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Advanced technology in the psychomotric tenacity study with implications in performance sport

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Abstract

The tenacity, regarding perseverance and persistence, is a very important psycho-motric quality for all sports, but mostly for combat sports. Being a quality from the volitive sphere, the measure can only be proven post factum. The indirect, correlative testing offers true information, using a tenacity index based on the solicitation of the excito- inhibitory processes of the palm flexor effort (amplitude, period, consistence, visual control of the oscillation etc.). Our research points out the fact that the tenacity index in significantly higher (300.14) for the right-handed athletes than for the left-handed ones or ambidextrous ones (259.62), at the significance threshold F< F critic (1,16<1,76).

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Keywords: tenacity, psychomotricity, sport performance

1. Introduction

It is known that the tenacity can be seen as an index for unspecific tenacity in the voluntary effort and for the excito- inhibitory regulation and control characteristics for a static voluntary effort. The specialty literature shows that the tenacity parameters can give information about the effort physiological modifications as well as about the local tiredness state, as an answer of the central nervous tiredness. Also, the tenacity is presented as being a genotypiv and paratypic psychomotric ability which modulates the maximum capacity for neuro-muscular effort, which activates as a sub-unit coefficient of this effort capacity and which has its vectorial origin in the volitive sphere (Gagea, 2010). The tenacity test reveals the accuracy of the tenacity index calculation by the multiplication of the maximum static force by the static contraction period at its half value (maximum inflexion). The tenacity index has the dimension of an impulse.

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For the maintenance of the maximum force at the half of the registered value, a very important role is played by the state if the neuro-muscular system involved in the effort, the quality of the excito-inhibitory command of the agonist and antagonist muscles, the visual feedback with the involvement of the central nervous system.

2. Material and Method

2.1. The Methods and Techniques Used:

Using the tenacity index with static efforts, Avramoff (1972) obtains correlations with the type of superior nervous activity and with the training degree.

The device and software used for this research use an interface with a microcontroller and an emulative graphic display in which the sequential and successive columns are proportional with the flexor force, so the test can be effortless and the recordings can be stored in a laptop (Zagrean, 2009).

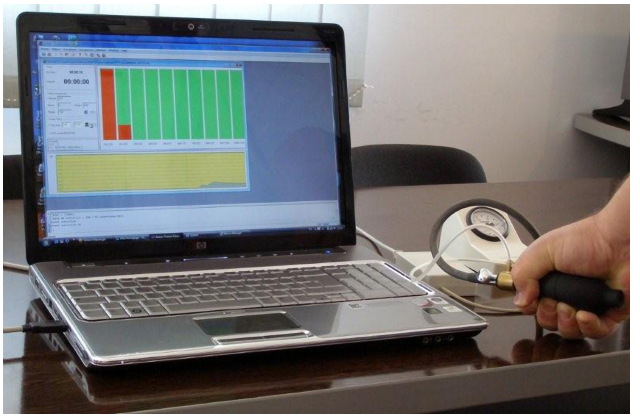

Figure 1 Tenacity Software

2.1.1. Research Subjects:

The research was done on 35 subjects with ages between 18 and 36 years, the average age being 23 years, 20 males (56%) with the average height of 180 cm and the average body weight of 78,66 kg and 16 females (44%) with the average height of 169cm and the average body weight of 65,11kg. We mention that the subjects of the research have a competition experience between 2 and 18 years and practiced the following sports: handball (30%), taekwondo (19%), gymnastics (11%), karate (8%), field tennis (8%), athletics (6%), football (6%), swimming (6%), polo (3%), rugby, volleyball (3%).

2.2. Research Protocol

Both arms of the subjects were tested, recording the affiliation at the predominant arm group. They were trained regarding the test execution form. The test execution consisted in 2 moments: the first was represented by recording the maximum force at the level of palm flexors, the recorded value being on the screen of the dynamometer (in bars) or on the interface (the columns on the computer's screen). The second moment of the test consisted in maintaining the maximum force at its half recorded value as constant as possible for as long as possible.

3. Results

The calculated statistical parameters are presented in the following:

Table 1 Index of tenacity

Descriptive statistics	Index of tenacity -right hand	Index of tenacity - left hand
Mean	26,47	25,84
Standard Error	2,89	2,69
Median	22,65	20,39
Standard Deviation	17,32	16,11
Sample Variance	300,14	259,65
Minimum	3,99	5,12
Maximum	83,16	65,46
Sum	953,03	930,4
Count	36	36
Largest (1)	83,16	65,46
Smallest (1)	3,99	5,12
Confidence Level (95,0%)	5,86	5,45

Table 2. F-Test Two-Sample for Variances

	Variable 1	*Variable 2*
Mean	26,47	25,84
Variance	300,14	259,65
Observations	36	36
df	35	35
F	1,16	
P(F<=f) one-tail	0,34	
F Critical one-tail	1,76	

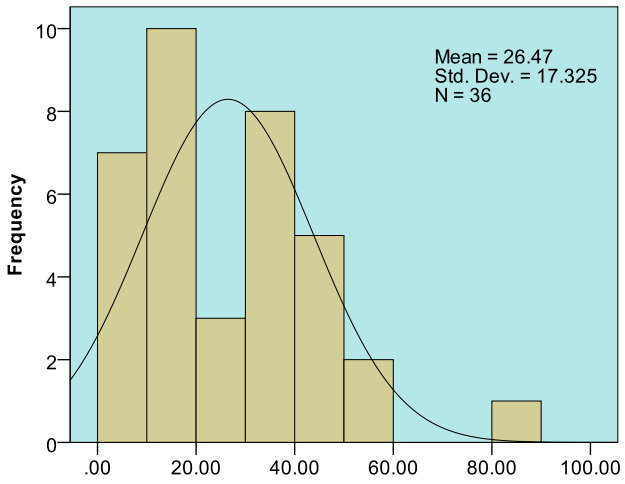

Figure 2 Frequency histogram index of tenacity/right hand

According to the frequency histogram, the mean score of the index tenacity for the right handed is 26.47

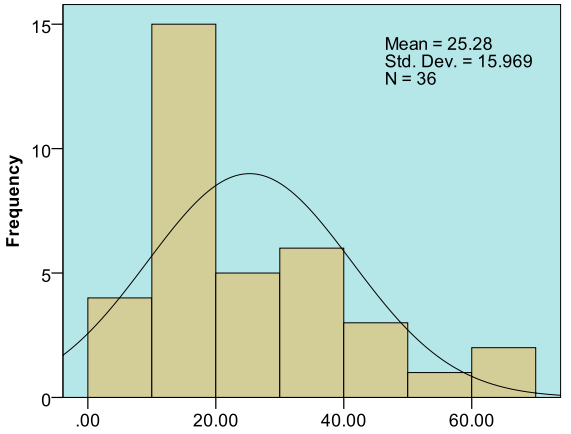

Figure 3. Frequency histogram index of tenacity /left hand

According to the frequency histogram, the mean score of the index tenacity for the right handed is 16,114.

4. Conclusions and discussions

According to the obtained data, it was noticed a higher variance for the individual results for predominant hand in comparison with the non-dominant hand for all the tested subjects, and for the ambidextrous ones the results were non conclusive.

The stability degree, calculated in the relative measuring from the measuring of the sinuous track length and of the level of the flexor muscles gave us relevant information about the equilibrium and the mobility of the ecxito-inhibitory processes at the flexor muscles level, under visual control, without the individual significant differences between the predominant and the non-dominant hand. The statistical values, including the theoretical form of the distribution show significant values between the right-handed group of subjects and the left-handed one. According to the test results, the critical value of the test is 1,76 (F<Fcritic), fact which allows us to state that the population from which subjects belong to, shows the same spread degree. The tenacity index for the right handed subjects is statistically higher than for the left-handed ones, without being able to verify the correspondence with the real situation from the competitions.

According to what we presented, we can say that the value of the flexor force depends on the concentration capacity of the nervous processes which regulates the muscle activity, and the maintenance of a stable mechanical pressure supposes a dynamic equilibrium between the excitation and the inhibition processes of the involved nervous instances. The visualization in real time of the recorded pressure and its variations surely has an emulative role and, at a limit, pregnantly solicits the psychical tenacity, as it is percepted at a competition level. Knowing the fact that the prenatal hormones balance the subsequent dexterimetry, especially for the left-handed. However, more recent research has emerged suggesting that high prenatal estrogen exposure is a plausible alternative of decreasing fertility. Some studies endorsed by the Centers for Disease Control (CDC), suggested that men who were prenatally exposed to different synthetic estrogen based fertility drug, are more likely to be left handed. On the other hand, the tenacity seems to be predominantly genotypic and less phenotypic. Our findings can open the way for a new physical hypothesis for the complex hormonal intermediation, including the psychomotric tenacity.

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