Impact of Skeletal Malocclusion on Quality of Life

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Abstract: *Introduction*: nowadays, one of the remarkable issues in dentistry is jaw growth pattern and tooth and mouth conditions (oral conditions) on patients' quality of life and daily activities. This study was done to evaluate skeletal malocclusion effect on the quality of life and oral health in Ahvaz.

Methods: 80 people with skeletal malocclusion and 80 people with normal skeletal occlusion (control) participated in this cross-sectional study. Data collection tools included: demographic and oral health impact questionnaires.

Results: there is not any significant difference between average quality of life of people with Cl III and Cl II skeletal (p=0.761), but there is a meaningful relation between Cl II skeletal and normal skeletal groups and also between Cl III skeletal and normal skeletal groups (p<0.001).

Conclusion: according to social and moral issues importance in raising the quality of life score and because study results showed that these patients are not in good condition of that, considering different moral and social aspects of oral condition in presenting dentistry services are suggested to develop general quality of life

Keywords: Oral health, quality of life, skeletal malocclusion.

INTRODUCTION

Nowadays, in orthodontic treatments, there is an emphasis on teeth and facial appearance. Mainly because patients' awareness about gaining more beauty by orthodontic therapies has increased. Moral and social problems related to face appearance can have a significant effect on each person's quality of life [1].

People's faces show the various range of dental-gnathic conditions which can be effective in understanding social characteristics, self-respect, popularity and fame [2]. People who are optimistic about themselves are more sociable and successful in communications [3].

By understanding the malocclusion effect on people's life, perception of orthodontic treatment request beyond clinical factors and clinician's assessment will be possible [4]. For evaluating this relation, different tools have been used in diverse populations. Quality of life evaluation questionnaires which have suitable reliability and validity in assessing effective conditions on life, are useful tools in better screening and recognizing societies and patients.

Quality of life means a person's feeling about his/her welfare condition due to his/her satisfaction and dissatisfaction with his/her life important aspects [5]. One of quality of life aspects is its relation with health which shows health and illness effect on the quality of life. Quality of life correlate with oral health means: oral condition does not have a negative effect on social life and a good feeling about the dental-facial condition [6].

Now, non-clinical indices which are related to oral health, are used for completing information gained by clinical indices, widely to study action limitations and dental-oral illnesses' effect on populations [7, 8].

Oral health impact profile (OHIP) is a valid tool for evaluating teeth and mouth-related quality of life. Its English version was introduced by a study group led by Slade in Australia in 1994. It included 49 items which were grouped into seven groups based on a mental concept. World health organization (WHO) international classifications such as disablements and disorders were used in these groups, and this original version was used many times [9]. Its German version (OHIP-G) which was an abridged version of the original one, included 14 items (OHIP-G14) [10]. In this study, its Persian version, which its validity and reliability has been proved in Dorri study, has been used [11].

OHIP-14 questionnaire shows the quality of life related to oral health which generally includes 7

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parameters: action limitation, physical pains, psychological annoyances, physical disability, mental disability, social disability and disablement. Each parameter has two questions and five marks based on a Likert scale (4=always, 3=often, 2=sometimes, 1=rarely, 0=never). The addition of marks which is between 0 and 56 show oral health general mark. Higher marks mean more oral problems and a lower quality of life.

According to some of the recent researches regarding the effect of malocclusion on psychosocial and functional problems, which can play a role in an individual's quality of life and social well-being [1], the purpose of this study was determining the effect of skeletal malocclusion on quality of life-related to oral and dental health in people with skeletal malocclusion by Iranian version of OHIP-14 questionnaire.

METHODS

This temporary study was done on available instances. Data collection method based on observation and interview was done by questionnaire. The study population included 160 people between 15 and 30(84 women and 76 men). Eighty of them were patient (34 people with CL III skeletal and 46 people with CL II skeletal) and also 80 of them had normal malocclusion. Having CL II skeletal malocclusion abnormalities (Div 1 & Div 2), real CL III, anterior and posterior open bite, deep bite, long face and also needing to treatment by orthognathic surgery based on clinical and radiographic examinations had been detected in them, and all of them were about to start treating. Also, the control group did not need surgery or orthodontic or both. The research was done in Ahvaz dentistry college in the year 2017 and 2018.

Output criteria included the people who had already orthodontic treatments or orthognathic surgery or were in the complicated dental period—also having a cleft lip, syndromes, facial abnormalities due to trauma, congenital abnormalities and systemic disease. This study has been approved by the Ethics committee of Ahvaz University of Medical Sciences (ethics code: IR.AJUMS.REC.1396.227). After explaining the purpose of the study to the participants and ensuring them that the results would be confidential, they were asked to fulfil the informed consent preceding the survey. Only those who agreed to participate were enrolled in the study.

So we used two questionnaires which were filled by participants in the waiting room in 10 to 15 minutes.

Demographic information questionnaire: this questionnaire includes information about age, sexuality, health status, dental and oral health status, the rate of a toothbrush, dental floss and mouthwash use and also rate of referral to a dentist.

OHIP-14 questionnaire shows the quality of life related to oral health which generally includes 7 parameters: action limitation, physical pains, psychological annoyances, physical disability, mental disability, social disability and disablement. Each parameter has two questions and five marks based on a Likert scale (4=always, 3=often, 2=sometimes, 1=rarely, 0=never). The addition of marks which is between 0 and 56 show oral health general mark. Higher mark means more oral problems and lower quality of life.

The purpose of this study is perusing effect of skeletal malocclusion on quality of life-related to oral and dental health in people with skeletal malocclusion by Iranian version of OHIP-14 questionnaire [12].

We used descriptive statistics including average, standard deviation, percentage to analyze the results and Chi-square test to study the frequency of kinds of malocclusion, general health status and oral health and ANOVA test to determine the quality of life score and Independent sample t-test and Tukey post hoc test to compare the quality of life score. All of those were done with SPSS software edition 22 and sig was considered 0/50.

RESULTS

A) Frequency of Kinds of Malocclusion

From 80 people with skeletal malocclusion, 38 people were male (47/5%), and 42 people were female (52/5%). Thirty-four people had CL III malocclusion (20 men and 14 women), and 46 people had CL II malocclusion (18 men and 28 women). Frequency of males was more than females in CL III (58/8%), and the frequency of females was more in CL II (60/9%).

Control group included 38 men (47/5%) and 42 women (52/5%).

B) General Health Status and Oral Health (Table 1 and Figure 1)

Data in conformity with Chi-square test showed people with normal skeletal (control) have better general health than people with skeletal malocclusion (Table **2** and Figure **2**).

Table 1: General Health Status in People with Skeletal Cl II and Cl III Malocclusion and Normal Occlusion (Control) in the Studied Population in Ahvaz (2017-2018)

		Health		General average	total	P
		Perfect	Good			
skeletal malocclusion	number	23	45	12	80	
	percentage	28.7%	56.3%	15.0%	100.0%	
normal skeletal (control)	number	57	23	0	80	0.00
	percentage	71.3%	28.7%	0.0%	100.0%	
Total	number	80	68	12	160	
	percentage	50.0%	42.5%	7.5%	100.0%	
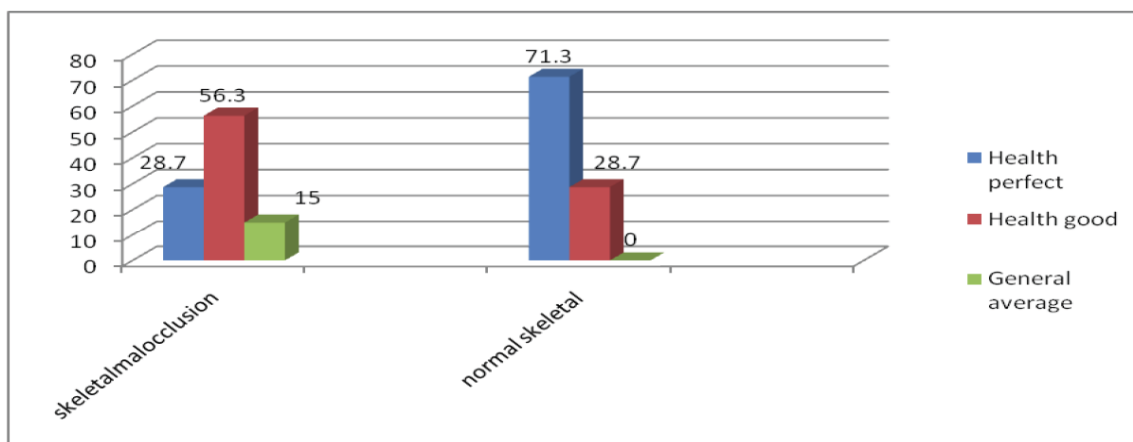
Figure 1: General health status in people with skeletal Cl II and Cl III malocclusion and normal occlusion (control) in the studied population in Ahvaz (2017-2018).

Table 2: Oral and Dental Health Status in People with Kinds of a Skeletal Malocclusion and Normal Skeletal Malocclusion (Control) in the Studied Population in Ahvaz (2017-18)

|		Health Perfect	Oral Good	And Average	Dental Weak	Total	P
skeletal malocclusion	number	9	41	25	5	80	
	percentage	11.3%	51.2%	31.3%	6.3%	100.0%	
Normal skeletal (control)	number	57	23	0	0	80	0.00
	percentage	71.3%	28.7%	0.0%	0.0%	100.0%	
total	number	66	64	25	5	160	
	percentage	41.3%	40.0%	15.6%	3.1%	100.0%	

Table data in conformity with Chi-square test shows that people with normal skeletal have better dental and oral health than people with skeletal malocclusion.

C) Quality of Life Status Related to Oral and Dental Health (Table 3 and Figure 3)

Data in conformity with ANOVA test shows that the lowest quality of life score belongs to a normal skeletal group (14/00). Therefore they have a higher quality of life than people with skeletal malocclusion (Table **4** and Figure **4**).

Table data in conformity with Tukey test shows there is not a meaningful difference between the quality of life average score difference of CL III skeletal and CL II skeletal (p=761). Still, there is a meaningful difference between CL II skeletal and normal skeletal
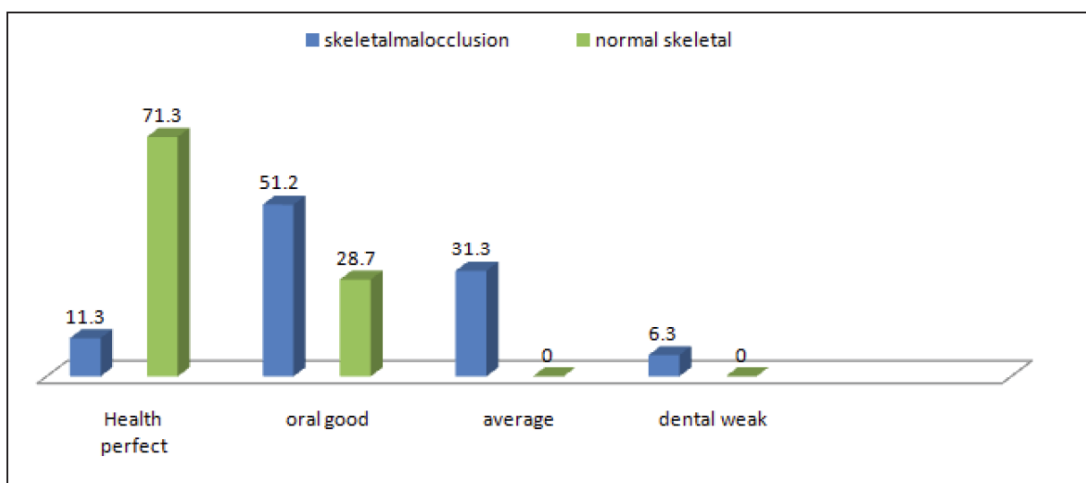
Figure 2: Oral and dental health status in people with kinds of a skeletal malocclusion and normal skeletal malocclusion (control) in studied population in Ahvaz (2017-18).

Table 3:   Quality of Life Score in CL II & CL III Malocclusion and Normal Occlusion (Control) in the Studied Population in Ahvaz (2017-2018)

OHIP Index	prevalence	mean	Variance	min	max	p
Cl III	34	26.67	10.64	14.00	46.00	
Cl II	46	26.23	7.34	16.00	56.00	0.00
Cl I (normal)	80	15.53	1.35	14.00	20.00	
Total	160	20.98	8.34	14.00	56.00	
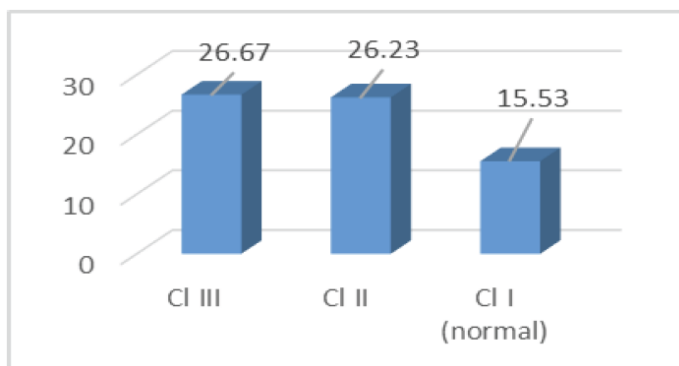
Figure 3: Quality of life score in CL II & CL III malocclusion and normal occlusion (control) in the studied population in Ahvaz (2017-2018).

Table 4:   Compare the Quality of life Average Score Difference in People with Kinds of CL II and CL III Skeletal Malocclusion and Normal Skeletal Occlusion (Control) in the Studied Population in Ahvaz (2017-2018)

Compare OHIP index		Average difference	p
CL III skeletal	CL II skeletal	0.43	0.76
	Normal skeletal(control)	11.13	0.00
CL II skeletal	CL III skeletal	0.43	0.76
	Normal skeletal(control)	10.70	0.00
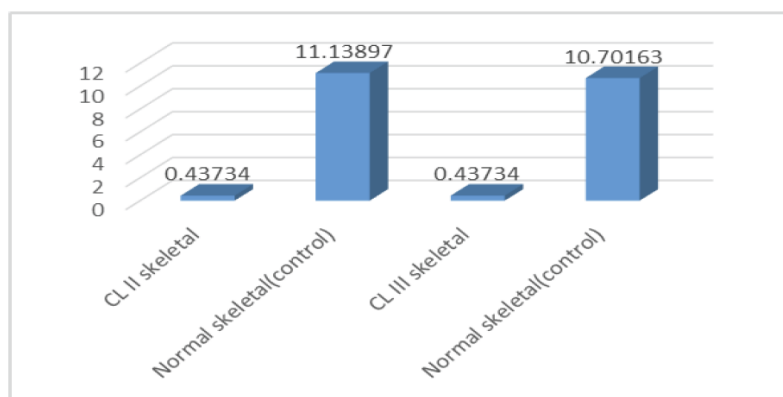
Figure 4: Compare the quality of life average score difference in people with kinds of CL II and CL III skeletal malocclusion and normal skeletal occlusion (control) in the studied population in Ahvaz (2017-2018).

Table 5: **Compare the Quality of Life Score between People with Kinds of a Skeletal Malocclusion and Normal Skeletal Occlusion (Control) in the Studied Population (2017-2018)**

OHIP index	frequency	Average	Standard deviation	p
Skeletal malocclusion	80	26.42	8/84	0.00
Normal skeletal(control)	80	15.53	1/35	
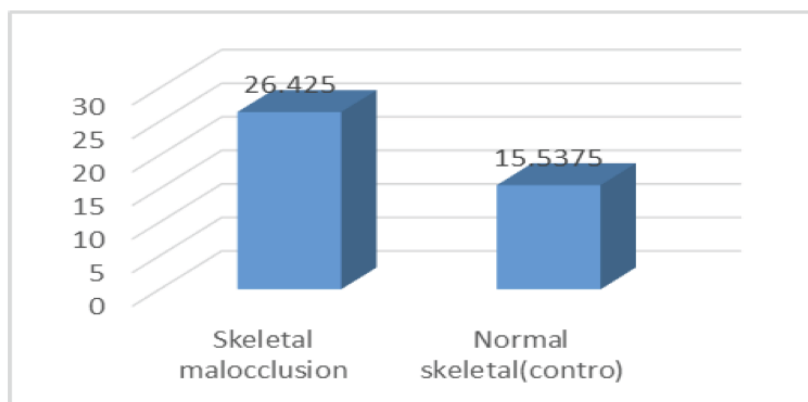
Figure 5: Compare the quality of life score between people with kinds of a skeletal malocclusion and normal skeletal occlusion (control) in the studied population (2017-2018).

and also between normal skeletal and CL III skeletal (p<0/001) (Table **5** and Figure **5**).

Table data in conformity with T-test shows there is a meaningful difference between life quality average score of normal skeletal (control) group and skeletal malocclusion group (p>0/001) (Table **6** and Figure **6**).

Table data in conformity with ANOVA test shows the problem with a sense of taste, annoying pains in mouth, the problem with self-confidence, having an improper diet, disorder in rest, being sensitive and crabbed against others are more in CL III skeletal group, and the problem with pronunciation, the problem with eating, nervousness and agitation and anxiety,

preventing from eating, a disorder in concentration, the problem with a job, dissatisfaction with life and disability in oral and dental functions are more in CL II skeletal group.

DISCUSSION

In the quality of life study related to oral and dental health in patients with skeletal malocclusion, data showed based on OHIP index there is a meaningful difference between quality of life average score difference of normal skeletal (control) group and skeletal malocclusion group (p>0/001). But there is not a meaningful difference between the quality of life average score difference of CL III skeletal group and

Table 6:   Life Quality Average Score of Kinds of OHIP Index in People with CL II and CL III Skeletal Malocclusion and Normal Skeletal Occlusion (Control) in the Studied Population in Ahvaz (2017-2018)

Average OHIP index	description	Normal skeletal	CL II skeletal	CL III skeletal	p
OHIP 1	Problem with pronunciation	1.03	1.93	1.88	0.001<
OHIP 2	Problem with sense of taste	1.05	1.06	1.23	
OHIP 3	Annoying pains in mouth	1.1	2.15	2.29	
OHIP 4	Problem with eating	1.12	2.21	2.11	
OHIP 5	Problem with self-confidence	1.13	2.60	2.67	
OHIP 6	Nervousness, agitation and anxiety	1.12	2.41	2.25	
OHIP 7	Having improper diet	1.11	1.41	1.47	
OHIP 8	Preventing from eating	1.4	1.84	1.64	
OHIP 9	Disorder in rest	1.11	1.65	2.02	
OHIP 10	Disorder in concentration	1.38	1.82	1.76	
HIP 11	Being Sensitive and crabbed against others	1.08	1.58	1.73	
OHIP 12	Problem with job	1.06	1.65	1.61	
OHIP 13	Dissatisfaction with life	1.03	2.06	2.02	
OHIP 14	Disability in oral and dental functions	1.11	1.73	1.64	
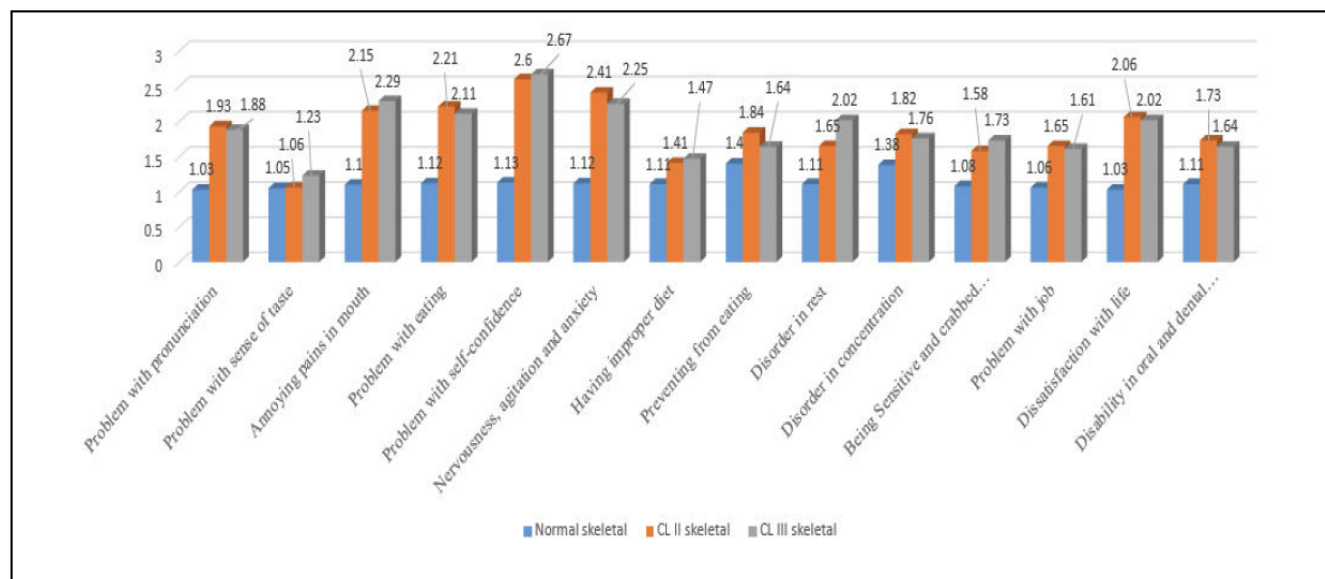
Figure 6: Life quality average score of kinds of OHIP index in people with CL II and CL III skeletal malocclusion and normal skeletal occlusion (control) in the studied population in Ahvaz (2017-2018).

CL II skeletal group. Also in studying the quality of life average score of OHIP indexes in people with CL II and CL III skeletal malocclusion and normal skeletal occlusion, results showed a problem with a sense of taste, annoying pains in mouth, the problem with self-confidence, having an improper diet, a disorder in rest, Being Sensitive and crabbed against others are more in CL III skeletal malocclusion and the problem with pronunciation, the problem with eating, nervousness and agitation and anxiety, preventing from eating, a

disorder in concentration, the problem with a job, dissatisfaction with life and disability in oral and dental functions are more in CL II skeletal group, and all of the features was the difference in normal skeletal occlusion group (p>0/001)

In this regard, many studies have been done in Iran and other countries which have similarities and differences in comparison with ours. for instance, in Germany (2012) Schmitt and his colleagues studied

the quality of life-related to oral and dental health in 28 patients (22 women and 6 men) in 18 to 27 range with skeletal malocclusion (without mentioning its kind) based on the German version of OHIP-14 questionnaire and observed that people with skeletal malocclusion have a lower quality of life-related to oral health OHRQoL than ordinary population. Also treating skeletal malocclusion has the most effect on the welfare and improving social relations [10]. In Wang and colleagues study in China (2017), they studied the oral and dental health-related quality of life changes in 50 patients with skeletal malocclusion (without mentioning its kind) by the Chinese version of OHIP-14 questionnaire which had a higher quality of life after treatment [13]. Also, Chen and his colleagues in China (2015) studied the oral related quality of life in 190 young people between 18 to 25 who had malocclusion. The Chinese version of OHIP-14 evaluated each patient before and after treatment. Based on research results, malocclusion has a considerable negative effect on the oral related quality of life, which has the most effect on mental disability and mental annoyance [14]. In Bahrimoghaddam and his colleague's longitudinal study in Shiraz (2015), they compared dental and oral health-related quality of life before and after treatment in 30 patients with CL III skeletal malocclusion and 28 CL II malocclusion patients by OHIP-14 questionnaire and the results showed orthodontic treatment and surgery had improved patients' quality of life, and they had the most effect on mental and social disabilities, mental annoyance and disablement [15]. In this study same as ours, there was not a meaningful difference between CL III and CL III skeletal malocclusion. Silva and colleagues in Sweden (2015) studied 50 patients to peruse dental and oral health-related quality of life in skeletal malocclusion patients (without mentioning its kind) by OHIP-14 and OQoL questionnaires. Results showed oral, and dental health-related quality of life has been improved after treatment and also skeletal malocclusion treatment had a considerable effect on improving social disabilities, mental annoyance and disablement [16]. In 2010 Rustemir and colleagues in Germany studied 50 patients (30 women and 20 men between 18 to 52) including 21 CL II patients and 29 CL III patients by OHIP-14 questionnaire to peruse dental and oral health-related quality of life in people with skeletal malocclusion. Results showed oral, and dental health-related quality of life has improved in comparison with before treatment.in this study data the same as ours, there was not a meaningful difference between CL II and CL III groups. Also, skeletal malocclusion

treatment had a considerable effect on improving social disability and mental annoyance [17]. Also in Finland (2009) Rosanne and colleagues studied 151 patients (92 women and 59 men between 16 to 64) including 67 CL II patients and 25 CL III patients and 53 lateral crossbite patients and 41 lateral scissor bite patients and 15 open bite patients and 81 deep bite patients who needed orthodontic treatment or orthodontic-surgery to study oral and dental health-related quality of life in patients with severe malocclusion by OHIP-14 questionnaire. Results showed oral, and dental health-related quality of life has been improved after treatment, and skeletal malocclusion treatment has the most effect on improving social disability and annoyance and physical pains [18], but there was no difference between groups. In Brazil (2014) Glaser and colleagues studied 5 CL I patients and 11 CL II patients and 58 CL III patients by OHIP-14 to peruse dental and oral health-related quality of life. Results showed the quality of life had been improved after treatment in all groups recognizably. In CL III patients, 7 items (action limitation, physical pains, mental annoyance, physical disability, mental disability, social disability and disablement) improved. When in CL II patients, there was an improvement in all items except action limitation [19]. Data of this research like Pahlaka and Kolinsky's research emphasize that CL III patients are more dissatisfied with their status than CL II group and have a lower quality of life, so after treatment, they feel happier and satisfied [20].

Although our study compared dental and oral health-related quality of life between skeletal malocclusion group and normal skeletal occlusion but the results are same as most of the mentioned studies which compared satisfaction before and after surgery or orthodontic treatment, and if there are differences, they can be related to environmental difference, racial difference, cultural status and same issues.

Results of different studies show OHRQoL evaluation is effective on clinical function [21] and skeletal abnormalities have a negative effect on patient's social life [22] and people with skeletal malocclusion have a lower quality of life in comparison with the ordinary population [10].

CONCLUSION

According to our findings, based on the OHIP index, class II and III skeletal malocclusion produced different functional and psychological problems for patients, but there were no significant differences between the mean

score of quality of life of the two groups. However, that of the normal skeletal group (control) was significantly different from the skeletal class II and III groups. Therefore, it is recommended to consider the various functional, social and psychological aspects of oral and dental health while providing dental services to improve the overall quality of life of individuals.

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