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ULTRA SLOW MOTION – PHENOMENOLOGY OF EXERCISE

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Abstract

Introduction: The existence of a correlation between the subjects' ability to coordinate with precision in ultra slow motion (USM, v=10-25 mm/s), for the alactacid anaerobic interval (Δt=0-15s), on the one side, and their mental ability to manage the primary impulse and dedicate to the job at hand, on the other side, highlighted by experimental studies, represent the premise of the present research. Aim: To draw up a guide to living and thinking based on the phenomenological analysis, when performing an ultra slow motion exercise (USME). Material and method: The target group brought together 26 subjects without any previous experience with ultra slow motion exercise or similar, but with good mental training and exercise, with theoretical and practical knowledge in the mental field. Subjects participated voluntarily in a test competition with a significant prize. The competition was organized in the form of a working group on the phenomenology of emotions. Results: The feeling of fear, recognised during the pre-test period, resulted in failing the exercise when fear persisted during practice. Good personal analysis (personal development), good dedication ability ("being in the zone") and similar previous experiences were prerequisites for the best test results, amid the general recognition of a hard-to-control exercise up to helplessness. Conclusions: Ultra slow motion exercise (USME) requires a high degree of mental abilities and, at the same time, represents a limit to human neuromotor coordination.

Keywords: Ultra slow motion exercise, mental performance, neuromotor coordination. .

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1. Introduction

Precision in coordination, on the one hand, and persistence of precision in coordination, on the other hand, underpin successful performance of the motor act, and secondarily, are the basis of sports performance. In relation to these two human abilities, a particular aspect has been noted and, in a way, it can be considered surprising: the loss of coordination ability following the repetition of different physical exercises, in a sports context or not, mainly results from fatigue in the cortical centre of motor coordination, being called the "motor cortex fatigue syndrome" (Tergau et al., 2000).

To combat this phenomenon, the ultra slow motion intelligent training (USMIT) program was created, as a kind of prophylaxis of the syndrome (Rădescu, Teodorescu, & Băbălău, 2017).

The USMIT program design has started from the generally recognised fact that one can induce neuroplasticity and local cortical modelling phenomena, and therefore the processing ability of the cortical coordination centre can be increased both per time unit and as duration in time. Classically, to achieve these results, it is necessary to increase the demand and the number of performed adjustments and coordination actions by increasing the duration of training (see the motor recovery programs after stroke: Crozier et al., 2018; Calabra et al., 2018).

Paradoxically, the idea of the USMIT program has been suggested by the fact that, when it comes to precision in coordination, the fine tuning of agonist and antagonist contractions increases per time unit as the execution speed decreases, by maximally reducing ("eliminating") the moments of inertia specific to the motor act. Thus, following the preliminary tests, the average execution speed of ultra slow exercises was set at 10mm/s (with a variation between 5mm/s and 20mm/s) (Rădescu, Teodorescu, & Urzeală, 2016). Most likely, enhancing the processing ability of the motor cortical centre can be the source for better energy consumption, finer tuning and possibly lower incidence of injuries caused by fatigue.

Positive results have been obtained with the USMIT training program, in terms of increased precision in coordination (Rădescu et al., 2017; Rădescu, Teodorescu, & Băbălău, 2018), as well as confirmations for significant correlations between the ability to control impulsivity (and the dedication ability) and precision in coordination (assessed in ultra slow motion conditions using the KinectX and KinectX Pro systems) (Rădescu, Teodorescu, Urzeală, & Marcu, 2016; Rădescu & Teodorescu, 2017).

2. Problem Statement

Preliminary testing has shown that ultra slow exercises and tests (the USMIT program and the KinectX Pro system) involve a high degree of difficulty (Rădescu, Teodorescu, & Urzeală, 2016) resulting, on the one hand, from the physical demand, at the limit of human coordination capability, and on the other hand, from the implicit cognitive and emotional demands (Rădescu, Teodorescu, & Urzeală, 2016). This difficulty has revealed the need to identify feelings, especially emotional states and the associated impulse, and cognitive patterns that occur before and during exercise.

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3. Research Questions

What are the feelings and impulses, on the one hand, and the cognitive patterns, on the other hand, present before and during ultra slow physical exercise testing in a group of people without athletic experience, but with good mental exercise ability?

4. Purpose of the Study

We aimed to develop a practical guide to feelings, especially emotional states and the associated impulse, and cognitive patterns, which might be a necessary instrument in the preparation of athletes when using the USMIT training program and the KinectX and KinectX Pro testing systems.

5. Research Methods

The phenomenological method (E1) was used as a main tool for the analysis and identification of the results. Two psychotherapists with considerable professional experience (over 10 years of practice) were part of the test group coordination team, both of them with phenomenological psychotherapeutic training (person-centred psychotherapy and existential analytical psychotherapy). In addition to the phenomenological method, a specific test for precision in coordination (E2), based on the KinectX Pro system, was performed for each participant, and free-will tests (E3) using the Existence Scale (ESK) (Längle, Orgler, & Kundi, 2003; Orgler, 2000) and the PIR-FT2016, a questionnaire for the assessment of understanding and attitude towards fear, were also performed. The order of the tests was E2, E1 and E3.

The subjects were selected on the basis of voluntary participation in a working group focused on the phenomenology of emotion, at the First Eastern European Conference of Mental Health, called “In and Out of Your Mind” and held in Galati, between 11 and 14 May 2017. The first 29 registered participants, out of the total of 282 participants, were accepted in the working group, and 25 of them took part in the test for precision in coordination performed with the KinectX Pro system (E2), and subsequently in the phenomenological assessment (E1). Only 11 (10 of the first 25) subjects responded to the questions in the Existence Scale (ESK) and the PIR-FT2016 questionnaire (E3).

6. Findings

6.1. Precision in coordination (E2)

The test results for precision in coordination showed scores similar to previous tests. Mean values for the coefficient of variation in average speed in the mode, for the alactacid anaerobic interval (Δt=0-15s) and the lactacid anaerobic one (Δt=21-50s), for both the left and the right hands, indicated a non-homogeneous distribution, highlighting once again the difficulty of coordination during ultra slow exercises, in the absence of specific training. (Table 01)

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Table 01. Mean values and standard deviations of the coefficient of variation in average speed in the mode (CV – coefficient of variation, LH – left hand, RH – right hand)

	Mean value	Standard deviation
CVLH 0-15	0.43	0.38
CVLH 21-50	0.48	0.15
CVLH 0-50	0.48	0.36
CVRH 0-15	0.42	0.14
CVRH 21-50	0.42	0.15
CVRH 0-50	0.43	0.15

One subject (S14) managed to achieve values of the coefficient of variation (CV) below 0.35 for the two intervals, the alactacid anaerobic and lactacid anaerobic ones (Figure 01), for both the left hand and the right hand (LH: 0.35; 0.35; RH: 0.33; 0.30). Four other subjects managed to obtain a homogeneous result, three for the left hand (S18: 0.36; 0.33; S9: 0.37; 0.34; S3: 0.36; 0.34) and one for the right hand (S5: 0.34; 0.38).

6.2. ESK andPIR-FT2016 assessments (E3)

The Existence Scale (ESK) results were considered irrelevant due to the small number of respondents. For the 11 respondents, the values showed good ability to perceive reality (ESK-AD=32.5±3.8), dedication ability and access to a not-easily-accessible emotional world (ESK-AT=61.8±5.2), a remaining potential for clarity and stability in the formation of their own judgement and decision-making (ESK-L=45.8±5.3), commitment and responsibility in their own lives (ESK-R=57.4±8.2), openness to the world with some limitations (ESK-P=96±8.5), determination and liability (ESK-E=102±13.2), as well as good penchant for the problems and offers of the world (ESK-G=196.3±19.6), values similar to those achieved in the other preliminary tests for similar groups of subjects (specialist or resident psychiatrists) (Rădescu, Teodorescu, Urzeală, & Marcu, 2016).

The PIR-FT2016 questionnaire results showed a relatively good understanding (obtained through education) and easy recognition of fear for all 11 respondents. Only 5 of them recognised fear as something rather valuable in everyday life.

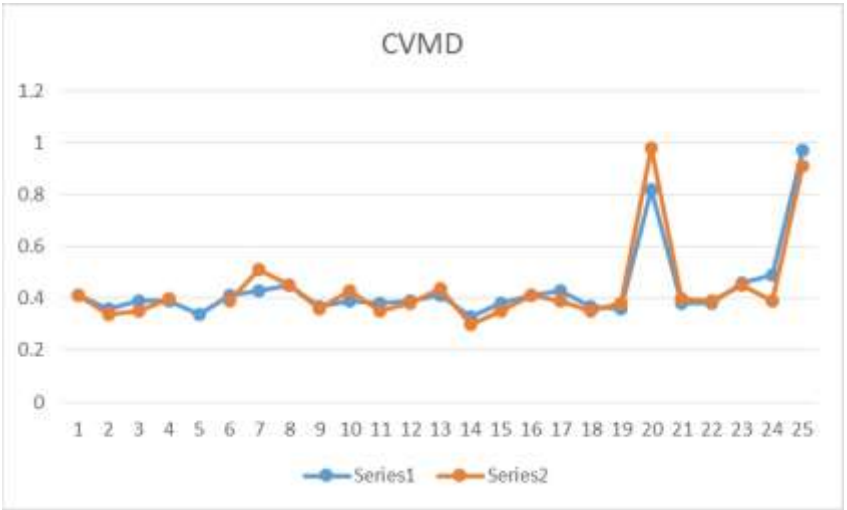

Figure 01. Values of the coefficient of variation for the right hand (S1 – alactacid anaerobic interval, S2 – lactacid anaerobic interval)

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6.3. Phenomenological assessment (E1)

The feeling of fear, recognised in the pre-test period, resulted in failing the exercise when fear also persisted during practice (Figure 01). The best result was associated with a very good personal analysis (personal development), the second result, with the dedication ability and "being in the zone" (Bennett, 2004) during exercise ("I did not think of anything, I tried to feel the movement"), and the third result, with previous experience with tact-pace exercises. The general background revealed the recognition of a difficult, chaotic, demanding, hard-to-control exercise up to helplessness. Psychologically, it aroused: irritation, annoyance, frustration, stress, fear, anxiety, worry, fright, insecurity, confusion, tension, but also joy, pleasure and even ecstasy (states that were positively felt during exercise, but were observed only after completing the exercise and the group phenomenological analysis).

From the somatic point of view, the following were felt subjectively and observed: limb tremors, stiffness and physical strain states, numbness (paraesthesia), fatigue, apnea, tachycardia, a feeling of emptiness in the stomach and an empty inside sensation. Two subjects completely lost limb coordination during exercise, the first by a freezing phenomenon (practically, the trajectory of the upward and then downward motion was reduced from 30+30 cm to about a few centimetres), and the second by a transformation into an upward motion of 5-10 cm and a downward motion of about 40 cm, achieved by the anterior flexion of the chest over the calves, and not by the translational motion of the upper limbs. In both situations, a strong anxious background, with an effect on the personality structure, was recognised.

The tests performed with the KinectX Pro system support once again the inclusion of ultra slow exercises into a limit form of coordination exercises (Rădescu, Teodorescu, & Urzeală, 2016). The ESK and PIR-FT2016 assessments confirm the previously obtained data (Rădescu, Teodorescu, Urzeală, & Marcu, 2016) and support the existence of a remaining mental potential, which apparently is not exploited through education, a generally true issue for the Romanian population (Rădescu, Teodorescu, Urzeală, & Marcu, 2016) and in accordance with the results of the phenomenological analysis.

The results of the phenomenological analysis allowed drawing up a guide to emotional experiences dominated by helplessness and various forms of secondary mental reactions, from irritation to insecurity and fear. They can influence motor performance to different degrees, depending on the ability to understand emotions and control impulses. The cognitive plane was less obvious, which enables us to assume that the strong emotional experience has considerably diminished the perception of cognitive patterns.

Secondarily, forms of somatic impairment were highlighted, most of them psychosomatic ones, an aspect recognised in the literature for similar fear-generating situations (exams, public exposure etc.), but also strictly somatic forms, possibly generated by the individual morphological particularities.

7. Conclusion

Ultra slow exercises (USE) included in the USMIT training program exert high demands on both the psychomotor coordination component and the psychological component. They can be classified as exercises at the limit of human capability, not only from the psychomotor point of view, but also from the psychological one. For this reason, we think that the USMIT program requires, for enhancing the training,

specialised assistance and an informative, descriptive guide to emotional experiences and somatic sensations.

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