

Original Research Article

Clear and Fixed Retainer's Outcomes After Orthodontic Ally Treated Open Bite Cases : Clinical Study

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Abstract

There is currently a lack of scientific evidence to about prolong retention of open bite malocclusion, from this point of view the idea of this paper start to feel free to change the protocol of wearing of clear retainer in open bite malocclusion because great satisfactions of patients to this type of retainers to see the final outcome of clear and fixed retainer in retention of orthodontic ally treated open bite cases. A sample of 15 orthodontics patients suffer from open bite malocclusion included in this study and 10 of them selected to be involved in this comparative study and 5 cases excluded because the discontinue the consent form of this research. Patient's age ranging from 16 -20 years old. The overbite measurements were done over three time frames these were zero day time of removal of fixed appliances and after six months and after one year by digital vernia. The result of the present study was encouraging to change the protocol of wearing of clear retainer with the help of fixed upper and lower from canine to canine retainer thus repeated measures ANOVA test shows highly significant difference between overbite measurements over three periods of time and Bonferroni test clarify there is highly significant difference between time frame measurements. In conclusion to this paper the holy recommendation for retention after orthodontically treated open bite cases is using clear retainer in upper arch and upper and lower canine to canine fixed retainers with change of protocol of wearing of clear retainer to 24 hours except meal time at least for six month and if extended to one year this will give marvelous result in regards to overbite measurements this will apparently improve the overbite measurement.

Key words: Clear retainer, Fixed retainer, Open bite

الخلاصة

حاليا يوجد نقص بالإثباتات العلمية الداعمة للتثبيت الطويل لحالات الاطباق المفتوح. من هذه النظرة تطورت الفكرة لهذا البحث والشعور بحرية لتغيير بروتوكول لبس المثبت الشفاف في حالات الاطباق المفتوح بسبب المقبولية الكبيرة لدى المرضى لهذا النوع من المثبتات لنرى مدى تأثير المثبت الشفاف والثابت في الفك العلوي والسفلي في تثبيت حالات الاطباق المفتوح الامامي المعالج تقويميا. عينة من 15 مريض تقويم يعانون من اطباق امامي مفتوح شملتهم الدراسة ولكن 10 منهم فقط تم اختيارهم وتم استبعاد 5 حالات بسبب عدم التزامهم بالبرنامج المعد مسبقا واعمارهم كانت تتراوح بين 16 - 20 سنة وقياس مدى التطابق بين الاسنان الامامية في الفك العلوي والفك السفلي في ثلاث فترات زمنية هي يوم الصفر وهو يوم رفع الجهاز الثابت ويوم السنة اشهر وبعد سنة كاملة من المتابعة. النتائج كانت مشجعة لتغيير برنامج لبس المثبت الشفاف لجميع المرضى و في اختبار الانوفا كان النتيجة الاحصائية مهمة معنويا في قراءات مدى التطابق بالمليمتر اما اختبار نسبة الاهمية الصغرى اوضح وجود اهمية معنوية عالية بين الفترات الزمنية الثلاث. وكمحصلة لهذا البحث فأن التوصية المقدسة لتثبيت بعد علاج حالات الاطباق المفتوح هو استخدام المثبت الشفاف مع في الفك العلوي ومثبت ثابت في الفك العلوي والسفلي من الناب في الجهة اليمنى الى الناب في الجهى اليسرى بتغيير برنامج لبسة لمدة 24 ساعة باليوم ماعدا وجبات الاكل على الاقل لمدة ستة اشهر وفي حالة زيادة لبس المثبت الشفاف لمدة سنة فأن النتائج تكون رائعة وهذا بوضوح سوف يحسن قياس التطابق بين الفكين.

الكلمات المفتاحية: المثبت شفاف, المثبت الثابت, الاطباق المفتوح.

Introduction

Understanding of multifactorial relapse of treated orthodontic cases is still to somehow vague, which makes retention one of the most controversial parts of orthodontically treated malocclusion. Although scientist prescribed a retention protocol or advice, but in the same time they are suggested that long period alignment was changeable and difficult to predict. Furthermore, there is no definitive measure to orthodontic cases to predict relapse[1]. The major goal of retention is to preserve teeth in their final positions. Without a retention period, there is a possibility to the teeth to return back to its pretreatments situation. This we call it relapse. The role of retention was identified early in 1919, Hawley wrote that, "if anyone would take my cases when they are finished, retain them and be responsible for them afterwards, I would gladly give them half the fee" [2]. The main goal of the retention period is to limit the relapse, preserve contouring and look of the teeth and permit for after treatment settling of the occlusion.

The vacuum formed retainer was introduced by Ponitz [3-5]. Ponitz called it the "invisible retainers" due to it formed from clear material. Sheridan was recommends that the clear retainer be worn full-time for a short period and then only at night, on the other hand, there is no clear evidence between specialists in regard to clear retainer wear[6]. Retention after anterior open bite correction is a big challenge facing many orthodontists and the relapse is due to elongation of molars and intrusion of anterior teeth. Fixed retainer is an effective mean to retain teeth after orthodontic treatment of open bite[5]. If specialist plan to use fixed retainer the important question hear is for how long fixed retainer last and it is affect periodontal health[7], articles support that there is no any harmful to the teeth or oral soft tissues [8,9]. On the other hand the use of retainers incorporating posterior bite block were recommended for prolonged retention of

anterior open bite malocclusions with unfavorable growth patterns [10], there is currently a lack of scientific evidence to support this, from this point of view the idea of this paper start to feel free to change the protocol of wearing of Biostar retainer in open bite malocclusion because great satisfactions of patients to this type of retainers according to Mollov et al[11] to see the final outcome of Biostar and fixed retainer in retention of orthodontically treated open bite cases.

Materials and Methods

A sample of 15 orthodontics patients of class 1 malocclusion suffer from open bite due to soft tissue factor (Tongue thrust) included in this study and 10 of them selected to be involved in this comparative study and 5 cases excluded because they were discontinued the consent form of this research. Patient's age ranging from 16 -20 years old.

Standardized profile photographs with Frankfort plane horizontal using Canon Power shot SD750 digital Elph (7.1 Megapixel, Japan) camera with a 100 cm distance from the patient were taken prior to the orthodontic treatment.

Roth stainless steel brackets (Bionic, Orthotechnology Co., USA) with 0.022" slot were bonded on the maxillary and mandibular teeth using no-mix orthodontic composite (Orthotechnology Co., USA). Orthodontic bands with Roth prescription were cemented on the first and second permanent maxillary and mandibular molar teeth using glass ionomer cement. Leveling and alignment phase was completed using NiTi sequence arch wires with cinch back posteriorly, then Finishing was done with 0.019 × 0.025" NiTi and stainless steel arch wires and settling of occlusion was completed by using Zig Zag elastic to get maximum intercuspation then the orthodontic appliances were removed in about two year treatment duration. Second profile photographs were taken after the orthodontic treatment and the effect of treatment was

compared and discussed with the patient as orthodontic protocol stated. Figure 1.

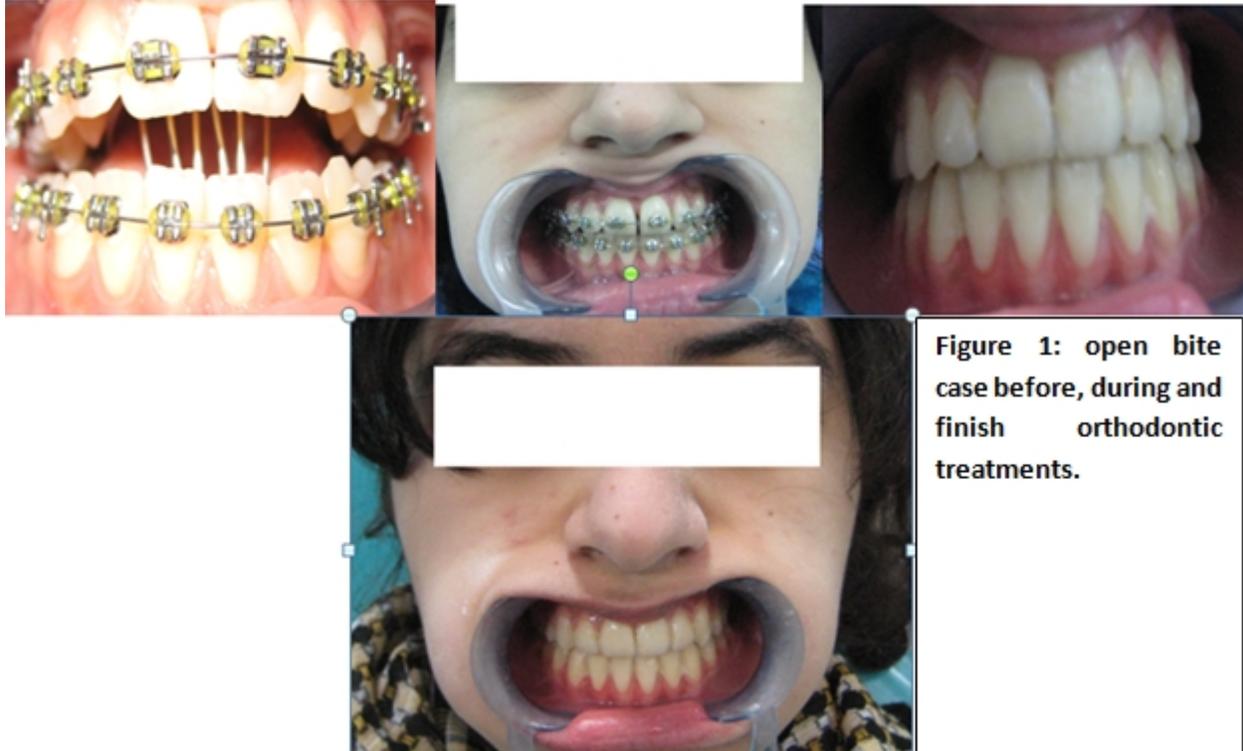


Figure 1: open bite case before, during and finish orthodontic treatments.

Retainers' constructions

After that removal of adhesive material done by carbide burs with largely separated blades to chips all remnant composite after de-bonding (Orthotechnology USA) and then did scaling and polishing with non-fluoride paste (Orthotechnology USA) in addition braided fixed retainer wire is directly bonded to lingual aspect of lower and upper canine to canine after 37% orthophosphoric acid application and ivoclar bonding was applied to the lingual aspect. Having alginate impression for the patient upper arch after direct fixed retainer bonding and poured by stone then trimmed and positioned inside vacuum forming machine (Keystone Company, USA) a sheet of clear plastic material (clear advantage series one, USA) of

1 mm thickness retainer positioned in four corner control of the vacuum machine then heater is switched on to provide heat that necessary to soften plastic material then vacuum switch is turned on to provide necessary negative pressure to hold the soften material against the stone cast to form the clear retainer furthermore remove the cast from vacuum machine and cut the boundaries by using cutting wheel bur (Orthotechnology, USA) by using micro engine on 20000 round per minute then the clear retainer finished and polished by using stone bur (Figure 2) and delivered to the patient after overbite registration and this we call it zero day measurements by using digital vernia, patients were strongly instructed to wear the retainer 24 hours except meals time and

recall visit every 3 month to adjust the retainer or replace it according to their occlusal contact, and after six months the second measurements of overbite was taken

and finally after one year third measurements of overbite was taken and registered in patient file.



Figure 2: Biostar retainer construction

Statistical Analysis

Descriptive statistics: mean, and Standard Deviation. Inferential statistics: repeated measure ANOVA and Bonferroni test

Results and Discussion

The descriptive statistics in Table 1 apparently shows that the mean value of overbite in one year is larger than that of 6 months and zero day respectively, while the inferential statistic in table 2 represented by repeated measure ANOVA for overbite measurements at different intervals clarify there is highly significant difference between all three measurement of overbite over the time frame zero day ,six month and one year

respectively, this result is highly encouraging to change the protocol of wearing of clear retainer and the result agreed for some extent with the Sheridan and completely agreed with Profit et al [5] they are stated “controlling eruption of upper molars therefore is the key to retention in open bite cases”and this is what happens by Biostar retainer control extrusion of molar and may be enhance growth of anterior dento alveolar segment with help of upper and lower canine to canine fixed retainer to prevent single tooth mal alignment during retention period and consequently affect overbite measurements. While there is an increase of overbite in about 0.68 mm between zero and

six month and 1.1 mm between zero day and one year and 0.44 between 6 months and one year this improvements in overbite measures during first six months is more than that of one year this is may be due to the compensatory mechanism and growth limit is start to decline at late teens periods this agreed with Proffit et al [5]. This result completely supports patient compliance during first and second three month about appliance retention in his/her mouth while these compliances start to decline during third and fourth 3 months periods.

Table 3 that focus on localization of the significant difference in overbite measurements by using Adjustment for multiple comparisons represented by Bonferroni test shows that there is a highly significant difference between each two time frame interval (Zero day and 6 month, zero day and one year, 6 month and zero day, 6 month and one year, one year and zero day, one year and six month measurements). The result of Bonferroni test support the evidence and result shows by repeated measures ANOVA test in table 2 and this may be due to increase of occlusal contact during the period of retention and this come in accordance of result of Macnamara et al [12]. In conclusion to this paper the holy recommendation for retention after orthodontically treated open bite cases is using clear in upper arch and upper and lower canine to canine fixed retainers with change of protocol of wearing of clear retainer to 24 hours except meal time at least for six month and if extended to one year this will give marvelous result in regards to patients esthetics and functions and this will apparently improve the overbite measurement.

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Table 1: Descriptive Statistics

	Mean	Std. Deviation	N
zero Day	2.3400	0.37178	10
six months	3.0200	0.33267	10
one year	3.4600	0.29889	10

Table 2: Repeated measure ANOVA test for deep bite measurements at different time intervals

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
time	Sphericity Assumed	8.456	2	4.228	839.382	0.001	0.989
	Greenhouse-Geisser	8.456	1.262	6.700	839.382	0.001	0.989
	Huynh-Feldt	8.456	1.372	6.161	839.382	0.001	0.989
	Lower-bound	8.456	1.000	8.456	839.382	0.001	0.989
Error(time)	Sphericity Assumed	.091	18	.005			
	Greenhouse-Geisser	.091	11.358	.008			
	Huynh-Feldt	.091	12.352	.007			
	Lower-bound	.091	9.000	.010			

Table 3: Adjustment for multiple comparisons: Bonferroni test

time		Mean Difference	Std. Error	Sig.
Zero day	6 month	0-.680	0.025	0.001
	One year	1.300	0.042	0.001
6 month	Zero day	0.680	0.025	0.001
	One year	0.620	0.025	0.001
One year	Zero day	1.300	0.042	0.001
	6 month	0.620	0.025	0.001
*. The mean difference is significant at the 0.05 level.				