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PHYSICAL EXERCISE AND DIABETES MELLITUS

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Abstract. Physical exercise is an important component in controlling diabetes, so it can be used to improve both the health status and quality of life of patients affected by this disease. The purpose of our paper is to achieve a theoretical and methodical approach regarding the development of strategies that allow people with diabetes to practice physical exercise and that aim at: increasing quality of life, reducing or avoiding the need for pharmaceuticals, improving metabolism and overall body functions, as well as preventing and acting on the risk factors. Patients with diabetes should take into account, before performing a session of physical exercises, the following precautions: blood glucose control, knowing the characteristics of physical exercise to be performed (e.g. type, duration, intensity and frequency), reducing the dose of pharmaceuticals and consumption of food with carbohydrates. As a conclusion, physical activity is relatively little used in the treatment of patients with diabetes, and this is mainly caused by the low effort endurance of these individuals, their indolence and lack of motivation to practice physical exercise.

Keywords: physical exercise, diabetes, blood glucose.

Introduction

Lack of physical activity is a major problem worldwide, especially in the developed countries. Specialized studies show that one in five adults is physically inactive, which is particularly highlighted among women, elderly people and those with a small income. A survey conducted by the National Center for Health and Nutrition in the United States over the period 2003 to 2004, which aimed to monitor the population’s activity, indicated that 55% of the hours when they were not sleeping, the subjects used to spend their leisure time in sedentary behaviors (sitting in front of the TV set or the computer) (CDC, 2006).

Epidemiological studies have proved that there is a reverse relation between physical shape and mortality, although other risk factors are controlled, in both men (Manson et al., 1999) and women (Blair et al., 1996).

Diabetes mellitus is a chronic metabolic disease described for the first time by Aretaeus of Cappadocia, in the 2nd century A.D., and characterized by increased blood glucose levels as a result of absolute or relative deficiency in insulin, because the pancreas does not secrete a sufficient amount or the amount produced is insufficient for the needs of the body. Two main types can be distinguished:

Type 1, juvenile or insulin-dependent diabetes occurs in children and young people under 30 years of age, representing 30% of the diabetes cases recorded in Europe and North America. It is considered an autoimmune disease, which means that one’s own immune system, from different causes, attacks the insulin-secreting cells and destroys them. As a consequence, insulin is not secreted any longer and, in this case, patients will need insulin administration by injection throughout their lifetime.

Type 2, maturity or noninsulin-dependent diabetes usually occurs in people over 40 years of age, representing 80% of the diabetes cases recorded in Europe and North America. In these patients, the pancreas does not produce sufficient insulin or the insulin produced cannot be used efficiently. As a result, glucose accumulates in the blood, which is called hyperglycemia. This type of diabetes occurs predominantly in overweight or obese people.

The progression of diabetes is towards numerous complications whose occurrence can be delayed, but not stopped for ever, by an appropriate control of glucose levels and maintaining a healthy lifestyle.

Complications may occur on the heart and vessels (atherosclerosis, high blood pressure, ischemic heart disease, arterial disease), nerves (diabetic neuropathy), kidneys (diabetic nephropathy), eyes (diabetic retinopathy), gums, teeth, genitals and other organs. Leg ulcers, which are possible to develop into gangrene, may also occur, but they can be easily controlled if a preventitive treatment is applied.

Among the beneficial effects of physical exercise for people with diabetes, we mention:

- Regular physical exercise helps to obtain a better long-term metabolic control.
- Physical training decreases basal and postprandial insulin concentrations and improves cell membrane permeability.
- It enhances insulin sensitivity. Glucose uptake stimulation during a muscular effort might depend on increasing insulin binds to its receptors in the muscle cells, resulting in enhanced insulin sensitivity.
- It helps to control and lose body weight.
- It improves cardiovascular function with the increase in maximal oxygen consumption \( (VO_2_{max}) \) and reduces heart rate for the same level of physical effort.
- It improves sensation of wellbeing and quality of life in patients with diabetes.

**The current level reflected in specialized literature**

Specialized medical literature proves that a prolonged sedentary behavior is associated with an increased risk of diabetes, cardiovascular diseases and mortality, which can be compensated by performing a mild activity (for example: walking) or physical exercises. Although there are risks associated with physical exercises in some patients, benefits outweigh the number of risks for most of them.

Specialized studies show that physical exercise, along with proper diet and pharmaceutical drugs, is the basis of treatment for people with diabetes. The effects of physical exercise depend on the type of diabetes, insulin dose or pharmaceutical treatment, blood glucose level before performing physical exercise, presence of complications, exercise intensity, duration and type.

**Topic addressed**

*Physical exercise and metabolism in diabetes mellitus.* We shall examine how metabolism develops in a healthy body. During physical exercise, muscles use energy mainly coming from glucose and free fatty acids. Glucose comes from the blood, liver and muscle glycogen. Fatty acids are stored in the subcutaneous cell tissue. At the beginning of the exercise, most of the glucose used comes from the blood and muscle glycogen. Subsequently, after about 15 minutes, it is used glucose produced in the liver glycogen, and finally, when the exercise exceeds 30 minutes, free fatty acids are used (exercise activates lipolysis) (Pérez Fernández and Nóvoa Castro, 2000).

While performing physical exercise, plasma insulin concentrations decrease, while glucagon and other counter-regulatory hormones (adrenalin) increase, which results in stimulating a greater production of glucose to counter-balance its peripheral use. During muscular effort, glucose is consumed because the muscle needs to receive more oxygen and nutrients, which involves dilation of arteries and also more insulin arrived, thus occurring an increase in the entry of glucose into the muscles and adipose tissue (insulin-dependent tissues require insulin to be able to incorporate plasma glucose and produce energy).

All these metabolic reactions are regulated through neurohormonal control. Performing physical exercise, in the case of people with diabetes, leads to increased glucose uptake by the muscle, which causes a decrease in blood sugar (especially in the recovery phase), as well as an increase in the number of insulin receptors and the sensitivity of this hormone. In patients with type 1, juvenile diabetes, it should be taken into account that insulin concentration remains constant due to exogenous administration, which also inhibits liver glucose production and neutralizes the action of counter-regulatory hormones. Under these conditions, glucose production is not able, in people with diabetes, to equalize peripheral use and thus blood glucose decreases, which causes the onset of hypoglycemia in type 1 patients having a glucagon deficiency.

Therefore, these patients are recommended to plan their activities for supplementing the exercise with a generous offer of glucose, determined by gastrointestinal absorption of food.

In the case of type 2, maturity diabetes, physical exercise is not related to the risk of hypoglycemia, but there is clearly a better control of blood glucose if the exercise is performed regularly (Table 1).

<table>
<thead>
<tr>
<th>Subject without diabetes</th>
<th>Subject with diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin decreases</td>
<td>Constant insulin level</td>
</tr>
<tr>
<td>Glucagon increases</td>
<td>Glucagon decreases</td>
</tr>
<tr>
<td>Increased production of counter-regulatory hormones</td>
<td>Neutralization of counter-regulatory hormones</td>
</tr>
<tr>
<td>Equalized use</td>
<td>Hypoglycemia</td>
</tr>
</tbody>
</table>

Theoretically, postprandial exercise is possible to cause, after 30-120 minutes, a decrease in glucose level. But due to the fact that sedentary behaviors are specific to patients with type 2 diabetes, the caloric intake related to exercise and weight loss is doubly beneficial (Cabezas-Cerrato and Cabezas Agricola, 2003).
Metabolism behavior in a body with diabetes depends on the amount of insulin available, level of diabetes control and state of hydration.

**Objectives proposed in the therapeutic protocol.** Increasing quality of life. Controlled and regular physical exercise produces, in the case of people with diabetes but also without diabetes, a double effect: on the one hand, it increases self-esteem, effort endurance capacity and self-confidence, and on the other hand, it reduces anxiety, depressive states, stress, tension and other harmful psychological factors.

- *Reducing or avoiding the need for pharmaceuticals.* There is a lower risk of suffering from self-induced complications that involve reliance on a permanent pharmaceutical treatment, under the aspect of both personal and social independence.
- *Improving metabolism and overall body functions,* although the main purpose is to improve glucose metabolism.
- *Preventing and acting on the risk factors.* There is intervention on obesity, hypertension and sedentariness, and benefits are obtained for people with latent diabetes, where we prevent or delay the onset of the disease, or for people with diabetes, where we prevent the onset and worsening of associated severe diseases.

**Strategies allowing the practice of physical exercise in patients with diabetes.** Patients with diabetes should take into account, before performing a session of physical exercises, the following precautions:

1. **Blood glucose control achieved before practicing physical exercise**

   Before initiating any type of physical exercise, it is recommended to check blood glucose level. This rule should be observed not only when intense sports activities are performed, but also when carrying out some daily activities that require a significant increase in physical activity (e.g. playing, dancing, swimming etc.). Depending on glucose values, the strategy used must be different (American Diabetes Association, 1997):

   - Low blood glucose - below 100 mg/dl: a supplement of 10-20 grams of carbohydrates is recommended before initiating physical exercise.
   - Blood glucose between 100 and 250 mg/dl: these values are appropriate to start physical exercise in optimal conditions.
   - High blood glucose - above 250 mg/dl: the presence of ketonic bodies in the urine must be checked. If ketonuria is positive, physical exercise should be avoided or postponed until the level of ketonic bodies in the urine disappears. In some cases, it is possible to administer a small extra dose of rapid-acting insulin and then check, after about two hours, blood glucose and ketonuria.

2. **Knowing the characteristics of physical exercise to be performed**

   The effect on blood glucose may differ depending on the type of activity to be performed.

   **Type of exercise.** Aerobic-type exercises, such as walking, running, swimming, skating or cycling, are indicated due to their hypoglycemic effect. Exercises with an anaerobic component, such as sprinting, combat sports or those that involve lifting weights, cause the production of a significant adrenergic stimulation (they stimulate glucose production in the liver) and have a strong hypoglycemic effect. Competitive sports, which are associated with strong emotional stress, cause significant increases in glucose levels, especially in children and adolescents.

   **Duration.** In the first 30-60 minutes of physical exercises performed with moderate-high intensity, muscle and liver glycogen is converted into the main muscle fuel. Then, glycogen stores are depleted and the muscle continues to obtain energy from lipids and plasma glucose.

   **Intensity.** Glucose is the preferred muscle fuel for those exercises performed with moderate or high intensity. Low intensity exercises use preferentially fatty acids as an energy source. Thus, activities performed with low intensity (walking) may have a minimal effect on blood glucose, while intense activities (running) may have a strong hypoglycemic effect.

   **Frequency.** Hypoglycemic effect normally increases after practicing physical exercise and especially after accumulation of several days of practicing physical exercise.

3. **Reducing the dose of pharmaceuticals before practicing physical exercise**
Insulin dose reduction before practicing physical exercise is a vital strategy to avoid hypoglycemia. This is one of the most common complications associated with the practice of physical exercise, which has been reported since the first insulin treatments for patients with diabetes.

We mention that hypoglycemia during the practice of physical exercise is the main obstacle to performing it, mainly in children and adolescents. Before practicing physical activities that last more than 30 minutes, the insulin dose should be reduced depending on the duration and intensity of each exercise (Table 2).

Table 2. Percentage of rapid-insulin dose reduction before practicing physical exercise, depending on its intensity and duration

<table>
<thead>
<tr>
<th>Physical exercise intensity (% of VO₂max)</th>
<th>30 minutes</th>
<th>60 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>25/mild</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>50/moderate</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>75/intense</td>
<td>75</td>
<td>100*</td>
</tr>
</tbody>
</table>

*In the case of long-duration and high-intensity physical exercise, inclusively rapid-acting insulin should be eliminated prior to physical exercise.

VO₂max – maximal oxygen consumption

Insulin dose reduction applies only if physical exercise is performed 2-3 hours after injection with rapid-acting insulin or 4-6 hours after administration of basal insulin. After this period, rapid-acting insulin level is very low and does not have a significant effect on physical exercise.

In the case of patients treated with sulfonylureas, meglitinides or intermediate (nighttime) insulin, it is recommended, before practicing physical exercise with an average or long length (40-60 minutes) and moderate or high intensity, to decrease the dose of pharmaceuticals.

Patients treated exclusively with noninsulin sensitizing pharmaceuticals (Metformin, Glucophage) have a low risk of experiencing hypoglycemic episodes while practicing physical exercises and they are even recommended neither to reduce treatment nor carbohydrate supplements.

In the situation where the practice of physical exercise coincides with the moment of maximum effect of a dose of insulin or oral hypoglycemic agent, there are increased possibilities to experience a hypoglycemic episode. This should not prevent from practicing physical exercise, but requires adopting appropriate preventive measures, which include prior control of blood glucose, insulin dose reduction or increased consumption of carbohydrates.

Scientific studies conducted by authors like Koivisto and Felig (1978) have reinforced the idea that insulin is not recommended to be injected in areas with significant muscle activity, which avoids hypoglycemia as a result of increased absorption rate of insulin, due to muscular activity.

However, it has never been proved that this effect is caused by increased subcutaneous circulation or that it would have a direct relationship with hypoglycemia during physical activity, although physical exercise is known to be one of the multiple factors affecting the absorption rate of insulin.

4. **Consumption of food with carbohydrates**

Normally, before practicing physical exercises, it is not enough to reduce the dose of insulin, but it is also necessary to increase consumption of carbohydrates. This is achieved when practicing long-duration exercises (60-90 minutes) or when performing unexpected physical activities. This supplement of carbohydrates should be individualized depending on the duration and intensity of physical exercise.

We present below the carbohydrate content of some foods and beverages commonly used during the practice of physical exercises (Table 3).

Table 3. The carbohydrate content of some foods and beverages used during the practice of physical exercise

<table>
<thead>
<tr>
<th>Foods and beverages</th>
<th>Amount</th>
<th>Carbohydrates (g)</th>
<th>Percentage of carbohydrates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isotonic drinks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isostar</td>
<td>200 ml</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Aguarius</td>
<td>200 ml</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Other drinks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refreshments</td>
<td>200 ml</td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>
Commercial fruit juice  200 ml  24  12
Redbull  200 ml  22  11.2

Other foods
Oranges  130 g  10  8
Apples  130 g  12  9
Bananas  80 g  16  20
Biscuits  3x21g  13  63
Bread  30g  14  47
Glucose tablets  2x10g  10  99.5
Energy bars  25g  15  60

In the situation where the performed physical activities have not been predicted and the change of insulin dose is not possible, the aim is to avoid hypoglycemia by increasing consumption of carbohydrates. It is necessary to calculate approximately the time for performing the respective physical activity, because, if the individual is under the maximal influence of a dose of rapid-acting insulin or pharmaceutical hypoglycemic agents, hypoglycemia must be avoided by administering a greater amount of carbohydrates. Initially, about 30-40 grams of carbohydrates will be administered and then carbohydrates will be consumed depending on the intensity and duration of physical exercise to be performed (Table 4).

Table 4. Supplement of carbohydrates depending on the intensity and duration of physical exercise

<table>
<thead>
<tr>
<th>Physical exercise intensity (% of VO$_2$max)</th>
<th>&lt; 20 minutes</th>
<th>20-60 minutes</th>
<th>&gt; 60 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>25/mild</td>
<td>0-10g</td>
<td>10-20g</td>
<td>15-30g/hour</td>
</tr>
<tr>
<td>50/moderate</td>
<td>10-20g</td>
<td>20-30g</td>
<td>20-50g/hour</td>
</tr>
<tr>
<td>75/intense</td>
<td>0-30g</td>
<td>30-50g</td>
<td>30-100g/hour</td>
</tr>
</tbody>
</table>

VO$_2$max – maximal oxygen consumption

Conclusions

Physical activity is relatively little used in the treatment of patients with diabetes, and this is mainly caused by low effort endurance of these individuals, their indolence and lack of motivation to practice physical exercise.

Physical exercise should be promoted due to its efficiency, along with measures such as insulin dose adjustment and diet with carbohydrates, in the treatment programs of diabetes centers, under the guidance of specialized staff (e.g. trainers, physiotherapists) applying practical, realistic and individualized exercise programs. As a general rule, patients treated exclusively with insulin are recommended to practice physical exercise preferably 2-3 hours before meal taking, and thus the effect of rapid-acting insulin and the risk of hypoglycemia will be much reduced.

References

EGO IDENTITY AND DEVELOPMENT IN ADOLESCENCE. A SYSTEMATIC REVIEW

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Abstract. Ego is the central part of which we are immediately aware, consisting of a set of cognitive structures that organize the person’s mental functions and continuously generate consistency, based on the existence of awareness of the self and the world. The systematic analysis used original studies identified in international databases, which brought to discussion the two variables of the research: identity and adolescence. Qualitative assessment of the scientific papers published in various reference journals or submitted at diverse international conferences was achieved relying on the PICO process. PICO process is a technique mainly used in evidence-based practice to answer a research question. The purpose of this review was to identify the scientific studies dealing with the role of identity in ego formation and development, as well as the causal relationships between these two variables during adolescence.

Keywords: identity, ego development, personality, adolescence.

Introduction

Contemporary society is defined by consumerism, globalisation, boom of mass media, advanced technology, which entail strong sociocultural changes that are also reflected in the adolescents’ behaviour and attitude. As mentioned by Clerget (2008: 12), the diversity of alternatives available to teenagers and the high expectations of social environment lead to uncertainty, worry, anxiety, emergence of some complexes that may culminate with the inability to define one’s own identity and/or to overcome the identity crisis specific to this age (it should be noted mentioned that not all adolescents go through an identity crisis). The questions: Who am I? What am I doing in this world? Where am I going? and the related answers create the future existential foundations. Even if, during the lifetime, the self is continuously defined and redefined, completing this stage with an assumed identity means a successful passage to another level, another age stage (Zlate, 1989).

Closely related to the concept of identity, the concept of ego appears in numerous works, being replaced sometimes with that of identity. However, the concept of identity is much closer to that of self-image. Designed (or not) as a structure of knowledge, the ego has always been regarded as something mysterious, unusual, an entity dominating the individual’s mental life, the only one “responsible” for his/her behaviour (Heyman, 2005: 86).

One of the most important concerns of personality psychology is to decipher the genesis, structure and role of the ego, understood as a central pivot of psycho-individual activity, and the processes of psychosocial relationship of the person with himself/herself, the others and the world. Essentially, the ego is a psychosocial process arising and manifesting in the interference zone between the individual and social spheres, where it intervenes as a main mediator in the relationship between person and his/her sociocultural environment.

Ego is the central part of which we are immediately aware, consisting of a set of cognitive structures that organize the person’s mental functions and continuously generate consistency, based on the existence of awareness of the self and the world. More exactly, the ego represents the central structure of personality – and therefore of the person – which ensures the dynamic and continuous integration of information about self and the world, generating thus the sense of identity, continuity and unity of own existence (Chelcea & Iliu, 2003: 144). The ego must be understood as the cognitive scheme serving to process information about self, the others and the world, always considering the conception about self.

The ego structure is characterized by stability, coherence and a high level of organization – without excluding a certain dynamics related to the process of its formation and evolution in ontogenesis, but also by circumstantial fluctuations manifested in varied degrees of contact with reality and the self.

Material and methods

The systematic analysis was based on original studies identified in international databases, which brought to discussion the two variables of the research: identity and adolescence. Qualitative assessment of the scientific papers published in various reference journals or submitted at diverse international conferences was achieved relying on the PICO process. PICO process is a technique mainly used in evidence-based practice to answer a research question (Huang, Lin & Demmer-Fushman, 2006).
**Purpose of the review:** this stage of the research aimed to identify the scientific studies dealing with the role of identity in ego formation and development, as well as the causal relationships between these two variables during adolescence.

**Participants:** adolescents

**Interventions:** any type of tool for assessing the causal relationships between the research variables (questionnaires, interviews) identified in theoretical papers, empirical studies etc.

**Results:** all results reported by the studies included in the systematic review

**Design of studies included in the analysis:** theoretical studies, case studies, longitudinal studies, cross-sectional studies etc., as related by their authors.

**Inclusion criteria.** The review of studies was focused on highlighting the relationships between the research variables: identity and adolescence. Thus, the review included papers published in journals indexed in international databases, such as Web of Science, SPORTDiscus, PubMed, Medline, and also papers submitted at specialized international conferences, such as European Child and Adolescent Psychiatry, or books.

**Search results**

Identity is one of the most studied constructs in social sciences. However, despite the wealth of findings across many disciplines, researchers in identity remain divided as regards some fundamental questions such as: *What exactly is identity? How do the identity processes work? Do people have a single identity or multiple identities? Is identity oriented individually or collectively? Is it constructed personally or socially? Is it stable or constant in its flow?* (Schwartz, Luyckx & Vignoles, 2011).

This comprehensive perspective on scientific studies emphasizes the depth and complexity of identity processes and areas, and presents views from many different studies and theoretical schools, as well as empirical approaches. Most often, a theory is the starting point. The only question is whether there are or not multiple meanings of the identity status. Table 1 provides an overview of scientific studies that address identity and ego development during adolescence.

<table>
<thead>
<tr>
<th>Study</th>
<th>Nb. subjects</th>
<th>Age</th>
<th>Study design</th>
<th>Assessment tool</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marcia (1993)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Theoretical study</td>
<td>Identity can be compared to those mental structures postulated by cognitive developmental theorists</td>
</tr>
<tr>
<td>Weinmann &amp; Newcombe (1990)</td>
<td>100</td>
<td>Retrospective study</td>
<td>Extended Objective Measure of Ego Identity Status</td>
<td>A significant quadratic trend in identity committed subjects’ ratings of the amount of love they felt for mother across the five age periods. A significant linear trend of increasing love for mother</td>
<td></td>
</tr>
<tr>
<td>LaVoie (1976)</td>
<td>juniors and high school pupils, girls and boys</td>
<td>Marcia Ego Identity Status Scale and measures of gender-role identification</td>
<td>The gender differences which emerged were congruent with the identity literature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kroger &amp; Haslett (1988)</td>
<td>76 subjects (41 women and 35 men)</td>
<td>Longitudinal study</td>
<td>Marcia Ego Identity Status Scale and Separation Anxiety Test (SAT)</td>
<td>Strong links between attachment style and identity status in 1986, and between identity status in 1984 and 1986; only an indirect connexion existed between attachment style in 1984 and...</td>
<td></td>
</tr>
</tbody>
</table>
Discussions and conclusions

According to specialists in development (Kroger & Marcia, 2011), in the first studies on identity status, the initial relationship of “closeness” was established between the new identity statuses, as well as the overall measure of ego identity, EI-ISB (Ego Identity Incomplete Sentences Blank). Although it gets closer to a concurrent validity form, EI-ISB had not been previously set as a measure of ego. As mentioned above, EI-ISB was established according to criteria representing a broader reading of Erikson’s theory. The positive relationship found between this measure and identity statuses suggests that statuses have provided an appropriate and broader representation of Erikson’s theory. A second measure was authoritarianism, where blockages had the highest score in situations. The fact that persons who followed directions unconditionally set for them by important figures in their childhood would adopt values of “law and order” and would prefer a strong leader was considered evidence corroborating the validity of the name of blockage. As regards the underlying psychoanalytical theory, it is proposed that the formation of an ideal ego (final development of superego) occurs during adolescence (Blos, 1974, quoted by Kroger and Marcia, 2011). The impossibility to complete this task leaves the individual at the mercy of a non-reconstructed superego formed in childhood, when the internalized parental figures are formidable characters in the child’s life. The suggestion emerging from the relationship often found between blockage and authoritarianism is that people with this identity status remain fixed in the values of childhood, and in their adult life they seek for reliable authorities that might guide them. Clinically, they would also be expected to depend on strict internal (parental) criteria that they have never reformulated on their own terms. To avoid guilt and anxiety, it would be apparently important for these people to maintain, according to their needs, the defensive purposes, to divide the world into “us” (fully human) and “them” (subhuman). A third measure involves the participants’ sensibility to the positive or negative feedback from the researcher watching their performance in a conceptually difficult task. It was found that participants in blockage and diffusion states changed estimations on their own abilities after receiving external feedback more than during achievements and moratoriums. Again, these results were consistent with the differentiation of those who had built or were in the process of building identity on their terms, in the case of people who either had adopted the conferred identities or were lacking firm identities (Kroger & Marcia, 2011).

The assumed determinants of ego were investigated by LaVoie (1976), the author including in his study sophomore, junior and senior high school males and females. The survey results were published in the Journal of Youth and Adolescence, volume 5/1976. According to the study, subjects were administered the Marcia Ego Identity Status Scale and measures of gender-role identification, personality development, psychological functioning, self-concept and parental socialization practices. Data analysis showed that high-identity adolescents achieved more positive scores on gender-role identification, personality development, psychological adjustment and self-concept, unlike low-identity adolescents. The gender differences which emerged were congruent with the identity literature. Generally, the study data supported Erikson’s theory of ego identity development.

It should be noted that the formation of ego identity is a major event in the development of personality. Occurring during late adolescence, identity consolidation marks the end of childhood and the beginning of adulthood. Identity formation involves a synthesis of aptitudes, beliefs and identifications from childhood in a more or less coherent but unique whole, which provides the young man with both a sense of continuity with the past and a direction for the future. In terms of internal organization, identity can be compared with those mental structures postulated by cognitive developmental theorists, especially Piaget (Inhelder & Piaget, 1958, quoted by Marcia, 1993). However, identity differs from Piaget’s structures by the fact that it is both content- and process-based. While Piaget’s structures are primarily experience-based operating procedures, identity includes both procedure styles and content elements. In other words, identity, as a structure, equally refers to the way in which experience is treated and what experiences are considered important (Marcia, 1993).

Regarding the ego development during adolescence, Kumru and Thompson (2003) conducted a research in order to analyse the association between identity status and self-monitoring behaviour, including age and gender differences in these variables, on a number of 476 adolescents (aged between 15 and 22 years) from Turkey - a non-Western society characterized by traditional and modernist cultural elements. The findings were published in
the *Journal of Adolescent Research*, whose purpose is to publish scientific studies from a variety of disciplines which focus on development during adolescence (10-18 years) and early adulthood in process (18-22 years old). In the study, identity was assessed with the Extended Version of the Objective Measure of Ego Identity Status, and self-monitoring was measured by the Self-Monitoring Scale. According to the research results, identity and self-monitoring were significantly associated, for ideological identity, with identity-achieved students lowest and diffusion students highest in Self-Monitoring. Also, the authors reported that there were no associations for interpersonal or general identity status. Compared to other similar studies conducted in North America, in the research made by Kumru and Thompson, there were significant increases in identity achievement and moratorium with age, and no gender differences in identity status. Males were significantly higher than females in self-monitoring, but there were no age differences. These findings are discussed in relation to the cultural influences on identity formation in adolescents from Turkey.

Also, Weinmann and Newcombe (1990) analysed the link between identity status in late adolescents and their memories of the relationships with their parents. The study conducted by the authors included 100 male and female adolescents who completed two questionnaires. The findings were published in the *Journal of Experimental Child Psychology*, by Elsevier. The first questionnaire used in the research assessed the retrospective perceptions of their affective relationships with parents across five age periods: from 1 to 5 years, 5 to 10 years, 10 to 15 years, 15 to 20 years, and the present. The second questionnaire, the Extended Version of the Objective Measure of Ego Identity Status, assessed the subjects’ current identity status. Analysis revealed both a significant quadratic trend in identity committed subjects’ ratings of the amount of love they felt for mother across the five age periods and a significant linear trend of increasing love for mother. In contrast, uncommitted subjects showed significant linear trends of decreasing love both for and from their mothers. As mentioned by the authors of the study, results are interpreted as evidence of the importance of solving the identity issues to the establishment of feelings of intimacy between late adolescents and their parents.

Interested in the developmental relationships between intra-psychic structure and ego identity status in late adolescence, Kroger and Haslett (1988) conducted a longitudinal study on a number of 76 subjects (41 females and 35 males). The purpose of their study was to examine the possible predictive relationship between initial attachment style and later identity status. Subjects were administered the Marcia Ego Identity Status Scale and Hamburg Separation Anxiety Test (SAT). The adapted log-linear models indicated strong links between attachment style and identity status in 1986, and between identity status in 1984 and 1986; only an indirect connexion existed between attachment style in 1984 and 1986, as measured by SAT. According to the results, which were published in the *Journal of Youth and Adolescence*, in 1988, when identity status was known - in 1984 and 1986, it was possible to predict in 1986 an attachment style without knowing the attachment style in 1984; the attachment style in the study of 1984 was unable to predict the identity status.

As mentioned by Kroger and Marcia in the work *Handbook of Identity Theory and Research* (2011), Loewinger’s measure of ego development (1976) is a tool designed to assess different levels of complexity relating to the way in which an individual gives sense to life and life experience. The lower end of the continuum (pre-conformist stages) is marked by a self-organization where the significance primarily derives from the standpoint of implications of life events, needs of others and needs of self, showing an increasingly higher tolerance to ambiguity and an assessment of individuality. Achievements and moratoriums, due to their solving or proximity to solving a psychosocial stage problem, should have the highest score in this measure, with blockages and especially diffusions at lower scores. Although moratoriums may occur in a period of bad feelings about self or when experiencing anxiety, they should have a relatively high score in this measure which assesses the complexity of significance construction rather than sensational emotional states. Jespersen, Kroger and Martinussen (2010, quoted by Kroger & Marcia, 2011) performed a meta-analysis of the relationship between identity status and ego development level. A total of 12 out of 14 studies contained sufficient data to be included in the two analyses. Results from 8 studies highlighted a poor to moderate relationship between identity achievement and post-conformist levels of ego development (the probability rate is 2.15). However, no relationship was found between blockage state and conformist level of ego development. Moreover, results from 6 studies showed a moderate correlation ($r = 0.35$) between continuous measures of identity status and ego development. Although some relationships emerged between identity achievement and post-conformist levels of ego development, and also between continuous measures of identity status and ego development, these relationships were not as strong as expected (Kroger & Marcia, 2011).

**References**
“OPPONENT INSIDE”: HOW A-TRAINT INFLUENCES THE MENTAL OPERATIONS OF IDENTIFICATION AND SELECTION IN FOOTBALL

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Abstract. In sports performance, the “opponent inside” refers to the emotional sector issues. Anxiety represents an emotion characterized by feelings of worry and involving psycho-physical tension. On the long term and at certain intensity, anxiety becomes a noxious phenomenon, the effects being felt at all levels. The mental operations of identification (of the right stimuli) and selection (of the proper psychomotor responses) can be affected by a low/high high level of anxiety. The current research explored trait anxiety in seven different types of situations: socially-evaluative, physically dangerous, new or strange, daily routines, separation, self-disclosure to family and self-disclosure to friends, in order to highlight the level of anxiety associated with superior performances in the case of two mental operations – identification and selection. 17 male football players participated in the study, aged between 20 and 22 years, students at the National University of Physical Education and Sports, Bucharest. To solve the research issues, we used EMAS-T and SAS-T questionnaires (parts of the Endler Multidimensional Anxiety Scales) and three computerized tests: TRS, TRD and TRSC (developed by RQ Plus). Through the Spearman correlation, we found significant relations between trait anxiety in physically dangerous and separation situations and the identification time. Also, we found significant correlations between trait anxiety in socially-evaluative and self-disclosure to friends situations and the selection time. The results emphasize that maintaining trait anxiety at a proper level is associated with a better time needed to identify the right stimuli and to select the appropriate psychomotor responses.

Keywords: trait anxiety; identification time; selection time; football.

Introduction

In sports performance, the “opponent inside” refers to the emotional sector issues (Epuran, Holdevici, & Tonita, 2001: 92). The emotional sector supposes less rational control. The stress/demands of the emotional sector come from lack of confidence, fear of failure, of injury, fear of victory (nikophobia) or from different types of anxiety. Anxiety represents an emotion characterized by feelings of worry and involving psycho-physical tension (Karageorghis & Terry, 2011: 91). We must distinguish between state anxiety and trait anxiety. State anxiety represents the individuals’ actual transitory anxiety response, while trait anxiety represents the individuals’ predisposition to experience anxiety, the pattern of anxious reactions which an individual may exhibit in various situations (Mitache et al., 2014). Until the late 1970s, no sport-specific trait anxiety measures existed (Smith & Smoll, 1990: 424). It is known that football players, on the field, are faced with situations that heighten anxiety. Therefore, it is important to examine anxiety in a variety of situations, in order to highlight the level of anxiety associated with superior cognitive or psychomotor performances (in 1999, Jokela and Hain did not find any study in which different athletes would have experienced the same optimal level of anxiety). In our research, we study the relation between trait anxiety and two mental operations: the capacity to identify the correct stimuli in the environment and the ability to select the appropriate psychomotor responses. Both stimulus identification and response selection (as mental operations), together with response programming, involve information-processing activities and are important in football (Schmidt & Wrisberg, 2008: 59). Thus, if the identification time and the selection time involve information-processing activities, we can talk about a decision-making process, in the case of football players. But how do we measure the stimuli-identification time and the response-selection time? By measuring the basic kinds of reaction time (Martin & Bush, 2008: 33) - the recognition reaction time, the simple and choice reaction time, we can achieve this desideratum. Donders (1969) has shown that choice reaction time is longer than reaction time, which is longer than simple reaction time. It means that a complex stimulus elicits a slower reaction time (Folstein, Van Petten, & Rose, 2008). This occurs because some mental stages/operations are interposed. We are talking about the mental operation of identification (of the right stimuli) and about the mental operation of selection (of the appropriate responses). By subtracting the values from the times found (for the complex reaction time, discrimination and simple reaction time), we can obtain, from the differences, a clear insight into the duration of the mental processes. In other words, we can measure the stimuli-identification time and the response-selection time: complex/choice reaction time – discrimination/identification reaction time = the selection time, while discrimination/identification reaction time – simple reaction time = the identification time.

Weinberg and Genuchi (1980) have argued that there is a relationship between competitive trait anxiety and sports performance. Being in a competition, athletes (male golfers) with low competitive trait anxiety have higher
levels of performance (the authors specify, however, that more studies need to be conducted using a variety of skills). Trait anxiety and competitive anxiety are known to reduce the efficiency that athletes can achieve when in competition. Reduction of the anxiety levels and also reduction of fatigue are the keys to increase the aggressiveness of an athlete (Aksutin & Korobeynikov, 2014). It has been found that male football players, at the age of 13-15, have high anxiety levels, and it has been proven that the fathers’ high education levels affect their anxiety levels in a negative way (Karabulut et al., 2013).

Regarding A-state and A-trait, researchers highlight: state anxiety, in tasks with high information content, such as complex reaction time tasks, can produce a slowing down of the information processing and motor strategies (Bolmont, Thuillier, & Abraini, 2000); trait anxiety facilitates the information processing for simple tasks, but not which require strategic processes (Pacheco-Unguetti et al., 2010). In most sports, including football, a good decision should be made fast. In order to have a better information processing and a successful decision-making, athletes must experience an optimal level of anxiety/stress. Hepler (2015) asserts that under no stress or under somatic anxiety/stress, athletes are faster in making a final decision about a given situation. Instead, under cognitive anxiety/stress, athletes delay decisions (delay selection of the appropriate cognitive responses).

The purpose of our investigation is to explore trait anxiety in seven different types of situations: new or strange, socially-evaluative, separation, physically dangerous, daily routines, self-disclosure to family and self-disclosure to friends, in order to highlight the level of anxiety associated with superior performances in the case of two mental operations: identification of the right stimuli and selection of the appropriate psychomotor responses.

Materials and methods

Participants

A number of 17 male football players participated in the study, aged between 20 and 22 years, students at the National University of Physical Education and Sports, Bucharest. Their training/competitive experience is comprised between 6 and 12 years.

Equipment and materials

The instruments used in the research were EMAS-T and SAS-T questionnaires, parts of the Endler Multidimensional Anxiety Scales (CAS++, developed by Cognitrom) and three computerized tests: TRS, TRD and TRSC, created by RQ Plus.

EMAS-T and SAS-T questionnaires allow high accuracy in evaluating and predicting anxiety across seven situations. The scales measure people’s predisposition to experience anxiety in new or strange situations, in socially-evaluative and separation situations, and also in physically dangerous, daily routines, self-disclosure to family and self-disclosure to friends situations.

The computerized TRS test consists of 50 sequences. The participants must respond at the appearance of a red circle on the computer screen (this represents the signal-stimulus). The athletes are required to push a button, as fast as they can, when the red circle appears on the screen. The TRS test supposes that the signal-stimuli can be viewed in a variable rhythm of appearance. The purpose of the test is to measure the simple reaction time (the speed of the nervous influx). The computerized TRD test consists of 100 sequences. In this case, the participants must respond at the appearance of a red square on the computer screen, using the same button. The essential difference between TRS and TRD tests is that, in the case of TRD test, in the centre of the screen (in an unpredictable succession), there appear nine images: green triangle, red triangle, yellow triangle, green square, red square, yellow square, green circle, red circle and yellow circle. The athletes are required to push the button of the lever only at the significant visual stimulus - the red square and to ignore the non-significant stimuli which can be observed. The purpose of the test is to measure the discrimination reaction time. It means the speed of the nervous impulse combined with the mental operation of identification (the time required by the athletes to identify the right stimuli - the red squares). The computerized TRSC test consists of 50 sequences, each sequence containing a signal-stimulus. The purpose of the test is to measure the complex reaction time, meaning the speed of the nervous impulse combined with the mental operation of identification and with the mental operation of selection (the time required by the athletes to select the appropriate psychomotor responses). The athletes responded depending on the signal-stimuli that occurred on the computer screen. Thus, the participants: pushed the left/right button when arrows appeared (in the left/right part of the screen); pressed the left/right button from the extremity of the desktop depending on the low or high frequency of a sound, and pressed the coloured buttons (red, yellow or green) depending on a traffic light actions.
Procedure

The research was carried out with groups of 5-21 people at a time, but only results from the participants practicing football were included in our investigation (we mention that in the research room there were 1-4 athletes belonging to the target group). The EMAS-T and SAS-T questionnaires were hand scored (the scales can also be computer scored using the Cognitrom Assessment System platform). The questionnaires and the three computerized tests used in the study: TRS, TRD and TRSC, were carried out by the athletes from Monday to Friday, during one month. In the first two weeks, we paid attention to applying the anxiety scales, and in the next two weeks, we focused on performing the computerized tests; we mention that some of the participants were tested in the morning and some in the afternoon. All the instruments were applied, every time, in the same order, as mentioned above. To solve the tests (and the two scales), generally takes about 50 minutes. EMAS-T and SAS-T lasted about 25 minutes, the TRS test lasted 5 minutes and the TRD and TRSC tests lasted each approximately 10 minutes. From the coefficients provided by the battery software: in the case of TRS test, we used the simple reaction time; regarding the TRD test, we used the discrimination reaction time, and concerning the TRSC test, the complex reaction time was used. We specify that these basic kinds of reaction time were used in order to determine the necessary time for the mental operations of selection and identification. The athletes did not practice any physical exercises before testing, being aware that a heart rate of 115 beats per minute is linked to a faster reaction time (Levitt & Gutin, 1971). Also, using conversation and observation, as research methods, we considered that athletes were in a neutral emotional state. This aspect is important because, as Lee and Sternthal (1999) have argued, the mood affects people’s capacity to process information. Also, Mano (1994) has shown that people experiencing negative emotional states use simpler decision strategies. The athletes were told that they could choose to stop any test at any time (no athlete practicing football decided to stop).

The scores registered by the football players in the anxiety scales were correlated to the performances obtained for the mental operations of selection and identification. The mental operations of selection were calculated by making the difference between the complex reaction time and the discrimination reaction time, while the mental operations of identification were calculated by making the difference between the discrimination reaction time and the simple reaction time.

Results

The investigation of the box-plot charts (in the preliminary data analysis) revealed that, in the scores registered by the athletes for TRS, TRD and TRSC tests, there were no extreme values (outliers). We specify the box-plot chart in the case of discrimination reaction time (Fig. 1).

![Box-Plot Chart](image)

Fig. 1. Discrimination reaction time - outliers

Through the Spearman correlation, we highlighted significant relations between trait anxiety and the mental operations of identification and selection. We mention that the necessary conditions, in order to apply the Spearman correlation, are fulfilled (Labăr, 2008: 87): the sample has a small volume (17 athletes), the variables
are ordinal, and when the values of a variable (for example, the identification time) decrease, the scores of the other variable (for example, the anxiety in new or strange situations) register growth.

### Table 1. Results for EMAS-T and SAS-T, for the stimuli-identification time and the response-selection time

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Identification time</th>
<th>Selection time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>rho Correlation</td>
<td>rho Correlation</td>
</tr>
<tr>
<td>new or strange</td>
<td>33.12</td>
<td>9.45</td>
<td>-.242</td>
<td>.348</td>
</tr>
<tr>
<td>socially-evaluative</td>
<td>32.59</td>
<td>7.05</td>
<td>-.505*</td>
<td>.039</td>
</tr>
<tr>
<td>separation</td>
<td>43.24</td>
<td>7.68</td>
<td>-.533*</td>
<td>.028</td>
</tr>
<tr>
<td>physically dangerous</td>
<td>33.00</td>
<td>9.77</td>
<td>-.581*</td>
<td>.014</td>
</tr>
<tr>
<td>daily routines</td>
<td>35.24</td>
<td>1.71</td>
<td>-.209</td>
<td>.421</td>
</tr>
<tr>
<td>self-disclosure to family</td>
<td>44.47</td>
<td>5.05</td>
<td>-.404</td>
<td>.108</td>
</tr>
<tr>
<td>self-disclosure to friends</td>
<td>36.47</td>
<td>6.73</td>
<td>-.371</td>
<td>.143</td>
</tr>
</tbody>
</table>

* Correlation is significant at the .05 level (2-tailed).

The analysis of the results from Table 1 underlines:

- There are negatively significant correlations (-.505, -.533, respectively -.581) between trait anxiety in socially-evaluative situations, manifested in separation situations and in physically dangerous situations and the mental operation of identification (the time needed by the athletes to identify the correct stimuli in the environment).

The values for the effect size index ($r^2$) are 0.25 (socially-evaluative situations), 0.28 (separation situations), respectively 0.34 (physically dangerous situations). In other words, the relation between trait anxiety, manifested in the mentioned three different situations, and the identification time is moderate.

- There are negatively significant correlations (-.601, respectively -.539) between trait anxiety in socially-evaluative situations and in self-disclosure to friends situations and the mental operation of selection - the time needed by the athletes to give the appropriate psychomotor responses, according to the existing situations (only after they identified the right stimuli).

The values for the determination coefficient (the effect size index) are 0.36 (socially-evaluative situations) and 0.29 (self-disclosure to friends situations). These can be translated through a moderate relation between trait anxiety, manifested in the mentioned situations, and the selection time.

### Discussions and conclusions

This research highlights the presence of significant statistical correlations between trait anxiety and the performances obtained by the football players for the stimuli-identification time and the response-selection time (as mental operations involving information-processing activities). There are negative correlations between trait anxiety manifest in separation situations, in physically dangerous and in socially-evaluative circumstances and the mental operation of identification. Therefore, a medium level/ slightly above average level of trait anxiety in separation situations, a medium level/ slightly below average level of trait anxiety in potentially harmful situations and a medium level of anxiety in socially-evaluative circumstances are related to a better identification time. Instead, if trait anxiety in all three situations mentioned above is below the average level, it can be linked to a less efficient time in order to identify the relevant stimuli from the environment. This also means that the athletes recording trait anxiety at a below the average level prove weaker ability for information processing, which leads to weaker ability in making final decisions regarding the importance/relevance of a visual stimulus. These data could be explained through the fact that football is a very popular sport involving plenty of spectators and is characterized by a direct contact with the opponent. Feeling more anxiety (actually, in general, a medium level of anxiety) in separation situations, in physically dangerous and in socially-evaluative circumstances, the football players are more alert and are looking for a better control of the environment, in order to avoid injuries and to manage possible difficulties with other people (spectators, peers, referee, coach, members of the multidisciplinary team).

Our investigation also reveals negative correlations between trait anxiety in self-disclosure to friends situations, manifested in socially-evaluative situations, and the mental operation of selection. Accordingly, a medium level/ slightly above average level of trait anxiety in self-disclosure to friends situations and a medium level of anxiety in socially-evaluative circumstances are related to a better selection time. Instead, if trait anxiety in
the mentioned situations (self-disclosure to friends and socially-evaluative ones) is below the average level, it can be correlated to a weaker time in order to select the appropriate psychomotor responses. Feeling more anxiety (in fact, a medium/slightly above the average level of anxiety) in self-disclosure to friends situations and in socially-evaluative situations, the football players are looking for less moral support from their colleagues, having a greater need in order to control the circumstances and to avoid disappointing others (spectators, coach, peers, members of the multidisciplinary team). On the other hand, feeling less anxiety (more exactly, a slightly below average/below the average level of anxiety) in self-disclosure to friends situations and in socially-evaluative situations, the athletes are looking for more compassion, support from their colleagues and reduce the ability to quickly select the appropriate psychomotor responses. It also means that these athletes reduce the capacity to process information, proving weaker ability in making final decisions. This fact can be explained through the phenomenon of social loafing (Carron & Brawley, 2008: 221). Thus, it is possible for the athletes experiencing trait anxiety in self-disclosure to friends situations at a lower level (saying what they are feeling and looking for more compassion from peers) to experience a reduction in the individual effort, in motivation, relying more on others’ help (football being a team sport). Our study results emphasize that maintaining trait anxiety (in specific situations) at the appropriate level is associated with a better time in order to identify the relevant stimuli from the environment and to select the adequate psychomotor responses. During this process (teaching athletes how to maintain anxiety at a proper level), the role of the sports psychologist is very important. Specialists can perform mental training with the athletes, can use mental imagery and self-talk strategies.

Specialized literature (Janelle, Singer, & Williams, 1999) reveals that a high level of anxiety alters the ability to acquire peripheral information at a perceptual level, this leading to a lower level of control, poor identification time and decision-making. In addition, we have discovered that not only a high, but also a low level of anxiety manifested in separation situations, in physically dangerous situations and in socially-evaluative circumstances is related to a poor identification time or decision-making.

In order to achieve high performance during sport, it has been proven that reducing the anxiety levels by the usage of mental imagery and self-talk strategies are very effective (Mousavi & Meshkini, 2011). Perez et al. (2014) have also shown that a high level of expertise is related to a reduced anxiety level and an increased ability of decision-making (involving a better capacity for information processing). But up to what level exactly to reduce anxiety and anxiety felt in which situations in order to register a better capacity for information processing? Our research answers this question, in the case of stimuli-identification time and in the case of response-selection time. It is important to observe the changes in mood of the athletes for trying to prevent them from experiencing high or low levels of anxiety, because performance (in the case of identification time - the identification of the correct stimuli, and in the case of selection time - the selection of the appropriate responses) seems to be negatively influenced by either of them. This information is invaluable for athletes, coaches and sports psychologists who are interested in optimizing their performance. The limits of our research are represented by the gender (what will happen when only female athletes are investigated?) or by the individual sensitivity. Another question is what will happen when athletes practicing different sports are investigated? A limit of our investigation is also represented by the day and the moment of the day in which the participants were tested – the football players were studied from Monday to Friday, some of the participants were tested in the morning and some in the afternoon. More studies need to be conducted to clarify the link between trait anxiety (manifested in different situations) and various skills essential for sports performance: analogical reasoning, cognitive inhibition, mental flexibility, working memory, divergent thinking, spatial orientation etc.

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MODEL OF COGNITIVE AND BEHAVIOURAL THERAPY FOR PATIENTS WITH POST-TRAUMATIC STRESS DISORDER (PTSD)

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Abstract. The present paper provides issues concerning post-traumatic stress disorder (PTSD) of patients suffering from it. The issues to which we refer are related to a model of cognitive and behavioural therapy and its stages. The studied specialty literature reveals that such a model includes a multilateral therapy dedicated to the various aspects of the clinical syndrome associated with PTSD. Some of these aspects are connected with the model components such as: training of anxiety management skills, exposure, “homework assignments”, training of social abilities. The model includes information about the management of the consequences of trauma, how to improve communication with other people and how to communicate in an assertive manner.

Keywords: cognitive and behavioural therapy, post-traumatic stress disorder, model.

Introduction

Generally, the specialty literature related to a series of domains defines trauma as something very unpleasant. Some of these fields may be medical or psychological one. So, trauma means “a very difficult or unpleasant experience that causes someone to have mental or emotional problems usually for a long time or a serious injury to a person’s body” (Merriam-Webster Dictionaries, n.d.). These injuries can be found in living tissues, “caused by an extrinsic agent, a disordered psychic or behavioural state resulting from severe mental or emotional stress or physical injury; an emotional upset as the personal trauma of an executive who is not living up to his own expectations (Posttraumatic Stress Disorder, n.d.)”. Treating post-traumatic states requires not simple, but combined therapeutic approaches (medical and psychological ones). In the psychological approach, psychotherapy is recommended. Psychotherapy (a type of counselling) addresses the emotional response to mental illness. It is a process in which trained mental health professionals help people by talking through strategies for understanding and dealing with their disorder.

It is well known that, in the case of the paper theme, Posttraumatic Stress Disorder, “many of us have witnessed or experienced a serious illness, an accident, a personal assault, or other traumatic events. With time, the grief typically passes, the pain lessens, and life eventually gets back to normal. Most people recover from traumatic events, but some experience severe distress, anxiety, and depression for months or even years” (Posttraumatic Stress Disorder, n.d.). PTSD is considered a serious illness, potentially debilitating the condition of someone when it occurs. This might be such a life-threatening event as accident, a terrorist attack, someone’s beloved death, a natural disaster, etc. In these situations, cognitive behavioural therapy is considered an appropriate approach.

Cognitive-behavioural therapy is a particular type of psychotherapy in which the person learns to recognize and change thought patterns and behaviours that lead to troublesome feelings.

The opinion of Hassett and Gevirtz (2009) mainstreams cognitive behavioural therapy assuming that changing maladaptive thought leads to change in affect and behaviour. Nowadays, applied variants of this therapy “emphasize changes in one’s relationship to maladaptive thinking rather than changes in thinking itself” (Hayes et al., 2011).

Topic addressed

After identifying the behaviours that need changing, whether they are in excess or deficit, the model of therapy can be applied.

A model of cognitive and behavioural therapy with multiple components is adequate for most people with PTSD. Find below the structure of a model of cognitive and behavioural therapy (Fig. 1).
Fig. 1. Cognitive and behavioural therapy model

Such a model includes a multilateral therapy dedicated to the various aspects of the clinical syndrome associated with PTSD, for instance the emotional and physiological reactivity to certain situations or actions which are trauma reminders, intrusive symptoms and avoidance behaviour, deteriorated social skills and emotion modulation (anger management). The program unifies the psychosocial therapeutic approach to PTSD with the most empirical support (therapy through exposure), with a component of exerting social skills and anxiety management.

The primary stage of cognitive and behavioural therapy model is Education.

All patients are provided with general data on chronic PTSD, including its frequently encountered modalities of manifestation, diagnosis-related issues, comorbidity with other anxiety or Axis I-related disorders, aetiology and a summary of current therapy strategies. In addition, this stage is important to guarantee that patients develop not only a realistic understanding of the therapy prognosis, but also a positive expectancy regarding the efficacy of behavioural therapy. Ultimately, this stage is used to educate patients with regard to the therapy they are about to receive and to what is expected from them with reference to their participation in the therapy program. This component can be efficiently conducted in 1-8 sessions.

The stages of the therapy are:

1. Training of anxiety management skills. Its purpose is to teach patients to control their anxiety and stress levels, including panic attacks. A structural program for exercising anxiety management skills, administered in a group format, may be focused on a set of both specific and general anxiety-related symptoms, which are often experienced by trauma victims. This may include control of generalized anxiety, panic attacks and compulsive behaviours. In this manner, the exercise of anxiety management skills can serve to multiple functions and is likely to be effectively conducted in 3-10 sessions. The programs for supplementing therapy through exposure with the exercise of anxiety management skills were successfully conducted on other populations of trauma victims and may include elements of practicing relaxation, breathing and panic control techniques. Equipping patients with anxiety management skills firstly helps them to tolerate exposure sessions in a much more efficient manner.

2. Exposure. It is shown that exposure addresses efficiently the unique characteristics of the structure of fear, the characteristics of each individual allowing a reduction in the general anxiety, physiological reactivity and intrusive symptoms. Essentially, patients should be exposed to the stimuli causing anxiety or fear (linked to trauma) in a prolonged manner until there is a reduction of fear or anxiety (until habit or extinction is obtained) during the sessions. Repeated contact with the fear-generating stimulus accelerates the habituation process and, with sufficient associations, the stimulus will lose its ability to trigger the fear response (habit). Typically, most people with PTSD avoid fear-triggering stimuli and this helps the increase in the fear response. Therefore, the purpose of exposure is to provide an extended contact with the stimuli that trigger the fear with a sufficient
duration for habit to occur during sessions (a reduction by 50% in the reactivity during the session). Repeated association for a number of days is also important and will expedite the habituation process. Data suggest that such a component can be effectively realized in 4-15 sessions.

3. **“Homework assignments”**. The “homework assignment” component (or “scheduled practice”) can be applied once several sessions of exposure have been successfully conducted and it represents a form of exposure which does not require the therapist’s presence. Exposure topics should be carefully planned so that the patients could obtain satisfactory results, although an intense stress is applied to them. The therapist should not be discouraged by the patient’s opposition to imagine such topics on his/her own. With careful planning and supportive encouragement, individuals should be able to fulfill such assignments. The exposure topics, as well as exposure sessions, should be specifically directed towards each patient’s individual model of fear; also, they should also provide the most comprehensive experience possible. In order to have maximum efficacy, the patient should take part in the planning of topics and in establishing when and where such experiences are to occur. Thus, we cannot make a specific list of such assignments, because they should be developed on a case-by-case basis as are also the individual scenes of therapy by exposure. However, the instances of adequate exercises focused on the traumatizing fears include sessions of self-exposure in one’s imagination conducted at home, which may serve as a first step towards in vivo activities, such as watching movies, discussing with other victims of traumas or with the loved ones about traumatic experiences, etc. Also, we should imagine experiences requiring the patient to engage in other activities of which he/she is afraid and which may interfere with the quality of life. The instances of adequate activities include social events (parties, meals served with friends), shopping, going to the movies, restaurant dinners, etc.

4. **Training of social abilities**. Its purpose is to form abilities which are absolutely necessary for effective social interactions and which can lead to a feeling of satisfaction. Although the persons who are victims of traumas may significantly differ from each other as far as basic social skills are concerned, in most cases there is room for improvement. A structured training program for social abilities, administered within a group format, can be directed to the category of PTSD symptoms that seem to resist to the methods of exposure, i.e. social anxiety, social withdrawal and alienation, excessive anger and hostility, explosive outbursts, marriage or familial conflict. The training of social abilities can be effectively picked up in 6-15 sessions. The training of social abilities envisages the training, modelling, behavioural repetition or “role plays”, feedback and strengthening. After each session, patients are given homework assignments in order to allow the subsequent exercise and strengthening the newly acquired abilities.

The training of social abilities includes the following elements:

- **Awareness of one’s social environment** establishes the nuances related to when, how and why social interactions should be initiated. This includes the verbal and non-verbal mechanisms of successful social reunions, including the identification of adequate conversation topics, specific exercises meant to enhance the skills related to attention and listening, as well as the effective changes in topics.

- **Stimulating social abilities** aims at forming the skills of initiating and maintaining friendships, skills adequate for telephone conversations and assertive communication. The purpose of this component is to help patients to learn those abilities which are necessary for them to involve in new and diversified social activities in order to enhance their social repertoire and the possibility that social interactions could become inherently more satisfying.

- **Anger management** targets the control of anger and of intense emotions. It should be dedicated to reducing temperamental outbursts and the problematic manifestation of anger. Specifically, this component should help by providing to patients a range of strategies to express their anger, solve their problems, improve their emotional modulation, and to communicate with other people in an assertive manner, so that physical and verbal violence should not continue to disturb their social relationships.

The management of the consequences of trauma teaches them how to improve their communication with other people with regard to trauma, so as to enhance the others’ understanding. Patients should be taught how to communicate in an assertive manner when they are unable or unwilling to discuss with other people about certain topics or events. In addition, they must also be taught to identify and oppose to the models of negative or dichotomist thought (the belief to not trust anyone else), which limits the quality of their lives by reducing their involvement in relationships with other people. Ultimately, this element should include information about how to avoid being victims of traumas in the future (advice regarding personal safety).
Conclusion

Persons developing the PTSD symptoms should not expect 1-4 months of intense cognitive-behavioural therapy to “heal” all the issues. Such a therapy should rather be regarded as a method to help patients master and control their symptoms, taking account of them; the long-term follow-up is expected to be necessary for most people with PTSD.

References


AN UNBREAKABLE RECORD

Corina IVAN

Abstract. Long jump has been one of the pentathlon disciplines since the beginning of the first Olympic Games in ancient Greece. As a matter of fact, it is known as the only competitive event in itself, the other events being initially practiced as forms of combat training. Men’s event has been part of modern Olympics since their beginning and, during its evolution, went through long stagnation periods (1901-1921, 1935-1960 and 1968-1991), a spectacular leap - from 8.35m (1967) to 8.90m (1968), and the most disputed contest in the history of athletics (1991). This paper presents the world record progression for men’s long jump, gives details about the way in which successful performances have been achieved and raised questions about its permanence in the current context, where there is (at least) one athlete who has the appropriate body size, speed and talent.

Keywords: record; long jump; progression

Introduction

In constant change at all levels, world athletics has accustomed us throughout the years with new performances. On the list of overall world records, there is a discipline that raises many questions: men’s long jump. This year marks 25 years since Mike Powell has been holding the world record in long jump. The previous one belonged, for 23 years, to Bob Beamon, and even before, it was Jesse Owens’ jump that also lasted 25 years. The longevity of performances intrigued the specialists of those times, who searched for explanations, found justifications, but an aura of mystery was created around each of them. In 1991, quietness enveloped this technical athletic event, the world record or its proximity becoming a forbidden territory for several decades after Mike Powell’s flight of 8.95m.

Stage of knowledge

In 1935, the American sprinter Jesse Owens improved the world record in a single jump, becoming at the same time the first athlete to go beyond the 8m limit. Competing in Ann Arbor (Michigan), a city located at 256m above sea level, he won in a single day 4 athletic events and set or tied as many world records. Because of the very large number of competitors, the events were running so quickly that sometimes, after finishing a race whose result was still unknown to him, Owens had to rush towards another corner of the stadium to line up for starting another event (Wikipedia, 2016). His way of achieving outstanding records has led the specialists to consider Owens a Michelangelo of athletics, who cannot be surpassed any longer.

Carl Lewis himself won 4 events in 1984, in Los Angeles, and Michael Phelps won 8 gold medals at the Beijing Olympics, in 2008, but this happened during a few days, while Owens had less than one hour (45 minutes) available, practically succeeding to set a world record every 11 minutes (Greatest 45 minutes ever in sports, 2013).

Coming back to the long jump, Owens’ performance (8.13m) was achieved on a grass track, in the first and only attempt available to him, because there were other 25 competitors, and 10 minutes later, he had to compete in the 200-yard race.

The 1968 Summer Olympics of Mexico City can be considered a milestone in the history of athletics through the numerous world records, which were also possible due to the positive effects of altitude (not less than five athletes set five records in the triple jump). Taking the year 1968 as a reference point, progression has been made in all events, better times or longer throws and jumps being periodically recorded (Cochennec, 2011).

Some examples: the world record in men’s triple jump improved 7 times shifting from 17.39 to 18.29m, in 3000m steeplechase - 17 times, in man’s shot put - 12 times. Over a period of only 20 years, starting with the World Championships of Tokyo, in 1991, the 100m record dropped 10 times.

However, absolutely surprising, the best world performance in men’s long jump was surpassed only once in 43 years, while in women’s event, this happened 13 times.

More exactly, from the famous Bob Beamon’s 8.90m in Mexico City, the record was broken only in 1991, at the Tokyo World Championships, where, during an unbelievable competition, Mike Powell jumped 8.95m, depriving Carl Lewis from the title he deserved more, perhaps. Beamon’s record survived 23 years. That of Powell will celebrate soon 25 years (2016). It is remarkable that, from Jesse Owens’ 8.13m, in 1935, only 4 athletes hold the world record in long jump: the American Ralph Boston, the Soviet Igor Ter-Ovanesian, and the Americans Bob Beamon and Mike Powell (Cochennec, 2011) (Table 1).
Table 1. World records for men’s long jump since 1931

<table>
<thead>
<tr>
<th>Result</th>
<th>Wind</th>
<th>Athlete</th>
<th>Venue</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.98 m</td>
<td>0.5</td>
<td>Chuhei Nambu</td>
<td>Tokyo</td>
<td>1931</td>
</tr>
<tr>
<td>8.13 m</td>
<td>1.5</td>
<td>Jesse Owens</td>
<td>Ann Arbor</td>
<td>1935</td>
</tr>
<tr>
<td>8.21 m</td>
<td>0.0</td>
<td>Ralph Boston</td>
<td>Walnut</td>
<td>1960</td>
</tr>
<tr>
<td>8.24 m</td>
<td>1.8</td>
<td>Ralph Boston</td>
<td>Modesto</td>
<td>1961</td>
</tr>
<tr>
<td>8.28 m</td>
<td>1.2</td>
<td>Ralph Boston</td>
<td>Moscow</td>
<td>1961</td>
</tr>
<tr>
<td>8.31 m</td>
<td>-0.1</td>
<td>Igor Ter-Ovanessian</td>
<td>Erevan</td>
<td>1962</td>
</tr>
<tr>
<td>8.31 m</td>
<td>0.0</td>
<td>Ralph Boston</td>
<td>Kingston</td>
<td>1964</td>
</tr>
<tr>
<td>8.34 m</td>
<td>1.0</td>
<td>Ralph Boston</td>
<td>Los Angeles</td>
<td>1964</td>
</tr>
<tr>
<td>8.35 m</td>
<td>0.0</td>
<td>Ralph Boston</td>
<td>Modesto</td>
<td>1965</td>
</tr>
<tr>
<td>8.35 m</td>
<td>0.0</td>
<td>Igor Ter-Ovanessian</td>
<td>Mexico City</td>
<td>1967</td>
</tr>
<tr>
<td>8.90 m</td>
<td>2.0</td>
<td>Bob Beamon</td>
<td>Mexico City</td>
<td>1968</td>
</tr>
<tr>
<td>8.95 m</td>
<td>0.3</td>
<td>Mike Powell</td>
<td>Tokyo</td>
<td>1991</td>
</tr>
</tbody>
</table>

The two world records of 1968 and 1991 are absolutely fabulous. In Mexico City, not only did Beamon beat the record of Ter-Ovanessian, but he ruined it through an extra distance deemed enormous for horizontal jumps: 55 centimetres. With that attempt, he also improved his personal record, not by 5 or 7 cm, but 57 cm, shifting from 8.33m to 8.90m, due to the effects of both altitude (Mexico is at 2250m above sea level) and wind, which was on the borderline of Regulations, namely 2m per second.

The world record progression for men’s long jump is shown in Figure 1.

In an atmosphere suffocated by humidity and electricity, the two advantages correlated with a perfect threshold, allowing him to add the 55 cm. But Bob Beamon has never jumped again over 8.20m in his entire career, which deepens even more the mystery of his wonderful performance.

The Tokyo competition has remained in the collective memory as the most beautiful one ever, due to the three world records: 100m, 4x100m (men), but especially the duel through which it was set the best performance in the world for men’s long jump.

Five days earlier, Carl Lewis had beaten the 100m world record in 9’86 and had qualified for the final with the best jump ever succeeded in the heats, 8.56m. At that moment, he had not lost for 10 years, having 65 consecutive victories in long jump, and he seemed to be the only one capable to surpass Bob Beamon, even if Mike Powell was among the other competitors qualified for the final.

Mike Powell was an unknown jumper. Always in the shadow of Carl, he had managed to win a silver medal at the Seoul Olympics of 1988 and had jumped, in the trials for the Tokyo World Championships, 1 cm less than Lewis. However, Powell was famous especially for his high percentage of unsuccessful jumps, and a victory over Lewis seemed impossible.
Being on the start list after Powell, Lewis was successful with an exceptional 8.68 m, the best world performance of the year, while Mike Powell opened the competition with a modest 7.85m jump. After the second jumping round, Powell goes to second position with 8.58m, while Lewis fails. In the third attempt, Powell reaches 8.29m, while Lewis, aided by the wind, jumps 8.83m, a distance that could have brought him the victory.

Powell is successful in another attempt (the fourth), estimated to 8.80m. Lewis responds with an even better jump, 8.91m, 1 cm above Beamon’s record considered unbeatable by then, but the anemometre refuses to approve it as a record, because of an aiding wind of 2.9 m/s.

In the fifth jumping round, Powell manages a valid jump, which catapults him directly into history, with a back wind of 0.3 m/s, within the authorized limits. The distance of 8.95m is the new world record, which will last long time from then on, because, despite of the last two exceptional attempts, Lewis is not able to surpass Powell. He jumps 8.87m with a head wind, a new personal record, and his last attempt measures 8.84 m.

Carl Lewis achieved the best series of jumps in the history. In addition, his jumps are still rated as the best 3rd and 5th performances ever, and the three are the best performances at sea level. After 1991, none of them managed any longer to jump over 8.70m, and the event went through an obvious decline.

However, we should not forget about Ivan Pedroso, the Cuban who had 4 years of domination in this event and recorded an implausible 8.96. His unapproved jump dates back to 1995 and was performed in Sestriere, at an altitude of 2000m, in questionable organizational conditions, hence its invalidation. Interestingly, but Carl Lewis refused to jump at altitude, because he wanted to break Beamon’s record in indisputable conditions.

Two years after the fabulous 100m record of Usain Bolt, in 2011, Powell declares that this one can be his successor: he is the fastest man on the planet and young enough to try. Besides, for exceptional results, speed and height are needed, and Bolt has both of them.

Years ago, Tom Tellez, the coach of Carl Lewis, gave a one-hour speech whose topic was the Training of long jumpers; he spoke 55 minutes about the approach run and only 5 minutes about the flight technique. When asked why he had allotted so little time to the technique, his answer was short and pertinent: there is no podium jump without good approach run.

Approach run speed is responsible for 90% of the jump length, while the technique contributes to it with a fraction. That is why great jumpers are very good sprinters. Therefore, the essence of an excellent jump is given by the speed reached and the threshold power. If speed increases, the length of the jump will do the same thing, even if the take-off angle is not optimal (Edward & Wallace, 1998).

For Powell, the speed on the last part of run-up was 10.9 m/s compared to 11.2 m/s for Lewis (Cochennec, 2011), and the take-off angle was 33°. Average speed for Bolt is 12 m/s, and if he kept the same take-off angle, he could land much beyond the 9m line, provided that he knows sufficiently the jumping mechanism, which is improving his flight and landing techniques.

Unfortunately for Bolt, who already has three world records (100m: 9.58, 200m: 19.19 and 4×100m Jamaican relay: 37.10), the perspective of becoming the first man to exceed 9m was not sufficiently motivating and he did not want to change the discipline, although Powell offered to train him. A possible explanation could be the uncertainty that his foot was strong enough to support the take-off.

This year, 2016, Bolt will turn 30 years old, and it is quite unlikely for him to resist in the confrontation with his younger compatriots in races requiring pure speed. Time is more indulgent with endurance athletes, and Bolt should have turned to another event: if not the long jump, then the 400m race, a combination of speed and endurance. Most specialists believe that he is talented enough not only to make a successful transition, but also to break the world record which stands for 17 years.

But the great athlete has repeatedly stated that he delays making a decision until after the Rio Games, because both events require hard work, and he (as himself has declared) is a little bit... lazy. It remains to be seen if he has prepared a surprise for us or not. Anyway, between Bolt and the title of best athlete of all time, there is an extra 200 metres or... a threshold.

Instead of conclusions

The issues presented suggest a strong linear connection between sprinting speed and long jump, the former conditioning the result of the latter. Technically speaking, record progression in the long jump event has had an unpredictable evolution. There were long years of stagnation and moments when valuable leaps occurred. Nowadays, the 8.95m line seems insuperable. However, specialists in this event and former world record holders believe that training in the current modern conditions can produce a jump exceeding 9m.

The best qualified to meet this goal is also the one who aspires to the title of most valuable athlete of all time, Usain Bolt. The kinematic model (Foster, 2010) purposely created for him, taking into account his height and
speed in ideal conditions, has indicated 10.50m. The addition of 1.5m is massive and hard to accept today; but on the other hand, nobody believed that the 100m race would ever be completed in less than 9.6 seconds.

References
OPTIMIZING THE SPECIAL FORCES FIGHTERS’ PHYSICAL TRAINING

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Abstract. The national defence system is characterized by coordinated operations against various types of attacks with the purpose of a rapid and total neutralization or elimination of the criminals, right after or even before they succeed to use violence. This paper is not, from several perspectives, a pioneering work, yet it has the advantage of a pertinent argumentation based on rigorous management logics and is intended as an effort complementing all the other scientific approaches that have been made so far in the direction of the aspects related to more efficient physical training in special intervention units. Starting from the principle according to which there is always, objectively, at least one adequate solution better than another, capable to achieve the purpose established at its best, the theory regarding a more efficient effort has also been implemented in this field of activity, as it is intended to obtain maximum efficiency with minimum effort. With our scientific approach, we shall try to point out how the special forces fighters’ physical training can be optimized in the field of formative requirements entailed by the specificity and constraints of the personnel meant for special missions, the means borrowed from the two fields, also the use of a rowing ergometer in order to improve endurance, having also the possibility to improve the educational contents with higher values in the professional and social shaping.

Keywords: Special Forces, physical training, rowing ergometer.

Introduction

Based on the analysis of experts’ opinions, we may consider that, in the field of public order and national security, more efficiency would mean obtaining the most favourable situation/balance between the effort made during training and the results obtained during missions. Endurance in the effort made to accomplish missions depends on the level of psychomotor skills (strength, endurance, speed, coordination, resilience), which “are present in the achievement of any motor act performed by the human being” (Rață & Rață, 2006: 11). Actually, at the same time with the development of the criminal phenomenon taking up violent forms, the management of all activities meant to counteract this phenomenon has been permanently related to the term of “efficient”. This is naturally associated with the specific actions for a successful mission, and this also entails the need to approach, harmonize and improve, within an adequate pattern, all the ideal, practical and theoretical means focused on solving the encountered situations, bearing also in mind the individual or group particularities of the combatants.

Without thorough knowledge of the typology, the degree of strain specific for a certain profession, the human qualities required in the circumstances of a real mission, planning, organizing and carrying out an efficient activity would be impossible. Irrespective of the progress made in the fields of technology, equipment and armament, the experts believe that the human being is the mission, and the mission is the human being, necessarily present at all times in the dispute, in both camps, with all of his physical, psychological, moral and willingness qualities. “The selection for Special Forces is carried out since school years, before the recruitment in the military service” (Radu, 2006: 52), but also among professional athletes. “The candidate, in order to be accepted in the Special Forces, must undergo the selection stage focused on physical training and endurance in conditions of non-sleeping, intense exhaustion, as all these aspects are extremely important in shaping up and developing specialists who are in charge with the protection and safety of the humans and State” (Radu, 2006: 53). According to Order 154 of March 3rd 2004, the training of Special Forces fighters is based on athletics, gymnastics and sports games. General physical training approaches all three basic motor qualities required within the physical training tests, namely: speed, strength and endurance.

The activity related to the defence of peaceful population and foods requires the fighters “to be endowed with a fast adjustment capacity, accurate and quick actions and reactions, spirit of sacrifice, and a permanent exposure to uncertainties and risk factors. In this context, one can consider that stress may influence differently the fighters’ behaviour, with effects conditioned by the level of training and their individuality” (Nățu, 2013: 61).

The Special Forces fighters’ training, represented by a “system of measures, means, methods that endure the development of morphological indicators, functional capacity, specific motor qualities” (Teodorescu, 2009: 48), can be carried out in different ways. By using a rowing ergometer, one can render more efficient the training process, which may lead to an increased human potential. Physical training, which is an important part of the Special Forces fighters’ activity, must ensure the development of each individual’s ability qualities and provide them a level of development that would allow them to fully display their technical and tactical qualities, according to requirements (Neagu, 2012: 47).
Material and methods

In achieving this study, we have started from the hypothesis according to which the use of a rowing ergometer in the physical training of Special Forces fighters triggers an improvement of effort capacity.

The study conducted between June 1st 2014 - February 30th 2015 focused on accomplishing the following tasks: identification of the techniques and means to practice with a rowing ergometer; establishing the working sample - control group and experiment group; selecting the tests for the initial and final evaluations; establishing how to collect the data; establishing the testing stages; drafting and applying the intervention program; recording and analysing the data; drawing the conclusions. The research included a number of 40 subjects aged 36 to 43 years, working at the Guard and Protection Service.

The subjects were randomly grouped in two working groups: control group, which underwent a standard physical training program, according to the existing methodology; experiment group, in the case of which the standard program was added an extra program using the rowing ergometer. The study was applied over 9 months, in Bucharest.

The research methods used were established according to the research objectives, as follows: bibliographical study/documentation method; testing; statistical and mathematical method; graphical representation; data analysis and interpretation.

The physical training process is generally seen as both an aerobic and anaerobic training. Aerobic and anaerobic effort capacity can be improved using appropriate physical training techniques. For the experimental group, we chose, as a novelty element, the rowing ergometer, both as a working and evaluation tool. The ergometer tests are relevant only with regards to strength and effort capacity. For this purpose, we tested the subjects timing the time frame necessary for a distance of 2,000 m. We have chosen the ergometer bearing in mind that this type of instrument develops both the upper and lower parts of the body, and endurance as well.

The key-elements that were followed and surveyed during the ergometer training were: the movement of the entire strike to be fluid; a pace rate of 24-30 strikes per minute; the grasp must be light and comfortable at joint level; long time effort, but not with high intensity. Table 1 includes and describes shortly the exercises performed on the rowing ergometer.

<table>
<thead>
<tr>
<th>Exercise aiming at</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant movement pace</td>
<td>- 20 to 40 minutes at a pace that would hardly allow entertaining a conversation with a partner</td>
</tr>
<tr>
<td>Interval-based pace</td>
<td>- 3 to 5 sets of 300 to 500 m each, at fast pace, with 2 minutes of break between sets;</td>
</tr>
<tr>
<td>Fartlek method pace</td>
<td>- alternating 1 minute hard to 1 minute light, for 20 minutes;</td>
</tr>
<tr>
<td>Light pace on a determined length</td>
<td>- 6000 m light pace;</td>
</tr>
<tr>
<td>Alert pace achieved by an evaluation test</td>
<td>- 2000 m record-setting pace</td>
</tr>
<tr>
<td>Pyramid method pace</td>
<td>- 1 minute hard, 1 minute break, 3 minutes hard, 2 minutes break;</td>
</tr>
<tr>
<td></td>
<td>- 5 minutes hard, 3 minutes break, 7 minutes hard, 5 minutes break;</td>
</tr>
<tr>
<td></td>
<td>- 5 minutes hard, 3 minutes break, 3 minutes hard, 2 minutes break;1 minute hard</td>
</tr>
</tbody>
</table>

Generally, in determining the kcal/hour relation, we have oriented according to the following concept:

- the pace to go 500 m in 4 minutes would be light/low intensity training;
- the pace to go 500 m in 2 minutes would be high intensity training.

These values are equivalent to 385 and 972 kcal/hour for an individual weighing 70 kilos (Deuster, 1997).

Results

The effort capacity assessment with the ergometer for a 2000 m distance pointed out different aspects for each group.

For the control group, we noticed an improved training time by 2 seconds (about 0.5%), from 7 minutes and 5 seconds in the initial testing to 7 minutes and 3 seconds in the final testing (Table 2).
The extreme results in this test vary from 6 minutes and 33 seconds to 7 minutes and 38 seconds in the initial testing, and from 6 minutes and 24 seconds to 7 minutes and 38 seconds in the final testing. In both tests, the data dispersion around the average is homogenous.

The values of Wilcoxon non-parametric test (Table 3) show that the differences between the two tests are statistically significant, $z = -3.967$, $p < 0.001 < 0.05$. The effect size indicator (0.63) shows a high difference towards an extremely high difference between the two tests. Thus, one can reject the null hypothesis according to which the decrease in the average effort capacity with the ergometer for 2000 m is significant.

Graphical representation of the results corresponding to the two tests in the control group is shown in Figure 1.

Table 3. Results for Wilcoxon test - 2000 m ergometer - Control group

<table>
<thead>
<tr>
<th>Ranks testing difference (Final-Initial)</th>
<th>N</th>
<th>Average ranks</th>
<th>Rank sum</th>
<th>Test parameters</th>
<th>Result</th>
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</thead>
<tbody>
<tr>
<td>Negative</td>
<td>20</td>
<td>10.50</td>
<td>210.00</td>
<td>Z</td>
<td>-3.967</td>
</tr>
<tr>
<td>Positive</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>P (2-tailed)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Equal</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>Effect size</td>
<td>0.63</td>
</tr>
</tbody>
</table>

Fig. 1. Graphical representation of the results corresponding to the two tests in the control group, 2000 m, ergometer

In the experiment group, we noticed an improved training time by 9 seconds (about 2%) on average, from 7 minutes and 7 seconds in the initial testing to 6 minutes and 58 seconds in the final testing (Table 4).

Table 4. Results for effort capacity assessment indicators evaluated using an ergometer, 2000 m - Experiment group

<table>
<thead>
<tr>
<th>TESTING</th>
<th>Average</th>
<th>Difference in average</th>
<th>Middle</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Variation quotient</th>
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<tbody>
<tr>
<td>Initial</td>
<td>07:07</td>
<td>-(00:09)</td>
<td>07:13</td>
<td>00:17</td>
<td>06:35</td>
<td>07:33</td>
<td>00:58</td>
<td>4.1%</td>
</tr>
<tr>
<td>Final</td>
<td>06:58</td>
<td>-2.0%</td>
<td>07:06</td>
<td>00:19</td>
<td>06:24</td>
<td>07:25</td>
<td>01:01</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

The results in this test vary from 6 minutes and 35 seconds to 7 minutes and 38 seconds in the initial testing and from 6 minutes and 24 seconds to 7 minutes and 25 seconds in the final testing. In both tests, the data dispersion around the average is homogenous (Table 4).
Table 5. Results for Wilcoxon test - 2000 m ergometer - Experiment group

<table>
<thead>
<tr>
<th>Ranks testing difference (Final-Initial)</th>
<th>N</th>
<th>Average ranks</th>
<th>Rank sum</th>
<th>Test parameters</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>20</td>
<td>10.50</td>
<td>210.00</td>
<td>Z</td>
<td>-3.925</td>
</tr>
<tr>
<td>Positive</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>P (2-tailed)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Equal</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>Effect size</td>
<td>0.62</td>
</tr>
</tbody>
</table>

According to Wilcoxon non-parametric test (Table 5), the difference reached the level of statistical significance, $z = -3.925$, $p < 0.001 < 0.05$. The effect size indicator (0.62) shows a high difference towards an extremely high difference between the two tests. Thus, one can reject the null hypothesis according to which the decrease in the average effort capacity with the ergometer for 2000 m is significant.

Graphical representation of the results corresponding to the two tests in the experiment group is shown in Figure 2.

Fig. 2. Graphical representation of the results corresponding to the two tests in the experiment group, 2000 m, ergometer

The comparative analysis of the progress reported in the case of the two groups points out that the average time for the effort test - Ergometer 2000 m - has improved more in the experiment group than in the control group by 5 seconds (1.4%), the averages being in the final evaluation 6 minutes and 58 seconds for the experiment group, and 7 minutes and 3 seconds for the control group (Table 6).

Table 6. Values of the assessment indicators in the 2000 m ergometer tests, in the final evaluation (control group and experiment group)

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Average</th>
<th>Difference in average</th>
<th>Middle</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Variation quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>07:03</td>
<td>-00:05</td>
<td>07:04</td>
<td>00:22</td>
<td>06:24</td>
<td>07:38</td>
<td>01:14</td>
<td>5.4%</td>
</tr>
<tr>
<td>Experiment</td>
<td>06:58</td>
<td>-1.4%</td>
<td>07:06</td>
<td>00:19</td>
<td>06:24</td>
<td>07:25</td>
<td>01:01</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

The values of the results vary in the final evaluation from 6 minutes and 24 seconds to 7 minutes and 38 seconds in the control group, and from 6 minutes and 24 seconds to 7 minutes and 25 seconds in the experiment group. In both tests, the data dispersion around the average is homogenous (Table 6).

Table 7. Mann-Whitney U Test - Ergometer, 2000 m - Control group and experiment group

<table>
<thead>
<tr>
<th>Ergometer 2000 m</th>
<th>GROUP</th>
<th>N</th>
<th>Average ranks</th>
<th>Rank sum</th>
<th>Test parameters</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>20</td>
<td>16.75</td>
<td>335.00</td>
<td></td>
<td>Mann-Whitney U</td>
<td>125.00</td>
</tr>
<tr>
<td>Experiment</td>
<td>20</td>
<td>24.25</td>
<td>485.00</td>
<td></td>
<td>Z</td>
<td>-2.086</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td>P (2-tailed)</td>
<td>0.037</td>
</tr>
</tbody>
</table>

Effect size 0.33
According to Mann-Whitney U non-parametric test (Table 7), in the final tests, there are statistically significant differences between the two groups, $z = -2.086$, $p = 0.037 < 0.05$. The effect size indicator (0.33) shows there is an average towards high difference between the two groups. Thus, one can reject the null hypothesis and accept the research hypothesis according to which the difference between the two groups in this test is significant. Graphical representation of the results corresponding to the two groups is shown in Figure 3.

![Graphical representation of the results](image.png)

Fig. 3. Values of the effect size indicator on the ergometer, 2000 m test - Control group and experiment group

**Conclusions**

The analysis of the results following the experiment that we have initiated, points out the following aspects:

- the average time in the effort test - Ergometer 2000 m - for the experiment group is better than for the control group by 5 seconds (-1.4%), the averages being, in the final evaluation, equal to 6 minutes and 58 seconds in the experiment group, and 7 minutes and 3 seconds in the control group;
- according to Mann-Whitney U non-parametric test, in the final tests, there are statistically significant differences between the two groups. The effect size indicator (0.33) shows an average difference towards high between the two groups;
- the improvement of effort capacity of the Special Forces fighters is an objective that requires the identification of new training possibilities;
- the hypothesis according to which the use of a rowing ergometer in the physical training of Special Forces fighters entails an improvement of effort capacity has been confirmed, and this aspect highlights the necessity and possibility to optimize their training level.

**References**


SPECIALIZATIONS AND INSTITUTIONS OF THE HIGHER EDUCATION OF PHYSICAL EDUCATION AND SPORTS AFTER 1989

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Abstract. The history of higher education of physical education and sports started in 1923 with the establishment of the National Institute of Physical Education in Bucharest. During the communist regime, despite political constraints, higher education of physical education and sports experienced an important development, through the emergence, in several newly established university centers, of physical education and sports specializations. The year 1989 brought the fall of communism and a new beginning for profile higher education. We tried to capture the most significant changes after 1989, focusing our attention on the diversification of physical education and sports specializations and the multiplication of university centers that organized such specializations, but also on other issues, such as the accreditation of new specializations, the development of private higher education and others.

Keywords: higher education, accreditation, specialization, institutions, physical education and sports

Introduction

The year 1989 and the fall of the communist regime have brought many changes to Romania in practically all fields of activity, as it was the case of the higher education of physical education and sports (PES). With a tradition rooted as far as 1923, the higher education of PES went, in the communist regime, through a period of political constraints negatively affecting the educational process, but it was also a time of development as regards, for example, the number of enlisted students, the capability to attract foreign students and the development of institutions to organize higher education of PES. In this article, we shall try to present the changes that took place in the higher education of PES after 1989, the point of a new beginning. How the higher education of PES was organized after 1989? What were the main fields of development, new specializations and new institutions? What were the changes that the private higher education brought to the higher education? We shall try to answer this question and to focus on the development of specializations and institutions of higher education of PES, but also on some related aspects in the new context. The sources utilized in this attempt are legislative acts, some of them comprising important lists of specializations and institutions (1995-2013), and official information from the university web pages, as the development of higher education after 1989 as a whole, not only for PES, is a poorly researched subject. The article is divided in two parts: one for the general aspects of the development of higher education of PES after 1989, and the other with a focus on specializations and the institutions were they could be studied.

Evolution of specializations and institutions of PES

Before presenting the situation after 1989, it is important to know that, during the communist period, the most important institution for the higher education of PES was the Institute of Physical Education and Sports from Bucharest. Starting with 1960, many faculties of physical education and sports began to appear in different higher education centers, mainly in order to train school physical education teachers. Apart from the physical education and sports specialization providing long- or short-term studies, there was no other possibility to study, until the mid-1970s, when this type of higher education changed its duration to three years, an additional year of study for further specialization. From the end of 1970, another important fact in the higher education of PES was that it started to attract many foreign students (Constantin & Maier, 2014), while the overall difficulties of the Romanian economy were affecting slowly also this domain of activity.

After 1989, the higher education of PES brought a new beginning: new specializations and new corresponding institutions emerged, but the change of the regime also brought some new issues as the private higher education appeared, developed and started to compete with the old public education institutions, but not always in a highly qualitative environment. To counteract this problem, an accreditation process was established for all higher education institutions, which will be presented in the following paragraphs.

The bases for the functioning of higher education were grounded on Government Decisions (HG) in the first years after 1989 (HG 521, 1990; HG 461, 1991; HG 345, 1992; HG 283, 1993; HG 426, 1994; HG 686, 1994; HG 796, 1994), but the list of specializations from the Romanian post-communist higher education appeared in 1993 (HG 283, 1996). For the higher education of PES, the following specializations were mentioned: sport mastery (3
years of study, on study completion the graduates receiving the title of Trainer), physical education and sports (4 years of study, the title of Bachelor of physical education) and kinetotherapy (4 years of study, the title of Bachelor of medical physical education), all three integrated into the profile of specialization, physical education and sports (HG 283, 1993).

Also in 1993, through the adoption of Law (Legea) no. 88, the process of accreditation was established in the higher education system. From then on, new institutions of higher education were to be founded by Government Decision, and subsequently they all entered into a process of accreditation that basically involved two phases: provisional functioning authorization (with the right to organize admission) and accreditation (with the possibility to organize the diploma exam followed by the issuance of a corresponding diploma). Accreditation had to be completed no later than two years after the first class.

As a consequence, in 1995, the Law no. 71 established that the graduates of 1994 and 1995 from private institutions of higher education could take the diploma exam only after passing a selection exam consisting of five written examinations set by the Ministry of Education.

Also in 1995, the Education Law no. 84 came into force, stating that education could be organized by the State, but it could also be financed by companies and, among other things, that higher education institutions had the right to guaranteed academic autonomy and that political propaganda was prohibited in the educational system. Regarding higher education, it could be achieved through different types of education, short- or long-term, full time, evening or extramural studies. Referring only to private higher education, it must be noted that the Act of 1995 reaffirms the principles set out in 1993.

The Ministry of Education, later functioning under other names (HG 690, 1997; HG 23, 2001; HG 51, 2009; HG 81, 2010), established in 1995 the specializations in higher education and the institutions where they could be studied, including PES: three long-term specializations lasting 4 years in full-time education or 5 years in extramural education (physical education - leading to the Bachelor of physical education, physical education and sports management - Bachelor of physical education, kinetotherapy - Bachelor of kinetotherapy) and a specialization for short-term education with a duration of 3 years of study, sport mastery - granting the title of Trainer (HG 488, 1995; HG 1071, 1995; HG 568, 1995; HG 225, 1996; HG 1371, 1996; HG 294, 1997; HG 472, 1997; HG 301, 1998; HG 442, 1998; HG 535, 1999; HG 645, 2000; HG 696, 2000; HG 1215, 2000).

Also in PES, another specialization included was military physical education and sports, full-time and extramural education, with corresponding 4 and 5 years of study. This specialization was included with the establishment of the Faculty of Military Physical Education at the Institute of Physical Education and Sports Bucharest, in 1991 (later under the names of National Academy of Physical Education and Sports and National University of Physical Education and Sports), with the purpose to offer special military education and to organize postgraduate education. With its special status, the faculty was subordinated to the Ministry of National Defense and the Ministry of Education and Science (HG 317, 1991). In 2003, the faculty was abolished, after earlier in 2001, the corresponding specialization ceased to exist (HG 1336, 2001; HG 1220, 2003).

Another worthy mention is that for a brief period, between 1997 and 2000, in the profile of psycho-pedagogy, which became social psycho-pedagogy in 1998, a specialization was dedicated for school teachers of physical education, specialization widespread in several institutions of higher education in the country, but only authorized to operate on a provisional basis (HG 1027, 2001). A similar existence was shared by physical education and sports management specialization (HG 294, 1997; HG 696, 2000; HG 1215, 2000).

In 1997, in addition to the six PES specializations (physical education, kinetotherapy, sport mastery, physical education and sports management, school physical education teachers, military physical education), it was added one short-term education: physical culture and eurhythm, in the profile of social psycho-pedagogy, studied under temporary authorization only at “Waldorf” College in Bucharest until 2004 (HG 472, 1997; HG 896, 2004). Therefore, we can conclude that the period from 1997 to 2000 had the most specializations in the higher education of PES (7).

In 2000, the higher education specializations and fields of study were established for both public and private institutions. The PES specializations were grouped first in physical culture (2000, 2001) and later under a category with the name of physical education and sports, until 2004, and another change was in 2001, when the sports mastery specialization was renamed sport and acrobatic mastery (HG 999, 2000; HG 1213, 2000; HG 1370, 2000; HG 1370, 2000; HG 174, 2001; HG 1336, 2001; HG 410, 2002; HG 682, 2003; HG 693, 2003; HG 1082, 2003; HG 896, 2004; HG 940, 2004, HG 1609, 2004).

In 2004, after the organization of higher education studies in three cycles, Bachelor, Master and PhD studies (Law no. 288, 2004), corresponding to an educational system known as Bologna (with many other changes, like the introduction of credits needed to pass a year of study - 60 credits per academic year).
In 2005, in the fundamental field of science, art and culture called physical culture and sports, and under the field for the undergraduate studies of physical education and sports, the following specializations were included: physical education and sports, sports and motor performance, kinetotherapy and special motor activities (HG 88, 2005; HG 916, 2005). After completing any of these three specializations, there was the possibility to obtain the title of Bachelor of physical education and sports (HG 890, 2008).

In 2006, the domain of physical culture and sport was renamed physical education and sports, the field of undergraduate studies keeping its original name and composition, in terms of specializations (HG 1175, 2006; HG 676, 2007; HG 981, 2007; HG 635, 2008; HG 922, 2008; HG 749, 2009; HG 943, 2009; HG 1093, 2009).

Regarding the structural or name changes in PES, we need to mention some of them as important examples. First, the National Academy of Physical Education and Sports of Bucharest, the most important institution for PES, changed its name to National University of Physical Education and Sports of Bucharest (UNEFS) in 2009 (HG 1093, 2009), and small changes appeared through the introduction of new specializations and the multiplication of centers where some corresponding specializations were already functioning (physical education and sports in French at UNEFS - 2010, and sport and physical education and kinetotherapy and special motor activities in Hungarian - 2011, and also sports and motor performance in Hungarian - 2012, all three at “Babeș-Bolyai” University from Cluj-Napoca), especially in different private universities; changes of the names of faculties (Faculty of Physical Education and Sport was renamed Faculty of Physical Education and Mountain Sports at the “Transilvania” University from Brașov - 2010; Faculty of Physical Education and Sport at “Constantin Brâncuși” University from Târgu Jiu was renamed Faculty of Nursing and Dental Technology, Art and Physical Culture, in order to include, since 2010, the corresponding specializations, in addition to physical education and sports and kinetotherapy and special motor activities). Also, in some institutions, the physical education specialization first functioned integrated into a different type of faculty at the beginning of 1990, and later was promoted to the status of faculty of PES. In other centers, contrary measures were taken, from reducing the structure related to PES to merging faculties or even ceasing the PES existence, while some specializations got accredited after a period of existing under the provisional authorization status (HG 631, 2010; HG 87, 2011; HG 966, 2011; HG 84, 2012; HG 707, 2012; HG 69, 2013; HG 493, 2013; HG 730, 2013).

In 2011, in the main ranking field of Social sciences, it was included the branch of science Psychology and behavioral sciences, and the ranking field of Physical education and sports, the academic studies of PhD/Master Sciences of Human Motricity, and two undergraduate studies, Physical education and sports and Kinetotherapy, the former comprising two specializations, Physical education and sports and Sports and motor performance, and the latter, the specialization Kinetotherapy and special motor activities (HG 707, 2012).

Two years later, for physical education and sports, it was established a new main field of ranking and a new branch of science named Sports science and Physical education, while the field ranking Physical education and sports was renamed Sports science and Physical education. Another renaming was carried for academic studies of PhD/Master Sciences of human motricity called now Sports science and Physical education. Regarding the undergraduate studies, its two branches were kept: Physical education and sports and Kinetotherapy, and the same three specializations (from the seven of the previous period): Physical education and sports, Sports and motor performance, Kinetotherapy and special motor activities (HG 493, 2013).

In the following paragraphs, after carefully assembling a table (not shown in this article) for 1995-2013, we shall detail each PES specialization and the corresponding institution(s) that provides/provided them.

1) **Physical culture and eurhythmy:** “Waldorf” College for School Teachers Bucharest.
2) **School physical education teachers:** “Vasile Alecsandri” University Bacău, “Babeș-Bolyai” University Cluj-Napoca, “Ovidius” University Constanța, University of Craiova, “Dunărea de Jos” University Galați, University of Pitești (also of Câmpulung Muscel), West University Timișoara (also in Deva), “Spiru Haret” University Bucharest (also in Blaj), “Vasile Goldiș” West University Arad (also in Sighetu Marmăției), “Ștefan cel Mare” University Suceava, “Decebal” Romanian Foundation for Youth Băile Herculane, “Petre Andrei” University Iași, University of Bucharest (only in Crevedia).
3) **Physical education and sports management:** University of Craiova, “Dunărea de Jos” University Galați, University of Pitești, University of Oradea, “Lucian Blaga” University Sibiu, “Spiru Haret” University Bucharest, “Bogdan-Vodă” University Cluj-Napoca (only in Baia Mare).
4) **Military physical education:** National University of Physical Education and Sports Bucharest.


10) Kinetotherapy and special motor activities in Hungarian language: “Babeș-Bolyai” University Cluj-Napoca.


For the above list, comprising 11 specializations and many higher education institutions, some important mentions need to be made. First of all, we can clearly see that the most popular PES specializations were physical education, kinetotherapy and sport mastery, being studied in many higher education institutions. Not all of these institutions were authorized to have these specializations for the whole period after 1989. Some institutions had the right even only for brief periods, two or three years (for example, at “Jiul de Sus” University Târgu Jiu, the physical education specialization functioned only in 2000 and 2001, the same for kinetotherapy at “Tibiscus” University Timișoara), and some institutions, mostly private higher education institutions were closed for different reasons. We also have to sort the institutions of higher education were PES specializations functioned and to give some examples of each: first, there were specialized institutions (National University of Physical Education and Sports Bucharest, University Foundation for Kinetotherapy Oradea), then the “classical” universities (“Alexandru Ioan Cuza” University Iași, University of Craiova), private institutions (“Spiru Haret” University Bucharest, Ecological University of Bucharest) or public institutions, as well as institutions with many specializations (“Babeș-Bolyai” University Cluj-Napoca, West University Timișoara) or with only one.

Most of the specializations involved full time studies, only physical education, military physical education, sport mastery and physical education and sports management had extramural studies at some institutions and often for a short period. Since 2005, for all PES specializations, the study duration has been reduced to 3 years, according to the Bologna educational system. The mentioned specializations could be accredited or could have the right to function only for a brief period, a situation that varied from one institution to another. For example, at the University of Pitești, kinetotherapy had a provisional authorization between 2000 and 2004, and was accredited in 2005. As for the study language of PES specializations, most of them were in Romanian with three exceptions: physical education (Hungarian and French), kinetotherapy and special motor activities (Hungarian) and sports and motor performance (Hungarian).

We also have to observe the variety of cities that hosted at one time a PES specialization: 29. Not all of these cities were higher education centers (Crevedia, Blaj, Sighetu Marmătci and others). Higher education in some of
these cities was developed with the support of another institution: for school physical education teachers in Crevedia, with the help of the University of Bucharest, for physical education and sports mastery in Bistrița, with the help of “Babeș-Bolyai” University Cluj-Napoca. In some cities, the competition for attracting freshmen was fierce as in Bucharest, Cluj-Napoca, Timișoara or Iași, meaning the most important higher education centers, and was the result not only of a diversified number of functioning specializations, but also of a variety of institutions, from private to public ones. Some institutions tried to create some advantages whether based on the existing offer (the choice to study PES in a different language than Romanian can be satisfied only at the National University of Physical Education and Sports Bucharest and “Babeș-Bolyai” University Cluj-Napoca; or the case of physical culture and eurhythm, a specialization that functioned only at “Waldorf” College for School Teachers Bucharest, between 1997-2004), or on the tradition of the higher education center in general (Bucharest, Iași, Cluj-Napoca), or especially on the tradition of the institution (National University of Physical Education and Sports Bucharest for all specializations, University of Oradea for kinetotherapy). Of course, other interesting aspects of the development of specializations and institutions of physical education and sports after 1989 can and need to be researched. For example, we leave the problem of competition between higher education institutions to be soon researched in another article, where we shall use a statistical approach, from tuition numbers to the number of enlisted students and graduates, a further research that could surely support a step forward in the research on the development of higher education of PES after 1989.

**Conclusions**

Higher education for physical education and sports undertook many transformations after 1989: from those needed in order to function in a new political regime (from communism to democracy) to those complying with the European Union standards. The process of accreditation and other legislative acts ensured an increase in the quality of educational activities, for studying in a new environment where students could attend private or public institutions, specializations accredited or with a provisional authorization. This was very important since the Government did have to ensure the well-being of the whole educational system encompassed by public and private institutions. Above all, the needs of students were not easily reconciled with the offer of higher education institutions and with job offers, especially in a domain as physical education and sports, more closely related to artistic higher education in this respect (an issue to be researched in a different article). The State is still one of the most important employers for the graduates of physical education and sports. In the previous pages, we saw important changes in the study duration according to Bologna Process, in the types of physical education and sports specializations that could be studied for a brief period or which have survived and are still studied, the emergence of new specializations and institutions, some with studies in a foreign language (but with no specialization in English yet, most of them being in Hungarian, which can be interpreted again as satisfying the domestic needs, and not as a measure to attract foreign students and enrich the ways for attracting freshmen to study in Romania, in order to be “fully” competitive); another important issue is the variety of cities where one could study in a physical education and sports specialization and the larger number of higher education institutions offering this possibility, some starting to gain prestige. The competition between institutions can be clearly seen for some specializations like physical education, kinetotherapy and sports mastery. Further research can detail other important aspects of the development of higher education of physical education and sports.

**Acknowledgments**

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HG nr. 1371 din 3 decembrie 1996 acordarea autorizației de funcționare provizorie, în conformitate cu prevederile Legii nr. 88/1993 de învățământ superior și recunoașterea diplomelor.

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HG nr. 301 din 5 iunie 1998 privind profilurile, specializările, durata studiilor, precum și titlurile obținute de absolvenții învățământului universitar, cursuri de zi.


HG nr. 535 din 1 iulie 1999 privind autorizarea de funcționare provizorie sau acreditarea specializărilor din cadrul instituțiilor de învățământ superior de stat și particular.

HG nr. 645 din 4 august 2000 privind profilurile, specializările, durata studiilor, precum și titlurile obținute de absolvenții învățământului universitar, cursuri de zi.


HG nr. 317 din 27 aprilie 1991 privind înființarea și organizarea Facultății Militare de Educație Fizică.

HG nr. 1336 din 27 decembrie 2000 privind domeniile și specializările de referința din învățământul universitar.

HG nr. 999 din 26 octombrie 2000 privind Nomenclatorul domeniilor și al specializărilor universitare de lungă durată din cadrul instituțiilor de învățământ superior de stat și particular.


HG nr. 23 din 4 ianuarie 2001 privind organizarea și funcționarea Ministerului Educației și Cercetării.


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HG nr. 635 din 11 iunie 2008 privind structurile instituțiilor de învățământ superior și specializările/programele de studii universitare de licență acreditate sau autorizate să funcționeze provizoriu organizate de aceasta.


HG nr. 749 din 24 iunie 2009 pentru aprobarea Nomenclatorului domeniilor, a structurilor instituțiilor de învățământ superior și a specializărilor/programele de studii universitare de licență acreditate sau autorizate să funcționeze provizoriu organizate de aceasta.


HG nr. 51 din 29 ianuarie 2009 privind organizarea și funcționarea Ministerului Educației, Cercetării și Inovării.

HG nr. 81 din 5 februarie 2010 privind organizarea și funcționarea Ministerului Educației, Cercetării, Tineretului și Sportului.

HG nr. 631 din 30 iunie 2010 privind modificarea și completarea Hotărârii Guvernului nr. 749/2009 pentru aprobarea Nomenclatorului domeniilor, a structurilor instituțiilor de învățământ superior și a specializărilor/programele de studii universitare de licență acreditate sau autorizate să funcționeze provizoriu organizate de aceasta.

HG nr. 87 din 2 februarie 2011 privind modificarea și completarea HG nr. 749/2009 pentru aprobarea Nomenclatorului domeniilor, a structurilor instituțiilor de învățământ superior și a specializărilor/programele de studii universitare de licență acreditate sau autorizate să funcționeze provizoriu organizate de aceasta.

HG nr. 966 din 29 septembrie 2011 pentru aprobarea Nomenclatorului domeniilor și al specializărilor/programele de studii universitare, a structurii instituțiilor de învățământ superior, a domeniilor și programelor de studii universitare acreditate sau autorizate să funcționeze provizoriu, a locațiilor geografice de desfășurare, a numărului de credite de studii transferabile pentru fiecare program de studii universitar, formă de învățământ sau limbă de predare, precum și a numărului maxim de studenți care pot fi școlarizați.

HG nr. 84 din 14 februarie 2012 pentru modificarea anexei nr. 3 la HG nr. 536/2011 privind organizarea și funcționarea Ministerului Educației, Cercetării, Tineretului și Sportului și pentru modificarea anexei nr. 2 la HG nr. 966/2011.

HG nr. 707 din 18 iulie 2012 pentru aprobarea Nomenclatorului domeniilor și al specializărilor/programele de studii universitare, a structurii instituțiilor de învățământ superior, a domeniilor și programelor de studii universitare acreditate sau autorizate să funcționeze provizoriu, a locațiilor geografice de desfășurare, a numărului de credite de studii transferabile
pentru fiecare program de studii universitare, formă de învățământ și limbă de predare, precum și a numărului maxim de studenți care pot fi școlarizați în anul universitar 2012-2013.

HG nr. 493 din 17 iulie 2013 privind aprobarea Nomenclatorului domeniilor și al specializărilor/programelor de studii universitare, a structurii instituțiilor de învățământ superior, a domeniilor și programelor de studii universitare acreditate sau autorizate să funcționeze provizoriu, a locațiilor geografice de desfășurare, a numărului de credite de studii transferabile pentru fiecare program de studii universitare, formă de învățământ și limbă de predare, precum și a numărului maxim de studenți care pot fi școlarizați în anul universitar 2013-2014.

HG nr. 730 din 25 septembrie 2013 pentru modificarea și completarea HG nr. 493/2013 privind aprobarea Nomenclatorului domeniilor și al specializărilor/programelor de studii universitare, a structurii instituțiilor de învățământ superior, a domeniilor și programelor de studii universitare acreditate sau autorizate să funcționeze provizoriu, a locațiilor geografice de desfășurare, a numărului de credite de studii transferabile pentru fiecare program de studii universitare, formă de învățământ și limbă de predare, precum și a numărului maxim de studenți care pot fi școlarizați în anul universitar 2013-2014.

Legea nr. 71 din 5 iulie 1993 privind dreptul absolventilor învățământului particular liceal, postliceal și superior de a susține examenul de finalizare a studiilor la unități și instituții similare din învățământul de stat.

Legea nr. 88 din 17 decembrie 1993 privind acreditarea instituțiilor de învățământ superior și recunoașterea diplomelor. (Detaliile procesului de acreditare nu fac obiectul acestei lucrări, dar trebuie menționat faptul că în anul 1999 legea care reglementa acest proces a fost republicată cu unele modificări în Monitorul Oficial).

Legea nr. 84 din 24 iulie 1995. Legea învățământului.

Legea nr. 144 din 27 iulie 1999 pentru modificarea și completarea Legii nr. 88/1993 privind acreditarea instituțiilor de învățământ superior și recunoașterea diplomelor.

Legea nr. 288 din 24 iunie 2004 privind organizarea studiilor universitare.
STUDY ON THE FREQUENCY OF FIGHTING SYSTEM TECHNIQUES IN JU-JITSU

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**Abstract.** Given that ju-jitsu is no longer just a traditional martial art, but a modern sport, competition becomes the primary means of verifying athletes. One of the competitive systems attracting more and more athletes is the fighting system, where, although the Regulations suppose many technical restrictions, selecting the most effective techniques is the trump of victory in battle. Thus, we believe that a study on the frequency of fighting techniques in the international system can help future orientation in training athletes. After a careful analysis, it appears that the most used techniques are gyaku-tsuki, yoko-geri, throwing techniques with the upper limbs and hip, as well as immobilization techniques.

**Keywords:** ju-jitsu, fighting, martial arts, frequency, technique.

**Introduction**

Given that mankind is in constant change, traditional ju-jitsu and martial arts are developing another side that attracts many followers worldwide. This new emphasis is called competitive ju-jitsu, organized by the Ju-Jitsu International Federation (IJJF). It was created in 1977, and currently consists of four competitive systems: duo demonstration system, duo show system, newaza system and fighting system. Any sport relies on technique, which is a system of dynamic structures specific to each sports branch, conducted rationally and efficiently in order to achieve maximum output in competitions.

The fighting system in IJJF holds the status of “semi contact fight”, seeking to obtain a fight with complex technical implications, namely: techniques of striking from a distance or proximity, grappling techniques, takedown techniques, ground fighting techniques. Martial arts techniques are called “waza” and represent the practical application of kata for defence, and same for attack (Frederick, 1993: 293). Currently, all competitive techniques represent specific propelling actions executed ideally, in terms of their effectiveness (Deliu, 2000: 90). The rigor of Regulations requires a jujitsuka to possess perfect technique, combined with exceptional psycho-physical preparation.

Taking into consideration this emphasis, according to Regulations, participation in a sports competition involves the following dynamics (Henrik et al., 2014: 6):

- **Part One:** striking techniques using the upper limbs and lower limbs from standing positions in combat, targeted on well-defined areas of the body;
- **Part Two:** throwing and grappling techniques, preceded by a mandatory striking technique, whereupon it is exhibited the skill to knock one’s opponent to the ground;
- **Part Three:** ground fighting techniques, where one seeks to immobilize the opponent for a certain period of time or to execute a technique forcing abandonment (joint locks or chokeholds).

Each part of the competition has certain technical features: the first one is quite restrictive, thus forcing competitors to master higher level striking techniques; the second one allows competitors to use a vast selection of techniques showing their ability to impose themselves through throwing techniques using arms, legs, hips and sacrifice techniques; in the third part, various technical possibilities are available: the fight can focus on both restraining methods, as well as joint locks and/or chokeholds.

The technical content is vast and complex, and we consider it appropriate to analyse the competitive system mainly because the results of our athletes are relatively unsatisfactory in competitions. Thus, we propose a systematization of the techniques allowed by Regulations in this competitive system (Figure 1) and an analysis of the techniques applied at the highest level in junior competitions.
Materials and methods

This research falls under the category of oriented fundamental research, with the possibility to promote the results in applied research and especially training practice. Analysing the specialty literature, one can notice that no study on this competitive system exists. Therefore, we consider that an analysis of the technical panel for the competition is useful.

The research hypothesis was based on the idea that the techniques frequently used in top-level competitions, according to the requirements of competition, are different from one category to another and according to gender.

The purpose of this research is to determine how frequently the main striking techniques are used and find out which technical group is the most used in the second and third part of the fight. The main objective of the study is to emphasize the technical system used in fighting in international competitions.

Since the number of athletes participating in competitive events was very large, we selected for analysis the first and the last weight class and one middle class. Thus, we examined 85 matches of male fighting (19 competitions from 56 kg category, 19 matches under 94 kg category and 47 matches under 77 kg category). As for the women fighting, we examined 40 matches and their distribution was the following: in the 49 kg category, we analysed 17 matches, 17 matches for 62 kg, and for +70 kg, because of the reduced number of female competitors, we analysed only 6 matches. These matches were played at the 2013 Junior Ju-Jitsu World Championship held from 20 to 24 November in Bucharest.

It should be noted that the purpose of this study is to highlight the motor skill means in high level competitions, and the presentation of male and female categories in a pooled manner has theoretical purposes. The observational method was the main instrument, alongside with data recording and analysis, statistical processing and graphical methods. Video analysis of the matches was necessary because the fight speed made impossible a correct accounting during the combat. The entire study answers the following questions:

1. What is the most used striking technique in both male and female fighters worldwide?
2. What technical group is most used in the second part of the fight for male and female?
3. What is the percentage of technical actions used in the third part (on the ground)?

Results

Following a careful video analysis of weight categories, we counted the following results (Table 1):
Table 1. Results for the fighting techniques/procedures used in the international system

<table>
<thead>
<tr>
<th>Technique</th>
<th>First part – male fighting</th>
<th>Second part – female fighting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-56 kg</td>
<td>-77 kg</td>
</tr>
<tr>
<td></td>
<td>Nb. %</td>
<td>Nb. %</td>
</tr>
<tr>
<td>Gyaku tsuki (Reverse punch)</td>
<td>244</td>
<td></td>
</tr>
<tr>
<td>Haito uchi (Ridge hand)</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>Ura-ken (Backfist)</td>
<td>89</td>
<td></td>
</tr>
<tr>
<td>Mae geri (Front kick)</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Yoko geri (Side kick)</td>
<td>109</td>
<td></td>
</tr>
<tr>
<td>Mawashi geri (Spin kick)</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>Ura mawashi (Hook kick)</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Ashi--waza (Foot throwing techniques)</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>Koshi waza (Hip throwing techniques)</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Kata-te-waza (Throwing techniques using upper limbs)</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Sutemi waza (Sacrifice technique)</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Osae waza (Pinning techniques)</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>Kansetsu waza (Joint lock techniques)</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Shime waza (Chokehold technique)</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td><strong>252</strong></td>
<td><strong>616</strong></td>
</tr>
</tbody>
</table>

Second and third parts – male

<table>
<thead>
<tr>
<th>Technique</th>
<th>61</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashi--waza (Foot throwing techniques)</td>
<td>17</td>
<td>6.7</td>
</tr>
<tr>
<td>Koshi waza (Hip throwing techniques)</td>
<td>12</td>
<td>4.7</td>
</tr>
<tr>
<td>Kata-te-waza (Throwing techniques using upper limbs)</td>
<td>23</td>
<td>9.1</td>
</tr>
<tr>
<td>Sutemi waza (Sacrifice technique)</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Osae waza (Pinning techniques)</td>
<td>27</td>
<td>10.7</td>
</tr>
<tr>
<td>Kansetsu waza (Joint lock techniques)</td>
<td>7</td>
<td>2.7</td>
</tr>
<tr>
<td>Shime waza (Chokehold technique)</td>
<td>4</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Second and third parts – female

<table>
<thead>
<tr>
<th>Technique</th>
<th>54</th>
<th>6.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashi--waza (Foot throwing techniques)</td>
<td>17</td>
<td>6.7</td>
</tr>
<tr>
<td>Koshi waza (Hip throwing techniques)</td>
<td>12</td>
<td>4.7</td>
</tr>
<tr>
<td>Kata-te-waza (Throwing techniques using upper limbs)</td>
<td>23</td>
<td>9.1</td>
</tr>
<tr>
<td>Sutemi waza (Sacrifice technique)</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Osae waza (Pinning techniques)</td>
<td>27</td>
<td>10.7</td>
</tr>
<tr>
<td>Kansetsu waza (Joint lock techniques)</td>
<td>7</td>
<td>2.7</td>
</tr>
<tr>
<td>Shime waza (Chokehold technique)</td>
<td>4</td>
<td>1.5</td>
</tr>
</tbody>
</table>
Graphical representation of techniques in the international fighting system is showed in Chart 1 for male and Chart 2 for female fighting system.

### Chart 1. Percentage of techniques in the international male fighting system

- **Gyaku tsuki**: 21%
- **Haito uchi**: 12%
- **Ura ken**: 2%
- **Koshinage**: 3%
- **Mawashi geri**: 9%
- **Yoko geri**: 10%
- **Mae geri**: 6%
- **Osae waza**: 8%
- **Kansetsu waza**: 3%
- **Shime waza**: 2%
- **Others**: 2%
- **Ashi waza**: 5%
- **Kata**: 6%
- **Kata-te**: 3%
- **Koshi-waza**: 3%
- **Others**: 2%
- **Ura mawashi**: 2%

### Chart 2. Percentage of techniques in the international female fighting system

- **Gyaku tsuki**: 24%
- **Haito uchi**: 16%
- **Ura ken**: 2%
- **Koshinage**: 4%
- **Mawashi geri**: 9%
- **Yoko geri**: 10%
- **Mae geri**: 7%
- **Osae waza**: 9%
- **Kansetsu waza**: 1%
- **Shime waza**: 1%
- **Others**: 1%
- **Ashi waza**: 6%
- **Kata**: 4%
- **Kata-te**: 3%
- **Koshi-waza**: 4%
- **Others**: 1%
- **Ura mawashi**: 2%

**Discussion**

Analysing the international fighting system for both male and female, it can be seen that the most common arm punch, regardless of the weight, is gyaku-tsuki with a total of 13%, followed by haito uchi with 9%, and with a quite low percentage, only 3%, uraken uchi. Regarding the hitting technique with the legs, the most used technique in small and medium weight classes is represented by yoko geri with a share of 10%, followed by mawashi geri with 9%, and in the heavy categories, the main techniques used are mae geri and mawashi geri with a rate of 7%.
The fighting style is rather similar, and the differences in technique are given by the morphological and motor qualities of the athletes.

In the second and third parts of the fight, we observed a tendency towards certain techniques. Regarding the throwing techniques using arms, which represent a total of 4%, the most commonly used techniques are morote gari and seoi nage (with its variants); for the throwing techniques using legs (performed in a share of 6%), the most common ones are: o soto gari/o soto otoshi, o uchi gari and ashi mochi. Using the hip throwing techniques, which represent 4%, the most used are goshi guruma and harai goshi. In the third part of the fight, the highest percentage, of 9%, is given by the immobilisation technique and the most common procedures are mune gatame and kesa gatame, followed by „ship immobilisation” (or bârcuţa, in Romanian). In terms of abandonment techniques, totalling only 1%, the most used one is juji gatame and the chokehold technique with a share of 1%, realized according to actual situations during fighting, and there is no a certain technique preferred by the athletes.

From the beginning, we can highlight a difference between the fighting styles of all weight categories. The second and third parts of the fight are determined by the athletes’ way of fighting and are managed by the referee, who can influence the time given to each part, depending on the athletes’ actions. Inevitably, in all weight categories, fight continues in the third part and is materialized by a large number of immobilisations, a total of 9% of the combat.

We believe that this study can provide essential information for the coaches that guide the athletes’ training and help increase their performance. Summarizing, the techniques used by males in the first part of the fight, ordered by frequency, are: gyaku tsuki 21%, haito uchi 12%, yoko geri 10%, mae geri 6%, mawashi geri 9%, uraken uchi 8%, ura mawashi 2%, and others (oi tsuki, ushiro geri etc.) 2%. In the second and third parts, since it is impossible to analyse the techniques independently, we looked for the technical groups. Thus, in the second part, the order is as follows: kata te waza (throwing technique using arms) 6%, followed by ashi waza (throwing technique using lower limbs) 5%, koshi waza (takedown technique using hip) 3%, and sutemi waza (sacrifice technique) only 3%. In the last part, the most used is osae waza (ground immobilisation technique) 8%, followed by kansetsu waza (joint techniques) 3% and shime waza (chokehold technique) 2%.

Looking at the female fighting system, in the order of frequency, the techniques are: gyaku-tsuki 24%, haito-uchi 16 %, mawashi-geri 10%, yoko-geri 9%, mae-geri 7%, uraken-uchi 3%, ura-mawashi 2%, and a few others (oi-tsuki, ushiro-geri etc.) only 1%. In the second part of the fighting system, the status is the following: ashi-waza (throwdown technique using lower limbs) with 7%, followed closely by kata-te-waza (throwdown technique using upper limbs) with 4%, koshi-waza (throwdown technique using hip) also with 4% and sutemi-waza (throwdown technique by sacrifice). In the third part of the fighting system, osae-waza (immobilisation technique) with 9%, kansetsu-waza (joint technique) with 1% and shime-waza (strangulation technique) also with 1% are used by the fighters.

After a careful analysis of the technical content from the two categories, both male and female, we can observe that, in the first part of the fight, the only difference between the mentioned categories is the frequency of mawashi-geri, more precisely 9% in male fighters and 10% in female fighters. In the second part of the fight, the most used technical group in male fighting is kata-te-waza (6%) and ashi-waza (6%) in female fighting. In the last part of the fight, both categories act relatively the same.

Conclusions

After finishing this analysis, we can address the 3 questions that have motivated and influenced it:

1. What is the most used striking technique in both male and female fighters worldwide?
   R: The most used striking technique is gyaku-tsukim, with a percentage of 24% in female fighters and 21% in male fighters.

2. What technical group is most used in the second part of the fight for male and female?
   R: In the second part of the fight, nage-kata-te-waza is the most frequent technical group used by male fighters, standing at 6%, and nage-ashi-waza, used by female fighters, standing at 7%.

3. What is the percentage of technical actions used in the third part (on the ground)?
   R: In the third part of the fight, the results are the following: female fighting consists of 9% immobilisation techniques, 1% kansetsu-waza and 1% shime-waza; male fighting consists of 8% osae-waza, 3% kansetsu-waza and 2% shime-waza.

Therefore, by looking at the results of the study, we can draw a few conclusions:

• There is a necessity to both master the technical side of the fight in order to counterattack gyaky-tsuki and execute gyaku-tsuki perfectly using diverse combinations;
• Fighters must use a fighting strategy in the first part of the fight, so that they can stop the opponent’s strikes.
• It is necessary for the fighter to practice counterattack techniques against shoulder and arm techniques, especially in male fighting.
• Counterattack techniques must be practiced by female fighters especially in order to react to throwdown techniques using lower limbs.
• Implementation of a specific set of techniques regarding the third part of the fight is necessary in order to obtain the 3 points. Also kansetsu-waza and shime-waza must be treated similarly.

The hypothesis that the technical percentage used in high level competitions conditioned by competitive requirements is different from one category to another and from males to females is validated, since there are differences between them.

The development of this study regarding the frequency of technical actions nationwide is necessary and can help organize the process of training.

References
STIMULATION OF TRIPLE EXTENSION TONE AND ORTHOSTATIC BALANCE IN THE CHILD WITH CEREBRAL PALSY THROUGH EXERCISES SPECIFIC TO MEDEK METHOD

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Abstract. Regaining the stand position and also gait in the case of children with cerebral palsy in spastic form has become a really topical issue, considering that early re-education and advancements of surgical treatments (especially the minimally invasive one, as miofibrotomy) and pharmaceutical treatments have begun to offer substantial benefits regarding the increase in their quality of life. The hypothesis from which we started in the development of this research was that the systematic practice of MEDEK-type exercises (specific to the stage when locomotion and orthostatic balance reaction should occur), twice a day, for 45 minutes, individualized for each patient – age, neuromotor development, momentary availabilities, etc., significantly accelerates the appearance of two reactions – trunk and lower limb extension and orthostatic balance, even if the child has not shown before visible trends to manifest them. The research was conducted in the period 2014-2015, within the polyclinic S.C. Rosana Medical S.R.L, on two groups of children (7 in each group) aged between 2-4 years. The first group was applied the kinetic methods specific to neuromotor development stages (Bobath method), and the second group, exercises specific to MEDEK method. The research conclusions demonstrate the beneficial effect of exercises from Medek method on the rapid gain in orthostatic balance, as a result of good coordination between extensor muscle groups.

Keywords: orthostatic position, cerebral palsy, neuromotor development.

Introduction

MEDEK method originates in Chile, its founder being the physical therapist Ramon Cuevas. Meanwhile, the method was renamed Cuevas Medek Exercises, but the term Medek is the most common at the moment (Pászai, 2004: 229). This term represents the abbreviation of the phrase that can be translated into “dynamic method of motion stimulation” (Cuevas Medek Exercises, n.d.).

The purpose of this method is to allow children with motor development disorders of neurological cause to develop automatic motor reactions which they would not be able to develop on their own, because of neurological injuries. Ramon Cuevas, while developing his method, started from the postulate that, even if the child’s brain is damaged, it can grow and progress forming other neuronal connections, which is nothing else but the neuroplasticity process. The first aspect supporting this method is represented by gravity and also the brain’s ability to stabilize the body in the space. Thus, gravity is the first stimulus in the activation of neuromuscular system. Furthermore, the basic idea is to bring the brain in the situation of creating a postural control response, “surrounding” the damaged cerebral areas by new neuronal connections. This can be done by (Cuevas, 2011: 45):

- exposing the child to “progressive challenges”, when he must fight gravity to avoid falling. This progressive balance acquisition allows the child to learn vertical control of the head and body (CME - Cuevas Medek Exercises, n.d.);
- an insignificant or no support from the therapist;
- practicing all the time through a sustained effort, because the brain registers the movements.

This method completely differs from traditional approaches in two aspects (Cuevas, 2011: 46-47):

- MEDEK method includes integrated dynamic stretches into functional exercises. Effectiveness is without doubt better than Bobath static stretches;
- hypertonicity of lower extremities does not avert from the stimulation of orthostatic position. In other words, MEDEK method challenges orthostatic position to develop vertical control of the body.

The limits of these methods are given by the child’s height and weight, because the therapist must have a very solid body and a significant muscular mass.

Hypothesis. If children with cerebral palsy (in spastic form), who do not show the trunk muscle and lower limb extension and orthostatic balance reactions specific to the age when they should occur, are applied MEDEK therapy three times a week, twice a day, for 45 minutes per session, then these reactions will appear.
Materials and methods

The research was conducted within the polyclinic S.C. Rosana Medical S.R.L, in the period March 2014 - February 2015, on two groups of children aged between 2 and 4 years, suffering from cerebral palsy in spastic form. Each group was made up of 7 children, one for control and one for experiment. Progress was monitored every three months. As regards the level of muscular spasticity, we took into consideration the homogeneity of the two groups. For this, it was used the evaluation of muscular group spasticity according to the model described by Le Métayer (1999). This way, joint angles were evaluated through passive mobilization, firstly with slow speed and then with fast speed. After each passive (slow and fast) mobilization, we noted down the angle dimensions. Measurements were applied to muscular groups of lower limbs, mostly affected in cerebral palsy: triceps surae, hip adductors, ischiotibial muscles. Depending on those values, we selected the children and inserted them into the two groups.

The frequency of recovery sessions was 3 sessions/week, and the duration of a session was 45 minutes. Patient evaluation was made at the beginning and the end of the treatment, monitoring the following parameters: appearance of the body and lower limb extension and orthostatic balance reaction. Extreme grades, responsible for estimating progress, were the complete absence, respectively the total presence of the two followed-up reactions. Their quantification was made creating a scale with values from 0 to 4 for both the triple extension and orthostatic balance reaction.

Implementation of experimental design

1. Control group

This group was applied standard kinetic programs consisting of stretching, passive mobilizations, Bobath therapy.

2. Experiment group

For the children who, in terms of chronological age, were in the period when they should have adopted an orthostatic position, but they have not, we applied the following procedure: supporting the patient in balance at the leg level and with slight posterior support. Then, once kept in the air for few seconds, we made slight up and down oscillations. This way, we reflexively induced an increase in tone of the body extensors, but also of the lower limbs. Always from the same position, gait movements were imitated and also a lokomat. At the beginning, due to poor coordination between muscle groups, the child tended to go outside the support base and therefore we had to “run” following his center of gravity. The action is similar to the one when we try to maintain balance of a cane in the palm and we have to move our hands according to the cane’s oscillation until we manage to regain balance.

The materials we used were three wooden boxes with the same dimensions (20cm x 40cm x 60cm), a bigger box, a wooden plate and two planks with the same dimensions (17cm x 80cm).

Boxes, together with the planks, were combined in different ways creating either a slide or a piano flap or a stair.

Once the child is able to stay in his feet supported by the hip, respectively the legs, using the boxes allows the therapist and parents all biomechanical functional possibilities in order to stimulate integrated stability reactions in orthostatic position and during gait. This type of reactions was used especially when the child managed to sustain his body while being supported at the ankle joint level. Through them, we offered the child different sensations from stand position and also a walking guidance. Materials had a substantial contribution to stimulate walking, because the child thought they were attractive.

Results

From the first sessions (approximately 8-10), we noticed a significant improvement of orthostatic postural tone (Fig. 2) and balance (Fig. 4) among the children being part of the group who was applied exercises specific to MEDEK method. We did not observe the same thing in the control group who was applied Bobath method, accompanied by classical exercises (Fig. 1 and Fig. 3). At the entire study timeframe, there were also periods “on the scene”, when we did not have any visible progress with the experiment group. As far as it regards the control group, the progress was visibly slower.

To have a unitary record of the progress evolution, we expressed it in percentages, in relation to the manifestation level in the motor plane considered for that phase. We highlighted the obtained results in the following charts:
For the body and lower limb extension parameter, we started from an average of 0.42, corresponding to a percentage of ~12.5%, and we reached an average of 1.577, corresponding to a progress rate of ~38%. At the initial evaluation, the limits were 0 and 1, describing the degree of absence, respectively presence of the reaction at the extension of body and lower limbs. At the final evaluation, the limits were 1 and 2.

For the body and lower limb extension parameter, we started from an average of 0.42, corresponding to a percentage of ~12.5%, and we reached an average of 3.28, corresponding to a progress rate of ~75%. At the initial evaluation, the limits were 0 and 1, describing the degree of absence, respectively presence of the reaction at the extension of body and lower limbs. At the final evaluation, the limits were 2 and 4. Effectiveness was ~74%. The limit when applying MEDEK exercises was 25% and was supported by individual particularities, respectively intelligence coefficient, degree of spasticity of the body and lower limbs, session frequency.

As shown in Figure 3, for the orthostatic balance parameter, we started from an average of 0.42, corresponding to a percentage of ~12.5%, and we reached an average of 1.71, corresponding to a progress rate of ~38%. At the initial evaluation, the limits were 0 and 1, describing the degree of absence, respectively presence of the orthostatic balance reaction. At the final evaluation, the limits were 1 and 2. Effectiveness of classical therapy was ~35%.
For the orthostatic balance parameter, we started from an average of 0.71, corresponding to a percentage of ~24%, and we reached an average of 3.28, corresponding to a progress rate of ~75%. At the initial evaluation, the limits were 0 and 1, describing the degree of absence, respectively presence of the orthostatic balance reaction. At the final evaluation, the limits were 2 and 4. Effectiveness was ~75%. The limit when applying MEDEK exercises was 25, being supported by individual particularities, respectively intelligence coefficient, degree of spasticity of the body and lower limbs, session frequency.

As can be seen from the charts, group II registered a significant progress rate in the development of the two reactions, compared to group I. Furthermore, the two reactions proportionally developed in relation to each other.

Conclusions

As regards stimulation of triple extension tone and orthostatic balance in children with cerebral palsy using MEDEK method, we can state with full conviction that the systematic application of an individualized exercise program specific to MEDEK therapy significantly accelerates the emergence and stabilization of these two reactions. This assertion relies on the fact that we started from relatively equal values of their presence and degree of manifestation in both groups (an average of 0.42 for trunk extension and 0.42 with 0.71 for orthostatic balance) and we reached an average value of 3.28 for the experimental group compared to 1.57 for the control group, which corresponds to a progress rate of about 75%.

In specialized literature, some studies have reported about the effectiveness of MEDEK therapy on the CUEVAS MEDEK EXERCISE website, the therapy being applied to a number of children with congenital cerebral hypoplasia, manifested through retardation in neuromotor development. The obtained results were surprisingly good, considering the degree of brain injury.

References

CONTRIBUTION REGARDING THE TREATMENT OF ASEPTIC OSTEONECROSIS OF THE FEMURAL HEAD BY KINETOTHERAPY MEANS

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Abstract. The present paper is a study on the aetiology and manifestation of the local homeostatic imbalance in the femoral head (aseptic) osteonecrosis (also avascular necrosis, AVN, aseptic necrosis, ischemic bone necrosis). Aseptic osteonecrosis of the femoral head is caused by muscular and skeletal handicap and it is a challenge both for diagnosing as well as treatment choice. In approaching this topic, there are many theories concerning the causes of aseptic osteonecrosis. A lot of studies present repeated episodes of vascular disorder as one of the causes that lead to bone dystrophies which cause the deformation of the femoral head and determine cartilaginous injuries. The case study is the main method used in the paper. In classical physical therapy (physiotherapy), an electro-mechanical device, BTL 16 plus, was used, which supports joint decompression by creating pressure fluctuations that facilitate the circulation of blood in the femoral head. The results of this method were mainly assessed via MRI examination.

Keywords: osteonecrosis, kinetotherapy, decompression.

Introduction

Named also as avascular necrosis and osteonecrosis, aseptic necrosis means “condition in which poor blood supply to an area of bone leads to bone death” (MedicineNet, 2013). So, aseptic necrosis is “a bone condition that results from poor blood supply to an area of bone, causing localized bone death. This is a serious condition because the dead areas of bone do not function normally, are weakened, and can collapse. Aseptic necrosis is also referred to as avascular necrosis or osteonecrosis” (Shiel, 2015). Aseptic osteonecrosis of the femoral head is a cause for muscular and skeletal handicap and it represents a major challenge as far as its diagnosis and treatment are concerned. Initially, osteonecrosis is asymptomatic, it progresses, and in the final stages of evolution it requires the arthroplasty of the joint.

“Although hip replacement is an effective approach to relieve pain and improve hip function in the short term, its long-term performance remains unsatisfactory” (Hungerford, 2007).

Opinions derived by the studies conducted on this aspect are that the cause of idiopathic coxarthrosis could be the repeated episodes of vascular insufficiency which trigger an alteration in the structure of the synovial capsule and the bone. According to the Subchondral Theory, which supports the idea that the discontinuity of the blood flow is irrefutable in the genesis of osteocartilaginous alterations, as they occur in the Caisson disease (the decompression sickness), epiphysiolysis, osteochondritis. Vascular disorders are incriminated in bone dystrophies which cause the deformation of the femoral head and determine cartilaginous injuries as well.

Therefore, cartilaginous alterations could be a consequence of subchondral vascular disorders. Pathogenically speaking, the following occur: infarction with oedema of the bone marrow, venous drain obstruction, an increasingly higher pressure with the expansion of the infarction area.

In order to approach the osteonecrosis, we consider it important to present Enneking’s stages of osteonecrosis classification (Table 1) (Shiel, 2015).

<table>
<thead>
<tr>
<th>Stage</th>
<th>Pain</th>
<th>Radiographs</th>
<th>Pathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>none</td>
<td>increased density</td>
<td>creeping substitution</td>
</tr>
<tr>
<td>II</td>
<td>none</td>
<td>reactive rim</td>
<td>rim, reinfarction</td>
</tr>
<tr>
<td>III</td>
<td>occasionally</td>
<td>crescent sign</td>
<td>fracture</td>
</tr>
<tr>
<td>IV</td>
<td>limp</td>
<td>step of flattening</td>
<td>loose fragments</td>
</tr>
<tr>
<td>V</td>
<td>continuous</td>
<td>collapse</td>
<td>cartilage flaps</td>
</tr>
<tr>
<td>VI</td>
<td>severe</td>
<td>deformed</td>
<td>advance arthritis</td>
</tr>
</tbody>
</table>

The therapy solution is orthopaedic in stages I, II and III, being applied a decompression of the femoral head by CORE drilling. This therapy procedure is quite controversial, since the intended results have not been obtained. Furthermore, non-traumatic ONFH typically occurs in young adults and involves both hips. On the other hand,
not all ONFH will progress to femoral head collapse” (Nam et al. 2008). For stages IV, V, the solution becomes only total hip arthroplasty.

A unanimous opinion of the specialists is that whatever the pathogenic disorder might be, it is clinically expressed through the following signs:

- pain;
- stability deficit;
- mobility deficit.

These signs presented are also the objectives of recovery assistance in the priority order mentioned above. There is a general approach which takes into account the objectives, on the one hand, and the morphofunctional particularities of the affected area, on the other hand. To these is added the relaxation as objective of the damaged hip functional recovery. “Relaxation is addressed both to state of stress, muscular tension and mental condition due to the hospital atmosphere. Relaxation exercises can be achieved by muscle relaxation and general relaxation” (Wheeless, 2015).

The general methodology for hip recovery uses the axes, planes and joint freedom degrees of movement. Aseptic osteonecrosis of the femoral head is a bone injury caused by both the discontinuity of the blood flow (Fig. 1), the vessels of the bone being sheltered in inextensible spaces, and the action exerted on the bone by physical or chemical agents.

The cause can also be known for post-traumatic (stress disorder), Caisson disease, with the known evolution within the three stages.

A series of joint degradations with an individuality defined through a functional imbalance is what characterizes the disorder. The functional imbalance is determined by the evolution of the pathological presentation. Thus, the vascular triggering factors, be they synovial or mechanical, should be well individualized in order to be able to apply an adequate treatment. In this respect, kinetotherapy offers many possibilities by the physical exercise applications. Among the multiple possibilities mentioned above for this paper, we picked the following aspects:

- the possibilities to decrease the pressure on joints for facilitation of the blood supply to the bones;
- the stimulation of the synovial sheath in order to obtain an enhanced secretion, implicitly a better lubrication.

When, from a biomechanical point of view, there is an accepted balance, orthopaedics proceeds to the decompression of the femoral head by means of drilling procedures.

*The purpose.* The purpose of this paper is to present the procedures and benefits of BTL16 plus, the Rocher cage and the quadriceps bench by means of kinesitherapy in avascular osteonecrosis of the femoral head.
Methods

In order to fulfil the aim of the present paper, we used the case study as the main method.

Subjects. B.A., 42 years of age, male, driver, received the clinical diagnosis of aseptic osteonecrosis of the right femoral head.

Procedures. From the recovery devices designed for the use of kinesiotherapy wards, we used an electro-mechanical device, BTL16 plus, created for tractions/elongations, the Rocher cage and the quadriceps bench. By using the BTL16-plus device, we made tractions for the entire lower limb in relation to the torso, in a longitudinal axis (Fig. 2). The use of tractions is to empower the role of decreasing the pressure exerted on the femoral head, as well as of stimulating the synovial activity.

Fig. 2. Lower limb in relation to the torso, in a longitudinal axis

The technical parameters of the device offer the possibility to increase and decrease the blood pressure from inside the femoral head, as follows:

- **in traction**, the decompression of the coxofemoral joint is obtained (intra-articular vacuum and stimulation of the secretion of synovial fluid, the change in the intra-bone pressure of the femoral head in the sense of its decrease);
- **in relaxation**, the intra-bone pressure increases, forcing the expulsion of the venous blood.

As compared to the classical method, by using the BTL16-plus device, we intended to obtain a pressure-related game at the level of the injured joint, with the role of facilitating the blood exchange.

In this manner, the vicious pathological circle already installed causes an articular blockage, and the BTL16-plus device allows the kinetotherapist to make the timing for the traction/relaxation; we divided into two stages the use of the working times in performing the treatment:

A. the stage of tractions, with a duration of 5 minutes, for the relaxation of the capsule and ligament structures, with short working times (2 seconds in traction and 4 seconds in relaxation);
B. the stage of tractions, with a duration of 5 minutes, for the exchange of the pressure at the joint level, with long working times (6 seconds in traction and 8 seconds in relaxation);

Case study. B.A., 42 years of age, male, driver, received the clinical diagnosis of aseptic osteonecrosis of the right femoral head, which diagnosis was also confirmed by the CT scan (Fig. 3) and the MRI examination (Fig. 4, 5 and 6).
Fig. 3. CT scan (reformatting in the coronal plane)

Fig. 3. CT scan (reformatting in the coronal plane): at the level of the right femoral head, a diffuse modification of the structure of osteolytic type is highlighted, with a slightly stained presentation, the head appearing slightly flattened, but with a net and orderly contour.

Fig. 4. Sequence in the coronal plane PD FSE (proton density, with fatty suppression), important oedematose infiltrates of interest for the right femoral proximal extremity, which appears in hyper signal, slightly inhomogeneous. Intra-articular fluid in a moderate quantity.

Fig. 4. Sequence in the coronal plane PD FSE
Fig. 5. Sequence in the sagittal plane PD FSE

Fig. 5. Sequence in the sagittal plane PD FSE, centred at the level of the right femoral head and neck. Important oedematose infiltrates of interest for the right femoral proximal extremity, which appears in hyper signal, slightly inhomogeneous. Intra-articular fluid in a moderate quantity.

Fig. 6. T1 coronal, oedematose ranges, appears in T1 hypo signal

In clinical terms, pain was present (including during the night), as well as the limitation of the thigh extension onto the pelvis and external rotation. Once the diagnosis was established, the recovery therapy was implemented. Such therapy was performed in Recovery, Physical Medicine and Balneology Clinic from the Ilfov County Clinical Emergency Hospital. We can say that the therapy period during 6 months included approximately 120 sessions. Each session did not exceed 30 minutes of work and included: connected exercises (with no interruption)
for facilitation at the Rocher cage, two stages of tractions on the table of tractions/elongations (described above) and working at the quadriceps bench.

Medical documents revealed that after approximately one month of therapy, night-time pain disappeared and the daytime pain disappeared after two months. The treating physician finds the articular mobility close to normal limits. After 6 months, a MRI exam is requested, and such exam reveals the normal aspect of the bone structure (Fig. 7a, b). The patient receives hygiene recommendation on body weight, which should be maintained within the current limits, and is advised to repeat the therapy twice a year, within the limits of the 12 days minimum (covered by the insurance system).

![Fig. 7 a](image1) ![Fig. 7 b](image2)

IRM: normal aspect of the bone structure; STIR – oedematous-type modifications; T1 - bone matrix.

**Discussions**

By means of physical exercise and the devices built especially for this purpose, the kinetotherapist acts towards improving the patient’s condition function and diminishing physical suffering. Kinetotherapy is a non-traumatic therapy which supplements and completes other therapies, in order to a homeostatic re-balancing. During the study period, application of the procedure and programs presented, there have been encountered the following difficulties:

- the prolonged time of therapy discourages certain patients;
- the early identification of aseptic osteonecrosis of the femoral head is not forthcoming to the kinetotherapist;
- people come to therapy usually in the advanced stages of the disorder, when it becomes secondary coxarthrosis;
- the unknown aetiology of this sufferance, with the absence of radiological signs in its early stage, leads to an erroneous diagnosis.

Comparing the two currently known methods of fighting against the osteonecrosis of the femoral head, orthopaedic therapy vs. kinetotherapy, we can easily remark that: the bleeding treatment is traumatizing, but expedite; the kinetic therapy is non-traumatizing, but prolonged.

Within the limits of an emerging aria, without being exhaustive, we believe that the takeover of this idea, with a more thorough study, would be beneficial for kinetotherapy.

**References**


CHARACTERISTICS OF CHEERLEADING AS A SPORT

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Abstract. Occurred more than three centuries ago, cheerleading has evolved from a common element of military band to a sport - a unique show that has increasingly more practitioners. If cheerleaders were originally seen only in events like the head of a parade, today there are competitions at national, international and global levels established for the three specific styles of this sport: traditional cheerleading, baton twirling and cheerleading. Cheerleading should be regarded as a sport in itself, because it is certified by the existence of the Romanian Majorettes Association (AMR), the European Majorettes Association (EMA) and the European Cheer Union (ECU), which, together with other international organizations join forces to promote, support and develop this branch of sport. The purpose of this essay is to highlight that cheerleading worldwide has already become a sport in itself due to its unique, spectacular and original character. The cheerleaders are athletes like gymnasts, basketball or football players, the only difference being that cheerleading is a much newer sport in Romania.

Keywords: cheerleading, cheerleaders, branch of sport.

Introduction

The term of cheerleading is known worldwide and can be described as: beautiful girls with elegant dancing posture and movements imposed by choreography or improvised at an exhilarating pace, using a suitable soundtrack and appropriate clothing. Its magnitude reached over time has resulted in a competitive cheerleading activity organized and structured on different levels and categories, and here we wonder: should we call it a sport or an art?

Cheerleading occupies a contested space in American culture and a key point of controversy is whether it ought to be considered a sport. The bid for sport status on the part of cheerleaders revolves around the desire for respect more than official recognition by athletic organizations; cheerleaders recognize the prestige associated with sport and they claim that prestige for cheerleading by highlighting its recent transformation into a more athletic, competitive activity that is no longer “just for girls” (Grindstaff & West, 2006: 500).

Finally, cheerleaders can fit in both categories since this kind of movement blends into a smooth and graceful exercise, resulting in a particular physical manifestation, displayed by style, elegance and class (Bettis & Adams, 2003). But cheerleading activity, regarded as a sport in itself, is certified by the existence of the Romanian Majorettes Association (AMR) and the European Majorettes Association (EMA), which, along with other international organizations in the field join forces to promote, support and develop this kind of movement - educational sports.

The first professional cheerleading team in Romania was established in Cluj-Napoca in 1998 under the name of Madness, and in 2005, the band leader founded the UMF Sports Club, making the Madness UMF Cheerleading Squad. It succeeded, within 11 years, to become a national benchmark in cheerleading and the first team to represent Romania in international competitions. Since 2002, Madness has been participating every year in the European Cheerleading Championships, the most important competition for cheerleading teams affiliated to EMA (U-BT, n.d.). Since 2008, Romania has been organizing an internal competition, National Cheerleading Championship, which aims to popularize the sport and increase the performance of Romanian teams.

With reference to the current level of literature in Romania, we can only say that authors discuss briefly some aspects relating to the image of a cheerleader and do not provide support information to understand this branch of sport. It is imperative to bring contributions and clarifications to popularize this sport at the mass level and to create a tradition similar to that of artistic gymnastics, but also to provide reference material for those who are interested in this field.

Approached theme. Cheering has evolved from an informal to a ritualized and stylized expression. Spontaneous verbal activity of the crowd members has given way to gymnastic and dance performances highly organized by specialists. Organizing the cheerleaders into “squads” and “teams”, adopting uniforms and increasing the demands for physical conditioning and extensive practice, all signify greater formality in the cheerleaders’ role. Changes in the style of performing have also occurred. The early direct relationship between cheerleaders and the spectators to the game has evolved towards including less direct interaction with crowds and more emphasis on stunts, which are independent of the athletic events taking place on the field. The ultimate extension of this tendency is evident in the rise of national and international contests, which define cheerleading as a competitive activity in its own right (Hanson, 1995: 4).
In order to better know and understand this new sport, we shall present all the categories that define the cheerleading as a sport.

1. **Traditional cheerleading with pom-poms**

Choreography is based on sector-specific march steps, which can be combined with other dance steps, other figures or specific elements of any dance style. In this section, it is prohibited to execute acrobatic elements (splits, bridges, side wheels, etc.), pyramids or elements from acrobatic/rhythmic gymnastics or other similar sports branches.

**Equipment**

a. The costume must keep the idea of military uniform and must contain the following compulsory pieces: skirt (or dress), jacket, hat (or cap) and boots (or shoes/boots/sneakers for cadets). All components of cheerleaders’ band must have identical costumes (colour and pattern), except for the captain who may wear different colours or points to highlight the position of captain.

b. It is prohibited for cheerleaders to be dressed with pants. Bands that do not comply with this specification will be penalized.

c. The particular aspects of the costumes can be varied. It is allowed to use elements of folk or local cuisine to make the costumes more interesting and attractive, but it is important to maintain a traditional, decent style.

d. Cheerleaders’ pom-poms are mandatory and their use is part of the final score obtained by the team. It is forbidden to use other accessories such as strings, scarves, canes, flags or any dance show accessory, except for the captain’s whistle.

2. **Baton twirling**

This part involves the manipulation of a metal rod and the human body to a coordinated routine and is similar to rhythmic gymnastics or colour guard (flag spinning). Twirling combines dance, agility, coordination, flexibility gymnastics and many more while manipulating a single baton or multiple batons. It is primarily performed with the accompaniment of music. Fundamental characteristics of the sport include the handling of the baton to create visual images, pictures and patterns executed with dexterity both close in and around the body, and the proper release of the baton into the air. The discipline requires the simultaneous blending of these fundamental characteristics, utilizing time and space to display both technical merit and artistic expression (Wikipedia, 2009). The outfit is identical to that described in the section “Traditional cheerleading with pom-poms”. The bar cheerleader is required and is part of the final score obtained by the team.

**Competition rules**

*The number of cheerleaders* in a team - The minimum number of cheerleaders in a team is 8. A cheerleader of each band must have the role/function of team captain (leader of cheerleaders) and must be clearly differentiated from the team by a different uniform, different colours of the costume, hierarchical symbols, degrees, etc.) The maximum number of cheerleaders in a team is not specified.

*Age categories* - Pre-cadets under the age of 8, cadets 8-11 years, juniors 12-14 years, seniors over 15 years. The following criteria and regulations on dance bands are valid for both competition disciplines (parade marching and stage choreography) and for both competition sections (baton and pom-pon).

During choreography for the parade marching and stage, instructors need to pay attention to equality and equal representation of the following elements: dance steps, movement formations and number of formations, technical work with baton/pom-pon. **Synchronizing** the entire formation is mandatory and must have a minimal percentage of 20% of the entire choreography.

“Dancing in the mirror” is the specific form of dance in which one part of the band performs the same movements on the opposite side of the body, doing exactly the same time and using the same kinds of movements and dance steps. The band working in the mirror must be the same size and arranged symmetrically. Dancing in the mirror is not considered out of the original synchronization. Changing dance formations during choreography is not considered a synchronization mismatch. Changing formation means that the team is moving from a defined position to another defined position. The formation is considered to be defined if maintained a sufficient time so as to be recognized by those who look choreography.

If one or more groups of cheerleaders move to another formation, this shift must be made very clearly and precisely in terms of choreography, so as to maintain synchronization with the rest of the team. Changing
formation needs to be made in the shortest time possible and should not exceed 50’ in the length of choreography. Any other non-synchronization than those described in this chapter will be penalized by the referees.

**Technique of handling the baton/ pom-pom** - Technical movements with the baton/ pom-pom are valued in the section “technical impression”, except for the captain’s characteristic movements indicating the parts who will represent choreography or the first part of the choreography.

**General criteria for scoring exercises** - The number of different figures made with the baton/ pom-pom; The difficulty of each figure separately; The speed of handling the baton/ pom-pom; Baton turns (over the shaft, arms, legs, shoulders, etc.); Handling the baton with right and left hands, the ease in handling the baton with left hand and the frequency with which the baton is exchanged from one hand to the other; The height of throwing the baton and the confidence when throwing and catching the baton; Synchronizing movements with the objects and dance steps with the formation, and the difficulty of dance movements that are performed simultaneously with the technical elements for baton. The team may go to the scene with minimum one baton/pair of pom-pom for each cheerleader and maximum 2 batons for each cheerleader. During the competition, it is forbidden to use any other accessory equipment or dance of the two, except for the captain’s whistle.

If the batons/ pom-poms drop during the competition, the judge who is closer to the object can interfere to recover it in the shortest time possible, but only with the main judge’s approval. Such an action will not be performed if it is obvious that the cheerleader does not need help to recover the object or if such an action could disrupt the other cheerleaders’ formation. If the object is thrown into the public or away from the competition flow, it can be replaced with another one received from the instructor.

### 3. Cheerleading

**Rules** - The choreography of this section is based on specific cheerleading steps, elements and acrobatic figures, stunts, pyramids, tumbling, basket toss. It is allowed to use steps from other dance styles, figures and specific elements of any style of dance, and also characteristic elements of acrobatic and rhythmic gymnastics. At the beginning of the choreography, each team member must have at least one foot on the ground.

**Competition sections** - Cheerleading - Team with minimum 8 and maximum 25 members;

- Group Stunt with minimum 4 and maximum 5 members;

- Cheer Dance - Team with minimum 4 and maximum 25 members.

The teams that participate in Cheerleading section can be formed of boys too, but their number should not exceed the number of girls. It is not allowed passing a cheerleader from one age group to the other. The age categories are presented in Table 1 (USASF, 2016).

<table>
<thead>
<tr>
<th>Age categories</th>
<th>Division</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadets</td>
<td>Allgirl/Coed</td>
<td>11 and under age 11</td>
</tr>
<tr>
<td>Juniors</td>
<td>Allgirl</td>
<td>12-16</td>
</tr>
<tr>
<td>Juniors</td>
<td>Coed</td>
<td>12-16</td>
</tr>
<tr>
<td>Seniors</td>
<td>Allgirl</td>
<td>over age 14</td>
</tr>
<tr>
<td>Seniors</td>
<td>Coed</td>
<td>over age 14</td>
</tr>
</tbody>
</table>

**Duration of exercise** - Cheer elements (acclamation) at Cheerleading can be made at the beginning or in the middle of the performance. The recommended length of time for this is 30 seconds (0:30). Ins and outs of the stage should be short and not included in the limitations of time. These will be executed without background music and choreographic conception. In a Cheerleading Team, the exercise should have maximum 2:30 minutes, for a Cheerleading Group Stunt 1:00 minute and Cheer Dance Freestyle Pom 2:30 minutes.

**Cheerleading specific terms** - **Bases**: team members who remain with both feet on the ground in the execution of a stunt or pyramid and grant the main support for lifting, throwing and/or catching the flyer. **Flyer**: is the person who is lifted and thrown into the stunt and pyramid. **Back Spotter** – is the person who is in the back of stunt or pyramid site and provides support for lifting and throwing the flyer. The back spotter helps the flyer’s foot positioning, is attentive to the flyer’s head and, if throwing and catching, this one should be careful with the upper back and neck. **Front Spotter** - is the person who is placed in the front of stunt or pyramid and provides additional support for lifting the flyer. The presence of a supervisor is not mandatory. **Spotter**: is the person who witnesses
the execution, stunt or pyramid site without getting into physical contact with the bases. The spotter can be part of the team and called internal supervisor, but cannot provide the main support for the flyer.

Prep level represents the height of bases’ arms and at least one of the flyer’s feet is at shoulder level (the base holds the cheerleader’s hands at chest level). Extended level is the distance from the ground to the maximum height reached by bases’ arms stretched overhead in stand position. Running Tumbling represents acrobatic elements linked in a single line, executed by a one member or several members simultaneously. Stunt represents any execution where the flyer is maintained above the surface of the competition by one or more team members. Pyramid represents a binding/ group of stunts connected between them. Cheer - the acclamation itself. Throws - Basket Toss means throwing where no more than 4 bases participate and where 2 members execute a setting hands by crossing the joints - a similar position to “chair” used in first aid.

Conclusions

Cheerleading should be regarded as a sport in itself, because it is certified by the existence of the Romanian Majorettes Association (AMR), the European Majorettes Association (EMA) and the European Cheer Union (ECU), which, together with other international organizations join forces to promote, support and develop this branch of sport. All this demonstrates that cheerleading worldwide has already become a sport in itself due to its unique, spectacular and original character.

Cheerleaders are veritable living symbols in most of the countries that have joined efforts to support and promote this sport. Therefore, we want to develop this activity in Romania in order to ensure for cheerleading a well-deserved place, along with other sports recognized and supported by specialized authorities.

References

OPTIMAL MODALITIES TO APPROACH RECOVERY IN THE CASE OF 2nd DEGREE KNEE SPRAINS IN FOOTBALL PLAYERS. AN EXPERIMENTAL STUDY

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Abstract. When confronted with an injury of peripheral knee ligaments and anterior cruciate ligament (ACL), it is important to achieve an accurate examination of injuries. MRI examination allows, to a very large extent, confirmation or affirmation of the suspected diagnosis. The hypothesis from which we started in the development of this research was that, by associating the PNF means with classical kinetic treatment of knee sprains in football players, the effectiveness of recovery process increases, an aspect that can be highlighted by the reduction of recovery treatment period and more efficient improvement of physical parameters. The research, organized as an experiment, was developed on a number of 12 patients within the Center for Children and Juniors of Concordia Chiajna Sports Club, in the period February 2015 - August 2015. Each of the two groups was composed of 6 patients aged between 14 and 19 years, all males. Patients in the control group followed classical kinetic treatment, and for those in the experimental group, PNF means were added. Sheets were prepared, including the first and last name, gender, age, diagnosis, position occupied in the team, kinetic treatment structuring and evaluations made during the recovery period.

Keywords: PNF techniques, ligament injuries, joint assessment.

Introduction

The therapeutic care of knee sprain has evolved a lot in the past few years, either within the conservatory treatment or after surgery. The conception according to which prolonged immobilization would be beneficial was removed by many authors, because it proved to have negative effects on the tissue scar, joint mobility, muscular recovery and proprioception.

The most common production mechanism is the indirect one, through movements exceeding the normal range of motion in a joint. Direct trauma on the knee is rarely seen. The stress put on the knee through indirect action (forced varus or valgus) may produce collateral ligament injuries of different degrees. If this mechanism is associated torsion of the leg (fixed leg and torsion of the body and hip or vice-versa) or exaggerated normal movements (hyperextension or hyperflexion), the stress being strong, sudden or for a long period, the other elements also start to fail. Associated anterior-posterior stress may sporadically affect cruciate ligaments (Tomoaia, 2008: 378).

Anamnesis must indicate the type of injury, the circumstances when it occurred. Mostly an indirect mechanism is revealed, especially on monopod support (flexion-rotation, abduction, adduction, extension-rotation, etc.). We also have to mention the disorders caused by joint laxity: pain, instability, hydrarthrosis. From the same anamnesis, some significant diet errors must be found, as we all know that protein intake and insufficiency of hydric input represent causes for muscular disorders determining a poor muscle adaptation to effort and their joint protection role.

Clinical examination must be systematic and reveal instability and responsible laxity, allowing thus the adoption of surgical method. Examination has to compare the two knees (Cleland, 2007: 308-320):

a) Lateral laxity during extensions; in full extension, ligaments and all other lateral elements should be checked;
b) Tibial laxities in 30° flexion and different internal rotation positions, when the two stability systems are checked:
   - internally
     - in valgus, flexion, internal rotation of the tibia
     - in varus, flexion, external rotation of the tibia
   - externally
     - in valgus, flexion, internal rotation of the tibia
     - in varus, flexion, external rotation of the tibia
c) Research of anterior drawer movements, also called “Slocum’s test of rotary instability”

   This can be done in three positions of the knee:
   - without leg rotation – direct drawer
   - with 30° internal rotation – internal rotary drawer
   - with 15° external rotation – external rotary drawer

Examination is carried out on the knee flexed at 60°, the leg being flexed by the examiner. An anterior dislocation of the tibia in respect of the femur is checked:
- in indifferent rotation, the anterior-external cruciate ligament is checked;
- in internal rotation, the elements controlling internal rotation (external capsular elements) are checked;
- in external rotation, the internal capsular plane, posterior corn of internal meniscus and anterior-external cruciate ligament are checked.

d) Research of posterior drawer:
- in indifferent position, the posterior-internal cruciate ligament is checked;
- in external rotation, an injury of posterior-internal cruciate ligament and posterior-external formations is checked;
- in internal position, an injury of posterior-internal cruciate ligament and a possible break in the internal cortical condyle are checked.

Materials and methods

Through association of PNF means (Cordun, 1999: 353-359) with classical kinetic treatment of knee sprains in football players, the effectiveness of recovery process increases, an aspect that can be highlighted by the reduction of recovery treatment period and more efficient improvement of physical parameters.

The clinical study presented in this paper was made on two groups of subjects, each one having 6 patients, all males. The period during which the study was conducted allowed total recovery of the patients and their reintegration into the professional activity. At the end of this period, in terms of the affected lower limb functionality, the patients managed to gain a stability and mobility allowing them to develop daily activities under normal conditions.

As regards the causes leading to knee sprains, 7 patients developed ligament stretching after a direct trauma (injury), and 5 of them suffered from a partial break of ligament structure.

Results

Patient evaluation was performed at the beginning and the end of the treatment, following the parameters: pain, inflammation, joint mobility and hip perimeter. Evolution of these parameters is shown in the charts below: Figure 1 (a) reveals the evolution of pain parameter for the control group, and (b), the same parameter, but for the experimental group, which was applied in addition to classical treatment and PNF techniques; in Figure 2 (a), it can be noted the evolution of inflammation for the control group, and in (b), the evolution of inflammation for the experimental group; Figure 3 (a) shows the evolution of flexion parameter for the control group, and (b), for the experiment group; in Figure 4 (a), it can be noted the hip circumference for the control group, and in (b), for the experiment group.

The evolution of pain parameter registered an improvement of ~66%, starting from an average of 3 and reaching an average of 1.2. For the second group, the evolution of pain parameter registered an improvement of ~90%, starting from an initial average value of 3 and reaching a final average value of ~0.3.
The inflammation parameter, for the first group, registered a positive evolution of ~30%, starting from an initial average value of 1 and reaching a final average value of 0.7. For the second group, the inflammation parameter had a positive evolution of ~80%, starting from an initial average value of 1 and reaching a final average value of 0.2.

From the analysis of the above objective data and the evaluation of patients’ cooperation degree, it can be noticed that the weakest evolution was in patients who did not prove scrupulosity and consistency in practicing the indicated recovery programs.

It can be seen that the flexion parameter registered an improvement of ~20%, starting from an initial average of ~108° and reaching a final average value of ~135°.

It can be noted that the hip circumference parameter registered an improvement of ~2 cm, starting from an initial average value of ~53 cm and reaching a final average value of ~55 cm. For the second group, the same parameter registered an improvement of ~3 cm, starting from an initial average value of ~53 cm and reaching a final average value of ~55 cm.
value of ~56 cm.

When we evaluated the evolution of hip circumference parameter, we did not take into account the limb dominance. The compared expression of the followed-up parameters, made by comparing the final values obtained for the two groups, is highlighted in the previous charts.

Conclusions

In 2nd degree knee sprains, the subjects’ results in the final testing are significant, in favor of the experiment group, for: pain, inflammation, flexion parameter and hip circumference parameter. Although we started from initial values comparable for all subjects, final testing showed significant differences only in the case of experimental groups, who benefited from association of PNF means with those specific to physical education and sports, according to original schemes proposed and tested by the author of this paper.

Having in mind the favorable results obtained with the football players, we can say that medical recovery in sports traumatology has only benefits from adopting, in its methodological arsenal, the physical therapy techniques specific to other medical areas (for example, neurological recovery) and adapting them to the psychophysiological and morphological features, because with their help the pain process can be controlled, at least in the early phase of recovery. And pain is known to block or hinder the gradual transition to other methods of recovery through movement, many of them specific to sports training.

References


STUDY REGARDING THE UTILITY LEVEL OF THE EXERCISES FOR LANDINGS TRAINING, IN WOMEN S ARTISTIC GYMNASTICS

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Abstract. The Artistic Gymnastics has become one of the most spectacular sports, being in constant development. There are new spectacular features, new preparation techniques, new helpful apparatus, but the existing ones have also improved, all those helping at the increase of difficulty and complexity of the exercises as well as the improvement of the execution technique. The purpose of this study is to highlight clearly the utility of each exercise, in order to optimize the preparation of the junior gymnasts, in terms landings training. The utility coefficient (CU) allows a hierarchy of means and reflects the usefulness of an exercise compared to another, based on the subjective assessment of the coach. The subjects who took part in this study were of 21 athletes, Juniors III, level 1 and 2 and Juniors II, level 3, aged 8-10 years old. By using the coefficient of utility, there can be prioritized and selected the most appropriate preparation means. Thus, following the obtained results we conclude that from the 17 proposed exercises, 3 exercises are not useful, the utility coefficient value for those being equal to 0.188; 8 exercises are having a medium utility, the utility coefficient value being between 0.304 and 0.536 and 6 exercises are very useful for the landings training in Women's Artistic Gymnastics, the utility coefficient values being between 0.652 and 0.971. Therefore, to optimize the training program, in terms of landings, and also to increase the athletic performance, we recommend the daily use of exercises with a high level of utility, in the training lessons.

Keywords: gymnastics; landings; utility coefficient.

Introduction

The Artistic Gymnastics has become one of the most spectacular sports, being in constant development. There are new spectacular features, new preparation techniques, new helpful apparatus, but the existing ones have also improved, all those helping at the increase of difficulty and complexity of the exercises as well as the improvement of the execution technique.

Besides the multitude of the items shown in the Women's Code of Points, (805 items), the practical activity has helped at the increasing of their numbers by making some preparatory and helpful elements. Thus, the need to speed the process in order to obtain quick results and experience the world methodic, led to the idea of rationalization and standardization of the means and methods used in training (Vieru,1997).

Rationing is represented by the selection of the exercises that best meet the intended purpose. Choosing the most effective exercises means saving of time and effort, both in learning and improving the motor skills and developing the motor qualities (Stoica, 2009).

The landing is the final stage of the elements with a flight phase, which is executed repeatedly during the training lessons in Women’s Artistic Gymnastics’ competitions. Landing in modern gymnastics is one of the most important factors which determine the final rank of gymnasts at competitions (Marinsek and Cuk, 2008).

Due to its importance, the landing must be learned and trained as a skill from the beginning, from an early age. The children should be taught to land technical correctly and aesthetic, both for obtaining a score as high as possible, as well to avoid accidents.

Due to the large number of landings that are executed in the Artistic Gymnastics and of the different landing surfaces, the landing technique and type vary from one element to another and from one athlete to another, and thus is increasing the number of training exercises aimed at them. Thus, we believe that the selection of training means are to be realised with the help of the sports training rationing methodology.

The study purpose. The purpose of this study is to highlight clearly the utility of each exercise, in order to optimize the preparation of the junior gymnasts, in terms landings training.

Methods, means of training, procedure and subjects

Methods. The research methods used in this study are: the observation method, the mathematical method and the computerized graphical representation method. Based on the observation, on the own experience and on the subjective evaluation of the coach, it was able to determine the usefulness of a training mean compared to another.
**Procedure.** The utility coefficient (CU) allows a hierarchy of means and reflects the usefulness of an exercise compared to another, based on the subjective assessment of the coach (Chepea, Ortanescu and Padeanu, 2013).

The assessing of the utility of a training mean is achieved by pairs comparison with another mean. Thus, each exercise will be compared with each of the other exercises. This utility will be marked with " + " for the mean that we find to be more useful to his pair (the other way), which will be marked with " - " (Alexe, 1992). In the case that the two exercises can not be differentiated, then those will be considered as neutral and will be marked with "0". In this case, the 17 means have determined 16 comparisons for each exercise.

Giving the utility for each sign of value will be made using the formula:

\[
\text{Sign value (positive / negative)} = \frac{\text{maximum possible utility value}}{\text{number of means selected}}
\]

In our case, the value of the signs + and - = 1/17 = 0.058.

The value of a "0" sign is equal to half of the " + " sign. Thus, the value of the sign 0 = 0.058 / 2 = 0.029.

After the comparison is made in pairs and the calculus matrix is complete for the utility coefficient, there are realized the following steps:

- There is calculated the total amount of signs with " + " for each mean of standardized training (MAST);
- There is calculated the total amount of signs with " - " for each MAST;
- There is calculated the total amount of signs with "0" for each MAST;
- There is multiplied the total corrections with " - " with the sigh value for each MAST;
- There is multiplied the total corrections with "0" with half of the positive sign;
- There are added the total negative corrections values to the overall corrections with "0";
- There is calculated the utility coefficient for each exercise using the following formula:

\[
UC = \text{maximum coefficient} - (\text{the total amount of negative correlations} + \text{the corrections value with "0"})
\]

**Subjects.** The subjects who took part in this study were of 21 athletes, Juniors III, level 1 and 2 and Juniors II, level 3, aged 8–10 years old. The 21 athletes are legitimized at the three gymnastics clubs in Bucharest as follows: 10 of the gymnasts are components of the CSS Steaua, 5 of the gymnasts are components of the CSS No. 2 and 6 of the gymnasts are components of CS Dinamo.

**Means of training**

- **Ex.1.** At floor, keeping the landing position (1');
- **Ex 2.** From standing, jumping with the knees up and fixing the landing (10 repetitions);
- **Ex.3.** Standing on the balance beam, facing the direction of travel, stretched jump, in depth and fixing the landing (7 reps **);
- **Ex. 4.** Standing on the vault table, facing the direction of travel, salto forward tucked, in depth and fixing the landing (5 reps **);
- **Ex.5.** Standing on the springboard with the back to the direction of travel, salto backward tucked and fixing the landing (5 reps **);
- **Ex.6.** Standing on hands on the vault table, facing the direction of travel, corbet and fixing the landing (7 reps **);
- **Ex.7.** Standing sideways on the balance beam, maintaining the position of landing (30');
- **Ex.8.** Standing facing a gymnastics crate lid, stretched jump on the the box lid and fixing the landing position, stretched jump with 180° turn on the box lid and fixing the landing (10 reps);
- **Ex.9.** Roll backward to tuck stand, stretched jump with 360° turn, and fixing the landing (5 repetitions);
- **Ex.10.** Standing on the vault table, facing the direction of travel, stretched jump with 180° turn, in depth, and fixing the landing (5 reps **);
- **Ex.11.** Standing on the vault table, with the back to the direction of travel, stretched jump with 180°, in depth, and fixing the landing (5 reps **);
- **Ex.12.** Squat with stretched jump and maintaining the landing for five seconds (10 repetitions);
- **Ex.13.** At floor, salto backward tucked and fixing the landing (5 reps **);
- **Ex.14.** At floor, stretched jump with 360° and maintaining the landing for two seconds (7 reps **);
- **Ex.15.** Sitting on the vault table, facing the direction of travel, jump with the knees up in depth, and fixing the landing (7 reps **);
Ex. 16. Sitting on vault table, the back to the direction of travel, jump with the knees up and in depth, and fixing the landing (7 reps **);  
Ex. 17. Sitting at the end of the balance beam, with the back to the direction of travel, salto backward tucked and fixing the landing (5 reps **);  
** There are counted only the landings made without penalty.  

Results  
After going through each step described above, we have calculated the coefficient of utility for each exercise. Thus, in Table 1 is presentent the calculation of this coefficient matrix and the obtained results.  

Table 1. The coefficient of utility results  

<table>
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<tr>
<th>No.</th>
<th>Standardized training means</th>
<th>Sum of signs</th>
<th>Corrections total</th>
<th>Total corrections sum</th>
<th>UC</th>
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<td>0.826 0.681 0.652 0.652 0.652 0.652 0.652 0.652 0.652 0.652 0.652 0.652 0.652 0.652 0.652</td>
<td>0.971 0.536 0.536 0.536 0.536 0.536 0.536 0.536 0.536 0.536 0.536 0.536 0.536 0.536 0.536</td>
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<tr>
<td>1</td>
<td>-   -   -   -   +   0   -   -   -   -   -   -   -   -   -   -</td>
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<tr>
<td>2</td>
<td>+   -   -   -   0   +   0   -   -   +   -   -   -   -   -   -</td>
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<td>0.638 0.058 0.696 0.304</td>
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<tr>
<td>3</td>
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<td>4</td>
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<td>13  0  3  0</td>
<td>0.087 0.087 0.913</td>
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<td>5</td>
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<td>3   6  7</td>
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<td>1   13  2</td>
<td>0.754 0.058 0.812 0.188</td>
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<tr>
<td>7</td>
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<td>0.29 0.232 0.522 0.478</td>
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<td>0.464 0.116 0.58 0.42</td>
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<td>8   3  5</td>
<td>0.174 0.145 0.319 0.681</td>
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<td>0.232 0.232 0.464 0.536</td>
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Figure 1 shows the graphical representation of the utility coefficient for each exercise, in order to highlight better their usefulness.
Discussion and conclusions

The quality and the organization of the preparation must be conditioned by the use of high utility training means. Most often, in practice, the criteria of selection and evaluation of the means is not achieved by using some specific methods which would verify the usefulness of the training exercises.

By using the coefficient of utility, there can be prioritized and selected the most appropriate preparation means. Thus, following the obtained results we conclude that from the 17 proposed exercises, 3 exercises are not useful, the utility coefficient value for those being equal to 0.188; 8 exercises are having a medium utility, the utility coefficient value being between 0.304 and 0.536 and 6 exercises are very useful for the landings training in Women's Artistic Gymnastics, the utility coefficient values being between 0.652 and 0.971.

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   *Corresponding author: popescuion@gmail.com

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Jurnalul Discobolul promovează cercetarea fundamentală și aplicativă, în special rezultatele obținute în cadrul proiectelor de cercetare națională și internațională, precum și contribuțiile stiintifice ale unor personalități din mediul universitar și cel socio-profesional, aferente domeniilor de interes pentru revista. Sunt acceptate spre publicare, materiale originale, care nu au fost publicate părțial sau integral în alte reviste. Este necesar ca articolele deja publicate să fie în proporție de 40% diferite de cele la care ne referim la acest punct.

Articolele vor fi redactate în limba engleză și vor fi publicate după ce au parcurs cele două etape ale procesului de recenzie, în urma deciziei în acest sens;

Articolele vor fi redactate în format A4 Word, utilizându-se fonturi Times New Roman, mărime 10 pt., la 1,15.

Ilustrațiile:

Sunt admise maxim 4-5 materiale ilustrative (tabele, grafice, figuri simbolice); acestea vor purta titluri și vor fi numerotate conform specificațiilor din text; este recomandat ca acestea să fie furnizate la dimensiunile la care se dorește publicarea. Nu sunt admise materiale scanate cu excepția figurilor/ foto. Tabelele vor fi numerotate cu cifre arabe, în ordinea apariției din text, vor purta un titlu clar și concis menționat deasupra fiecărui tabel. Figurile, graficale vor avea o calitatea superioară (min.300 pixels), vor fi denumite concis și numerotate sub fiecare apariție.

Acronimele folosite vor fi detaliate la prima lor apariție în text.

1. Pagina de titlu va cuprinde:
   • Titlul articolului - în limbi: română și engleză
   • Numele și prenumele autorilor
   • Afilierea instituțională, adresa de corespondență, oraș, țara
   • Adresa de corespondență (e-mail).

   Exemplu:

   TITLUL......
   Ion POPESCU1*, Rodica STANESCU2, Cornelia MIHALACHE3
   1 Universitatea Națională de Educație Fizică și Sport, Constantin Noica, 140, București, România
   2 Universitatea Politehnică (adresă, oraș, țară)
   3 Universitatea din Oradea (adresă, oraș, țară)
   *Adresă de corespondență: popescuioan@gmail.com

   • Abstractul (numai în engleză). Abstractul cuprinde între 100- 150 cuvinte.
   • Cuvințele cheie (în engleză). Pentru fiecare lucrare vor fi selectate între 3-5 cuvinte, reprezentând termenii utilizăți în lucrare.

2. Articolul nu va depăși 6 pagini pentru studiile de cercetare, 4 pagini pentru lucrările tip eseu, 1 pagină pentru recenzii, informații, reportaje de la evenimente stiințifice.

   • Studiul de cercetare va cuprinde: Introducere - Se va prezenta o scurtă introducere cu privire la problematica abordată, cu precizarea scopului, a obiectivelui(lor) cercetarii și a ipotezei(lor) de lucru. Material și

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   • Studiul de cercetare va cuprinde: Introducere - Se va prezenta o scurtă introducere cu privire la problematica abordată, cu precizarea scopului, a obiectivelui(lor) cercetarii și a ipotezei(lor) de lucru. Material și
metodă – această secțiune va descrie metodologia de cercetare utilizată, modul de selecție a eșantionanelor studiate, criteriile de includere și cele de excluere, metoda, tehnică, programul statistic folosit în prelucrarea datelor etc. **Rezultate** – în această secțiune vor fi prezentate concis rezultatele obținute, de obicei prin intermediul tabelelor și al graficelor. Se va prezenta statistica descrisivă și inferențială, diferențele dintre măsurători (inițială și finală; între grupul de experiment sau grupul martor etc.). Este obligatoriu să se precizeze nivelul de semnificație (valoarea lui p sau mărimea efectului d), precum și testul statistic folosit. **Discuții** – se vor preciza aspectele noi și importante ale studiului, interpretarea rezultatelor proprii, în contextul literaturii de specialitate. **Concluzii** – concluziile studiului vor fi enunțate cu claritate, stabilindu-se o legătură între acestea și scopurile studiului. **Referințe** - se vor întocmi conform stilului APA (a se vedea Lista referințelor bibliografice).

- **Studiile de caz**. Sunt rapoarte ale materialelor de caz, obținute în timp ce se lucrează cu o persoană, un grup, o comunitate sau o organizație. Studiile de caz ilustrează o problemă, indică un mijloc pentru rezolvarea unei probleme; și/sau pun în lumină viitoarele nevoi de cercetare, aplicațiilor clinice, sau aspecte teoretice. În scrierea studiilor de caz, autorii analizează cu atenție echilibrul dintre furnizarea de material ilustrativ important și responsabilitatea asupra materialelor de caz confidențiale.

- **Articolele tip eseu/Recenziile din literatura de specialitate** (din domeniu Știința Sportului și Educației Fizice, Psihologia Sportului, Pedagogia Sportului, Sociologia Sportului etc.) - vor avea ca structură: Introducere; Nivelul actual reflectat în literatura de specialitate; Problematica abordată; Concluzii; Referințe.

- **Recenziile cărții**

3. **Lista referințelor bibliografice**. Revista Discobolul recomandă respectarea stilului APA (American Psychological Association, Ed. 6) de redactare a listei referințelor bibliografice. **Sursele bibliografie sunt menționate în text, în paranteze rotunde.**

Exemplu:

According to Suchilin (2010, p.5), the biomechanical criteria are used for dividing the gymnastics elements into parts. Thus, the technical structure of gymnastics elements contains three levels – periods, stages and phases.

The Publication Manual of the American Psychological Association was first published in 1929 as a seven-page "standard of procedure, to which exceptions would doubtless be necessary, but to which reference might be made in cases of doubt" (Bentley et al., 1929, pp. 57-58).

Verificați că fiecare sură citată să apară atât în corpul textului, cit și în lista bibliografică, iar autorul și anul să fie identificate din punct de vedere ortografic. Lista bibliografică de la finalul articolului științific oferă informații necesare pentru a identifica fiecare sură. APA solicită că fiecare listă să fie redactată la rând dublu, iar elementele din listă să fie **indentate** începând cu rândul al doilea al fiecărui element (APA Manual, sixth edition). Se vor menționa: *autorul (i-ii), anul, titlul, editura, paginile, în funcție de sursa citării (carte, articol de revistă, site de internet).*

Exemple:

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