

Dementia Development: Pathologic-Physiology and Prevention

Prasert Boongird, M.D.

Professor of Neurology, Mahidol University, Bangkok
President, the Dementia Association of Thailand

Abstract

Prevention of dementia is indeed a hot topic in both international conferences and academic scientific journals nowadays. Many RCT studies have been launched over the past 5-10 years; some still going on, some are finished. So far there are no definite conclusions and solid clear-cut answers from these investigations in the medical arena of dementia prevention. When facing a medical dilemma such as this, the best way to solve this solution is going back to the authentic sources of knowledge with hidden **IDEAS of LATERAL THINKING in MIND** when running through those texts of neuroanatomy, neurophysiology, neuropathology and neuropharmacology

. Human body, particularly the brain, is an amazing and incredible product of the nature. It is built with an intrinsic automatic biochemical machines mechanism to...buildup...maintain ...repair ... and to...destroy... the target nerve cells or tissues... in order to keep the brain in a maximum balance and perfect function at any time and also any age. All the magic essential ingredients for those biochemical machines together with topnotch highly qualified doctors... intrinsic internal M.D. specialists have been with us since we were born.

What we have to do in this mission is so simple...**we have to MODIFY our LIFESTYLE...** splitting our leisure time schedule into 2 parts. One part of time is virtually our time – we can do anything we want to do, the other part of time is to do what our brain needs for dementia prevention. This part of time is only ½ -1 hour a day or longer if we enjoy it. The **key message and action for this mission is...WALK or WORK... or a combination of both until we get... TIRED and SWEAT.** SWEAT is the key indicator or end point index to tell that the amount... quantity and quality of our WALKING or WORKING exercise input is right and long enough for our brain to... counter balance... clear and clean up... toxic substances coming out from metabolic errors of functioning nerve cells. These toxic substances when fully accumulated... precipitation, aggregation and that **neuritic/amyloid plaque** formation will take place. So these so-called oxidative toxic metabolic substances have to be cleared and totally cleaned up as soon as possible, the sooner the better! A wide spread accumulation of these amyloid plaques in the brain...a formation of amyloid cascade... will eventually switch a preclinical, asymptomatic, elderly subject to be a symptomatic clinical dementia patient. When we walk or work, we give a constant mechanical stimulation to the brain...sending VIBRATION IMPULSES from the MOTION of our feet, hands, head, the whole body, and perhaps our mouth if we talk while we walk or work. These VIBRATION IMPULSES can bypass the brainstem and **directly stimulate cerebral cortex** of the **brain** on both sides. When we do a walking-working exercise, our brain do not get only an indirect **mechanical stimulation but, also at the same time in a parallel fashion, a very powerful metabolic driving stimulation!** After midlife it is an up-turn of our age but, on the other hand, a down-turn of the whole biological metabolic processes inside the body. **Without such a concomitant mechanical vibration stimulation** from vigorous walking or working exercise, the ongoing **physiologic metabolic processes may not be strong enough to overcome metabolic stresses/errors...**an amyloid cascade formation... and that the consequent by-products... the **amyloid plaques**.

. Together with the walking exercise a **“MISSION 2 in 1 WALK”** can be accomplished. In this mission a meditation practice is thoroughly combined with a walk. This is simply a Buddhist walking meditation. With this type of walking exercise we will be able to get both **PHYSICAL FITNESS** and

MENTAL FITNESS at the same time in the same trip. Once when we can achieve it, our **walking endurance time** will be markedly increased! Though we have a lot of profuse sweating and yet we do not get a feeling of muscle fatigue or tiredness...so being happier because more **endorphin** in the circulation!

The brain is a unique and highly specialized organ of the body. It is enclosed within the cranial cavity and totally submerged in water...the cerebrospinal fluid – CSF. A normal adult brain weight is 1200 ± 50 grams in the air, but in the CSF as such its weight is only 60 grams or 1/20 of the real weight. Being submerged in CSF water, the brain is extremely sensitive to VIBRATION impulse of the body... moving, shaking SLOWLY with every single respiratory motion, and shaking, vibrating QUICKLY with every single heart beat...non-stop... days and nights...during sleep and wakefulness...throughout its life time within the head of human body. These are soft, regular, and constant INDIRECT MECHANICAL STIMULATION from the heart and respiratory muscles. Much stronger stimulation will come from movements of head, mouth, hands, body, and feet or all in combination when doing house works, playing games, jogging, and running. Why brain shaking vibration is so important for brain function, because it is the only one type of stimuli that can bypass the brainstem and directly stimulate the brain cortex on both sides, other kinds of somatic stimuli such as pain, temperature, touch, pressure cannot do this job. This was the research work of Professor Milan R. Dimitrijevic, head of restorative neurology and human neurobiology, Baylor College of Medicine, Houston, Texas, U.S.A. After repeated stimulation with vibrator machines strapped to the limbs of those poor paraplegic victims after motor cycle or car accidents, some of them had recovered and then regained basic function of the extremities, providing that continuity of the spinal cord was still intact with surviving tissue of a damaged spinal cord no less than 10-15%. They were able to stand up and walk again, although not as good as they were, but certainly enough for them to help themselves for basic personal function and care. So, mechanical vibration stimulus is helpful not only in a normal ageing brain in case of dementia prevention, but also in a damaged spinal cord and brain following motor cycle accident. A basic mechanism by which the vibration stimulus doing a successful recuperation mission in those paraplegics with a contused brain and damaged spinal cord is still unknown..... ? **NEUROPLASTICITY**.

In normal subjects at the top-end of human body function two types of sweat are seen...the **WATERY- SALTY SWEATS** during and after aerobic **PHYSICAL EXERCISE**, and the **OILY-STICKY SWEATS** in case of **MENTAL EXERCISE**. These are simple signs but highly accurate indicators for a normal overall basic autonomic...metabolic... function of the 100-billion neurons of our brain. NO SINGLE SWEAT! After an exhaustive walking/working exercise, on the other hand, is an index to indicate a **NEGATIVE BALANCE of body health**. This is just a surface manifestation of a deeper parallel ongoing **METABOLIC ABNORMALITY of our BODY, particularly the BRAIN – an OXIDATIVE / METABOLIC STRESS with a consequent accumulation of the toxic organic metabolic substances**. These substances, though coming up from the metabolic processes inside our brain, are toxic to normal nerve cells. When these substances continue to accumulate...a formation of amyloid cascade... they will precipitate and then form an insoluble organic material – a neuritic or amyloid plaque of the Alzheimer disease. **Once the amyloid cascade NUCLEUS is fully established it may be not possible to break or reverse it ... TOO LATE!**

Other medical problems and/or diseases such as overweight, dyslipidemia, hypertension, and diabetes mellitus have to be simultaneously treated and keep them under a good control. Diabetes mellitus is firmly connected with Alzheimer disease through the A β – insulin degradation and destruction mechanism, amyloid body is also found in ageing and degenerating pancreas. HbA1C of 6.8 and above was significantly connected with all types of dementia. Nowadays some scientific data have shown that a successful treatment of these conditions is one of the important key factors to be seriously considered and fully implemented in the regular, conventional, practice of dementia prevention.