

## **Comparative evaluation of changes observed in the weights of patients undergoing fixed orthodontic treatment in Jaipur Population**

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### **I. INTRODUCTION**

Overweight and obesity affect a large portion of the population in developed and developing countries, and their prevalence has increased in recent years. Recent surveys have found that 54.9 per cent of United States adults and 20 per cent of Swedish adolescents are overweight or obese. In recent years, investigators have begun to use the body mass index (BMI) to measure whether a subject is over or underweight. This is calculated as the weight in kilograms divided by the square of height in meters:  $\text{weight (kg)}/[\text{height (m)}^2]$ . Overweight is defined as a BMI of 25.0 to 29.9, while obesity is a BMI of 30 or greater.

In fact, obesity has been recognized as a major public health problem, and evidence exists for its role as a major risk factor for a number of diseases, such as cardiovascular diseases, diabetes mellitus, cancer, osteoarthritis, and gallbladder disease. It has been mentioned that obesity is significantly associated with periodontitis in adult nonsmoking women. Many of the psychological problems noted in the obese such as anxiety, depression, and poor self-esteem seem to be the result of, rather than the cause of the obese state. Human body weight and the level of fat accumulation is influenced by multiple interrelated factors, including health status, basal metabolism, diet, physical exercise, hormonal balance, race, and heredity. Several treatment modalities are available for weight loss including gastric and intestinal bypass, behavioural treatment, conventional dietary approach, diet with low glycemic index and **orthodontic jaw wiring**.

Nevertheless, the prevalence of obesity in **INDIA** is increasing, especially among women. A quarter of the population of INDIA would be classified as overweight or obese if Indo-Asian-specific BMI cutoff values are taken as yardstick. Almost all patients undergoing orthodontic treatment perceived discomfort and/or pain while chewing or biting on food, causing them to shift over to a preferred diet. With this preview in mind we designed this study with the assumption that diet changes in orthodontic patients may cause weight changes, which are to be determined and further recorded as what is the nature of those changes.

### **II. METHODOLOGY**

The study was conducted in the orthodontic department of Jaipur Dental College. 130 adult patients between 12-40 years presenting for orthodontic treatment were screened for the study. They were analyzed on the basis of inclusion criteria. Patients having any systemic disease, anxiety and stress, were excluded from the study. Patients on steroid therapy, diet plans, exercise or any other drug were also excluded from the study. Four patients joined gym during treatment and the other four had to start anti-anxiety drugs so they were excluded from the study for sample purification. Finally a total number of 122 patients were included in the study. Weight Machine of 'Health Scale model LZ-120' was used to check the weight of the patients before the start of Orthodontic treatment (W1), one month into orthodontic treatment (W2) and two months into orthodontic treatment (W3). Patients were weighed three times without shoes and the mean weight was considered final at W1, W2 and W3 to control the procedure error. Weights were recorded in kilograms by a single observer and each time history was taken for drugs and diseases to control the confounding variables.

Statistical analysis was done using SPSS version 16. Weights recorded at W1, W2 and W3 were compared with the help of analysis of variance (ANOVA). The statistical significance was set at the level of  $p < 0.05$ .

**TABLE 1: MEAN AGE OF THE SAMPLE**

<b>Minimum age</b>	<b>Maximum age</b>	<b>Mean age</b>	<b>Standard deviation</b>
13.0 y	24.0 y	16.77 y	2.88

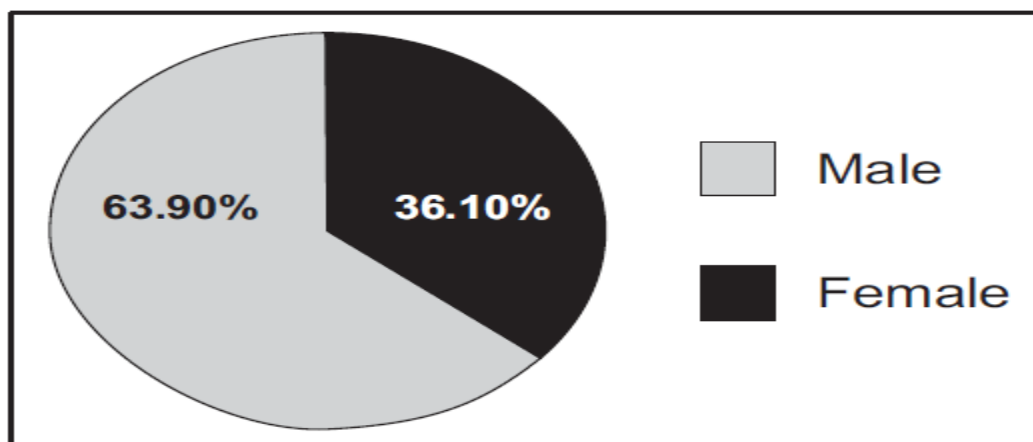
**TABLE 2: COMPARISON OF W1, W2 AND W3 (ANOVA)**

<b>ANOVA</b>						
		<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
W1	Between Groups	1296.109	10	129.611	2.528	.015
	Within Groups	2563.531	50	51.271		
	Total	3859.639	60			
W2	Between Groups	1263.803	10	126.380	3.175	.003
	Within Groups	1990.115	50	39.802		
	Total	3253.918	60			
W3	Between Groups	1130.945	10	113.095	2.952	.005
	Within Groups	1915.612	50	38.312		
	Total	3046.557	60			

### RESULTS

From a sample 130 orthodontic patients 8 were excluded as they did not fit the inclusion criteria. Out of a total sample of 122 patients, 78 were females i.e. 63.9% and 44 were males i.e. 36.1% as shown in Fig 1. The age range of the whole sample was found to be between 13.0 years to 24.0 years with a mean value of 16.77 years standard deviation 2.88 as shown in Table 1. Mean age for males and females were found to be 16.31 years and 17.02 years respectively. On inquiring patients about diet changes, 24 males (54.5%) and 48 females (61.5%) reported difficulty in chewing and drastic diet changes while undergoing fixed orthodontic treatment. The mean weight of the sample was calculated at three different times W1, W2 and W3 with an interval of one month. The mean difference of weight loss from W1 to W2 and weight gain from W2 to W3 was relatively higher in males as compared to females as shown in Fig 2. The mean values for W1, W2 and W3 were found to be 57.8 kg SD 8.02, 57.42 kg SD 7.36 and 57.39 kg SD 7.125 respectively.

To assess the value of significance, statistical test ANOVA (Analysis of variance) was applied to the data. The result was found to be statistically significant with a value of .015 as shown in Table 2. It can be inferred from the results that significant weight changes occur during orthodontic treatment. The values are shown in Table 2.



**Fig 1: Percentage of Males and Females**

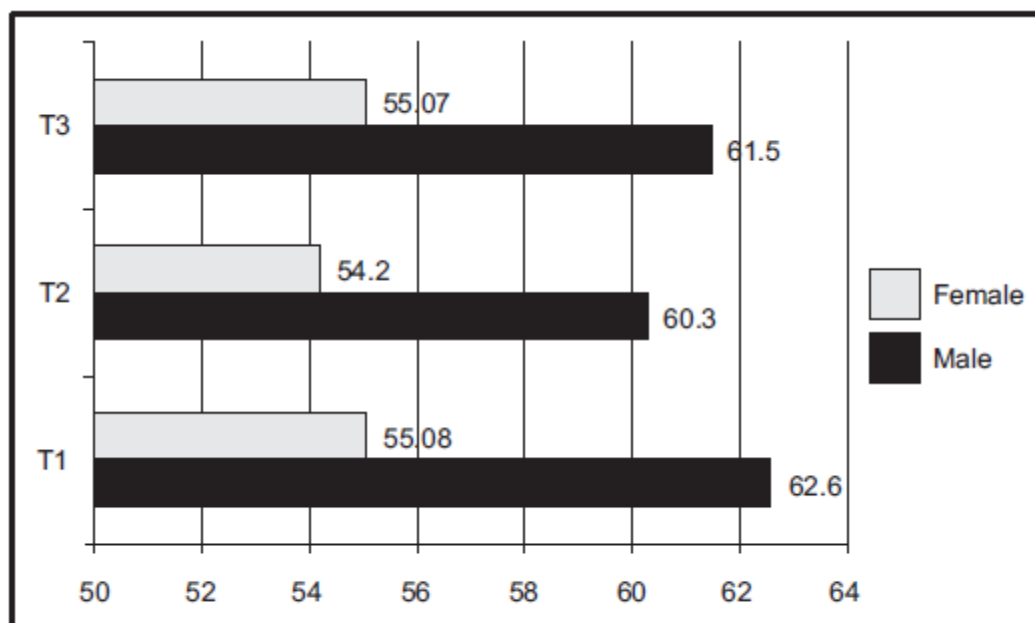


Fig 2: Mean weight for Males and Females

### III. DISCUSSION

Various local studies in INDIA have revealed that the prevalence of overweight and obesity, in our general population, is 25.0% (95% confidence interval [CI] 21.8%–28.2%). The most common factors significantly associated with the overweight and obesity included greater age, being female, urban residents, having a high economic status and a high intake of meat. Our sample comprised of normal subjects between the age range of 13 to 24 years. All the patients belonged to the same socioeconomic status and all were from the urban areas. All confounding variables which could affect the weight of the patients positively or negatively were preferably controlled. It included critical history of exercise, exams, dieting, specific drugs and stress. It is self-evident that orthodontic treatment affects patient's appearance, speech, ability to take in nutrition, and their social interactions. In addition, almost all orthodontic patients reported pain when chewing and biting food, causing them to change their diet. Finally, pain and discomfort during orthodontic treatment has been shown to affect a patient's overall satisfaction with their orthodontic treatment outcomes.

It can be predicted that pain and discomfort and change in dietary pattern while undergoing orthodontic treatment, will result in loss or gain of weight in orthodontic patients. According to our study 61.5% of females and 54.5% males reported dietary changes. They reported difficulty in chewing chapatti and felt comfortable with rice and liquids especially for the first ten days after the start of orthodontic treatment. Significant weight loss was found from W1 to W2 and gain from W2 to W3; although it could not match the original weight. These changes were recorded at an interval of one month since the outset of treatment. Unfortunately, there is no study available to us so far to compare our results with that, however weight loss has been found with jaw fixation in few of the studies. Patients who reported that they ate for consolation tended to regain weight after fixation, whereas patients not reporting this style of eating pattern continued to lose weight. At times patients posed a totally different scenario, like they underwent jaw fixation with the intention of weight loss. Surprisingly in this study weight loss was not intentional. One cannot blame the dietary change solely for weight loss in the first month because most of the patients reverted to normal diet as soon as the appliance activation pain subsided. Furthermore, few patients gained some weight from W2 to W3 in spite of the pain and dietary change in the first ten days of activation. Perhaps weight cycling like intentional weight loss is frequently followed by unintentional regain or patient adaptability could be responsible for this diversity but still etiology of long-term variation in weight because of methodological errors or inconsistent results have yet to be established.

Behavior modification programmes aimed at changing problematic eating patterns and teaching self-management skills in relation to food consumption have been moderately successful and have been shown to result in a mean post-treatment weight loss of 7 to 16 pounds. An emerging literature has shown that weight

losses as little as 5% to 10% of initial weight is frequently sufficient to improve weight-related complications, including hypertension, type II diabetes, and dyslipidemia. It is not necessary to reduce to ideal weight to achieve such benefits, and for most significantly obese individuals, it is not possible.

A new step towards behavioral treatment is to help obese individuals accept more modest weight losses. Almost all researchers agree that prevention could be the key strategy for controlling the current epidemic of obesity. Children should therefore be considered the prime group for intervention strategies.

Prevention may be achieved through a variety of interventions targeting built environment, physical activity, and diet. As fixed orthodontic treatment continues for 2-3 years it can be considered as an excellent adjunctive and preventive strategic plan in pursuit of weight loss concomitant with focus on the behavior and diet modifications.

## **VIII. CONCLUSIONS**

Obesity is a silent killer among all other health problems. It cripples not only the physical activities, but also undermines the physical outlook and smartness of an individual at a society level. Patients should be encouraged and alerted to give serious thoughts to their health, and weight gains. They are to be educated seriously to lose some weight during their orthodontic treatment as an adjunct to other weight losing tools. These obese patients if suffering from malocclusion are given a proper orthodontic treatment will not only help in restoring their dentofacial esthetics but also through the diet restraint, will boom up, to their physical smartness, dignity and self-esteem, which will certainly be in the best interest of the patient and orthodontist alike.