

## Assessment of oral health status in chronic headache patients and its comparison with healthy control

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### ABSTRACT

**Introduction:** Headache is a common problem with intense side effects on quality of life. Dental and maxillofacial problems, including dental infections and temporomandibular disorders may trigger the onset of headache or have direct impact on the intensity of headache. The purpose of this paper is assessment of oral health indexes in chronic headache patients and compare it with a healthy control group.

**Materials and Methods:** Thirty chronic headache patients based on diagnosis by a neurologist were enrolled in our study and thirty healthy volunteers were recruited into the control group. Dental and periodontal examination were carried out in order to evaluate of the decayed, missing and filled teeth (DMFT) index, the assessment of community periodontal index of treatment needs (CPITN) index and determination of tooth wear status and oral health status. Statistical analysis was done using SPSS statistical package (version 20, IBM).

**Results:** Mean age, educational level, tooth brushing, using dental floss and DMFT index was not statistically different between chronic headache patients and control group. There was no statistically significant difference in CPITN index between cases and control group (p-value=0.538).

**Conclusion:** This study suggest that chronic headache patients have an acceptable oral hygiene which may be attribute to their attempts to omit pain from head and oral region. Considering high prevalence of chronic headache, planning a protocol for oral hygiene instruction is necessary. In this regard, coordination between neurologists and oral medicine specialists can be very effective.

**Keywords:** Oral health; Chronic headache; DMFT index; CPITN index.

### Introduction

Headache is a common disorder characterized by superficial and intense pain [1]. Migraine is the sixth highest cause of healthy life lost to disability

(YLDs) in the world, and headache disorders collectively are third, according to the Global Burden of Disease Study 2013 (GBD 2013) [2].

In general, headache is divided into two distinct sub-type, primary headache that are some types of headache that there is no distinct etiology for them. Secondary headache which are some types of headache that categorized based on their etiology [3]. Prevalence of primary headache is much more higher than secondary ones, which account nearly 90% of all headache types [4]. In some studies, headache is categorized in three distinct type, acute, subacute and chronic headache. Chronic headache have several subtypes, which include migraine headache, cluster headache and tension headache. Chronic headache is defined as a headache which occur more than 15 days in a month and last for at least three month [5].

Dental and maxillofacial problems may be a predisposing factor for headache. Dental abscess, infection after tooth extraction and temporomandibular disorders can induce referral pain to head and face region [6]. Migraine headache is a painful neurovascular disorder which is comorbid with a large number of pain disorders [5]. The prevalence of migraine disorder is estimated 15%. Chronic migraine which defined as more than 15 headache-days per month for three months with migraine features on more than eight days per month, is more accompanied with pain disorders than episodic migraine [7]. Migraine is accompanied with some comorbidities such as chronic pain disorders, sleep disorders, vertigo, cardiac disorders, stroke, gastroesophageal reflux disease and stress disorders [5]. Several studies indicated that migraine headache is more common in patients with TMD symptoms compared to individuals without headache [8].

Cluster headache is the other form of primary headache disorders which are characterized by recurrent attacks of unilateral pain, usually involving the orbital and periorbital region, associated with local autonomic symptoms on the same side (lacrimation, conjunctival injection, nasal congestion or rhinorrhea, ptosis or miosis) [9]. Attacks of CH last between 15 and 180 minutes. It is indicated that cluster headache is accompanied with a high rate of misdiagnosis with other disease including trigeminal neuralgia (22%), migraine without aura (19%), sinusitis (15%) dental problems and TMJ disorders. Misdiagnosis lead to delay in diagnosis of cluster headache [10]. Tension type headache (TTHA) is probably the most common primary headache disorder. The prevalence of episodic that is about 70-80% and prevalence of chronic TTHA is about 1-3%. TTHA is typically a bilateral, with hat band distribution and mild to moderate intensity, lasting minutes to days. This type of headache is not ac-

companied with nausea and vomiting, but sometimes photophobia and phonophobia may be present. There is a possible correlation between episodic TTHA and TMJ dysfunction [11]. Nearly all forms of chronic headache syndromes are accompanied by orofacial symptoms [12]. In addition, toothache could be a possible cause of chronic headache. The pain result from migraine headache, cluster headache, trigeminal neuralgia may refer to maxillofacial structures and teeth. Conversely pain from temporomandibular structures and its muscular and ligaments attachments may induce headache [13].

Oral cavity disorders and dental infections rarely induce headache. The most common dental problem, which induce headache, is pulpitis. Dental abscesses the other disorders that may cause headache [14]. Bruxism is a secondary cause of chronic headache. 20% of general population experience bruxism in their life, which is defined, with obvious grinding of teeth. Bruxism is more prevalent in 3-12 years old children and 19-45 years old adults. bruxism induce pain in the jaws after awakening and tension headache that relieve during day [15]. Regarding the association between different types of headache and TMD and oral and dental problems, the aim of this study is assessment of oral and dental status in chronic headache patients.

## Materials and Methods

This study was a case control study, which was conducted in neurology department of Imam Khomeini hospital, Tehran, Iran. Thirty chronic headache patients were randomly selected and entered the study. In addition, thirty age and sex matched healthy volunteer from patients were referred to TUMS dental faculty entered to the study as control group. By definition, chronic headache is a headache that is repeated 15 days in a month and last for at least three month. A neurologist in all patients confirmed affection to chronic Headache. Exclusion criteria for case and control group include age lower than 12 years, involvement with systemic disease, pregnant women, smoking, and alcohol consumption. Prior to study informed consent was studied by patients and signed by them. Personal, dental and medical questionnaire was filled for each patient and then a dentist did oral and dental examination. Demographic data included age, gender and educational level. Dental questionnaire included frequency of tooth brushing, frequency of dental flossing and frequency of dental visits. Dental examination was done in a standard condition with enough light, sterile dental probe and mirror and sterile CPITN probe was

done. To assess dental status of case and control group, DMFT index was calculated. The level of tooth wear was calculated with tooth wear index and scored 1 to 3 for each jaw. (1-without wear, 2-superficial wear of limited teeth in enamel surface, 3: sever wear with enamel destruction and dentin exposure). To assess periodontal status of patients, CPITN index was used, which was determined with CPITN probe (WHO 621 probe). first and second upper molar, upper right central incisor, first and second lower molar and lower left central incisors were assessed with probe in 3 point of buccal surface and 3 point of lingual surface through walked around method with 20-25 gram force. For each tooth a score between 0-4 was considered. (0= healthy gingiva, 1= without any periodontal pocket and bleeding on probing, 2= calculus around the teeth and presence of periodontal pocket<3mm depth, 3= presence of periodontal pocket with 4-5mm depth, 4= presence of periodontal pocket>6mm depth). The highest score for each tooth was recorded and the mean values were considered as CPITN index. Wear of maxillary and mandibular teeth was assessed using tooth wear index. Scoring was from 1 to 3. (1= without wear, 2= superficial wear of enamel surface in at least 4 teeth, 3= sever with enamel deterioration and dentin exposure. For statistical analysis, SPSS V20 software was used. Statistical analysis for Quantitative variables such as age and DMFT index was done using T-test and for the other variables, Mann-Whitney test was used. All of

the participants were informed from the aim of study and signed the informed consent. This study confirmed by the ethical committee of Tehran University of medical science.

### Results

Total number of participants in the study was 60, 30 patient with chronic headache and 30 healthy volunteer. Mean age of patient group was 34.8 and mean age of control group was 35.4. There was no statistically significant difference in mean age of case and control group (p-value=0.803). In control, group 23 person (76.7%) were female and 7 person (23.3%) were male. In patient group 24 person (80%) were female and 6 person (20%) were male. There was no difference between two group in gender distribution (p-value=0.756). There was no difference in educational level of patient and control group (p-value=0.163). There was no difference in frequency of tooth brushing (p-value=0.878).

	Patient	Control
Mean age	34.8	35.4
Female gender	24(80%)	23(76.7%)
Male	6 (20%)	7 (23.3%)

Table 1. Demographic characteristics of participant.

	0 Times per day	Ones per day	Twice per day	Three times per day
Patients	0	22(73.3%)	5(16.7%)	3(10%)
Control	0	22(73.3%)	7(23.3%)	1(3.3%)

Table 2. Frequency of tooth brushing.

	0 Times per day	Ones per day	Twice per day	Three times per day
Patients	0	6(20%)	18 (60%)	6(20%)
Control	10(33.3%)	1(3.3%)	12(40%)	7 (23.3%)

Table 3. Frequency of dental flossing.

DMFT index	Minimum	Maximum	Mean	Standard deviation
Patients	3	26	13.3	5.296
Control	0	0	0	0

Table 4. DMFT index in patient and control group.

	Minimum	Maximum	Mean	Std dev
Patients	1	3	2.1	0.712
Control	1	3	2.2	0.847

Table 5. CPITN index in case and control group.

Frequency of dental flossing in patient group was significantly higher than control group (p-value=0.035). Frequency of dental visit in patient group was significantly higher than control group (p-value=0.008). Maximum number of decayed teeth in patient group was 18 and minimum number of decayed teeth in this group was 0. In control group these values was 14 and 2 respectively. There was no statistically significant difference in case and control group (p-value=0.063). The maximum number of teeth missed because of caries was 11 in patient group and 12 in control group. The minimum number of teeth missed because of caries in case and control group was 0. There was no statistically significant difference in these two values between two groups (p-value=0.159). The maximum number of filled teeth in case and control group was 20 and 11 respectively and the minimum number of filled teeth in both groups was 0. There was no statistically significant difference between two groups regarding the number of filled teeth (p-value= 0.755). The maximum and minimum value of DMFT index in case group was 26 and 3 respectively. These values in control group were 24 and 6 respectively. There was no difference between case and control group in DMFT index (p-value=0.111). There is no statistically significant difference between case and control group in maxillary tooth wear index (p-value=0.763). There is no difference between case and control group in mandibular tooth wear index (p-value=0.466). Maximum and minimum values of CPITN index in case and control group were similar. There is no statistically significant difference between case and control group in CPITN index (p-value=0.538).

## Discussion

In this study, oral health status of chronic headache patients was compared with healthy volunteers. The patient group included all patients affected by chronic headache such as migraine, tension type and cluster headache. This study was a case control study, which

gender and age of case and control group was matched to each other to prevent the bias from gender or age difference. Therefore, there was no statistically significant difference between case and control group in gender and age distribution. Various stressors trigger chronic headache onset. Psychological stress, depression, sleep disorders, stressful situation in work are risk factors of chronic headache onset [16]. Most jobs with high responsibility require high education and stressful situations accompanied with these jobs are much higher than others. Therefore prevalence of stress disorders, depression and sleep disorders in these jobs is higher than the others [17]. In this study, educational level of patient group (43.3%) was higher than control group (26.7%). This difference was not statistically significant that is attributed to low sample size. Cempekersoy et al. conducted a similar study to investigate oral and dental health status in chronic migraine patients. All of the patients were selected from educated people and relationship between educational level and headache had not been studied [18]. As mentioned in result section, there was no statistically significant difference in frequency of tooth brushing in case and control group. We can concluded that, chronic headache and its complications doesn't prevent proper oral hygiene and proper tooth brushing. In acute migraine attacks, most patients experience some degree of inability which may have negative impact on oral hygiene, but these adverse effects doesn't seen in chronic migraine patients. Results of present study is similar to cempekersoy et.al study [18].

Frequency of dental flossing in patient group is higher than control group and the difference is statistically significant. This study indicated that 33.3% of control group never do not use dental floss but 100% of patient group floss their tooth routinely. Regarding no difference between patient and control group in the other items, difference in dental flossing can be attributed to chronic headache. It seems that chronic headache patients consider oral hygiene status as

an etiologic factor for their headache. Dental abscess, pulpitis and socket infection after extraction may induce referral pain to head and face and may exacerbate headache of patients with chronic headache [14]. On the other hand, pain from migraine and cluster headache may refer to the jaws and teeth and the patient regard his teeth unhealthy which needs more care [11]. Also the data gathered from studying and physicians, and also personal experience of relationship between toothache and headache, cause more attention to dental and oral hygiene status. These Results is related to study population and doing a similar study in a different population may have different results. In a similar study by cempekersoy et al. showed that frequency of dental flossing in patient and control group was similar [18]. The frequency of dental visits in the patient group is higher than control group and is more regular. These frequent dental recalls result in more education and more suitable dental health. The results of the study indicated that most people (53.4%) with chronic headaches have regular dental visits and the frequency of dental visits in patient group is higher than control group. more frequent dental visits can attribute to their chronic headache.

The frequent and excessive use of non-narcotic analgesics such as aspirin and acetaminophen in chronic headache sufferers often perpetuates and worsens head pain rather than relieving it. It also interferes with standard, usually effective, pharmacologic therapy and prevents expected improvement [19]. Awareness of Analgesic rebound effect for prevention of drug interaction, result in more frequent dental visits in chronic headache patients. These patients defer self-medication and prefer to go to dental office for their dental problems [20]. These results are similar to cempekersoy et al. study. DMFT index in patient group was lower than control group but difference was not statistically significant ( $p$ -value=0.111). In Cempekersoy et al.'s study, DMFT in patient group was higher than control group, the cause of this difference was attributed to nausea, vomiting and gastrointestinal reflux in migraine patients which induce dental erosion and tooth decay. On the other hand, prevalence of TMD in migraine patients is higher than control group, which induce dental abrasion and tooth decay. In the present study, we assess DMFT index in a group of patients with chronic headache. Therefore, our results were affected by common factors in all types of chronic headache. Regarding tooth wear index, prevalence of tooth wear in patient and control group does not have statistically significant difference. Prevalence of tooth wear in

patient and control group was relatively high and this attributed to nutritional status and high prevalence of bruxism. Frequently dental visits in chronic headache patients, can lead to on time diagnosis of temporomandibular disorders and its predisposing factors such as premature contacts and bruxism. Therefore, tooth wear originating from bruxism decrease and effect of nutritional habits on tooth wear, will be highlighted [21]. Results of cempekersoy's study about tooth wear in migraine patients revealed that tooth wear in patient group was higher than control group and it was because of higher prevalence of TMD in migraine patients which is attributed to higher prevalence of bruxism in migraine patients. CPITN index in patient and control group was similar. Periodontal disease have a direct relationship with oral hygiene and frequency of tooth brushing and dental flossing [22]. Therefore, regarding no difference in patient and control group in frequency of dental brushing, there is no statistically significant difference in CPITN index between two groups. In cempekersoy's study, CPITN index in patient group was higher than control group, which was attributed to discontinue of oral hygiene index during migraine attack and dental plaque accumulation on the abraded tooth plaque.

## Conclusion

The present study was designed to evaluate the oral and dental health in chronic headache patients. These findings suggest that these patients have regular program for dental appointment and try to have good oral hygiene. Chronic headache us a prolonged health problem which can affect quality of life of the patient. In addition, chronic headache have a direct relationship with dental and temporomandibular joint disorders. Therefore, researches on this association and improvement of dental and oral health is very important in CH patients.

## Conflict of Interest

There is no conflict of interest to declare.

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