FUNCTIONAL CHANGES INDUCED BY HIGH ALTITUDE TREKKING
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Abstract
This paper is part of an ampler approach that aims at emphasizing the efficiency of outdoor activities for increasing the quality of life in persons of different age categories. Within our study, the opportunity of these activities introduced into the adult persons’ program of physical exercises is assessed through the functional alterations registered at the individual’s body level, under the conditions of his participation in altitude trekking activities. At the same time, we think that an extension of the outdoor-type activities to the persons of any age will decisively improve the individual’s degree of awareness about the importance of conserving the natural environment and, consequently, his involvement on this direction.

Key-words: outdoor activities, altitude trekking, quality of life, environment conservation.

1. Introduction
Modern society provides the individuals a multitude of modalities to spend their free time and among them the outdoor-type activities have become more and more diversified, by offering the practitioners numerous benefits on the bio-psycho-social level. The wide range of activities generally depends on the "natural resources" and on the "user-oriented resources, respectively facilities, installations, equipments" destined to recreation, by valorizing either one of these elements or a combination of natural elements and cultural settings.

The great variety of geographical elements found on the Romanian territory has positively left its print on the Romanians’ options of spending their free time, by providing them particular experiences within a wide range of activities such as trekking, escalate, mountain climbing, rafting, paragliding, alpine skiing, long-distance skiing, tour skiing etc. The geographical diversity allows multiple approaches also depending on each activity practicing level. Thus, we meet both easy tracks equally accessible to children and high-value technical tracks, sometimes unique, which provide satisfaction to all the practitioners regardless of their age, training level or option concerning the activity type.

Outdoor activities that include trekking are known to bring benefits related both to health and, implicitly, to the personal wellbeing through the following: weight control and body fat redistribution (Sherer, 2003); arterial pressure control, improvement of cardio-vascular and respiratory activities, low incidence of heart strokes and cerebral vascular accidents (Sherer, 2003); fortification of muscles, bones and joints (Wannamethee et al., 2000); low incidence of diabetes and colon cancer (Wannamethee et al., 2000, Rockhill et al., 1999); body immunity increase (Mooney, L. et al., 2002); self-image improvement, more confidence in his own potentialities (Tarrant et al., 1994); stress release (Coleman and Iso-Aloha, 2001; Tarrant, 1994); increase of both the quality of life and the life expectancy (Riddik and Steward, 2001).

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2. Organization of the research

2.1. Purpose

This paper aims at establishing if the functional alterations and the psycho-social benefits registered in the practitioners of outdoor altitude activities can encourage their recommendation as part of the physical exercise programs meant to increase the quality of life in persons aged 40 to 60 years old, under the perspective of their biopsychosocial effects.

2.2. Subjects

This case study brings into discussion a healthy adult man with no previous activity in performance sports, but an occasional practitioner of physical activities in the first part of his life, who is presently involved in a shape-preserving program based on weekly training sessions particularly oriented toward the cardio-vascular component and on the muscular endurance at the lower limb level.

2.3. Methods

To complete this study, we used the following methods necessary for us to collect and interpret the data:

- Heart rate monitoring with a SUUNTO X6HR pulse-tester - as an expression of the body functional response to the exertions required by the proposed activities.
- Observation - to monitor the subject’s attitudes and social behavior while performing the proposed activities; to assess the quality of his communication within the group; to assess his general psychic condition.
- Questionnaire - to collect information about the fatigue level reported by the subject and also to register other aspects revealed during the proposed activities.
- Anamnesis - to highlight the subject’s previous experiences related to the purpose of our study.
- Data transfer soft and SUUNTO Activity Manager 2.3.4. graphical interpretation.

2.4. Description and development

The trekking activity selection for our study is argued by the fact that it determines functional demands encompassed in the recommendations for the physical exercise practice in the leisure time of persons aged 40 to 60 years old. At the same time, the activities performed in the natural environment specific to altitude trekking involves relationships within the group of practitioners, with a positive impact on the individual’s personality, they determining affective-related attitudes, behaviors and manifestations that can be considered real benefits to the psycho-social component. The cumulated gains of such activities are finally concretized in the quality of life higher value and an increase of the individual’s degree of awareness about the importance of conserving the natural environment, which also represents a positive example for the family younger members, who are usually present in the composed groups.

Trekking was performed on the forest paths, in an open space, or on the rock, on marked tracks corresponding to the national and international standards about the mountain track medium and high categories of difficulty. The ascended slopes were encompassed in the national and international qualifications for medium and sometimes difficult tracks and, depending on the selected track type, we met passages requiring an easy escalate on the mountain wall. The tracks didn’t require either technical facilities or techniques specific to mountain climbing, except for the winter tracks that, although of an easy difficulty, imposed the use of boot corners. The travel on the
selected itineraries didn’t require the previous learning of some specific techniques acquired within the specialized courses, but only a good physical shape and the equipment specific to trekking activities. The selected tracks were at an altitude comprised between 1,800 and 4,800 m, with covered altitude differences of 500 to 1,000 m a day. Trekking was performed in different seasons (spring, summer, autumn, winter), generally under good and very good climatic and atmospheric conditions. The investigated subject’s program of physical exercises, destined to his general and specific physical training, included weekly jogging sessions lasting 75 to 90 minutes, performed at an intensity of 70% on an average, as well as stepper sessions 3 times a week, for 60 to 90 minutes, at a variable intensity going from 60 to 90%. In the last 5 years, trekking activities have been a relatively regular part of the subject’s program (at least 2 times a month, regardless of the season) and they can offer a picture throughout the time of their role in maintaining the biological parameters within the age normal limits.

2.5. Test results

The performed registrations bring into discussion the heart rate alterations, the fatigue particular states and the general motor behavior modifications, under the effort conditions specific to altitude trekking. At the same time, we identified the subject’s attitudes and social behavior within a small group performing activities under the above-mentioned conditions, in order to emphasize the psycho-social benefit of such an activity type. For different altitude and difficulty levels of the proposed itinerary, we registered the following aspects: heart rate; discomfort generated by the altitude and/or by the track difficulty (increased respiratory rate, lowered amplitude of the respiratory act, headaches, lack of appetite, nausea, muscle soreness, others); fatigue level assessed through the deterioration of motor skills and a diminution of the general coordination capacity; fatigue level reported by the subject; quality of the communication within the group; general psychic condition.

3. Results

The analysis of the functional alterations registered on the tracks covered in 2011 highlights a good training level assessed through the maximal heart rate values comprised between 149 and 172 pulse/min; such values are optimum for this age category, as mentioned in the specialty literature (S. Reeves, 1982, quoted by A. Bota, 2006). The maximal oxygen consumption (VO$_{2\text{max}}$) calculated according to the heart rate (U. Niels; H. Sørensen, K. Overgaard, P.K. Pedersen, 2004) corresponds to the values registered in well-trained men aged 21 to 51 years old (V. Heywood, 1998; A. Guyton, J.E. Hall, 2011). In table 2, we can notice a correlation between the subject’s degree of fatigue and his communication level and psychic condition. The fatigue level and the psychic condition were negatively influenced, on the one hand, by the bad weather, and on the other hand, by the track difficulty or long duration. The most difficult ascent, due to the altitude and to the lack of oxygen, was represented by Mont Blanc, where the subject, despite his heart rate normal values and his good psychic condition determined by an increased motivation, showed a very high fatigue level assessed by the deterioration of his motor skills and a diminution of his general coordination capacity.
4. Conclusions

The exertion level proposed by trekking and by easy escalate activities is within the limits accepted for sports leisure activities.

At the functional sphere level, we registered positive results, as showed in the graphs, which proves that the altitude trekking activities represent a valuable alternative to the general fitness maintaining in adult persons from the investigated age category.

The psycho-social benefits of the participants in altitude trekking activities are sometimes superior to the functional ones, which represents an aspect particularly important to the individuals, in general, and mostly to those from the age category over 40 years old.

The increased level of involvement into the actions for the environment preservation, by starting from the individual behaviors in the natural space and ending with the actions of persuading the groups and the responsible decision factors, represents a very important aspect, which is completed by the educative factor for the young generation participating in such activities often performed within the family and the groups of friends.

5. Recommendations

The obtained benefits, as showed in our study, sustain our proposal to extend the trekking activities to other age categories, but also to combine them with other outdoor-type activities, in order to increase the quality of life and
the level of involvement into actions meant to preserve the natural environment and, last but not least, as a formative factor for the young generation.

References


