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## Accompanying symptoms and psychiatric comorbidity in migraine and tension-type headache patients

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### Abstract

**Objective:** Our objective was to assess the prevalence of accompanying symptoms of migraine and tension-type headache in patients with such conditions (both episodic and chronic) and in headache-free controls, and their relationship with depression and anxiety. **Method:** A psychological assessment (Axis I, DSM-IV) was performed, and 21 accompanying symptoms were investigated in 506 patients with episodic migraine (231), chronic migraine (102), episodic tension-type headache (83), and chronic tension-type headache (90) and in 80 controls. The relationship between symptoms, headache type, and psychiatric comorbidity

was analyzed. **Results:** The mean number of symptoms was significantly higher in patients ( $n=10.3$ ) than in controls ( $n=3.4$ ). Most symptoms were significantly associated with depression and anxiety, while only some of them were significantly associated with headache, with no relevant difference among groups. **Conclusion:** In headache patients, psychiatric comorbidity (compared with headache type or chronicity) seems to be more strictly associated with an increased burden of accompanying symptoms.

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**Keywords:** Migraine; Tension-type headache; Depression; Anxiety; Accompanying symptoms

### Introduction

It is well known that headache is frequently accompanied by physical and psychiatric complaints. Likewise, the association between headache and psychiatric disorders (the most common being between headache and depression and anxiety) has been extensively explored [1–3], as demonstrated by epidemiological and prospective studies [4–12]. Furthermore, subjects with a combination of anxiety disorders and major depression are more likely to have migraine compared with those with depression or anxiety only [3,13]. The relationship between headache and depression and/or anxiety disorders seems to be bidirectional [4,5,8,13], and recent evidence suggests that

such disorders may influence headache history in the long term [9].

Patients suffering from different headache types usually complain of numerous accompanying symptoms (behavioral and somatic), which may be partially related to psychiatric comorbidity [14], in particular to anxiety and mood disorders (Axis I, DSM-IV). In a previous study [15], somatic symptoms were demonstrated to be more common in patients with chronic migraine [CM; considered by the authors as a combined diagnostic category encompassing transformed migraine, migraine with tension-type headache (if  $\geq 15$  headache days/month), and new daily persistent headache] and what they referred to as chronic daily headache (if  $\geq 15$  headache days/month but not fulfilling criteria for CM). The symptoms were more common in the presence of a higher frequency of severe headaches, and with depression or anxiety, diagnosed on the basis of clinical impression or self-report [15]. However, the authors could not distinguish any specific pattern of symptoms

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between migraine and tension-type headache, and diagnoses of psychiatric comorbidities were made clinically rather than by a standardized interview.

The purposes of this study were: (a) to investigate the prevalence of accompanying symptoms in patients with migraine and tension-type headache (both episodic and chronic) compared to that in normal controls; and (b) to assess the extent to which the symptoms were associated with headache type and/or to comorbid mood and anxiety disorders.

## Method

### Patients

Five hundred six patients consecutively referred to the Unit of Headache–Facial Pain, Department of Clinical Pathophysiology, University of Turin (Turin, Italy) and fulfilling the International Headache Society (IHS) diagnostic criteria [16] for episodic migraine (EM), episodic tension-type headache (ETTH), CM, and chronic tension-type headache (CTTH) were enrolled. The chronic forms (CM and CTTH) were those characterized by a headache frequency higher than 15 days/month for at least 3 months [16]. Exclusion criteria were (a) the presence of other comorbid major medical illnesses (acute or chronic inflammatory disorders and endocrine, nervous, cardiovascular, liver, and kidney diseases) superimposing on the headache and (b) medication overuse, according to IHS criteria [16]. Patient distribution was as follows: 231 had EM (22 men, 209 women), 83 had ETTH (13 men, 70 women), 102 had CM (6 men, 96 women), and 90 had CTTH (14 men, 76 women). Eighty headache-free controls (10 males, 70 females), without mood and anxiety disorders, were also recruited; their mean age ( $42.4 \pm 11.7$  years) was not significantly different ( $P > .05$ , Student's *t* test) from that of patients ( $39.2 \pm 14.0$  years).

### Measures

After giving informed consent, every patient underwent a neurological examination and a psychological assessment on Axis I (anxiety, mood, and somatoform disorders) DSM-IV by means of a structured interview (Structured Clinical Interview for DSM-IV Axis I Disorders) [17]. The presence of accompanying symptoms (behavioral or somatic) was then investigated with a semistructured interview, using a checklist of 21 items. These items, on a previous study [18], had shown a significantly different prevalence when used for screening among healthy subjects and groups of patients suffering from hormonal, vascular, neurological, and psychiatric disorders. Each symptom was considered positive if claimed as habitual or was significantly present in the last 6 months such that it was remembered as annoying by the patient. We considered oral parafunctions (such as tooth grinding, clenching, lip biting, and nail biting) as habits. Circulatory disorders were peripheral vascular or capillary circulation disorders. The same semistructured interview, with the checklist of 21 items, was also administered to the controls.

### Statistical methods

The prevalence of depression and anxiety was assessed in the four headache diagnostic groups (EM, ETTH, CM, and CTTH) and compared by chi-square test.

The mean numbers of symptoms were compared among the headache groups and the control group by means of one-way analysis of variance (ANOVA), with Bonferroni test for multiple comparisons among groups (differences with *P* values  $< .05$  were considered as statistically significant). Then, within each headache group, the numbers of symptoms were compared in patients with and in patients without psychiatric comorbidity (depression and/or anxiety) by means of Mann–Whitney *U* test.

Table 1

Age (mean  $\pm$  S.D.), psychiatric comorbidity (number and percentage of patients), and number of symptoms (mean  $\pm$  S.D.) in EM, ETTH, CM, and CTTH groups and in controls

	EM ( <i>n</i> =231; 22 M, 209 F)	ETTH ( <i>n</i> =83; 13 M, 70 F)	CM ( <i>n</i> =102; 6 M, 96 F)	CTTH ( <i>n</i> =90; 14 M, 76 F)	Controls ( <i>n</i> =80; 10 M, 70 F)
Age (years)	40.3 $\pm$ 13.3	37.5 $\pm$ 14	39.7 $\pm$ 13.8	38 $\pm$ 14	42.4 $\pm$ 11.7
Depression	37 (16%)	13 (16%)	35 (35%)	13 (14%)	—
Anxiety	35 (15%)	15 (18%)	31 (30%)	21 (23%)	—
Anxiety+depression	48 (21%)	7 (8%)	16 (15%)	22 (25%)	—
Total psychiatric comorbidity	120 (52%)*	35 (42%)*	82 (80%)*	56 (62%)*	—
Number of symptoms (All)	10.32 $\pm$ 5.29	9.45 $\pm$ 4.58	11.33 $\pm$ 4.98	10.09 $\pm$ 4.87	3.95 $\pm$ 3.33**
Number of symptoms (WO)	7.32 $\pm$ 4.26***	7.44 $\pm$ 4.07***	7.30 $\pm$ 4.56***	7.78 $\pm$ 4.38***	—
Number of symptoms (W)	13.01 $\pm$ 4.86***	12.2 $\pm$ 3.77***	12.51 $\pm$ 4.48***	11.63 $\pm$ 4.59***	—

M=males; F=females; All=all patients; W=patients with depression or anxiety or both; WO=patients without depression or anxiety.

\*  $\chi^2 = 48.81$ , *df*=3,  $P < .0001$ , chi-square analysis of the different prevalences of psychiatric comorbidity across the four diagnostic groups.

\*\*  $P < .001$ ,  $F = 29.8$ , *df*=4, 582, one-way ANOVA (Bonferroni test used to compare the mean number of symptoms among the four headache groups and the controls).

\*\*\*  $P < .0001$  [Mann–Whitney Rank Sum test used to compare, in each group, the mean number of symptoms between patients with (W) and without (WO) depression or anxiety.

Table 2

Prevalence (%) of accompanying symptoms in EM, ETTH, CM, and CTTH groups and in controls, with the results of the chi-square test used to compare the headache patients (EM, ETTH, CM, and CTTH together) and the controls (CONT)

Symptoms	Prevalence					P
	EM	ETTH	CM	CTTH	CONT	
Colitis	38.1	39.3	42.2	35.6	22.5	.0057
Gastritis	47.6	39.3	48.0	43.3	17.5	<.001
Swallowing difficulties	22.5	22.6	26.5	23.3	10.0	.013
Digestion difficulties	33.3	31.0	26.5	32.2	13.8	.0022
Anorexia/bulimia	20.0	19.1	34.3	21.2	6.3	.0006
Phobias	32.9	35.7	35.3	37.8	11.3	<.001
Sleep disorders	57.6	54.8	63.7	55.6	31.3	<.001
Palpitations	49.4	51.2	59.8	54.4	15.0	<.001
Panic attacks	23.8	28.6	25.5	28.9	6.3	<.001
Fainting	9.1	10.7	16.7	10.0	3.8	.1128
Dizziness	40.7	38.1	52.9	41.1	11.3	<.001
Tinnitus	19.5	8.3	22.5	16.7	8.8	.0509
Weariness	66.7	51.2	75.5	65.6	22.5	<.001
Oral parafunctions	59.0	51.2	38.2	60.0	20.0	<.001
Cramps	34.6	22.6	44.1	44.4	15.0	<.001
Paresthesias	39.8	28.6	39.2	36.7	13.8	<.001
Back pain	61.0	66.7	66.7	60.0	31.3	<.001
Urinary disorders	10.4	4.8	16.7	5.6	2.5	.2117
Nail/hair fragility	54.6	46.4	61.8	44.5	15.3	.0091
Circulation disorders	22.9	17.9	36.3	18.9	18.8	.3228
Vaginism/frigidity	17.3	17.8	28.5	12.2	1.3	<.001

The prevalence of each accompanying symptom was assessed in each headache diagnostic group and in controls. The difference between headache patients and controls was evaluated by chi-square test.

Eventually, logistic regression models were applied to evaluate the association of each symptom with diagnostic categories and with psychiatric comorbidity (anxiety and/or depression), taking EM, ETTH, CM, and CTTH groups and psychiatric comorbidity as independent variables and the prevalence of each symptom as a dependent variable.

## Results

Demographic characteristics, the prevalence of psychiatric comorbidity, and the number of symptoms in the four headache diagnostic groups and in controls are shown in Table 1. The prevalence of depression and/or anxiety was elevated in all headache groups, particularly in chronic headache types. The prevalence of psychiatric comorbidity ranged from a minimum of 42% in ETTH patients to a maximum of 80% in CM patients. Anxiety disorders were represented by generalized anxiety disorders in 95% of the cases and by panic disorders or agoraphobia in only 5% of the cases. Depressive disorders were represented by major depression in 86% of the cases and dysthymic disorder in 14% of the cases. The distributions of these two disorders were similar among the diagnostic groups. The low number or the absence of other specific anxiety and mood disorders in our files may be attributed to the fact that patients with these disorders are more frequently referred directly to a psychiatric institution.

Chi-square analysis across the four diagnostic groups (Table 1) showed a significant difference in the prevalence

Table 3

Logistic regression model results [odds ratio (OR) with confidence interval (CI)], with EM, ETTH, CM, and CTTH groups and psychiatric comorbidity (PSYCH) as independent variables and with the prevalence of each symptom as dependent variable (the control group being a covariate)

Symptoms	EM		ETTH		CM		CTTH		PSYCH	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Colitis	1.521	0.812–2.846	1.752	0.862–3.559	1.311	0.635–2.706	1.571	0.761–3.239	<b>1.817</b>	<b>1.242–2.658</b>
Gastritis	<b>3.232</b>	<b>1.667–6.268</b>	<b>2.486</b>	<b>1.180–5.239</b>	<b>2.631</b>	<b>1.244–5.564</b>	<b>2.914</b>	<b>1.371–6.194</b>	<b>1.677</b>	<b>1.161–2.423</b>
Swallowing difficulties	1.404	0.597–3.303	1.612	0.632–4.113	1.377	0.533–3.557	1.393	0.540–3.590	<b>2.806</b>	<b>1.753–4.491</b>
Digestion difficulties	1.517	0.718–3.206	1.584	0.690–3.635	1.319	0.568–3.062	0.809	0.341–1.920	<b>3.457</b>	<b>2.250–5.310</b>
Anorexia/bulimia	1.972	0.711–5.469	2.030	0.669–6.161	2.021	0.667–6.126	<b>3.363</b>	<b>1.140–9.924</b>	<b>2.287</b>	<b>1.397–3.743</b>
Phobias	<b>2.298</b>	<b>1.047–5.042</b>	<b>2.963</b>	<b>1.263–6.950</b>	<b>2.702</b>	<b>1.144–6.389</b>	2.078	0.869–4.970	<b>2.471</b>	<b>1.656–3.689</b>
Sleep disorders	1.777	1.001–3.154	1.823	0.937–3.547	1.522	0.775–2.989	1.810	0.910–3.600	<b>2.722</b>	<b>1.870–3.962</b>
Palpitations	<b>2.665</b>	<b>1.320–5.378</b>	<b>3.495</b>	<b>1.605–7.610</b>	<b>3.032</b>	<b>1.380–6.663</b>	<b>2.987</b>	<b>1.348–6.621</b>	<b>3.879</b>	<b>2.644–5.690</b>
Panic attacks	1.179	0.678–2.09	2.962	1.016–8.839	2.265	0.764–6.712	1.511	0.502–4.548	<b>4.303</b>	<b>2.652–6.982</b>
Fainting	2.005	0.550–7.302	2.563	0.644–10.192	2.171	0.532–8.860	3.653	0.936–14.253	1.531	0.832–2.817
Dizziness	<b>3.785</b>	<b>1.751–8.180</b>	<b>3.725</b>	<b>1.605–8.646</b>	<b>3.699</b>	<b>1.587–8.624</b>	<b>5.382</b>	<b>2.306–12.562</b>	<b>1.901</b>	<b>1.308–2.763</b>
Tinnitus	1.570	0.634–3.886	0.642	0.205–2.008	1.228	0.439–3.428	1.585	0.579–4.338	<b>2.225</b>	<b>1.326–3.735</b>
Weariness	<b>3.664</b>	<b>1.971–6.810</b>	2.164	1.064–4.403	<b>3.169</b>	<b>1.535–6.540</b>	<b>4.125</b>	<b>1.944–8.751</b>	<b>3.704</b>	<b>2.491–5.508</b>
Oral parafunctions	<b>3.193</b>	<b>1.689–6.037</b>	<b>3.058</b>	<b>1.492–6.266</b>	<b>3.463</b>	<b>1.676–7.153</b>	1.308	0.619–2.761	<b>2.010</b>	<b>1.384–2.920</b>
Cramps	<b>2.170</b>	<b>1.069–4.402</b>	1.288	0.565–2.939	<b>3.185</b>	<b>1.458–6.958</b>	<b>2.842</b>	<b>1.288–6.271</b>	<b>1.785</b>	<b>1.210–2.633</b>
Paresthesias	<b>2.570</b>	<b>1.243–5.312</b>	1.710	0.750–3.896	2.112	0.936–4.768	2.042	0.900–4.629	<b>2.361</b>	<b>1.597–3.492</b>
Back pain	<b>2.220</b>	<b>1.250–3.942</b>	<b>3.291</b>	<b>1.671–6.481</b>	2.010	1.024–3.948	<b>2.315</b>	<b>1.160–4.619</b>	<b>2.344</b>	<b>1.602–3.430</b>
Urinary disorders	2.956	0.638–13.695	1.386	0.236–8.150	1.427	0.250–8.154	4.389	0.882–21.842	2.026	1.029–3.988
Nail/hair fragility	1.762	0.789–3.933	1.581	0.640–3.904	1.296	0.515–3.263	2.678	1.109–6.468	<b>1.725</b>	<b>1.108–2.683</b>
Circulation disorders	0.858	0.426–1.728	0.643	0.298–1.572	0.639	0.277–1.474	1.413	0.644–3.100	<b>2.017</b>	<b>1.283–3.172</b>
Vaginism /frigidity	7.607	0.996–58.118	<b>9.958</b>	<b>1.212–76.974</b>	4.958	0.593–41.428	<b>10.936</b>	<b>1.373–87.109</b>	<b>2.292</b>	<b>1.308–4.014</b>

Significant values are in boldface.

of psychiatric comorbidity (highest in CM and lowest in ETTH;  $\chi^2=48.81$ ,  $df=3$ ,  $P<.0001$ ).

The mean number of symptoms was significantly higher ( $P<.001$ ,  $F=29.8$ ,  $df=4$ , 582) in headache patients than in controls, but it was not statistically different ( $P=.08$ ) among the four headache groups. Moreover, in each headache group, it was significantly higher in patients with psychiatric comorbidity (depression or anxiety, or both) than in those without psychiatric comorbidity ( $P<.0001$ ).

The prevalence of accompanying symptoms in the four diagnostic groups and in controls, with the results of the chi-square test, is reported in Table 2. As observable, most symptoms were significantly more prevalent in all headache subjects than in controls.

The logistic regression models (Table 3) demonstrated a significant association of all symptoms (except fainting and urinary disorders) with psychiatric comorbidity (anxiety and/or depression). The relationship between symptoms and headache was found to be significant for gastritis, phobias, palpitations, dizziness, weariness, oral parafunctions, cramps, back pain, and sexual disturbances, with very few differences across the four diagnostic categories.

## Discussion

Our results demonstrate an overwhelmingly (more than twofold) higher number of accompanying symptoms in a large and homogeneous cohort of patients with migraine and tension-type headache (both episodic and chronic) than in headache-free controls (Table 1). Psychiatric comorbidity was generally quite elevated. In particular, a significantly higher prevalence of psychiatric comorbidity was observed in chronic forms with respect to episodic ones, most especially in CM patients, while in episodic headaches, comorbid psychiatric disorders were more prevalent in migraine than in tension-type headache (Table 1).

This finding seems to point to a role of mood disorders in the chronicization process, in agreement with previous studies showing that, in migraine patients, the relationship between headache and depression or anxiety disorders is bidirectional [4,5,8,13] and that such disorders may influence headache history in the long term [9].

A significantly higher prevalence of most symptoms was detected in headache patients. This increased burden of physical complaints in headache patients may be, at least partly, subsequent to, or influenced by, an increased attention to bodily sensations or may be inherent to the pain disorder. Indeed, a high prevalence of sleep, bowel disturbances, and fatigue frequently occurs in chronic pain disorders, most likely fibromyalgia, and may reflect underlying pathophysiological mechanisms that are as yet poorly understood. Nevertheless, the significantly higher number of symptoms in patients with psychiatric comorbidity and, above all, the results of the logistic regression models strongly suggest a role of depression and anxiety in the presence of accompany-

ing symptoms. In fact, we detected a significant association between the majority of symptoms (all but fainting and urinary disorders) and psychiatric comorbidity (Table 3). This finding, consistent with the findings of previous authors [15] that found somatic symptoms to be more common in patients with associated depression or anxiety, clearly hints at the involvement of psychiatric comorbidity in the expression of physical complaints. Nevertheless, some symptoms appeared to be significantly related to the presence of headache as well. Since they were generally associated with migraine and tension-type headache (whether episodic or chronic), it seems that the presence of headache, more than its diagnostic category or course, plays a role in affecting a given amount of physical complaints. The pathophysiological background of the association between some symptoms and headache is difficult to clarify. Regarding oral parafunctions, we may hypothesize the possible role of muscular tenderness as a common mechanism involved in the complex pathophysiology of tension-type headache and in the expression of this symptom [19–23].

At any rate, our findings suggest that, in headache patients, psychiatric comorbidity (compared with headache diagnosis or chronicity) is more strictly associated with an increased burden of accompanying symptoms. The question about the role of these factors in affecting the natural history of headache arises. In the aforementioned study [9], the co-occurrence of depression and personality changes in women with migraine seemed to negatively influence headache course in the long term. More recently, it was observed that, in patients suffering from EM, anxiety and/or depression was related to a higher level of tenderness of the pericranial muscles and, even more, of the cervical muscles [24]. It was hypothesized that the more elevated muscle tenderness in migraine patients with psychiatric disorders could be one of the factors that may influence the history of migraine and may facilitate its evolution into CM.

The increased burden of accompanying symptoms detected in this research, above all in subjects suffering from depression and/or anxiety, could represent another putative mechanism of influence of psychiatric disorders on migraine history. Further longitudinal studies are needed to confirm this hypothesis. In any case, in a clinical point of view, an accurate investigation of the accompanying symptoms in headache patients may provide clinicians with a useful additional tool with which to appraise the potential presence of a psychiatric comorbidity and to accordingly adjust treatment strategies.

## References

- [1] Cao M, Zhang S, Wang K, Wang Y, Wang W. Personality traits in migraine and tension-type headaches: a five-factor model study. *Psychopathology* 2002;35:254–8.
- [2] Bensenor IM, Tofoli LF, Andrade L. Headache complaints associated with psychiatric comorbidity in a population-based sample. *Braz J Med Biol Res* 2003;36:1425–32.



- [3] Zwart JA, Dyb G, Hagen K, Odegard KJ, Dahl AA, Bovim G, Stovner LJ. Depression and anxiety disorders associated with headache frequency The Nord-Trøndelag Health Study. *Eur J Neurol* 2003;10:147–52.
- [4] Merikangas KR, Merikangas JR, Angst J. Headache syndromes and psychiatric disorders: association and familial transmission. *J Psychiatr Res* 1993;27:197–210.
- [5] Breslau N, Davis GC, Schultz LR, Peterson EL. Migraine and major depression: a longitudinal study. *Headache* 1994;34:387–93.
- [6] Guidetti V, Galli F, Fabrizi P, Giannantoni AS, Napoli L, Bruni O, Trillo S. Headache and psychiatric comorbidity: clinical aspects and outcome in an 8-year follow-up study. *Cephalalgia* 1998;18:455–62.
- [7] Cassidy EM, Tomkins E, Hardiman O, O'Keane V. Factors associated with burden of primary headache in a specialty clinic. *Headache* 2003;43:638–44.
- [8] Breslau N, Lipton RB, Stewart WF, Schultz LR, Welch KM. Comorbidity of migraine and depression: investigating potential etiology and prognosis. *Neurology* 2003;60:1308–12.
- [9] Mongini F, Keller R, Deregibus A, Raviola F, Mongini T, Sancarlo M. Personality traits, depression and migraine in women A longitudinal study. *Cephalalgia* 2003;23:186–92.
- [10] Puca FM, Genco MP, Prudenzeno MP, Savarese M, Bussone G, D'Amico D, Cerbo R, Gala C, Coppola MT, Gallai V, Firenze C, Sarchielli P, Guazzelli M, Guidetti V, Manson G, Granella F, Muratorio A, Bonuccelli U, Nuti A, Nappi G, Sandrini G, Verri AP, Sicuteri F, Marabini S. Psychiatric comorbidity and psychosocial stress in patients with tension-type headache from headache centers in Italy. *Cephalalgia* 1999;19:159–64.
- [11] Radat F, Swendsen J. Psychiatric comorbidity in migraine: a review. *Cephalalgia* 2004;25:165–78.
- [12] Bag B, Hacıhasanoglu R, Tufekci FG. Examination of anxiety, hostility and psychiatric disorders in patients with migraine and tension-type headache. *Int J Clin Pract* 2005;59:515–21.
- [13] Merikangas KR, Angst J, Isler H. Migraine and psychopathology. Results of the Zurich cohort study of young adults. *Arch Gen Psychiatry* 1990;47:849–53.
- [14] Mongini F, Ciccone G, Ibertis F, Negro C. Personality characteristics and accompanying symptoms in temporomandibular joint dysfunction, headache, and facial pain. *J Orofac Pain* 2000;14:52–8.
- [15] Maizels M, Burchette R. Somatic symptoms in headache patients: the influence of headache diagnosis, frequency, and comorbidity. *Headache* 2004;44:983–93.
- [16] International Headache Society. The International Classification of Headache Disorders. *Cephalalgia* 2004;24(Suppl 1):1–160.
- [17] Mazzi F, Morosini P, De Girolamo G, Lussetti M, De Guarnaldi GP. SCID-I Structured Clinical Interview for DSM-IV Axis I Disorders (Italian version). Firenze: OS-Organizzazioni Speciali, 2000.
- [18] Mongini F, Ferla E, Gioria A, Simone D, Tarenzi L. Assessment of systemic factors and personality characteristics in tension-type headache and other types of facial pain. In: Olesen J, editor. *Tension-type headache: classification, mechanisms and treatment*. New York: Raven Press, 1993. pp. 231–6.
- [19] Langemark M, Olesen J. Pericranial tenderness in tension headache. A blind, controlled study. *Cephalalgia* 1987;7:249–55.
- [20] Hatch JP, Moore PJ, Cyr-Provost M, Boutros NN, Seleshi E, Borcharding S. The use of electromyography and muscle palpation in the diagnosis of tension-type headache with and without pericranial muscle involvement. *Pain* 1992;49:175–8.
- [21] Jensen R, Rasmussen BK, Pedersen B, Olesen J. Muscle tenderness and pressure pain thresholds in headache. A population study. *Pain* 1993;52:193–9.
- [22] Lipchik GL, Holroyd KA, Talbot F, Greer M. Pericranial muscle tenderness and exteroceptive suppression of temporalis muscle activity: a blind study of chronic tension-type headache. *Headache* 1997;37:368–76.
- [23] Jensen R, Bendtsen L, Olesen J. Muscular factors are of importance in tension-type headache. *Headache* 1998;38:10–7.
- [24] Mongini F, Ciccone G, Deregibus A, Ferrero L, Mongini T. Muscle tenderness in different headache types and its relation to anxiety and depression. *Pain* 2004;112:58–63.