

Anti-Aging Coordination - AAC
Coordination exercises as a preventative and as treatment
for dementia patients in general and for Alzheimer's patients in particular
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Background

In the elderly, it would seem that some mental illnesses are a combination of both mental and physical illnesses, and they are linked to each other through the vascular and metabolic systems. Today, more and more neuro-biologists state that the real reason for the physical and mental deterioration that occurs with aging, is malfunctioning in the brain. Malfunctioning in the brain is expressed by:

- **Weakening** of connections in the brain because of reduced activity of the synapses
- Slowing down of electrical transmission
- Shrinkage of the dendrites

This malfunctioning is dangerous because it is two-fold, both physical and emotional, and it is the cause of various illnesses, such as dementia, cardiac illnesses, diabetes and more. So in most cases, there is a combination of a number of illnesses in the same person. Statistics show that the risk of a diabetic patient developing dementia is 65% higher than that of a person who does not have diabetes; the risk of a person with excess cholesterol developing dementia is 43% higher than that of a person who does not have excess cholesterol.

In addition to the malfunction in the brain, the process of aging also includes:

- Gradual loss of the ability for **in-take of information**
- A decrease in the ability to **store** information after processing it
- A decrease in the functional ability needed for nerve-muscle coordination, particularly in **stress situations**.

The process of aging and the process of dementia are parallel processes described as a degenerative process, meaning that the deterioration of the neural connections is greater than the regenerative process. In such a situation we discern problems in mental functioning, but we do not always link problems in mental functioning with problems in physical functioning (most people consider physical functioning only as physical activity, such as walking, running or general physical exercises).

Dementia is described as a "break in communication," expressed at first in:

- Simple difficulties in memory
- Damage to the ability to think and make decisions
- **Concentration difficulties**

Later, we discern difficulties in:

- Spatial orientation
- Malfunctioning sense of time
- Functioning in different situations
- Communication with people
- Personality changes
- Neuro-psychological disturbances that cause restlessness and a reduction in spontaneity

In recent years, scientists in the fields of **movement and training sciences** and brain sciences have carried out joint research studies and are trying to understand **better** how we carry out **purposeful** movements according to the task, while examining how we take in, process and **store** the information, and how we carry out intentional movements **with suitable strength**, adapted to a changing environment.

Many research results show the influence of exercise on the aging brain, and **emphasize** the importance **and the benefit** of this influence on daily mental functioning. The good results of the activity are particularly in memory and general intelligence tests (**Jennifer, Harward**).

Dementia, Alzheimer's and movement

There are different kinds of dementia. The commonest form is Alzheimer's disease, characterized by, among other things, the accumulation of a layer of amyloid that damages first the hippocampus (the memory center of the brain), and then spreads to the frontal lobe and the temporal lobe (one of the areas that deteriorates in Alzheimer's disease). Alzheimer's disease causes a degenerative process in the brain, leading to functional disability in many fields – emotional, mental, social and communicational. Loss of memory is the principal cause of difficulties in independent daily function, and also often causes abnormal behavior even to the extent of aggressive verbal and physical outbursts (which are often the result of frustration).

In addition, loss of memory seriously affects personality and self-image.

Research in brain science, coordination and learning shows that **learning processes are essential for the rebuilding of neural connections**. Learning processes may be carried out in different ways. The brain may be activated cognitively through unique physical activity that also rebuilds communication between the nerve cells.

The most significant learning process for building a memory process is **learning through activity**. Activity as a learning process depends a great deal on the level of coordination (in all its components), in its development and in its preservation. To create the mental-physical link in everything linked to the brain, the neuro-physiological process requires new, suitable stimuli.

So coordinated physical activity, as for instance in the Anti-Aging Coordination system (AAC), has particular significance in creating memory processes that serve as a basis for daily functioning (Alzheimer's Association Germany).

Studies show that the level of coordination declines naturally from age 60 and in consequence there is a decline in daily life functioning.

A research study was recently published in the USA, showing that walking speed (a basic, repetitive movement), can "foretell" dementia. Previous studies have succeeded in proving a link between slow walking and defective health, and between brisk walking and a longer lifespan. Brisk walking requires better coordination (hand movements synchronized with the pace of leg movements).

Dr. Erica Camargo (Boston Medical Center) says: "Weakness of the hands and low physical activity in older people has already in the past been linked to a rise in the risk of developing dementia, but until now we were not sure of the influence on middle aged people."

Studies show a link between physical ability and the intensity of the dementia, for example:

A long-term study in Finland, carried out on a large community of 1500 people, showed that physical exercise defers the development of dementia. Particularly outstanding is the finding that even in people carrying a gene linked to Alzheimer's, the influence of the gene is reduced because of the physical activity.

MRI scanning before and after physical activity shows an increase in the volume of the frontal and temporal lobes.

The researcher **Kraemer** claims that this anatomical change shows the building of new blood vessels, new nerve cells and new neural links. That is, not only was there no degeneration, but there was compensation and rebuilding resulting from the stimulus of physical activity, even when damage already existed. General physical movement improves blood circulation in the brain and, in turn, the supply of oxygen.

Today it is known that aerobic activity (walking), a balanced diet, abstinence from smoking, normal levels of blood pressure and cholesterol and a healthy life-style are important, but they are not sufficient to prevent dementia or improve the condition of somebody already suffering from it.

In order to improve function, unique physical activity is required, by means of unique exercises that will create stimuli in the nerve-muscle system, and nerve-muscle coordination between muscles and within muscles, as a basis for building a foundation of better neural links and finding ways of thinking and acting, and finding solutions for various disabilities, even when cells are destroyed.

In other words, the creation of thought linkage between the cognitive stimulus and the physical-motor exercise requires the building of processes through coordination tasks (as in the OCO system).

Movement and optimal coordination

Coordination means, in Latin, "Proper **order of acts**," which, from the physiological viewpoint, means the ability to coordinate between nerve and muscle, when a particular action is required, both as an autonomous action and as an automatic reaction. Coordination is a complex of abilities, for instance: balance, regulation of strength, **rhythm and pace**, orientation, **coupling** and more.

Coordination is the component of "learning through movement." Abilities in this field determine the level of daily functioning. Good coordination enables efficient functioning, economy in strength and energy, strengthening the self-image and self-awareness of the person himself and of his surroundings, and can compensate for cognitive **disorder**. A low level of coordination or a lack of it can, in addition, lead to functional **disorder** and emotional health problems (**Missiuna**).

From the physiological angle, **active** exercise, with the **emphasis** on coordination, enables a person to find better solutions for situations in which he is required to recall relevant information and **combine it with** a physical reaction, because the nature of the **coordination** exercise obliges the person doing it **to in-take information** and store new movements.

When there are signs of dementia, such as manual weakness and difficulty in walking, together with memory difficulties, it is necessary to start with exercises aimed at reducing the problems preceding the illness. If the illness has already started, it is necessary to try, amongst other things, exercises aimed at preventing rapid deterioration.

Many Alzheimer's patients in the early stages, and even in the moderate stages, retain relatively good movement abilities. In contrast to general opinion, that these patients need only to activate their brains, mainly by cognitive stimuli, it is recommended to activate them by movement combined with cognitive stimuli, in order to preserve existing strong systems and to develop cognition through coordination.

There are different types of coordination exercises, to create coordination between the different body limbs, to create better neural connections in the brain, thus contributing towards memory processes through activation of the small brain (responsible for coordination) in a cognitive process.

Coordinated activities, such as pouring water into a glass and drinking from the glass, can be preserved and carried out with no trembling, and even improved, if the person practices general coordination exercises containing all the coordination components and structured principles.

Coordination improves organization before an action, sensation, reaction, understanding of the change and adaptation to the change, concentration and memory, as long as it combines cognitive with coordination exercises.

AAC – Anti-Aging Coordination system

The aim of the AAC system is to improve function (physical-mental). Coordinated movement in the AAC system is an additional way of learning, when the cognitive process is damaged or another process has not developed, is damaged, or has degenerated.

The AAC system is a derivative of the OCO system (Optimal Coordination Order), and is aimed at the elderly population. Coordination in the AAC system provides a specific response to activity **that focuses on physical- coordinative movements and exercises combined with different brain functions of its various parts**. In contrast to aerobic heart-lung activity and/or **strength training**, which focuses on a muscle or movement exercises and joint flexibility and the soft matter surrounding the various joints, activity in the AAC system is based on the understanding that coordination:

- is a complex of abilities that together allow the in-take of information, processing the information and its preservation in various ways, thereby providing solutions in different conditions.
- is the link between the in-take of external information and internal function and is based on movement and the recalling of information during movement.
- **synchronize** between the various limbs while "defining the components of coordination" and while giving information in various ways, it stands at the center of the activity of the person suffering from dementia.
- can build new brain connections and ease the condition in which nerve cells are destroyed and there is damage to memory, orientation and more.

Exercise with the AAC system improves the function of the small brain (cerebellum), which is the center of memory and cognition, and creates compensation for the damage caused to the brain (**not to the motor memory**), to cognitive memory, by preserving the function of the small brain.

Coordination exercises by the AAC system strengthen the cognitive ability, stop the deterioration of memory and **vitalize memory** and improve the quality of function and the quality of life.

The exercises are characterized by requiring the carrying out of one of the coordination components together with various tasks and talk, which are integrated into the activity, for instance: a balancing exercise accompanied by talk which describes and incorporates information from different fields.

The AAC exercises place the accent on characteristics of age and the level of the patient's dementia, **and it is purposeful** activity allowing the patient to acquire learning tools and additional functions. When the exercises are carried out for a while they form a preventive tool (e.g. preventing falls) and an emotional tool – acquiring self-belief through movement. The systematic exercises create a complex of experiences that form a basis for self-control for the person doing them.

Principles of learning-exercise and training in the AAC system

1. Transmission of information visually and verbally at a slow pace suited to the individual and the group.
2. Carrying out uncomplicated coordination exercises gradually, from easy to hard.
3. Carrying out exercises within a defined range and in **structured** movements.
4. Learning through movement.
5. Organization exercises in known order of activities in different **movement- levels**.
6. Increasing or decreasing sources of information during **performances in various physical conditions**.
7. Improvement of **proprioceptive feeling**
8. Carrying out movement and memory through **proprioceptive feeling**
9. Carrying out daily tasks with the accent on coordination components.
10. Changing the execution by **using** different means requiring adaptation to the changes.

Examples of some general coordination exercises

(These exercises will be carried out only after determining the patient's level)

- Walking and counting the steps consecutively.
- Walking while saying a color on the right foot, names of people on the left.
- Walking while transferring a glass from right hand to left, while following outside information and recalling it.
- Walking while raising the right and left hand alternately, touching a limb each time.
- Walking while raising the knees. When the right knee is raised, the left hand touches the appropriate limb in pre-determined order.
- Walking sideways while touching the shoulder with the hand, **and reciting the "ABC."**

Conclusion

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More is hidden than is revealed in everything concerned with the brain in movement. In recent years focus has been on brain research so there is an increase in findings linked to the brain and movement. Today it is known that focused physical activity is very significant, reducing the difficulties that arise in the brain because of Alzheimer's disease.

It must be remembered that in order to create the best coordinated activity program for the patient, and for the activity to be effective, the patient's coordination component "most damaged," or the component that is "strongest," must first be determined.

Even a healthy person can benefit himself by doing coordination exercises to preserve brain function and delay aging and its manifestations.

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