



CASE VIGNETTE

“I just need this refill, unless there’s something stronger I could try.”

Jennifer, a 25-year-old secretary new to the area, initially came in seeking a refill for her Fiorinal with codeine (butalbital, aspirin, caffeine and codeine). She complained of chronic headaches that increased in frequency following a car accident 6 months previously. Vital signs and neurologic exam were normal. On examination, she had tenderness in the neck over the occipital insertion of the left trapezius and also tenderness over the left temporomandibular joint with some jaw deviation on mouth opening. She complained of ache of the left masseter on jaw clamping and tenderness of the muscle on palpation. She had no tenderness on palpation of scalp muscles.

Describe your headaches, Jennifer. Where do you feel the pain and how severe is it? Do you have any other symptoms in addition to the head pain? Does anything seem to trigger the headaches or make them worse?

The headache affected both sides of her head and the back of her neck. It was a constant dull ache. Her head felt heavy as if she were carrying a heavy weight on her head. The neck pain worsened during the day after some hours on the computer. She had no nausea or vomiting, no worsening of headache on movement and no auras. Her headaches were usually present on awakening and got steadily worse during the day. The office fluorescent lighting made her headaches worse.

How long have you been taking the Fiorinal? How effective is it, and how much do you take?

Most days she took 4-6 Fiorinal capsules. Her previous doctor told her she should not take more than 6 in one day. About once or twice a week she was able to manage with 2 capsules. They kept her headaches quiet for 2-3 hours. When she started Fiorinal 3 months ago they gave relief for 4-6 hours. She worried because she felt she was now dependent on medication and her headaches, if anything, were becoming worse.

Are these headaches interfering with your work or with your social life? Are

you able to keep up your normal activities and enjoy your life?

Her headaches were making it difficult to concentrate and she was making more errors in her typing than usual. She felt some anxiety about her new job but did not feel depressed. She exercised regularly, though recently she had cut down because of lack of energy. She attributed her fatigue to a lack of sleep. She had moved to the area with her fiancé after his firm had transferred him to a position locally. Although she missed her parents and long-time friends, she was happy in her new life with her fiancé. She lived at home before the move.

You say your headaches worsened following a car accident. Tell me about the accident. Did you have any injuries? What examinations or other consultations have you had?

Six months previously—shortly before her relocation—she was sideswiped by a car that had run a red light. She had bruising of her left shoulder and side. She had no apparent head injury. She was examined at an emergency room and discharged with a diagnosis of bruising and prescribed Tylenol. The soreness went in 7-10 days. When her headaches intensified some time after the accident, her previous doctor ordered a CT scan of the head that was completely normal. She visited a dentist recently because of toothache. He could find no abnormality and thought her problem was due to grinding her teeth at night and recommended that she see an orthodontist. She planned to do so at a later date. A settlement was still pending as a result of the accident, and she was worried about the delay.

Were you prone to headaches before the accident? How is your health generally? Does anyone else in your family have a headache problem?

She had experienced mild-to-moderate headaches periodically, often at times of stress, which she either ignored or treated with 1-2 Tylenol. Otherwise, she had no history of troublesome headaches. Beyond the usual childhood illnesses, she had no previous

serious illnesses nor any history of head injuries. She took pride in her healthy lifestyle. Both parents were fit and well, as were two siblings. There was no family history of migraine.

There are a number of possible causes for your daily headaches, Jennifer, and they suggest a number of steps we can take to try to get control over the problem. First of all, you are taking a great deal of Fiorinal and it’s likely to be making the headaches worse rather than better. Let’s discuss the options for replacing the Fiorinal with some other medication that’s likely to be safer and more effective.

PRETEST

1. What is the diagnosis?
2. What associated conditions might be exacerbating the headaches?
3. What other consultations might be advisable for managing these conditions?
4. What should be considered in withdrawing this patient’s pain medication?

COMMENTARY

Jennifer has chronic tension-type headache (CTTH), evolving from a history of episodic tension-type headache, and exacerbated or perpetuated by overuse of analgesics.

Describe your headaches, Jennifer. Where do you feel the pain and how severe is it? Do you have any other symptoms in addition to the head pain? Does anything seem to trigger the headaches or make them worse?

She does not have any of the associated symptoms of migraine. The dull, persistent quality of the pain suggests tension-type headache. In the chronic form, the headache is often present on awakening or soon thereafter. Fluorescent lighting and poor posture or muscular tension (developing over several hours at

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the computer) can aggravate either migraine or tension-type headache. Excessive contraction of head, neck and scalp muscles is more typical of tension-type headache.

How long have you been taking the Fiorinal? How effective is it, and how much do you take?

Daily or near-daily use of analgesics is associated with the development of a daily rebound headache that recurs as each dose wears off. It can occur in conjunction with over-the-counter analgesics as well as narcotics/barbiturates. It's thought that frequency of use may be of greater significance than size of dose in leading to a rebound headache pattern. The prescribing doctor gave her a daily limit on Fiorinal use without suggesting a limit on weekly use. These headaches do not improve until the offending medication is withdrawn. The fact that Jennifer readily acknowledges overuse and poor efficacy is encouraging.

Are these headaches interfering with your work or with your social life? Are you able to keep up your normal activities and enjoy your life?

While Jennifer denies depression, she admits some anxiety, fatigue and disturbed sleep. The move away from home and the new job are major stressors that may well be contributing to some degree of dysphoria, increased stress and increased headache. Anxiety is quite common in patients with chronic tension-type headache.

You say your daily headaches began following a car accident. Tell me about the accident. Did you have any injuries? What examinations or other consultations have you had?

Jennifer may have experienced TMJ dysfunction resulting from the lateral jerk of head and neck in the accident. Her bruxism is a further manifestation of anxiety that might aggravate TMJ dysfunction. Although she is awaiting settlement of a claim, nothing in her history and behavior suggests malingering, attention-seeking or somatization. Some mild mood symptoms are evident, but she represents herself as a happy, active and healthy person except for the headaches.

Were you prone to headaches before the accident? How is your health generally? Does anyone else in your family have a headache problem?

She has a history of episodic tension-type headaches and may be prone to headaches in times of stress.

There are a number of possible causes for your daily headaches, Jennifer, and they

suggest a number of steps we can take to get control over the problem. First of all, you are taking a great deal of Fiorinal and it's likely to be making the headaches worse rather than better. Let's discuss the options for replacing the Fiorinal with some other medication that's likely to be safer and more effective.

Jennifer was given the choice between embarking on an immediate or gradual withdrawal program. Immediate withdrawal would require close supervision, i.e., daily office visits and absence from work for several days and possibly hospitalization. Gradual withdrawal would involve tapering of Fiorinal over a 2-3 week period and replacing it with naproxen (375 mg bid). She chose gradual withdrawal. She would also require a daily low-dose anxiolytic (diazepam 2.5 mg bid) for 2 weeks to reduce the risk of seizures following withdrawal of butalbital. A follow-up appointment was set for the next week. Jennifer was given further education by the staff nurse, along with printed patient education materials covering analgesic rebound headache.

She was seen 7 days later. She had reduced her Fiorinal to 1 capsule twice daily. The naproxen twice daily was not very effective. Her diary showed increased headache for the first 3 days of Fiorinal reduction. She called the practice daily during that period and was urged by the nurse to persist. Her headaches had returned to their normal level when seen. She was sleeping better.

She continued to be seen at weekly intervals during the next 3 weeks. She found ibuprofen 500 mg twice daily gave some relief and stopped the naproxen. She saw an orthodontist who prescribed a flexible mouth guard to wear at night. This reduced her jaw pain considerably.

Jennifer felt proud of her ability to reduce her Fiorinal use; however, she continued to feel low. She was referred to a clinical psychologist who confirmed a diagnosis of adjustment reaction with anxiety and depression. Her work-up revealed previous bouts of mood disturbance. He recommended a course of relaxation therapy and biofeedback. At this stage her diazepam was stopped and she started amitriptyline 25 mg twice daily. In general, chronic daily headaches are slow to improve. She may be prone to another cycle of increased headache-analgesic overuse in any time of major stress unless an effective long-term management strategy can be found. She requires further counseling, and hopefully she will continue to improve with relaxation therapy.

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DIAGNOSIS AND TREATMENT OF TENSION-TYPE HEADACHE

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Tension-type headache is the most frequent headache experienced by adults. It is characterized by a dull, squeezing ache around the head or on both sides of the head. This pain is milder than migraine pain, and does not usually cause the sufferer to take to her bed or be sick to her stomach. In fact, the ability to function during the attack is very often a useful guide to distinguishing between tension-type and migraine headache. Most patients with tension-type headache can still manage at work or at home. Sensitivity to external stimuli like noises, lights, and smells is also milder and less disabling than with migraine. Although the intensity of the pain is milder, the headache lasts longer and occurs more frequently. Some people have tension-type headache episodes that last for several days in a row, and others may even have persistent headaches that last for weeks or months. Tension-type headaches occurring less than 15 days per month are termed *episodic*, while those regularly occurring 15 or more days per month are labeled *chronic tension-type headache*.

Interestingly, depression, anxiety, and poor quality of life occur in association with frequent headache, whether the headaches are mild or severe.¹ This means that people with frequent headaches, like Jennifer, need to be questioned about psychosocial stressors and require aggressive treatment to reduce how often they have headaches. Just because individual headache episodes are not severe or not migraine does not mean treatment is unnecessary. Failure to provide effective treatment perpetuates a heightened response to stressors (in Jennifer's case, her move, new job, and engagement), often with associated symptoms of anxiety and depression, like Jennifer's bruxism and lack of energy.

The same type of serotonin imbalance found in migraine has also been demonstrated in tension-type headache. Both types of headache have been shown to have the same types of underlying chemical imbalance, changes in blood vessels, and muscle spasm.² The difference between migraine and tension-type headache is the severity of these changes, with more severe changes seen in migraine. This means that the same type of treatments work in treating both headache conditions.

Frequent headache, like tension-type headache, needs to be treated with headache preventive therapy. The antidepressants (tricyclics and SSRIs) and the

cardiovascular agents (beta and calcium channel blockers) that prevent migraine will also prevent tension-type headache. The efficacy of the tricyclics and the beta blockers for headache prophylaxis has been better demonstrated; however, the SSRIs and calcium channel blockers are often quite effective with better tolerability profiles, which may be important to young working people like Jennifer.^{3,4}

Some patients may also get relief from one of the newer seizure medications gabapentin (Neurontin) or a muscle relaxant tizanidine (Zanaflex). In addition, nonmedication therapies like relaxation, biofeedback, and myotherapy may also be helpful in treating tension-type headache. Several recent small double-blind studies have indicated that botulinum toxin (Botox) may also provide effective prophylaxis for migraine and tension-type headache.

An outdated term for tension-type headache is muscle contraction headache. Interestingly, most chronic headache sufferers experience musculoskeletal abnormalities, including myofascial pain, like Jennifer's tender trapezius, and posture abnormalities.⁵ In some cases, treating these abnormalities is helpful in relieving headache pain; however, that treatment is most beneficial in cases of cervicogenic headache, in which muscle trigger point palpation or joint movement triggers or reproduces headache episodes. A controlled study evaluating the efficacy of chiropractic manipulation for tension-type headache failed to demonstrate efficacy, and led the authors to recommend this type of treatment for cervicogenic headache, rather than tension-type headache.⁶

The acute care medications used to treat migraine, including analgesics and even the triptans, are also effective against tension-type headache.⁷ They can only be used infrequently, however, and must be limited to no more than 3 days per week. Frequent headache sufferers are at risk for developing analgesic overuse or drug rebound headache. Treating each headache episode with acute care medications like analgesics usually results in increased frequency and severity of headache, as was the story with Jennifer. People with frequent tension-type headache can only use acute care medications for the occasional headache episode that is more severe than their usual frequent headache.

Jennifer's story of tension-type headache is very typical. She experiences nondisabling, frequent headache for which she has begun to overmedicate herself. In addition, she is endorsing symptoms of anxiety and depression that occur typically with frequent headache. Her examination reveals musculoskeletal changes with both myofascial tenderness in the neck and temporomandibular dysfunction. Headache treatment involves a careful analysis and plan for treatment of these multifactorial components of her headache.

DIAGNOSIS: CHRONIC TENSION-TYPE HEADACHE

- Headache ≥ 15 days for ≥ 6 months
- Headache has at least 2 of the following characteristics:
 - Pressing/tightening quality
 - Mild to moderate severity
 - Bilateral location
- Headache is accompanied by 0-1 of the following symptoms (>1 suggests migraine):
 - Nausea
 - Phonophobia
 - Photophobia
- History, physical and neurologic exams do not suggest underlying causes such as head trauma, vascular disorders, intracranial neoplasm or infection, etc., or these causes have been ruled out by subsequent investigation.

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MEDICATION BEHAVIOR PROBLEMS: SIGNS & SYMPTOMS

- Increasing requests for pain medication
- Office visits repeatedly cancelled and replaced by requests for refill of pain medication
- New patient presents with request for refill of narcotic pain medication
- Requests for narcotic medications out of hours or at weekends (when office records may not be easily available)
- Refill before due, "spouse used my tablets for backaches"
- Pharmacy calls "another doctor is also prescribing for this patient"

BEHAVIORAL THERAPY FOR CHRONIC TENSION-TYPE HEADACHE

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Jennifer may find behavior therapy, which teaches her skills to manage her own headaches, compatible with the value she places on a healthy lifestyle; thus, she is likely to be a good candidate for this treatment. The therapist might begin with relaxation training and cognitive-behavior therapy, adding biofeedback training if needed.

RELAXATION TRAINING

Relaxation training is a systematic procedure for teaching individuals to gain awareness of and exert control over physiologic responses. The most frequently used method is *progressive muscle relaxation* (PMR), the systematic tensing and relaxing of specific muscle groups throughout the body. A typical relaxation training protocol consists of 10 sessions, with many clinicians using fewer when treating uncomplicated headache problems. PMR typically begins with the systematic tensing and relaxation of 16 major muscle groups. In subsequent sessions, the number of muscles are reduced to 7 groups, and then 4 groups. Once basic relaxation techniques are mastered, training is geared towards incorporating relaxation techniques into daily living, making them a portable coping skill designed to reduce stress and muscle tension before headaches begin. Brief relaxation by recall (relaxation of muscles without tensing them first) and cue-controlled relaxation techniques (association of relaxation with a cue word such as “relax”) are typically introduced when relaxation by tensing and relaxing specific muscle groups has been mastered. Patients are taught to use these skills as preventive rather than solely as abortive techniques. Patients are instructed to practice 30 minutes daily, and audio tapes are provided to assist the patient in learning and using relaxation skills.

Jennifer may benefit from practicing relaxation just prior to bedtime to improve her sleep and to relax her jaws, thereby reducing her tendency to bruxism. Relaxation training will help prevent her mild headaches from progressing to more intense headaches. With consistent practice, Jennifer likely will become more aware of subtle increases in muscle tension so that she can relax her muscles, preventing exacerbations of jaw pain and headaches.

BIOFEEDBACK TRAINING

Biofeedback training uses electronic instruments to provide information about physiologic responses, typically using an audio or visual display. This “feedback” is used to help the patient learn to self-regulate the response being monitored. The most frequently

employed type of biofeedback for tension-type headache is electromyographic (EMG) biofeedback—feedback of electrical activity typically from muscles of the forehead, face, or neck—typically used to reduce muscle tension in treating tension-type headache. Because Jennifer clenches her jaws, her therapist likely will monitor EMG activity from masseter muscles so that she can learn to recognize and control muscle tension specifically in these muscles. Biofeedback training is usually accompanied by instructions to practice the self-regulation techniques learned during biofeedback training at home for about 30 minutes daily. If Jennifer is unable to control facial, neck and shoulder tension with PMR, a few biofeedback training sessions may be of assistance.

COGNITIVE-BEHAVIORAL STRESS-MANAGEMENT TRAINING

Cognitive-behavioral stress-management interventions focus on the ways the individual’s methods of coping with everyday stressors can precipitate, exacerbate and maintain headache episodes, or increase headache-related disability and distress. Cognitive-behavioral training focuses on increasing the patient’s awareness of the role of cognitions (thoughts and beliefs about stressful situations and headaches) in generating stress responses, as well as awareness of relationships between stress and headaches. Cognitive restructuring teaches patients to identify and challenge dysfunctional thoughts as well as underlying maladaptive assumptions and beliefs that generate stress responses. A typical cognitive-behavioral stress-management protocol consists of 3 to 12 sessions. Cognitive-behavior therapy typically begins with one or more sessions of relaxation training before introducing other headache management skills.

Cognitive-behavioral interventions will be tailored to address Jennifer’s symptoms of anxiety and depression. Jennifer will be asked to monitor her thoughts when she is feeling anxious or sad as well as prior to headache activity. Thought monitoring will help pinpoint any cognitive errors or dysfunctional beliefs. For example, Jennifer may have unarticulated worries about adjusting to her new location and to her new life with her fiancé that generate anxiety and increased muscle tension that can either trigger or exacerbate her headaches. With cognitive-behavioral training, Jennifer will learn to challenge stress-generating beliefs and use problem-solving techniques to facilitate her adjustment and manage symptoms of anxiety and depressed mood.

MEDICATION REBOUND HEADACHE

Behavioral factors may help maintain excessive analgesic consumption. For some patients the mood-altering effects of medications containing barbiturates or caffeine reinforce excessive use of medications. Others may take analgesics in anticipation of a headache, even though they are unable to accurately predict the onset of headaches. Often anxiety and fear of headaches, rather than valid signals of headache

onset, cue the individual to take medication. Behavioral interventions can help patients distinguish valid signs of headache onset from anxiety or fear of headaches and can teach skills for managing anxiety. Acquiring skills for managing anxiety without resorting to the use of medication may reduce the risk of relapse over the long term.

TREATMENT EFFICACY

In the treatment of tension-type headache, relaxation training, EMG biofeedback, combined relaxation training and EMG biofeedback, and cognitive-behavioral stress management have each yielded about a 50% reduction in headache activity. The addition of cognitive-behavioral stress-management interventions enhances the effectiveness of relaxation training for a significant number of patients. Cognitive-behavioral interventions may be particularly helpful where psychological or environmental problems (e.g., chronic work stress, affective distress, other adjustment problems), which are not effectively addressed by relaxation/biofeedback therapies, aggravate headaches or prevent patients from effectively using self-regulation skills.

Biofeedback training may provide a nonthreatening way to introduce patients who are not psychologically minded to psychological treatment, and help them to acknowledge and address psychological difficulties. Recent findings suggests that when tricyclic antidepressant medication and cognitive-behavior therapy are combined, a larger proportion of patients (64%) show clinically significant reductions in chronic tension-type headache activity than when antidepressant medication (38%) or cognitive-behavior therapy (35%) are used alone.

Suggested Reading

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COMMUNICATION AND COMPLIANCE

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In caring for patients with head pain, dilemmas common to other chronic illness populations are encountered. A patient discouraged by slow initial progress may drop out prematurely from a program likely to help over the longer term. Without clear communication, an individual's treatment may be confounded by disjointed interventions by multiple health care professionals. The management of headache disorders is in itself a challenge that can be rendered more complex by noncompliance and medication overuse. Finally, patients in pain often request services by telephone, which under most circumstances is an inadequate means of providing health care. These dilemmas, though not simply resolved, may be managed by anticipating them, developing a system to accommodate and respond to problems, and communicating effectively with patients and their health care professionals.

The collaboration between health care provider and patient may improve patient satisfaction as well as treatment efficacy through working toward common goals, cooperatively sharing responsibility for identifying and solving problems, and making joint decisions to implement treatment. The patient must be a participating, contributing member of the team, but in order to effectively collaborate, he or she must be educated to understand the illness and its treatment.

Research as well as clinical experience suggest that headache patients value information as much as pain relief.¹ It is important for patients to know that they are not alone, that approximately 20% of the general population experiences problematic headache. They may also be interested in the basic anatomy and physiology of the brain and other structures involved (or not involved) in their headache disorder. They can be briefed on the mechanisms of pain as we understand them, including the concept of rebound headache. Also important are the psychophysiological connections between depression/anxiety, discouragement/irritability, sleep disturbance, etc., and headache, which are common “bidirectional” comorbidities rather than cause-and-effect relationships.

A certain obstacle to successful treatment is poor adherence to the medicinal or non-medicinal aspects of the care plan. Many patients desire a simple diagnosis and a straightforward cure—the hope for a “find and fix” solution—and it may take some convincing to get them to accept the concept of ongoing treatment. Education and communication, once again, are the means to establishing mutual goals and expectations. Failure to consistently follow through with any of the treatment components may sabotage the entire program or render it less than maximally effective.

MEDICATION USE AND OVERUSE

Underlying fear or skepticism about preventive medications may consciously or subconsciously affect the likelihood of a patient taking her doses regularly. Inappropriate expectations about the rapidity or extent of therapeutic effect may lead to premature discontinuation of a potentially successful drug because it did not reduce the headaches quickly enough or resolve them altogether. Untoward effects, such as drowsiness, weight gain, or reduced exercise tolerance, may not be significant enough in themselves to require discontinuation of the drug, but may reduce the patient's motivation to take it regularly. Because many individuals experiencing problematic headache are otherwise healthy, they are not accustomed to taking daily preventive medication and may simply forget. Patient education regarding the concept of preventive treatment as well as specific drug information may ease fears and improve commitment. Providing a medication dose schedule and having the patient keep a headache diary that records medication doses can help compliance as well.

The overuse of abortive/analgesic medication can complicate baseline headache by creating rebound phenomena and abuse syndromes, as well as potential for secondary organ involvement, such as GI, hepatic, and renal disease. It is basic instinct to seek escape from pain, and it is not uncommon for patients to take more over-the-counter (OTC) or prescription medication than directed. With a long history of headache, you may find the medicine cabinet full of different OTC preparations. In going from physician to physician for headache care, patients may collect a comparable array of prescribed medications. In an effort to obtain relief from severe or persistent headaches, some patients have secured more than one source of “rescue” medication.

Guidelines and strict limitations for these “controlled” medications must be established. Patients need to know how much is safe to take per day and how many days per week are appropriate—and why. These instructions and limitations, written directly on the prescription, emphasize to the patient (and the pharmacist) your determination to closely monitor drug use.

Discriminating practices that count doses and account for medications prescribed help to identify overuse problems. If the patient is overusing medication, it may be an indication that the management program is inadequate, and attention can be directed to a more effective preventive program or a more appropriate symptomatic treatment.

Medication, of course, is only one aspect of the care plan for many headache patients. Follow-through on behavioral recommendations (reduce caffeine, avoid alcohol, don't sleep too late on weekends) and non-pharmacologic interventions (biofeedback, family counseling, physical therapy) should also be emphasized. Regular review of these aspects as part of the prescribed treatment emphasizes your commitment to a comprehensive approach to care.

TELEPHONE CALLS

The issue of telephone calls from patients is particularly important in light of the changing and variable nature of headache disorders and the immediacy of pain. Patients want to have access to their health care providers and to be assured that help is but a phone call away. However, the provision of health care by telephone has inherent risks. It is essential that reasons to make contact by phone be established early on, including to report atypical headache or new neurologic symptoms, relentless headache not responsive to usual interventions, a change for the worse in the headache pattern, or adverse reactions to prescribed medication. It is best to discourage major program changes between visits and instead offer conservative advice and then arrange for a thorough, in-person evaluation as needed. Above all, be supportive of the patient who is calling for advice or assistance. Discussions, handwritten instructions, and preprinted information provided at the time of appointments, though time consuming, are likely to increase adherence and decrease phone calls between visits.

Among the benefits of open lines of communication and ongoing health education are the potential for improved adherence, safety, and outcome—essential components of good health care. Key issues to address in patient education include:

- Advise keeping a headache diary: suggest the patient record suspected triggers, pain intensity, medicinal and non-medicinal interventions tried, and their effectiveness.
- Encourage positive health behaviors and use of non-medicinal interventions and comfort measures as a complement to prescribed therapy.
- Emphasize that primary headache is a disorder to be controlled, not a disease to be cured. Guide patients to be reasonable as well as optimistic in their expectations.
- Explain that progress may be dramatic; more often it is gradual, with initially subtle reduction in headache frequency, intensity, or duration. Other measurements of improvement include better coping mechanisms and reduced impact of headaches on quality of life.

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EDUCATIONAL MATERIALS

Patient education materials are available on the American Headache Society website. Point your browser to: <http://ahsnet.org/resources/patient.php>

Past issues of *AHS Headache Profiles* are also available in PDF format at <http://ahsnet.org/education/>

THE PATHOPHYSIOLOGY OF TENSION-TYPE HEADACHE

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The pathophysiology of migraine was discussed in an earlier issue of *AHS Headache Profiles*. This article proposed that migraine appears to be an inherited disorder with an abnormal threshold for headache and an underlying neurovascular mechanism.

Tension-type headache (TTH) has been previously described as "muscle-contraction headache." This term suggested that muscle contraction underlies the pain of this disorder. TTH had also been known as "tension headache," an ambiguous term. To some it suggested muscle tension and to others psychological tension as the underlying pathology. Unlike migraine, TTH is not associated with a significant amount of autonomic activity. Pain is therefore the predominant feature in TTH. It is not unusual, however, for patients to have a mixed headache pattern, with both tension-type and migraine headaches occurring at different times. It has been suggested that migraine and tension-type headaches represent opposite ends of a spectrum of one underlying condition. Should that be so, many pathophysiologic similarities should exist between these two conditions. Although the International Headache Society (IHS) criteria do not recognize the concept that tension-type headache and migraine are related, they do recognize that there are different forms of TTH: those with and those without pericranial muscle involvement.

If muscles were significantly contracted during this headache, ischemic changes could lead to pain. No ischemia has been documented in such cases, however. In addition, a literature review in 1984 found that 50% of the studies reported normal resting EMG levels in patients with TTH and 50% reported elevated levels. This suggests that even objective muscle tension cannot be used as a marker of these headaches. It has also been shown that migraineurs experience as much muscle contraction during their attacks as patients with TTH. The degree of increase in EMG activity, if present, does not correlate with the degree of head pain. Amyl nitrite, a vasodilator, has been shown to worsen TTH, as it does with migraine. Clinically, both migraineurs and patients with TTH often experience significant pericranial muscle tenderness during their attacks, and EMG abnormalities are not useful markers for tenderness.

Chronic tension type headache (CTTH) is a rarer variant of TTH. According to the IHS criteria, this occurs at least 15 days/month and for at least 6 months, but is otherwise phenomenologically the same as the episodic form. In Jensen's study, CTTH patients exhibited a modest increase in their EMG lev-

els during rest and decreased levels during maximal voluntary contraction. This suggests that there is impairment in relaxation at rest as well as impaired recruitment during maximal activity. Most patients who develop chronic TTH evolve this from the episodic form in the same way that transformation can occur in migraineurs. CTTH usually occurs in patients who have experienced pervasive episodic tension-type headaches. It is thought that central sensitization may occur during this transformation, with impairment of supraspinal modulation of the peripheral stimuli, such as muscle contraction.

Peripheral serotonin has been investigated in forms of TTH. In CTTH, platelet serotonin has been found to be lower when compared to normal controls. No reproducible differences in platelet serotonin have been found in those with the episodic form. There is an association of depression and anxiety with chronic tension-type headaches, but not in the episodic form. The only nearly objective marker of TTH remains tenderness on examination, which tends to correlate with the severity of the attack. It appears that TTH, like migraine, is a reflection of a neuronal sensitivity rather than a condition of increased muscle contraction. The trigeminal nucleus caudalis is the primary nucleus receiving nociceptive inputs from blood vessels of the head and from the pericranial musculature. In both migraine and TTH, there may be a central hypersensitivity stemming from an inhibition of this nucleus, which allows for an elevation in nociceptive input. Perhaps in TTH the pericranial muscular nociceptive input predominates and in migraine the cephalic vascular nociceptive input is primary. In episodic TTH, there might be peripheral sensitization. After headaches evolve to CTTH, a combination of peripheral and a secondary segmental central sensitization could occur. The mechanism suggested for transformation of episodic TTH into chronic TTH is a reaction to prolonged nociceptive stimuli from pericranial musculature. This implies that aggressive treatment of frequent TTH may be important to prevent progression of the disorder.

Suggested Reading

Drummond PD. Scalp tenderness and sensitivity to pain in migraine and tension headache. *Headache* 1987; 27:45-50.

Jensen R. Pathophysiological mechanisms of tension-type headache: a review of epidemiological and experimental studies. *Cephalalgia* 1999; 19:602-21.

Olesen J. Clinical and pathophysiological observations in migraine and tension-type headache explained by integration of vascular, supraspinal and myofascial inputs. *Pain* 1991; 46:125-32.

Pikoff H. Is the muscular model of headache still viable? A review of conflicting data. *Headache* 1984; 24:186-98.

Raskin NH. *Headache*, 2nd ed. New York: Churchill-Livingstone, 1988.

POSTTEST—TRUE OR FALSE

1. Since frequent tension-type headaches are unlikely to affect functioning, this headache disorder usually does not require treatment.
2. Migraine preventive medications are usually ineffective for tension-type headache.
3. Medication overuse is often implicated in the development of chronic near-daily headaches such as chronic tension-type headache.
4. Muscle tension is an essential feature of both episodic and chronic tension-type headache.
5. Combined use of biofeedback and antidepressant medication benefits a larger proportion of patients than either modality alone.

ANSWERS—PRETEST

1. Chronic tension-type headache with past history of episodic tension-type headache.
2. Her daily headaches are likely multifactorial, potentially involving:
 - a) Rebound headache resulting from analgesic overuse.
 - b) Mood disturbance (depression/anxiety)
 - c) Left temporomandibular joint dysfunction, possibly dating from the accident, and myalgia of associated muscles
 - d) Bruxism
3. Given the associated conditions, two consults might be helpful:
 - a) A clinical psychologist or psychiatrist to evaluate her mood disturbance and offer a stress management program such as biofeedback or relaxation training.
 - b) An orthodontist or dentist to evaluate her TMJ symptoms and possibly provide an appliance to relieve the jaw pain
4. Relevant considerations include:
 - a) Limiting risk of seizures on butalbital withdrawal with an anxiolytic
 - b) Offering alternative pain medications, since headaches may intensify as Fiorinal is withdrawn
 - c) Patient preference and insurance coverage for gradual versus immediate withdrawal program (which might require hospitalization)
 - d) Thorough patient education and frequent contact to motivate adherence

ANSWERS—POSTTEST

1. F 2. F 3. T 4. F 5. T