

HEALTH AND STRESS

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TENTH INTERNATIONAL MONTREUX CONGRESS ON STRESS

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Hans Selye Award Recipient Ross W. Adey, M.D.

Plenary Sessions On Energy Therapy In The Millennium,, The Epidemic Of Violence In Contemporary Society, Job Stress And Health In The Workplace, Post Traumatic Stress Disorder, Type A Behavior Update, Time, Stress And Creativity, And Much, Much, More. Holistic Medicine Stress Reduction Day - March 6

PARKINSON'S AND ALZHEIMER'S: THE SURPRISING ROLE OF STRESS

Key Words: Aging, oxidative stress, Down' syndrome, memory loss, antioxidants, positive effects of smoking, placebo phenomena, faith healing, *chi*, therapeutic touch, electromagnetic, and other subtle energy healing effects.

Both Parkinson's and Alzheimer's diseases are degenerative disorders of the nervous system that seem to be occurring more frequently now than in the earlier part of this century. There are several possible reasons for this, the most obvious explanation being that their incidence increases with advancing age, and more and more people are living longer. There were only 3 million Americans 65 or older in 1900, and today, there are over 10 times as many. More than one out of every eight people are now senior citizens, and the over 85 age group has become the most rapidly growing segment of the population.

At least a third of everyone born in 1990 will live to be over 85, and in thirty years, one out of every five senior citizens will be in this category. In 1980, there were 14,000 people 100 or older, but relatively few were able to function on their own. On the *Today* morning news program, Willard Scott, would occasionally show pictures of those rare individuals who appeared to still be healthy and have all their marbles. By 1990, there were more than 36,000 centenarians, a 250% increase, and an even more significant rise is predicted by the millennium. It is now not unusual to see several of these spry super seniors on TV every morning, and it is impossible to accommodate all the requests that pour in from family members.

Unfortunately, the vast majority of the very elderly do have significant health problems. It is estimated that as their number steadily rises, a new nursing home with over 150 beds would have to open every day for the next four years to keep up with the anticipated demand. But greater longevity may not be the sole reason for the increase in these diseases.

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*The Newsletter of
The American Institute of Stress*

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Parkinson's Disease And Parkinsonism

Although the cause of Parkinson's disease is unknown, it is clearly age related. It affects about one in a thousand between the ages of 50 and 65, but the incidence is 40 to 45 times greater in the 85-95 year age group. The disorder is characterized by tremor, muscular rigidity, slowness of movement, and difficulty in walking. These disabilities are quite distinctive. The tremor is frequently described as "pill rolling", since it is manifested by the thumb and forefinger moving in opposite directions in a rhythmic fashion, when at rest but not with activity, and never while sleeping. Walking is impaired, and often manifested by repetitive small steps, which the French refer to as the "*marche a petit pas*". Patients find it difficult to stop quickly if pushed forward, which frequently occurs spontaneously while walking, producing an unusual type of shuffling gait called festination, in which they propel themselves in small steps while bent forward, as if trying to catch up with their center of gravity.

The facial appearance is also quite characteristic, and has been described as "mask-like", because the suppression of muscular activity results in a loss of expressiveness. Since small muscles are most affected, blinking and ocular movements are diminished, and the eyes always seem to be staring. Speech may be slurred and monotonous because of difficulties pronouncing consonants, as well as the lack of variation in pitch. Difficulties in chewing and swallowing often lead to drooling.

The movements of the small muscles of the hand are particularly affected, causing clumsiness, and making it difficult to perform needlework, dealing cards, or taking money out of a pocket or purse. There is a tendency for handwriting to become tiny, or micrographia. Pain and sensory disturbances are minimal, except when muscle spasm is severe. Depression is common, and sleep is often impaired because of this as well as other reasons. Unlike Alzheimer's disease, cognitive functions can remain comparatively intact, even when physical impairment is severe, although it does occur in the very late stages. Males are affected more than females.

Parkinson's disease tends to appear after the age of 50, usually with the onset of tremor in one hand, most often the right, followed by tremors in the leg on the same side. It is always progressive, but the rate of development of this and other symptoms varies considerably. However, a Parkinsonian like disorder that follows a different course can result from viral infections of the brain, medications like reserpine and antidepressants, exposure to carbon monoxide, manganese, and other toxins. Certain diseases may produce similar symptoms, including hypothyroidism, Alzheimer's, brain tumors, subdural hematoma, and "punch drunk" syndrome from repeated trauma.

Bodily movements are regulated by a portion of the brain called the basal ganglia, whose cells require a proper balance of dopamine and acetylcholine, chemical messengers which are responsible for the transmission of nerve impulses. In Parkinson's, the cells that produce dopamine begin to degenerate, and this normal equilibrium is disturbed. Since injecting dopamine is not effective, most treatments try to correct this with oral drugs that are metabolized into dopamine, like levodopa (L-dopa). Their efficacy decreases over time as the body develops resistance, but the antioxidant selegiline may help to prevent this. Bromocriptine and pergolide are drugs that mimic dopamine's activity, rather than increasing it, and other medications are used to decrease acetylcholine. Implanting adrenal medullary tissue or fetal tissue to manufacture dopamine has been tried, as well as giving nerve growth factor to prevent cell damage. Stereotactic neurosurgery can control rigidity and tremor but does not alter the progress of the disease.

The most promising developments are an implantable device that influences the electrical activity at certain brain sites, and external electromagnetic stimulation. The stunning successes achieved with both of these will be featured at our Tenth Congress.

Stress And Parkinson's

Parkinson's disease was originally described by James Parkinson in 1817, in his "Essay on the Shaking Palsy". In discussing his very first patient, he emphasized that the onset of symptoms followed an emotionally stressful event. Subsequent authorities were also impressed with this relationship, and the leading textbooks indicated that the disease could be "precipitated or aggravated by fright or emotional upset", and that tremor "is increased by emotional excitement and almost always disappears with sleep." As one typical patient described it, "My tremor did not significantly interfere with handwriting except in the presence of strangers. For example, when registering at a hotel the tremor would rapidly increase so that my signature was nearly illegible. Yet, when I signed my checks, it hardly showed any tremor."

So called "essential tremor", is often seen as part of the aging process in healthy people. As in Parkinson's disease, the disability often becomes intensified during stressful situations, or when very precise movements of the fingers are required, like picking up a needle, or putting a specific paper clip that is in one small container into another. As in Parkinsonism, the normal trembling and tremor is clearly aggravated by emotional stress, since the disability increases directly in proportion to the importance of the assignment, or the speed with which it must be performed. This may be due to increased secretion of stress related hormones like adrenaline, and the treatment of choice is a beta blocker drug like Inderal, which blocks adrenaline effects. Parkinsonian patients also complain that other symptoms such as slurred speech, drooling, gait disturbances, and loss of balance are also worse during stressful situations. In fact, one prominent neurologist has stated that any time the disease suddenly deteriorates for no apparent reason, a stressful situation can almost always be identified as the precipitating cause.

An abrupt onset of palsy and disability identical to that seen in Parkinson's has been described following a sudden fright, like seeing one's house on fire, but this usually vanishes after a few minutes. Paradoxically, the same type of acute stress can result in a temporary disappearance of muscle spasm and rigidity in Parkinsonian patients. There is comparatively little in the current scientific literature about stress, because it has been difficult to demonstrate a mechanism of action. However, recent insights into the influence of oxidative stress on the process of aging have provided a new perspective and a rationale.

The Role Of Oxidative Stress

It now seems quite apparent that the vast majority of stigmata and disorders associated with the aging process, including Parkinson's disease, Alzheimer's disease, atherosclerosis, cataracts, gray hair, wrinkled skin, and various malignancies seen in the elderly are due to the production of oxygen free radicals. Free radicals are unstable molecules because they have one or more unpaired electrons in their outer shell. They race around the body to correct this deficit by robbing electrons from normal cells, disrupting their function and wreaking havoc, since these cells now become unstable. This results in a cascade of chain reactions that results in further damage. Most anti-aging therapies are based on blocking the production of free radicals, or neutralizing their oxidative stress injuries. Rust is a good example of oxidative stress, and in a very real sense, we do not wear out when we grow old, but rather rust out.

Oxidative stress damages are normally blocked by natural antioxidants like melatonin, but our ability to manufacture these declines with age. Melatonin is the body's most powerful neutralizer of the hydroxyl (OH) radical, which causes the greatest harm, and melatonin supplementation appears to have potential therapeutic value in neurodegenerative diseases like Parkinson's and Alzheimer's. Emotional stress accelerates free radical production and interferes with the normal protective actions of melatonin, and early research dealing with various aspects of this has been presented at our prior International Montreux Congresses on Stress. Some studies also suggest that vitamin E may provide similar benefits because of its important antioxidant properties.

So called stress or heat shock proteins may provide another clue. Under normal circumstances, they act as chaperones to insure the normal maturation of essential proteins. When cells are subjected to stressful insults such as heat shock, deprivation of oxygen, metabolic disruption and exposure to toxins, stress proteins protect them from irreversible damage and promote recovery. There is good evidence that these functions may be impaired in both Parkinson's and Alzheimer's disease.

Finally, it should be emphasized that Parkinson's disease is very stressful, not only for those affected, but relatives and caregivers, setting up a vicious cycle. Stress reduction strategies may not only reduce symptoms and possibly progression of the disease in some patients, but also improve the quality of life for those who live, or must frequently interact with them.

Alzheimer's Disease And Dementia

In 1907, Dr. Alois Alzheimer, a German neurologist and pathologist, first described the disease that now bears his name. For years, it was referred to as "presenile dementia", since it closely resembled the impairment generally seen in the senility associated with the very elderly. Approximately one in 20 people over age 65 is affected, by age 85 this rises to one out of three, and if everyone lived to be 100, it is estimated that about half the population would suffer. The disorder is characterized by a gradual decline in all brain functions, including memory, judgment, behavior, personality, abstract thinking, language, and motor skills, usually over a 7-10 year period. Although patients seem to enter into a second childhood, the sequence of events is usually the reverse of what occurs in normal human development.

Babies first learn to swallow, and then acquire social skills, such as smiling, or connecting in other ways with caregivers, and subsequently others. They later begin to vocalize, repeat words and try to walk. During this early toddler stage, verbal skills improve, but they do not have bowel or bladder control. They eventually don't fall as frequently, learn to become toilet trained, improve their language and memory skills, and finally, they develop judgment. This pattern is reversed in Alzheimer's, with disturbances in judgment, memory and language being early signs, and incontinence and problems with motor skills and frequent falls following. If patients live long enough, they find it difficult to walk, even with assistance, and eventually, unable to swallow, so that death is often due to aspiration pneumonia or asphyxia.

The disorder tends to progress in stages. The first lasts from 1 to 3 years, with memory difficulties being the most common symptom. You may recall what happened years ago, but not what you had to eat the night before. There is difficulty remembering the names of friends, famous movie stars and celebrities, or you forget to shower, brush your teeth, comb your hair, or the most important item you went to the supermarket to buy. It may be harder to keep your check book accurate, remember to do routine things around the house, or make decisions that once were easy. There is less interest in doing things, and you may feel confused, angry, or depressed about the changes that you and others observe in your appearance and actions. Some who become very aware and concerned about this, will often make up stories or excuses to explain or hide their forgetfulness.

This gradually evolves into Stage 2, which can last 6 to 10 years, during which there are progressive problems in choosing what clothes to wear, and performing simple tasks like shaving. Attention to body hygiene becomes less important, and you may have difficulty recognizing friends and family, or become confused about a previously familiar place and how to get there. It may be hard to find the right words, or use proper sentences, and your speech may be hard to understand both because of this, as well as a tendency to quickly change topics during a conversation. You may put things in strange places and forget where they are, and find it difficult to make choices, solve problems, or plan ahead.

Complaints of fatigue are common because everything now seems to require much more effort and energy. Distinguishing between right and wrong, and judgment becomes impaired, and difficulty with bladder control can begin. There are often feelings of anxiety, restlessness or agitation in the late afternoon, a condition called "sundowning". Emotional lability is common, and can vary from depression, to being inappropriately happy. Or you may find it hard to control your feelings, and burst out in anger if you can't get what you want, like a little child. Patients get harder to manage and some can become violent.

Stage 3, usually from 8 to 12 years, is associated with a complete loss of memory and speech. Muscle groups no longer work in a coordinated fashion, and there is progressive loss of bowel and bladder control. Walking without assistance becomes much more difficult, and swallowing becomes impaired. Behavioral changes increase, and some patients can become hostile, aggressive, destructive, and very difficult to control. They can no longer care for themselves, and require continual monitoring and constant assistance to stay alive.

Alzheimer's disease always progresses, and there is no cure. That's pretty scary, since many of the memory and concentration problems characteristic of the early stages are identical to those often experienced by perfectly healthy people middle aged and younger. How can they or concerned family and friends be sure that this is not the beginning of the end? The stress of this ominous possibility often worsens symptoms, and there are no simple tests to offer reassurance. Only a brain biopsy or autopsy can provide a definitive diagnosis. Discovering what causes Alzheimer's could lead to ways to prevent it or slow it down, and there is progress in this area.

What Causes Alzheimer's?

Researchers recently identified a protein called beta-amyloid in plaque lesions found in the brains of Alzheimer's patients. It is not found in healthy people or those suffering from other types of dementia, and wasn't noticed previously because conventional staining techniques couldn't detect it. Beta-amyloid is derived from a compound found in platelets and other sites, and these levels tend to be lower in Alzheimer's patients, suggesting that this precursor had been used up to form the destructive brain lesions. In one study, researchers introduced small amounts of beta-amyloid into the brains of monkeys and rats of different ages, and autopsied them 11 days later. Monkeys 25 years and older showed considerable Alzheimer's type plaque and brain damage, even in this short period of time. Younger monkeys and rats of all ages showed little or no injury, suggesting that beta-amyloid affects only the brains of older primates, and that the disease does not occur in lower forms of life.

Individuals with Down's syndrome tend to develop Alzheimer's disease more frequently and at earlier ages. The incidence of Alzheimer's is also higher in healthy relatives of Down's patients, suggesting a genetic link with this inherited disorder. Since it occurs more frequently in children of older mothers, scientists wondered if parental age might also play a role in Alzheimer's, and one study has now confirmed that children born to older fathers are at significantly higher risk. Down's patients often have an exaggerated response to tropicamide drops, which are used to dilate the pupils for eye examinations. Researchers now report that in Alzheimer's, pupillary dilatation following instillation of these drops is three times greater than normal. Since this has been demonstrated even in the very early stages of the disease, it might prove to be a useful screening procedure for individuals who are genetically predisposed.

Scientists have pinpointed the location of a gene that controls the production of a protein called apolipoprotein E that could account for as much as half of all cases of Alzheimer's disease. There are three versions of this APOE gene, E(2), E(3) and E(4), and since everyone's APOE gene is made up of only two of these versions, there are six possible combinations. One E(4) doubles your risk of Alzheimer's deposits, but if you are unlucky enough to have two, your chances are 8-10 times higher than average. E(2) which blocks amyloid deposits, reduces risk, and E(3) doesn't seem to help or hurt.

It has long been noted that patients with one disease are much less likely to develop other specific disorders. Although having E(4) increases the risk for Alzheimer's, it lowers chances for developing macular degeneration, the leading cause of age related blindness. Interestingly enough, the reverse is true for E(2), suggesting that there may be a genetic basis for this disorder in some patients. Genetic testing for apolipoprotein variants is generally discouraged, since the results only show risk, and could generate false fears as well as hopes. Despite having two E(4) versions, many individuals live well into their eighties without ever developing any signs or symptoms of Alzheimer's. Should preventive drugs be discovered, then testing would make more sense, because it might identify a population who would benefit the most.

Repeated head injuries, hypertension, and little strokes appear to increase susceptibility, probably because of injury to brain tissue. Since seizures can be due to damaged brain cells, this could be another risk factor, and Mayo Clinic researchers recently reported that Alzheimer's patients were six times more likely to have suffered seizures as an adult, compared to normal age matched controls. Infections may play a role in other patients. *Chlamydia pneumoniae*, a common cause of upper respiratory infections and possibly heart attacks, was found in the brains of 17 out of 19 Alzheimer patients, but only 1 of 19 dying from other causes. A possible link with herpes virus has also been suggested.

Zinc and aluminum have been incriminated, and increased concentrations of both have been found in Alzheimer's plaque. In some studies, Alzheimer's patients taking zinc deteriorated more rapidly, and since zinc supplements are taken by many older individuals to improve taste and smell and are included in popular multivitamin mineral products, authorities warn that daily doses should not exceed 30 mg. For many years, rumors have circulated that aluminum cookware could contribute to Alzheimer's, and at least one study showed an increased risk from drinking water with more than 11 micrograms of aluminum per liter, a fairly low concentration.

Finally, there is the use it or lose it factor. Mental challenge improves cognition, and low educational level and poor linguistic and writing skills also appear to increase risk. Samples of writing taken from nuns in their teens and twenties showing poor grammar and few creative ideas, predicted a significantly higher likelihood of Alzheimer's 40 years later.

Is There Any Hope For A Cure?

It is estimated that there are about 4 million Alzheimer's sufferers in the U.S., 18 million around the world, and that these numbers will double by 2030. In addition to disastrous effects on health, the price tag for society may be as high as \$100 billion per year, if lost work-time for caregivers is considered. The emotional cost to patients and their families over years of progressive, inevitable brain deterioration is impossible to calculate. This was succinctly described by Ronald Reagan's biographer, who stated "For the last 6 months he hasn't recognized me, and for the last 3 months I haven't recognized him." Anything that can help prevent or slow down this disastrous disease would be a sensational breakthrough, and there are some promising developments

Although women are affected more than men, several studies have shown that taking estrogens decreases risk, and delays its appearance. Women who take estrogen replacement therapy after menopause have an unexpectedly low rate of Alzheimer's, which may be due to a reduction in cholesterol induced atherosclerosis, as well as a decrease in apolipoprotein E that contributes to amyloid plaque formation. Estrogen also improves the circulation of blood in small blood vessels in the brain, and stimulates nerve cell growth in areas affected by Alzheimer's. Female patients who are given estrogen supplements have less severe symptoms, and slower mental deterioration.

It has been observed that patients with severe arthritis or leprosy rarely develop Alzheimer's. This is probably not a genetic influence, but more likely related to the fact that the treatment of both conditions often includes large doses of nonsteroidal antiinflammatory drugs like aspirin, Motrin, Advil and Naprosyn, but not Tylenol. Researchers suspect that since inflammation of brain tissue plays a key role in the formation of amyloid plaque, these drugs might help prevent or delay the onset of the disease or be used to treat it. Support comes from the forty year old Baltimore Study of Aging, which found that people who took these drugs on and off for at least two years were 30 to 60 percent less likely to develop the disease, and risk went down proportionately as use increased. The Johns Hopkins Alzheimer's Disease Research Center tested patients periodically to see how rapidly their mental deterioration progressed, and similarly reported a direct correlation between consumption of these drugs and less deterioration over time.

Since oxidative stress can cause nerve cell damage, antioxidant supplements have been used for the treatment of both Alzheimer's and Parkinson's disease, and vitamin E and selegiline appear to be particularly effective. As indicated previously, there is good reason to suspect that melatonin may be of value because of its powerful antioxidant effects. British and Norwegian scientists believe that taking folic acid and vitamin B12 may also help prevent or delay the onset of Alzheimer's disease. They found that compared to matched controls, Alzheimer's patients had moderately elevated blood levels of homocysteine, which causes inflammation, and reduced concentrations of folate and vitamin B12, both of which lower homocysteine.

Ginkgo biloba has been shown to be effective in improving memory loss in double blind Alzheimer trials, possibly because it has unique compounds that improve the microcirculation in the brain, and others that are antioxidants. Huperzine, another compound found in Oriental plants, prevents the breakdown of acetylcholine, and has been shown to improve memory and cognition in many patients with advanced dementia. Tacrine, the first drug approved for Alzheimer's, works the same way, but efficacy declines after a few months.

Scientists just reported finding another plant extract with a seemingly phenomenal ability to inhibit Alzheimer's amyloid plaque fibrils from forming. In test tube trials, it actually caused existing plaque to dissolve after only two hours of incubation, and initial animal studies show it can inhibit amyloid deposition in the brain. New compounds called neuroimmunophilins are among the first orally-active small molecules that can cross the blood-brain-barrier and cause regrowth of damaged nerve cells. One of these, labeled NIL-A, has been demonstrated to protect and stimulate the regeneration of brain cells in an animal model of Parkinson's disease which is unprecedented. Researchers are very excited, since it is the first time that any agent has been able to make injured nerve tissue regenerate with a complete restoration of functional ability. AIT-082, an oral purine derivative, can activate the genes for making protein molecules that regenerate nerve cells in the brain and spinal cord. The results of early clinical trials just completed suggest that it will prove to be beneficial in Alzheimer's as well as Parkinson's disease, and help to restore injured nerve cells in the brain and spinal cord. (Continued on Page 7)

An experimental drug called galantamine has been shown to improve memory and learning and slow progression in one study of over 600 Alzheimer's patients. It appears to prevent the breakdown of acetylcholine but also to stimulate nicotine receptors, which brings up an interesting observation. Many smokers say that cigarettes help them think, reason, and concentrate better, and animal and human research findings confirm that nicotine improves learning and memory skills. Autopsy studies show that Alzheimer's patients have fewer nicotine receptors in their brain tissue, and researchers are trying to figure out why. Some are trying to develop drugs that will increase or selectively stimulate nicotine receptors, and one, SIB-1553A, has already completed early trials with promising results. Others are trying nicotine based drugs and patches similar to those used for smoking cessation.

Although smoking is obviously very harmful, the Surgeon General reported several decades ago that smokers had only half the incidence of Parkinson's disease. A recent review of some 11 studies has similarly revealed that smokers were half as likely to have Alzheimer's. This seems difficult to explain, since smoking increases free radical production which contributes to both diseases. In addition, a prospective study which followed some 7000 healthy men and women 55 years or more for a long period, did show that twice as many smokers eventually did develop the disease, so time may be a factor.

Smoking appears to be associated with other strange health benefits. According to the government's Health and Nutrition Examination Survey, osteoarthritis is up to five times less likely to occur in heavy smokers. Female smokers are 50 percent less apt to develop cancer of the uterus than nonsmokers, possibly because estrogen levels or effects are reduced. Colon cancer and ulcerative colitis are 30 percent and 50 percent less frequent in smokers. Many patients with ileitis (Crohn's disease) have reported that the onset of symptoms started shortly after they gave up cigarettes. Since improvement often follows when smoking is resumed, patches, gum, and other sources of nicotine are increasingly being tried as an adjunctive treatment for this disorder.

One of the most promising and exciting developments is the use of electromagnetic field therapy. Picotesla stimulation based on "resonance therapy" has been shown to stimulate regeneration of nerve cells following injury, and improve symptoms in a variety of neurodegenerative disorders ranging from Parkinson's disease, to multiple sclerosis and epilepsy. Presentations on this will be featured at our Tenth Congress.

Various forms of weak electromagnetic energies have also proven effective for the treatment of anxiety, insomnia, depression, and other stress related disorders. Examples of these and a comprehensive review of the psychophysiologic effects of cranioelectrical stimulation will also be featured at this Congress. There will be additional papers on the benefits of other subtle energies, including certain types of music, aromatherapy, and *chi*.

The legendary ability of "laying on of hands", and "the King's touch" to cure different diseases has been recounted in numerous anecdotes for centuries. Certain *Chi gong* masters and healers do seem to be able to transfer their energies to patients, even without direct physical contact. In therapeutic touch, practitioners hold their hands a few inches away from recipients as they attempt to transfer healing energies to them. While many physicians are skeptical, studies have shown that this technique can help to relieve anxiety, reduce post operative pain, and accelerate wound healing. It is doubtful that all of these are placebo effects, and if so, who cares, if it makes patients better, and is harmless and cost effective. There are numerous placebo phenomena, and it is not clear how such responses, or the power of faith, can provide so many different salubrious rewards. Since these do not appear to be mediated via observable neuroendocrine or immune system activities, it has been suggested that there are energy communication pathways in the body about which little is known that may be involved. Nordenström has proposed that such an electrical circulatory system exists.

It is quite likely that we all possess a powerful innate potential for self-healing, if we could only learn to tap into this resource. It does not seem inconceivable that some individuals can transmit such healing energies to others. In one report, staff members at a facility received instruction on how to develop and utilize therapeutic touch for six months. Those who became proficient, then began to utilize the procedure on Alzheimer's patients. Although responses were not scientifically quantified, it was evident that many patients received significant relaxation benefits. Obsessive rocking and fist clenching ceased, they slept better, were less verbally abusive, and became much easier to manage. In addition, caregiver stress was greatly reduced, which may have also helped the patients. Stress and Alzheimer's is a very complex subject that requires further discussion.

The Role Of Stress In Alzheimer's Disease

In addition to increasing the production of free radicals, stress can contribute to Alzheimer's in other ways. Hormones like cortisol, that are increased during stress, block the ability of glucose to gain entry into brain cells. Unlike other tissues, glucose is the only source of energy for the brain, and some structures like the hippocampus, are affected more by this deprivation than others. The hippocampus is important for maintaining learning and memory skills, particularly the kind of short term memory that allows you to remember the list of things you went to buy at the supermarket. A daily dose of stress hormones can begin to interfere with short term memory in less than a week. Researchers have also demonstrated a direct correlation between a reduction in hippocampal size, and decreased ability to remember words or pictures after as little as five or ten minutes.

There is strong evidence that stress is responsible for the memory deficits increasingly being seen in younger individuals. Most people 35 years or older suffer from this to some degree, and a recent survey of primary care physicians revealed that this is probably much more common than appreciated, since the subject is rarely discussed during office visits. When specifically asked, ninety percent of patients cited an increased amount of stress from work or personal pressures as the leading cause of their memory problems. Almost all physicians feel that these complaints will progressively worsen over the next decade or two, but it is not known whether this will result in a higher incidence of Alzheimer's. It has been suggested that the increased psychosocial stresses of contemporary society may have also contributed to the recent rise in this and other types of dementia.

Cortisol levels are higher in depressed patients, who frequently complain about problems with concentration and memory. The observation that all of these abnormalities disappear following successful treatment further supports a cause-effect relationship. In addition, a study of Vietnam veterans suffering from Post Traumatic Stress Disorder found that the hippocampus was significantly smaller in those with more combat exposure, also suggesting a link with stress. The hippocampus atrophies with age, and MRI enhancements now allow us to measure such changes quite accurately. Some authorities suggest that this shrinkage, which can go down to 10 percent of original size, may represent one of the earliest consistent signs of Alzheimer's disease.

Another link between stress and Alzheimer's comes from a study of teenagers whose heart rate and blood pressure responses to mental stress differed, depending on whether their apolipoprotein E versions showed a predisposition to the disease. This suggests that in some individuals, Alzheimer's may depend on a combination of inherited and environmental factors, and may also explain why others who are genetically susceptible never develop the disorder. Reducing stress levels could also play a role. Since Alzheimer's patients enter a second childhood, one might suspect that soothing lullabies and gentle rocking would help relax them, just as they have for infants and children since humans evolved. Researchers recently reported that the more demented patients sat in a rocking chair, the more their anxiety, tension, crying, depression and other stress related symptoms decreased. Those who rocked the most requested less pain medication, and rocking also appeared to improve their balance and ability to walk. Soothing or familiar music that patients seem to recognize and enjoy, stroking, and gentle massage may provide similar stress reduction benefits, and will also be discussed at our Tenth Congress.

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