

The Relationship between TMJ Dysfunction, Reported Bruxism and Recurrent Headaches

Odnos između temporomandibularne disfunkcije, bruksizma i povratnih glavobolja

Robert G. Jagger¹, MScD
FDSRCS
Isabelle Cunningham², BDS
FDSRCS
Daryll C Jagger³, MSc
FDRSC

¹Senior Lecturer & Consultant in Prosthetic Dentistry, Department of Restorative Dentistry, University of Wales College of Medicine, Dental School, Heath Park, Cardiff CF4 4 XY

²Community Dental Officer, Gwent Community Health Authority NHS Trust

³Lecturer, Division of Restorative Dentistry, Dental School, Lower Maudlin Street, Bristol

Summary

This study investigates the relationship between reported bruxism, recurrent headaches and signs of TMJ dysfunction. 244 consecutive patients attending the Examination and Emergency Primary Care Unit for dental treatment, were examined for signs of TMJ dysfunction. The patients also completed a questionnaire which determined the prevalence of recurrent headaches and habitual bruxism. Results were analysed using cross-tabulation to obtain chi-square values to investigate associations between reported bruxism, recurrent headaches and TMJ dysfunction. There was a highly significant relationship between:

TMJ and masticatory muscle pain and recurrent headaches ($p < 0.005$);

Reported bruxism and TMJ and masticatory muscle pain ($p < 0.001$), and a significant relationship between:

Reported bruxism and recurrent headaches ($p < 0.05$).

The frequency of the signs and symptoms provides support for closer liaison between dentists and other disciplines to provide improved education, treatment and research in the fields of headaches and orofacial pain.

Key words: *TMJ dysfunction, bruxism, headaches*

Acta Stomatol Croat
1997; 207—212

ORIGINAL SCIENTIFIC
PAPER

Received: May, 14, 1997

Primljeno: 14. svibnja 1997.

Introduction

Clinical and epidemiological studies have demonstrated a significant relationship between symptoms of temporomandibular joint (TMJ) dysfunction

and recurrent headaches (1,2). Magnusson and Carlsson (1) for example reported that 70% of patients referred to a clinic for treatment of TMJ dysfunction also suffered regular headaches compared with 34% of a control group. A high incidence of sy-

ptoms of TMJ dysfunction has also been reported in groups of headache patients (3-5).

Experimental bruxism can lead to headache and symptoms of TMJ dysfunction (6) and clinical studies have demonstrated that the incidence of reported bruxism is significantly higher in headache patients than in control groups (2).

The purpose of the present study was to further investigate the association between symptoms of TMJ dysfunction, reported bruxism and recurrent headache by determining the incidence and relationships of these parameters in a single population.

Materials and Methods

Consecutive patients attending for dental treatment at the Examination and Emergency Primary Care Unit of the Dental Hospital over a five day period were included in the study. Patients below the age of 16 and patients with headaches that could be related to a known medical condition (e.g. hypertension) were excluded. All patients included in the study were asked the following questions:

1. Do you have headaches once a month or more?
2. Do you often clench or grind your teeth?

Those patients who responded yes to the first question were asked a further set of questions to provisionally diagnose and classify the headaches using diagnostic criteria proposed by Blau (7-9) (Table 1) which enables a provisional headache diagnosis to be assigned.

All patients were then examined by one clinician (IC) who was unaware of the answers to the questions relating to the headaches. The lateral aspects of the TMJ joints were gently palpated in order to detect crepitus of clicking associated with uncoordinated movement of the head of the mandibular condyle during opening and closing of the mouth. The joints were then firmly palpated laterally and posteriorly and patient was asked whether this palpation caused pain.

Left and right temporalis, masseter and lateral pterygoid muscles were palpated according to standard procedures described by Hansson and Nilner (10) and the patient was again asked whether pal-

Table 1. *Headache diagnosis (after BLAU, J.N. 1985)*

Tablica 1. *Dijagnosticiranje glavobolje (po J. N. BLAU, 1985)*

1 Negative	No headaches or headaches less than once per month
2 Common migraine	Headache not present most days of the week and presence of three of: (a) usually unilateral (b) usually accompanied by nausea/vomiting (c) described as throbbing/pulsating (d) photophobia during headache
3 Classical migraine	Headache not present most days of the week and patient reports any neurological changes, hemiparaesthesia, hemiparesis
4 Tension headache Type I	Headache twice a week or more and bilateral, plus three of: (a) dull ache all over (b) sensation of pressure around head present constantly through the day (c) analgesic no effect (d) increase with stress
5 Tension headache Type II	Headache twice a week or more, localized to a certain area plus one of: (a) certain periods of the day only (b) analgesic help
6 Combination headache	Features of tension headache and migraine
7 Other headache	

pation caused pain. Note was made of any specific muscle causing pain. Results were analysed using cross-tabulation to obtain chi-square values in order to investigate associations between reported bruxism, headaches and TMJ and masticatory muscle pain.

Results

The investigation included 244 patients (123 males, 121 females). The mean age was 38 years (standard deviation 17 years).

56 patients (23%) were aware of habitually clenching of grinding their teeth.

88 patients (36%) reported suffering from recurrent headache, i.e., at least once a month whilst of these, 32 (13%) reported suffering from headaches twice a week or more. The provisional diagnosis of these headache patients is shown in Table 2.

Table 2. *Provisional headache diagnoses*
Tablica 2. *Provizorne dijagnoze glavobolje*

Headache	Yes	%
Headache more than once/month	88	36
Provisional diagnosis:		
(a) Classic migraine	10	4
(b) Common migraine	7	3
(c) Tension Type I	6	3
(d) Tension Type II	10	4
(e) Combination	13	5
(f) Other	42	17
Total migraine headaches (a, b and e)	30	12
Total tension headaches (c and d)	16	7
Other headaches (f)	42	17

The findings of the TMJ examination are given in Table 3. 88 patients (36%) were adjudged to have tenderness to palpation of one more TMJs or muscles of mastication. Table 4.

Of those 56 patients who reported bruxing, 32 (57%) had TMJ or muscle tenderness whilst of those 188 that were not aware of bruxing, only 56 (30%) had tenderness. This was a highly significant association: Chi square=15.2 df=1 p=0.0005.

Table 3. *TMJ and muscle signs*
Tablica 3. *Simptomi čeljusnog zgloba i mišića*

	Number	%
No TMJ signs (Muscle pain, TMJ pain or sound)	114	47
Signs of TMJ dysfunction:	130	53
Click TMJ	61	25
Crepitus TMJ	18	7
TTP TMJ posterior	2	1
TTP TMJ lateral	23	9
TTP temporalis	26	11
TTP masseter	43	18
TTP lateral pterygoid	46	19

TTP = tenderness to palpation

Table 4. *TMJ and muscle signs*
Tablica 4. *Simptomi čeljusnog zgloba i mišića*

	Number	%
1 Negative	114	47
2 Total patients with TMJ and/or muscle signs:	130	53
Joint sound only	42	17
Patients with joint and/or muscle pain	88	36

Of those 156 that reported no recurrent headache, 27 (17%) were aware of habitual clenching or grinding. Of those 30 with a provisional diagnosis of migrainous headache 9 (30%) were aware of clenching or grinding whilst of those 58 with other headaches 20 (34%) were aware of clenching or grinding. Whilst the magnitude of this association suggests a relationship between clenching and both migrainous and other headaches it was considered that the numbers in the headache subgroupings were too small to justify statistical analysis. There was, however, a significant relationship between reported bruxing and all headaches. Chi square=8.0 df=2 p<0.018.

Of the 156 (64%) with no recurrent headaches 42 (27%) had TMJ or muscle tenderness whilst 16 (53%) of the 30 migraine patients and 30 (52%) of the 58 patients with other headaches had tenderness. Again, the headache numbers are considered relatively small but there is a highly significant rela-

relationship between TMJ and muscle tenderness and recurrent headache. Chi square=15.2 df=2 p=0.0005.

Discussion

Standard muscle and joint palpation procedures were used to detect the presence of signs of TMJ dysfunction (9) and all patients were examined by the same examiner in order to exclude inter-observer variability (11).

The results of muscle and joint palpation must be interpreted with caution. In particular Johnstone and Templeton (12) suggested that it is not possible to palpate the lateral pterygoid muscle directly and that pressure distal to the pterygoid notch can also elicit pain from the superficial head of medial pterygoid and/or insertion of temporalis.

The findings of muscle and joint palpation mirrored the high incidence of objective signs of TMJ dysfunction reported in previous epidemiological surveys (1).

Methods and criteria for detecting joint sounds differ in various studies and this will affect the results. The present study did not include the use of a stethoscope and the recorded incidence of joint sounds was 32%. It is of interest to note that an extensive review of the literature (13) concluded that 30% is an approximate mean for joint sounds in most non TMJ dysfunction patient populations.

For the purpose of this study, recurrent headache was defined as being a headache that occurs more than once per month. The incidence of such headaches was high (36%). This finding is in agreement with previous investigations (14,15).

Twenty - three per cent of patients reported that they were aware of habitually grinding or clenching their teeth. This figure may underestimate the true number since people may be unaware of unconscious parafunction during the day or of nocturnal bruxism during their sleep. Marbach et al. (16) however cautioned that dentists may inform patients that they habitually clench or grind their teeth merely because they have symptoms of TMJ dysfunction. Nonetheless a significant relationship ($p < 0.001$) between reported clenching and grinding and symptoms of TMJ dysfunction was demonstrated.

The diversity of conditions causing headache and orofacial pain is illustrated by the International He-

adache Society's Classification of Headache Disorders, Cranial Neuralgias and Facial Pain (17) in which thirteen separate categories are recognized. It has been estimated that more than 90% of patients with headaches referred to outpatient departments for diagnosis and treatment are muscle contraction or migraine types (8).

Blau (7-9) has outlined specific diagnostic criteria for the categories of migraine and muscle contraction headaches and by use of a questionnaire a provisional diagnosis can be made. Accurate diagnosis of a headache necessitates a full history and examination by a qualified medical practitioner and the limitations of the questionnaire approach to diagnosis must be emphasized. In this study the questionnaire proved useful for provisionally diagnosing migraine headaches. No such distinct separation occurred for many other recurrent headaches (Table 2). 42 of 88 patients with recurrent headaches could only be classified as 'other' headache. Whilst the magnitude of the association suggested a relationship between bruxing/clenching and migraine headaches, numbers were too small to justify statistical analysis.

A significant relationship was demonstrated however between both TMJ and masticatory muscle pain and all recurrent headaches and bruxism and all recurrent headaches. These correlations support the findings of clinical investigations of patients in headache clinics (3-5, 18,19).

General dental practitioners' knowledge of craniofacial anatomy and related disorders of these structures should enable them to readily diagnose common TMJ disorders. Dental students and dentists are less well instructed in differential diagnosis of headaches and in the important relationships of headache with TMJ dysfunction and bruxism confirmed by this study.

Relatively simple treatment methods will provide improvement of symptoms of many patients with TMJ dysfunction and associated recurrent headaches. Treatment techniques include behaviour modification, occlusal splints and the appropriate use of drugs for acute cases. The work of Quayle et al. (20) has demonstrated that inter-occlusal splints might also benefit many patients suffering recurrent headaches that are not associated with symptoms of TMJ dysfunction.

Facial pain and recurrent headaches impose a significant burden on the community in terms of suffering and days off school and work (21,22). The results of the present study provide support for closer inter-disciplinary cooperation to provide improved education, treatment and further research in the field of headaches and orofacial pain.

Conclusions

1. This study demonstrated a significant between:

(i) Bruxism and TMJ pain dysfunction $p < 0.001$

(ii) Bruxism and recurrent headache $p < 0.05$

(iii) TMJ pain dysfunction recurrent headache $p < 0.001$.

2. They frequency of signs and symptoms provides support for closer interdisciplinary liaison to provide improved education, treatment and further research in the field of headaches and orofacial pain.

Acknowledgments

The authors are also grateful to Dr E Absi for allowing access to his patients.

ODNOS IZMEĐU TEMPOROMANDIBULARNE DISFUNKCIJE, BRUKSIZMA I POVRATNIH GLAVOBOLJA

Sažetak

Istraživanjem se ispitivao odnos između bruksizma, ponavljajuće glavobolje i disfunkcije čeljusnoga zgloba. Ispitivanjem je obuhvaćeno 244 uzastopnih pacijenata Odjela za stomatološku prvu pomoć, a sa svrhom da se prepoznaju znakovi disfunkcije čeljusnoga zgloba. Pacijenti su također ispunjavali upitnik kako bi se odredila prevalencija ponavljajuće glavobolje, vrijednost rezultata dokazivana s pomoću χ^2 - testa, kako be se provjerila povezanost između bruksizma, ponavljajuće glavobolje i disfunkcije čeljusnoga zgloba. Utvrđena je statistički znatna povezanost između bolova zgloba i žvačnih mišića s ponavljajućom glavoboljom ($p < 0,005$) i bruksizma s bolovima zgloba i žvačnih mišića ($p < 0,001$). Isto tako utvrđena je znatna povezanost između bruksizma i ponavljajućih glavobolja ($p < 0,05$).

Čestoća simptoma i znakova pokazuje kako je potrebno povezivati stomatologiju i relevantne medicinske specijalnosti sa svrhom bolje edukacije, liječenja i istraživanja u orofacijalnoj boli i glavoboljama.

Ključne riječi: disfunkcije čeljusnoga zgloba, bruksizam, glavobolja

Address for correspondence:
Adresa za dopisivanje:

Mr Robert G Jagger
Senior Lecturer & Consultant
in Restorative Dentistry,
University of Wales College
of Medicine, Dental School,
Heath Park, Cardiff CF4 4XY

References

1. HELKIMO M. Epidemiological surveys of dysfunction of the masticatory system. Oral Science Reviews 1976;7:54-69.
2. MAGNUSSON T, CARLSSON GE. Comparison between two groups of patients in respect of headache and mandibular dysfunction. Swed Dent J 1978;2:85-92.
3. FORSELL H, KANGASNIEMI P. Mandibular dysfunction in patients with muscle contraction headache. Proc Fin Dent Soc 1984;80:211-216.

4. FORSELL H, KANGASHIEMI P. Mandibular dysfunction in patients with migraine. *Proc Fin Dent Soc* 1984;80:217-222.
5. LOUS L, OLESEN J. Evaluation of pericranial tenderness and oral function on patients with common migraine, muscle contraction headache and 'combination headache'. *Pain* 1982;12:385-393.
6. VASTERGAARD CHISTIENSEN L. Some effects of experimental hyperactivity of the locomotor system in man. *J Oral Rehab* 1975;169-178.
7. BLAU JN. Tension headaches: clinical features and an attempt at clarification. In: Ferrari MD and Lataste X (Eds). *Migraine and Other Headaches*. Parthenon Publishing Group 1989;65-71.
8. BLAU JN. Are common migraine and tension headaches clinically distinguishable? In: Ferrari MD and Lataste X (Eds): *Migraine and Other Headaches*. Parthenon Publishing Group 1989;131-137.
9. BLAU JN. How to take a history of head or facial pain. *Br Med J* 1985;285:1249-1251.
10. HANSSON T, NILNER M. A study of the occurrence of symptoms of diseases of the temporomandibular joint masticatory musculature and related structures. *J Oral Rehab* 1975;2:313-324.
11. DWORKIN SF, Le RESCHE L, De ROUEN T et al. Assessing clinical signs of temporomandibular disorders. *J Prosthet Dent* 1990;63:574-579.
12. JOHNSTONE DR, TEMPLETON M. The feasibility of palpating the lateral pterygoid muscle. *J Prosthet Dent* 1980;44:318-323.
13. WABEKE KB, HANSSON TL, HOOGSTRATEN J, Van der KUY P. Temporomandibular joint clicking. A literature overview. *J Craniomandibular Disord Fac Oral Pain*, 1989;3:163-173.
14. AGERBERG G, CARLSSON GE. Functional disorders of the masticatory system. Distribution of symptoms according to age and sex as judged from investigation by questionnaire. *Acta Odontol Scand* 1972;30:597-613.
15. MAGNUSSON T, CARLSSON GE. Comparison between two groups of patients in respect of headache and mandibular dysfunction. *Swed Dent J* 1978;2:85-92.
16. MARBACH JJ, RAPHAEL KG, DOHRENWEND BP, LENNON MC. The validity of tooth grinding measures. Aetiology of pain dysfunction syndrome revisited. *J Am Dent Assoc* 1990;120:327-333.
17. Cephalgia. Classification and diagnostic criteria for headache disorders cranial neuralgias and facial pain. 1988, *Cephalgia* 8: Suppl 7, Norwegian University Press.
18. MOSS RA, LOMBARDO TW, MARLIN-HODGSON J, J'CARROL K. Oral habits in common between tension headache and non-headache populations. *J Oral Rehab* 1989;16:71-74.
19. SCHOKKER RP. Craniomandibular disorders in headache patients. *J Craniomandib Disord Fac Oral Pain* 1989;3:71-74.
20. QUAYLE AA, GRAY RJM, METCALFE RJ, GUTHRIE E, WASTELL D. Soft occlusal splint therapy in the treatment of migraine and other headaches. *J Dent* 1990;18:123-129.
21. LOCKER D, GRUSCHKA M. The impact of oral and facial pain. *J Dent Res* 1987;66:1414-1417.
22. STERNBACH RA. Survey of pain in the United States. The Nupren Pain Report. *Clin J Pain* 1986;2:49-53.