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OPTIMIZATION OF THE RELATION BETWEEN EFFORT CAPACITY AND PSYCHO-AFFECTIVE STATE IN OLDER PEOPLE

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Abstract
The purpose of this research is to identify the relation between the psycho- affective state of older people and their effort capacity, upon implementing some complex kinesic programs.
Methods: explanation and practical demonstration methods; Conversation method; Observation method.

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Results: data analysis showed a powerful, negative and statistically significant correlation at a threshold of 0, 01 (rho = - 0, 74, p < 0,001), between emotional distress and the maximal oxygen consumption in the final testing phase.
Conclusions: the more they experience a larger number of dysfunctional emotions, the more the effort capacity is higher.
Key word: Effort capacity, psycho-affective state, kinesitherapy, tendon rupture, return to the sport activity.

Introduction

Old age is not a disease, as it was thought of in the beginning of the 20th century; it consists of a number of normal processes evolving over time, a life stage, very complex from a medical and medical-social points of view.

From a psychological point of view, old age is less intense involution scenery than the biophysical one. The most significant deteriorations are registered within those functions directly related to the biophysical features of the neuroendocrine system, namely the mnesic function (it registers and fixates current information), focus and attention's stability, vivaciousness and spontaneity of imagination, flexibility in thinking, emotional stability (they cry very quickly for anything), stress resistance, and so on.

An active old person does not age intellectually, physically or socially, and has to time to think about old age (Dumitru, 1984).

Movement preserves a satisfactory condition of the cardiovascular and mioartrokinetic system's functional parameters, creates a certain psychical balance, giving a feeling of independence and usefulness (Dumitru, 1984).

Physical exercises and sport in older people have a double outcome on psychical functions: firstly by stimulating them, and second, by ensuring the intellectual activity's stability (Niculescu, Georgescu, Marinescu, 2006).

The gerontological studies regarding the influence of physical exercises and sport on man's health and longevity have proven that athletes enjoy longer life than the other individuals, and most of them are physically fit and in good psychical condition at an advanced age (Cristea, 1990).

Following the introduction of a few hours of sport or aerobic exercises per week on a longer period, net improvement in cognitive performances and distinctive increases of resources for attention in older people was seen.

Studies show that intense aerobic physical activity done over the years (prophylactically) favour those who have done it, as compared with the ones who have lead a sedentary life, by the way in which they do different activities requiring good visual- spatial qualities (Sbenghe, 1999).

Aims of study

This scientific approach was based on the idea according to which fighting against isolation and preservation of the old persons' dignity implies the promotion of physical activity, by using kinetic means as a solution to achieve the „active longevity" objective.

This study was carried out at the Social Work and Care Centre of Pitești.

A number of 40 subjects participated in the research, aged between 64 and 72 years old; they were divided into two groups: the experimental sample (n =20), for which a kinesitherapy program was implemented, and the control sample (n =20), which carried out the regular daily program, refusing to participate in the programs carried out within the centre.

Within the kinesitherapy sessions, the old people followed 2 cardio-type programs, 3 days per week for 6 months. The basic idea was that at this age, we are less interested in the strength of a given muscle, and more interested in the individual's effort capacity in carrying out daily activities and psycho-affective comfort that this total independence gives them.

Research premises

- The ageing process is very complex or it can be seen as a number of general, universal and irreversible processes. The basic reason for human ageing is yet to be solved;
- An optimal health status during the entire life is the key element for an active old age period;
- Awareness of older persons' health status allows different courses of treatment or therapy with a view to delay the deficits processes and prolonging lifespan.
- As people grow old, pathological hazards influence the body at an increased frequency and intensity; this implies prophylaxis measures, early diagnosis and, when necessary, adequate treatment;
- Currently and in perspective, accent is laid on primary health measures, by which the elderly care is ensured at their own home, within the family; this rules that will ensure healthy ageing;
- Personalized kinetic means to be used for ending ageing-specific phenomena turned out to be beneficial on the ageing process.
- Kinesitherapy allows the preserving of fitness, by optimal use of functional (reserves) availability of the body, when adapted to the morpho-functional particularities of the older persons.

- Systematic and regular physical training in older persons does not only reduce the occurrence of diseases (high blood pressure, osteoporosis, arthrosis, non-insulin dependent diabetes mellitus, obesity), but it can also improve the symptomatology of existent chronic diseases, can improve general effort capacity (endurance), ensuring them ADL (*activities of daily living*) independence; they are thus able to take care of themselves, and last but not least, it develops the communication and social abilities, so useful at this time.
- Regardless of age and diseases, by prescribing a physical exercises program by the methodology specific to the elderly people, significant results can be seen after just 6 months; these results consist of the increase in effort resistance, improvement of articular mobility and muscle strength, improvement of balance and coordination, etc.
- Kinesitherapy holds the resources needed to draw-up and implement into the geriatric care and assistance system certain diversified kinetic programs, individualised, meant to ensure the improvement of the quality of life in old persons.
- Physical activity plays a prevention role and influences positively the functions of the cardiovascular, respiratory, digestive and nervous systems. By doing physical activity, the emotional tone is preserved and proper functionality is achieved, which ensures body adaptation to new situations;
- Physical activity helps preserving the psychical tone and proper functionality in organic systems is achieved, which ensures optimal body adaptation to physical stresses and nervous tension;
- Physical exercises used correctly ensures obvious physical relaxation, gives the toned feeling of usefulness, ability and independency to act.

Kinesitherapy sessions were carried out according to the scheme:

MONDAY	WEDNESDAY	FRIDAY
Cardio training program (by National Heart, Lung, and Blood Institute and the American Heart Association)	Training program (adapted by the multistratified protocol for testing on the ergometric bicycle)	Cardio-training program (by National Heart, Lung, and Blood Institute and the American Heart Association)

Objectives

- Reducing the risk of developing certain diseases (atherosclerosis, hypertension (HBP), osteoporosis, diabetes mellitus, etc);
- Preserving a psycho-affective ability within normal parameters and preventing depressive states;
- Increasing the anaerobic functional power or the maximum oxygen consumption rate (VO2max);
- Achieving a more economic work of heart and vessels (lower cardiac frequency);
- Reducing the energy cost for the same type of effort made;
- Developing the ability and desire to carry out effort in each session to the end.
- Preserving and improving effort capacity.

Methods

- Observation method;
- Explanation and practical demonstration methods;
- Conversation method.

Materials

- Ergometric bicycle
- treadmill

Means

- physical exercise (bike –pedalling, walking on the treadmill)

Specific methodology for assessment

- one-mile walk test ;
- physical activity index ;
- emotional distress.

Methodical indications

- Subjects under study were divided into 2 pair depending on the FC Max (maximum cardiac frequency) of each individual;
- The training was done at 70% of FC Max and it was stopped at any sign of discomfort of the patient;
- Pulse was monitored after each effort stage and the FC Max value was never exceeded;
- There was permanent communication with the patient, giving indications on how to do the effort during a training session;
- We mention that, at the first session, only 4 of them managed to finish training, showing signs of fatigue after about 10 minutes;
- The rhythm was the usual one, of walking on the street, and the walking acceleration was made depending on the individual possibilities of each subject;

- After the two months of training, a new testing was carried out to set further the approach for the cardio-training programs.
- Upon finishing the actual training, the final testing was made, noticing the notable evolution of subjects during the experiment.

Tables no 1 CARDIO TRAINING PROGRAM 1

Training stages	Training type	Dosage	FCM Maximum cardiac frequency
Warm up–5 min	Pedaling on the ergometric stationary bike	• level 1, with 25 W charge – 5 min.	75% of FCM
The actual aerobic training –20 min.	Stepper	• 3 min. in level 1	
	Rowing simulator	• 3 min. average charge • 3 min. break	
	Pedaling on the ergometric stationary bike	• 11 minutes in level 3 with a charge of 75 W	
Recuperating period following effort - 5 min.	Pedaling on the ergometric stationary bike	• 5 minutes in level 1 with a charge of 25 W.	

Tables no 2 CARDIO TRAINING PROGRAM 2

Warm-up	Obtaining the right pulse – 70 % of FCM	Come-back	Total time	Apparatus used
Normal walk for 5 minutes	Quick walk for 5 minutes	Normal walk for 5 minutes	15 minute s	Rolling carpet – inclination of 0^0
Normal walk for 5 minutes	Quick walk for 7 minutes	Normal walk for 5 minutes	17 minutes	
Normal walk for 5 minutes	Quick walk for 9 minutes	Normal walk for 5 minutes	19 minutes	
Normal walk for 5 minutes	Quick walk for 11 minutes	Normal walk for 5 minutes	21 minutes	
Normal walk for 5 minutes	Quick walk for 13 minutes	Normal walk for 5 minutes	23 minutes	
Normal walk for 5 minutes	Quick walk for 15 minutes	Normal walk for 5 minutes	25 minutes	
Normal walk for 5 minutes	Quick walk for 17 minutes	Normal walk for 5 minutes	27 minutes	
Normal walk for 5 minutes	Quick walk for 19 minutes	Normal walk for 5 minutes	29 minutes	

Results

In terms of the relation between physical fitness and psycho-affective state of the old people, data analysis showed a powerful, negative and statistically significant correlation at a threshold of 0, 01 (rho = - 0, 69 $p < 0,001$), between emotional distress (assessed by the Profile of Emotional Distress scale PDE) and physical fitness (assessed by the physical activity index) in the final testing phase.

The more the person experiences a larger number of dysfunctional emotions, the more the physical fitness is weaker.

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Tables no. 3 The corelation between physical fitness and psycho-affective state of the old people

		Scor PDE
physical fitness	Correlation coeffcient Spearman (rho)	-0,695**
	Level of significance (bilateral testing)	0,000
	N	40

** correlation is significant at a threshold of 0,01 (bilateral testing)

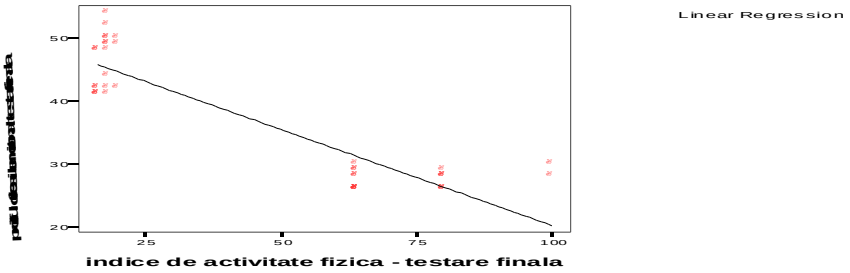

Figure no 1. The relation between physical fitness and psycho-affective state of the old people

As far as the relation between the psycho-affective state and the maximum oxygen consumption is concerned, data analysis showed a strong, negative and statistically significant at a correlation at a threshold of 0, 01 (rho = - 0, 74 p < 0,001), between emotional distress (assessed by the Profile of Emotional Distress PDE) and maximum oxygen consumption, in the final testing phase.

The more the person experiences a larger number of dysfunctional emotions, the more the maximum oxygen volume is higher.

Tables no. 4 The correlation between the psycho-affective state and the maximum oxygen consumption

		Score PDE – final testing
maximum oxygen volum final	Correlation coeffcient Spearman (rho)	-0,747**
	Level of significance (bilateral testing)	0,000
	N	40

**correlation is significant at a threshold of 0,01 (bilateral testing)

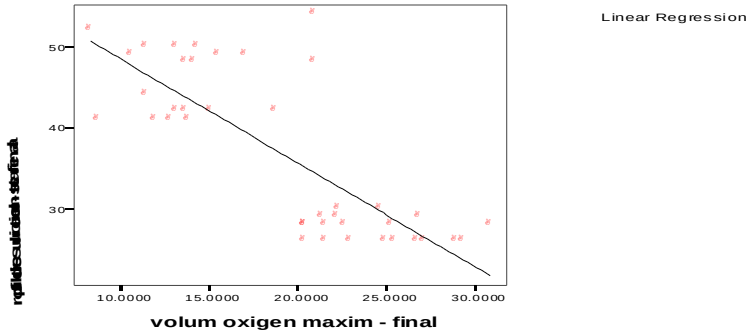

Figure 2. The correlation between *the psycho-affective state and the maximum oxygen consumption*

Discussion

- Experiencing certain kinesitherapy programs in elderly people assumes, on the one side, teamwork, and on the other side, special attention which should be paid to each reaction of the subjects under research during the experiment; the reactions may provide information on the old person's psycho-affective state, based on which the kinesitherapist can decide either to interrupt the program, or to change exercises or to increase their difficulty.
- Thus, the success of the kinetic intervention does not assume just the analysis of the final and initial outcomes, but also the follow-up of subject's behaviour during the experiment; it can sometimes give more details on the way in which the subject perceives effort, for instance, rather than by carrying out a simple test.
- Starting from this research's outcomes, there are various authors in the specialized literature who have confirmed the close connection between the effort capacity and the psychical factor in older people. Thus, Dr. Mavritsakis Nikolaos, 2008 claimed that physical exercise in older people does not only maintain the individual's physical state, but also his/her psychical one, thus a maintained effort capacity under normal parameters would condition a psychical comfort of the individual as well, he/she enjoying independency in current daily activities.
- To this effect also, Dr. Gheorghe Dumitru, 2006 promotes the principle of an active life in older people, underlying, at the same time in his studies, the close connection between the individual's effort capacity and their psychical side, stating that total independence at this age constitutes a sustained psychical comfort also, as well as an increase in life span.
- Sbenghe Tudor, 1999, supported the idea that maintaining effort capacity by aerobic training in older people gave them a good psychical state, shown by different aspects (wellbeing, decrease of depressive or anxious states, increase of intellectual capacity, sleep adjustment, higher ability to focus, increased availability for varied activities, etc).

Conclusions

1. For old people, physical rehabilitation is the quasi-mandatory condition for effort capacity's partial recovery, which would allow them to lead an active life, even if it shall be limited to solely taking care of themselves, do housework and the possibility to move on their own.
2. Generally, it is not the recovery of work skills that is aimed at, but the independent life, self-service skills, that would give them the feeling of confidence in own strength and the desire to be active in order to preserve health status.
3. Apart from the beneficial outcomes that movement has physically, there are also registered the outcomes on the older person's psychical and social side, manifested by the desire to communicate, to express experiences, to relate to the people around them, to participate in different activities, all these contributing to the removal of the feeling of loneliness, which is quite strong at this age;
4. To conclude, the more effort capacity is higher, the more psychical comfort is higher, negative psycho-affective states are more reduced, the old person feeling independent, good about themselves and useful to their family as well.
5. Physical inactivity and a sedentary lifestyle are a significant risk factor, damaging older persons' health status, fact which assumes the design of geriatric rehabilitation programs within every social care and assistance center, converted into well-structured kinetic programs, applied under optimal environment conditions and focused on specific objectives that would ensure:
   - Preserving adequate functional ability of an independent life;
   - Improving the quality of life;
   - Reducing the risk for developing certain diseases (high blood pressure, osteoporosis, diabetes mellitus, etc);
   - Slowing-down the chronic diseases progression;
   - Promoting psychological state of well-being and providing the opportunities to have an active social life;

Exploitation of outcomes and their implementation into the older persons' social care and assistance system;

- Optimisation of kinesitherapy activity within the social care and assistance centers for the elderly people;
- Promotion and spreading the movement concept as a way to remove the negative outcomes resulted from the ageing process and prolonging life span;
- Stimulation of the older persons' wish to practice systematically and in an organized

fashion physical activity under different types, and to convince them of their beneficial outcomes.

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