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# COMPARE THE RATIO OF BOLTON IN GROUP 1 MALOCCLUSION WITH NORMAL OCCLUSION

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**Abstract**

In order to have fitting correlation with normal overjet and overbite, there should be certain dimensional relations between two mandibles teeth. The Bolton analyze have been one the most accurate and useful methods for diagnosing dental disorders which isused based on the ratios of mesiodistal width between mandibular and maxillary teeth. **Materials and Methods:** 98 casts including 49 men and 49 women have been selected for this study. All the patients were in the period ofpermanent teeth and all the teeth from 6 to6 were fullygrown and morphormologically normal. The teeth were without any wear or proximally decay; there were no restoration of crown, bridge and etc, which cause changes on mesiodistal width of teeth. Class l malocclusion has been determined based on division angle with ANB angle between zero and five degrees. (Normal skeletal growth pattern). According to Bolton method the mesiodistal width of 12 mandibular teeth from first molar of one side to the first molar of other side have been measured and the same thing done in the maxillary , after that the data have been calculated by analysis of variance ( ANOVA ) and multiple range test of Duncan and value in different groups and genders. **Findings:** The anterior, posterior and total ratio in women were respectively : (79.49 ), ( 103.93 ) , (92.08 ) that shows the difference of ( 0/54 ) , ( 0/15 ) , ( 0/ 15 ) with the anterior , posterior and total ratio in men which respectively were : ( 78.95 ) ( 104.08 ) ( 91.54 ) which is statically meaningless. **Conclusion:** In terms of gender there was no significant difference in the anterior, posterior and total ratio. The average of anterior ratio in the total sample (class l malocclusion group) in current study was 79.22 which was

different with the result of Bolton (normal occlusion group). The average of total ratio in the total sample was 91.81 which had no significant difference with Bolton.

**Key words**: Bolton analyze, anterior, posterior, total ratio, Class l malocclusion.

**Introduction**

One the most important goals of orthodontic treatment are to make a normal occlusion. We can use the word normal for theteeth in a mouth when they are all exist and have desirable contact and stable condition and make the patient feel comfortable. In order to have a fitting correlation between overjet and overbite there should be certain dimensional relations between the teeth of two mandibles. A significant variety should be compensated in this relation. Awareness of the existing disorders is not only useful but also essential for making an ideal dental and occlusion relation. Now if the abnormal tooth size is not specified, identifying them in the final stages of the treatment prevents us from achieving our ideal goal and a medium conclusion will be achieved (1).

The clinical evaluation of teeth size works as a diagnostic tool these days. A simple evaluation provides us information about function and the beauty of the patient after treatment (2). The size of the teeth and the existing ratio between them has been evaluated by Bolton, Tanaka Johnson and etc as diverse analysis which their clinical use, is very significant. Bolton analysis is one the most accurate and useful method for diagnosing the disorders in the size of teeth. Which is used based on the mesiodistal width of mandibular and maxillary teeth. After identifying the disorders in the teeth size and determine their area and the spot, different treatment will be done. The purpose of this study is the measurement of Bolton ratios (anterior, posterior, and total) in class l and comparing the malocclusion and analogy of ratios (anterior,total) in class l malocclusion with normal occlusion group.

**Materials and Methods**

Before the treatment the cast who were in the period of permanent teeth have been chosen among all the visitors of the orthodontic department of Esfahan university .All the teeth were fully grown and morphomologically normal from 6 to 6 . The teeth were without any wear and proximally decay. There were no restoration of crown, bridge, and etc on teeth which caused changes on the mesiodistal width of the teeth. And according to above conditions, 98 casts including 49 men and 49 women have been chosen for the study.

In fact with this number of samples the difference of 1/5 in the level of 0/05 with the possibility of 0/8 will be reasonable.

Class l malocclusion is determined based on angle division with ANB angle between zeros to five degrees (normal skeletal growth pattern).

Measurement methods

The largest mesiodistal dimension of teeth has been measured according to occlusal plane and perpendicular on the long axis of the teeth. In order to measure the mesiodistal width of the teeth we use the caliper with an accuracy of 0/05.

According to Bolton method the mesiodiatal width of 12 mandibular teeth have been measured from the first molar of one side to the first molar of other side. And the same thing has been done in the maxillary. In order to prevent measurement error, the measurement has been done by two persons and if the difference was more than 0/5 it would be measured for the third time. And the average of two numbers with the least difference would be considered as the final size.

The statistical calculating method

After gaining the anterior, posterior, total ratios in the Bolton method, the average standard deviation, standard deviation, variance, maximum, minimum and the range of data have been calculated in each group and each gender and all of the groups. After that the data has been calculated by ANOVA, multiple range and sex separation.

Results

The anterior, posterior and total ratio in women was respectively: (79.49) (103.93) (92.08) which had difference of (0.54) (0.15) 0.54) with anterior, posterior, total ratio in men which were respectively (78.95) (104.08) (91.54) which was not statically reasonable.

**Table 1: Results of study.**

| | male | | | female | | | | |
|---|---|---|---|---|---|---|---|---|
| variable | N | Mean | S.D | N | Mean | S.D | Sig P Value | |
| overall ratio | 49 | 91.54 | 2.27 | 49 | 92.08 | 2.23 | - | 0 |
| anterior rat | 49 | 78.95 | 2.24 | 49 | 79.49 | 2.25 | - | 0 |
| posterior ra | 49 | 104.08 | 1.99 | 49 | 103.93 | 2.51 | - | 0 |

**Table 2: Results of study.**

| | soleimani.T class 1 mal occlusion | | | Bolton normal occlusion | | | | |
|---|---|---|---|---|---|---|---|---|
| variable | N | Mean | S.D | N | Mean | S.D | SIG P Value | |
| overall ratio | 49 | 91.81 | 2.25 | 55 | 91.3 | 1.91 | - | 0 |
| anteriro rat | 49 | 79.22 | 2.24 | 55 | 77.2 | 1.65 | * | 0 |

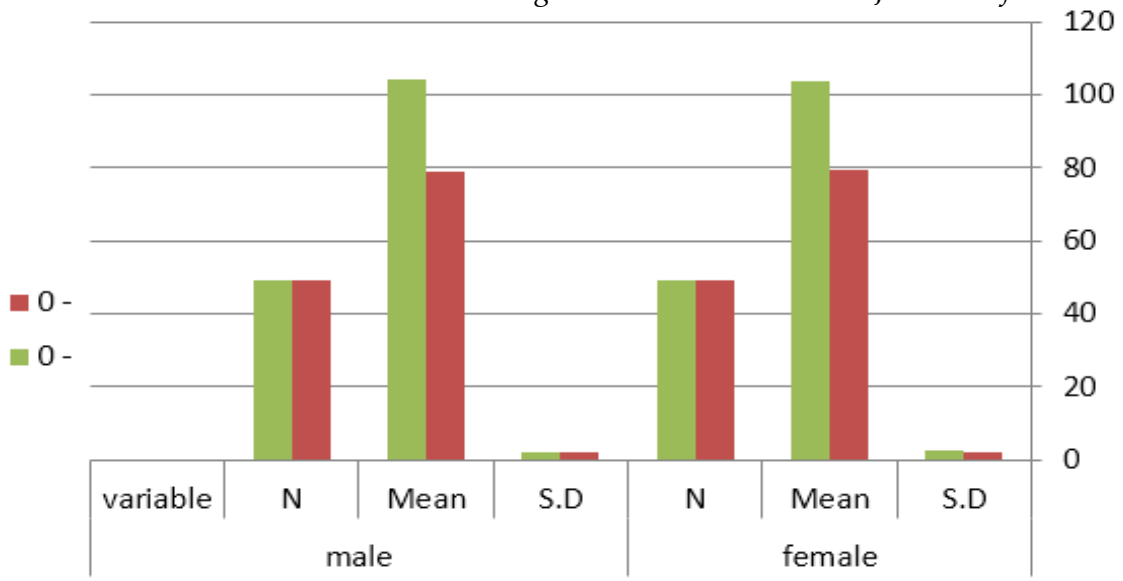


**Figure 1: Compare of variable in male and female.**

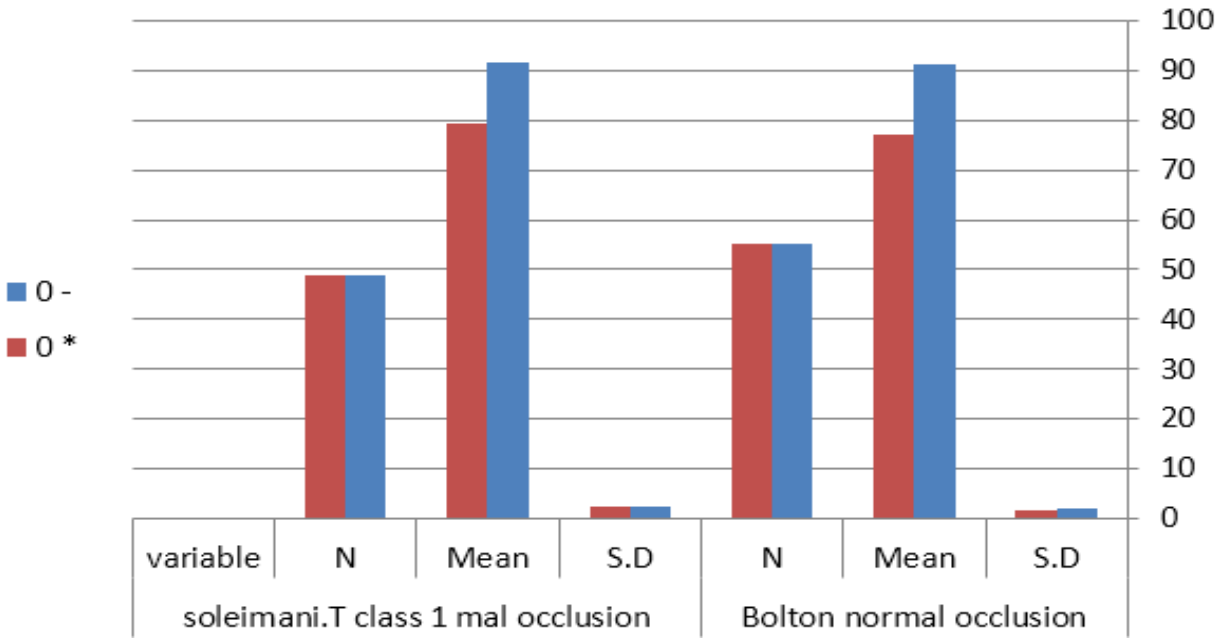


**Figure 2: Compare of variable in male and female.**

## Discussion

The purpose of the current study was to compare the Bolton ratio (anterior, posterior, total) in class l malocclusion and the ratio anterior, total) in malocclusion class l with normal malocclusion group by sex separation in Esfahan. In the current study which is about class l malocclusion, the anterior ratio obtained as 91.81 and posterior ratio obtained as 79.22.Bolton has obtained number 77.2 for anterior ratio, and number 91.3 for total ratio through the study on the samples with normal malocclusion. Crosby in 1089 and stiffer echoed the Bolton study which showed significant difference in anterior ratio with each other and with Bolton study but in the whole study there was significant difference.

Santaro and co-workers in 2000 has obtained total ratio of Dominican Americans for 91.3 % and the anterior ratio for 78/1 % which compared with current study this difference in anterior ratio is statically reasonable while in total ratio there was no significant difference. In smith study there was also a significant difference between women and men in the ratios which the ratios of men were more than women. While in the current study there was no significant difference between two genders.

Xiying and Zhuxia in 1999 have gained the similar results with current study which shows there were no significant difference between malocclusion and normal occlusion groups. So many studies showed the same results in these relations about the lack of significant difference between anterior ratios in two genders. According to the current study and studies in this term, it is obvious that the Bolton ratios may not work in various communities. But occlusions without Bolton ratios have impairment on the teeth size of one or two mandibles. The evaluation of inconsistence of teeth size is not possible by physical examination of the patient and the Bolton analysis provides necessary insights about final occlusion easily. Therefore we emphasis on the use of the analysis before performing treatment. Because according to the adoption of this relationship the treatment should be over treat in order to reducing the possibility of relapse or in the extraction and stripping must be predicted for correction of occlusal relations.

**Conclusion**

In terms of gender there was no significant difference in anterior, posterior and total ratios. The average of anterior ratio in the whole samples (class l malocclusion) in current study has obtained as 79.22 which were different with Bolton results. The average of total ratio in the whole samples has obtained as 91.81 in the current study which had no significant difference with Bolton total ratio. According to the results of this study and other studies that happened in the past , one the important issues that should be considered in diagnosing and treatment plans are the Bolton ratios because one the causes of malocclusion is the inconsistence in the numerical width of two mandibles teeth.

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