

# Clinical Characteristics of Headaches in Temporomandibular Disorder Patients : Primary Headache vs Headache Attributed to TMD

Ji-Won Ryu, D.D.S.,M.S.D., Kook-Jin Bae, D.D.S., Seong-Ju Hong, D.D.S.,  
Chang-Lyuk Yoon, D.D.S.,M.S.D,Ph.D., Jong-Mo Ahn, D.D.S.,M.S.D.,Ph.D.

*Dept. of Oral medicine, College of Dentistry, Chosun University*

The objective of this study was to describe the prevalence of the headache attributed to Temporomandibular disorder(TMD) symptoms and to investigate the relationships of headache and TMD. 66 patients seeking care for signs and symptoms of Temporomandibular disorders(TMD) and Orofacial pain in the department of oral medicine, Dental Hospital, Chosun University, from January, 2008 to June, 2008, were recruited. The obtained results were as follows :

1. A muscle and TMJ origin combined was the most common in study populations(54.55%), grouped as TMD classification.
2. Tension type headache was the most common in study population(89.39%), grouped as headache classification.
3. 36 patients out of 66(54.55%) had headaches which related to TMD.
4. Out of 36 patients who had suffered the headache which were attributed to TMD, 19 patients(52.78%) described that their headache related to TMD was different from their own primary headaches.

In conclusion, headache attributed to TMD is relatively common in the patients who had headaches and TMD symptoms together. And the new headache patterns may related to headache and TMD chronification. Larger-scale studies and more specified and controlled comparison study is needed to confirm the relationship between the headache and TMD.

Key words: Headache, Temporomandibular Disorder, ICHD-II

Corresponding author : Jong-Mo Ahn  
*Dept. of Oral Medicine, College of Dentistry,  
Chosun University  
Seosuk-dong 421, Dong-Gu, Gwang-Ju, 501-825  
Tel: 82-62-220-3896  
Fax: 82-62-234-2119  
E-mail: jmahn@chosun.ac.kr*

Received: 2009-06-25  
Revised: 2009-07-27  
Accepted: 2009-08-13

\* This study was supported by research funds from Chosun University, 2007

## I. INTRODUCTION

Temporomandibular disorders (TMDs) can be defined as a cluster of clinical problems that involve masticatory muscles, temporomandibular joint, or both, and associated structures.<sup>1)</sup> Population-based studies have reported the prevalence of TMD to be from 8% to 15% for women and from 3% to 10% for men,<sup>2)</sup> indicating that TMD are major causes of non-dental pain in the orofacial region.<sup>3)</sup>

In the orofacial region, headaches are also the common complaints of patients that present in all

Table 1. Clinical Diagnosis of TMD in the study population patients

Diagnosis (devided by the origins for TMD)	Number of patients(%)
Masticatory muscle	8(12.12)
Temporomandibular joint	22(33.33)
Masticatory muscle + Temporomandibular joint	36(54.55)
Total	66

practices of medicine, constitutes a large public health problem impacting both the individual sufferer and society.<sup>4)</sup>

Several clinical and epidemiological studies have demonstrated an association between headache and TMD, indicating that individuals with headache and TMD have a number of symptoms and signs in common.<sup>3,5-9)</sup> However, the exact relationship between those two entities is still largely unknown.<sup>3)</sup> In reviewing the articles about the relationship between headache and TMD, however, there has been no one discussing the prevalence and symptoms of headache related to TMDs, as we know.

For assuming the relationship between headache and TMD, it may be logical to evaluate the headache symptoms with the TMD symptoms.

The objective of this study was to describe the prevalence of the headache attributed to TMD symptoms and to investigate the relationships of headache and TMD.

## II. MATERIALS AND METHODS

### 1. Participants

A consecutive series of new patients seeking care for signs and symptoms of Temporomandibular disorders(TMD) and Orofacial pain in the department of oral medicine, Dental Hospital, Chosun University, from January, 2008 to June, 2008, were recruited. For inclusion, primary headache which did not related to any condition had to be presented two or more for 3 months. Patients with headaches which had occurred after trauma, infection were excluded.

Table 2. Clinical Diagnosis of primary headaches in the study populations

Diagnosis	Number of patients(%)
Migraine	6(9.09)
Tension type Headache	59(89.39)
Migraine + Tension type Headache	1(1.52)
Total	66(100)

### 2. Physical examination for TMD

The TMD examination was performed at the first visit, by expert dentists who had been trained on the orofacial pain and TMD. The TMD evaluation included measurements of mandibular movements and recordings of joint sounds. Pain, locking or luxation of the joints during movements were examined. TMJ and masticatory muscles were palpated bilaterally. The diagnosis about TMD were performed based on Research Diagnostic Criteria for temporomandibular disorders(RDC-TMD). In the study, we divided the patients into three diagnostic groups by the origin for TMD: Muscle disorder, Joint disorder, Muscle and Joint disorder combined.

### 3. Headache examination

Headache diagnosis was based on the second edition of International Classification of Headache Disorders (ICDH-II).<sup>10)</sup> Besides the diagnosis of primary headaches, we evaluated the headache which was related to TMD symptoms. If the patients had

headaches attributed to TMD, we evaluated the symptoms about the headaches (same or another type of headaches vs their own primary headaches).

Table 3. Prevalence of Headache attributed to TMD in the study population

	Number of patients(%)
Yes	36(54.55)
No	28(42.42)
Unknown	2(3.03)
Total	66(100)

Table 4. New pattern of headaches compared to their own primary headaches

	Number of patients(%)
Yes	19(52.78)
No	16(44.44)
Unknown	1(2.78)
Total	36(100)

Table 5. Diagnostic criteria for secondary headaches<sup>10)</sup>

---

A. Headache with one (or more) of the following [listed] characteristics and fulfilling criteria C and D  
 B. Another disorder known to be able to cause headache has been demonstrated  
 C. Headache occurs in close temporal relation to the other disorder and/or there is evidence of a causal relationship  
 D. Headache is greatly reduced or resolved within 3 months (this may shorter dor some disorders) after successful treatment or spontaneous remission of the causative disorder

---

Table 6. Diagnostic criteria for Headache or facial pain attributed to temporomandibular joint(TMJ) disorder<sup>10)</sup>

---

A. Recurrent pain in one or more regions of the head and/or face fulfilling criteria C and D  
 B. X-ray, MRI and/or bone scintigraphy demonstrate TMJ disorder  
 C. Evidence that pain can be attributed to the TMJ disorder, based on at least on of the following:  
 1. pain is precipitated by jaw movements and/or chewing of hard or tough food  
 2. reduced range of or irregular jaw opening  
 3. noise from one or both TMJs during jaw movements  
 4. tenderness of the joint capsule(s) of on or both TMJs  
 D. Headache resolves within 3 months, and does not recur, after successful treatment of the TMJ disorder

---

### III. RESULTS

A total of 66 patients (female: male: 52:14 ; mean age: 35.6212) were recruited. Out of 66 patients, 8(12.12%) had a masticatory muscle origin, 22(33.33%) had a TMJ origin, and 36(54.55) patients had a muscle and TMJ origin combined (Table 1). In regards of headache diagnosis, out of 66 patients recruited in the study, 59(58.39%) patients were affected tension type headache, 6(9.09%) patients suffered migraine, and only one patient(1.52%) had migraine and tension type headache (Table 2).

Out of 66 patients, 36(54.55%) patients had headaches which related to TMD. 28(42.42%) patients answered that their headache are not related to TMD. 2(3.03%) patients did not answered about the relationships between headache and TMDs (Table 3).

Out of 36 patients who had suffered the headache which were attributed to TMD, 19(52.78%) patients described that their headache related to TMD was different from their own primary headaches. 16(44.44 %) patients describe that the patterns of headaches with TMD were same to their own headaches. One patient(2.78%) did not answer. (Table 4).

#### IV. DISCUSSION

Both headache and temporomandibular disorders (TMD) are very prevalent conditions in the general population,<sup>2-5,11-19)</sup> representing a serious health problem and a major impact on society and on the quality of life of affected individuals.<sup>20-22)</sup> Although an evaluation and understanding of the possible relationship between TMD and headache is controversial, many previous studies have suggested that headache and TMD are related.<sup>5,23,24)</sup>

In our study population, most patients are affected with TMJ plus muscle origin(54.55%) in regards of TMD classification.(Table 1) These finding are consistent with those reported in previous studies.<sup>25-27)</sup> However, myofascial pain, which is one of the most common diagnosis in the TMD classification, is characterized by a regional, dull, aching muscle pain and the presence of localized trigger points in the muscle, tendon, or fascia and is known to a pathogenetic factor in tension type headache and migraine.<sup>28-30)</sup> Maybe this difference is explained by the classification for TMD. We classified the groups for anatomic origin, not the pain origin. However, there is a study suggesting a close relationship between primary headache and painful TMDs that subjects with frequent headaches had a threefold increase in risk of having pain dysfunction syndrome of TMJ.<sup>31)</sup> So in the future study, grouping by the TMD classification should be revised and precised.

In regards of headache diagnosis, the tension type headache is the most prevalent disorder in our study population(89.39%). These finding are consistent with those reported in previous studies.<sup>26,27)</sup> Jensen and Olsen, postulated a tension headache model system, suggesting that varying amounts of masticatory muscle overactivity can stimulate an acute headache in the test subjects.<sup>32)</sup> Several studies have been performed on the evaluation of headache features in TMDs patients and have hypothesized a clinical and pathogenetic link between the myogenous components of TMDs and those occurring inpatients with tension type headache

(TTH).<sup>32,33)</sup>

But such as above the previous studies had been focused on the primary headache and TMD relationship. Because of an anatomical relationship and neural denervation, TMD may cause headache, worsen existent primary headache.<sup>28)</sup> However, a certain chronification may exist, even though there are so many factors affecting this phenomenon. The uniqueness of our study is that we evaluated the headache attributed TMD and try to describe the pattern.

In the study population, they all had the primary headaches, and 54.55% (36 out of 66) had the headaches which related to TMD symptoms.(Table 3) According to the ICHD-II classification<sup>10)</sup>, they suggested headache attributed to temporomandibular joint disorder. Diagnostic criteria for secondary headaches are described in table 5 and headache or facial pain attributed to TMJ disorder(11.8 in ICHD-II) is in table 6. If the patient had a primary headache and a certain disease made significantly worse the existed primary headache in close temporal relationship, the patient could be diagnosed as primary headache and the secondary headache, according to ICHD-II guideline.<sup>10)</sup>

In the study, 44.44% (16 out of 36) patients with headache related to TMD had the same patterns of headache.(Table 4) These are diagnosed as headache attributed to TMJ disorder according to ICHD-II guideline. But the rest of them (54.55%; 19 out of 36) experienced new patterns of headache. We didn't evaluate the symptoms specifically, however, new symptoms must be examined in the following study and these may be key factors the relationship between headaches and TMDs. Because the study sample is relatively small, we didn't evaluate the relationship between the type of primary headaches and the TMD symptoms. But the tension type headache and TMJ plus masticatory muscle origin were the most prevalent in those with the new headache patterns.

The present studies focus on the common symptoms on headache and TMD, such as cutaneous allodynia and choronic pain grade classification and

depression.<sup>3,34</sup> In the long term, identification of common features or associations between TMD and headache may have a major impact on future treatment strategies and clarify the importance of an interdisciplinary effort between different specialities, e.g. dentists, psychologists and neurologists.<sup>38</sup> It is also important to target the common symptoms that both headaches and TMDs are treated efficiently. However, it is more important to evaluate the relationship. Both experimental methods and clinical retrospective study is needed.

#### REFERENCES

1. The American Academy of Orofacial Pain. Differential diagnosis and management considerations of temporomandibular disorders. In: Okenson JP(Ed). Orofacial pain: guidelines for assessment, diagnosis and management. American Academy of Orofacial Pain. Chicago, 1996, Quintessence Publishing Co, Inc, pp. 113-141.
2. LeResche L. Epidemiology of temporomandibular disorders: implications for the investigation of etiologic factors. *Crit Rev Oral Biol Med* 1997;8:291-305.
3. Ballegaard V, Thede-Schmidt-Hansen P, Svensson P, Jensen R. Are headache and temporomandibular disorders related? A blinded study. *Cephalalgia* 2008 ;28(8):832-841.
4. Rasmussen BK, Jensen R, Schroll M, Olesen J. Epidemiology of headache in a general population—a prevalence study. *J Clin Epidemiol* 1991;44:1147 - 1157.
5. Ciancaglini R, Radaelli G. The relationship between headache and symptoms of temporomandibular disorder in the general population. *J Dent* 2001;29:93 - 98.
6. Glaros AG, Urban D, Locke J. Headache and temporomandibular disorders: evidence for diagnostic and behavioural overlap. *Cephalalgia* 2007;27:542 - 549.
7. Rantala MA, Ahlberg J, Suvinen TI *et al*. Temporomandibular joint related painless symptoms, orofacial pain, neck pain, headache, and psychosocial factors among non-patients. *Acta Odontol Scand* 2003;61: 217-222.
8. Nassif NJ, Talic YF. Classic symptoms in temporomandibular disorder patients: a comparative study. *Cranio* 2001;19:33-41.
9. Pettengill C. A comparison of headache symptoms between two groups: a TMD group and a general dental practice group. *Cranio* 1999; 17:64-9.
10. Headache Classification Subcommittee of the International Headache Society. The International Classification of Headache Disorders, 2nd edn. *Cephalalgia* 2004; 24 (Suppl. 1):1-160.
11. Scher AI, Stewart WF, Liberman J, Lipton RB. Prevalence of frequent headache in a population sample. *Headache* 1998; 38:497-506.
12. Stovner L, Hagen K, Jensen R *et al*. The global burden of headache: a documentation of headache prevalence and disability worldwide. *Cephalalgia* 2007;27:193-210.
13. Schwartz BS, Stewart WF, Simon D, Lipton RB. Epidemiology of tension-type headache. *JAMA* 1998; 279:381-383.
14. Stewart WF, Shechter A, Rasmussen BK. Migraine prevalence. A review of population-based studies. *Neurology* 1994;44 (6 Suppl. 4):S17-23.
15. Gesch D, Bernhardt O, Alte D *et al*. Prevalence of signs and symptoms of temporomandibular disorders in an urban and rural German population: results of a population-based study of health in Pomerania. *Quintessence Int* 2004;35:143-150.
16. Jensen R, Rasmussen BK, Pedersen B, Lous I, Olesen J. Prevalence of oromandibular dysfunction in a general population. *J Orofac Pain* 1993;7:175-182.
17. Lipton JA, Ship JA, Larach-Robinson D. Estimated prevalence and distribution of reported orofacial pain in the United States. *JADA* 1993;124:115-121.
18. De Kanter RJ, Truin GJ, Burgersdijk RC *et al*. Prevalence in the Dutch adult population and a meta-analysis of signs and symptoms of temporomandibular disorder. *J Dent Res* 1993;72:1509 - 1518.
19. Lyngberg AC, Rasmussen BK, Jorgensen T, Jensen R. Has the prevalence of migraine and tension-type headache changed over a 12-year period? A Danish population survey. *Eur J Epidemiol* 2005;20:243-249.
20. Holroyd KA, Stensland M, Lipchik GL, Hill KR, O'Donnell FS, Cordingley G. Psychosocial correlates and impact of chronic tension-type headaches. *Headache* 2000;40:3 - 16.
21. Rasmussen BK, Jensen R, Olesen J. Impact of headache on sickness absence and utilisation of medical services: a Danish population study. *J Epidemiol Community Health* 1992;46:443-446.
22. Leonardi M, Musicco M, Nappi G. Headache as a major public health problem: current status. *Cephalalgia* 1998;18 (Suppl. 21):66 - 69.
23. Kemper JT Jr, Okeson JP. Craniomandibular disorders and headaches. *J Prosthet Dent* 1983;49:702 - 705.

24. Molina OF, dos Santos J Jr, Nelson SJ, Grossman E. Prevalence of modalities of headaches and bruxism among patients with craniomandibular disorder. *Cranio* 1997;15:314-25.
25. Hentschel K, Capobianco DJ, Dodick DW. Facial pain. *Neurologist* 2005; 11:244 - 249.
26. Kang JK, Ryu JW, Choi JH, Merrill RL, Kim ST. Application of ICHD-II criteria for headaches in a TMJ and orofacial pain clinic. *Cephalalgia* 2009; Apr 30. (Epub ahead of print)
27. Kim ST, Kim CY. Use of the ID Migraine questionnaire for migraine in TMJ and Orofacial Pain Clinic. *Headache* 2006;46(2):253-258
28. Graff-Radford SB, Reeves JL, Jaeger B. Management of chronic head and neck pain: effectiveness of altering factors perpetuating myofascial pain. *Headache* 1987;27:186-190.
29. Olesen J. Clinical and pathophysiological observations in migraine and tension type headache explained by integration of vascular, supraspinal and myofascial inputs. *Pain* 1991;46:125-132.
30. Malick A, Burstein R. Peripheral and central sensitization during migraine. *Funct Neurol* 2000;15 (suppl 3):28-35.
31. Macfarlane TV, Gray RJM, Kincey J, Worthington HV. Factors associated with the temporomandibular disorder, pain dysfunction syndrome (PDS): Manchester case-control study. *Oral Dis* 2001;7:321 - 330.
32. Jensen R, Olesen J. Initiating mechanisms of experimentally induced tension-type headache. *Cephalalgia* 1996;16:175-182.
33. Liljestrom MR, Jamsa T, Le Bell Y *et al*. Signs and symptoms of temporomandibular disorders in children with different types of headache. *Acta Odontol Scand* 2001;59:413 - 417.
33. Svensson P. Muscle pain in the head: overlap between temporomandibular disorders and tension-type headaches. *Curr Opin Neurol* 2007;20:320-325.
34. Bevilacqua-Grossi D, Lipton RB, Napchan U, Grosberg B, Ashina S, Bigal ME. Temporomandibular disorders and cutaneous allodynia are associated in individuals with migraine. *Cephalalgia* 2009; Jul 9. (Epub ahead of print)

---

## 국문초록

# 측두하악장애 환자의 두통 양상의 분류 : 일차성 두통 vs 측두하악장애로 인한 두통

조선대학교 치과대학 구강내과학교실

유지원 · 배국진 · 홍성주 · 윤창륙 · 안종모

본 연구는 측두하악장애와 연관된 두통의 유병율을 평가하고 측두하악장애와 연관된 두통의 양상을 평가함으로써 두통과 측두하악장애와의 관계를 평가하기 위하여 시행되었다. 2008년 1월부터 2008년 6월까지 측두하악장애 관련 증상을 주소로 조선대학교 치과병원 구강내과에 내원한 환자 중 일차성 두통을 가지고 있는 환자 66명을 대상으로 하여, 측두하악장애, 두통에 관한 평가를 시행하였다. 연구결과는 다음과 같다.

1. 측두하악장애를 기준으로 분류하였을 경우, 측두하악관절 및 저작근이 동시에 이환된 경우가 66명 중 36명(54.5%)로 가장 많았다.
2. 두통을 기준으로 분류하였을 경우, 긴장성 두통이 66명중 59명(89.39%)로 가장 많았다.
3. 66명 중 36명(54.5%)이 측두하악장애와 연관된 두통을 호소하였다.
4. 측두하악장애와 연관된 두통을 호소한 36명 중 19명(52.78%)이 본래 존재한 일차성 두통과는 다른 양상이 측두하악장애와 연관되어 나타난다고 하였다.

즉 측두하악장애와 일차성 두통을 동시에 가지고 있는 경우, 측두하악장애와 연관된 두통이 상대적으로 흔하게 발생된다고 볼 수 있을 것이다. 또한 그 중 과반수 이상이 기존 두통양상과는 다른 증상을 호소하는 것으로 보아, 측두하악장애와 두통의 연관성을 연구하는데 있어 새로운 두통양상에 대한 연구가 추가적으로 이루어져야 할 것이다. 또한 측두하악장애와 두통과의 연관성을 평가하기 위해서는 보다 많은 모집단을 대상으로, 보다 세분화된 기준을 가지고 대조군을 설정하여 평가하는 것이 추후에 필요할 것으로 사료된다.

주제어: 두통, 측두하악장애, 국제두통분류 개정판

---