RESEARCH

Assessment of weight loss in the first three months of fixed orthodontic treatment

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ABSTRACT

Assessment of weight loss in the first three months of fixed orthodontic treatment

Background: To asses weight changes in patients in the first three months of fixed orthodontic treatment.

Materials and Methods: 53 patients (12 males, 41 females) in test group who needed fixed orthodontic treatment were selected. 50 subjects (14 males and 36 females) with similar conditions were selected as control. The mean age was for treatment group was 17.44±0.75 and was 17.67±0.85 for control group. Weight values of patients recorded immediately before bonding of brackets at beginning of treatment, 1 week after bonding and in orderly 1, 2 and 3 months after bonding. The same values were recorded also for the control group.

Results: According to the results of Repeated Variance Analysis: time dependent changes were statistically significant (p:0.015) but, Time-Group interaction results were not statistically significant (p: 0.051). There was a statistically significant difference between the weight values according to the time intervals between the baseline values and 1.week and 1.month values; while there was not a statistically significant difference between the other time intervals. There was a statistically significant decrease in the mean weight values of treatment group according to the mean baseline values.

Conclusion: Remarkable weight loss was observed in all patients in the first month of the treatment. Patients started to recover weight loss after second month of treatment.

KEYWORDS

Dietary changes, fixed orthodontic treatment, weight loss

ÖZ

Sabit ortodontik tedavinin ilk üç ayında kilo kaybının değerlendirilmesi

Amaç: Sabit ortodontik tedavinin ilk üç ayında gerçekleşen kilo değişimini değerlendirmek.

Gereç ve Yöntemler: Sabit ortodontik tedaviye ihtiyaç duyan 53 hasta (12 erkek, 41 kadın) seçildi. Benzer koşullara sahip 50 birey(14 erkek ve 36 kadın) kontrol olarak seçildi. Kontrol grubunda yaş ortalaması 17.44 ± 0.75, tedavi grubunda 17.67 ± 0.85 idi. Tedavi başlangıcında, braketleme sonrası 1. hafta ve 1., 2. ve 3. ay düzenli şekilde hastaların kilo değerleri kaydedildi. Aynı değerler kontrol grubu için de kaydedildi.

Bulgular: Tekrarlanan Varyans Analizi sonuçlarına göre zaman bağımlı değişmeler istatistiksel olarak anlamlıydı (p: 0.015), ancak Zaman-Grup etkileşimi sonuçları istatistiksel olarak anlamlı değildi (p: 0.051). Başlangıç değerleri ile 1. hafta ve 1. ay değerleri arasındaki zaman aralıklarına göre ağırlık değerleri arasında istatistiksel olarak anlamlı fark vardı; diğer zaman aralıkları arasında istatistiksel olarak anlamlı bir fark yoktu. Tedavi grubunun ortalama ağırlık değerlerinde, ortalama başlangıç değerlerine göre istatistiksel olarak önemli bir düşüş vardı.

Sonuç: Tedavi gurubundaki tüm hastalarda tedavinin ilk ayında kayda değer kilo kaybı gözlendi. Tedavinin ikinci ayından sonra ise hastalar tekrar kilo almaya başladı.

ANAHTAR KELİMELER

Diyet değişimleri, sabit ortodontik tedavi, kilo kaybı

The effects of fixed orthodontic treatment on patients' weight and dietary intake are still requiring further investigations.[1] Orthodontic treatment causes physical, physiological and emotional stresses which induce changes in the nutrition of patients.[2] Orthodontic treatment may alter the consistency, quality and quantity of a person's diet.[3,4] Patients having orthodontic treatment will need to have alteration in their food choices because of discomfort, sensitivity and pain on biting and chewing.[5,6]

While having orthodontic treatment, patients are not allowed for hard, sticky and chewy foods and they are recommended for a soft diet to avoid possible pain, discomfort and, debonding risk of appliances in biting and chewing.[6,7] A balanced diet enables natural disease prevention, weight control, and a proper sleep which results in a higher total quality of life.2 In addition to the effects on general health, nutrition effects the tissue tolerance of orthodontic treatment patients.[8,9]

Diet is an essential factor which effects weight.[10] Lee et al[11] presented that oral pain can cause the restriction of food intake and as a result of this, diminished nutrition and an unintentional weight loss can be observed. In addition to the factors like: health status, basal metabolism, diet, physical exercise, hormonal balance, race and heredity[12], patient weight is also influenced by gastric and

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intestinal surgery[13], behavioral regulation[14], dietary modalities[15], low glycemic index diet[16], orthodontic jaw wiring, Dental Device System application and Smart Appliance application.[17] Fixed orthodontic treatment can effect also the overall health of the patients by effecting the patients weight. Scott and Ludwig reported that eating with removable appliances could reduce food in-take, and as a result, orthodontists may have an active role in weight reduction of patient.[18]

Due to the long lasting nature of orthodontic treatments, an orthodontist has the opportunity to watch the general health status of patients. However, measuring the weight of patients in every appointment is not a routine procedure in dental clinics.[19] The aim of this study was to asses weight changes in patients in the first three months of fixed orthodontic treatment. The null hypothesis of this study was that there was no significant difference in weight changes between the treatment and control groups.

MATERIALS AND METHODS

The study was approved by the ethical committee of Istanbul Medipol University with reference number of 197/2017. Informed consent for all of the subjects was obtained from the parents at the beginning of the study. This prospective study was performed involving 53 patients (12 males and 41 females) with similar malocclusion severity and similar socio-economic conditions in treatment group who were requiring fixed orthodontic treatment. Patients having any history of dietary or nutritional problems, having had gastric surgery, having mental issues were excluded in this study. Fifty subjects (14 males and 36 females) in the same age interval having no orthodontic treatment were enrolled as control group. All of the subjects in both groups were checked by hand-wrist films and found to be in post pubertal period. The mean age was for treatment group was 17.44±0.75 and was 17.67±0.85 for control group. G*Power Software (Heinrich-Heine- Universitat, Dusseldorf, Germany) was used to determine the sample size. Power analysis results presented that the power of the test for 50 samples in each group was %83.9. Weight (kilograms - kg) and demographic records were taken: immediately before bonding of brackets, 1 week after bonding and 1, 2, 3 months after bonding. All of the patients' weights were measured using the same digital scale: TefalTM Classic Digital Bascule, France and recorded by the same researcher (DDK). All of the patients were requested to fill out a 4 questioned questionnaire to determine and record the dietary intake changes, when they came for the first appointment (Table 1). All of the subjects were conducted the questionnaire by the same experienced clinician. The questionnaire was prepared by two researchers of this study which are both experienced of 10 years in clinical orthodontics. All of the patients were having same 0.18 slot brackets (Gemini 0.18 slot Roth Brackets, (3M Unitek, Monrovia, Calif.)) and all had similar appliance activation with; 0.14 super elastic Ni-Ti upper and lower arch placement in first 2 months and 16X16 heat-activated NiTi placement in 3. month. Data was collected using excel spreadsheet.

Table 1.

Dietary intake questionnaire

Have you done any changes in your diet?
A. Yes B.No
Have you done any changes in your diet?
A. Yes B.No
Have you done any changes in your diet?
Have you done any changes in your diet?

RESULTS

Mean weight values were not statistically significant according to the groups in baseline, 1. week, 1. month, 2. month and 3. month of treatment (p: Baseline/0.657, p: 1. Week/0.475, p: 1. Month/0.468, p: 2. Month/0.570 and 3. Month/0.667) (Table 2).

Table 2.

Mean weight values according to the groups

	Control Group	Treatment Group	p
Baseline	61.17 ± 11.69	60.17 ± 11.2	0.657
1. Week	61.08 ± 11.68	59.48 ± 11.05	0.475
1. Month	61.01 ± 11.69	59.38 ± 11.07	0.468
2. Month	60.90 ± 11.67	59.62 ± 11.11	0.570
3. Month	60.90 ± 11.69	59.92 ± 11.40	0.667

According to the results of Repeated Variance Analysis: time dependent changes were statistically significant (p:0.015) but, "Time - Group" interaction results were not statistically significant (p: 0.051) (Table 3).

Table 3.

Repeated variance analysis results for weight index

	F	p
Time	4332	0. 015
Time - Group	3044	0. 051

F: Repeated Variance Analysis Test, p: 0.015, p: 0.051

There was a statistically significant difference between the weight values according to the time intervals between the "baseline values - 1. week values" and "baseline values - 1. month values"; while there was not a statistically significant difference between the other time intervals. There was a statistically significant decrease in the mean weight values of treatment group according to the mean baseline values (Table 4).

Table 4.

Time - weight interaction according to the groups

	Group	Mean ± Standard Deviation
Baseline	Control group	61.17 ± 11.69
	Treatment group	60.17 ± 11.20
	Total	60.65 ± 11.40a*
1. Week	Control Group	61.08 ± 11.68
	Treatment Group	59.48 ± 11.05
	Total	60.26 ± 11.34b**
1. Month	Control Group	61.01 ± 11.69
	Treatment Group	59.38 ± 11.07
	Total	60.17 ± 11.35b**
2. Month	Control Group	60.9 ± 11.67
	Treatment Group	59.62 ± 11.11
	Total	60.25 ± 11.34ab***
3. Month	Control Group	60.9 ± 11.69
	Treatment Group	59.92 ± 11.40
	Total	60.40 ± 11.50ab***

a-b: There is no significant difference between the same lettered time results

Weight decreases between "baseline values - 3. month values" according to the groups were com-pared and there was not a statistically significant difference between these two mean values. (p:0.950) (Table 5).

Table 5.

Comparison of weight change between starting and 3. month values according to the groups

Group	Mean ± Standard Deviation	p
Control Group	0.27 ± 1.32	0. 950
Treatment Group	0.24 ± 2.23	

Statistical analysis

IBM SPSS V23 was used for data entry and analysis. Kolmogorov Smirnov test was used in the assessment of the conformity of the data for normal distribution. Comparison between groups were evaluated by independent variables t-test. Weight changes according to time according to the groups were assessed by Repeated Variance Analysis test. Results were represented as mean±standard deviation. Significance level was p<0,05.

DISCUSSION

The fact that orthodontists are aware of the diets of individuals undergoing orthodontic treatment and observing changes in dietary habits of patients has an importance to contribute to the treatment quality and quality of life of patients.[20]

There are several studies about the relationship between the orthodontic treatment and weight loss in the literature.[3,21] Orthodontic treatment may have a negative effect on nutrition.[6] Almost all of the patients having orthodontic treatment experience pain and discomfort in biting and chewing food during the treatment. It was reported that, 70% - 95% of the patients experience pain during orthodontic treatment.[5]

Johal et al[1] stated that, patients reduce food intake during the first follow up period of fixed orthodontic treatment compared to control group. This results were consistent with our findings. In our study all of the patients emphasized a discomfort in biting and chewing for the first week of their treatments. Moreover a dietary change and restriction in food intake was also reported after beginning of the treatment. In contrast to our study, Azaripour et al[22] did not find any significant differences in the eating habits of patients having fixed orthodontic treatment.

In our study soft diet was more frequently preferred in the treatment group. All of the patients in treatment group emphasized discomfort especially for the first week of the treatment. Decreased dietary intake, change in the food choice, having smaller proportions, difficulties during chewing and eating period was also reported. In addition to these, it was mentioned by our patients that, they could not eat food like: dried food (like: nuts and fruit), hard food, Turkish delight, stone fruits and vegetables (like: olive and greengage), hard fruits (like: apple and pear), hard sides of bread and boiled corn. All of the patients reported that they have preferred to eat softer food like: soup, stew, boiled vegetables, pasta, purée food and pudding and preferred to have liquids and beverages for nutrition.

Ajmera et al[2] stated that a bad, diminished and imbalanced diet can cause many overall health and oral health problems. Lee et al[11] presented that oral pain can cause the restriction of nutrition which can result as an unintentional weight loss can be observed.

In this study, a statistically significant difference was found between the weight values according to the time intervals: between the "baseline values - 1. week values" and "baseline values - 1.

month values". There was a statistically significant decrease in the mean weight values of treatment group according to the baseline values.

In consistency with our findings, Sandeep et al[7] reported that patients had a significant weight loss at the end of the first month, followed by weight gain, but at the end of the third month they still could not regain their initial weight. We found that the patients recovered some of the weight they lost at the third month of treatment and the difference between the mean initial weight values and the average weight values at the third month was not statistically significant. That could be because of getting used to the appliances and having learned how to eat and what to eat with the appliances by the time which could result in a more comfortable nutrition. However, some patients reflected their pleasure about their weight loss and new healthy eating habits because of the orthodontic treatment.

Shirazi et al[23] stated that inability of eating hard food like: meat, bread, fruits and raw vegetables during fixed orthodontic treatment can effect the growth of adolescents. Riordan[3] reported a decrease in the copper and manganese intake of fixed orthodontic treatment patients which could lead into a negative effect on tooth movements. In addition to this, it was presented in the literature by Lee et al[11] that, orthodontic treatments during adolescence could have trigger pathological eating problems such as anorexia nervosa.

CONCLUSION

Orthodontic treatment effects the food choice and nutritional behaviors and as a result it may change the weights of fixed orthodontic treatment patients.

All of the patients preferred soft diet and reported difficulty and discomfort during eating and chewing.

There was a weight loss in first week and first month of treatment but patients started to gain their lost weights back by degrees after the second month of treatment. The null hypothesis was accepted. No significant differences were found between the treatment and control groups according to the total observation time.

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