

Volume 5, No. 3, Summer 2016  
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**Journal's Office:** Oral and Dental Diseases Research Center, Kosar Blvd, Kerman, Iran, 7618836555

**TelFax:** +98 34 32133440

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Haapasalo M, Qian W: Irrigants and Intracanal Medicaments. In: Ingle JI, Bakland LK: *Endodontics* 6. 6<sup>th</sup> ed. BC Decker Inc, Hamilton; Ontario, Canada. 2008; Chapter 28: 997-9.

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## Knowledge and attitude of post-graduate dentistry students regarding HIV-positive patients

*Maryam Alsadat Hashemipour DDS, MSc<sup>1</sup>, Mohsen Shahi DDS<sup>2</sup>, Azin Mirzadeh DDS<sup>2</sup>,  
Sayed Amir Hossien Gandjalikhan-Nassab<sup>3</sup>*

### Original Article

#### Abstract

**BACKGROUND AND AIM:** Human immunodeficiency virus (HIV) can cause a hazardous disease and has severe fatal consequences. The problem of dental treatment in affected patients has still remained a big debate. The objective of this study was to evaluate the knowledge and attitude of post-graduate dentistry students regarding treatment and education of HIV-positive patients.

**METHODS:** This was a cross-sectional descriptive study on the post-graduate students of dentistry in Iran. Samples were collected using consensus method. A valid questionnaire comprising three parts was designed according to previous studies. The questionnaire comprised of a demographic part, general questions and questions regarding knowledge and attitude of the subjects. Answers were collected and Student's *t*-test and Fischer's exact test was used to analyze the data.

**RESULTS:** A total of 380 subjects took part in this study (164 male, 216 female). There were 92 HIV-positive patients. The average score of knowledge was  $14.5 \pm 2.8$  (range = 0-24). The average score of knowledge in male and female participants was  $14.5 \pm 2.8$  and  $14.6 \pm 2.7$  respectively (range = 0-65). There was no significant relationship between knowledge and gender ( $P = 0.70$ ). The average score of attitude was  $44.8 \pm 5.25$  and male residents had a positive attitude in comparison to female residents. Male participants had a significantly more negative attitude toward high risk and HIV-positive patients compared to female residents ( $P = 0.04$ ).

**CONCLUSION:** The results of this study showed that post-graduate students had a positive attitude toward treatment of HIV-positive patients. Also, this study showed that post-graduate students had a good knowledge about the HIV-positive patients. This study shows that post-graduate students of dentistry were eager to learn more about the treatment of HIV-positive patients. Findings of this study also add new concepts to the oral hygiene maintenance of HIV-positive patients and decision making for them.

**KEYWORDS:** Knowledge; Attitude; Dentistry; Human Immunodeficiency Virus (HIV)

**Citation:** Hashemipour MA, Shahi M, Mirzadeh A, Gandjalikhan-Nassab SAH. **Knowledge and attitude of post-graduate dentistry students regarding HIV-positive patients.** *J Oral Health Oral Epidemiol* 2016; 5(3): 120-8.

There were over 33 million people affected by HIV at the end of 2012. One new case is added to this number every seven seconds and one person dies from this virus every 11 seconds. At the beginning, male homosexuals and drug abusers were the high risk subjects, but today, the population of HIV is changing

and the number of patients is increasing in other groups as well.<sup>1</sup>

The first case of HIV in Iran was reported in 1987. According to official data of the Iranian Ministry of Health, 67% of the patients are intravenous drug users and 9% are affected through sexual transmission. The major concern is the validity of these data and the

1- Associate Professor, Oral and Dental Diseases Research Center AND Kerman Social Determinants on Oral Health Research Center AND Department of Oral Medicine, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

2- Dentist, Oral and Dental Diseases Research Center AND Kerman Social Determinants on Oral Health Research Center AND Department of Oral Medicine, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

3- Student of Medicine, School of Medicine, Kerman University of Medical Sciences, Kerman, Iran

Correspondence to: Maryam Alsadat Hashemipour DDS, MSc

Email: m\_s\_hashemipour@yahoo.com

danger of spreading the disease through different parts of the society. Iran's geopolitical location and its long border with Afghanistan and Pakistan which have a major role in production of world's heroine makes the situation even more complex and Iranian government is faced with the problem of drug transit plus the danger of drug abuse.<sup>1</sup>

According to World Health Organization (WHO) report, it is estimated that about 38 million people were HIV-positive by 2009 and 2.7 million new cases are reported each year.<sup>2</sup> Since the first diagnosis of HIV, 25 million people have died from this disease which affected a total of 63 million people till 2009.<sup>3</sup> The routes of HIV transmission are sexual contact, contaminated blood and blood products and vertically. Recent international studies have indicated that oral lesions (e.g. oral candidiasis and Kaposi sarcoma) occur in as many as 50 to 70 percent of all HIV/AIDS cases. These conditions, which may be preventable and/or treatable with regular dental care, often persist and lead to discomfort, dysfunction, and disability that, if left untreated, can significantly impede quality of life.<sup>4</sup>

Due to the fact that HIV can cause a hazardous disease and have severe fatal consequences along with its unresponsiveness to current medications, the problem of dental treatment in these patients still remains a big debate.

Oberoi et al. studied 427 dental student from India in 2014 and the willingness to treat HIV-positive patients among dental students was 67.0%, and 74.20% were confident about treating a patient with HIV.<sup>5</sup> Bennett et al. showed that 71% of the 671 studied dentists did not show a positive attitude to perform dental procedures for HIV-positive patients and most of the dentists referred high risk patients.<sup>6</sup> A similar result was obtained by Lewis et al., most of the dentists preferred not to work for HIV-positive patients and believed that these patients should be treated in tertiary special

clinics.<sup>7</sup> Studies have revealed two reasons for not working on HIV-positive patients: first, the risk of losing other patients due to accepting to work for HIV-positive patients and second, risk of disease transmission from patient to the dentist.<sup>7</sup>

Information regarding the differences in oral health maintenance and performing procedures on these patients or high risk subjects, and training of dental staff is an important issue which should be well addressed. American Dental Association (ADA) reports still emphasize on the importance of providing efficient oral health services and providing different services to the patients who do not receive enough care. The safety issues on treating these patients and the necessity to educate pre- and post-graduate students makes teaching them an important topic. The question that arises here is whether dental staffs are prepared to work for these patients and whether they are willing to treat them or not.<sup>8</sup>

Considering the safety of working for HIV-positive patients, the question is whether the students are appropriately prepared to work with these patients and whether they have received enough education about infection control and are ready to work for them or not. It is also noticeable that HIV-positive patients are considered as patients with special needs and it is preferable that an expert person works for them to minimize the risk of infection and time consumed to do the procedure. These facts highlight the role of post-graduate students in treatment of these patients. Curriculums of dental schools reveal that most of the education regarding treatment of HIV-positive patients is limited to an abstract introduction to the disease, oral manifestations and infection control in these patients.<sup>7,8</sup>

This study was designed to evaluate knowledge and attitude of Iranian post-graduate students about treating HIV-positive patients. It is noticeable that despite the fact that several studies have been conducted on students, people from general population and

prisoners,<sup>6,9-12</sup> a few studies have been done in dental schools<sup>6,12</sup> but none has addressed dentistry post-graduate students.

### Methods

This was a cross-sectional descriptive study performed on post-graduate students of dentistry in Iran (2012-2013). First, a questionnaire was designed according to previous studies.<sup>7,13</sup> The questionnaire comprised of a demographic part, general questions and questions regarding knowledge and attitude of the subjects. Validity of the questionnaire was evaluated by 10 specialists in Kerman, Iran. They were asked to express their opinion on each question by these phrases: totally appropriate, appropriate, no idea, inappropriate and totally inappropriate.

After evaluation by the specialists, comprehensibility of the questions was evaluated. In total, the questionnaire had 18 questions; three questions were inappropriate according to the experts' opinion and were excluded from the questionnaire. Therefore, validity of the questionnaire was good. Its overall validity was 79% and the validity coefficient (Cronbach's  $\alpha$ ) for each question was between 77-89 percent. Reliability of the questionnaire was 0.8 considered to be good.

The final questionnaire comprised of 28 questions plus demographic data (age, sex). The questionnaire was distributed by a senior student through email. Post-graduate Students of all dental schools in Iran (Isfahan, Tabriz, Tehran, Zahedan, Shahid Beheshti, Kerman, Shiraz, Mashhad, Shahed, Yazd, Azad University of Tehran, Khorasegan and Qazvin) were asked to fill the forms. Confidentiality was guaranteed and subjects were asked to freely express their opinion. Questionnaires were designed un-identified and un-addressed. To analyze the data, in knowledge section, for each correct answer, 2 scores were given, for each wrong answer 0 score and for not answering, 1 score was given (average = 0-24 scores).<sup>7,14</sup> To evaluate the attitude section, questions were designed

so that the answers were as totally agree, agree, no idea, disagree and totally disagree and a score of 5 to 0 was given to the answers subsequently (average = 0-65 scores). Fischer's exact test, Student's t-test, chi-square and regression test were used to analyze the data using SPSS (version 18.0, SPSS Inc., Chicago, IL, USA).

### Results

A total number of 420 questionnaires were emailed and 380 were filled by the subjects (overall response rate: 90.5%, male response rate: 89.1%, female response rate: 91.5%). One hundred sixty-four male (43.1%) and 216 female (56.9%) subject with the average age of  $28.5 \pm 4$  years participated in this study.

Regarding the question about previous treatment of HIV-positive patient, 24.3% ( $n = 92$ ; 42 women, 50 men) of the subjects answered yes and the other participants who said no declared causes such as not countering such a patient, fear of disease transmission and inability to fully control infection. No significant relationship was found between gender, age and treating HIV-positive patients ( $P = 0.09$  and  $P = 0.08$ , respectively). About 59% (155 subjects; 80 women and 75 men) had previously participated in educational programs regarding infection control principles in HIV-positive patients.

Table 1 shows the results of survey on attitude. The most positive answers (totally agree) were given to the questions 13, 4 and 7 and the most negative answers were given to questions 5, 10, 1 and 8. Maximum score of attitude section was 62 and minimum was 27 ( $44.8 \pm 5.25$ ). The average score of attitude in male participants was  $45.6 \pm 5.8$  and in female subjects, it was  $44.6 \pm 4.8$ .

Table 2 demonstrates the answers to attitude section based on gender. There was a significant positive relationship between positive answers to questions 5, 6 and 10 and gender. This study revealed that there was no significant relationship between attitude score and gender ( $P = 0.11$ ).

**Table 1.** Answers of post-graduate dentistry students to attitude questions

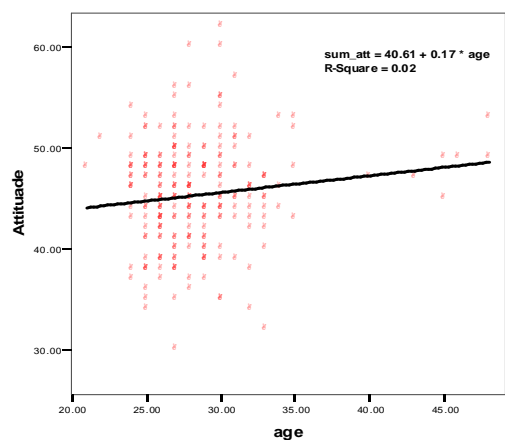
Number	Question	SA	A	NA-NDA	DA	SDA
1	Meeting an individual who is HIV-positive would influence my decision to treat HIV positive patients in the future.	47	138	74	77	43
2	Learning about persons from different backgrounds by being in a discussion group would be helpful.	43	195	87	40	24
3	Reading case reports from patients with infectious diseases would help me to be a better provider for these patients.	63	201	63	31	22
4	Treating an HIV positive patient with close clinical supervision would give me more confidence in treating these patients in the future.	108	183	37	28	26
5	Because of the level of risk involved in treating homosexual patients, I would prefer not to treat them.	33	86	84	130	48
6	Because of the level of risk involved in treating intravenous drug users, I would prefer not to treat them.	34	106	66	131	11
7	If it became revealed that patients with infectious communicable diseases are treated in a dental practice, some patients might leave the practice.	79	195	37	11	26
8	I am very concerned about contracting an infectious communicable disease from my patients.	47	107	69	120	37
9	I would prefer not to treat a patient who is currently using intravenous drugs.	37	92	74	134	11
10	I would prefer not to treat a patient who has a homosexual or bisexual orientation.	41	107	71	115	46
11	Dentists have a professional obligation to treat patients with HIV/AIDS.	72	170	73	39	26
12	I am currently working in a work environment where people with HIV are in the work place.	43	129	94	78	36
13	I think that drug addiction is a disease that needs to be treated.	111	176	41	32	20

SA: Strongly agree; A: Agree; NA-NDA: Neither agree nor disagree; DA: Disagree; SDA: Strongly disagree

There was a significant positive relationship between age and attitude score ( $P = 0.04$ ). This study showed that residents with older age had a more positive attitude toward treating HIV-positive patients compared to younger ones (Figure 1).

Maximum score of knowledge was 24 and minimum score was 7 ( $14.5 \pm 2.8$ ) (Table 3).

The average score of knowledge in male subjects was  $14.5 \pm 2.8$ , for the female participants, it was  $14.6 \pm 2.7$ . There was no significant relationship between knowledge and gender ( $P = 0.70$ ) (Table 4).



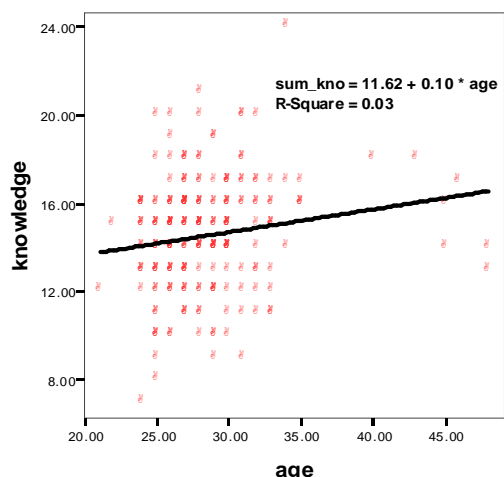
**Figure 1.** Mean attitude score according to age

**Table 2.** Answer of post-graduate dentistry students to attitude questions according to the gender

Questions	SA		A		NA-NDA		DA		SDA		P
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	
1	19	28	58	80	29	45	33	44	26	17	0.63
2	24	19	81	114	31	47	17	23	12	12	0.32
3	30	33	95	106	27	36	16	15	10	12	0.53
4	50	58	73	110	18	19	13	15	11	15	0.26
5	15	18	36	52	30	54	54	76	30	18	0.01*
6	16	18	38	68	25	41	57	74	26	17	0.02*
7	40	39	78	117	16	21	18	25	12	14	0.45
8	25	22	41	66	32	37	48	72	18	19	0.40
9	17	20	33	59	32	42	57	77	24	19	0.20
10	21	20	31	76	31	40	50	65	30	16	<0.01*
11	31	41	73	97	29	44	18	21	14	12	0.80
12	23	20	66	63	35	59	31	47	19	17	0.14
13	44	67	77	99	18	23	17	15	11	9	0.32

SA: Strongly agree; A: Agree; NA-NDA: Neither agree nor disagree; DA: Disagree; SDA: Strongly disagree  
 \*Significant

Besides, there was a significant relationship between age and knowledge score (P = 0.01). In other words, residents with older age had more knowledge about treating HIV patients compared to younger ones (Figure 2).



**Figure 2.** Mean knowledge score according to age

In addition, this study showed that there was no significant relationship between year of

study and attitude score and score of knowledge (P = 0.12 and P = 0.09, respectively).

### Discussion

The results of this study revealed that only 24.3% of the subjects had previously provided services for HIV-positive patients. Data from a survey on 206 dentists from Chicago in 1989 revealed that only 16% of the subjects tend to work for HIV-positive patients.<sup>4</sup> Bennett et al. showed that 29% of the dentists were willing to work for these patients and about 90% of the dentist referred these patients to the dental schools, specialty clinics or specialists offices.<sup>9</sup> Lewis et al. showed that most of the dentists tend to refer these patients to the specialty clinics.<sup>6</sup> Oberoi et al. studied 427 dental students from India in 2014 and the willingness to treat HIV positive patients among dental students was 67.0%, and 74.20% were confident about treating a patient with HIV.<sup>5</sup> One study showed that Sixty-eight percent of the dentists declined appointment requests from



**Table 3.** Answer of post-graduate dentistry students to knowledge questions

Questions	Yes	No	Do not know
Saliva has been found to be a vehicle for the transmission of HIV	111	264	5
All patients should be considered potentially infected with HIV	361	13	6
Infection control methods for hepatitis B provide adequate protection against the transmission of HIV	323	86	29
The HIV virus is destroyed with all methods of sterilization	278	87	15
Application of chlorhexidine is essential before all dental procedures in HIV-infected patients	191	85	104
P24 is the screening test for the diagnosis of HIV infection	81	74	225
Intravenous drug is The most common route of HIV transmission in Iran	288	58	34
The UV radiation destroys HIV virus	181	81	118
HIV virus remains for a week on contaminated instruments and the environment	43	299	38
Oral manifestations of HIV lesions include lesions characterized by red-blue or purple plaques or nodules	188	118	74
The risk of HIV infections after a needle stick injury is about 45-50 percent.	29	305	46
Hepatitis B is known to be more infectious than HIV/AIDS	349	15	16

HIV: Human immunodeficiency virus; UV: Ultraviolet

patients with HIV.<sup>5</sup> Previous studies regarding the attitude of dentists have demonstrated that many of the dentists did not agree to work for these patients due to reasons including

exposure of the dental staff and other patients to the disease and loss of patients. Prevalence of anti-homosexuality among health care providers may affect their professionalism.<sup>7,14,15</sup>

**Table 4.** Answer of post-graduate dentistry students to knowledge questions according to the gender

Questions	Yes		No		Do not know		P
	Men	Women	Men	Women	Men	Women	
1	69	42	143	121	3	2	0.20
2	208	153	5	8	4	3	0.30
3	185	138	44	42	16	13	0.80
4	152	126	54	34	11	4	0.15
5	107	84	50	35	60	44	0.90
6	41	40	39	35	135	90	1.90
7	160	128	35	23	22	12	0.40
8	105	76	43	38	62	50	0.70
9	29	14	166	133	21	17	0.20
10	98	90	67	51	51	23	0.02*
11	21	18	169	136	30	16	1.90
12	200	149	9	6	7	9	0.43

\*Significant

Almost half of the subjects had already participated in educational programs on HIV. Educational curriculum of the dental schools throughout the world provides education in form of class lectures, clinical tutorials and oral presentations regarding treatment of HIV-positive patients. Despite the fact that knowledge of health care providers about this disease and treatment of the affected patients has increased, a few improvements have been made on fear of working for these patients and practically, it has had no effect on tendency to work for these patients.<sup>7,13</sup>

Educational curriculum of general course for dentistry only comprises of two theoretical concepts on treatment and infection control of HIV-positive patients plus oral manifestation of the disease. There is no such class provided in post-graduate level for the residents and they receive no education on these concepts.<sup>7,13</sup>

This study showed that 40% of the subjects consider their curriculum good for the treatment of HIV-positive patients which is consistent with study by Seacat and Inglehart.<sup>7</sup> Nearly all of the participants (95%) thought that each patient should be considered infected which is consistent with Seacat and Inglehart study (99.5%). About 31% of the subjects chose the wrong answer for the oral manifestations of HIV and 19.5% said that they do not know the manifestations. With regard to the same question, Seacat and Inglehart<sup>7</sup> showed that 32.2% made the wrong choice or said they do not know the answer to this question that this was similar to others studies.<sup>5</sup>

With regard to the question about needle stick and the risk of disease transmission, 80.3% made the right choice which is consistent with Seacat and Inglehart study.<sup>7</sup> In this study, 49.6% disagreed or totally disagreed with working for homosexuals and 45.8% disagreed with working for the addict patients. In Seacat and Inglehart study, most of the subjects were disagree with working for the HIV-positive patients.<sup>7</sup> There is not a

positive attitude in Iranian society toward homosexuality and addiction and these people do not have an accepted social norm. This disagreement might be due to incomprehension of the disease transmission risks, lack of enough facilities and lack of education. Undoubtedly, increasing the skills and self-esteem in facing HIV-positive patients causes tendency toward doing procedures on these patients.

Nearly half of the subjects agreed with group discussions and treatment of these patients in residency to achieve more skills and 76.6% of the subjects believed that treating an HIV-positive patient under precise clinical watchfulness increases the confidence of the doctors which is consistent with Seacat and Inglehart study.<sup>7</sup>

It seems that theoretical education of the post-graduate students beside clinical education in clinics and offices with precise supervision enhances the level of services given to these patients.

Results revealed that 94.3% of the subjects had high knowledge regarding HIV. This finding is consistent with Ayranci<sup>16</sup> and Seacat and Inglehart studies.<sup>7</sup> While studies conducted by Tefera et al. on rural population of Etiopia,<sup>17</sup> Rad et al. (Kerman Population),<sup>18</sup> Al-Serouri et al. (Yemens general Population),<sup>19</sup> Montazeri (Tehran Population),<sup>20</sup> Ramphoma and Naidoo,<sup>21</sup> AlMuzaini et al.<sup>22</sup> and Prabhu et al.<sup>23</sup> have shown a lower level of knowledge.

In another study by Jaiswal et al. on high school students, the level of knowledge was reported to be very low.<sup>24</sup> Undoubtedly, knowledge of residents should be higher than the general population due to their higher education and more in-depth studies.

In this study, the mean score of knowledge from 12 questions was  $14.5 \pm 2.8$  (range = 0-24). Although the score of knowledge section was not significantly different among male and female subjects but female participants had a higher level of knowledge. Similar to this finding, level of knowledge was reported to be

higher in female subjects compared to male ones in others studies.<sup>6,18-27</sup> Level of knowledge was higher in female participants in Seacat and Inglehart study<sup>7</sup> which is similar to Brook et al. study.<sup>28</sup> Despite these reports, Agrawal et al. demonstrated that boys had a better knowledge compared to girls.<sup>29</sup>

This study revealed that 29.2% of the subjects considered saliva as a media for virus transmission. Studies have demonstrated that saliva alone cannot transmit the disease and only saliva with blood can transmit the disease.<sup>17,19,20</sup> Similar to this study, Rad et al.<sup>18</sup> and Tavooosi et al.<sup>11</sup> showed that 30% of the participants believed that saliva can transmit the HIV. Therefore it seems that the level of knowledge about the virus propagation method is low, so a good educational program seems to be necessary for the pre- and post-graduate students and this may lead to decreased psychosocial distresses.

About 45% of the subjects had no problem with working in an environment which an HIV-positive person is working in. Rad et al. showed that 30.1% of the subjects agreed with the participation of HIV-positive patients in social programs and 49.1% agreed with quarantining HIV-positive patients.<sup>18</sup>

Seacat and Inglehart<sup>7</sup> and Tavooosi et al.<sup>11</sup> showed that about one third of the students disagreed with sitting near an infected person which is similar to Brook et al. study.<sup>28</sup> In Merakou et al. study, only 5% of the students expressed that they will deny their HIV friends.<sup>30</sup> This study was conducted after 15 years of HIV prevention in Greek Schools.

One third of the Indian students in Agrawal et al. study disagreed with entrance of infected person into universities.<sup>29</sup> This study is consistent with Krasnik and Wangel<sup>31</sup> and Ross.<sup>32</sup>

### Conclusion

The results of this study showed that post-graduate students had a positive attitude toward treatment of HIV-positive patients. Also, this study showed that post-graduate students had a good knowledge about HIV infection. It is also necessary to provide theoretical and practical education with enhancement of these programs for prevention and control of the disease which will lead to achieving more skills and enhancing self-esteem. Also due to fear and anxiety of some of the subjects about the transmission of the disease or loss of patients due to accepting to work for HIV-positive patients, it is necessary to strictly perform infection control procedures in dental offices beside enhancing the level of knowledge in society about the transmission routes of this disease.

### Conflict of Interests

Authors have no conflict of interest.

### Acknowledgments

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## The prevalence and risk factors of gingivitis in a population of 6-year-old children in Iran

*Fatemeh Jahanimoghadam DDS, MSc<sup>1</sup>, Hoda Shamsaddin DDS, MSc<sup>1</sup>*

### Original Article

#### Abstract

**BACKGROUND AND AIM:** Gingivitis is a reversible inflammation of gingival tissue. The prevalence of gingivitis is different in various communities. The aim of this study was to determine the prevalence of gingivitis among 6-year-old ( $\pm 3$  months) children of Rayen, Kerman, Iran.

**METHODS:** In this cross sectional study, 279 children (129 boys and 150 girls) from all Rayen's nursery schools and primary schools were selected. Data collected through clinical examination with the consent of parents and teachers. Gingival Bleeding Index (GBI) was measured by using light and dental probe pressure.

**RESULTS:** The prevalence of gingivitis was 37.8. There was statistically significant association between gender and gingivitis. Mouth breathing and toothbrush frequency were factors associated with gingivitis.

**CONCLUSION:** This study showed relatively similar prevalence of gingivitis compared to other studies. The prevalence of gingivitis was more in boys than girls. Health educators and parents should have a more active role in children's oral health education.

**KEYWORDS:** Gingivitis; Prevalence; Mouth Breathing; Children; Gender

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Gingivitis is a reversible inflammation of gingival tissue characterized by swelling, bleeding, change in normal colour, and often sensitivity and tenderness.<sup>1</sup> Histologically it is characterized by the presence of an inflammatory exudate and edema, some destruction of collagenous gingival fibers, ulceration and proliferation of the epithelium facing the tooth.<sup>2</sup> The most common form of periodontal disease in children is plaque induced gingivitis.<sup>3</sup> Cariogenic bacteria, food impaction, mouth breathing and improper tooth position are the predisposing factors reasonable for this type of gingival disease.<sup>4</sup> The inflammation of tooth surrounding tissues can spread to bone and results in loss of connective tissues and bone.<sup>5</sup> The role of poor oral hygiene and dental plaque

in gingivitis formation has been well established.<sup>1</sup> Gingival health can be maintained with good oral hygiene. The prevalence of gingivitis is different in various communities. Most studies have reported it up to 50%-100%.<sup>6</sup> In developed countries, the prevalence and severity of gingivitis are widely investigated at different ages. The prevalence of gingivitis in children has mentioned from 61.5% in the USA to 85% in Australia, 70% in Mexico, and 95% in India.<sup>7</sup> In contrast to many developed countries, high prevalence of gingivitis has been reported in Iranian children.<sup>1</sup>

Jalaleddin and Ramezani showed that the gingivitis prevalence is 97% in 6- to 7-year-old children in Qazvin, Iran.<sup>8</sup> Ketabi reported the prevalence of gingivitis was 73% among 6- to 11-year-old children in Isfahan.<sup>7</sup> Four indices

1- Assistant Professor, Oral and Dental Diseases Research Center AND Kerman Social Determinants on Oral Health Research Center AND Department of Pediatric Dentistry, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran  
Correspondence to: Fatemeh Jahanimoghadam DDS, MSc  
Email: fatemehjahani4@gmail.com

commonly used to evaluate gingival inflammation in children and young adults in recent studies are: Gingival Index (GI) (Loe and Silness, 1963), Gingivitis Index (Suomi and Barbano, 1968), Papillary Bleeding Index (PBI) (Saxer and Muhlemann, 1975), and Gingival Bleeding Index (GBI) (Ainamo and Bay, 1976). The index described by Ainamo and Bay, considers presence or absence of bleeding on gentle probing of the gingival tissue. GBI has proved to be useful in a number of epidemiological and clinical trials. The diagnostic criteria (bleeding or no bleeding) are assumed to be relatively easy to interpret. Thus, this index is assumed to be relatively insensitive to examiner differences.<sup>9</sup> Furthermore, researchers suggest that bleeding upon gentle probing of the gingival sulcus may occur before change in the colour, texture, or form.<sup>10</sup> So GBI was used to assess the bleeding in this study.

Considering the high prevalence in this age group, the present study tends to evaluate prevalence and risk factors of gingivitis among 6-year-old children. It seems that factors such as family income and socioeconomic status would influence on prevalence.<sup>11</sup> It was considered necessary to develop a research study that would describe the prevalence of gingivitis in a preschool age population for a better screening in the design of intervention programs to limit the healthcare problem represented by periodontal disease. We assume that in deprived area such as some rustic regions the level of parent's awareness about children's oral health practice is low and lead to higher level of dental caries and gingivitis. The aim of this study was to evaluate the prevalence of gingivitis in nursery schools and primary schools of Rayen and increase level of parent's awareness about children's oral health.

## Methods

A cross-sectional survey was carried out among 6-year-old ( $\pm$  3 months) children in Rayen, one of the cities of Kerman, Iran.

Kerman Province is the largest Province in Iran and is located in the south east of the country and Rayen is located in the south east of Kerman with a population of over 50000. The racial structure of the population in this city is heterogeneous. All 279 children aged 6 years ( $\pm$  3 months) in all nursery schools and primary schools of Rayen were selected through census method. After getting the consent of the school's authorities for participation in our survey, informed consent was obtained from the parents to include their children in the study. The ethical code (IR.KMU.REC.1394.245) was allocated to this study by ethics committee of Kerman University of medical sciences.

A checklist on the demographic characteristics, gingival bleeding index (GBI), habits, and systemic conditions were completed by a trained examiner for 279 children. Full mouth examination was done under natural light in a school's room and using disposable mouth mirror and periodontal probe (Williams-coded-Hufriedy, USA). Participants who had systemic diseases were not included. GBI was measured by using light and dental probe pressure. In this index, bleeding of marginal gingival cervices in all teeth or selected teeth are measured.<sup>12</sup> In this study, GBI was measured in selected teeth (51, 55, 65, 71, 75, 85). Zero score indicated the absence of gingival bleeding within 10 seconds. Score 1 indicated that there was bleeding in gingival margin of teeth. Total GBI was calculated by dividing the number of sites with hemorrhage on total number of tooth sites and multiplying the result to hundred to gain the percentage of gingival bleeding index.<sup>12</sup> Mobile teeth, teeth with gross caries (more than 3 surfaces were lost) and teeth during active phase of eruption were excluded. Factors such as gender, mouth breathing, and tooth brushing frequency were evaluated. Lip seal or incompetency was used for measuring mouth breathing index. Tooth brushing frequency was asked from participants. Lip seal or incompetency was

used for measuring mouth breathing index. Furthermore, parents were asked if their children open their mouth when they sleep. Tooth brushing frequency was asked from participants and their parents.

Data was analyzed by analysis of variance (ANOVA), post-hoc (Tukey test) and Student's t-test in SPSS (version 20.0, SPSS Inc., Chicago, IL, USA). P-values of less than 0.05 was considered to be statistically significant.

## Results

In this study, the prevalence of gingivitis and its related risk factors were determined in 279 children aged 6 years ( $\pm$  3 months). The prevalence of gingivitis was 37.8.

GBI was measured in boys and girls (Table 1). Statistically significant difference in GBI was seen between boys and girls. The prevalence of gingivitis was more in boys than girls, and this difference was statistically significant ( $P = 0.005$ ).

Children were divided in four different groups based on toothbrush frequency:

1. Children who never used toothbrush or any material to clean their teeth (G1).
2. Children who were sometimes using toothbrush during a week (G2).
3. Children who were brushing their teeth daily (G3).
4. Children who were brushing their teeth twice or more a day (G4).

Statistically significant difference was seen between G1 and G2, G3, G4 ( $P = 0.001$ ). Tukey test showed GBI difference was statistically significant between G2 and G3 ( $P = 0.030$ ) as well as G2 and G4 ( $P = 0.009$ ), but not for G3 and G4 ( $P = 0.950$ ). Table 1 shows the comparison of GBI mean according toothbrush frequency. More than half (55.2%) of children examined did not brush their teeth whereas only 16.5% of them brushed twice or more a day. GBI among mouth breather children was significantly higher in comparison with non-mouth breathing group ( $P = 0.001$ ).

## Discussion

There is a lack of epidemiological studies about periodontal status and gingival disease at 6-year-old age in Iran. Our results showed that the prevalence of gingivitis was 37.8 among 6-year-old children. In other studies, this prevalence was recorded 16.41% in Sarvabad, a city in Kurdistan Province, Iran<sup>13</sup> and 97% in 6- to 7-year-old children in Qazvin, Iran.<sup>8</sup> Pourhashemi et al. found 95.7% of 6- to 10-year-old children in Tehran, Iran, were affected by gingivitis.<sup>14</sup> It could be resulted from different community and the age of subjects.

Gingivitis was more common in boys which is in line with Taani,<sup>15</sup> Ketabi et al.<sup>7</sup>, and Rezaeian et al.<sup>13</sup> studies. It may be due to more precise oral hygiene cares in girls and less motivation of oral hygiene practices in boys.<sup>15</sup>

**Table 1.** The comparison of GBI mean according to gender, mouth breathing and toothbrush frequency

Variables	Groups	Number (%)	GBI mean (SD)	P
Gender	Boys	129 (46.23)	42.45 (35.29)	0.005
	Girls	150 (53.76)	33.07 (37.46)	
Mouth breathing	Yes	55 (19.71)	75.44 (18.09)	0.001
	No	224 (80.28)	28.12 (34.07)	
Toothbrush frequency	G1	154 (55.19)	64.15 (25.75)	0.001
	G2	28 (10.03)	16.05 (24.28)	
	G3	51 (18.27)	0.81 (4.12)	
	G4	46 (16.48)	0 (0)	

GBI: Gingival Bleeding Index; G1: Never; G2: Sometimes; G3: Daily; G4: Twice or more a day

We found that mouth breathing habit had positive effect on gingival health. This result is in agreement of Wagaiyu and Ashley<sup>16</sup> and Jacobson<sup>17</sup> studies. An explanation of this finding is dehydration of exposed surface of gingiva during mouth breathing.<sup>18</sup> The various factors such as enlarged glandular tissue, asthma and allergies can lead to mouth breathing habit.<sup>19</sup>

It was estimated that there is an inverse relation between the incidence of gingivitis and oral hygiene practice frequency. Jessri and coworkers showed children who brushed their teeth once a week had almost 4 times the likelihood of experiencing dental caries and gingivitis compared to those who brushed their teeth 2 times a day.<sup>1</sup>

More than half of examined children (55.2%) in our study did not use any material to clean their teeth and they had the most prevalence of gingival bleeding index. This result has been stated by a number of researchers.<sup>20,21</sup> With regard to this fact that the poor oral hygiene is the most important factor in prevalence of gingivitis<sup>13</sup> and the significant relation between tooth brush frequency and gingivitis, it is recommended to train children about importance and proper use of toothbrush. The most important association with gingivitis was dental plaque. Numerous studies indicated that gingival disease may be passed from parents to children.<sup>22</sup> Based on these findings, the American Academy of Periodontology (AAP) recommends that treatment of gingival disease may involve entire families and that if one family member has periodontal disease, all family members should visit a dentist for periodontal disease screening.<sup>23</sup>

This study had some limitations. For example, factors like family income and level of parent's education that have direct effect on child's oral health practice were not assessed in

this study. High prevalence of gingivitis in this study necessitates the implementation of immediate therapeutic and preventive policies. This study suggests that parents in Rayen should receive information about importance of gingivitis and its causes. The researchers designed a pamphlet containing information about oral health practice in children which was given to parents. Dental health programs and dental camps at school level are necessary in this region and they should be performed at regular intervals, because children in this area do not have accessed to standard dental care. Asking health educators to have a more active role in children's oral health education and also educating parents about their children's oral health could be a first step towards oral health promotion. Parents and caregivers should be educated on the need for effective plaque control to prevent this condition. Furthermore, we suggest evaluating the etiology of mouth breathing among pre-school children and curing it as soon as possible.

### Conclusion

According to this study, the prevalence of gingivitis among 6-year-old children in Rayen is higher in boys.

The highest prevalence of gingivitis was seen among children who did not use toothbrush. With increasing toothbrush frequency, gingival bleeding index was decreased.

Gingivitis is more common in children with mouth breathing.

### Conflict of Interests

Authors have no conflict of interest.

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## The impact of laminate veneer restoration on oral health-related quality of life: A case series study

Faezeh Hamzeh DDS, MSc<sup>1</sup>, Raha Habib-Agahi DDS<sup>2</sup>, Nader Navabi DDS, MSc<sup>3</sup>, Shiva Pouradeli MSc<sup>4</sup>

### Original Article

#### Abstract

**BACKGROUND AND AIM:** Laminate veneer restorations exhibit excellent ability to reproduce the natural teeth regarding esthetic and biomechanics. The aim of the present study was to determine the impact of laminate veneers on oral health-related quality of life (OHQoL).

**METHODS:** In this case series study, the impact of treatment on OHQoL was measured using the standard questionnaire OHIP-14. This tool was applied to 19 patients who visited the private office of restorative and cosmetic specialist before and six months after treatment.

**RESULTS:** The maximum score recorded by Oral Health Impact Profile-14 was 34 before treatment, with 31 after treatment. The average score decreased from  $13.1 \pm 9.44$  (before treatment) to  $12 \pm 10.6$  (after treatment). Comparison of the frequencies of patient's responses to OHQoL suggested that changes in OHQoL for question number 4 (uncomfortable to eat food) and question number 9 (difficult to relax) were significant, respectively ( $P = 0.03$ ,  $P = 0.02$ ) and for question number 10 (feeling embarrassed) were nearly significant ( $P = 0.07$ ). Nineteen subjects in this study exhibited improvement in OHQoL.

**CONCLUSION:** Esthetic dental treatment using laminate veneers would significantly affect OHQoL enhancement in some aspects.

**KEYWORDS:** Oral Health; Quality of Life; Cosmetic Dentistry; Laminate Veneer

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Oral health-related quality of life (OHQoL) represents a personal assessment of how much and how a person's social life and its functional and emotional aspects are affected by the health-related issues of their mouth.<sup>1</sup> In other words, OHQoL is considered to be a measure that shows the impact of oral and dental changes on various aspects of life, including eating, sleeping, socializing and self-esteem.<sup>2</sup> Nowadays, reliable standard devices are available to researchers for measuring OHQoL,

but the majority of studies in this field are dedicated to the impact of chronic disease conditions (e.g. oral cancers) on quality of life.<sup>1,3</sup> However, it appears that professional treatments and cosmetic restorative dentistry can have a significant impact on OHQoL through their impact on the quality aspects of life, such as an increase in confidence and improved smiling, speech and facial appearance. White teeth have been positively correlated with high ratings of social competence, intellectual ability, psychological

1- Assistant Professor, Oral and Dental Diseases Research Center AND Kerman Social Determinants on Oral Health Research Center AND Department of Aesthetic and Restorative Dentistry, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

2- PhD Student, Oral and Dental Diseases Research Center AND Kerman Social Determinants on Oral Health Research Center, Kerman University of Medical Sciences, Kerman, Iran

3- Assistant Professor, Oral and Dental Diseases Research Center AND Kerman Social Determinants on Oral Health Research Center AND Department of Oral and Dental Diseases, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

4- Epidemiologist, Oral and Dental Diseases Research Center AND Kerman Social Determinants on Oral Health Research Center, Kerman University of Medical Sciences, Kerman, Iran

Correspondence to: Raha Habib-Agahi DDS  
Email: raha2979@yahoo.com

adjustment and relationship status.<sup>4</sup> Alternatively, untreated dental caries, non-aesthetic or discolored anterior teeth restorations and missing anterior teeth usually lead to dissatisfaction with dental appearance.<sup>5,6</sup> Furthermore, treatments improving dental aesthetics have been found to increase patient quality of life and psychological status.<sup>7,8</sup>

Makino-Oi et al. showed the effect of prosthesis on quality of life in patients with shortened dental arch.<sup>9</sup> Another study reported the effect of using denture during nights on OHQoL of the patients.<sup>10</sup> All studies have shown that despite the diversity of modern research carried out in terms of dental interventions, the cosmetic domain of quality of life among patients has received less attention in comparison to all the other domains of quality of life.<sup>11-16</sup> Laminate veneer treatment is among these treatments with cosmetic and conservative mechanical properties in relation to health and beauty and is ideal for use in anterior teeth.<sup>17,18</sup> Conservation of more tooth structure and its integrity are the most important features and the success rate of these cosmetic restorations is around 94%–96%. Therefore, laminate veneer treatment is highly favorable for dentists and patients due to its excellent imitation of natural tooth characteristics such as color, translucency, shape and surface characteristics.<sup>19,20</sup>

Assessment of the success rate of dental treatments is carried out through clinical criteria (such as CPITN index) in the treatment of periodontal diseases, radiography (alveolar bone healing after surgical treatment) and photography and casts and corrected occlusion after orthodontic treatment; but in cosmetic treatments, patient's satisfaction with treatment in certain aspects of his life is particularly important.<sup>21</sup> Therefore, more measuring OHQoL following cosmetic dentistry treatments is highly important. This study aimed to evaluate OHQoL in patients following laminate veneer treatments.

## Methods

In this case series study, the OHQoL was evaluated for 19 patients who visited a private office of restorative and cosmetic specialist, before and 6 months after laminate veneer treatments for anterior teeth (canine to canine). Sampling was carried out consecutively.

The inclusion criterion for patients was an age of 14 years and over. Patients with known systemic diseases and those unable to complete the questionnaire for whatever reason were excluded from the study.

For resin composite veneering of the teeth, at the first step, the desired shade was selected using day light as well as dental unit light source (according to the adjacent teeth, two or more composite shades was selected from the following list: Vit-l-escence shade B1, A1, A2, A3, Pearl Neutra (PN), Pearl Frost (PF) or Pearl Amber (PA), (Ultradent, USA) or Z350 shades Enamel A1, A2 or A3 and Dentin A1, A2 or A3, 3M, (Ultradent, USA). Afterwards, all the caries affecting hard tissues were removed while in cases without any caries, surface roughening was done by a high speed hand piece in order to increase the bond strength. Prior to acid etching (35% phosphoric acid gel, Ultradent, USA) and bonding (Universal bond, 3M, USA), the field was isolated by cotton roll. The selected resin composites were incorporated subsequently using layering technique while each 2 mm thick layer was light cured for 40 seconds (LED 695C, Dentamerica, Taiwan). Finally, occlusal adjustment, finishing and polishing were accomplished using diamond bur (Dia, Swiss), silicon carbide disks (Soflex, 3M, U.S.A), polishing rubbers (Jiffy, Ultradent, U.S.A) and diamond paste (Diamond composite polishing paste, Ultradent, U.S.A) in a rubber cup (Jiffy, Ultradent, U.S.A), respectively.

Oral Health Impact Profile-14 (OHIP-14), which is the most available tool for assessing OHQoL changes following dental treatment interventions, was used in this study.<sup>1,2,22</sup> The original OHIP-14 was in English which had been translated into Farsi and the validity and

reliability of the Persian version has been confirmed by Navabi et al.<sup>23</sup>

A standardized Persian version of this tool consists of 14 questions and was filled out for all study participants in separate (before and after) sessions in the form of an interview. OHIP-14 measures quality of life in seven domains (2 questions for each domain) of functional limitation, physical discomfort, psychological discomfort, physical disability, psychological disability, social disability and physical disability.

The structure of questionnaire is in a way that each two consecutive questions are related to one of the seven domains, for example, questions 1 and 2 are related to the first domain and questions 5 and 6 are related to the third domain.

Each question on OHIP-14 is designed in such a way that respondents should answer a particular problem in relation to the recent experience with the teeth or mouth. For example, question 1 runs as follows: Have you had any trouble pronouncing any words because of problems with your teeth or mouth? Replies were recorded in Likert scale with zero for (never), one for (rarely), two for (sometimes), three for (often), and four for (almost always). The final total score of OHIP-14 ranged from zero to 56. A lower total score and closer to zero indicated a higher level of quality of life and a better OHQoL.<sup>16,17</sup> The aim of the study was explained to the patients and patients participated in the study voluntarily.

Oral consent was obtained from all patients. Purpose of the study was explained for the patients and they were given a choice to exit from the study whenever they want. Patients' data were kept confidential. Demographic data of the patients as well as information obtained from OHIP-14 at the two time points were analyzed with SPSS (version 22.0, SPSS Inc., Chicago, IL, USA) using descriptive statistics. Shapiro-Wilk test was used to check the normality of data and Wilcoxon test was used to compare the average scores of the questionnaire before and after treatment.

## Results

A total of 19 patients participated in the study. Table 1 shows the demographic data of the patients. The age of the patients ranged from 14 to 61 years with a mean of  $27.7 \pm 12.8$  years. The maximum score recorded by OHIP-14 was 34 before treatment and 31 after treatment. The average score decreased from  $13.1 \pm 9.44$  (before treatment) to  $12 \pm 10.6$  (after treatment).

**Table 1.** Demographic characteristics of the patients

Independent variable	Variable levels	Frequency [n(%)]
Sex	Male	4 (21.1)
	Female	15 (78.9)
Age (Years)	Under 20	6 (31.6)
	20 to 40	11 (57.9)
	Above 40	2 (10.5)
Education	Student	6 (31.6)
	Diploma	4 (21.0)
	Above	9 (47.4)

In figures 1 and 2, patients' clinical status before and after the laminate veneer restorations are visible.



**Figure 1.** Patient's clinical status before and after laminate veneer restorative

OHIP-14 scores were not significantly associated with sex and education ( $P = 0.64$  and  $P = 0.16$ , respectively) but were significantly associated with age ( $P = 0.02$ ). Laminate treatment had greatest impact on patients' quality of life at the age range of 20 to 40 years.



**Figure 2.** Patient's clinical status before and after laminate veneer restorative

Shapiro-Wilk test showed that the distribution of mean scores before and after treatment were not normal. Therefore, Wilcoxon analysis showed that despite lower average score of OHIP-14 after the laminate veneer treatment, the average reduction was not significant ( $P = 0.40$ ). Table 2 shows the distribution of participants' responses to questions of OHIP-14 before and after treatment. As can be seen, comparison of the frequencies of these responses suggested that after treatment, changes in OHQoL for question number 4 (uncomfortable to eat food) and question number 9 (difficult to relax) were significant ( $P = 0.03$ ,  $P = 0.02$ , respectively) and for question number 10 (feeling embarrassed) was marginally significant ( $P = 0.07$ ).

### Discussion

This study confirmed the improvement of OHQoL-14 in the psychological disability domain. After cosmetic dental treatment,

significant and nearly significant results were achieved regarding question number 9 and 10, respectively, which were related to psychological disability domain. This finding has considerable importance and shows the impact of cosmetic dental treatments to improve quality of life in the psychological aspects that certainly will affect the patient's general mental health. In other words, the majority of patients in this study had confirmed that the laminate treatment increased their comfort and confidence which showed the depth of this cosmetic treatment impact on patient's quality of life.

The role of dental treatments on health-related and functional aspects of quality of life is more than the cosmetic aspect of dental treatments; for example van Eekeren et al. reported the effect of implant therapy on OHQoL of the patients with different occlusion classes.<sup>24</sup> da Silva et al. reviewed the impact of metal-ceramic restorations on 50-year-old women's OHQoL and concluded that OHIP-14 score decreased from 28 (before treatment) to zero (after treatment).<sup>25</sup> While the study was conducted on one patient, evaluation of 19 patients in our study provided the possibility of a closer examination of the quality of life after dental treatments.

In this study, OHQoL level after laminate veneer treatment improved but this change was not statistically significant. In our study, OHQoL changes were assessed in a group of patients and each patient was compared with himself/herself. Meireles et al. evaluated the OHQoL changes subsequent to bleaching treatment in a randomized, double-blind study and showed that tooth whitening had a positive impact on the quality of life of some patients but negative effect on some others.<sup>26</sup> Our results were similar to Meireles et al. study in terms of overcoming embarrassment of showing teeth, but their study showed some hygiene problems and sensitivity in some patients following treatment, which were not reported in the present study. The differences are justified in two ways:

**Table 2.** The comparison of OHIP-14 scores in 19 patients before and after laminate veneer treatment

Questions	Before treatment					After treatment					P
	Never	Rarely	Sometimes	Frequently	Almost always	Never	Rarely	Sometimes	Frequently	Almost always	
Have you had trouble pronouncing any words because of problems with your teeth, mouth or dentures?	18	1	0	0	0	15	3	1	0	0	0.15
Have you felt that your sense of taste has worsened because of problems with your teeth, mouth or dentures?	17	1	1	0	0	17	0	0	1	1	0.56
Have you had painful aching in your mouth?	10	3	4	1	1	9	6	3	0	2	0.60
Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?	12	2	2	1	2	6	4	7	0	4	0.03*
Have you been self-conscious because of your teeth, mouth or dentures?	7	5	4	2	1	8	3	2	2	1	0.45
Have you felt tense because of problems with your teeth, mouth or dentures?	8	4	4	3	0	5	6	4	3	1	0.32
Has your diet been unsatisfactory because of problems with your teeth, mouth or dentures?	14	1	2	2	0	12	3	0	2	1	0.83
Have you had to interrupt meals because of problems with your teeth, mouth or dentures?	13	3	1	2	0	12	3	0	2	1	0.13
Have you found it difficult to relax because of problems with your teeth, mouth or dentures?	9	4	4	1	1	3	6	3	3	5	0.02*
Have you been a bit embarrassed because of problems with your teeth, mouth or dentures	6	5	3	2	3	3	1	6	5	4	0.07
Have you been a bit irritable with other people because of problems with your teeth, mouth or dentures?	3	4	3	6	3	3	3	4	7	0	>0.99
Have you had difficulty doing your usual jobs because of problems with your teeth, mouth or dentures?	12	3	2	0	2	11	4	3	1	0	0.55
Have you felt that life in general was less satisfying because of problems with your teeth, mouth or dentures?	12	4	0	2	1	12	5	1	1	0	0.35
Have you been totally unable to function because of problems with your teeth, mouth or dentures?	14	3	1	1	0	19	2	1	0	0	0.39

\*Significant

1. Meireles et al. tool for measuring OHQoL was OIDP (Oral Impacts on Daily Performances), which was somewhat different to the tool used in this study (OHIP-14) in terms of domains of quality of life. For example, aspects of the problem in the dental hygiene are not included in OHIP-14.

2. Bleaching treatment has potential side effects such as tooth sensitivity; such complications of treatment did not exist in this study (laminate veneer).

In the present study, some aspects of OHQoL, such as feeling relaxed improved significantly following the intervention of cosmetic dentistry, which was consistent with the study by da Silva.<sup>25</sup> Likewise, in Meireles et al. study, the cosmetic treatments caused significant changes in the patient's discomfort in relation to their appearance.<sup>26</sup> The impact of cosmetic dental treatments on OHQoL was expected to affect the response to question 5 (self-consciousness), 6 (feeling tense), 9 (difficult to relax) and 10 (feeling embarrassed). The results of this study showed significant changes in two of these 4 questions. For a closer look at the impact of dental cosmetic treatments on OHQoL, clinical trials in two groups (or more) are recommended in future studies so that the effects of different cosmetic treatments can be compared and more effective treatment in relation to OHQoL can be identified.

Nowadays, due to increased awareness of people about beauty and importance of beauty in the community, many patients are seeking cosmetic restorations, natural tooth color and correction of dental problems with cosmetic treatments to change their appearance in an

attempt to achieve improvements in their quality of life. Actually, regarding to the decreased prevalence of dental caries in modern societies, the mandatory demand in referring to dental clinics has been gradually shifted from functional needs toward esthetic dentistry.<sup>4</sup> Accordingly, it has been frequently documented that the esthetic dentistry could improve the individual's self-confidence.<sup>26</sup> Based on this, resin composite laminate veneers are increasingly popular due to their numerous advantages compared to other esthetic treatments such as orthodontic therapy and even ceramic veneers. In view of that, resin composite veneers could be accomplished in a single visit treatment while is it categorized as a quite non-invasive protocol, since there is no need for tooth preparation as it is discussed in in-direct ceramic veneers.<sup>19</sup> Therefore, resin composite veneers are becoming widespread among dentists.

### Conclusion

The present study showed that proper cosmetic treatments such as laminate veneer may impact on the OHRQoL of younger adults, may improve their satisfaction with dental appearance and decrease embarrassment.

### Conflict of Interests

Authors have no conflict of interest.

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## Assessment of oral health-related quality of life: Comparison of two measurement tools

Nouzar Nakhaee MD<sup>1</sup>, Nader Navabi DDS, MD<sup>2</sup>, Azadeh Rohani DDS<sup>3</sup>

### Original Article

#### Abstract

**BACKGROUND AND AIM:** Development of patient-based outcome measures has enhanced our ability to assess the oral health-related quality of life (OHRQoL). Present study aimed to compare the performance of the Geriatric Oral Health Assessment Index (GOHAI) and the Oral Health Impact Profile-14 (OHIP-14) as two methods of assessment of oral health-related quality of life.

**METHODS:** In this cross-sectional survey, a sample of 400 healthy participants which were 18-65 years old was recruited in Kerman School of Dentistry, Iran. Main measurement tools were the validated Persian version of GOHAI and OHIP-14 questionnaires. Data were collected by means of personal interview. Internal consistency and discriminant validity were carried out to compare the two measures.

**RESULTS:** The internal consistencies of both tools were acceptable and Pearson's correlation coefficient between the scores was 0.739. Both measures discriminated between dentate subjects over and under 25 natural teeth and wearing removable dentures or not, both also showed significant associations with dental attendance, self-rated oral health and satisfaction with oral health status.

**CONCLUSION:** Both GOHAI and OHIP-14 are appropriate instruments with equal power for survey of OHRQoL on under-elderly population.

**KEYWORDS:** Oral Health, Quality of Life; Oral Health-Related Quality of Life (OHRQoL); Oral Health Impact Profile-14 (OHIP-14); Geriatric Oral Health Assessment Index (GOHAI)

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The new definition of oral health refers to the individual's experience and perception of thorough physical, psychological and social health. Based on this patient-based model, the patient's appraisal of health has, to a great extent, replaced clinical aspects of patient assessment<sup>1,2</sup> and its relevant assessments have become qualitative and subjective.<sup>3</sup> Oro-dental conditions are very common and they not only have physical complications but also have economic, social and psychological complications, too. These conditions seriously affect the quality of life in a large number of

patients and influence many aspects of their lives.<sup>4,5</sup> An individual's personal appraisal of the extent of the effects of functional, psychological and social factors and experience of pain and discomfort in relation to his/her oral problems is defined as Oral Health-Related Quality of Life (OHRQoL).<sup>6</sup>

Based on OHRQoL concept, an acceptable level of oral health is no longer defined as the absence of disease in the oral cavity or disturbance in its functions; rather, it refers to the absence of negative effects of oral conditions on the social life and the positive feeling the oral status exerts on self-confidence

1- Professor, Neuroscience Research Center, Kerman University of Medical Sciences, Kerman, Iran

2- Associate Professor, School of Dentistry AND Social Determinants on Oral Health Research Center, Kerman University of Medical Sciences, Kerman, Iran

3- Dentist, Kerman, Iran

Correspondence to: Nader Navabi DDS, MD

Email: n\_navabi@kmu.ac.ir

in relation to the dento-facial system.<sup>7</sup> The most valid tools to measure OHRQoL are self-reported and multiple choice questionnaires, of which two questionnaires, Oral Health Impact Profile-14 (OHIP-14) and Geriatric Oral Health Assessment Index (GOHAI) are more famous all over the world than others. These two questionnaires are widely used in research; however, some believe that OHIP-14 tool is not sufficiently sensitive to minor changes in individuals' quality of life of.<sup>8</sup>

On the other hand, relative differences between the items of these two questionnaires have prompted the researchers to believe that GOHAI is more appropriate for the evaluation of physical symptoms and signs such as pain and dysfunction and that OHIP-14 is more suitable for the evaluation of psychological effects of changes in oral health.<sup>9,10</sup> Some other researchers believe that the validity of using them in populations with low-to-moderate treatment needs requires further studies.<sup>11</sup> Although OHIP-14 can be used for adults of all ages, some researchers believe that GOHAI has been useful for the evaluation of the outcome of oral diseases at younger age groups, too; therefore, in recent years "G" in the abbreviation stands for "General", rather than for "Geriatric". The problem of selecting a superior tool from these two questionnaires for use in studies and clinical evaluations has not been solved to date.<sup>9-11</sup>

An important consideration is the fact that to date no study has been undertaken to compare these two questionnaires in terms of OHRQoL for non-geriatric subjects. In addition, the validated Persian versions of these tools, OHIP-14 and GOHAI questionnaires, are available,<sup>12-14</sup> the present study aimed to compare the performance of these two measurement tools for OHRQoL.

## Methods

The present cross-sectional study was carried out through interviewing individuals, using convenience sampling technique. Half of the subjects consisted of patients referring for oral

and dental screening to Department of Diagnosis and Oral Medicine, Kerman School of Dentistry, Iran, and the other half consisted of the individuals accompanying these patients, with an age range of 18–65 years. Before initiating the study, an oral medical history was taken from each participant for a history of affliction with systemic or psychological conditions. In case of a positive history of such conditions, the patient was excluded from the study.

OHIP-14 and GOHAI questionnaires were completed for all the subjects and the following variables were registered for study population: gender, marital status, level of education, the rate of visiting a dentist or dentists during the previous year (defined as no visits, one visit, and more than one visit), subject's satisfaction with his/her oral health (very satisfied, satisfied, dissatisfied, and very dissatisfied), oral examination based on the number of natural teeth in the oral cavity (except for third molars) and use of removable partial or complete dentures, in order to compare the two tools.<sup>9,15,16</sup>

Data were collected and the questionnaires were completed during sessions when the patients and the individuals accompanying them referred to the School of Dentistry for treatment. Considering to filling out the questionnaires equally, for all illiterate and literate subjects questionnaires were filled out by the researcher. All the subjects submitted informed consent forms to be included in the study and their personal data were kept confidential. This study was approved by the ethics committee of Kerman University of Medical Sciences under the protocol number of K/92/456.

OHIP-14 questionnaire consists of 14 questions, all of which ask the interviewee to reply the questions in relation to the problems with his/her teeth, the oral cavity or dentures based on his/her experience during the previous 12 months. The responses are registered based on Likert scale, with the code 4 for a problem that always exists, code 3 for

“in most case”, code 2 for “sometimes”, code 1 for “seldom” and the code zero for “never”. As a result, the overall score range would be 0-56 and the OHRQoL would decrease with a higher overall score.<sup>12</sup>

GOHAI questionnaire consists of 12 questions and the answers to the questions should be based on problems experienced during the preceding 3-month period. The pattern of the questions is like this: “When have you experienced ... in relation to your month or teeth”? The responses to 12 questions are registered based on Likert scale in 5 choices as follows: “never”, “seldom”, “sometimes”, “in most cases” and “always”. The overall score for each subject is calculated via adding up the scores of all the 12 replies, which will have a range of 12-60, score 5 for “never” and score 1 for “always”. A low overall score would indicate a low OHRQoL and a high overall score would indicate a high OHRQoL, i.e. fewer problems in relation to the effect of oro-dental problem on the individuals’ quality of life.<sup>13</sup>

The standardized Persian versions of the questionnaires were used.<sup>12-14</sup>

The sample size was determined to be 300 subjects based on similar studies,<sup>15,16</sup> which increased to 400 subjects to increase the accuracy of the results. Data were analyzed via SPSS software (version 17.0, SPSS Inc., Chicago, IL, USA), using commonly used distribution parameters to estimate the frequency distribution of demographic variables. To evaluate concurrent validity, the statistical index of internal consistency was used at an acceptable level of the more than 0.7. To this end, Cronbach’s alpha coefficient was calculated for the total questions of the two GOHAI and OHIP-14 questionnaires. Spearman’s correlation coefficient was calculated two-by-two for these tools. Independent t-test was used to evaluate discriminant validity at a significance level of 0.01. In the evaluation of discriminant validity, the mean scores of the two questionnaires were compared with the subjects’ responses to

clinical questions.

## Results

A total of 400 subjects were included in this study, with a mean age of  $32.73 \pm 9.98$  years and an age range of 18-65 years (Table 1).

**Table 1.** Demographic characteristics and clinical oral conditions of 400 subjects referring to Kerman School of Dentistry for oral and dental screening

Variables		Frequency (%)
Sex	Male	138 (34.5)
	Female	262 (65.5)
Marital Status	Married	252 (63.0)
	Single	141 (35.3)
	Others	7 (1.7)
Level of Education	Illiterate	23 (5.8)
	Diploma	60 (15.0)
	Academic	317 (79.2)
	None	121 (30.2)
Dental visit in last year	Once	134 (33.5)
	More than once	145 (36.3)
Self-oral health assessment	Excellent	18 (4.5)
	Good	147 (36.8)
	Moderate	183 (45.7)
	Poor	52 (13.0)
Satisfaction from oral health	Very satisfied	21 (5.3)
	Satisfied	236 (59.0)
	Unsatisfied	126 (31.5)
	Very unsatisfied	17 (4.2)
Number of natural teeth	< 25	56 (13.9)
	≥ 25	344 (86.1)
To have removable denture	Yes	20 (5.0)
	No	380 (95.0)

Cronbach’s alpha was 0.797 for GOHAI and 0.842 for OHIP-14. The mean total scores ( $\pm$  standard deviations) of respondents were calculated for both tools as  $14.96 \pm 7.04$  for GOHAI and  $11.85 \pm 7.67$  for OHIP-14. Two-by-two Pearson’s correlation coefficients

**Table 2.** Relative frequency (frequency) of answers to GOHAI items among 400 subjects referring to Kerman School of Dentistry for oral and dental screening

Questions	Seldom	Sometimes	Fairly often	Very often	All the time
Limit the kinds or amount of food	30.50 (122)	35.00 (140)	21.00 (84)	11.00 (44)	2.50 (10)
Have trouble chewing food	22.25 (89)	34.75 (139)	25.75 (103)	13.50 (54)	3.75 (15)
Able to swallow comfortably	58.50 (234)	24.50 (98)	12.00 (48)	4.00 (16)	1.00 (4)
Prevention of speaking the way you wanted	66.50 (266)	23.00 (92)	6.50 (26)	2.75 (11)	1.25 (5)
Able to eat without discomfort?	32.75 (131)	37.50 (150)	19.00 (76)	9.50 (38)	1.25 (5)
Limit contacts with people	70.50 (282)	19.00 (76)	7.50 (30)	2.50 (10)	0.50 (2)
Pleased with the looks of teeth	15.00 (60)	15.25 (61)	20.25 (81)	36.75 (147)	12.75 (51)
Use medication to relieve pain or discomfort	34.00 (136)	31.75 (127)	20.25 (81)	9.75 (39)	4.25 (17)
Worried about the problems with teeth	11.75 (47)	25.75 (103)	25.50 (102)	23.00 (92)	14.00 (56)
Feel nervous because of problems with teeth	17.75 (71)	29.25 (117)	25.5 (102)	20.75 (83)	6.75 (27)
Feel uncomfortable eating in front of people	53.75 (215)	27.5 (110)	11.00 (44)	6.25 (25)	1.50 (6)
Teeth gums sensitive to hot, cold or sweets?	9.00 (36)	30.00 (120)	33.25 (133)	20.00 (80)	7.75 (31)

GOHAI: Geriatric Oral Health Assessment Index

were calculated yielding the result of 0.739. Tables 2 and 3 present frequencies of responses of the subjects to the questions of both questionnaires.

Independent samples t-test showed a significant relationship between the mean scores of the two questionnaires and all the clinical questions evaluated ( $P < 0.001$ ).

**Table 3.** Relative frequency (frequency) of answers to OHIP-14 items among 400 subjects referring to Kerman School of Dentistry for oral and dental screening

Questions	Never	Seldom	Sometimes	Often	Very often
Had trouble pronouncing any words	78.00 (312)	15.75 (63)	4.50 (18)	1.50 (6)	0.25 (1)
Felt that your sense of taste has worsened	71.00 (284)	20.25 (81)	6.00 (24)	2.50 (10)	0.25 (1)
Had painful aching in mouth	27.50 (110)	35.00 (140)	27.00 (108)	9.75 (39)	0.75 (3)
Uncomfortable to eat any foods	38.50 (154)	32.25 (129)	20.75 (81)	7.75 (31)	0.75 (3)
Been self-conscious	9.25 (37)	20.75 (83)	17.25 (69)	32.75 (131)	20.00 (80)
Felt tense	35.75 (143)	30.25 (121)	18.00 (72)	10.75 (43)	5.25 (21)
Diet been unsatisfactory	61.00 (244)	23.00 (92)	8.75 (32)	4.50 (18)	2.75 (11)
Had to interrupt meals	60.75 (243)	23.25 (93)	10.75 (43)	4.75 (19)	0.50 (2)
Found it difficult to relax	50.25 (201)	29.00 (116)	13.00 (52)	5.75 (23)	2.00 (8)
A bit embarrassed	60.00 (240)	25.00 (100)	7.00 (28)	5.75 (23)	2.25 (9)
A bit irritable with other people	28.25 (113)	33.00 (132)	19.00 (76)	15.50 (62)	4.25 (17)
Had difficulty doing your usual jobs	61.00 (244)	27.00 (108)	8.75 (35)	2.75 (11)	0.50 (2)
Felt that life in general was less satisfying	63.25 (253)	23.75 (95)	7.50 (30)	3.75 (15)	1.75 (7)
Been totally unable to function	83.00 (332)	12.50 (50)	3.50 (14)	1.00 (4)	0.00 (0)

OHIP-14: Oral Health Impact Profile-14

In other words, both GOHAI and OHIP-14 questionnaires were consistent in relation to the following variables: the rate of visits to a dental office during the past one-year period, personal appraisal of the oral health status, satisfaction with oral health (based on the number of remaining natural teeth), and use of partial or complete dentures. In addition, based on evaluations made with the use of the two GOHAI and OHIP-14 tools, subjects with higher OHRQoL had paid more visits to a dentist during the post one-year period and had a better appraisal of their oral health status. Therefore, they were more satisfied with their oral health status, had a lower rate of use of partial or complete dentures and had more natural teeth remaining in their oral cavity.

### Discussion

Evaluation of OHRQoL is one of the necessities in epidemiologic and clinical studies of communities in order to provide correct information about the promotion of health and programming for prevention of diseases.<sup>12</sup> In the present study, the capabilities of two OHIP-14 and GOHAI tools were evaluated to determine OHRQoL. The results showed that these two tools are almost equally efficacious. The major difference between the present study and previous studies on the subject was the age factor of the subjects; in this context, contrary to previous studies, attention was not focused on the elderly population and an age range of 18-65 years was selected, concluding that GOHAI was equally effective like OHIP-14 for non-geriatric subjects. However, Hassel et al. believe that GOHAI is more suitable for the elderly.<sup>17</sup> It can be concluded from the results of the present study and the study by Hassel et al. that in non-geriatric adult subjects both OHIP-14 and GOHAI tools are effective.

In the present study, subjects selected for evaluation of OHRQoL enjoyed an acceptable level of general health, which is similar to the conditions of the study carried out by Hassel et

al.,<sup>17</sup> however, it is different from the conditions of a study by Locker et al.<sup>18</sup> because the majority of their subjects suffered from chronic and debilitating conditions. Comparisons between OHRQoL studies will be more valid if subjects in different studies be in the same general physical condition because some conditions such as diabetes mellitus affect the orodental status, making it difficult to make comparisons with healthy subjects.

The present study was carried out on subjects with an age range of 18-65 years; therefore, it was easy to select systemically healthy subjects. However, in studies on elderly subjects, it will be rather difficult to select and include subjects without any chronic systemic conditions. The mean scores on the two OHIP-14 and GOHAI questionnaires were 11.85 and 14.99, respectively, indicating a lower level of OHRQoL compared to that of participants in the study by Hassel et al. in Germany;<sup>17</sup> such a difference might be attributed to different reasons, including economic, social and cultural factors. However, the mean scores of GOHAI and OHIP-14 questionnaires in the study carried out by Ikebe et al. were 11.7 and 10, respectively,<sup>19</sup> indicating lower levels of OHRQoL in Japan compared to the present study; such a difference might be attributed to differences in the ages of the subjects between the two studies. In the study by Ikebe et al., subjects over 65 years of age were evaluated.

Evaluation of internal reliability of the two tools used in the present study showed Cronbach's alpha coefficients of 0.842 and 0.797 for OHIP-14 and GOHAI, respectively, both were acceptable. In similar studies by Locker et al.,<sup>18</sup> Hassel and Ikebe et al.,<sup>19</sup> the ranges of Cronbach's alpha for OHIP-14 and GOHAI were 0.87-0.95 and 0.75-0.87, respectively. As it is evident, Cronbach's alpha in the present study for GOHAI was acceptable compared to other studies in other parts of the world and for OHIP-14 it was 30% lower than other studies.

In the present study, the correlation

coefficient between GOHAI and OHIP-14 tools was calculated at 0.79, which is acceptable and similar to that of the study by Ikebe et al, (0.728).<sup>18</sup> In the present study, the rate of zero response for the OHIP-14 was in the range of 9-83% for its questions. One of the drawbacks of OHIP-14 questionnaire, reported by previous researchers, is the presence of zero responses, which makes it difficult for this tool to determine changes in the quality of life.<sup>18</sup> In other words, the rate of responses of zero in the OHIP-14 tool does not completely coincide with the similar rate (ie. 60) for GOHAI.<sup>17</sup> The difficulty of interpretation of responses to the OHIP-14 tool due to the presence of zero choice was considered as a high floor effect by Ikebe et al.<sup>19</sup> and was confirmed by El Osta et al.<sup>20</sup>

All the clinical parameters of oral function in the present study in the evaluation of the reliability of the tool exhibited a significant relationship with questionnaire scores. The rate of satisfaction with oral health was used as a parameter to evaluate reliability by Hassel et al.<sup>17</sup> and Locker et al.<sup>18</sup> Personal appraisal of oral health was evaluated by Ikebe et al.;<sup>19</sup> however, Locker et al. evaluated personal appraisal of general health with the use of a checklist consisting of 17 items.<sup>18</sup> Similar to the present study, Ikebe et al, used the number of natural teeth as a criterion for the evaluation of reliability.<sup>19</sup> Locker et al.<sup>18</sup> and Hassel et al.,<sup>17</sup> similar to the present study, took into the account the use of dentures, too. It is obvious that the variable of the number of visits to a dental office was used in the present study for the first time as a clinical criterion for the comparison of questionnaire scores. Some previous studies have used more complex parameters to this end. For example, Locker et al.<sup>18</sup> used a 7-item questionnaire to evaluate xerostomia and de Souza et al.<sup>21</sup> used temporomandibular joint (TMJ) pains as criteria. In this context, the most comprehensive and complex evaluations were carried out in a study by Ikebe et al., in

which a laboratory technique was used to evaluate the masticatory efficacy, the salivary flow rate and occlusal forces.<sup>19</sup> One of the advantages of the present study compared to similar previous studies was the sample size. In the present study, the largest sample size (400 subjects) was evaluated, with Ikebe et al.<sup>19</sup> study ranking the second in relation to sample size (290).

However, analysis of the results of the present study showed that 79.2% of the subjects had university and college education, which shows a probable education bias in the selection of subjects and can be considered one of the disadvantages of the present study.

### Conclusion

The final finding of the present study indicates the equal efficacy of the two OHIP-14 and GOHAI tools to evaluate OHRQoL; in addition, these two tools were equally useful in systemically healthy non-geriatric subjects. Both these tools exhibited almost equal and acceptable level of efficacy in evaluating physical and psychological aspects of OHRQoL. Therefore, it is suggested that researchers use GOHAI with elderly subjects and if the subjects are under 65 years of age it is possible to use both tools. Of course, studies with structures similar to that of the present study with the use of these questionnaires in other languages might substantiate these recommendations by providing further evidence because it is always difficult to interpret the results of studies on OHRQoL.<sup>22</sup>

### Conflict of Interests

Authors have no conflict of interest.

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## Efficacy of closed reduction surgery on treatment of nasal bone fracture in admitted patients to Shahid Bahonar Hospital, Kerman, Iran

*Javad Faryabi DDS<sup>1</sup>, Ahmad Enhesari MD<sup>2</sup>, Pouyan Sigari DDS<sup>3</sup>, Shiva Pouradeli MSc<sup>4</sup>*

### Original Article

#### Abstract

**BACKGROUND AND AIM:** Nasal fracture is one of the most common facial fractures and the main goal of this study was evaluation of closed reduction surgery of nasal bone fractures.

**METHODS:** Thirty six patients including 24 male and 12 female patients suffered from nasal bone fractures were treated by closed reduction method. Preoperative and postoperative computed tomographic scans were analyzed by an expert panel. Statistical methods including chi-square, Fisher's exact test and regression were used to evaluate the relationship between age, sex and type of trauma and to evaluate the efficacy of closed reduction technique.

**RESULTS:** Type of trauma, age and sex had not any effect on closed reduction efficacy. We had 36.1% complete success rate (nearly complete anatomic reduction), 36.1% favorable success rate (acceptable non-anatomic reduction) and 27.8% absolute failure (no acceptable reduction) after treatment of nasal bone fractures by closed reduction method.

**CONCLUSION:** Closed nasal reduction is the most commonly used technique for a fractured nose, but it has high degree of failure of treatment, so when choosing the closed reduction method for treatment of nasal bone fractures, appropriate radiography must be taken for meticulous evaluation to reducing the complications.

**KEYWORDS:** Nasal Fracture; Trauma; Treatment; Bone

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Nasal fracture, commonly known as broken nose, is one of the most common facial injuries, since the central position and anterior protrusion of nose from the face makes it a likely target for traumatic injuries.<sup>1-4</sup> Blunt traumas such as car accidents, sport injuries and fights are the most prevalent causes of nasal fracture.<sup>3,5,6</sup>

Nasal fractures often include multiple traumas and several models, based on fracture site and force intensity and direction, have been proposed for classification purposes.<sup>1,6,7</sup> Nasal bone reduction methods include open

reduction and close reduction.<sup>4</sup> Close reduction treatment is mostly used in the early stages of trauma due to its simplicity and minimal side effects. However, there is a 14% to 50% chance of deformity which may require future septoplasty and rhinoplasty.<sup>5,8,9</sup>

In addition, some studies have introduced drawbacks of closed reduction. DeFatta et al. concluded that in the closed reduction group of their study, 60% of patients had significant postoperative septal deviation whereas only 12.5% suffered from residual septal deformity in the open reduction group.<sup>10</sup> Besides, in the study of Adami Dehkordi et al., they showed that the

1- Associate Professor, Department of Oral and Maxillofacial Surgery, School of Dentistry AND Oral and Dental Diseases Research Center, Kerman University of Medical Sciences, Kerman, Iran

2- Assistant Professor, Department of Radiology, Shahid Bahonar Hospital, Kerman, Iran

3- Assistant Professor, Department of Oral and Maxillofacial Surgery, School of Dentistry, Ardabil University of Medical Sciences, Ardabil, Iran

4- Epidemiologist, Oral and Dental Disease Research Center AND Kerman Social Determinants on Oral Health Research Center, Kerman University of Medical Sciences, Kerman, Iran

Correspondence to: Javad Faryabi DDS

Email: jfomfs@gmail.com



most symptoms associated with dissatisfaction of patients after closed reduction of nasal bone fractures were nasal hump, septal deviation and dysmorphology of nasal septum.<sup>11</sup>

Due to the disadvantages of closed reduction of nasal bone fractures, Stafel stated that treatment of acutely fractured nose with an individually tailored protocol of closed reduction, septoplasty, osteotomies, release of the upper lateral cartilages, fracture of the anterior extension of the perpendicular plate of the ethmoid, and camouflaging cartilage grafts yields straighter noses compared to closed reduction alone.<sup>5</sup>

It is necessary to explain that usefulness of conventional (plain) radiographies for clinical decision making is highly controversial and computed tomography (CT) has been shown to be a more accurate diagnostic tool compared to conventional radiography for evaluating nasal bone fractures.<sup>12-15</sup>

So due to greater sensitivity and specificity of CT scan in comparison with conventional radiography and the presence of the above mentioned controversies, we decided to perform this research and investigate the position of the fractured segments with attention to more details by taking pre- and post-operative CT scans and then comparing them together to measure the efficacy of closed reduction for treatment of nasal bone fractures. For meticulous evaluation of closed reduction method, we considered the nearly complete anatomic reduction as complete success of treatment, acceptable non-anatomic reduction as favorable success and no acceptable reduction as absolute failure.

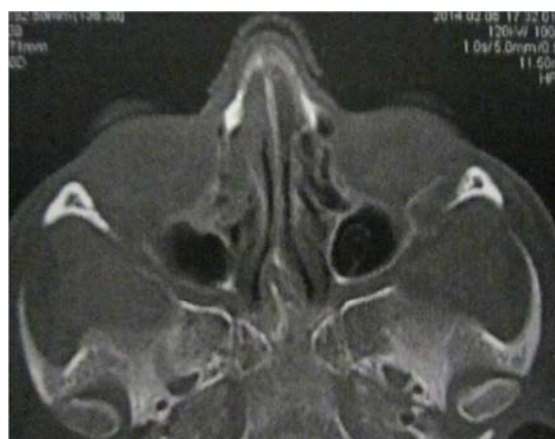
### Methods

Patients admitted to Oral and Maxillofacial Ward of Shahid Bahonar Hospital, Kerman, Iran, from 23/8/2014 to 21/3/2015 were enrolled in this study. The inclusion criteria consisted of all patients with isolated nasal bone fractures and the exclusion criteria consisted of patients who had old nasal fractures, open nasal fractures and comminuted nasal fractures. Based

on the inclusion and exclusion criteria, 36 qualified patients were chosen.

First, CT scan of the patients with coronal and axial cuts was obtained (Toshiba Co., Aquilion model, Japan); then, under general anesthesia, closed reduction surgery was done by oral and maxillofacial surgery residents. After stabilization of the patient's general condition in the first day of the surgery, a CT scan with the same machine, same radiology technician and similar conditions of radiation exposure was obtained. CT scans were taken after careful explanation to the patients and an informed written consent form was obtained from each patient.

The study was approved by Vice Deputy of Research at Kerman University of Medical Sciences. For the purpose of this research, all personal information was excluded from both pre-operation and post-operation CT scans and coded stereotypes were presented to expert panel. The expert panel comprised of two oral and maxillofacial surgeons and two radiology specialists who had no information about the patients. Coded stereotypes were analyzed and interpreted by the expert panel and the quality of reduction was reported in terms of complete success rate (nearly complete anatomic reduction), favorable success rate (acceptable non-anatomic reduction) and absolute failure (no acceptable reduction). In cases of complete success, all broken bones were relocated in their anatomic position (Figure 1).



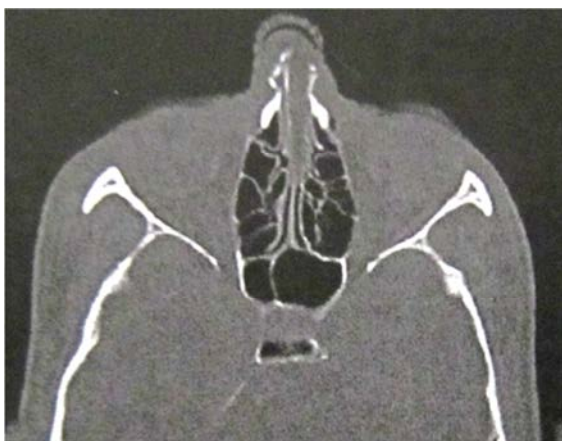
**Figure 1.** Complete success of closed reduction of a patient with nasal bone fracture

In cases of favorable success, although the original position of bones was missed, most of the broken bones were placed in their pre-traumatic positions (Figure 2).



**Figure 2.** Favorable success of closed reduction of a patient with nasal bone fracture

In cases of absolute failure, the broken bones were completely distant from their original place and close reduction had no significant effect on the complete relocation of bones (Figure 3).



**Figure 3.** Absolute failure of closed reduction of a patient with nasal bone fracture

Results were analyzed via SPSS software (version 19.0, SPSS Inc., Chicago, IL, USA) using chi-square and logistic regression tests.

### Results

This study investigated the data of 36 patients who were admitted in the oral and

Maxillofacial Surgery Ward of Shahid Bahonar Hospital. The patient's age range was between 13-56 years with the average of  $29.86 \pm 10.5$  years. The highest percentage of patients (55.6%) belonged to the age group of 20-30 and the age groups of 10-20 and 50-60 had the lowest number of nasal fracture. Among the 36 patients of the study, 12 were female (33.3%) and 24 were male (66.7%), which shows that the number of male patients were twice as the number of female patients. Causes of nasal trauma in this study consisted of three categories as fights, accidents and falls. Among these, there were 7 cases of fight (19.4%), 26 cases of car accident (72.2%) and 3 cases of fall (8.3%). Based on the type of nasal fracture, 12 patients (33.3%) had unilateral simple fractures, 22 patients (61.1%) showed signs of bilateral simple fractures and 2 patients (5.6%) had bilateral fractures with septum fracture. Among these, the unilateral simple fracture and bilateral fracture with septum fracture, with respectively 61.1% and 5.6%, showed the lowest and highest frequency. Based on treatment effectiveness, 13 cases had complete reduction (36.1%), 13 cases had favorable reduction (36.1%) and 10 cases had absolute failure (27.8%) (Table 1).

Chi-square test was used to study the relationship between treatment effectiveness and age, gender, cause of trauma and type of nasal fracture; however, no significant relationship was identified. This showed that age, gender, cause of trauma and kind of nasal fracture had no impact on the chosen treatment. In terms of treatment effectiveness, there was no significant and meaningful difference between complete success, favorable success and absolute failure treatments. However, classification of treatments into two categories of acceptable reduction (including full and optimal reductions) and unacceptable reduction (including insufficient reduction) showed a significant and meaningful treatment effectiveness ( $P = 0.008$ ).

**Table 1.** Effectiveness of closed reduction treatment with age, gender, cause of trauma and kind of nasal fracture

Variables	Categories	Number (%)	P
Gender	Female	12 (33.3)	0.934
	Male	24 (66.7)	
Age	10-20	3 (8.3)	> 0.999
	20-30	20 (55.6)	
	30-40	6 (16.7)	
	40-50	4 (11.1)	
	50-60	3 (8.3)	
Cause of Trauma	Assault	7 (19.4)	0.387
	MVA	26 (72.2)	
	Falling down	3 (8.3)	
Type of fracture	Simple unilateral	12 (33.3)	0.278
	Simple bilateral	22 (61.1)	
	Septal	2 (5.6)	
Efficacy of closed reduction treatment	Absolute failure	10 (27.8)	0.779
	Favorable success	13 (36.1)	
	Complete success	13 (36.1)	

MVA: Motor vehicle accident

In addition, multiple logistic regression was used to investigate the impact of this treatment on different individuals and the results showed no significant difference for close reduction method (Table 2).

**Table 2.** The effect of direct variables on efficacy of closed reduction method of nasal bone fractures

Variable	B	SE	P
Sex	0.35	1.01	0.73
Age	0.02	0.04	0.63
Trauma type	-1.30	0.94	0.16
fracture type	-0.73	0.54	0.18

\* Multiple logistic regression

## Discussion

According to the results of this study, if absolute success in reduction of nasal bone fracture was considered as the optimum treatment, then the closed reduction procedures would not be a sufficient and

suitable treatment for most cases of nasal bone fractures. Our finding is compatible with research done by DeFatta et al. that stated in the closed reduction group of their patients, 60% had significant postoperative septal deviation.<sup>10</sup> In addition, Staffel stated that acute fractures yielded straighter noses with an individually tailored protocol of closed reduction, septoplasty, osteotomies, release of the upper lateral cartilages, fracture of the anterior extension of the perpendicular plate of the ethmoid, and camouflaging cartilage grafts compared to treatment by closed reduction alone.<sup>5</sup> Adami Dehkordi and et al. have shown that the most dissatisfaction of their patients belonged to closed reduction group of nasal bone fractures with symptoms like nasal hump, obstruction of nose, deviated nose, and dysmorphism of nasal septum.<sup>11</sup>

In this study, nasal fractures of male patients were twice as female patients which

is in concordance with studies of Murray et al.<sup>3</sup> and Ashoor and Alkhars.<sup>16</sup>

In the present study, the highest rate of nasal fracture was observed among the age group of 20-30 years (55.6%) and the lowest prevalence was observed in age groups of 10-20 years (8.3%) and 50-60 years (8.3%) that is compatible with the study of Cavalcanti and Melo that demonstrated 13-17-year-old teenagers had the highest rate of fractures<sup>17</sup> and with Hwang et al. study that showed the highest incidence of nasal fractures was among the age group of 11-20 years.<sup>12</sup>

In this study, 61.1% of the patients had simple (without comminution) bilateral fractures, while 33.3% had simple one-sided fractures and 5.6% showed signs of bilateral fractures with nasal septum fracture. Since most septum fractures require open reduction or septoplasty treatment, were excluded these patients from our study which yielded to low prevalence of septum fracture.

There was no significant relationship between the effectiveness of close reduction treatment and age, gender, cause of trauma and type of nasal fracture.

In overall view, closed reduction of nasal bone fractures is an easy procedure performed routinely for treatment of this type of nasal fractures, but the failure of this method is

relatively high, and therefore we recommend that every patient suffering from nasal bone fractures must be evaluated individually by thorough clinical and radiographic examination and by taking appropriate CT scan if needed before attempting closed reduction techniques. If the operator has doubt for efficacy of closed reduction method, then it is advised to do open reduction surgery instead to minimize future complications.

### Conclusion

We must cautiously use closed reduction method for treatment of nasal bone fractures in selected patients, not routinely. Clinical and radiographic examination especially CT scan should be performed when deciding between closed versus open reduction for treatment of nasal bone fractures.

### Conflict of Interests

Authors have no conflict of interest.

### Acknowledgments

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## Students' orthodontic treatment needs and oral-health-related quality of life in Qazvin city, Iran

Roya Naseh MD<sup>1</sup>, Parviz Padisar MD<sup>1</sup>, Habibollah Shojaei-Nejad DDS<sup>2</sup>,  
Marzieh Morsaghian<sup>3</sup>

### Original Article

#### Abstract

**BACKGROUND AND AIM:** Clinical indices that determine the need for orthodontic treatment do not provide information about the impact of malocclusion on the quality of life. The present study was carried out to assess the correlation between the aesthetic component of the Index of Orthodontic Treatment Need (IOTN) and the Child Perception Questionnaire (CPQ<sub>11-14</sub>) in determining the need for orthodontic treatment.

**METHODS:** In 2015, 250 students between 11 to 14 years were randomly selected using a two-stage stratified cluster sampling and the total CPQ<sub>11-14</sub> score was calculated. In addition, the self-perceived and normative needs were determined based on aesthetic component.

**RESULTS:** A significant correlation existed only between the self-perceived needs and the score of functional limitations. In other domains, no significant correlation was seen between the self-perceived or normative need and CPQ<sub>11-14</sub> scores. Girls had a higher score for mental well-being and total CPQ<sub>11-14</sub> score than boys.

**CONCLUSION:** The weak correlation between the total CPQ<sub>11-14</sub> score and aesthetic component indicates that these indices have measured different characteristics. It seems that using the criteria of the Oral Health Related Quality of Life (OHRQoL) in assessing the self-perceived need for orthodontic treatment, along with the normative needs, may provide an accurate estimate of the need for orthodontic treatment.

**KEYWORDS:** Index of Orthodontic Treatment Need; Oral Health; Quality of Life

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Malocclusion is a common oral disorder that can have a negative impact on oral health, social life and patients' self-image.<sup>1</sup> Traditional clinical indices barely give an indication of how malocclusion can affect the patient's quality of life because of its resulting limitations on performance and psychosocial well-being. Thus, the necessity of introducing and applying other criteria, along with orthodontic treatment need indices, has become evident.<sup>2,3</sup> Accordingly, there has been an increasing attention directed to applying such criteria in dentistry, known as the Oral

Health Related Quality of Life (OHRQoL) indices.<sup>4</sup> Quality of life is defined as an individual's perception of health resulting from satisfaction or dissatisfaction in important aspects of life.<sup>5-7</sup> Currently, no single OHRQoL criterion is available to be used in particular situations; although it has been recently shown that OHRQoL criteria can be introduced and used in orthodontic treatment.<sup>8-11</sup>

Several studies have evaluated the relationship between malocclusion and the quality of life in relation to oral health, with somewhat contradictory results.<sup>12</sup> Taylor et

1- Associate Professor, Dental Caries Prevention Research Center, Qazvin University of Medical Sciences, Qazvin, Iran

2- Dentist, Private Practice, Qazvin, Iran

3- MSc Student, Department of Orthodontics, School of Dentistry, Qazvin University of Medical Sciences, Qazvin, Iran

Correspondence to: Marzieh Morsaghian

Email: mmmorsaghian@yahoo.com

al. reported no significant relationship between orthodontic treatment and changes in the quality of life.<sup>13</sup> A study by Leao and Sheiham showed that young individuals who had received orthodontic treatment during the previous ten years had a better quality of life compared to those who had not received such a treatment.<sup>14</sup>

The Child Perception Questionnaire (CPQ<sub>11-14</sub>) is an OHRQoL criterion with 37 questions designed to assess the effects of oral health problems on quality of life in children aged 11 to 14 year, which includes oral symptoms, functional limitations, mental well-being and social well-being. The questionnaire's validity has been confirmed for English speaking children in Canada, England and New Zealand and for Arabic speaking children in Saudi Arabia.<sup>15-18</sup>

Racial standards, life style and social, economic and cultural expectations of oral and dental health are effective on quality of life. The quality of life is related with oral and dental health differs in cities and countries with various culture and economy. Though evaluation of these indices should be performed in every society separately.<sup>19</sup>

The present study was carried out in Qazvin city, Iran, with the aim of comparing this quality of life measure and the Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN) to assess the orthodontic treatment needs of 11- to 14-year-old children in Qazvin.

## Methods

This analytical-descriptive study was carried out on 250 students aged between 11 and 14 years with equal gender distribution in two educational districts of Qazvin, Iran.

The patients were included in the study on the basis of their own ability and interest using two-stage cluster random sampling method. Various parameters relating to different social classes were also taken into account. Students with a history of orthodontic treatment were excluded.

The questionnaire was administered among students who had a written consent form signed by their parents or legal guardian. They were divided into small groups and taken to separate rooms to indicate their need for orthodontic treatment on the basis of the AC of IOTN. They were asked to compare ten standard AC pictures with their own teeth and give a score to themselves (self-perceived need).<sup>20</sup> Then, a dental student calibrated by an orthodontist during a preparation session scored the AC of the students, which was considered as the normative need. The CPQ<sub>11-14</sub> containing 16 questions to measure the effect of oral health using a five-point Likert scale was given to the students. The questionnaire used in this study was validated for Iranian population by Khadem et al.<sup>18</sup> Based on this questionnaire, the higher the score the more negative the impacts on the quality of life. The scoring of the questionnaire for each question was between 0 and 4 (never = 0, once or twice = one, occasionally = two, often = three, and every day or almost every day = four) and the total score was between 0 and 64.

The correlation among the variables was assessed using the Spearman's rho correlation coefficient. The Wilcoxon signed-rank test was used to assess the differences between the AC of students and that of the specialist. The difference between the two groups by gender and type of school was assessed using the Mann-Whitney U test, while the Kruskal-Wallis test assessed their difference by age.

## Results

The mean age of the students ( $\pm$  standard deviation) was 12.5 ( $\pm$  1.11) years. Of these students, 168 (67.2%) studied in private schools and 82 (32.8) in public schools.

Evaluating the relationship between the scores of the AC of IOTN (self-perceived and normative needs), on the basis of the scores of the CPQ<sub>11-14</sub> revealed that the least correlation

coefficient existed between the AC determined by the students and the score of mental well-being of the CPQ ( $\rho = -0.039$ ,  $P = 0.54$ ). The highest correlation coefficient was seen between the AC determined by the students and the score of functional limitations ( $\rho = 0.130$ ,  $P < 0.04$ ). The AC determined by the students (the self-perceived need for treatment) had a statistically significant correlation only with the scores of functional limitations and no such correlation was seen in other domains. As for the scores of the AC of IOTN determined by the dental student (normative need) based on CPQ<sub>11-14</sub>, no statistically significant correlation was found between the scores of the four variables, the total score of the CPQ<sub>11-14</sub> and the normative need for treatment. The highest correlation coefficient existed between the normative need and oral symptoms ( $\rho = 0.030$ ,  $P = 0.64$ ); the least correlation coefficient was seen between the normative need and the score of functional limitations of the CPQ ( $\rho = 0.001$ ,  $P = 0.98$ , Table 1).

In addition, the scores of the four variables and the total score of the CPQ<sub>11-14</sub> by the students' gender were assessed and Mann-Whitney U test showed that the score of mental well-being of the CPQ and the total

score of the CPQ<sub>11-14</sub> were higher in girls than in boys (Table 1).

The scores of the self-perceived need and the normative need showed a moderately significant correlation ( $\rho = 0.276$ ,  $P < 0.0001$ ). Comparison of the mean AC scores by the Wilcoxon signed-rank test showed that the specialist had given higher scores to the AC of IOTN and this difference was statistically significant ( $P < 0.0001$ , Figure 1).

None of the variables (age, gender or type of school) had significant effects on the severity of the self-perceived and normative need for orthodontic treatment (Table 2).

**Table 2.** The correlation between the scores of the perceived and need and sex, type of school and age in 11- to 14-year-old children in Qazvin city, Iran, 2015

Variables	Sex*	Type of school*	Age**
Perceived need	$P = 0.21$	$P = 0.16$	$P = 0.28$
Normative need	$P = 0.09$	$P = 0.58$	$P = 0.24$

\* Mann-Whitney U test; \*\* Kruskal-Wallis test

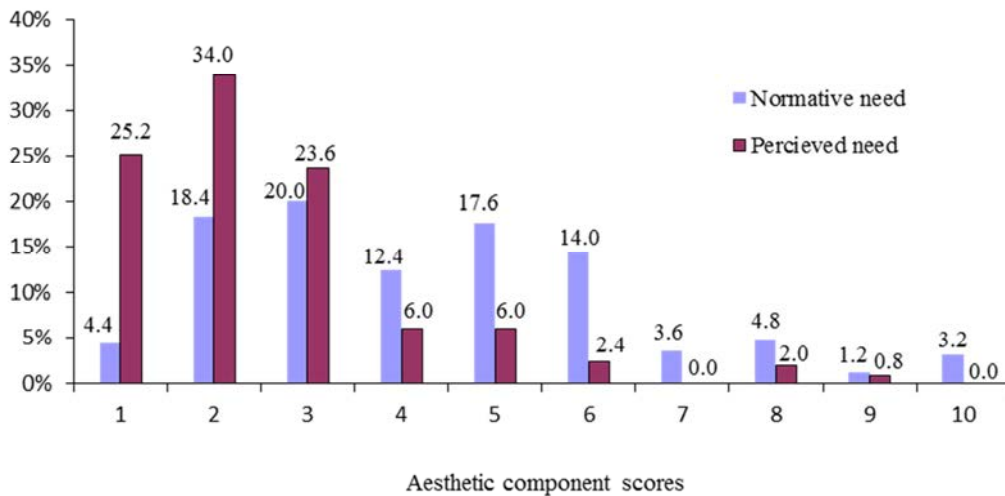
The results of the assessment of the severity of the self-perceived and normative need for orthodontic treatment are presented in figure 2.

**Table 1.** The correlation between the scores of the Child Perception Questionnaire (CPQ<sub>11-14</sub>), the perceived need, the normative need and sex in 11- to 14-year-old children in Qazvin city, Iran, 2015

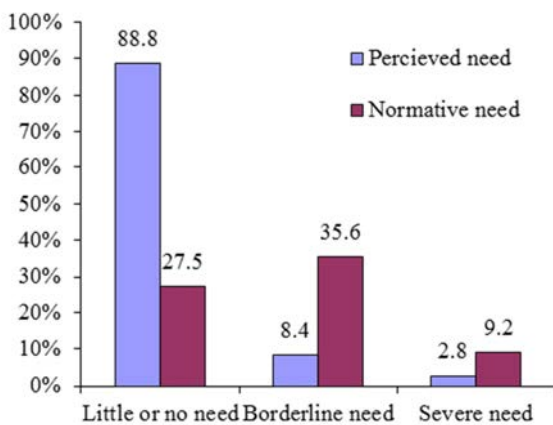
Variables	Perceived need	Normative need	Sex*
Oral symptoms	$\rho = 0.06$ $P = 0.36$	$\rho = 0.03$ $P = 0.64$	$P = 0.42$
Functional limitations	$\rho = 0.13$ $P < 0.04$	$\rho = -0.001$ $P = 0.98$	$P = 0.96$
Mental Well being	$\rho = -0.04$ $P = 0.54$	$\rho = 0.01$ $P = 0.86$	$P < 0.01$
Social impact	$\rho = 0.06$ $P = 0.37$	$\rho = 0.02$ $P = 0.77$	$P = 0.15$
Total scores	$\rho = 0.06$ $P = 0.35$	$\rho = 0.02$ $P < 0.7$	$P = 0.03$

\* Mann-Whitney U test





**Figure 1.** The dispersion of the perceived need and normative need scores in 11- to 14-year-old students in Qazvin city, Iran, 2015



**Figure 2.** Comparison of orthodontic treatment needs severity in 11- to 14-year-old students in Qazvin city, Iran, 2015

## Discussion

The results of the present study showed that there were statistically significant differences between the self-perceived need and the normative need for orthodontic treatment so that the specialist had given higher AC scores to the students than the students themselves (mean value of 4.32 versus 2.56). In assessing the self-perceived need for orthodontic treatment, 88.8% had little or no need for treatment, 8.4% had borderline and 2.8% had severe need for orthodontic treatment. These percentages in assessing the normative need for treatment were 55.2%, 35.6% and 9.2%,

respectively.

Kok et al. compared the AC of IOTN and the total score of the CPQ<sub>11-14</sub> in determining the need for orthodontic treatment and showed that the children had given lower scores to themselves than the scores given by the examiners (statistically significant); this was consistent with our results.<sup>20</sup> In addition, de Oliveira et al. in their study on 187 children between 11 to 16 years in England showed that there have been discrepancies in using the IOTN according to the self-perceived and normative determination of the need for orthodontic treatment.<sup>21</sup> Ghijssels et al. compared normative and self-perceived orthodontic treatment need in 11- to 16-year-old children and showed significant correlations between the normative orthodontic treatment need (IOTN AC) and most of the OHRQoL measures. Similarly, a significant correlation was found between the IOTN AC scores given by the experts and the IOTN AC ratings given by the students.<sup>22</sup> Attention to the opinions of those who come for orthodontic treatment, their reasons for seeking treatment and their expectations of the results plays an essential role in achieving a successful outcome; although in some cases, it might be dispersed or even contradictory. Thus, when an

individual's need for treatment is in agreement with the scientific principles and the clinician's opinion, then seeking treatment will be inevitable.<sup>23</sup> Since the environment, friends, parents, and some other factors play an undeniable role in encouraging and referring the patients for orthodontic treatment, this has become a basis for measuring the need for treatment based on an individual's personal views.<sup>24</sup> This becomes more evident in orthodontic treatment; hence it can be said that measuring the normative need of an individual for orthodontic treatment cannot determine his/her self-perceived need for orthodontic treatment or predict his/her demand for it. In addition, feelings about mental well-being and other related aspects of being satisfied with one's dental appearance cannot be considered in assessment of the normative need. On the other hand, offering treatment on the basis of normative need may cause bias in selection of patients in favor of the treatment provider(s). Moreover, previous knowledge of the students about the arrangement and order of teeth, prior experience with orthodontic treatment and presence of a dentist or an orthodontist in their family may affect their assessment of their need for orthodontic treatment. Of course, these variables were not assessed in the current study.

The results of our study showed that only the correlation between the AC determined by the students and the score of functional limitations of the CPQ<sub>11-14</sub> was found to be statistically significant, although the correlation coefficient was low. There was no statistically significant correlation between the self-perceived need for orthodontic treatment and the scores of oral symptoms, mental well-being and social well-being in the CPQ<sub>11-14</sub>. These findings reveal that malocclusion affects chewing hard foods, pronouncing some words and mental and social well-being and results in longer eating time and problems in drinking cold and hot

drinks. Besides, the correlation coefficients in assessing the correlation between the scores of the four variables, the total score of CPQ<sub>11-14</sub> and the normative need for treatment were lower and there was no statistically significant correlation between them. The highest correlation coefficient existed between the normative need and the oral symptoms and the least correlation coefficient was seen between the normative need and the score of functional limitations of the CPQ. The above-mentioned results indicate that having malocclusion based on a specialist's view had not resulted in appearance of oral symptoms, functional limitations and mental or social well-being problems. In the study by Kok et al., the scores of the AC in determining the normative need for orthodontic treatment had a statistically significant correlation only with the score of mental well-being of the CPQ<sub>11-14</sub> and no such correlation existed in other domains.<sup>20</sup> Besides, in the above-mentioned study, the correlation coefficient values between the scores of the self-perceived need for orthodontic treatment and the scores of the CPQ<sub>11-14</sub> were higher compared to those of the normative need; this was consistent with our results. The low values of the correlation coefficient of the AC of IOTN (self-perceived or normative) reveal the fact that these are two different scales that measure different characteristics (malocclusion or need for orthodontic treatment); the same view was emphasized in the study by Kok et al.<sup>20</sup> Mandall et al. also reported a weak correlation between the AC of IOTN in determining normative need for orthodontic treatment and the scores of the OHRQoL questionnaire ( $\rho = 0.24$ ).<sup>10</sup> In a study by de Oliveira and Sheiham, despite a statistically significant correlation between the Dental Health Component (DHC) of IOTN and the normative need for orthodontic treatment, a remarkable percentage of those needing orthodontic treatment showed no malocclusion-related

oral symptoms.<sup>25</sup> Forty six percent of those requiring orthodontic treatment (degrees 4 and 5 of IOTN) and 67% of those in moderate need of orthodontic treatment (degree 3 of IOTN) reported no social effect of malocclusion on their life while, interestingly, 28.6% of those who had reported social effects of malocclusion on their life did not need orthodontic treatment.

In order to evaluate the OHRQoL, the scores of the four variables and the total score of the CPQ<sub>11-14</sub> were reviewed based on the students' gender. The results showed that females had a higher score of mental well-being and total score of the CPQ<sub>11-14</sub> or a poorer quality of life than males in this study. This indicates their higher vulnerability to mental and psychological aspects of oral health problems. This emphasizes that the need for treatment is higher in girls.

In our study, we used the CPQ<sub>11-14</sub> to evaluate the OHRQoL. The reason for choosing this age group was that in this period, all or most of their permanent anterior teeth have erupted and most of them have not experienced orthodontic treatment. Jokovic et al. applied this questionnaire in 123 children with dental problems and verified its validity and reliability.<sup>15,26</sup> These two studies showed that oral health has significant effects on individuals' mental well-being and their functionality, as detected in 11 to 14-year-old children. In a study by Goursand et al. the CPQ<sub>11-14</sub> differentiated children with treated dental caries from those with untreated caries.<sup>22</sup> The results showed that the children with untreated dental caries had higher CPQ

scores and poorer quality of life than the treated ones. The fact that malocclusion is not the specific cause and other oral conditions may be the cause of high scores is the main limitation of this questionnaire.<sup>26,27</sup> Hence, other questionnaires and criteria used in the future for evaluating the OHRQoL must be able to distinguish the effects of existence and severity of dental malocclusions from other oral conditions.

### Conclusion

The results of our study revealed that there is a weak and minimal correlation between the scores of the four variables and the total score of the CPQ<sub>11-14</sub> and the AC of IOTN; this indicates that these indices have measured different characteristics. It also showed that the self-perceived need for orthodontic treatment was significantly less than the normative need for orthodontic treatment and the specialist determined a higher need for treatment for these students than the students themselves. It seems that using the criteria of the OHRQoL in assessing the self-perceived need for orthodontic treatment, along with normative needs, may provide an accurate estimate of the need for orthodontic treatment.

### Conflict of Interests

Authors have no conflict of interest.

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## The level of evidence of articles published in Iranian Endodontic Journal in 3 years (2007, 2012 and 2013)

Raziehsadat Rezvaninejad DDS, MSc<sup>1</sup>, Arash Shahravan DDS, MSc<sup>2</sup>

### Original Article

#### Abstract

**BACKGROUND AND AIM:** Endodontists have the opportunity to apply relevant research findings to care their patients using the principles and methods of evidence-based treatment. The best level of evidence can be used to inform decisions regarding care. The aim of this study was to evaluate the level of evidence and study the design of all the articles published in Iranian Endodontic Journal in years 2007, 2012 and 2013.

**METHODS:** We reviewed all articles published in 2007, 2012 and 2013 in the Iranian Endodontic Journal. These articles were classified according to the level of evidence (LOE) using Oxford Scale from 0 to 5 and type of the study. Statistical analyses were performed using Fisher's exact test. Significant level was set at 0.05.

**RESULTS:** Frequency of articles with LOE was 117, that 5 papers were level 1 (4.2%), 1 level 2 (0.9%), 10 level 3 (8.5%), 1 level 4 (0.9%), and 3 level 5 (2.5%); 97 articles (83.0%) were identified as LOE 0 or non-evidence. Comparison of the LOE of Iranian endodontic journal in 3 years did not reveal statistically significant differences between the published articles ( $P = 0.14$ ).

**CONCLUSION:** It appears that few high level of evidence-based articles have been achieved in 3 years related to endodontic subjects. Hence, journals, authors, and editors should all cooperate to achieve high-LOE articles.

**KEYWORDS:** Clinical Trials; Dentistry; Endodontic; Evidence-Based; Journal Article

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Sackett et al.<sup>1</sup> defined evidence-based medicine, nowadays termed evidence-based dentistry (EBD), as “the conscientious, explicit and judicious use of current best evidence about the care of individual patients” integrated with clinical expertise and patient values to optimize outcomes and quality of life.<sup>2-7</sup> The concepts of evidence-based treatment, which include the tracking-down of specific scientific evidence, assessing its validity, and using the “best” evidence to inform patient care decisions can affect specialists, general dentists, patients, and employers who purchase insurance packages, insurance companies, and policy makers alike.<sup>8</sup> The American Dental

Association defined evidence-based (EB) dentistry as an approach to oral healthcare that requires the judicious integration of systematic assessments of clinically relevant scientific evidence, relating to the patient's oral and medical condition and history, with the dentist's clinical expertise and the patient's treatment needs and preferences.<sup>9-10</sup>

This process will allow the researcher or clinician to find the best available evidence related to the treatment of the patient. Best available evidence includes suitable designed randomized controlled clinical trials and systematic reviews.

Suzanne Fletcher and Dave Sackett generated “levels of evidence” (LOEs) for

1- Resident, Department of Oral Medicine, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

2- Associate Professor, Endodontology Research Center AND PhD Candidate, Department of Oral Epidemiology, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

Correspondence to: Arash Shahravan DDS, MSc

Email: arashahravan@gmail.com

ranking the validity of evidence about the value of preventive maneuvers and then tied them as “grades of recommendation” to the advice in the report for the Canadian Task Force on the Periodic Health Examination 20 years ago.<sup>11</sup> These levels have developed over the ensuing years.<sup>10-14</sup> The National Health Service (NHS) Research and Development Centre for Evidence-Based Medicine (RDC) in Oxford, UK, developed an updated version.<sup>8</sup>

Torabinejad et al. searched for clinical articles pertaining to success and failure of nonsurgical root canal therapy, and to assign levels of evidence to these studies. Based on these findings, it appears that a few high-level studies have been published in the past four decades related to the success and failure of nonsurgical root canal therapy.<sup>15</sup>

Shafiei and Shahravan assessed the level of evidence in two leading journals and reported that there were not statistically significant differences between the published articles in two journals.<sup>16</sup>

Asgary et al. evaluated published endodontic articles in PubMed-Indexed Journals from Iran. They found that evidence of articles in the field was insufficient.<sup>17</sup>

These are the most important articles published in journals that provide a higher level of evidence to answer clinical questions here by higher level of evidence than running in the papers.

The aim of this study was to evaluate the level of evidence and study design of all the articles which were published in Iranian Endodontic Journal in years 2007, 2012 and 2013.

## Methods

We reviewed all the articles published in years 2007, 2012 and 2013 in the Iranian Endodontic Journal, excluding letters and erratum to rate level of evidence of each article.

The scale used in this study was developed by the NHS Research and Development Centre for Evidence Based Medicine in Oxford, UK (Table 1).

Hence, there were 6 groups as 0, 1, 2, 3, 4

and 5. In-vitro articles, case reports, and technical notes rated according to this scale as non-evidence (LOE 0).

**Table 1.** Level of evidence (LOE) according to Oxford scale

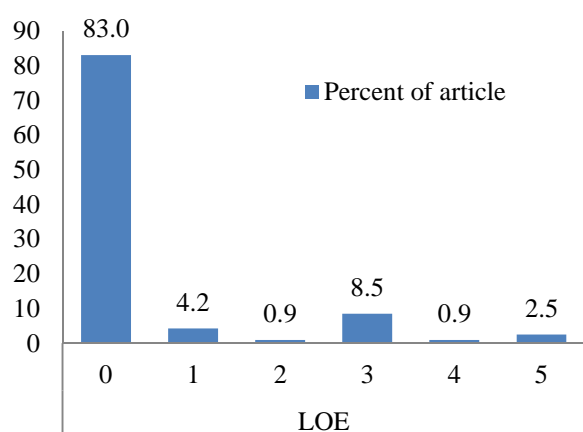
Code	Study Type
1a	Systematic review (with homogeneity) of randomized clinical trial(s)
1b	Individual randomized clinical trial (with narrow confidence interval)
2a	Systematic review with homogeneity of cohort study
2b	Individual cohort study
2c	Outcome research
3a	Systematic reviews with homogeneity of case-control studies
3b	Individual case-control study
4	Case series (and poor quality cohort and case-control studies)
5	Expert opinion without explicit critical appraisal

Reviewing the articles was done by two researchers and uncertainties were gotten the same opinion. Data extraction consisted of study design, year of publication and level of evidence. Statistical analyses were performed using the SPSS software (version 17.0, SPSS Inc., Chicago, IL, USA) via Fisher’s exact test.

Data was analyzed by analysis of variance (ANOVA), post-hoc (Tukey test) and Student’s t-test in SPSS version 20.0 (SPSS Inc., Chicago, IL, USA). P-value of less than 0.05 was considered to be statistically significant.

## Results

In total, 117 endodontic articles had been published in the Iranian Endodontic Journal in years 2007, 2012 and 2013. When studies were assessed using LOE, 5 papers were level 1 (4.2%), 1 level 2 (0.9%), 10 level 3 (8.5%), 1 level 4 (0.9%), and 3 level 5 (2.5%). Therefore, 97 (83.0%) of the articles were identified as LOE 0 or non-evidence (Figure 1).



**Figure 1.** Percentage of articles in each level of evidence (LOE) (0-5)

The publication pattern of the articles related to the study design in different years is demonstrated in table 2. Analysis of the articles showed that very few high-level studies had high level of evidence.

Comparison of the LOE of Iranian Endodontic Journal in 3 years did not reveal statistically significant differences between the published articles ( $P = 0.14$ ).

## Discussion

Evidence-based dentistry is an emerging perspective to insure that the best available scientific evidence is integrated in clinical practice for the maximal benefit of each individual patient. It is focused on identifying the statistically and clinically significant findings from randomized clinical trials. The successful opinions and experiences of dentistry rely on a vast spectrum of dental subjects, which ranges from materials research to observational studies.<sup>9</sup>

In this study, we found that the number of published non-evidence articles (in-vitro, case reports, and expert opinion) in Iranian Endodontic Journal were considerably more than highly-evident articles (systematic review and clinical trial) published in the journal. This difference in 2012 and 2013 was more than 2007. Thus, there are more published papers in "Iranian Endodontic Journal" which cannot be used as answers of clinical questions of clinicians in recent years in comparison to past.

**Table 2.** Frequency (n) and relative frequency (%) of different study designs of Iranian Endodontic Journal in studied years

Year	2013	2012	2007	Total
	Number (%)	Number (%)	Number (%)	Number (%)
In-vitro	22 (46.8)	22 (57.9)	20 (62.5)	64 (54.7)
Randomized Clinical Trial	3 (6.4)	1 (2.6)	1 (3.1)	5 (4.2)
Cohort	0 (0.0)	0 (0.0)	1 (3.1)	1 (0.9)
Cross-Sectional	5 (10.6)	0 (0.0)	3 (9.4)	8 (6.8)
Case-Report	11 (23.4)	10 (26.3)	4 (12.5)	25 (21.3)
Quasi-Experimental	2 (4.2)	0 (0.0)	0 (0.0)	2 (1.7)
Animal Study	0 (0.0)	1 (2.6)	3 (9.4)	4 (3.5)
Review	3 (6.4)	1 (2.6)	0 (0.0)	4 (3.5)
Systematic Review	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Case Series	1 (2.1)	0 (0.0)	0 (0.0)	1 (0.9)
Editorial	0 (0.0)	3 (7.9)	0 (0.0)	3 (2.5)
Total	47 (100.0)	38 (100.0)	32 (100.0)	117 (100.0)

Shafiei and Shahravan searched the level of evidence in articles of International Endodontic Journal and Journal of Endodontics.<sup>16</sup> In that study, 83.6% of the articles were classified as non-evidence. Therefore, we can see identical percentages of non-evident articles published in Iranian Endodontic Journal with those two leading endodontic journals.

Lau and Samman reported that 50% of articles in oral and maxillofacial surgery journals were non-evidence.<sup>14</sup> Besides, Kyzas confirmed that oral and maxillofacial surgery literatures lack high-quality evidence articles.<sup>19</sup>

Proescholdt et al. performed electronic database searches on MEDLINE, CANCERLIT, and EMBASE in the field of brain tumor resection. They showed that there was not published high-LOE articles.<sup>18</sup>

Torabinejad et al. searched for clinical articles relating to various endodontic treatment, in endodontic journals and evaluated the levels of these studies. They found that, few high-level of evidence studies had been published in these journals.<sup>7,15,20</sup>

EBD should be included as a core competency in learning critical care dentistry, and its instruments. Obviously, there will always be situations in which we have to make

decisions with insufficient data. Far from being frustrating, these dilemmas should be an opportunity for integrating collective and individual experience and clinical expertise.<sup>21</sup>

In EBD, critical appraisal of articles is crucial step to accept a research result as the answer of clinical question. There are some papers published about the qualification of clinical trials published by Iranian authors in the field of dentistry.<sup>22,23</sup>

### Conclusion

It appears that few high-level of evidence articles have been published in 3 years in Iranian Endodontic Journal. However, for answering clinical questions, it is necessary to have high levels of evidence articles and it is suggested that Iranian Endodontic Journal publishes more clinical trial and systematic review articles with high LOE in future.

### Conflict of Interests

Authors have no conflict of interest.

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## Ameloblastic fibro-odontoma: A case report

Neda Kargahi DDS, MSc<sup>1</sup>, Mahsa Kalantari DDS, MSc<sup>2</sup>,  
Molook Torabi-Parizi DDS, MSc<sup>3</sup>, Parisa Kalantari DDS<sup>4</sup>

### Case Report

#### Abstract

**BACKGROUND AND AIM:** Ameloblastic fibro-odontoma (AFO) is a rare, mixed odontogenic tumor that usually occurs in children and young adults with no gender predominance. Posterior mandibular region is usually involved and a painless swelling is the most common clinical feature.

**CASE REPORT:** We here report a case of AFO in a 12-year-old girl with a complaint of a painful expansive lesion in the right posterior mandible. Radiographic examination showed a well-defined radiolucency containing radiopaque materials. The second molar was displaced by the lesion. Enucleation was conducted and no recurrence was observed after 4 years of follow-up.

**CONCLUSION:** AFO is a benign expansive jaw lesion which develops in children. To treat AFO, proper surgical excision and curettage should be performed.

**KEYWORDS:** Ameloblastic Fibro-Odontoma; Odontogenic Tumors; Neoplasm

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Ameloblastic fibro-odontoma (AFO) is a rare, benign and mixed odontogenic tumor composed of proliferating odontogenic epithelium in a cellular ectomesenchymal tissue with varying degrees of inductive changes. Clinically, it is usually asymptomatic and might be accompanied by a non-erupted or displaced vital tooth.<sup>1,2</sup> Most cases are diagnosed during the first or second decade of life, with equal frequency in the maxilla and mandible, and no gender predominance.<sup>3,4</sup>

Radiographically, it appears as a well-defined radiolucency containing various amounts of radiopaque material with irregular size and form.<sup>5,6</sup> Histologically, it is composed of strands and islands of odontogenic epithelium embedded in a cell-rich ectomesenchymal tissue, resembling

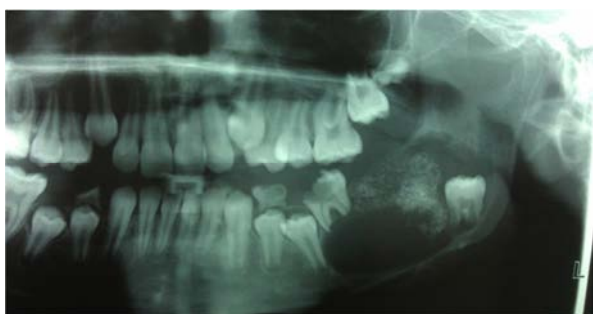
dental papilla. Formation of dental hard tissues resembling enamel and dentin is seen. Usually, AFO is not aggressive and the best treatment is conservative surgical excision and it has no tendency to recur.<sup>7,8</sup> This paper reports a case of a large painful expansive AFO in a 12-year-old girl.

#### Case Report

A 12-year-old girl with a complaint of an expansive and painful lesion in the right posterior mandible was referred to the Department of Oral and Maxillofacial Pathology. Clinical examination showed a swelling in that area with no history of local infection or trauma. The medical and familial histories were unremarkable and the results of physical examination and hematologic tests were within normal limits. Panoramic

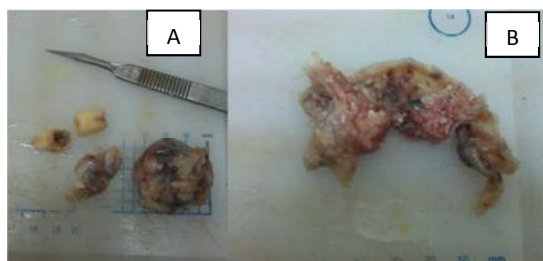
1- Assistant Professor, Department of Oral and Maxillofacial Pathology, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran  
2- Assistant Professor, Oral and Dental Diseases Research Center AND Department of Oral and Maxillofacial Pathology, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran  
3- Associate Professor, Department of Oral and Maxillofacial Pathology, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran  
4- Resident, Department of Orthodontics, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran  
Correspondence to: Mahsa Kalantari DDS, MSc  
Email: kalantary.mahsa@yahoo.com

radiography revealed a well-defined radiolucent lesion containing scattered foci of radiopaque material, extending from the mandibular first molar to the angle of mandible, occupying whole posterior body of the mandible. The roots of the involved first molar were resorbed. The second molar was displaced to the inferior border of the mandible by the lesion (Figure 1).



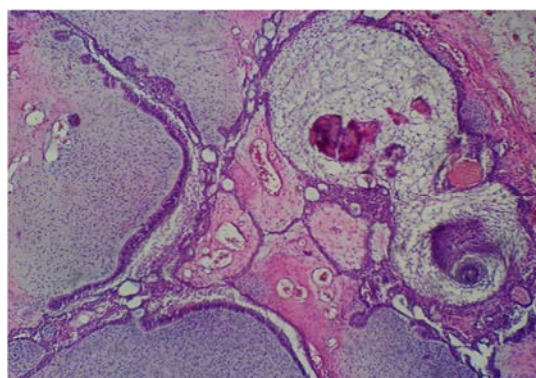
**Figure 1.** Panoramic radiograph showing a well-defined radiolucent lesion which contained scattered foci of radiopaque material in the left lower jaw

Based on the clinical and radiographic findings, the differential diagnosis included several odontogenic cysts and tumors like AFO, immature complex odontoma, calcifying epithelial odontogenic tumor, calcifying odontogenic cyst and odontoameloblastoma. Excisional biopsy was performed and the mass was removed along with the first and second molars. The surgical specimen measured  $3.2 \times 2.7 \times 2$  cm. It had a cystic appearance with a lumen containing a tumor-like mass with mineralized material in its internal wall (Figure 2, A and B).



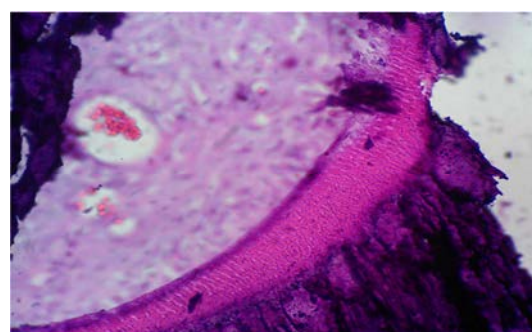
**Figure 2.** Surgical specimen showing a cystic like mass with the first and second mandibular molars (A), internal part of the specimen containing mineralized material (B)

Histopathological examination revealed strands and islands of odontogenic epithelium showing peripheral palisading and loosely arranged cells identical to stellate reticulum in the central area. The stroma comprised of loose connective tissue, with abundant extracellular matrix containing plump fibroblasts resembling the dental papilla (Figure 3). Immature particles similar to dental organ were also seen. Dental hard tissues, including dentinoid structures and osteodentin with ghost cells, were observed in some areas (Figure 4). There was no evidence of malignancy in this lesion. Based on these findings, the tumor was diagnosed as an AFO.



**Figure 3.** The lesion photomicrograph showing strands of odontogenic epithelium with peripheral palisading and stellate reticulum-like area arranging in a myxoid cellular stroma resembling dental papilla

Four years after surgery, no recurrence was observed and the clinical and radiographic appearances of the bone demonstrated bone healing.



**Figure 4.** Photomicrograph showing dentinoid like material

## Discussion

Odontogenic tumors constitute 7% of all cases of oral lesions in children and adolescents.<sup>9</sup> Among them, AFO is relatively rare and represents approximately 1%-3% of all these lesions.<sup>10</sup> A study conducted by Saghravanian et al.<sup>11</sup> in Iran showed that odontogenic tumors constitute 1.9% of oral and maxillofacial lesions and among them, the prevalence of AFO was 3.2%. In similar studies carried out by Kowkabi et al.<sup>12</sup> and Taghavi et al.<sup>13</sup> in Iran, the prevalence of AFO was reported to be 6.5% and 1.6% of odontogenic tumors, respectively.

This lesion usually occurs in people under 20 years of age with an average age of 9 years. Therefore, in the differential diagnosis, age is as an important characteristic parameter.<sup>14,15</sup> Philispen et al.<sup>16</sup> investigated 86 cases of AFO and observed only one case over 20 years of age.

AFO has a marked tendency to occur in the molar area, with an equal distribution between the maxilla and mandible and no gender predilection.<sup>17</sup> Swelling, failure of tooth eruption and tooth displacement are the most common complaints of the patients, but other symptoms, such as pain and paresthesia are not common.<sup>18</sup> Saghravanian et al.<sup>11</sup> noted that painless swelling is the most common clinical finding in patients with AFO. However, the case presented here had a painful swelling in the involved region.

In radiographic evaluation, a well-defined radiolucency containing various amounts of radiopaque material is usually discovered. The amount of radiopaque component differs from one lesion to another; sometimes it predominates and the lesion may resemble an odontoma.<sup>7</sup>

The proper classification of AFO is controversial. According to the World Health Organization, it is included in the group of tumors of odontogenic epithelium with odontogenic ectomesenchyme, a mixed odontogenic tumor. AFO is a benign tumor that exhibits the same benign biologic

behavior as that of ameloblastic fibroma. Conversely, the term odontoameloblastoma (or ameloblastic odontoma) refers to tumors representing a histological combination of ameloblastoma and odontoma.<sup>15</sup>

Recent studies have suggested that the immunohistochemical assays show strong reactivity for amelogenin,  $\beta$ -catenin, and CD44 in odontogenic tumors. In a peripheral AFO case described by Lin et al.,<sup>19</sup> tissue sections showed high levels of amelogenin,  $\beta$ -catenin, CD31 and CD44.

AFO is well-circumscribed and does not invade the surrounding bone. Many authors have reported that AFO can be properly treated by surgical curettage.<sup>2</sup> Nascimento et al.<sup>5</sup> reported the case of an 8-year-old boy with an AFO that was treated by enucleation and curettage, without recurrence during an 8-year follow-up. Also, Arab Oghli<sup>6</sup> followed a case of AFO for six years in a 3.5-year-old boy treated by enucleation and reported no recurrence.

In a study by Tsagaris<sup>20</sup> only one of 29 AFO cases recurred, which was due to inadequate surgical removal at the time of the initial treatment. Also in a case reported by Frissell and Shafer<sup>21</sup> the lesion was aggressive and recurred twice after the initial surgical excision.

Reis et al. have reported that the impacted tooth associated with AFO can be preserved, while others have reported recurrence after preservation of the teeth involved.<sup>22</sup>

Malignant transformation of AFO is rare, and the exact rate is not known.<sup>2</sup> Herzog et al.<sup>23</sup> followed a 14-year-old girl with an AFO for twelve years and during this period, they observed four recurrences with histological changes in the connective tissue toward a more cellular and disorganized pattern diagnosed as odontogenic sarcoma. Also Howell and Burkes<sup>24</sup> presented two cases of malignant transformation of AFOs. They described that malignant transformation of AFO seemed to be more frequent than previously thought. Bregni et al.<sup>25</sup> reported that in patients with a higher average age (33 years), ameloblastic fibro-

sarcomas can developed from previously benign tumors like AFOs.

As mentioned in the literature review, not all AFOs are aggressive, nor should they be expected to recur after conservative surgical excision.<sup>3,6</sup> If recurrence occurs with a change in the histopathological pattern toward a more cellular and unrecognized fibrous stroma with displacement of the epithelial component, then more extensive procedures should be performed.<sup>6</sup>

### Conclusion

AFO is a rare benign neoplasm with low

malignant transformation potential. It seems that a case-dependent treatment plan may result in the best outcome. Therefore, in the case of repeated recurrences or malignant transformations, a more extensive treatment is recommended. Long-term follow-up should be considered in the management of AFO.

### Conflict of Interests

Authors have no conflict of interest.

### Acknowledgments

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