

HEALTH AND STRESS

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STRESS, HEADACHE, AND OTHER HEAD PAIN

Key Words: Hormonal influences, environmental triggers, depression, endorphins, serotonin, side effects of pain pills, cluster headache, TMJ, MFS syndromes, bio-feedback, pulsed signal therapy.

Tension headache, migraine, and a variety of other pains above the shoulders are frequently due to stress. He's a "pain in the neck", or "nothing but headaches", and "I was so furious I thought my head would blow off", are common expressions that reflect the widespread belief in this relationship. Manufacturers of over the counter analgesics such as aspirin and acetaminophen (Tylenol), or different types of nonsteroidal anti-inflammatory drugs like ibuprofen (Motrin) and naproxen (Naprosyn, Aleve) often target their advertisements to headache victims, since this is far and away their largest market. Americans spend more than \$4 billion annually on headache remedies, roughly \$16 for every man, woman, and child. That's not too surprising, since almost everyone has experienced a transient headache or pain in the skull at some time.

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Nearly 50% of patients with headaches use prescription medications, and 90% regularly use nonprescription drugs when they have intermittent episodes of pain in the head. Most of these are classified as "tension" headaches, the vast majority of which are due to stress. However, over 45 million, or one in six people, have chronic or severe recurrent headaches that frequently affect their ability to function properly. That's especially true for the 18 million whose periodic attacks of migraine make them absent 57 million workdays each year. Chronic daily headaches can also be caused by overuse of over the counter and prescription drugs. Industry loses about \$50 billion annually due to absenteeism and medical expenses caused by headaches, and children miss a million days of school.

In addition to tension headaches and migraine, other types of headaches and head pains can also be stress related. These include cluster headaches, facial, and/or scalp pain due to trigeminal neuralgia (tic douloureux), temporomandibular joint (TMJ) and myofascial pain dysfunction (MPD) syndromes, cervical disc disease and arthritis, fibromyalgia, temporal arteritis, carotidynia, mitral valve prolapse, and neuropsychiatric conditions such as depression, or hysteria and other conversion disorders.

Support for the role of stress in headache and head pain comes from reports of relief following the use of a variety of stress reduction strategies.

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*The Newsletter of
The American Institute of Stress*

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Migraine

The word migraine is derived from the Greek *hemicranios*, meaning half a head, and the disorder is characterized by a moderate to severe throbbing pain confined one side of the head lasting from four to 72 hours. Approximately 26 million Americans are believed to suffer from migraine, but this estimate is based on anecdotal reports, since there are no definitive medical tests that can confirm the diagnosis. Figures are based on anecdotal reports, since there are no medical tests that can prove the diagnosis with certainty. Attacks can occur two or three times a year, or as frequently as twice a week or even more. It appears to be an inherited disorder, and some authorities believe that a family history can be found in almost 90 percent of patients. While the attacks usually start in the late teens or twenties, they can also occur in children, where the pain is sometimes felt on both sides of the head.

About one in five patients have so called classical migraine, in which an "aura" is experienced 15-20 minutes prior to the onset of pain. These premonitory symptoms are usually in the form of visual disturbances, such as seeing flashing lights, bright spots, zig zag lines, or a sudden loss of vision in certain areas. There may also be numbness or tingling in the face, tongue, or even hand, warning that an attack will follow. These disturbances tend to be consistent for each individual.

The severe, throbbing pain that ensues is associated with an annoying sensitivity to light and noise, usually accompanied by nausea, with vomiting and diarrhea in some patients. Migraine appears to be a vascular disorder in which there is an initial constriction or spasm in arteries thought to produce the symptoms that are associated with auras. This is followed by a sudden dilatation and widening of the vessel that stretches its muscular wall, causing pain. Researchers believe that the resultant throbbing discomfort is precipitated by abnormal or sudden changes in the levels of serotonin, noradrenaline, and possibly other neurochemical messengers that modulate blood vessel tone.

There are significant hormonal links, and some studies suggest that attacks of migraine tend to be associated with a change or rapid drop in estrogen levels, especially if they have been elevated for several days. Although migraine affects more young girls than boys, this ratio increases dramatically following the onset of menstruation. Almost three out of four migraineurs are women. More than half report some relationship in the frequency or severity of headaches with their menstrual period, but this varies. Attacks can occur several days before, immediately after, or during menses. In others, headaches are most frequent when they ovulate, or during the period between ovulation and menstruation. Pregnancy influences migraine. Most women find that their attacks disappear completely, occur less often, or are milder during pregnancy. In the remainder, headaches can either worsen or show little change with respect to frequency and/or severity. A complete disappearance of migraine following the menopause is common. However, the attacks often resume when estrogen supplements are given to alleviate hot flashes or sweats, or to prevent osteoporosis and heart attacks. In most of these cases, attacks disappeared or became less frequent after estrogens were discontinued.

Oral contraceptives also affect the incidence of migraine attacks. In one study, about half reported their headaches started to get worse, 40 percent saw no difference, and 10 percent actually improved. In almost three out of four who had experienced an adverse reaction, their normal pattern of headaches resumed after the medication was discontinued.

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Most physicians believe that females with a history of migraine should not take oral contraceptives or other medications that contain compounds with estrogenic activity. This is particularly true if the headaches are preceded by aura phenomena, since this type of migraine is a significant risk factor for stroke. Post menopausal migraine patients should take only the lowest possible dosage, and unless there is some medical contraindication, this should be taken on a daily uninterrupted basis to avoid sudden changes in blood levels.

It seems likely that genetic factors may predispose some women to migraine, since their blood vessels are much less sensitive in responding to cold temperatures compared to age matched controls. The reason for this may be that their blood platelets are not as efficient in retaining serotonin. Serotonin is a potent blood vessel constrictor, and its highest concentrations in the body are found in blood platelets. These observations support a theory that some attacks of migraine may be precipitated by a sudden change or drop in blood serotonin levels. Serotonin particularly influences on behavior and mood. Very low levels have been linked to an increase in violent acts as well as depression.

Some scientists suspect that migraine patients are born with a hypersensitive nervous system that causes them to overreact to a variety of environmental or lifestyle stimuli that can provoke an attack. Various attempts have been made to find some common characteristics in the personality profile of migraine patients using standard measures such as the MMPI, personal interviews, and responses obtained from family and friends. Although there is no unanimity of opinion, they tend to be ambitious, orderly individuals, constantly striving for perfection in everything they attempt. This appears to be particularly true for females, who may experience more frequent, prolonged, or severe headaches when they are frustrated because everything does not go precisely the way they wanted it to.

There are sporadic reports that some patients have improved significantly once they have been made aware of these behavioral traits, and are taught to correct them. In general, however, attempt to prevent migraine by psychiatric interventions have not met with stunning success.

There are a host of other triggers, including:

Dietary Factors

- alcoholic beverages
- foods containing tyramine; like aged cheeses, Chianti wine, pickled herring, dried smoked fish, sour cream, yogurt, yeast extracts, chocolate, citrus fruits, dairy products, onions, nuts, beans, caffeine (excess, withdrawal), fatty foods,
- food additives; nitrites (e.g., in hot dogs, luncheon meats), monosodium glutamate (MSG), aspartame artificial sweetener (NutraSweet, Equal)

Environmental Factors

- bright light
- flickering light sources
- fluorescent lighting
- perfumes
- strong odors
- fumes from industrial complexes, air pollution
- second hand cigarette smoke

Motion

- travel, athletic activities
- complex moving visual patterns (checks, zig-zag lines)
- weather changes

Lifestyle Factors

- STRESS
- disrupted sleep patterns, "letdown", fatigue
- irregular eating habits
- smoking

Medications

- blood vessel dilating drugs (nitroglycerin)
- drugs for high blood pressure (hydralazine, reserpine) and diuretics
- anti-asthma medications (aminophylline)
- over use of analgesics, ergotamine

Physical Factors

- head trauma
- invasive medical tests
- excess exertion (sports, sexual orgasm)
- neck disorders (arthritis, disk narrowing)

All of the above are highly individual. As in gout, where there may be similar triggers, some patients regularly react to red wine but have no problems with chocolate or other foods and medications that are devastating to others - and vice versa. The challenge is to find what common denominator mediates this response. (Continued on Page 4)

Hormonal Factors in females, such as;

- onset of puberty
- menstruation
- menopause
- pregnancy
- birth-control pills
- estrogen replacement therapy

have already been discussed. As indicated, these can vary tremendously. While many individuals worsen with estrogens, some seem to improve, and it is likely that other hormones play a role, or that it is the balance between estrogen and some of these that is important. There is some suggestion that there may also be endocrine influences in males, but much less is known about this. The important role of stress in migraine and other headaches, and the benefits of stress reduction will be discussed in a subsequent section.

Tension Headaches

Approximately 90 percent of all headaches are classified as tension-type headache. Pain, or the feeling of tightness or discomfort is due to increased spasm of the muscles of the scalp and/or neck. Unlike migraine, which usually affects only one side, it tends to be generalized all over the head, and is steady rather than throbbing. There is often a "hat band" distribution, and tenderness of the neck musculature on applying pressure. Complaints of disturbed sleep are also common. Patients with pre-existing neck problems like cervical arthritis or disk narrowing may be particularly susceptible. They often experience a radiating pain over the back of the head referred to as occipital neuralgia. Tension headaches tend to be less severe and disabling than migraine, and respond much more readily to over the counter pain relievers and anti-inflammatory drugs.

Tension headaches vary with respect to severity, frequency, and location. Although there is no antecedent aura, some often suspect they may be headed for trouble because of a sensation of tightness or constriction in the head, or neck. There may also be increased discomfort when applying pressure to these areas. Pain in the back of the head or neck is sometimes relieved with moist heat. This is in contrast to migraine, where the pain often lessens when strong pressure or cold is applied to the throbbing area.

Tension headaches can be divided into two broad categories: those that pop up on a random or episodic basis and others that tend to be chronic or occur almost daily. Such individuals often wake up in the morning with discomfort in the head or back of the neck, and frequently complain of problems sleeping. In some individuals, the pain gradually dissipates or disappears, while in others, it persists or may worsen depending on the events of the day. Daily headaches can also be due to depression, persistent anxiety, and other emotional problems.

Chronic headaches of any type require prompt intervention to determine their cause, so that an attempt can be made to prevent them. While readily available medications often provide prompt relief, there is always the danger of developing a dependence on them that can perpetuate the problem. In addition, the body often builds up a tolerance to them, so that they must be taken in larger amounts or more frequently. Long term use can lead to drug withdrawal headaches when an attempt is made to stop them because of disturbing side effects like stomach pain or gastrointestinal bleeding. These headaches also tend to be chronic and can be very difficult to manage.

"Muscle tension" or "nervous" headaches are much more common and unpredictable. They can result from a sudden or severely stressful situation, but are more often due to an excess of daily hassles, like fights with customers, co-workers, or family, or constant commuting problems because of traffic jams, stress, or an excess of daily irritants and tensions. Although there is little evidence to support a genetic link, certain personality types seem to be particularly predisposed. This type of tension headache seems to occur more frequently in sensitive individuals whose feelings are easily hurt or others who are quick to become very annoyed or angry over relatively minor disturbances. In both instances, those who suppress their feelings are much more susceptible.

As indicated previously, nine out of ten headaches are tension headaches, which tend to be sporadic, and not terribly disabling. In addition, most are readily responsive to aspirin, Tylenol, combination products like Excedrin and anti-inflammatory drugs that no longer require a prescription. However, this may be a mixed blessing that can boomerang.

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Stress, Pain, And Depression

Pain is a subjective phenomenon that can be manifested in many forms. Adjectives such as shooting, searing, burning, lancinating, aching, soreness, radiating, throbbing, constrictive, piercing, crushing, and others are often used. However, it may be difficult to describe, much less measure its severity so that others can appreciate what is being felt. Sensitivity to pain can vary considerably, and some individuals seem to be able to tolerate more than others. A useful mnemonic aid for remembering and appreciating some basic pain concepts is:

- P:** Pain is a *perception* of personal sensation of hurt.
- A:** Pain is an *awareness* of existing or impending tissue damage.
- I:** Pain is an *integration* of impulses to create a pattern of responses.
- N:** Pain is a *negation* of usual behavior that may have evolved as a useful response designed to protect us from harm.

There are numerous and complex interrelationships between stress and pain, as well as depression. Stress causes pain and pain can cause stress. This sometime leads to a vicious cycle that perpetuates itself until either problem is diminished or removed. Paradoxically, individuals under severe stress may have no pain at all despite serious injuries. This became apparent in World War II, when it was observed that soldiers subjected to constant and dangerous battle conditions rarely complained of pain despite having a leg or arm blown off. Many required no pain medication for several hours, when they reached the safety of a hospital bed. Yet, this rarely occurred with similar injuries sustained in civilian life because of a sudden and unexpected accident. Elite marathoners may continue to run despite broken bones in their feet, or knee injuries because they do not perceive the usual pain signals that would normally cause them to curtail their activities. This oblivious reaction to pain is due to the increased secretion of endorphins, small peptide neurochemicals that also have powerful effects on mood. Endorphins are responsible for the "runner's high", a peculiar state of euphoria associated with a sense of heightened inner "awareness" similar to that described by accomplished practitioners who reach the deepest states of meditation, or nirvana.

Endorphins may be thought of as the body's natural morphine and a vivid example of their power was supplied by the African explorer, Dr. Livingston (of Stanley and Livingston fame). In the 1850's, he recounted his response to an attack by a lion some twenty years before.

"I heard a shout, and looking half around, I saw the lion, just in the act of springing on me. I was upon a little height. He caught my shoulder as he sprang, we both came to the ground below together. Growling horribly, close to my ear, he shook me, as a terrier does a rat. The shock produced a stupor in me similar to that which seems to be felt by a mouse after the first shake of the cat. It caused a sort of dreaminess in which there was no sense of pain or feeling of terror, although I was quite aware of all that was happening. The shake annihilated fear and allowed no sense of horror in looking around at the beast. This peculiar state is probably produced in all animals killed by the carnivore, and if so, is a merciful provision by our benevolent Creator for lessening the pain of death."

There are several types of endorphins, which are also thought to be responsible for feats of unusual strength, such as the sudden ability of a frail 97 pound elderly woman to lift a 100 pound log to save her grandchild from an approaching train. The secretion of endorphins parallels that of ACTH, the premier stress hormone which stimulates the production of cortisol from the adrenal cortex.

There are also complex links between stress, pain, and depression that involve other neurotransmitters like serotonin. As previously noted, an abrupt fall in serotonin is thought to be responsible for triggering some attacks of migraine. Serotonin levels tend to be low in depression, and antidepressant drugs designed to raise serotonin, are also frequently prescribed to relieve persistent headache and other pain in non depressed patients, because of their efficacy, especially when taken with NSAID's.

Cortisol levels are also high in depression, since the normal suppression of ACTH secretion does not occur, even when powerful steroids are administered. There is a similar disturbance in the usual pituitary-thyroid feedback mechanism, and it is likely that other hormones and humoral neurotransmitters are involved, as in the case of estrogens in migraine, which occurs more frequently in females.

The Pitfalls Of Pain Pills

Over-the-counter products for tension headaches and other aches and pains obviously work fairly well, as indicated by the huge amounts that are sold every day. In January 1998, a version of extra-strength Excedrin called "Excedrin Migraine" became the first nonprescription drug specifically approved by the FDA for migraine. The fact that these medications are readily available leads many people to assume that they are relatively safe, and most never bother to read the warning labels.

Few are aware of the dangers of long term use of many of these, especially those that previously required a prescription. This is especially true for NSAID (non steroidal anti-inflammatory drugs) that can cause ulcers and gastrointestinal bleeding but mask the usual early warning signs. Close to 100 million prescriptions are filled for NSAID's every year, and non prescription sales are probably much higher. There is evidence of stomach ulcerations or erosions in 40 percent of those who take NSAID's for extended periods. These drugs have now also been linked to ulcerations in the small intestine by researchers. They believe that small bowel complications requiring surgery is far more common than generally recognized. It is estimated that well over 100,000 people are hospitalized annually for NSAID gastrointestinal complications, at an average cost to the economy of \$10,000 for each hospitalization. Because of the surgical triumphs portrayed in *Chicago Hope*, *ER*, and other TV programs, it is not generally appreciated that people admitted to the hospital for stomach bleeding have a ten percent chance of dying.

There are also significant kidney complications that can occur, and few are aware of their extent and potential danger. A Mayo Clinic study of patients admitted for nephropathy concluded that over ten percent could be traced to NSAID's. Even one or two ibuprofen (Motrin) capsules taken two or three days a week can cause kidney damage. Most people with a history of peptic ulcers or esophagitis know that they should avoid these drugs, as well as any that may contain aspirin. However, patients with kidney disease are also at risk, and even low doses can cause interstitial nephritis or tubular necrosis leading to kidney shutdown and the need for dialysis.

A Canadian study warned that long term use of NSAID's should be avoided whenever possible, stating that "No NSAID is available that lacks potential for serious toxicity." This is especially true for high risk patients and the elderly, where they were found to be overprescribed. Older people also often take two or three other medications, many of which don't mix well with pain pills. A daily dose of aspirin is increasingly being advised as a way to prevent heart attacks, but in addition to stomach ulcers, side effects can include tinnitus, dizziness, allergic reactions, and interference with other drugs. Celecoxib, which allegedly does not cause stomach ulcerations was recently approved by the FDA for pain relief, and at least one other so-called "super aspirin" is in the wings. However, not much is known about other possible side effects of long term use of these selective COX-2 inhibitors, or how they may react with other drugs.

Acetaminophen (Tylenol), which many people take to avoid gastric irritation, causes other problems. When combined with alcohol, it can lead to liver damage that is irreversible and fatal in some instances. Since this is a component of many combination pain pills the FDA recently mandated alcohol warning labels on all such products, advising that if you drink three or more alcoholic beverages a day, you should consult your doctor before taking them. Cortisone and related drugs are sometimes given to reduce inflammation and pain, but in addition to ulcers, can cause osteoporosis, mental disturbances, and increased susceptibility to infections because of suppression of immune system resistance. Antidepressants which are increasingly being prescribed for pain relief can also have very disturbing side effects. The addiction potential for opiates and drugs containing codeine is well known, and long term use is similarly not advised.

That is why stress reduction approaches are so important. In addition to being completely safe, they are also extremely cost effective, and many can be readily learned and practiced whenever indicated. There are other exciting non-traditional bioelectromagnetic approaches already available, and others are on the horizon that are even more promising. A major emphasis will be placed on these at our forthcoming Tenth Montreux Congress and will be reported on subsequently.

Cluster Headache And Other Head Pains

In addition to tension and migraine headaches, cluster headaches may also be stress related. These are much less common, usually start after the age of 30, and are characterized by very intense and severe pain over one eye, often described as having a burning or piercing quality. with associated swelling or tearing, drooping of the lid, increased nasal congestion and increased secretions, and forehead of facial sweating, all confined to the same side. Like migraine, it is thought to result from a dilatation or swelling of blood vessels in the head. However, it may be throbbing as well as constant, nausea and vomiting are very uncommon, and the pain is so severe that most sufferers, ninety percent of whom are male, patients generally can't sit still, and will often pace during an acute attack. Attacks can last from 15 minutes to three hours, generally reaching their full force within five or ten minutes after onset and are almost identical. Although they start suddenly and there is no aura, there is sometimes a warning sensation of burning or discomfort on the affected side.

Attacks most often last for 30 to 45 minutes, and disappear only to recur in clusters three to eight times later in a 24 hour period. They tend to recur at the same time so regularly on subsequent days, that they have been called "alarm clock" headaches, when they waken the patient in the early morning or during the night. Headache periods can last for several weeks or months and then disappear completely for months or years. Since clusters of headaches often occur in the spring or autumn, they are often associated with allergies, but increased job stress during these seasons is a more likely culprit.

Temporomandibular joint or TMJ syndrome, is a much more common cause of facial pain that is often due to stress. While originally thought to be due to an arthritic involvement of the lower jaw joint, current research has established that the problem actually originates in the muscles that move the jaw. The term now preferred to describe the condition, myofascial pain dysfunction (MPD) syndrome provides a better understanding of both the source and cause of the problem and has led to simpler and more effective forms of therapy. Dull, aching pain in and around the ear is the most common symptom, and may radiate to the side of the scalp, back of the head or down into the neck, causing headache and pain in these locations.

It is often made worse by chewing, excessive talking or yawning. Accompanying the pain there may be difficulty in opening the mouth or clicking and popping sounds in the jaw joint. Tender spots in the jaw muscles is another common finding. Originally thought to be due to problems with the bite, it is now clear that in most cases, the painful muscle spasm is related to psychological stress. This does not mean that the pain is imaginary but, as with hypertension, ulcers and angina, stress can lead to changes in body function and produce physical illness. The disorder tends to affect women more than men, which may reflect the changing role of women in our society, which has greatly increased their stress levels, especially those who work in addition to being homemakers. Although it can occur at any age, most patients are in the twenty to forty age group.

Certain types of individuals seem to be more prone to develop MPD syndrome than others. Those who find difficulty in coping with stressful life situations, or who are unable to successfully vent their emotions, build up inner tensions, which are then expressed through increased muscle tone and spasm. For those with MPD syndrome the muscles with which they chew are mainly affected and people with this syndrome are literally "uptight" in their jaw muscles. In some, the condition is further aggravated by tension-relieving habits such as clenching or grinding the teeth (bruxism). Those individuals who grit their teeth mainly in the daytime find that their symptoms get worse as the day progresses. Others do this at night and find that the pain and limitation of jaw movement are then worse in the morning. Although the significance of such habits was not always appreciated, these tendencies have been recognized for thousands of years.

As will be seen, stress reduction strategies, some of which are well established and others which are quite innovative and novel, offer great hope for the treatment of this and other types of head pain. More importantly, all of these are completely safe, and will be a mainstay of the therapeutic armamentarium as we move into the millennium.

Stress Reduction: Safe And Cost Effective Prevention And Treatment For Headache

Headaches are responsible for more visits to physicians than any other complaint. Up to four out of five Americans have at least one severe headache a year, and close to half the population have more than one a month. All headaches must be taken seriously, regardless of their nature or severity, since they could be an early warning sign of a brain tumor, bleeding into the brain from an aneurysm, or some systemic disorder that requires immediate attention. Surprisingly, headache, backache and other pains seem to occur more frequently in the late teens and early twenties than in other age groups. Some studies link a higher incidence of such symptoms with increased job stress, a problem that has steadily escalated in the past two decades. Stress and pain are inevitable consequences of being human. As the poet Francis Thompson wrote:

"Nothing begins, and nothing ends

that is not paid with moan.

For we are born in other's pain

And perish in our own"

The word pain is derived from the Greek word for penalty. The early derivations of pain can also be translated as punishment, and in ancient times, was viewed as a punishment for having displeased the Gods. Fortunately, we can now do a lot more to escape the punishment of pain. There are many new treatments for migraine, including Imitrex (sumatriptan) which comes in a fast acting nasal spray, and chemical relatives like Amerge, Maxalt, and Zomig, all of which have different side effect profiles. While brightness tends to intensify pain and other symptoms, researchers recently reported that exposure to artificial bright light could actually help prevent attacks. Light therapy has previously been shown to be of value in patients with some types of depression, insomnia, and eating disorders, and it is believed that these benefits are due to effects on serotonin and other brain neurotransmitters. In some ulcer patients who also suffered from migraine, antibiotic treatment not only cured their ulcers, but also significantly reduced their headaches. In one study of 225 migraine patients, 105 were found to be infected. A brief course of antibiotic therapy was effective in eradicating the bug in more than four out of five, resulting in a complete disappearance of migraine in 23% and significant improvement in the 75% of the rest. Although the bug may produce no symptoms, chemicals produced by the immune system in response to the chronic infection could trigger migraine attacks by effects on blood vessels in the brain.

Traditional stress reduction techniques such as meditation and autogenic training can also be effective in migraine and other headaches. Thermal biofeedback can help reduce migraine and cluster headaches, as muscle tone feedback does for tension headache. As demonstrated at our Tenth Congress, pulsed signal therapy offers great promise for the treatment of temporomandibular joint syndrome, and other bioelectromagnetic approaches may also be effective for this, as well as depression, which is an important contributor to pain in general. There is also evidence that ordinary magnets can help, so stay tuned.

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TENTH INTERNATIONAL MONTREUX CONGRESS ON STRESS

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