



Weight Loss in Fixed Orthodontic Treatment - A Myth?

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Abstract

Aims: The objective of this study is to assess the changes in weight of the patients undergoing fixed orthodontic treatment. Further the aim is to examine the relation between gender of the patient and the change in the weight.

Materials and Methods: A total of thirty five patients, 12 - 25 years old, being treated at Department of Orthodontics and Dentofacial Orthopedics, were selected. The weight was measured before the start of the treatment as W0 and then for next 10 months after the start of the treatment at an interval of 1 month each as W1, W2.....W10.

Statistical Analysis: Weights recorded at W0 were compared to weights from W1 to W10 with the help of Post Hoc and T Test. The statistical significance was set at the level of $P < 0.05$.

Results: No significant weight change was seen when pretreatment weight was compared to the weight at any of the 10 months. No significant difference was also found when change in weight was compared between male and female subjects.

Conclusion: This study indicates that there is no significant weight change during fixed orthodontic treatment and hence the treatment should be undertaken wherever indicated without the side effect of weight loss.

Keywords: Fixed Orthodontic Treatment; Weight Loss

Introduction

For more efficient clinical management of orthodontic patients, it is desirable to be aware of the factors that would predict their behaviour and compliance during their subsequent treatment. Important human values are at stake in the course of treatment. These include preventing pain, preserving as well as restoring oral functions for normal speech and eating, improving the patient's physical appearance and promoting a sense of control and responsibility for his or her own health. Orthodontists must be able to address the concerns of the patient about their treatment.

Pain and discomfort are frequent side effects of orthodontic therapy with fixed appliances [1,2]. It can be predicted that pain, discomfort and change in dietary pattern while undergoing ortho-

odontic treatment may result in gain or loss of weight in orthodontic patients [3].

However while most previous studies have only assessed the experiences of pain and discomfort among orthodontic patients immediately after insertion of appliances or during progress of treatment [2,4-9], only few studies have assessed the weight change if any, as an impact of the wearing of fixed orthodontic appliances [2,6,10,11]. Due to its large psychosocial component orthodontics is one of the dental treatments that requires the use of certain measures to relate to the quality of life affected by it [12,13]. Some specific rather than generic measures should also be used, such as weight change because the focus of specific measures makes them potentially more responsive to small but clinically important

changes in health [14-16]. A measurement of weight change may assess the impact of the orthodontic appliance in daily life and would identify the problems patients experience during the progression of treatment.

The assumption that diet changes in the orthodontic patients may cause weight change forms the basis of our objective of the study which is to assess among orthodontic patients the impact of orthodontic appliances on the weight of the patients. This is a study to find a relationship between any changes in the weight of the patient during the course of the fixed orthodontic treatment. Further the aim is to examine the interactions between the gender of the patient and the change in the weight.

Materials and Methods

A total of 35 patients were recruited for this study. The study was conducted in the Department of Orthodontics and Dentofacial Orthopedics. Out of the total sample of 35 patients, 22 were female and 13 were male patients. The age group of the patients was between 12 and 25 years. The patients were selected on the basis of inclusion criteria which were that all the patients had their multi-bracket treatment started and continued here in the department. The exclusion criteria included patients having any systemic disease, anxiety related stress disease or under any exercise, diet regime. Weight was measured using bathroom scales up to 0.5 Kg. The scale was kept on a flat surface and the subject was requested to step on it bare feet without holding on to anything. Subjects were measured in normal apparel. The patients were weighed 3 times at

each appointment and the mean weight was taken as the final. To control any observer error there was a single observer and measurements were made in kilograms. The weight was recorded before the start of the treatment (W0). Further recordings of weight were made at every appointment at one month interval as W1, W2, W3.....W10, for a period of 10 months after the start of the treatment. Each time history of any systemic disease, drug use and any change in exercise regime was taken. Statistical analysis was done. Weights recorded at W0 were compared to weights from W1 to W10 with the help of Post Hoc and T Test. The statistical significance was set at the level of P < 0.05.

Results

From a sample of 35 orthodontic patients 22 were females and 13 were males i.e. 62.86% were females and 37.14% were males. The weight of patients was measured 11 times. One before treatment as W0 and one each at 1 month interval after the start of the treatment as W1, W2-----W10. The mean values of weights for females, males (Table 1) and total subjects (Table 2) were calculated at pre-treatment and at each month after the start of treatment for a period of 10 months.

The mean of weights recorded at W0, W1-----W10 were compared between females and males with the help of T Test. The statistical significance was set at a level of p < 0.05 and the result showed there was no significant difference when mean weight of females was compared to mean weight of males at the time of pre-treatment as well as at any of the monthly readings for a period of 10 months (Table 3 and 4).

W	Mean	Female N = 22			Male N = 13			
		SD	Min	Max	Mean	SD	Min	Max
Pre-treatment-W0	50.568	7.7750	35.9	61.9	53.215	18.3192	30.6	94.5
Month 1-W1	50.109	7.1491	38.1	61.2	52.738	18.2564	30.1	93.2
Month 2-W2	50.150	6.9733	35.9	61.3	52.931	18.7226	28.8	95.2
Month 3-W3	50.568	7.2607	36.4	61.8	53.054	18.7791	30.1	95.7
Month 4-W4	50.995	7.4287	37.7	62.4	52.962	18.6640	30.2	95.9
Month 5-W5	51.282	7.7092	38.4	62.6	53.508	17.7634	30.8	95.1
Month 6-W6	52.005	6.8707	39.2	61.9	53.208	17.4366	30.7	94.6
Month 7-W7	51.100	7.3198	38.2	62.3	53.462	17.4837	30.6	94.2
Month 8-W8	51.264	7.0390	38.2	61.8	53.346	17.2828	29.8	92.8
Month 9-W9	51.168	7.2680	38.0	62.3	54.408	18.3981	30.9	99.1
Month 10-W10	50.950	7.3370	37.6	62.2	54.600	18.0368	32.1	99.3

Table 1: Mean values of weights for females and males at pre-treatment and for 10 months into treatment.

Weight	Mean Wt.	Standard deviation	Minimum	Maximum
Pre-treatment-W0	51.551	12.5485	30.6	94.5
Month1-W2	51.086	12.2826	30.1	93.2
Month 2-W2	51.183	12.4744	28.8	95.2
Month 3-W3	51.491	12.5902	30.1	95.7
Month 4-W4	51.726	12.5682	30.2	95.9
Month 5-W5	52.109	12.2174	30.8	95.1
Month 6-W6	52.451	11.6967	30.7	94.6
Month 7-W7	51.977	11.9298	30.6	94.2
Month 8-W8	52.037	11.7076	29.8	92.8
Month 9-W9	52.371	12.4345	30.9	99.1
Month 10-W10	52.306	12.2993	32.1	99.3

Table 2: Mean values of the whole sample at pre-treatment and for 10 months after treatment (N = 35).

	t	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Pre Treatment	.597	.554	2.6472	4.4319	-6.3696	11.6640
Month -1	.606	.549	2.6294	4.3373	-6.1949	11.4537
Month -2	.632	.532	2.7808	4.4030	-6.1771	11.7387
Month -3	.559	.580	2.4857	4.4496	-6.5671	11.5384
Month -4	.442	.661	1.9661	4.4496	-7.0868	11.0190
Month -5	.515	.610	2.2259	4.3209	-6.5651	11.0168
Month -6	.290	.774	1.2031	4.1480	-7.2361	9.6424
Month -7	.560	.579	2.3615	4.2161	-6.2162	10.9393
Month -8	.503	.618	2.0825	4.1414	-6.3431	10.5082
Month -9	.740	.465	3.2395	4.3791	-5.6699	12.1489
Month-10	.845	.404	3.6500	4.3208	-5.1408	12.4408

Table 4: Result of T test comparing the means of weights of females and males.

Where df = 33.

	Male/ female	Mean	Std. Deviation	Std. Error Mean
Pre- Treatment	M	53.215	18.3192	5.0808
	F	50.568	7.7750	1.6576
Month-1	M	52.738	18.2564	5.0634
	F	50.109	7.1491	1.5242
Month-2	M	52.931	18.7226	5.1927
	F	50.150	6.9733	1.4867
Month-3	M	53.054	18.7791	5.2084
	F	50.568	7.2607	1.5480
Month-4	M	52.962	18.6640	5.1765
	F	50.995	7.4287	1.5838
Month-5	M	53.508	17.7634	4.9267
	F	51.282	7.7092	1.6436
Month-6	M	53.208	17.4366	4.8360
	F	52.005	6.8707	1.4648
Month-7	M	53.462	17.4837	4.8491
	F	51.100	7.3198	1.5606
Month-8	M	53.346	17.2828	4.7934
	F	51.264	7.0390	1.5007
Month-9	M	54.408	18.3981	5.1027
	F	51.168	7.2680	1.5495
Month-10	M	54.600	18.0368	5.0025
	F	50.950	7.3370	1.5642

Table 3: The means of weight compared between females and males using T test.

To assess the change in weight the pre-treatment weight was compared to weight at each month after the start of the treatment for a period of 10 months for the female and male sample separately as shown in table 5. The result showed that there was no statistically significant difference in weight change for both female and male sample.

The pre-treatment weight of the whole sample was also compared to weights after the start of the treatment for a period of 10 months. The result was found to be statistically non-significant (Table 6).

Discussion

In all clinical work the orthodontist should carefully outline indicated treatments, including their benefits and burdens as well as the consequences of no treatment. Information should be gathered to identify the problems patient’s experience during the progression of orthodontic treatment. It can be predicted that pain and discomfort leading to change in dietary plan while undergoing orthodontic treatment will result in loss or gain of weight in orthodontic patients [3]. The prevalence as well as intensity of weight change caused by fixed orthodontic treatment was assessed in this study.

Male/Female	(I) Time-Period	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
F	Month-1	-.4591	2.1979	1.000	-6.477	5.559
	Month-2	-.4182	2.1979	1.000	-6.436	5.599
	Month-3	.0000	2.1979	1.000	-6.018	6.018
	Month-4	.4273	2.1979	1.000	-5.590	6.445
	Month-5	.7136	2.1979	1.000	-5.304	6.731
	Month-6	1.4364	2.1979	.996	-4.581	7.454
	Month-7	.5318	2.1979	1.000	-5.486	6.549
	Month-8	.6955	2.1979	1.000	-5.322	6.713
	Month-9	.6000	2.1979	1.000	-5.418	6.618
	Month-10	.3818	2.1979	1.000	-5.636	6.399
M	Month-1	-.4769	7.1038	1.000	-20.043	19.089
	Month-2	-.2846	7.1038	1.000	-19.851	19.282
	Month-3	-.1615	7.1038	1.000	-19.728	19.405
	Month-4	-.2538	7.1038	1.000	-19.820	19.313
	Month-5	.2923	7.1038	1.000	-19.274	19.859
	Month-6	-.0077	7.1038	1.000	-19.574	19.559
	Month-7	.2462	7.1038	1.000	-19.320	19.813
	Month-8	.1308	7.1038	1.000	-19.436	19.697
	Month-9	1.1923	7.1038	1.000	-18.374	20.759
	Month-10	1.3846	7.1038	1.000	-18.182	20.951

Table 5: Post Hoc test to compare the pre-treatment weight to weight at each month into treatment.

Where J= pre-treatment time period.

(I) Time-Period	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
				Lower Bound	Upper Bound
Month-1	-.4657	2.9293	1.000	-8.462	7.530
Month-2	-.3686	2.9293	1.000	-8.364	7.627
Month-3	-.0600	2.9293	1.000	-8.056	7.936
Month-4	.1743	2.9293	1.000	-7.822	8.170
Month-5	.5571	2.9293	1.000	-7.439	8.553
Month-6	.9000	2.9293	1.000	-7.096	8.896
Month-7	.4257	2.9293	1.000	-7.570	8.422
Month-8	.4857	2.9293	1.000	-7.510	8.482
Month-9	.8200	2.9293	1.000	-7.176	8.816
Month-10	.7543	2.9293	1.000	-7.242	8.750

Table 6: Post Hoc Test to compare the pre-treatment weight of whole sample to weight at each month into treatment.

Where J= Pre-treatment time period.

Our sample was of 35 patients belonging to the same socioeconomic status hence ruling out the variable of the type of diet which could affect the weight of the patients to increase or decrease. Other variables which could affect the weight of an individual like any disease, stress or anxiety, change in exercise regime were also considered by taking a history at each appointment.

Biting and chewing were reported to be most painful circumstances associated with fixed orthodontic appliances [3]. Even after few days, biting and chewing are still a source of considerable discomfort. It is hence evident that orthodontic treatment affects patients' ability to take in nutrition, their appearance, speech and social interaction. Almost all orthodontic patients have reported with pain when chewing.

Weight loss has been found with jaw fixation in few of the studies where patients who ate for consolation, had a tendency to regain weight after fixation whereas patients not going by this pattern of eating continued to lose weight [17]. In our study there was no significant change in weight of patients for a period of 10 months after the start of the treatment, when it was compared to their pre-treatment weights.

This is in accordance with other studies where discomfort after start of orthodontic treatment diminished after few days. Sergl reported that there is significant reduction in functional discomfort during the first week following appliance insertion [2]. Together with rapid reduction of pain, sensitivity and pressure observed after appliance insertion, indicating physiological adaptation to new appliances tends to occur as a short term event. The speed of adaptation to new appliance underlines the significance of a patient's initial reaction to an appliance and necessitates early consideration by treating clinician.

There are many studies saying that the pain and discomfort is experienced only during the earlier days of orthodontic treatment which helps us in the assumption that dietary change if any is only for few days and hence not affecting the weight of the patient as found in our study. Scheurer, *et al.* found that biting and chewing were the most painful everyday activities affected in the week after insertion of appliances [18]. Kvam, *et al.* in 1987 reported that pain began quickly after insertion of appliances leading to discomfort within the first 24 hours [19]. Pain after insertion of fixed appliances subsides to negotiable levels by days 5 to 7 which may be the result of a significant loss of proprioceptive ability 4 days af-

ter insertion of appliance [20]. Ngan, *et al.* in 1989 showed that higher pain scores was for anterior teeth than for posterior teeth [21]. Mandall, *et al.* reported that undergoing orthodontic treatment caused impacts related to aesthetics as well as functional limitations [22]. It can be predicted that pain and discomfort during eating with fixed appliances will result in loss or gain in weight of orthodontic patients. According to Phillip among the daily activities, eating was the most affected by orthodontic appliances [23]. According to Oliver, the short and long term courses of treatment, fixed or functional appliances have been previously reported to produce a higher intensity of discomfort than removable appliances [24]. This finding provides useful information in relation to the likelihood of pain, discomfort and side effects for patients undergoing orthodontic treatment.

Gender comparison: There was no significant difference by gender in the change in weight caused by wearing of orthodontic appliances in our study.

This is in accordance with another study conducted by Jones, who reported no difference in perception of pain from orthodontic appliances between males and females [25]. It may be predicted that this may further affect their eating and chewing habits and hence affect their weights. Similarly, Fasnham, *et al.* in a sample of adults after oral surgery also reported that women did not report more pain or require more analgesics than men. But PA Scheurer reported significant differences in response to fixed appliances with respect to pain between males and females [6]. Kvam, *et al.* 1987 also reported that truancy was much higher in girls as they reported a much higher impact on daily life from orthodontic appliances than boys [19]. Whereas our finding shows no significant difference in weight change on gender basis. When informing the patients about the side effects of fixed appliances, it should be borne in mind that the perception of general pain intensity, pain when eating and influence of discomfort on daily life can under same circumstances differ in girls and boys.

One cannot blame the dietary change solely for the weight loss initially if any because most of the patients revert to normal diet as soon as appliance activation pain subsided. Furthermore, few patients gained some weight in spite of dietary change. Perhaps weight cycling like intentional weight loss is frequently followed by unintentional regain or patient adaptability could be responsible for this diversity.

The present findings provide useful information in relation to likelihood of pain, discomfort and side effects for patients undergoing orthodontic treatment. However further studies are needed to assess the change over time of weight related impact related to wearing orthodontic appliance. As fixed orthodontic treatment continues for a long time of 2 - 3 yrs no significant adverse change in weight can encourage more patients to undergo the treatment when needed. The potential side effects of orthodontic treatment including pain during chewing, dietary change, weight change should be discussed with patients before they give consent to treatment and informed that they are transient changes gradually adapting to the long term treatment plan.

There were no differences in weight change in patients with multi-bracket therapy. Our study confirms previous reports that pain intensity peaks within 2 days after appliance insertion and decreases to minor levels after 5 days.

There is a strong interrelationship between a patient's attitude at the beginning of the orthodontic treatment, his or her capability to accommodate to discomfort associated with the orthodontic appliance, the type and intensity of discomfort encountered and the resulting overall compliance with treatment. Behaviour modification programmes aimed at changing problematic eating patterns and teaching self-management skills in relation to food consumption will help in making patients more compliant to the treatment.

Conclusion

Today persons requesting orthodontic treatment do so primarily for aesthetic reasons or functional disability. Aesthetics are important in people's lives and facial appearance has a profound influence on personal attractiveness and self-esteem because it affects health and reverberates in social, affective and professional relationships. It is the duty of the orthodontist to inform the patient of any adverse effects and difficulties the patient may face during the treatment. The result of our study showed no weight change during first 10 months of treatment. However, there is a need to conduct more studies on weight changes if any during the course of the treatment to come to a definitive conclusion. Our study concluded that the general notion that there is a weight loss during orthodontic treatment is not true. It may be assumed that the initial discomfort and pain during mastication is transient and the patient adapts to it easily, reverting back to his initial dietary pattern, thereby not affecting his weight also. This fact may help in moti-

vating the patients needing orthodontic treatment to undergo the treatment taking into consideration that the discomfort and pain during this treatment leading to alteration in the weight of the patient is only transient and not significant.

Bibliography

1. Doli GM., *et al.* "Relationship between patient discomfort, appliance acceptance and compliance in orthodontic therapy". *The Journal of Orofacial Orthopedics* 61 (2000): 398-413.
2. Sergl HG., *et al.* "Functional and social discomfort during orthodontic treatment – effects in compliance and prediction of patients adaptation by personality variables". *The European Journal of Orthodontics* 22 (2000): 307-315.
3. Krishan V. "Orthodontic pain: from causes to management- a review". *The European Journal of Orthodontics* 29 (2007): 170-179.
4. Oliver RG and YM Knapman. "Attitudes to orthodontic treatment". *British Journal of Orthodontics* 12 (1985): 179-188.
5. Ngan P., *et al.* "Perception of discomfort by patients undergoing orthodontic treatment". *American Journal of Orthodontics and Dentofacial Orthopedics* 96 (1989): 47-53.
6. Scheurer PA., *et al.* "Perception of pain as a result of orthodontic treatment with fixed appliances". *The European Journal of Orthodontics* 18 (1996): 349-357.
7. Stewart FN., *et al.* "Appliance wear: the patient's point of view". *The European Journal of Orthodontics* 19 (1997): 377-382.
8. Sergl HG., *et al.* "Pain and discomfort during orthodontic treatment: causative factors and effects on compliance". *American Journal of Orthodontics and Dentofacial Orthopedics* 114 (1998): 684-691.
9. Firestone AR., *et al.* "Patients' anticipation of pain and pain-related side effects, and their perception of pain as a result of orthodontic treatment with fixed appliances". *The European Journal of Orthodontics* 21 (1999): 387-396.
10. Mandall NA., *et al.* "The impact of fixed orthodontic appliances on daily life". *Community Dental Health Journal* 23 (2006): 69-74.
11. Zhang M., *et al.* "Patients' expectations and experiences of fixed orthodontic appliance therapy". *The Angle Orthodontist* 77 (2007): 318-322.

12. De Oliveira CM and A Sheiham. "The relationship between normative orthodontic treatment need and oral health-related quality of life". *Community Dentistry and Oral Epidemiology* 31 (2003): 426-436.
13. De Oliveira CM and A Sheiham. "Orthodontic treatment and its impact on oral health-related quality of life in Brazilian adolescents". *Journal of Orthodontics* 31 (2004): 20-27.
14. Allen PF. "Assessment of oral health related quality of life". *Health Qual Life Outcomes* 1 (2003): 40.
15. Cunningham SJ and NP Hunt. "Quality of life and its importance in orthodontics". *Journal of Orthodontic* 28 (2001): 152-158.
16. Guyatt GH., *et al.* "Measuring health-related quality of life". *Annals of Internal Medicine* 118 (1993): 622-662.
17. Bjorvell H., *et al.* "Long term effects of jaw fixation in severe obesity". *International Journal of Obesity* 8 (1984): 79-86.
18. Scheurer PA., *et al.* "Perception of pain as a result of orthodontic treatment with fixed appliances". *The European Journal of Orthodontics* 18 (1996): 349-357.
19. Kvam E., *et al.* "Traumatic ulcers and pain during orthodontic treatment". *Community Dentistry and Oral Epidemiology* 15 (1987): 104-107.
20. Soltis J., *et al.* "Changes in ability of patients to differentiate intensity of forces applied to maxillary central incisors during orthodontic treatment". *Journal of Dental Research* 50 (1971): 590-596.
21. Ngan P., *et al.* "Perception of discomfort by patients undergoing orthodontic treatment". *American Journal of Orthodontics and Dentofacial Orthopedics* 96 (1989): 47-53.
22. Mandall NA., *et al.* "The impact of fixed orthodontic appliances". *Dental Health* 23 (2000): 69-74.
23. Phillips C., *et al.* "Dentofacial disharmony motivations for seeking treatment". *The International Journal of Adult Orthodontics and Orthognathic Surgery* 12 (1997): 7-15.
24. Oliver R and Knapman Y. "Attitudes to orthodontic treatment". *British Journal of Orthodontics* 12 (1985): 179-188.
25. Jones M. "An investigation into the initial discomfort caused by placement of an arch wire". *European Journal of Orthodontics* 6 (1984): 48-54.

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