



Psychologic aspects of chronic headache

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Chronic recurrent headache affects 45 million Americans. Despite recent advances in medical modes of therapy for headache, the underlying pathophysiology for the condition is not yet fully understood. Like other conditions for which we have no objective markers for disease, nor a clear understanding of pathophysiology, psychologic causes are suspected. Although mounting evidence suggests a biochemical basis for headache, many clinicians still believe that psychologic influences may contribute to maintaining headache chronicity. Nonpharmacologic and psychologic treatment modalities such as biofeedback and cognitive/behavioral therapy may be successfully used as part of a comprehensive treatment program to give patients a greater sense of control, reverse anticipatory anxiety, and improve functioning and quality of life.

(Key words: headache, cephalgia)

The role of psychologic and behavioral factors in primary headache disorders has long been debated. Headaches have been portrayed as a manifestation of unconscious conflict for more than a century. Contemporary headache research has favored a central biochemical disorder as an underlying headache etiology. For the first time, medications such as the serotonin 1_{BD} agonists ("triptans") have been designed specifically to abort migraine headaches. Despite the evidence for a biologic mechanism, many physicians still believe that chronic headaches are largely "psychogenic," a condition not worthy of time and efforts best spent on other more serious medical disorders. Even many headache specialists believe that although the underlying initiating event causing headache may be biochemical, other fac-

tors, including psychologic conditions, most likely have a role in maintaining headache chronicity; psychosocial issues must be addressed as part of a comprehensive treatment approach.

Psychologic evaluation should focus on personality characteristics, lifestyle, and life-situation factors that account for individual differences in headache susceptibility or moderate a current vulnerability to headaches. Pain behaviors as well as positive and negative consequences to headaches should be examined as potential contributors to maintaining headache chronicity. Psychologic treatment modalities, instituted concurrently with pharmacologic and other nonpharmacologic measures, may improve therapeutic outcome and quality of life for the 45 million Americans who have chronic recurrent primary headache disorders such as migraine, tension-type headache, and cluster headache.

Quality-of-life issues

Chronic headache sufferers report marked reductions in functional impairment and quality of life.¹ In a medical outcome study

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using an instrument that measured patient-perceived level of physical, role (work), and social functioning, mental health, health perceptions, and pain, migraineurs primarily reported impaired role functioning. Cluster headache sufferers reported the greatest pain perception, and chronic tension-type headache sufferers reported impaired mental health and generalized impairment of functioning.¹ Overall, patients with chronic headache rate their level of functioning as worse than that of patients with diabetes or arthritis and comparable to that of patients with congestive heart failure.²

Chronic headaches also affect economic status. One migraine study found that 50% of its subjects missed an average of 2 days of work per month because of headaches and had another 5 days of reduced productivity while at work.³ The higher prevalence of migraine among lower socioeconomic groups has been explained as a "downward social drift" resulting from inability to perform and compete in an educational or work setting, resulting in lower income strata. Tension-type headaches also have an economic impact on the individual and society, with an estimated 822 lost workdays annually per 1000 persons due to tension-type headache.⁴ Financial stressors can contribute to the maintenance of headaches.

Studies have found that the family unit is affected by headache disorders.^{5,6} Migraines most commonly occur in women of childbearing age, when they are juggling careers and child rearing. Reduced functioning affects all family members, but studies find that households with young children suffer most. Sixty percent of family members polled noted frequent cancelled plans for playing, spending time together, or helping with homework.⁵ Children were frequently confused or upset about their parent's condition, and spouses felt anger, frustration, and suspicion of secondary gain at times.⁶ Spouses also noted that they had a reduced ability to express criticism and annoyance with the headache sufferer and were less apt to be open and express feelings.⁷

A negative impact on marital sexual relations existed.⁵ Headache sufferers expressed guilt and self-blame for "controlling" their families with their disorder.⁶

Despite the effect chronic headaches have on functioning and quality of life, less than 50% of migraineurs and less



Checklist

- **Migraine headache^{9,10}**
 - ☐ Ambitious
 - ☐ Energetic, "type A" personality
 - ☐ High need for social approval
 - ☐ Controlled good behavior
 - ☐ Repressed anger
 - ☐ Self-imposed demands and responsibilities beyond coping ability
 - ☐ Perfectionistic
 - ☐ Obsessional
 - ☐ Dependent
 - ☐ Emotionally inhibited, rigid
 - ☐ Hypochondriacal
 - ☐ Depressed
 - ☐ Anxious
 - ☐ Hysterical tendencies
- **Tension-type headache¹¹⁻¹³**
 - ☐ Tense, unable to relax
 - ☐ Disorganized
 - ☐ Openly hostile
 - ☐ Repressed anger
 - ☐ Anxious
 - ☐ Depressed
 - ☐ Psychosexual conflict
 - ☐ Unresolved dependency
 - ☐ Moral self-righteousness
 - ☐ Poor coping and adaptation skills
 - ☐ Somatization tendencies
- **Cluster headache^{10,14}**
 - ☐ Ambitious
 - ☐ Energetic
 - ☐ Aggressive tendencies
 - ☐ Hysterical tendencies
 - ☐ Dependent
 - ☐ Suppressed anger
 - ☐ Hypochondriacal
 - ☐ Emotionally repressed
 - ☐ Obsessive-compulsive

Figure 1. *Personality profiles of primary headache sufferers. "Personality profiles" have not been substantiated in recent scientific literature.^{9,15}*

than 15% of sufferers of tension-type headache seek treatment by a physician.⁸ Proposed reasons are lack of respect, empathy, and understanding by physicians; not being taken seriously; and widespread belief that headaches have a purely psychological basis. Healthcare

providers should not minimize these patients' pain, but rather validate their headache disorder. Even when headaches are episodic, practitioners must recognize the significance these headaches have on all aspects of the sufferer's life.

Personality profiles

Early studies have suggested a so-called headache personality that predisposes individuals to headache conditions due to interpersonal conflicts and resultant stress (*Figure 1*).⁹⁻¹⁵ Current studies using various psychometric instruments have not confirmed any one personality type that is attributable to the group of primary headache sufferers.^{15,16}

Personality disorders may complicate headache diagnosis and treatment. Histrionic patients may exaggerate complaints, leading to a more extensive workup and more aggressive treatment regimens with greater potential for adverse effects. Borderline patients may become manipulative or threatening (or both) with escalating medication demands, leading to rebound headaches or toxicity. Passive/dependent personalities have an external locus of control, relying on the healthcare provider to "make them better" without taking the initiative of changing behaviors that could improve treatment outcome. Personality disorders contributing to refractoriness to treatment may cause frustration in the healthcare provider as well as in the patient. These reactions should be examined, and if they interfere with adequate therapy, the patient should be referred to a physician better suited to treat his or her disorder.

Psychometric testing

Extensive psychological testing among headache sufferers is usually unnecessary. Minnesota Multiphasic Personality Inventory (MMPI) studies have found elevated scores on "neuroticism" in migraineurs, supporting beliefs of maladaptive coping skills, proneness to depression, pessimism, and somatization in this population.¹⁷ Others have found no differences in MMPI scores among headache sufferers and attribute conflicting findings to varying patient populations sampled.¹⁸ Elevations of various psychological test scores on MMPI, such as hypochondriasis, depression, hysteria, paranoia, and schizophrenia, correlate with poor response to headache therapy, as do elevated Beck Depression Inventory scores, Psychosomatic Symp-

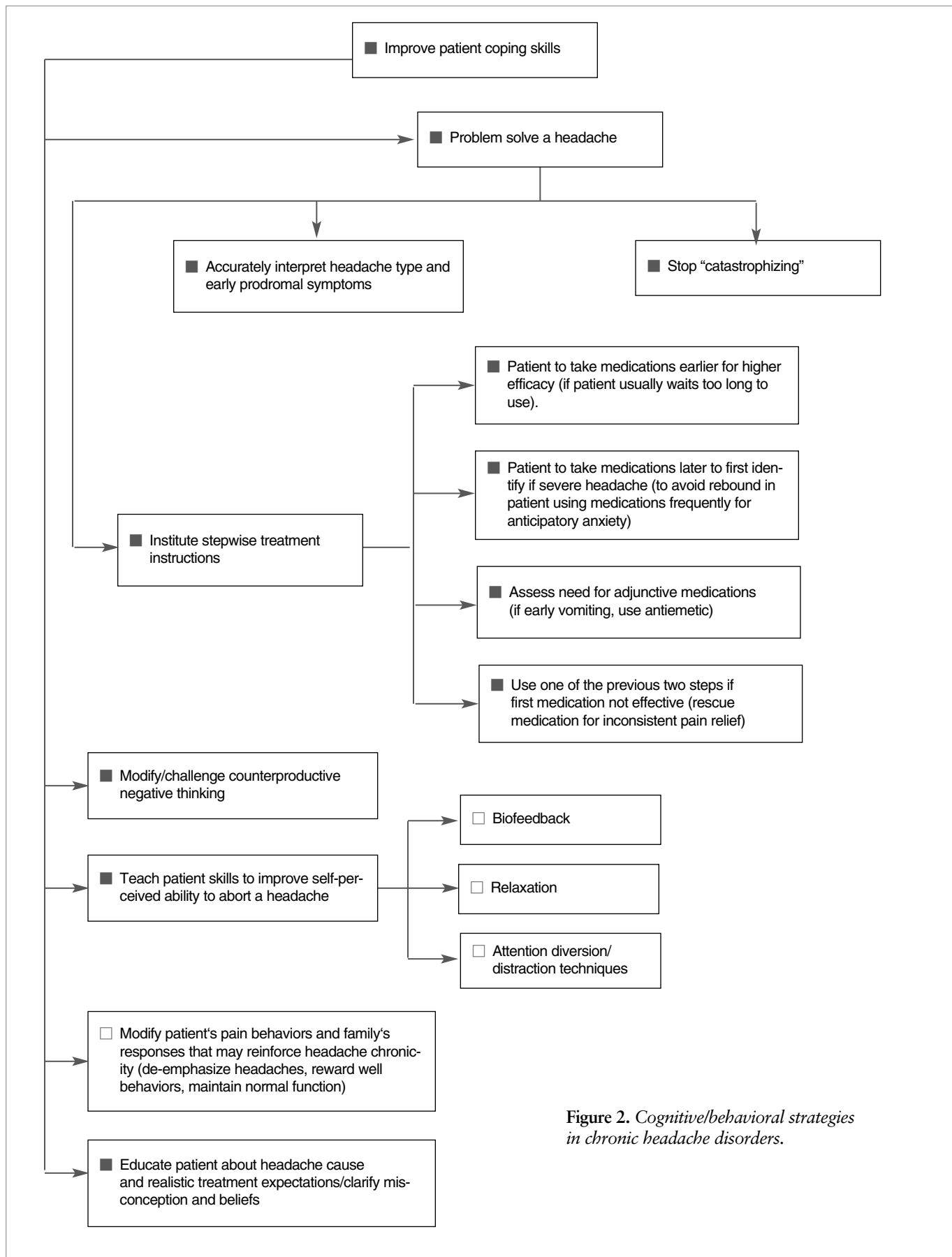


Figure 2. Cognitive/behavioral strategies in chronic headache disorders.

toms Check Lists, or Trait Anger Scales.¹⁶ The Beck Depression Inventory and Hamilton Rating Scales for anxiety and depression have been studied and identify higher rates of depression and anxiety for all chronic headache conditions.¹⁹

Neuropsychiatric testing is not helpful in predicting organic causes of headache but may be used in posttraumatic headache disorders to identify cognitive changes associated with concomitant posttraumatic syndrome. Overall, no one psychologic test can yet predict clinical outcome or guide the physician to one specific treatment modality.

Psychiatric comorbidities

Various psychiatric conditions are found more commonly in chronic headache sufferers. Migraineurs are 12 times more likely to suffer panic disorder, 2.5 times more likely to have depression, and have higher rates of dysthymia, bipolar disorder, drug abuse, smoking, and suicide attempts.²⁰⁻²² Hamilton Rating Scales for anxiety and depression were found to be higher among all headache types (migraine, tension-type, cluster, analgesic overuse, and mixed-headache disorders).¹⁹ It is possible that these comorbidities are due to a shared alteration of serotonin biology or that one condition causes the other.

Guidetti and colleagues²³ suggest a bidirectional nature for the two conditions, that anxiety in childhood predisposed to chronicity of migraine and development of depression in later years.²³ They studied children with migraine and found 75% of those with anxiety had persistent migraine 8 years later (vs 30% of those without childhood anxiety) and depression developed in only those patients with childhood anxiety and continued later-life migraine (58%).²³ Interestingly, psychologic factors in young children (younger than 6 years), such as depression, sleeping difficulties, concentration difficulties, and behavioral problems, have been found to be strong predictors for future headaches.²⁴

Higher levels of somatization disorder have also been found in patients with chronic headache, possibly due to heightened vigilance to bodily sensations that may signify prodromal symptoms preceding a headache.²⁵ It is believed that early effective treatment of headache may prevent later somatization or other serotonin-related syndromes.

Overall, findings of studies examining the prevalence of psychiatric comorbidity and headache have been conflicting. Inconsistencies in data may be attributable to different sample populations, changes in headache diagnostic criteria, small sample sizes, lack of control groups, and difficulties in determining cause or effect of affective disorders and headache. Comorbid affective disorders often improve once headaches are effectively treated, suggesting chronic headache pain may be the cause rather than effect of concomitant psychiatric conditions.¹⁹

Psychogenic headaches

Some researchers have suggested that chronic headaches may serve to obscure a serious emotional disorder—most often depression or anxiety—and that these conditions may be converted into an acceptable physical symptom such as headache.²⁶ Headaches rarely may be diagnosed as a conversion disorder, somatic delusion, or somatoform disorder; patients may identify with the headache symptoms of a significant other. These patients often complain of severe headaches that are discordant with their calm appearance. Initial onset of conversion headaches may occur after a particularly stressful event. For these individuals, psychotherapy is the treatment of choice.²⁶

Biofeedback

Biofeedback techniques teach the headache sufferer how to control certain bodily functions such as muscle relaxation and vasodilation, which are normally not under voluntary control. In this way, the patient with headache may control physiologic responses to stressors and therefore decrease headache frequency or severity (or both). The two most common techniques are electromyographic and thermal biofeedback. Electromyographic surface electrodes “feed back” visual or audio signals based on the patient’s ability to relieve muscle tension in the face, neck, or upper region of the back. Finger probes in thermal biofeedback record the ability to increase peripheral blood flow and raise finger temperature. Techniques taught may include progressive muscle relaxation, visualization, or imagery techniques. With practice, many patients can achieve desired responses without requiring biofeedback instruments.

Patients with an internal locus of con-

trol who are motivated to be an active participant in their care or who prefer to limit medications (or both) are good candidates for biofeedback training. Younger patients (children and adolescents), women, and pregnant patients generally are more successful at learning biofeedback than older patients or men. Few absolute contraindications to biofeedback or adverse effects exist, but patients with a history of sexual abuse may have anxiety when attached to the biofeedback instruments and may defer treatment.

Biofeedback has been found to decrease frequency or severity (or both) of tension-type or migraine headaches in numerous studies.²⁷ Electromyographic biofeedback studies overall found an approximate 50% reduction in tension-type headache activity, and this benefit persisted even years after patients learned the techniques.²⁷ It is unknown whether beneficial effects are directly related to muscle relaxation, decreased sympathetic tone, and vasodilation of the extremities, or are due to alterations of central pain regulatory mechanisms via a heightened sense of self-perceived control over headaches.²⁸ Only weak correlations between improvement in headache and biofeedback instrument readings have been found.²⁹

Cognitive behavioral therapy

Headaches may be precipitated or exacerbated by stress.²⁸ Physicians cannot alter patients’ life circumstances, but they may suggest cognitive behavioral therapy to alter patients’ perceptions about their life events, to minimize levels of physiologic arousal, and decrease the frequency or severity (or both) of headache.²⁵ Cognitive behavioral therapy identifies and modifies the effect of thoughts and behaviors on headache. One study found that cognitive behavioral therapy was comparable to amitriptyline hydrochloride in decreasing the frequency and intensity of tension-type headache, but only cognitive behavioral therapy reduced general somatic complaints and improved patients’ sense of control over their headaches.³⁰

Stress is a subjective interpretation of particular life events based on cognitive framework, personality traits, and coping strategies. Recommended cognitive behavioral therapy for patients with headaches is most often short term and goal oriented, directed at improving patients’ coping skills, developing an inter-

nal locus of control, and experiencing a heightened level of self-efficacy to control their headaches (*Figure 2*). Studies find that many sufferers of chronic headache have maladaptive coping strategies such as avoidance, repression, self-blame, and lack of utilization of social supports.³¹ They also tend to underestimate their level of control over their headaches. Negative thinking and “catastrophizing” their pain experience results in lower pain thresholds, increased anxiety, and escalation of headache pain.³²

Cognitive behavioral therapy teaches patients to check negative cognitions and self-defeating behavior and to judge their condition more realistically and positively. Patients are taught to “problem solve” a headache with step-wise instructions based on their type of headache (that is, migraine, tension type), the characteristics of a particular headache (that is, awakening with a full-blown headache, early nausea and vomiting), and lifestyle circumstances on that particular day (that is, vacation day, busy workday). Patients are given clear instructions on when to use medication, proper dosing, need for adjunctive measures (such as use of antiemetic, caffeinated beverage) and further steps should initial dosing not be effective. Learning and applying these problem-solving skills shift patients’ locus of control from external to internal, giving them a sense of control over their headaches and thus alleviating anxiety that may exacerbate their condition. Teaching distraction/attention diversion exercises is another coping strategy that may be recommended.

Cognitive behavioral therapy may at times involve families of chronic headache sufferers to identify and address behaviors that may unconsciously reinforce secondary gains and chronicity of the disorder (*Figure 3*). Generally, families should de-emphasize the influence a patient’s headaches have on the family and encourage the sufferer to maintain as normal a lifestyle as possible despite his or her condition. This approach is particularly important in families in which the headache sufferer is a child and parents continually inquire about the child’s pain status throughout the day. De-emphasizing pain behavior is not synonymous with ignoring the sufferer; well behaviors should be “rewarded” with encouragement and support previously given to pain behaviors.

Psychotherapy as a single treatment modality rarely adequately manages a patient’s headache disorder. Psychotherapy attempts to identify and deal with past, probable unconscious, unresolved conflicts that may contribute to causing or exacerbating somatic symptoms such as headache. Individual or family psychotherapy (or both) may be part of a comprehensive treatment approach to modify a headache sufferer’s perfectionistic goals and standards, maladaptive coping mechanisms, or excessive environmental demands as well as to encourage effective expression of anger and emotions and develop a less critical view of self.

Pharmacologic treatment

Abortive (“as needed,” symptomatic) medications with or without prophylactic (preventive, daily) medications are usually considered part of a comprehensive treatment approach for primary headache disorders. Efforts should be made to find an effective medication regimen early in intervention, using the contemporary abortive stratified-care approach, which incorporates more effective medications such as the serotonin 1_{BD} agonists as first-line therapy for moderately to severely disabled headache sufferers. The older, stepped-care approach, starting with the simple analgesics in every headache sufferer regardless of disability and advancing as needed based on patient satisfaction with treatment, may cause unnecessary suffering and be detrimental to the patient/physician collaboration. Many patients are lost to follow-up before effective therapy is found. Various patient perceptions when treatment fails may be found in *Figure 4*.

As discussed previously, negative thinking and catastrophizing during headache attacks likely intensify the pain experience. Studies find a marked increase in negative thinking when the first dose of abortive medication is ineffective, again highlighting the need for maximizing relief with the initial dose of abortive medication.

Inconsistent pain relief is a limitation of most abortive medication, even the newer triptans. Prescribing a second-line abortive agent, termed a “rescue” or “escape” medication, alleviates patients’ anxiety and improves their perceived ability to control their headaches. Prophylactic medication may be considered even for infrequent headaches when patients are psy-

chologically unable to cope with their headaches or when abortive therapy does not give satisfactory relief.

When prescribing medication to patients who have headache with comorbid psychiatric disorders, treatment should be tailored to the characteristics of the headache and the patient’s beliefs and lifestyle. Use of barbiturate compounds or narcotics is to be avoided in severely depressed patients or in anxious patients who are more prone to using them to relieve anxiety symptoms. Prophylactic medications used to treat patients with affective disorders include antidepressants and divalproex sodium. β -Blockers should be used cautiously in severely depressed patients. Lack of controlled headache studies and concerns about adverse effects limit the use of phenothiazines prophylactically for headaches; however, phenothiazines may reduce headache severity and frequency and are a logical choice for headache sufferers with a history of psychosis.

Overall, establishment of a collaborative patient/physician relationship in developing an individualized treatment program is most important in maximizing therapeutic response (*Table 5*). Physicians should attempt to work around patient biases against certain medications if alternative treatment options are available. Headache sufferers are more prone to hypervigilance about any bodily symptoms, including adverse drug effects; several medication trials may be needed to find one that has both efficacy and tolerability. Multiple drug sensitivities are common in chronic headache sufferers. Patient education, including counseling about medication side effects, treatment rationale, and realistic treatment expectations, improves compliance and reduces anxiety about harmful medication effects.³² Patients must realize that daily preventive medications may have delayed effectiveness of 4 to 8 weeks at a full therapeutic dose and that no one medication is effective for all individuals. A realistic goal of preventive therapy is reduction of frequency of headache by about half, decreased severity and duration of headache, with or without enhanced abortive effect of the medication.

Without patient education, patients are unlikely to comply with therapeutic regimens. One study found that less than 50% of headache patients complied with proper use of medication and more than

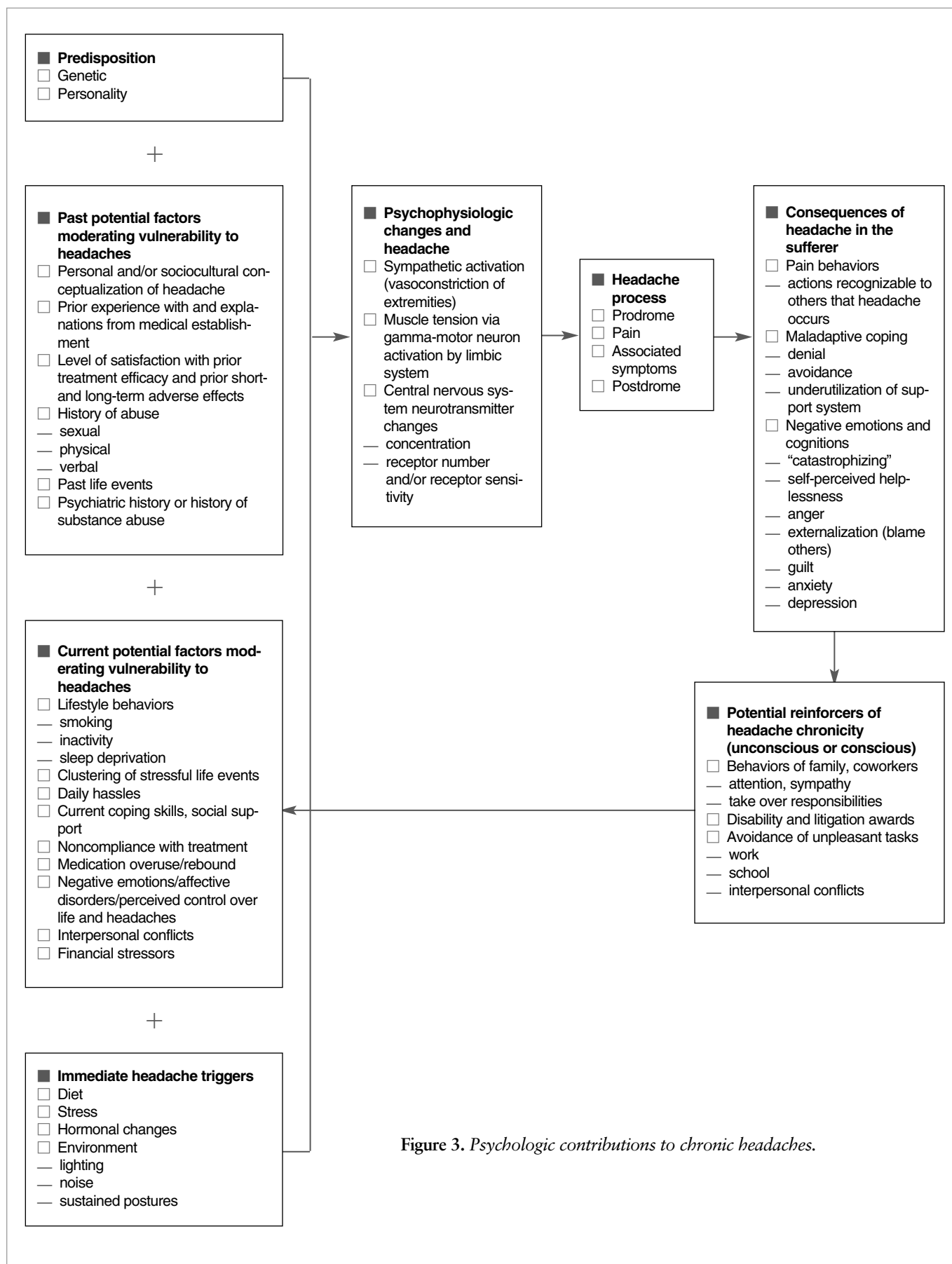


Figure 3. *Psychologic contributions to chronic headaches.*

10% never filled their initial prescriptions.³³ Passchier and colleagues³² found that 75% of studied patients with headache expressed negative or ambivalent attitudes toward medication use because of potential short- or long-term side effects.

Once an effective treatment regimen is found, the "art" of treating patients with headache is in maintaining a satisfactory level of treatment efficacy balanced by an acceptable side effect profile. Headaches are a dynamic condition, and regular follow-up is needed to assess the need for adjustments in medication and to reinforce nonpharmacologic modalities. Headaches may worsen at times, particularly during stressful events or interpersonal conflicts. Options at such a time are to maintain current therapy and reassure the patient that the exacerbation of headache is temporary, make minor adjustments such as increasing current dose of medication or adding another agent, or discontinue the current therapeutic regimen entirely and start over. Because of delayed efficacy when starting a new prophylactic treatment regimen and possible exacerbation of headaches during medication transition periods, frequent changes of therapeutic regimens are discouraged.

Comment

Chronic headaches markedly reduce the quality of life of the sufferers and affect all aspects of their lives. A delay in effective headache management may contribute to chronicity of headaches and comorbid affective disorders. Regardless of the initiating precipitants, maintenance of headaches may be caused by entirely different factors and a delay in management may lead to more frequent pain behaviors (in the headache sufferer and in significant others' response to them) that may reinforce chronicity of the headaches. Incorporating psychologic assessment and treatment modalities into a comprehensive treatment regimen most likely would maximize therapeutic outcome.

Primary headache disorders (migraine, tension-type, and cluster) are diagnosed based on subjective, historical features. Because there are no objective markers for these disorders, psychologic causes have been debated. Rather than dissecting headaches into "organic" or "psychogenic" categories, clinicians must understand the interplay between personality characteristics, negative emotions,



Checklist

- ☐ Hopeless/helpless: "no help for me"
- ☐ Fearful/anxious: "There must be something seriously wrong"
- ☐ Dissatisfied/angry with physician:
 - "Doctor thinks I'm crazy/doesn't believe me."
 - "Doctor doesn't know how to treat headaches."
- ☐ Ongoing search for relief: "A chiropractor, acupuncturist, herbalist...will help me."

Figure 4. Patient perceptions when treatment fails.



Checklist

- ☐ Validate/reassure about headache condition.
- ☐ Educate about headache causes and treatment options.
- ☐ Appreciate significance headaches have on all aspects of patient's life:
 - assess quality of life.
 - assess disability.
- ☐ Define realistic treatment expectations.
- ☐ Develop collaborative, comprehensive treatment approach/make patient an active participant.
- ☐ Modify psychologic contributors to headache condition.
- ☐ Recognize your reactions to "difficult" patients and consider referral when your reactions interfere with adequate care.
- ☐ Encourage patient participation in headache support groups.

Figure 5. Guidelines to successful management.

maladaptive cognitions and coping skills, pain behaviors, unconscious reinforcers, and headache physiology, which may include musculoskeletal, autonomic, and central nervous system responses to heightened arousal from stressful events.

Psychologic characteristics or frank psychiatric comorbidities (or both) may contribute to chronicity of headaches and refractoriness to treatment. Incorporating a psychologic evaluation and treatment plan into a comprehensive treatment program for sufferers of chronic headache may improve treatment outcomes. Psychologic treatment modalities may include patient education, relaxation, cognitive, imagery, attention/diversion, and biofeedback techniques that may be taught by the physician specializing in headache treatment or an allied health professional. Further research is required to identify which subgroups of patients would benefit most from which treatment modalities.

References

1. Solomon GD, Skobieranda FG, Gragg LA. Does quality of life differ among headache diagnoses? Analysis using the medical outcomes study instrument. *Headache* 1994;34:143-147.
2. Solomon GD, Skobieranda FG, Gragg LA. Quality of life and well-being of headache patients: Measurement by the Medical Outcomes Study Instrument. *Headache* 1993;33:351-358.
3. Osterhaus JT, Gutterman DL, Plachetka JR. Labor costs associated with migraine headaches. *Headache* 1990;30:302-303.
4. Stewart WF, Schechter A, Lipton RB. Migraine Heterogeneity: disability, pain intensity, attack frequency and duration. *Neurology* 1994;44(suppl 4):S24-S39.
5. Smith R. Impact of migraine on the family. *Headache* 1998;38:423-426.
6. Rueveni U. Brief consultation with headache sufferers. *Am J Fam Ther* 1992;20:168-178.
7. Koop M, Richter R, Rainer J, Koop-Wiffling P, et al. Differences in family functioning between patients with chronic headache and patients with chronic low back pain. *Pain* 1995;63:219-224.
8. A Study of headache in North America Primary Care Report from the Ambulatory Sentinel Practice Network. *J R Coll Gen Pract* 1987;37(302):400-403.
9. Ktronks DL, Tulen JHM, Peppinkhuizen L, Verheij R, et al. Personality traits and psychological reactions to mental stress of female migraine patients. *Cephalalgia* 1999;19:566-574.

10. Gallagher RM. Influencing factors of headache. In: Gallagher RM, ed. *Drug Therapy for Headache*. New York, NY: Marcel Dekker, Inc; 1991:29-44.
11. Kolb LC. Psychiatric aspects of the treatment of headache. *Neurology* 1963;13:34-37.
12. Martin MJ, Rome HP. Muscle contraction headache: therapeutic aspects. *Res Clin Stud Headache* 1967;1:205-217.
13. Sternbach RA, Dalessio DJ, Kunzel M, Bowman GE. MMPI patterns in common headache disorders. *Headache* 1980;20:311-315.
14. Steinhilber RM, Pearson JE, Rushton JG. Some psychologic consideration of histamine cephalgia. *Mayo Clin Proc* 1960;35:691-699.
15. Cuypers J, Ahenkirch H, Bange S. Personality profiles in cluster headache. *Headache* 1981;21:228-229.
16. Penzien DB, Rains JC, Holroyd KA. Psychological assessment of the recurrent headache sufferer. In: Tolison CD, Kunkel RS, eds. *Headache Diagnosis and Treatment*. Baltimore, Md: Williams & Wilkins; 1993:39-49.
17. Fan AY, Gu RJ, Thou AN. MMPI changes associated with therapeutic intervention: a migraine control study. *Headache* 1999;39:581-585.
18. Kudrow L, Sutkus BJ. MMPI pattern specificity in primary headache disorders. *Headache* 1979;19:18-24.
19. Mitsikostas DD, Thomas AM. Comorbidity of headache and depressive disorders. *Cephalalgia* 1999;19:211-217.
20. Breslau N, Davis GC. Migraine, major depression and panic disorder: a prospective epidemiologic study of young adults. *Cephalalgia* 1992;12:85-90.
21. Passchier J, Schouten J, Van der Donk J, Van Romunde LKJ. The association of frequent headaches with personality and life events. *Headache* 1991;31:116-121.
22. Breslau N, Davis GC, Andreski P. Migraine, psychiatric disorders, and suicide attempts: an epidemiologic study of young adults. *Psychiatry Res* 1991;37:11-23.
23. Guidetti V, Galli F, Fabrizi P, Giannantoni AS, Napoli L, et al. Headache and psychiatric comorbidity: clinical aspects and outcome in an 8-year follow-up study. *Cephalalgia* 1998;18:455-462.
24. Aromaa M, Rautava P, Helenius H, Sillanpää ML. Factors of early life as predictors of headache in children at school entry. *Headache* 1998;38:23-30.
25. Baskin SM. Psychological treatment of headache. In: Samuels M, Feske S, eds. *Office Practice of Neurology*. New York, NY: Churchill Livingstone; 1996:117-142.
26. Packard RC. Psychiatric management of the headache patient. In: Diamond ML, Solomon GD, eds. *The Practicing Physician's Approach to Headache*, 6th ed. Philadelphia, Pa: WB Saunders Co; 1999:191-198.
27. Reich BA. Noninvasive treatment of vascular and muscle contraction headache: a comparative longitudinal clinical study. *Headache* 1989;29:34-41.
28. Marlowe N. Self-efficacy moderates the impact of stressful events on headache. *Headache* 1998;38:662-667.
29. Martin PR, Mathews AM. Tension headaches: psychophysiological investigation and treatment. *J Psychosom Res* 1978;22:389-399.
30. Holroyd KA, Nash JM, Pingel PD. A comparison of pharmacological (amitriptyline hci) and nonpharmacological (cognitive-behavioral) therapies for chronic tension headaches. *J Consult Clin Psychology* 1991;59(3):387-393.
31. Siniatchkin M, Riabus M, Hasenbring M. Coping styles of headache sufferers. *Cephalalgia* 1999;19:165-73.
32. Passchier J, Mourik J, Brienens JA, Humfeld JAM. Cognitions, emotions, and behavior of patients with migraine when taking medication during an attack. *Headache* 1998;8:458-464.
33. Packard RC, O'Connell P. Medication compliance among headache patients. In: Adler CS, Morrissey AS, Packard RC, eds. *Psychiatric Aspects of Headache*. Baltimore, Md: William & Wilkins; 1987:280-288.