after retention is often a consequence of continued growth and the compensatory migration of the teeth (instability) rather than the failure of the treatment. The purpose of this study was to compare the rate of relapse with Damon Q and conventional bracket in extraction cases. The study sample consisted of 20 subjects. The subjects were equally divided into two groups. The first group (Group A) consisted of 10 patients who underwent treatment with Ormco Damon Q Brackets. The second group (Group B) consisted of 10 patients who underwent treatment with Conventional Ligating Brackets (MBT). Dental casts were routinely made at the following stages: pre-treatment (T1), post-treatment (T2), 6 months after T2. Four variables were measured: Irregularity Index, Inter-canine width, Inter-molar width, arch length

INTERPRETATION OF RESULTS

One of the most closely evaluated changes was that of arch length. In this study arch length was increased significantly during postretention

showing relapse in cases treated with Damon Q SL brackets ($p < 0.001$). In this study results showed that the irregularity of the anterior incisors in the mandible increased considerably more in participants without a retainer compared with those who had a fixed retainer in place at T2. Most participants in this study were satisfied with their treatment outcome. According to the evidence, patients are more aware of their anterior teeth than the rest of their occlusion. In this study clear relapse was seen but the participants may not have noticed that. In this study four variables were measured: Irregularity Index, Inter-canine width, Inter-molar width, arch length.

In irregularity index there was significant difference were observed for overall rate of relapse in between Damon and Conventional given by a P value of 0.025 and 0.103 in both jaw simultaneously. The mean for Overall rate of relapse in Damon was $0.488(\pm 0.66099)$ and for conventional $0.186(\pm 0.56816)$ in upper jaw, While rate relapse in lower jaw in Damon is $0.823(\pm 0.82649)$ and for conventional $0.429 (\pm 0.42956)$. it concluded that rate of relapse is more in Damon Q brackets compared with conventional MBT brackets in irregularity index.

In Arch length there was significant difference were observed for overall rate of relapse between Damon and Conventional given by a P value of 0.286 and 0.001 in both jaw simultaneously. The mean for Overall rate of relapse in upper jaw in Damon was $0.1210(\pm 1.05491)$ and for conventional $0.3700 (\pm 0.93862)$, while rate relapse in lower jaw in Damon was $0.8600 (\pm 3.04633)$ and for conventional $0.2150 (\pm 0.77352)$. It concluded that there is rate of relapse in arch length in post retention period is more in Damon brackets in lower arch compared to conventional brackets but in upper arch there is no significant difference were observed between Damon an MBT brackets.

In inter-canine width there was no significant difference were observed for overall rate of relapse in inter-canine width between Damon and Conventional given by a P value of 0.166 and 0.105 in both jaw simultaneously. The mean for Overall rate of relapse in upper jaw in Damon was $0.0607(\pm 0.6622)$ and for conventional $0.0255 (\pm 0.39593)$, while rate relapse in lower jaw in

Damon was $0.476(\pm 0.72499)$ and for conventional $0.605 (\pm 1.90125)$. There was small significant difference in rate of relapse in upper arch between Damon and MBT brackets.

In inter-molar width there was no significant difference was observed for overall rate of relapse in inter-molar width between Damon and Conventional given by a P value of 0.478 and 0.358 in both jaw simultaneously. The mean for Overall rate of relapse in upper jaw in Damon was $.533(\pm 1.05603)$ and for conventional $0.94 (\pm 1.42624)$, while rate relapse in lower jaw in Damon is $0.481(\pm 1.27693)$ and for conventional $1.25 (\pm 2.24249)$.

COMPARISON WITH OTHER STUDIES

Our study is in agreement with a study conducted to evaluate the stability of orthodontic treatment outcome and retention status 7 or more years after active treatment in relation to posttreatment or postretention time, type of retention appliance, and duration of retainer use. This study concluded that occlusal relapse can be expected after active orthodontic treatment irrespective of long-term use of fixed retainers.²⁵

Our study is in agreement with the study conducted to evaluate in the 1970s suggested that premolar extraction treatment had poor stability over the long term. The study was concluded that Maxillary and mandibular intercanine distances behaved differently. The mandibular intercanine distance showed a net decrease between pre-treatment and follow-up, whereas the maxillary arch had a net increase. Individualized brackets (torque) should then be coordinated with the guidance angle of the maxillary teeth⁴.

LIMITATION OF STUDY

This study had the limitation because of small sample size and short follow-up period, being only 6 months, the results are to be considered as short term. Of course, we believe that 6 months postretention control is short and not sufficient, but registrations 6-month postretention were done within the routine treatment program. A better scientific credibility for the study can be achieved only after long term observation periods.

CONCLUSION

Damon System have challenged several aspects of conventional orthodontic thought and treatment pattern. Damon system is a breakthrough in orthodontic treatment mechanics. Damon system is based on Bio-Adaptive Therapy (BAT), it is an emerging treatment modality in fixed orthodontic treatment.

The new Damon Q brackets are the latest designs in the Damon passive self-ligating series. They incorporate the latest technology to provide the best combination of results and ease of use.

This study focused on mandibular and maxillary intercanine and inter molar width changes and changes in mandibular anterior alignment (irregularity index).

In this study Little irregularity index, dental arch length and width were measured which can comprehensively reflect the statues of relapse as relapse not only included the change of overbite/overjet, but also the change of dental arch length and width. Some researchers used only irregular index to evaluate long term stability, which has certain one-sidedness.

In a word, in terms of short term (6 months) stability between SL and CL brackets, there is not much significant differences were found in this study. Due to the fact that self-ligating braces are expensive, the advantages of saving time and reducing root absorption still need stronger evidence to be proven.

This study found that the dental arch had a certain degree of expansion in both groups and there was no statistically significant increases in inter-canine width, but Damon Q brackets resulted in statistically greater increase in inter canine width in upper arch, and Little's irregularity index than conventional appliances. However Damon Q show post-retention decrease in their molar width than CL, which may be related to the fact that the two groups existed statistically significant differences, but the difference was only 1 mm, which was not clinically different.

On the basis of the dental cast from a sample of 20 cases evaluated short-term following 4 premolar extraction therapy, the following conclusions were reached: Overall stability was relatively good. The

relapse patterns seen were similar in nature. Arch length and irregularity index were significantly increase at post retention in Damon Q bracket system compared to conventional MBT bracket system. But inter canine and inter molar width were not significant difference at post retention in both groups.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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