

NATIONAL UNIVERSITY OF PHYSICAL EDUCATION AND
SPORTS, BUCHAREST

DISCOBOLUL

*Physical Education, Sport and Kinetotherapy
Journal*



Index Coverage of Discobolul

ERIH PLUS, The Journals Impact Factor (JIFACTOR), Index Copernicus,
J-Gate, SCIPRO, Romanian Editorial Platform
DAIJ, SIS - Scientific Indexing Service
OAJI.net (Open Academic Journals Index)
Google Academic

APPEARS QUARTERLY

Year XIII No.2(48)

April-June 2017

ISSN (online) 2286 – 3702; ISSN–L 1454 – 3907

<http://www.unefs.ro/discobolulmagazine.html>

Copyright © 2017 by *Discobolul* Publishing House

All rights reserved

CONTENT

Ethnographic research in sports Mihaela PĂUNESCU, Cătălin PĂUNESCU.....	5
Comparative study between the personality of students in N.U.P.E.S. and personality wanted by potential employers Vasilica GRIGORE, Constanța-Valentina MIHĂILĂ, Radu PREDOIU, Mihaela PĂUNESCU, Mihaela APOSTU, Răzvan-Liviu PETRE.....	12
Appreciation of eating habits in a group of teenagers from two high schools in the city of Iasi: sports highschool and G. Ibraileanu theoretical highschool Adriana ALBU, Ionuț ONOSE, Mihaela Elena CĂRĂUSU, Raluca Mihaela HODORCĂ...	19
Key personality traits of former handball players which can facilitate a successful career Alexandra PREDOIU.....	24
Correlative analysis of the biomechanical characteristics and performances achieved by junior gymnasts in balance beam events Vladimir POTOP, Victor BOLOBAN, Vasile TRIBOI, Alexandru GORASCENCO.....	30
Methodological, methodical benchmarks and motor performance in the preparation of gymnasts with intellectual disabilities - level b Eugen Gabriel POPESCU.....	35
Improving the tolerance to lactate and its efficiency in the end of the football game Marius STOICA, Cornel BLEJAN.....	41
Arm traction strength training in young swimmers Cornelia POPOVICI, Adrian Marius SUCIU.....	46
The efficiency of the special programs dedicated to the development of the Olympic athletes Florin MIȘCĂ.....	54
Use of didactic technologies for achievement of the learning units of acrobatic gymnastics in primary school Larisa POTOP, Bogdan URICHIANU.....	64
School dropout, a major risk in decreasing the level of education Ioan-Cosmin BOCA, Vasile MARCU, Mirela DAN, Dan Constantin MATEI.....	69
Physiological patterns, neuromuscular efficiency, technical style and biomechanical adaptations of the lower limb - transition to 110 m/400 m hurdles Gheorghe Adrian ONEA, Lorand BALINT, Mihai PASCU.....	74
Theoretical aspects on using the solving problem method in preparing the football players Iordan ROMAN, Gloria RAȚĂ.....	79

The highlighting of the laterality through the study of the kinematic parameters of a simple technique executed by a beginner karate practitioner Irina BĂIȚEL, Luminița PĂTRU.....	84
Sports and politics – from regime to sports values Ioan AUGUSTIN.....	89
Findings on physical activity –influence on telomere shortening Carmen RĂCHITĂ.....	94
Economic dimension by organizing a major sport event and the European Union. Ways to do it Emilia Carmen TOCALĂ.....	99

ETHNOGRAPHIC RESEARCH IN SPORTS

Mihaela PĂUNESCU^{1*}, Cătălin PĂUNESCU²

¹National University of Physical Education and Sports, 140 Constantin Noica Street, Bucharest, Romania

²University of Medicine and Pharmacy, 37 Dionisie Lupu, Street, Bucharest, Romania

* Corresponding author: misu_paunescu@yahoo.com

Abstract. This paper is an introduction to sports ethnography, and its purpose is to highlight the significance and applicability of ethnographic research to sports studies. In this article, the author wants to emphasize the importance of ethnography in sports research. The paper reflects personal points of view, but also relevant information extracted from literature. As a research strategy, ethnography is ideal to investigate the dynamic and complex activities constantly encountered in different sports cultures. Thus, from aerobic gymnastics to windsurfing, sport provides a multitude of cultural and social experiences, as well as a real perspective on the way in which we, as humans, act in everyday life through sport. The paper describes in detail the main characteristic feature of ethnographic research, namely fieldwork, achieving a deconstruction of the definition and the main stages of an ethnographic sports study. To assume that ethnography consists only in doing fieldwork and making observations is totally inappropriate and wrong. In other words, the ethnographer must penetrate beyond the initial field experience, where each aspect seems fascinating, any nuance seems to be in correlation with another one and each small fragment he reads adds new ideas to the already existing ones.

Keywords: ethnography, culture, sports.

Introduction

Probably some of you are wondering: *What is, in fact, ethnography?* You might know something about ethnography, because, as Hammersley mentions in his book *Reading Ethnographic Research* (2016), there are more and more texts that introduce us to ethnographic research, but for many young researchers, ethnography can be a rather odd scientific phenomenon.

The definition of ethnography has long been a controversial topic. For some researchers, the term refers to a philosophical paradigm involving total commitment, while for others it designates a method they use appropriately (Atkinson and Hammersley, 1994, p. 248). According to dictionaries, ethnography is the study and systematic recording of human cultures, or a descriptive work produced from such research (Merriam-Webster, n.d.). *Etymologically*, the word ethnography derives from *ethnos*, which means people or peoples, and *graphy*, which means description. Therefore, ethnography describes and understands the lifestyle of people from a narrative point of view. Ybema et al. (2010) examine the ontological and epistemological presuppositions underlying ethnography. Ethnographic research can range from a realist perspective, in which behavior is observed, to a constructivist perspective, where understanding is socially constructed by the researcher and subjects. In the authors' view, research can range from an objectivist account of fixed, observable behaviors to an interpretivist narrative describing the interplay of individual agency and social structure.

Fetterman highlights in the work *Ethnography: Step-by-Step* (2010) that "ethnography is about telling a credible, rigorous and authentic story. Ethnography gives voice to people in their own local context, typically relying on verbatim quotations and a 'thick' description of events. The story is told through the eyes of local people as they pursue their daily lives in their own communities. The ethnographer adopts a cultural lens to interpret the observed behavior, ensuring that the behaviors are placed in a culturally relevant and meaningful context. The ethnographer is focused on the predictable, daily patterns of human thought and behavior. Ethnography is thus both a research method and a product, typically a written text" (p. 1).

According to some authors, there is an important distinction between ethnographic research and ethnography. The term 'ethnographic' refers to research methods and approaches that are employed to understand culture. There are several methods that are considered ethnographic, most often observation and unstructured or semi-structured interviews. Methods considered to be ethnographic take place 'in the field' – ethnographic researchers normally enter into the cultural space of those they are researching to gain an understanding of how those people live, behave and interpret the world around them. The extent to which research methods that take place outside the field can be considered ethnographic has also been put forward descriptive accounts of culture, but for many researchers (particularly those from the anthropological tradition), the failure to enter the field reduces the claim of these methods to be considered ethnographic (Schwell, Kowalska and Szogs, 2016, pp. 11-12).

In this context, we aim to emphasize the significance and applicability of ethnographic research to sports studies.

Fieldwork—a main attribute of ethnography

The distinctive feature of ethnography is *fieldwork*, whose father is Bronislaw Malinowski. With Malinowski, the anthropologist also becomes an investigator: “The ethnologist has turned into an ethnographer and the theorist is collecting his own materials for analysis”...becoming thus an “orchestra-man”: “The anthropologist is an orchestra-man: he must do everything, because he is alone in the field. This solitude is both a fact and an option. The first large field inquiries were real expeditions—therefore, they were collective. But the multitude of populations to be studied and the universal tradition of the solitary anthropologist thinker have quickly led to dispersion of fields. This historical situation will be assumed as a methodological option: the effect of distancing or participant observation is possible only if the anthropologist is alone. If there are two or more people, the terms of comparison already become inaccurate and the intimate experience relative to the studied society is disrupted. The anthropologist is therefore a solitary man who wants to remain alone with his field” (Mihăilescu, 2009, pp. 73-75).

In ethnography, primary data collection is mainly achieved through fieldwork. Actually, for many anthropologists, the word *field* is almost synonym with ethnography. According to Blommaert, Dong and Jie (2010), it may seem a scary thing to be “in the field”, trying to accomplish a task initially formulated as a perfectly coherent research plan, with questions, methods, lectures and so on, but realizing that the “field” is a chaotic and extremely complex place. For the author, *fieldwork* refers to the moment when the researcher contacts everyday reality and discovers that the rules in the academic environment are not necessarily the same as those of daily life.

Why is field work essential in ethnography? To answer this question, we bring to discussion the opinion of Wolcott (1995, cited by Whitehead, 2005), for whom fieldwork is a form of inquiry requiring the researcher to immerse personally into the social activities developed by some persons or a group of people. For the ethnographers who mainly study local communities, immersion means spending 24 hours per day, 7 days a week in the field, regardless of the season, over a long period of time (even one year). In this way, the researcher becomes familiar with the spatial dimensions of the research framework, and also with the socio-cultural dynamics of the group, which may change at certain times of the day, week or year.

In their turn, LeCompte and Preissle (1993) suggest that ethnography or ethnographic research *is a process* that involves investigation methods, a result and a record—a result of the inquiry. The research intention is to create a reconstruction as vivid as possible of the culture or groups under study (p. 235). To all these, we can add the point of view presented by Krane and Baird (2005), who argue that ethnographic research uses many methods to obtain a comprehensive understanding of the social environment and the perceptions of social group members. In this regard, it is known that most forms of knowledge can be localized in time and space. They come from certain persons for a specific purpose, in a certain historical period whose traits reflect inclusively stereotypes and prejudices. Thus, ethnography is not immune to such trends. This is a methodology with over 100 years of history, which emerged in Western countries as a form of knowledge on remote cultures (usually non-Western ones) that had been impenetrable to analysis and consisted only of short ephemeral contacts or short conversations. But, despite its good intentions... ethnography is still a colonial method (Gobo, 2008, p. 2).

We consider it appropriate to bring to discussion the viewpoint of Atkinson (2015), who believes that ethnographic fieldwork always involves a degree of *participation* in the chosen field. To put it negatively, it is not the enactment of a series of interviews, however ‘active’ or exploratory they may be. Ethnographic fieldwork may involve many conversations, some of which may be in the form of interviews, but they alone do not constitute an adequate ethnography, worthy of the name (whatever other benefits there may prove to be). Now the degree and nature of that participation can (and should) vary considerably. In the author’s opinion, this aspect of ‘participation’ does not depend on the adoption of that way of life. One does not need to spend one’s time as a school student, as a street person, as an employee in a complex organization. Indeed, to equate ethnographic participation with such role-adoption is, at root, to trivialize it. To participate is, in other words, to make a certain personal as well as intellectual commitment. It is also to exploit (in the best sense) one’s full range of human capacities in order to make sense of a given social world. Such capacities include the ability to be observant, to take the role of the other, to listen, to learn and to imitate, indeed to do all of the things that everyday social actors do in order to make sense of themselves, others and the world about them. In order to do so, we employ specialized methods of recording and thinking that transform participant observation from mundane activity, and that make it a form of theorized – rather than purely practical – activity (pp. 54-55).

As a conclusion to the attempt of defining ethnography, we can mention that it represents an investigation of a group by collecting data, generally over a substantial period of time, using various methods. Holt and Sparkes (2001, cited by Gratton and Jones, 2004, p. 176) suggest that the defining trait of an ethnography is its **purpose**, and this purpose is represented by the study of a group of people and their culture, where

understanding the group is obtained rather by the behavioral examination of that group than from the perspective of the researcher. To achieve this purpose, the researcher must take the role of an *intruder* and spend a longer period of time with the group, during which data are collected.

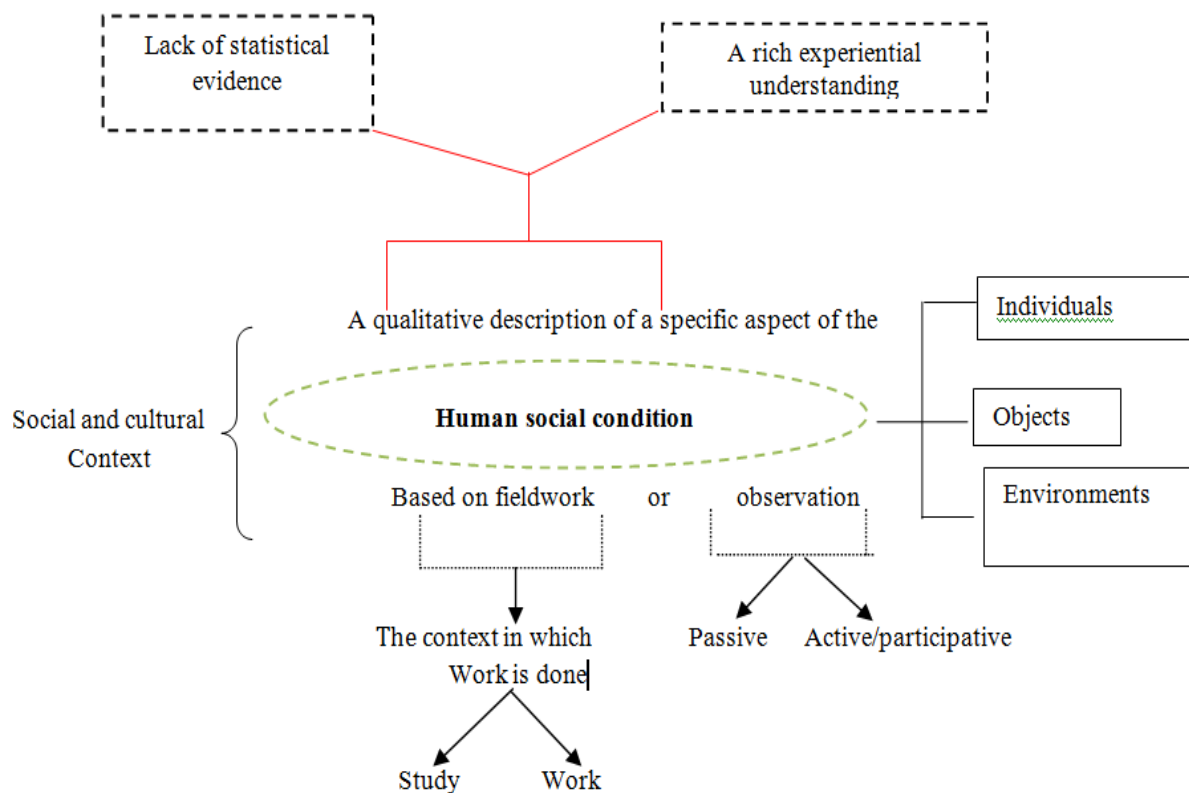


Fig. 1. Deconstructing the Definition of Ethnography (Aqeell and Campbell, 2012)

As can be seen in figure 1, the qualitative description of a human social condition involves little statistical evidence, but a better experiential understanding based on the collected data. Contextual inquiry focuses on the social and cultural aspects of a social phenomenon. Any social phenomenon occurs thus within a social and cultural context and exists when there is interaction between people, objects or environments. Therefore, the “field” is where the work is done (the context of the work or study), and data are collected through active or passive observation (Aqeell and Campbell, 2012).

Ethnographic sports research

An ethnography study is neither an academic project one participates in a leisurely fashion or a hobby undertaken in one’s spare-time spectrum. Full-scale, realist ethnographies totally encompass and connect one’s professional and personal lives. This is the essential, and critical, logic of the method (Young and Atkinson, 2012).

For Silk and Andrews (2011), the study of sports and physical culture, or what has sometimes been referred to as *physical cultural studies* (PCS) is a trans-disciplinary and multi-epistemological approach to the analysis of human movement, embodiment and corporal representation. PCS researchers often strive to produce local, national and cross-national analyses of how sport, exercise and physical activity may be contexts where social inclusion, health, safety and human rights promotion is evident, and physical, intellectual, emotional and artistic potentials are supported without fear or prejudice (Atkinson, 2011).

Smith (2010) mentions that ethnography, as a qualitative research strategy, is ideal to investigate the dynamic and complex activities constantly encountered in different sports cultures. From aerobic gymnastics to windsurfing, sport provides a multitude of cultural and social experiences, as well as a real perspective on the way in which we, as humans, act in everyday life through sports. With the broad sense of qualitative research in the field of sports, such a methodological diversity enables a wide range of studies to be performed. To this purpose, ethnography extends and improves our understanding as a way of examining sports cultures and the people who are part of them (p.169). The author emphasizes that ethnography can be particularly attractive to sports research, because it can be used to evaluate the interventions applied in sport for problem solving or better multicultural

understanding. Smith draws attention that sport has its own culture and, in this vast culture, each type of sport has its own culture. To this purpose, ethnography is well suited for investigating sports culture, acting on situations from the real life of athletes. An ethnography research in the field of sports or physical education represents a very flexible methodology, where data collection is often unstructured, unplanned or even unexpected. Thus, unlike an experimental study, in an ethnographic study it is hard to provide a precise framework that gets closer to such an approach. However, Kassing et al. (2004) note that there are very few studies, ethnographic or otherwise, of the inside of sports franchises, primarily because obtaining access in such organizations is very difficult.

In the book *New Ethnographies of Football in Europe: People, Passions, Politics*, Schwell, Kowalska and Szogs (2016) outline the essential elements of an ethnography study:

- It must be a written representation of culture,
- The account must provide 'thick description' of the social environment,
- In an ethnography, theory can only come after description and must give way to it,
- Ethnographies are invariably microscopic,
- Ethnography must provide an authentic account of the field.

Stages in ethnographic sports research

Summarizing the stand point of some specialists, we present graphically the main *stages* of an ethnographic study that can be completed in sports research.

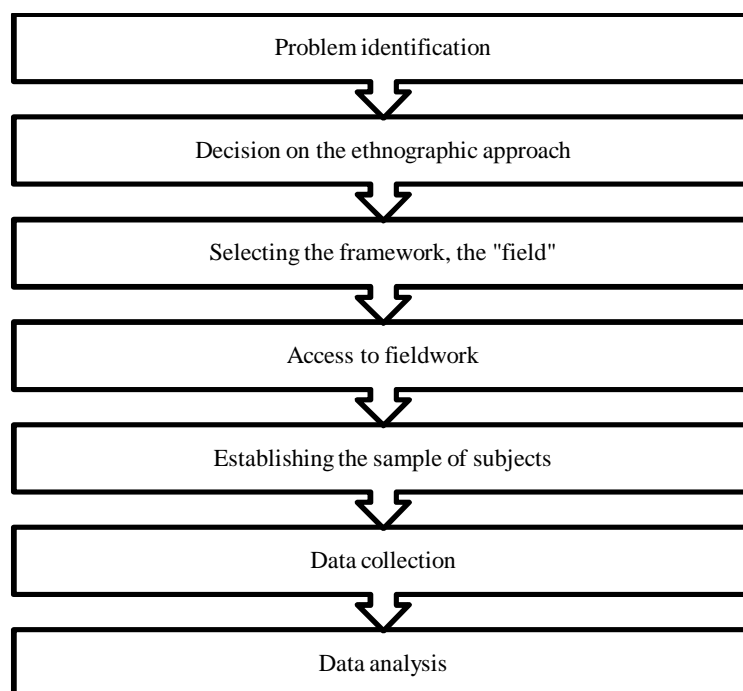


Fig. 2. Stages in ethnographic sports research

In the following lines, we shall give some necessary details regarding the content of each stage. Thus, as happens in any research study, ethnographic studies also start with the stage in which it is decided on the *research problem*. In this regard, Mason (1996, p.166-167) suggests that a possible way to deal with these problems consists in the attempt to clarify your intentions when formulating the research problem. The author establishes some ethical imperatives for an ethnographer, namely:

- decide on your research purposes, for example: football fans, sports hooliganism or propaganda etc.;
- try to see which individuals or groups might be interested in or affected by your research;
- try to delimit the consequences presumed by your way of configuring the research issue on the involved parties.

One cannot initiate an ethnographic research in the field of sports without having an idea on the research problem. The research problem that the ethnographer chooses guides the entire research endeavor. It typically dictates the shape of the research design, including the budget, the tools to conduct the research, and even the presentation of the research findings. How the ethnographer interprets and defines the problem usually reflects

either a basic or an applied research orientation. The problem may also suggest the most appropriate research approach – ethnographic, survey, or experimental (Fetterman, 2010). In this context, we can exemplify the study achieved by Kirk and MacPhail (2003) on the concept of social positioning to explore the construction of a youth sports club by young people, their parents and coaches. The study goes on to explore the value of this concept for investigating the construction of a youth sports club by reporting in turn the various positions occupied by the athletes, their parents and their coaches at Forest Athletics Club. As a research strategy, the authors used ethnography, as a means of studying social positioning and the construction of a youth sports club. In this study, the purpose of ethnography is to capture the routine and everyday activities of the people who occupy a particular site and to understand the meaning of these activities from the participants' points of view (Hammersley and Atkinson, 2007).

In an ethnographic research, theory arises from or is built based on data and for this reason there must be some general objectives to accomplish, so that the researcher knows what to observe in the field. And what the researcher should not do in the ethnographic process is imposed by the theoretical framework designed before the data collection process. Thus, the next stage of the research process is to establish whether the *ethnographic approach* represents a suitable research design. If the research objective is to better understand a group or a sports subculture, ethnography can be the appropriate research strategy. If the research requires more descriptive data or you want to evaluate a larger number of people through statistical techniques, you should use another research strategy. Then, although the *selection of the research framework or the field* is usually done after the research question has been formulated, it might occur the situation where the research framework is chosen first, especially when it is familiar or accessible to the researcher. In this stage, it is important that choosing the framework and formulating the research question are compatible. Obviously that, after selecting the framework in which the researcher wants to conduct the ethnographic study, there are established the possibilities of gaining entry to the setting. Having access to the intended group for collecting data is a key step in ethnography. The entry pathway has implications on the subsequent validation and validity of the obtained data, and for this reason it should be approached very carefully. A common method is to identify, to find a “gatekeeper”, a person trusted by the group members, who can later introduce you to other people (Gratton and Jones, 2004, p. 182).

As Mason highlights (1996), gaining access is one of the main methodological stages of ethnographic research. In this regard, specialized works distinguish two types of research environments:

- “closed” or “private” (such as organizations, deviant groups), where the access is controlled by *gatekeepers*;
- “open” or “public”, to which the access is free, but not always without difficulties, which are either practical (e.g. establishing a role for the researcher in that public setting) or ethical (e.g. do we have the right to impose our presence in the middle of a vulnerable minority?).

Keep in mind that the access to information and therefore to the research data will be strongly influenced by the way in which the group members interpret your reasons and interests as a researcher. Regarding the study achieved by Kirk and MacPhail (2003), the gatekeeper was represented by the club president, who facilitated their access to the study participants.

As we know, ethnography aims at understanding the culture of a particular group from the perspective of the group members. In this context, you must take into account the *group of subjects*, the fact that a group may have many members, that they can exhibit several behaviors etc., and data collection gets a slightly different meaning compared to the one encountered so far, especially when the time frame you have set to collect data is limited. Thus, because of the limited timeframe, it will not be possible for you to record all data and you will have to decide on the data to be measured. In this regard, there are two categories of data (Hammersley and Atkinson, 2007): first, there are those categories of data which, in the initial fieldwork, you identify as suitable information. Secondly, there are those who volunteer themselves, or are volunteered by other members of the group. It is thus emphasized the role of the ethnography researcher in evaluating the suitable sample of subjects and making the decision on what and how the data will be collected. As mentioned by Gratton and Jones (2004), another important feature refers to the possibility for the ethnographer to fit with the group, without raising suspicions or standing out from the group in a way or another. In our example, in the study conducted by Kirk and MacPhail, the participants were children (aged between 9 and 15 years), parents and coaches.

An important stage in ethnographic research is *data collection*. Most often, ethnographic data are written in the form of field notes, but it is also possible to use recording devices, such as: tape recorders, cameras or video equipment. Field notes should be recorded as soon as possible, preferably when you are in the field, excepting the situations in which circumstances do not allow it. In this respect, the main ethnographic methods for data collection are *observation, structured or unstructured interviews or archive research*. In the study of Kirk and

MacPhail, the main methods for data collection were observations and field notes achieved during training sessions and competitions. As mentioned in the study, the second author was the principal fieldworker. The authors of the study also used individual or group interviews with parents, children, coaches or even the club president.

Data analysis is a continuous process that takes place during and at the end of ethnography. Interpretation emerges from the initially collected data, and then additional data can be collected to support or reject the research questions; thus, explanations can be continuously developed and tested. From the data collected in the study *Social positioning and the construction of a youth sports club* by Kirk and MacPhail (2003), which included both field notes and interviews, there were identified text segments. According to the authors, category labels were attached to the segments and all text segments that related to a specific category or theme were sorted accordingly, similar to the constant comparative method of generating grounded theory. The data were reviewed repeatedly and continually coded, and similarities and differences, groupings, patterns and items of particular significance were sought.

Discussions

It is obvious that ethnography has an anthropological background, and ethnographic research can be sometimes problematic when we are not quite familiar with the social habits of the studied people or their language (Hancock, Ockleford and Windridge, 1998).

In their reference book for the field of sports, *Qualitative research on sport and physical culture*, Young and Atkinson (2012) highlight that most ethnographers will also interview members of the culture or setting under study in order to deepen their understandings of the people there, and to collect life history data on the group members. Thus, realist ethnographic methods are undertaken quite frequently as triangulation-based studies. Ethnographic interviews provide a context for focused data collection by asking specific but open-ended questions among key informants identified through the research process (p. 28). To assume that ethnography consists only in doing fieldwork and making observations is totally inappropriate and wrong. In other words, the ethnographer must penetrate beyond the initial field experience, where each aspect seems fascinating, any nuance seems to be in correlation with another one and each small fragment he reads adds new ideas to the already existing ones.

Authors' contributions

All authors had equal contributions and approved the final manuscript.

References

- Aqeel, S., & Campbell, R. (2012). Contextual Research. *Introduction to Ethnographic Research style*. Retrieved from <https://contextualresearch.wordpress.com/week-02/class-03/>
- Atkinson, P., & Hammersley, M. (1994). Ethnography and Participant Observation. In N. K. Denzin and Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 248-260). Thousand Oaks, CA: Sage.
- Atkinson, M. (2011). Physical cultural studies (redux). *Sociology of Sport Journal*, 28, 135–141.
- Atkinson, P. (2015). *For Ethnography*. Cardiff University: SAGE Publications Ltd.
- Blommaert, J., Dong, J., & Jie, D. (2010). *Ethnographic fieldwork*. Clevedon, UK: Multilingual Matters.
- Fetterman, D. M. (Ed.). (2010). *Ethnography: Step-by-step* (Vol. 17). New York: Sage.
- Gobo, G. (2008). *Doing ethnography*. New York: Sage.
- Gratton, C., & Jones, I. (2010). *Research methods for sports studies*. Oxford: Taylor & Francis.
- Hammersley, M. (2016). *Reading ethnographic research*. Oxford: Routledge.
- Hammersley, M., & Atkinson, P. (2007). *Ethnography: Principles in practice*. Oxford: Routledge.
- Hancock, B., Ockleford, E., & Windridge, K. (1998). *An introduction to qualitative research*. Nottingham: Trent focus group.
- Kassing, J. W., Billings, A. C., Brown, R. S., Halone, K. K., Harrison, K., Krizek, B., & Turman, P. D. (2004). Communication in the community of sport: The process of enacting, (re)producing, consuming, and organizing sport. In P. J. Kalbfleisch (Ed.), *Communication year book 28* (pp. 373-408). Mahwah, NJ: Lawrence Erlbaum.
- Kirk, D., & MacPhail, A. (2003). Social positioning and the construction of a youth sports club. *International review for the sociology of sport*, 38(1), 23-44.
- Krane, V., & Baird, S. M. (2005). Using ethnography in applied sport psychology. *Journal of applied sport psychology*, 17(2), 87-107.
- LeCompte, M. & Preissle, J. (1993). *Ethnography and Qualitative Design in Educational Research* (second edition). London: Academic Press.
- Mason, J. (2002). *Qualitative researching*. New York: Sage.

- Merriam-Webster (n.d.). *Ethnography*. Retrieved from <http://www.merriam-webster.com/dictionary/ethnography>
- Mihăilescu, V. (2009). *Antropologie. Cinci introduceri*. Iași: Polirom.
- Schwell, A., Kowalska, M., & Szogs, N. (Eds.). (2016). *New Ethnographies of Football in Europe: People, Passions, Politics*. New York: Springer.
- Silk, M., & Andrews, D. (2011). Toward a physical cultural studies. *Sociology of Sport Journal*, 28, 4–35.
- Smith, M. F. (2010). *Research Methods in Sport*. Exeter: Learning Matters Ltd.
- Whitehead, T. L. (2005). Basic classical ethnographic research methods. *Ethnographically Informed community and cultural assessment research systems*.
- Ybema, S., Yanow, D. Wels, H., & Kamsteeg, F. (2010). Ethnography. In A. J. Mills, G. Durepos, & E. Wiebe (Eds.), *Encyclopedia of Case Study Research: L-Z; Index* (Vol. 1). New York: Sage.
- Young, K., & Atkinson, M. (Eds.). (2012). *Qualitative research on sport and physical culture*. West Yorkshire: Emerald Group Publishing.

COMPARATIVE STUDY BETWEEN THE PERSONALITY OF STUDENTS IN N.U.P.E.S. AND PERSONALITY WANTED BY POTENTIAL EMPLOYERS

Vasilica GRIGORE¹, Constanța-Valentina MIHĂILĂ¹, Radu PREDOIU^{1*},
Mihaela PĂUNESCU¹, Mihaela APOSTU¹, Răzvan-Liviu PETRE¹

¹National University of Physical Education and Sports, 140 Constantin Noica, Bucharest, Romania

* Corresponding author: radu_predoiu@yahoo.com

Abstract. *Personality is what designates the complex and dynamic reality of each of us. Personality is complex because it includes both anatomical and physiological elements, as well as psychic and socio-cultural elements. It is dynamic because it can take some time to develop its various characteristics. The purpose of our study was to investigate if there are significant differences between third-year students' personality and the personality desired by potential employers, to support a better integration into the workforce for the graduates. A total number of 130 people took part in this study, with ages between 21 and 65: 100 students at the National University of Physical Education and Sports Bucharest and 30 potential employers with interests in Sports Science and Physical Education field. The instrument used was the NEO FFI personality inventory (purchased from TEST CENTRAL), which captures the five major factors: Neurotism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness. Using the "t" test for independent samples, statistically significant differences were revealed for the five factors of the personality, between the researched samples: "students-men" vs. "employers" (the desired personality) and "students-girls" vs. "employers" (the desired personality). The study shows that a low level of neurotism and a high level of extraversion, openness to experiences, agreeableness and conscientiousness lead to a better integration of N.U.P.E.S. graduates in the job market.*

Keywords: personality, neurotism, extraversion, conscientiousness, agreeableness, openness to experience.

Introduction

The personality is the result of all psychic evolution. From a broad perspective, personality designates the complex and dynamic reality of each of us. The personality is complex because it includes both anatomical and physiological elements, as well as psychic and socio-cultural elements (Zlate, 2000, p. 234). It is dynamic because (although personality traits are relatively stable) its various characteristics can withstand a certain development throughout time. According to Larousse's Great Dictionary of Psychology (Bloch et al., 2006, p. 892), the personality is described as the set of relatively stable and general characteristics (affective, emotional, dynamic), the way of being of a person and the way a person responds to certain situations.

The general principles state that personality features (for example: conscientiousness, agreeability, openness to experiences, intelligence) are manifested in different situations and activities: playing, learning, working, communicating (Horghidan, Mitache and Tüdös, 2001, p. 256). In terms of extraversion, Lavach (1991) highlighted the fact that extraverted (communicative, social) individuals tend to show patterns of brain activation (surprising through EEG) significantly higher in the right hemisphere, unlike introverted (solitary, less sociable, less communicative).

When it comes to sports, the researchers generally compare the athletes' personality with those of non-sportsmen. Such studies (McKelvie, Lemieux and Stout, 2003; Urzeală, Popescu and Predoiu, 2014) highlight that physical exercise reduces anxiety - sports facilitate better adaptation of the nervous system, which becomes more reactive and less fragile. At the same time, physical activity (Predoiu, 2016, p. 10) improves self-awareness and self-confidence, facilitates social contacts and generates well-being (cognitive and stress-relieving experiences). In our study, the dimensions (used to quantify personality) investigated in the personality are: neurotism, extraversion, openness to experiences, agreeableness and conscientiousness. Neurotism refers to the intensity and frequency of occurrence of negative emotions associated with a negative outlook on life and a relatively low emotional adaptation. Extraversion captures the tendency to look for the company of others or not and the energy manifested by people in social relationships or environments. Opening up to new experiences reflects people's receptivity to new information, as well as behaviors of active search for this type of information. Agreeableness defines the orientation of individuals towards respecting and promoting good manners, as well as the tendency to avoid conflicts and disputes at an interpersonal level. Conscientiousness refers to the extent to which people's behavior is focused on goals and the achievement of goals, as well as on personal organization. We are talking about the Five Factor Theory of Personality Model. McCrae and Costa (2008, p. 163) present the essential components of the personality system (Fig. 1).

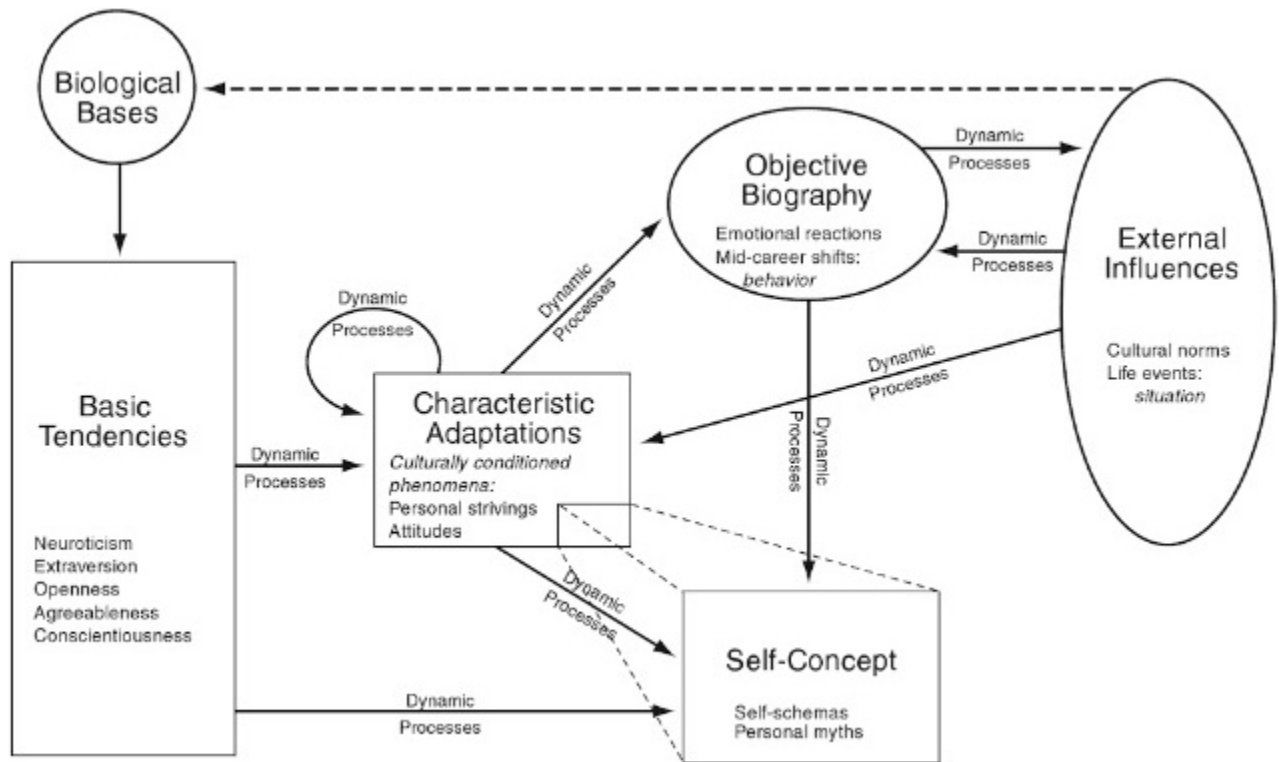


Fig. 1. Representation of the five factors of personality theory - F.F.T. (McCrae and Costa, 1996)

F.F.T. (The Five-Factor Theory of Personality) postulates

- *Primary tendencies*

- all individuals can be characterized by differentiated manifestation of personality features that determine patterns of thought, sensation and action.
- the development of personality features takes place as a result of maturation, especially in the first life stage, but continues throughout their lives.
- the characteristics are organized hierarchically from narrow/specific to large/general. Neuroticism, extraversion, openness to experience, agreeableness and conscientiousness represents the highest level of the hierarchy.

- *Adapters*

- over time, the individuals react to the environment by developing patterns in thought and action, consistent with their own personality traits.
- at one point a person's reactions may not be optimal, taking into account the cultural values or personal goals.
- plasticity refers to the fact that the adapters change over time as a response to biological maturation and as a direct result of social roles and changes in the environment.

- *Objective biography*

- individuals have plans, set up a certain program, a series of goals, so the action is organized for a set time, depending on their own personality traits.

- *Self-image*

- individuals have a certain cognitive and affective image on their own person, which is accessible to consciousness.
- the informations are selectively represented in the self-image, in accordance with the personality traits of the person.

- *Social influences*

- the social and physical environment interacts with personality, shaping behaviors.
- the human individual builds/manipulates the environment according to his personality traits.
- the people selectively influence the environment with which they interact.

- Dynamic processes

- the individual's ability to adapt to the environment, to behave, to develop strategies in thinking is regulated in part by cognitive, affective and universal volitional mechanisms. Certain dynamic processes are differently affected by the individual's primary tendencies, including personality traits.

The purpose of our study is to analyze if there are statistically significant differences between the personality of third year students (separately for boys and girls) and the desired personality of potential employers. Research is part of a wider study that aims to better integrate students into the labor market, taking into account the fact that, with the completion of their undergraduate studies, students will try to engage and integrate into the workplace.

Materials and methods

Participants. A total of 130 people took part in the study, with ages between 21 and 65, divided into two groups as follows:

- 100 students (average age of 21.5 years) - 34 students from the PES (Physical Education and Sports) study program, 35 students from the SMP (Sport and Motric Performance) program and 31 students From the Faculty of Kinetotherapy, all students at the National University of Physical Education and Sports Bucharest;
- 30 potential employers (average age 53.1 years) with interests in the field of sports, science and physical education – the potential employers were represented by: presidents and vice-presidents of specialized sport federations, directors of school sports clubs, presidents and managers of private sports clubs, federal coaches from specialized sports federations, medical directors, general directors, share holders or administrators at recovery or rehabilitation clinics, as well as Bucharest School Inspectorate teachers / kinetotherapists / methodologists for special schools.

Instruments

The NEO-FFI personality questionnaire was used to provide a clear picture of the personality features of the evaluated person.

Developed by P. Costa Jr. and R. McCrae, the NEO-FFI was specifically built to measure the five major personality factors. This tool is considered to be one of the most valid tools in construction's term. Moreover, NEO-FFI is one of the most widely studied tools for personality assessment, its interpretations being validated in hundreds of research programs, on different populations. The dimensions evaluated are in part the five major factors: Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness. Also, for each of the five major factors measured in the NEO-FFI, two coherent sub-dimensions, as meaning and interpretative relevance, were isolated. These sub-dimensions capture clusters of differentiated behaviors, allowing for an interpretation with a high degree of specificity.

The NEO FFI inventory measures differences between normal people, is not a test of intelligence or abilities and is not intended to diagnose the mental health issues.

Procedure

The NEO-FFI personality questionnaire was applied online by the 130 participants (students and potential employers), using a computing platform, through the company "TEST CENTRAL". The period during which these 130 questionnaires were sent, accessed and completed by the participants (using a specific account and password for each person) was 1 November - 10 December 2016. The participants were free to fill in the personality inventory at any time of day, accessing the link they received on their personal email address and then, entering their username and password.

Completing the NEO FFI questionnaire takes about 15 minutes and the personality profile is generated automatically. Please note that potential employers completed the questionnaire using third person writing style. We wanted to highlight the employer's perception of the ideal employee. The training was the following - "Please answer the 60 items of the questionnaire depending on how you want to think/relate to the test situation the 21 year old ideal male employee" (or females).

The students' scores in the following dimensions: Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness were compared (separately for boys and girls) with the results desired by potential employers with interests in the Sport Science and Physical Education field.

Results

Through the “t” test for independent samples, we checked whether there are statistically significant differences between the groups surveyed: "students-boys" vs. "employers" and "students-girls" vs. "employers", compared regarding the means of the dependent variables analyzed- neuroticism, extraversion, openness to experiences, agreeableness and conscientiousness. This “t” test is specific to intergroup designs.

The conditions for applying the “t” test were fulfilled: group independence (each subject belongs to only one group and these groups are independent); the dependent variable is quantitative, measured on the interval scale; the dependent variable is normally distributed (the skewness coefficient in absolute value, in most cases is less than 1). Please note that some authors believe, however, that “t” tests are quite robust and can be applied when this condition is violated (Labăr, 2008, p. 97).

When it comes to the homogeneity of variances (groups must be part of populations with equal variances) the results of the Levene test are generally insignificant ($p > 0.05$). Only in the case of "students-boys" vs. "employers" values less than 0.05 have been found in the Levene test for agreeableness and openness, which means that the variants are unequal. In this case an adjusted value of the “t” test will be read.

Table 1. Results group "Students – boys" vs. "Employers" – descriptive statistics

	group	N	Mean	Std. Deviation	Std. Error
neuroticism	students	58	37.22	26.72	3.51
	employers	15	18.07	21.87	5.64
extraversion	students	58	64.50	28.38	3.72
	employers	15	83.60	25.50	6.58
openness	students	58	57.71	26.76	3.51
	employers	15	78.93	17.51	4.52
agreeableness	students	58	55.28	28.25	3.71
	employers	15	81.00	17.10	4.41
conscientiousness	students	58	70.45	25.21	3.31
	employers	15	85.60	19.94	5.14

Table 2. Results group "students - boys" vs "employers"

Variables	t	df	p	g	Confidence interval	
					lower	higher
Neuroticism	2.55	71	.013	0.74	4.23	34.08
Extraversion	-2.36	71	.021	0.68	-35.18	-3.00
Openness	-3.70	71	.001	0.84	-32.87	-9.57
Agreeableness	-4.46	71	.000	0.97	-37.41	-14.03
Conscientiousness	-2.15	71	.035	0.62	-29.16	-1.13

The analysis of the results obtained for the five factors of personality, in table number 2, highlights:

- the average value for neuroticism desired by employers is significantly lower ($p < .05$) than the average for neuroticism obtained by third year students-boys.
- the average value for: extraversion, openness to experiences, agreeableness and conscientiousness desired by employers is significantly higher ($p < .05$) than the average of students in the above-mentioned dimensions.
- the effect size index (Hedges's g) shows a strong difference between the results for openness to experience and agreeableness desired by employers and the results obtained by third year students; there is also a

moderate to strong difference between the results for neurotism, extraversion and conscientiousness desired by employers and the results of third year students.

Table 3. Results group “students - girls” vs “employers” – descriptive statistics

	group	N	Mean	Std. Deviation	Std. Error
neurotism	students	42	49.10	30.08	4.64
	employers	15	28.13	26.54	6.85
extraversion	students	42	62.57	29.47	4.54
	employers	15	82.07	20.82	5.37
openness	students	42	61.76	29.91	4.61
	employers	15	62.60	23.98	6.19
agreeableness	students	42	63.60	29.49	4.55
	employers	15	75.87	23.45	6.05
conscientiousness	students	42	66.02	28.16	4.34
	employers	15	84.07	18.93	4.88

Table 4. Results group “students - girls” vs “employers”

Variables	t	df	p	g	Confidence interval	
					lower	higher
Neurotism	2.38	55	.021	0.71	3.34	38.58
Extraversion	-2.35	55	.022	0.70	-36.09	-2.89
Openness	-3.70	55	.923	0.03	-18.03	16.35
Agreeableness	-4.46	55	.152	0.43	-29.19	4.65
Conscientiousness	-2.15	55	.026	0.69	-33.79	-2.29

The analysis of the results obtained for the five personality factors, in table number 4, reflects the following:

- the average for neurotism desired by employers is significantly lower ($p < .05$) than the average for neurotism obtained by third year students-girls.
- the average value for extraversion and conscientiousness desired by employers is significantly higher ($p < .05$) than the students average for the specified personality traits.
- there are no significant differences in the openness to experience and in the case of agreeableness between the desired results of the employers and those obtained by the students of the third year ($p > .05$).
- the size effect index (Hedges's g) shows a moderate to strong difference between the results for neurotism, extraversion and conscientiousness desired by employers and the results of third year students.

Conclusions

The analysis and statistical data processing reveals significant differences for the five personality factors (Neurotism, Extraversion, Openness, Agreeableness and Conscientiousness) among samples of subjects to research: third year students (boys and girls) from N.U.P.E.S. and potential employers with interests in the Sport Science and Physical Education field. Thus, the average for neurotism desired by employers is significantly lower than the average obtained by both groups: students-boys and students-girls. In other words, the employers want the people to be calm and relatively free of negative feelings or emotions. The emotional manifestations of future

N.U.P.E.S. graduates need to be more stable and adapted to the situations they faced. The lack of negative emotions does not mean that people only live positive emotions, but that they feel less anger, anxiety or stress. Also, the results desired by employers for extraversion and conscientiousness are significantly higher than those recorded by both boys and girls students groups. The potential employers expect that the 21 year old employees (male and female) to be individuals who have a tendency to get involved in the social environment, to effectively interact with others, to show verbal fluency and assertive communication. Moreover, it is good that the people to show initiative in social contexts and to feel comfortable when they are in the spotlight. Regarding to the conscientiousness, the employers want people who are more organized in their personal and professional lives, who are able to control their emotional responses, thus being prepared to persistently pursue medium-term and long-term goals. The differences noticed for conscientiousness refer also to the capacity to respect deadlines and to the ability to effectively organize the activities so that the resources can be properly managed.

Considering the students (boys group) there were significant differences, in contrast with the employers' vision, also in the case of openness to experience and agreeableness. The potential employers expect the ideal employees to show greater interest in new activities, to be more curious and open to new experiences. The differences found in agreeableness are expressed through the need of the students in the third year to be more concerned about harmonizing the relationships with others, to focus on cooperation rather than competition. It is important that the future N.U.P.E.S. graduates to be individuals who have a more optimistic perspective on human nature, being willing to reach a compromise rather than engage in conflicts with others. In the case of third year students-girls group, there were no statistically significant differences regarding openness to experience and agreeableness between their profiles and those desired by the employers.

Our study highlights the fact that a low level of neuroticism and a high level of extraversion, openness to experience, agreeableness and conscientiousness facilitate a better integration of N.U.P.E.S. graduates into the job market. In this process (the personal development of third year students: boys and girls), the role of psychologists or the counselors is very important. The specialists, when working with students, will use various techniques, involving: self-monitoring of emotional reactions (verbal and behavioral); building the capacity to establish new social relationships; the inner monologue (positive self-talk); the knowledge of the others; the positive resolution of social conflicts; learning ways to mediate conflicts; autogenic training and analytical relaxation; the awareness of their own motivations; a greater involvement in physical activities which makes them happy; the increasing of self-confidence; the formation of assertive, nonverbal and paraverbal communication skills. The process of personal development is invaluable for students - boys and girls who want to optimize their professional performance.

The research was limited by the psycho-physical condition (fatigue, affective-motivational factors) of the participants at the time of testing, which may lead to the variations of alertness, variations in the perceptual quality of the relevant information or in the processing capacity. Conversation and observation used as research methods support the value of our research that aims to increase students' accountability for their own professional training as well as to guide students in order to plan and manage their own educational path. Through students' awareness regarding the differences between their personality profile and the one desired by potential employers will facilitate the future relationship between students and employers, and a better integration of graduates into the labor market.

Acknowledgement

All authors contributed equally to the study and accepted the final form of the paper. The study is conducted and published under the aegis of the National University of Physical Education and Sports, Bucharest, as beneficiary of the CNFIS-FDI-2016-0122 institutional development program, through the project "Sports students are preparing for the right job!".

References

- Bloch, H. et al. (2006). *Marele dicționar al psihologiei – Larousse*. București: Trei.
- Horghidan, V., Mitrache, G., & Tüdöş, Ş. (2001). *Psihologie normală și patologică*. București: Globus.
- Labăr, A. V. (2008). *SPSS pentru științele educației*. Iași: Polirom.
- Lavach, J. F. (1991). Cerebral Hemisphericity, College Major and Occupational Choices. *The Journal of Creative Behavior*, 25, 218-222.

- McCrae, R. R., & Costa, P. T. (2008). The Five-Factor Theory of Personality. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of Personality, Third Edition: Theory and Research*(pp. 159-182). New York: The Guilford Press.
- McKelvie, S. J., Lemieux, P., & Stout, D. (2003). Extraversion and Neuroticism in Contact Athletes, No Contact Athletes and Non-athletes: A Research Note. *Athletic Insight. The Online Journal of Sport Psychology*, 5(3), 19-27.
- Predoiu, R. (2016). *Psihologia sportului. Maximizarea performanței sportive*. Iași: Polirom.
- Urzeală, C., Popescu, V., & Predoiu, R. (2014). Dimensions of the personality of athlete and non-athlete normal weight and overweight female students. *Social and Behavioral Sciences*, 117, 395–401.
- Zlate, M. (2000). *Fundamentele psihologiei*. București: Pro Humanitate.

APPRECIATION OF EATING HABITS IN A GROUP OF TEENAGERS FROM TWO HIGH SCHOOLS IN THE CITY OF IASI: SPORTS HIGHSCHOOL AND G. IBRAILEANU THEORETICAL HIGHSCHOOL

Adriana ALBU^{1*}, Ionuț ONOSE², Mihaela Elena CĂRĂUSU¹, Raluca Mihaela HODORCĂ²

^{1*} "Gr. T. Popa" University of Medicine and Pharmacy of Iași, 16 Universității, Iași, România

² "Al. I. Cuza" University of Iași, 11 Carol I, Iași, România

^{*}Corresponding author: raluca.hodorca@yahoo.com

Abstract. *Balanced nutrition helps maintain the health of adolescents and plays an important role in supporting their sports performance. Study objectives: comparative assessment of the alimentation in sportive and not sportive adolescents. Methods: The study was conducted on a sample of 183 adolescents from the Sports High School of Iassy (94 students) and G. Ibrăileanu High School (87 students) from Iasi. On these teenagers was applied a questionnaire frequency of food consumption (insisted in the intake of cheese, fish, fruit, sugar and confectionery) and one on the frequency of daily physical activity. Processing of the results was performed with the Pearson's test. Results and Discussion: At the Sports High School often exceeds the time of 60 minutes of physical activity per day, and calculated on the differences being statistically significant at $p < 0.0001$ ($GI = 4$, $\chi^2 = 94.638$). The dominant of cheese intake is 2-3 times (37.70%) or 1 time (32.78%) per week where we found statistically significant differences ($p > 0.05$, $GI = 4$, $\chi^2 = 7.208$). Fish is especially present only 1 time per week (50.81%) so the differences are all statistically significant ($p > 0.05$, $GI = 3$, $\chi^2 = 1.248$). Fruits are especially present in the daily menu (61.20%), the differences obtained are statistically insignificant ($p > 0.05$, $GI = 4$, $\chi^2 = 5.415$). Sugar / confectionery products are mainly consumed daily (38.79%) or 2-3 times (28.41%) per week. Calculated differences are statistically significant at $p < 0.05$ ($GI = 4$, $\chi^2 = 9.852$) and highlight the growing contribution from confectionery to the students of G. Ibrăileanu High School. Conclusions: intense sports activity requires adequate nutritional support. To the students from the Sports High School in Iasi eating habits didn't appear to adapt to the needs of the body.*

Keywords: teenagers, sport, balanced diet.

Introduction

For a teenage athlete compliance with certain standards of hygiene of life is an essential element. In the early years of sports activity will form some healthy habits for life, which will persist during sports performance. One of the aspects that must be closely watched is the one related to food and especially of its correlation with training programmed (Cascua and Rousseau, 2005).

This program includes 3 stages oriented to achieving an optimal level of performance during the competitions: extensive period; intensive period; explosive period.

Extensive period involves making a sustained effort to develop the muscle masses and physical abilities. It is a stage in which adequate dietary intake is essential. Sports performance optimization requires maintaining balance, carbohydrate metabolism, nitric and hydric. The student nutrition must be studied starting from 3 basic elements: control of body weight, percentage of fat mass evaluation, ensuring a balanced nutritional intake.

Intensive stage of training involves a certain quality of labor and sports specific training, which is accompanied by a reduction in daily energy needs.

Explosive stage is based on an increased effort and quality, which must not be associated with a reduction in nutrient intake, since they appear intense mental requests related to the proximity of the competition. It is the stage at which it is appropriate to increase muscle glycogen reserves, increase achieved by increasing daily intake of carbohydrates. They will get to represent 65% of the total caloric intake.

On the day the competition food intake will be facing: avoiding the occurrence of hypoglycemia, dehydration and overlapping physical exertion over digestive activity (Biesalski and Grimm, 2001; Barrault, 1999).

After the competition is necessary rehydrate, recovery, recovery of the stock of glycogen, protein and waste disposal (Wardlaw and Kessel, 2002). All these aspects should be carefully monitored by the athlete, coach and team nutritionist.

Materials and methods

Study group comprises 183 teenagers coming from 2 High Schools in the city of Iasi: High School Sports Program (94 young) and High School G. Ibrăileanu (89 students)-theoretical high school. Students examined were aged between 15 and 17 years old. Young people in the study had filled out 2 questionnaires about the daily physical activity time and nutrition. Daily physical activity time: is less than 15 minutes; 15-30 minutes; 30-45 minutes; 45-60 minutes; over 60 minutes. Appreciation of eating habits was carried out with the help of a weekly

frequency quizzed the intake of food groups. We insist on a weekly consumption of cheese, fish, fruit, sugar/sugary products. The questionnaire includes the following response: zero; 1 time; 2-3 times; 4-6 times; daily. The results will be presented on the two communities compared the school insisting in particular on the situation of pupils of the High School Sports Program. They make an intense physical activity what should be backed up by a proper diet. Processing of the results was done using Pearson test.

Results

The first aspect to be discussed is the one related to the daily time set by teenagers on exercise. All time roster daily motion is granted, especially, over 60 minutes (49.72%), which is a positive element. On this unit, the response occurs at 84.04% students with high school sports program and only at 13.79% youth at least theoretically. Statistical differences calculated are significant at a $p < 0.0001$ ($G1 = 4$, $\chi^2 = 94.638$) and call attention to the physical effort of teenagers practicing sport. This effort will need to be supported by a proper diet (table 1).

Table 1. Daily time given for physical activity by young people

	Under 15 min	15-30 min.	30-45 min.	45-60 min.	Over 60 min.
Sports Program High School	1	3	6	5	79
Theoretical High School	14	34	17	12	12
Total no.	15	37	23	17	91
%	8.19	20.21	12.56	9.28	49.72

Attract attention 8.19% of young people who practice physical activities under 15 minutes daily, which represents a major health problem.

The second aspect is the one related to the studied eating habits of teenagers questioned. The cheese is present in young people, in particular the drop 2-3 times (37.70%) or 1 time (32.78%) per week. The calculated differences being statistically non-significant ($p > 0.05$, $G1 = 4$, $\chi^2 = 7.208$) face similar eating habits of young people in the two communities studied. The result is problematic for young people engaged in sustained physical effort which have increased nutritional needs (Fig. 1).

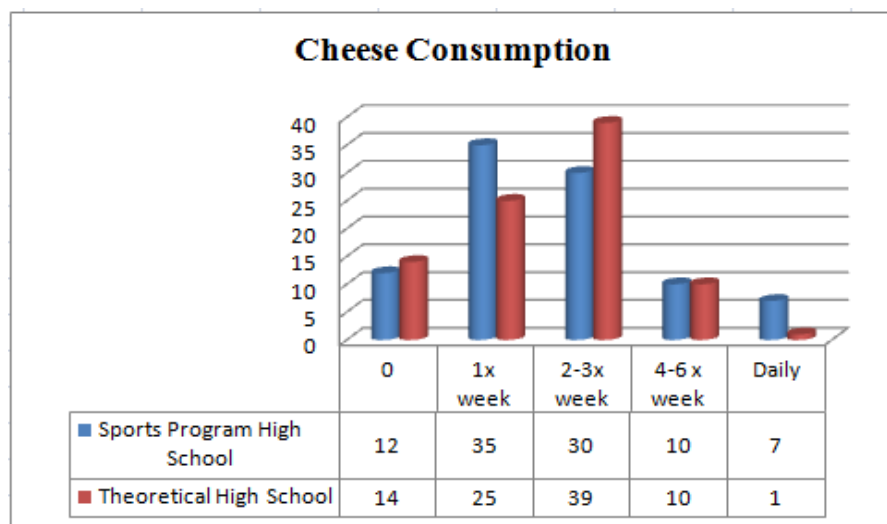


Fig. 1. The frequency of cheese consumption

Attract attention 14.20% young who choose zero variant, so do not consume cheese which represents a serious nutritional mistake. At the opposite pole is placed a 10.92% younger consume 4-6 times a week and the other students a 4.37 percent consume daily, results that are consistent with the norms of rational consumption.

Another group of food of animal origin is represented by the fish. It is present in the menus especially 1 time per week (50.81%). The differences are calculated statistically insignificant community ($p > 0.05$, $G1 = 3$, $\chi^2 = 1,248$) and orient everything towards the idea of the existence of similar eating habits (table 2).

Table 2. *The presence of fish in the studied menus*

	0	1 x week	2-3 x week	4-6 x week
Sports Program High School	34	45	12	3
Theoretical High School	32	48	8	1
Total no.	66	93	20	4
%	36.06	50.81	10.92	2.18

The results are surprising because they allow highlighting of 36.06% young that are missing fish from the menus. At the opposite pole is placed at 10.92% families that fish is now 2-3 times a week and 2.18% other situations in which it is consumed even 4-6 times a week.

Of vegetable products fruits have been studied and the sugar/sugary products. The fruits are present in the menus especially (61.20%) or daily (4-6 times a week (16.93%) which represents a rational consumption rules adapted. Special problems arise from 1.09% youth who do not consume them and at 4.37% students eat only 1 time per week. It is not beneficial for the development of national nutrition education programs related to eating fruit for 6% of the school population (Fig. 2).

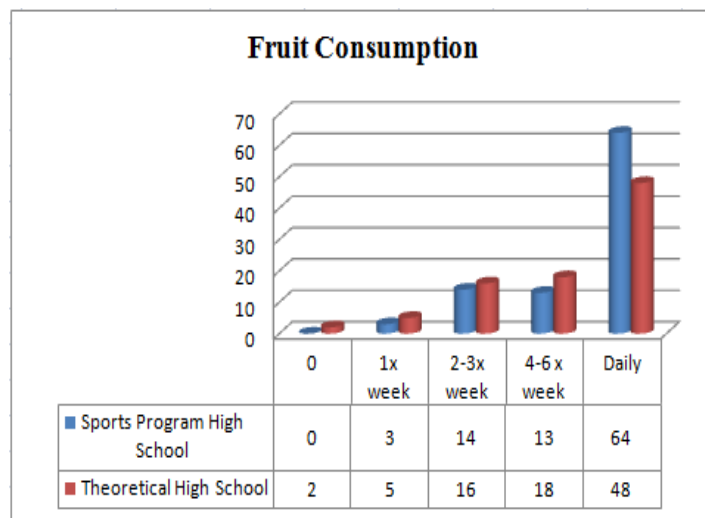


Fig. 2. The frequency of fruit consumption

Statistical differences calculated is not significant ($p > 0.05$, $G1 = 4$, $\chi^2 = 5.415$) and highlights a strong anchor in the pupils' families questioned traditions.

Sugar/sugary products are consumed daily (38.79%) for a third of the students surveyed. The presence of 1.63% teenagers opting for zero variant and 12.02% students marking variant 1 (table 3).

Table 3. *The presence of sugar/sugary products in the studied menus*

	0	1 x week	2-3 x week	4-6 x week	Daily
Sports Program High School	34	45	12	3	27
Theoretical High School	32	48	8	1	44
Total no.	66	93	20	4	71
%	36.06	50.81	10.92	2.18	38.79

Statistically significant differences are obtained from a $p < 0.05$ ($G1 = 4$, $\chi^2 = 9.852$) and highlighting the growth of sugar intake/sugary foods to students in high school.

Discussions and conclusions

The main objective pursued is the one related to the appreciation of the comparative nutrition students from two school organizations: sports program high school and the theoretical one. It requires knowledge of the changes occurring in youth nutrition according to the time to physical activities.

Improving sports performance requires the achievement of a balance-oriented food in 5 main directions: moisturize, quantity, quality, distribution, diversity. Hydration involves achieving a hydric intake before, during and after exercise.

The quantity is essential for covering energy losses, but maintaining a constant body weight. Quality is assessed by means of a balanced intake of animal protein and vegetable, animal and vegetable fat, carbohydrate, mineral elements and vitamins (Martin and Tarcea, 2015; Apfelbaum, Romon and Dubus, 2004).

The distribution is very important because there should be 4-5 daily intakes (3 main meals and 2 snacks) placed, depending on the daily schedule. Diversity is essential in order to ensure intake of all nutrients (Chevallier, 2005).

At this studied group daily physical activity get filed 45-60 minutes and just over 60 minutes. Such responses are triggered by students from both high schools, even though big time granted physical activity is dominant at high school teens from sports program high school.

Young people's concern for the physical activity is confirmed by the studies made in other countries. In a survey conducted in France occur over 70% boys and 55% girls engaged in sports activities at school, in clubs or together with friends. Sport activity is intense at over 7% of young people aged 12-25 years old from France, who made sport more than 6 hours in the last 7 days and at over 10% of pupils have made sport more than 4 hours in the last 7 days. Time sports activity decreases with increasing age, which is a negative element (Guilbert et al., 2004).

Intense physical activity should be supported through adequate food intake. The study of food has been on the food groups with special emphasis placed on the cheese and fish intake of category of animal products and fruit and sugary foods from plant products category.

Adequate consumption of cheese and fish offers the body a large amount of animal protein, which have a balanced content of essential amino acids (Fredot, 2007; Jacotot and Le Parco, 1992). Unfortunately, the results obtained are not those expected. Consumption of these two kinds of food of animal origin is similar to the students from the two communities examined. There is a strong anchor in the tradition of students' families questioned, and this situation was encountered in other surveys carried out in the area (Albu and Gavăt, 2015). This rigorous observance of dietary habits learned in childhood is not a beneficial element for teenagers who practice sports and have increased nutritional needs.

The fruits are present in the menus, in most cases, daily so that the students polled is not necessary for the development of educational program geared towards improving consumption of these foods. The result obtained is similar to that of other studies conducted in the area of Moldova, which must face the necessity to think again of providing fruit in schools through national program (Albu, Moraru and Hodorcă, 2015).

Sugary products/sugar body increased intake of carbohydrates are considered by some authors as products that offer empty calories (Webster-Kenna, Madden and Holdsworth, 2006). The batch of higher consumption study of sweets appears to students from the theoretical high school, working in a very intense intellectual activity. The nervous system uses carbohydrates as the sole source of energy, so the increased intake of sweets faces the daily requirements. Students who practice sport need carbohydrates to avoid the occurrence of hypoglycemia. However, they sometimes avoid due to the risk of increasing the total calorie intake and is associated with alteration of body weight (Jacotot and Campillio, 2003). These young people need nutritional information consistent to avoid the risk of uncontrolled growth of body weight, as well as the occurrence of some serious nutritional imbalances.

The study conducted is among the few existing in the country and enable highlighting of some serious nutritional mistakes made by the families of teenagers who practice sports performance. It requires the existence of a specialist in healthy human nutrition and athlete's performance at the Sports Program High School, in order to obtain increased performance and maintaining the health of these children.

In conclusion we can say that in the case of the High School Sports Program there are too few concerns regarding the adaptation of food nutritional needs of teenagers. The situation is even more serious, there are young people who are still in their growth period, and which have very different nutritional needs. Not adapting nutrition to these necessities will be associated with the emergence of growth/development issues and with shrinking sports performance.

References

Albu, A., & Gavăt, D. (2015). The assessment of eating habits in a teenage sample from Iasi City. *Anthropological Researches and Studies*, 5, 41-47.

- Albu, A., Moraru, C.E. & Hodorcă R. M. (2015). The evaluation of some eating habits at a group of teenagers studying at Dimitrie Cantemir Highschool of Iasi. *Procedia Social and Behavioral sciences*, 197, 1947-1951.
- Apfelbaum, M., Romon, M., & Dubus, M., (2004). *Diététique et nutrition*. Paris: Masson.
- Barrault, D. (1999). Hygiène de vie de l'enfant champion. *Rev. Cinésiologie*, 187, 157-160.
- Biesalski, H.K, & Grimm, P. (2001). *Atlas de poche de nutrition*. Paris: Maloine.
- Cascua, S. & Rousseau, V. (2005). *Alimentation pour le sportif*. Paris: Amphora.
- Chevallier, L. (2005). *Nutrition : principes et conseils*. Paris: Masson.
- Fredot, E. (2007). *Nutrition du bien-portant. Bases nutritionnelles de la diététique*. Paris: Éditions Médicales Internationales.
- Guilbert, P., Gautier, A., Baudier, F., & Trugeon, A. (2004). *Baromètre santé 2000. Les comportements des 12-25 ans*, Paris: Éditions INPES.
- Jacotot, B., & Campillio, B. (2003). *Nutrition humaine*. Paris: Masson.
- Jacotot, B., & Le Parco, J-Cl. (1992). *Nutrition et alimentation*. Paris: Masson.
- Martin, S.A., & Tarcea, M. (2015). *Nutriția sportivului*. Târgu Mureș: University Press.
- Wardlaw, G., & Kessel, M. (2002). *Perspectives in nutrition*. Boston: McGrawHill.
- Webster-Gandy, J., Madden, A., & Holdsworth, M., (2006). *Oxford Handbook of Nutrition and dietetics*. New York: Oxford University Press Inc.

KEY PERSONALITY TRAITS OF FORMER HANDBALL PLAYERS WHICH CAN FACILITATE A SUCCESSFUL CAREER

Alexandra PREDOIU^{1*}

¹National University of Physical Education and Sports, 140 Constantin Noica Street, Bucharest, Romania

* Corresponding author: alexandra.predoiu@yahoo.com

Abstract. Considered one of the most fascinating feature of the psychic life of the human being, personality has been studied intensely over many decades being an object of research for many sciences. The purpose of this study was to highlight the important role of handball in the development of personality traits, which are likely to facilitate a successful career. The study comprised 15 participants, former handball players, with a mean age of 47.68 years, having over 15 years of sport experience and managed to obtain success in their careers. To solve the research matters we used the SIC (Success in career) opinion questionnaire, which comprised 20 items, grouped in two parts. The first part investigated the level in which the practice of handball can develop specific personality traits – the five suprafactors of the Big Five model were discussed and the second part assessed the importance of each of the personality traits for achieving career success. The questionnaire was administrated in collaboration with the Laboratory of Psychology and Psychomotricity within NUPES Bucharest. In order to verify the degree of association between variables a Sommer indicator was used. The results underline significant positive associations between the results concerning the degree in which the practice of performance handball develops specific personality traits and the scores registered regarding the level of influence of those features upon obtaining career success. We therefore underline the important role of handball for the enhancement of the output in the professional line of work.

Keywords: personality, Big Five model, career, handball.

Introduction

From a wide perspective, personality can be defined as the complex and dynamic reality of each of us (Zlate, 2000, p. 234). According to Child (1968, p. 83) personality comprises “the more or less stable, internal factors that make one’s person’s behaviour consistent from one time to another and different from the behaviour other people would manifest in comparable situations”. It is considered to be determined by multiple and complex factors, among which are mentioned: heredity, childhood experiences, the development of the self-concept and specific learning experiences (Eysenck, 2004, p. 446). Personality assessment, as studied and practiced nowadays, has evolved from long ago acknowledgment of the fact that people differ from each other in how they think, feel or act and are generally inclined to behave in particular ways (Weiner and Greene, 2008, p. 3). Assessment may be defined as a conceptual problem-solving process of collecting relevant information about an individual or group, in order to make informed decisions (Turner et al., 2001). Specialized literature (Cooper, 2015, p. 48; Eysenck, 1994, p. 67) mentions four main types of personality assessment: self-report questionnaires, behaviour ratings, objective tests and projective tests. From this perspective, the personality tests which involve the assessment of the five major personality factors (Big-Five model) are considered the most comprehensive, reliable and useful tools for discussing personality (Nettle, 2007; Saklofske and Zeidner, 1995, p. 462). The specialized literature (states that the five suprafactors of the Big Five model are: extraversion, emotional stability, conscientiousness, agreeableness and autonomy. Extraversion, in a narrow sense is characterized by sociability and in a broad sense the definition includes different subtraits like: assertiveness, warmth, positive emotions, optimism and activation (Zuckerman, 2005, p. 140). Emotional stability can be described as the ability of a person to handle stress, to experience fewer mood swings and to trust his own forces (Buss and Hawley, 2011, p. 46). Conscientiousness is considered (Leary and Hoyle, 2009, p. 377) the tendency to be more hardworking in achievement settings, to respect rules, norms and to plan the actions according to the deadlines. Agreeableness, as a personality construct is characterized by sympathy, trust, cooperation, altruism and “it is mostly a sign of harmony-seeking, not a sign of a pushover or a yes-man” (Thomas and Segal, 2006, p. 52). Autonomy (Chen, Sipes and Lee, 2017, p. 76) as a personality trait refers to the person’s complete control of it’s welfare, the assuming of responsibility for one’s success and failure and also, independence from others. In a previous research (Roco et al., 2014) concerning cerebral dominance and the suprafactors of the Big Five model, assessed through the Five Factor Personality Questionnaire (CP5F) belonging to the computerized platform of psychological assessment CAS++, designed by Cognitrom, in the case of junior handball players (14-15 years old) was identified a positively significant correlation between the Emotional stability and the results obtained for the upper left quadrant of the brain (cerebral dominance) and also, a positively significant correlation between the Autonomy and the results for the upper left brain. A large number of studies have demonstrated that a particular sport discipline attracts people which possess very particular personality features (Arfa, 2015, p. 14; Thomas, Nelson and Silverman, 2015, p. 621; Digel, 2013, p. 313). Contemporary handball is an undoubtedly significant sport and also, a cultural, social and marketing phenomenon. It is a competitive sport, its spectacularity being assured by the dynamic game with

intermittent and unpredictable changes of situations (Negulescu, 1998, p. 14). Moreover, handball is known to attract a large number of people to both direct and indirect participation and in addition, challenges people all around the world to admire sport idols and leads them to self improvement (Taborski, 2011, p. 7). Generally, it is believed (Schermerhorn, 2011, p. 133) that self improvement is a way to realize your dreams and ensure career success considering the many complex challenges of work and everyday living in our uncertain times. Career success may be discussed at a social or objective level, with reference to the position on a financial or organizational hierarchy, or at a personal, subjective level, in terms of self-fulfillment or realization of the set goals (O'Donovan-Polten, 2001, p. 8). Career success can be defined according to specialized literature (Kakabadse, Bank and Winnicombe, 2004, p. 45) using different criteria: payment and position, accomplishment and achievement, challenging work, recognition, influence, power, increased responsibility, personal development or respect (Burrow and Kleindl, 2014, p. 119). The social learning approach states that personality comprises a group of characteristics that are learned rather than genetically predetermined and consequently can be developed (Honeybourne, 2003, p.87).

The purpose of our research is to examine and identify the personality traits considered to have been developed through the practice of performance handball and which also, exert significant influence upon achieving success in career.

Materials and methods

Participants

The present study comprised 15 participants, women former handball players, with a mean age of 47.68 years, having over 15 years of sport experience (most of them were part of Romanian National Handball Team) and managed to obtain success in their careers.

Apparatus and materials

The SIC Opinion Questionnaire (Success in career) was administrated in collaboration with the Laboratory of Psychology and Psychomotricity within the National University of Physical Education and Sports Bucharest. The Questionnaire comprised two parts. The first part included 10 items regarding the level in which the practice of performance handball can develop specific personality traits – the five suprafactors of the Big Five model (Extraversion, Emotional Stability, Conscientiousness, Agreeableness and Autonomy) were discussed. The items were formulated having as a model the items from the Five Personality Factors Questionnaire (CP5F Questionnaire) belonging to the computerized platform of psychological assessment CAS++, designed by the firm Cognitrom, used in a previous research mentioned above. The participants answered by selecting one of the following alternatives: „1 = not at all”, „2 = little”, „3 = moderated”, „4 = much” and „5 = a great deal”. The second part comprised 10 items concerning the importance of each of the personality traits for achieving a successful career. The participants considered which was the level of importance for each of the items presented and answered by choosing one of the following alternatives: „1 = not important”, „2 = low importance”, „3 = moderately important”, „4 = important” and „5 = very important”.

Procedure

The assessment took place individually, at different dates, during a three months period (from January to March 2017) and all the former handball players gave their consent to participate in the study. We mention that throughout the research ethical principles were ensured (Denscombe, 2014, p. 318): the participants were informed that they could withdraw from the study at any moment and for any reason without suffering penalties, the results were confidential, treated with respect and consideration and the anonymity of the participants was assured.

Results

In order to verify the degree of association between the variables (results for the first part of the SIC questionnaire, concerning the level in which the practice of performance handball can develop specific personality traits and scores for the second part, regarding the importance of each of the personality traits for achieving a successful career, given by the former handball players) d Sommer indicator was used. This statistic indicator was selected because of the asymmetric relationships between variables – the achievement of success in career (the importance of specific personality traits in obtaining success at the workplace) is considered to be the dependent

variable, while the practice of performance handball (through which are developed specific personality traits) represents the independent variable.

Table 1. Results for Extraversion – importance for successful career and as a trait developed by the practice of handball

			Extraversion – developed through handball				Total
			little	moderated	much	a great deal	
Extraversion for successful career	moderately important	Count	2	0	1	1	4
		%	66.7%	.0%	25.0%	20.0%	26.7%
	important	Count	1	3	1	1	6
		%	33.3%	100.0%	25.0%	20.0%	40.0%
	very important	Count	0	0	2	3	5
		%	.0%	.0%	50.0%	60.0%	33.3%
Total	Count	3	3	4	5	15	
	%	100.0%	100.0%	100.0%	100.0%	100.0%	

The data presented in the table number 1 underline that:

- From the 4 former handball players who considered that extraversion is moderately important for career success, 2 (66,7% of those who stated that extraversion is “little” developed by handball) asserted that extraversion is “little” developed through the practice of handball, 1 (25,0%) that is “much” developed and 1 former athlete (20,0%) considered that the practice of handball developed “a great deal” the extraversion.

- Also, from the 6 former athletes who asserted that extraversion is important for career success, 1 (33,3%) considered that extraversion is “little” developed through handball practice, 3 (100,0%) considered that in a “moderated” way, 1 (25,0%) appreciated that handball “much” developed extraversion, while 1 (20,0%) considered “a great deal”.

- Likewise, from the 5 former handball players who appreciated extraversion as very important for a successful career, 2 (50,0%) considered that handball practice developed “much” extraversion and 3 (60,0%) stated that handball developed “a great deal” this personality trait.

Regarding d Sommer indicator $d = 0.433$ and $p = .037$. Hence, there is a significant positive association between variables. The capacity of handball as a performance sport to develop the extraversion is linked with the importance of this personality trait in achieving success in career.

Table 2. Results for Emotional stability – importance for successful career and as a trait developed by the practice of handball

			Emotional stability – developed through handball			Total
			moderated	much	a great deal	
Emotional stability for successful career	important	Count	2	4	0	6
		%	66.7%	50.0%	.0%	40.0%
	very important	Count	1	4	4	9
		%	33.3%	50.0%	100.0%	60.0%
	Count	3	8	4	15	
	%	100.0%	100.0%	100.0%	100.0%	

In tablenumber 2, the data presented emphasize that:

- From the 6 former handball players who considered that emotional stability is important for a successful career, 2 (66,7%) stated that emotional stability is “moderated” developed through the practice of handball and 4 (50,0%) that is “much” developed.

- Also, from the 9 former athletes who argued that emotional stability is very important for career success, 1 (33,3%) considered that emotional stability is “moderated” developed through handball practice, 4 (50,0%) considered that emotional stability is developed “much” by handball and 4 (100,0%) appreciated that handball developed emotional stability “a great deal”.

Regarding d Sommer indicator $d = 0.459$ and $p = .014$. Therefore, there is a significant positive association between variables. Handball’s possibility as a performance sport to develop athletes’ emotional stability is linked with the importance of this personality trait in obtaining career success.

Table 3. Results for Conscientiousness – importance for successful career and as a trait developed by the practice of handball

			Conscientiousness – developed through handball			Total
			moderated	much	a great deal	
Conscientiousness for successful career	moderately important	Count	1	0	0	1
		%	50.0%	.0%	.0%	6.7%
	important	Count	1	3	1	5
		%	50.0%	42.9%	16.7%	33.3%
	very important	Count	0	4	5	9
		%	.0%	57.1%	83.3%	60.0%
Total	Count	2	7	6	15	
	%	100.0%	100.0%	100.0%	100.0%	

In table number 3 the data has revealed that:

- One former handball player considered that conscientiousness is moderately important for career success and asserted that conscientiousness is “moderated” developed through the practice of handball.
- From the 5 former athletes who considered that conscientiousness is important for career success, 1 (50,0%) considered that conscientiousness is “moderated” developed through handball practice, 3 (42,9%) stated that handball “much” developed conscientiousness, 1 (16,7%) appreciated that handball developed “a great deal” the conscientiousness.
- Also, from the 9 former handball players who appreciated conscientiousness as very important for career succes, 4 (57,1%) considered that handball practice developed “much” conscientiousness and 5 (83,3%) stated that handball developed “a great deal” this personality trait.

Regarding d Sommer indicator $d = 0.520$ and $p = .021$. Consequently, there is a significant positive association between variables. The possibility of handball as a performance sport to develop the conscientiousness is linked with the importance of this personality trait in obtaining success in career.

Table 4. Results for Autonomy – importance for career succes and as a trait developed by the practice of handball

			Autonomy – developed through handball			Total
			moderated	much	a great deal	
Autonomy for successful career	moderately important	Count	3	2	0	5
		%	50.0%	28.6%	.0%	33.3%
	important	Count	3	2	2	7
		%	50.0%	28.6%	100.0%	46.7%
	very important	Count	0	3	0	3
		%	.0%	42.9%	.0%	20.0%
Total	Count	6	7	2	15	
	%	100.0%	100.0%	100.0%	100.0%	

In table number 4 the data has revealed that:

- From the 5 former handball players which considered that autonomy is moderately important for career success 3 (50,0%) asserted that autonomy is “moderated” developed through the practice of handball and 2 (28,6%) considered that handball developed “much” this personality trait.
- From the 7 former athletes who considered that autonomy is important for career success, 3 (50,0%) considered that autonomy is “moderated” developed through handball practice, 2 (28,6%) stated that handball “much” developed autonomy and 2 (100,0%) appreciated that handball developed “a great deal” the autonomy.
- Also, 3 former handball players have appreciated autonomy as very important for career succes (42,9%) and considered that handball practice developed “a great deal” this personality trait.

Regarding d Sommer indicator $d = 0.317$ and $p = .025$. Consequently, there is a significant positive association between variables. The possibility of handball as a performance sport to develop autonomy is linked with the importance of this personality trait in obtaining success in career.

With respect to Agreeableness, as a personality trait, no significant associations between the two variables were found.

Discussions and conclusions

The present research demonstrates significant positive associations between the importance of specific personality traits in obtaining success in career and the degree in which the practice of performance handball can develop those specific personality traits. Our findings regarding the importance of extraversion, emotional stability, conscientiousness and autonomy in career success are consistent with meta-analytic evidence in specialized literature. Therefore, we mention a study (Seibert and Kraimer, 2001) that states the fact that extraversion positively predicted earnings and promotions and also, there is evidence which indicates that extrovert people report higher levels of job (Judge, Heller and Mount, 2002) and life satisfaction (DeNeve and Cooper, 1998). The majority of the findings across studies suggests that extraversion and emotional stability tends to be positively related to career success (Gunz and Peiperl, 2007, p. 64). Moreover, Barrick and Mount (1991) found a positive correlation between conscientiousness and salary in five studies. Conscientiousness also, was found to enable people to obtain promotions into more complex and highly regarded jobs (Howard and Bray, 1994). Researchers mention that not all the traits included in the Big-five personality model may be relevant to career success. In our study, with respect to Agreeableness, as a personality trait, no significant associations between the two variables were found. This result is supported by other findings which show that agreeableness tends to have very little effect on achieving career success, did not predict increased salary, promotions or high job level (Boudreau, Boswell and Judge, 2001). On the other hand, one study found that extraversion and agreeableness were positively related to performance at the work place, only when job autonomy was high (Gellatly and Irving, 2001). Personality and sport activities are interconnected in an ongoing process of two-way conditioning. In other words, it is generally believed that certain personality characteristics (such as traits, motives, needs or desires) are considered to be important factors in selecting a sport and being successful at it, and on the other hand, the sport responds by influencing the development of specific personality features. Therefore, knowing that personality features are not independent of experience, handball players can be stimulated through appropriate training programs, shaping their personality in a way that is more likely to help them achieving success in their career. Although the present research has reached its aims and offers valuable insight regarding the personality traits which can be developed through the practice of performance handball and which also, are considered to facilitate the career success, certain research limitations were inherent in the study and must be acknowledged. The study limits were mainly represented by: the sample of participants (the size - the research was conducted only on a small size of population considered to be representative for the specific investigated domain, the gender, the age and the sports training history), the social environment and the distinct features of the investigated sport. Also, integrating additional methods of data collection could have increased the results and the depth of analyses. Further research is necessary to investigate other personality traits, like: openness to experience, neuroticism, activity, aggressivity, together with other facets of all mentioned traits. Furthermore, it is important to investigate besides personality, aspects linked to intelligence, topographical memory and creativity, which can be developed through handball practice and could be involved in career success.

Acknowledgements

I would like to thank the specialists from the Laboratory of Psychology and Psychomotricity, within the National University of Physical Education and Sports Bucharest, who provided insight and expertise that greatly assisted the research.

References

- Arfa, Y. (2011). Personality traits as predictors of physical capacities development. In A. Psintrou & H. Höritsch (Eds.), *EHF Scientific Conference – Science and Analytical Expertise in Handball* (pp. 14-18). Vienna: European Handball Federation.
- Barrick, M. R., & Mount, M. K. (1991). The Big Five personality dimensions and job performance: A meta-analysis. *Personnel Psychology, 44*, 1-26.
- Boudreau, J. W., Boswell, W. R., & Judge, T. A. (2001). Effects of personality on executive career success in the United States and Europe. *Journal of Vocational Behavior, 58*, 53-81.
- Burrow, J. L., & Kleindl, B. (2014). *Business Management*. Mason, OH: South-Western Cengage Learning.
- Buss, D. M., & Hawley, P. H. (2011). *The Evolution of Personality and Individual Differences*. New York: Oxford University Press.
- Chen, C., Sipes, B. S., & Lee, T. (2017). *Enabling Agri-entrepreneurship and Innovation: Empirical Evidence and Solutions for Conflict Regions and Transitioning Economies*. Boston, MA: Cabi.
- Child, I. L. (1968). Personality in culture. In E. Borgatta, & W. Lambert (Eds.), *Handbook of personality theory and research* (pp. 80-101). Chicago: Rand McNally.
- Cooper, C. (2015). *Individual Differences and Personality*. New York: Routledge.
- DeNeve, K. M., & Cooper, H. (1998). The happy personality: A meta-analysis of 137 personality traits and subjective well-being. *Psychological Bulletin, 124*, 197-229.
- Denscombe, M. (2014). *The good research guide: for small-scale social research projects*. Berkshire: Open University Press.
- Digel, H. (2013). *Sociological Aspects of Modern Sports*. Aachen: Meyer and Meyer Sport Ltd.
- Eysenck, M. W. (1994). *Individual Differences: Normal and Abnormal*. New York: Psychology Press.
- Eysenck, M. W. (2004). *Psychology: An International Perspective*. New York: Psychology Press.
- Gellatly, I. R., & Irving, P. C. (2001). Personality, autonomy and contextual performance of managers. *Human Performance, 14*, 231-245.
- Gunz, P. H., & Peiperl, M. (2007). *Handbook of Career Studies*. Thousand Oaks, CA: Sage Publications.
- Honeybourne, J. (2003). *BTEC National Sport Textbook: Development, Coaching and Fitness*. Cheltenham: Nelson Thornes Ltd.
- Howard, A., & Bray, D. W. (1994). Predictions of managerial success over time: Lessons from the Management Progress Study. In K. E. Clark, & M. B. Clark (Eds.), *Measures of leadership* (pp. 113-130). West Orange, NJ: Leadership Library of America.
- Judge, T. A., Heller, D., & Mount, M. K. (2002). Five-factor model of personality and job satisfaction: A meta-analysis. *Journal of Applied Psychology, 87*, 530-541.
- Kakabadse, A., Bank, J., & Vinnicombe, S. (2004). *Working in organisations*. Aldershot: Gower Publishing, Ltd.
- Leary, M. R., & Hoyle R. H. (2009). *Handbook of Individual Differences in Social Behavior*. New York: The Guilford Press.
- Negulescu, C. I. (1998). *Handbal. Argument pentru un debut timpuriu*. București: Universitas Company.
- Nettle, D. (2007). *Personality: What makes you the way you are*. New York: Oxford University Press.
- O'Donovan-Polten, S. (2001). *The Scales of Success: Constructions of Life-career Success of Eminent Men and Women Lawyers*. Toronto: University of Toronto Press.
- Roco, M., Mitrache, G., Predoiu, R., & Radu, A. (2014). Cerebral dominance and the suprafactors of the Big Five model in junior handball players. *Procedia - Social and Behavioral Sciences, 117*, 226-231.
- Saklofske, D. H., Zeidner, M. (1995). *International Handbook of Personality and Intelligence*. New York: Plenum Press.
- Schermerhorn, J. R. (2011). *Introduction to Management*. Singapore: John Wiley & Sons Pte Ltd.
- Seibert, S. E., & Kraimer, M. L. (2001). The five-factor model of personality and career success. *Journal of Vocational Behavior, 58*, 1-21.
- Taborsky, F. (2011). Phenomenon Handball. In Psintrou, A. & Höritsch, H. (Eds.), *EHF Scientific Conference – Science and Analytical Expertise in Handball* (pp. 7-13). Vienna: European Handball Federation.
- Thomas, J. C., & Segal, D. L. (2006). *Comprehensive Handbook of Personality and Psychopathology, Personality and Everyday Functioning*. New Jersey: John Wiley & Sons.
- Thomas, J. R., Nelson, J. K., & Silverman, S. (2015). *Research Methods in Physical Activity* (7th ed.). Champaign, IL: Human Kinetics.
- Turner, S. M., DeMers, S. T., Fox, H. R., Reed, G. M. (2001). APA's guidelines for test user qualifications: An executive summary. *American Psychologist, 56*, 1099-1113.
- Weiner, I. B., & Greene, R. L. (2008). *Handbook of Personality Assessment*, New Jersey: John Wiley & Sons.
- Zlate, M. (2000). *Fundamentele psihologiei*. București: Pro Humanitate.
- Zuckerman, M. (2005). *Psychobiology of Personality*. New York: Cambridge University Press.

CORRELATIVE ANALYSIS OF THE BIOMECHANICAL CHARACTERISTICS AND PERFORMANCES ACHIEVED BY JUNIOR GYMNASTS IN BALANCE BEAM EVENTS

Vladimir POTOP^{1*}, Victor BOLOBAN², Vasile TRIBOI³, Alexandru GORASCENCO³

^{1*} Ecological University of Bucharest, 1G, Vasile Milea Street, Bucharest, Romania

² National University of Physical Education and Sport from Ukraine, 1, Fizculturi Street, Kiev, Ukraine

³ State University of Physical Education and Sport of the Republic of Moldova, 22, Andrei Doga Street, Chisinau, Moldova

* Corresponding author: vladimir_potop@yahoo.com

Abstract. *The aim of this paper is to highlight the degree of connection between the kinematic and dynamic characteristics of sports technique key elements and the performances achieved by junior gymnasts in balance beam events. This scientific approach is part of the ascertaining pedagogical experiment of the postdoctoral thesis, at midway point, in the end of the competitive year 2013. For this purpose we used the following research methods: bibliographic study of the specialized literature, pedagogical observation, video method of biomechanical analysis, method of movement postural orientation, statistical-mathematical and graphical representation methods. In order to make this correlative analysis, following up the biomechanical analysis of the dismounts off balance beam, we selected the most effective biomechanical indicators of movement execution. The study results prove that the comparative correlative analysis of the biomechanical characteristics and the performances achieved in competition by junior gymnasts, analysis made by parametric and nonparametric statistic methods, reveals different degrees of connection of the studied indicators and their relationship in conformity with the kinematic and dynamic particularities of sports technique key elements in the dismounts off balance beam.*

Keywords: balance beam, biomechanics, correlation, sports technique, performance.

Introduction

Artistic gymnastics has recorded remarkable progresses; it develops in accordance with performance sport trends but it has its specific features too, such as: increase of sports mastership which reaches virtuosity, development and rivalry of competitive programs, creation of new complex routines; improvement of components that provide the training of high classification gymnasts (Vieru, 1997; Arkaev and Suchilin, 2004).

The beam, specific event of women's artistic gymnastics, can be characterized as a balance apparatus par excellence both physically and mentally. From biomechanical point of view, the mastery and adjustment of balance throughout the exercises on beam can be achieved by respecting the law principle of the permanent projection of body center of gravity on the support surface so narrow. In conformity with the international regulations, the routine on beam must include a mount, elements of different structural groups (acrobatic, gymnastic, mixed elements) and elements next to the balance beam. The entire combination must be characterized by dynamism, changes of rhythm and continuity. The end of the exercise (dismount) must be consistent with the difficulty of the whole and the competition specific requirements. The dismount off the beam is also a very important moment of each exercise, because the last impression depends on it (Vieru, 1997; Smolevskij and Gaverdovskij, 1999; Gaverdovskij, 2002, 2007; Potop, 2014).

The general problems of the biomechanical analysis of the contemporary technique in gymnastics are insufficiently approached and treated in the specialized literature; the same situation regarding the knowledge of the crucial factors for the technical training and for gymnastics training contents optimization. Current concerns in scientific research on the biomechanical issues in gymnastics and on the characteristics of rotation routines were expressed by Hochmuth and Marthold, 1987; Bruggmann, 1994; Witten, Brown and Espinoza, 1996; Prassas, Papadopoulos and Krug, 1998 (cited in Crețu, Simăn and Bărbulescu, 2004).

The review of specialized literature reveals the importance of the research on gymnastics exercises technique and their learning, in terms of body postures and positions. Thereat, Boloban and Biriuk (1979) propose to use the movement postural orientation method for studying the technique of gymnastics sports branches (Potop, Grad and Boloban, 2013). The concept and methodology of using this method by studying the papers have been perfected during the recent years (Boloban, 1988-2013; Sadovski, Nizhnikovski, Mastalez, Vishiovski and Begajlo, 2003-2013; Andreyeva, 2013, Potop, 2012, 2013, 2014).

The goal of the paper is to highlight the extent of connection between the kinematic and dynamic characteristics of sports technique key elements and the performances achieved by junior gymnasts in balance beam events.

The hypothesis of the paper is that a comparative correlative analysis (made by parametric and nonparametric statistic methods) of the biomechanical characteristics in the dismounts off balance beam and the performances achieved by junior gymnasts in the events on this apparatus reveal different degrees of connection between the

studied indicators and their relationship according to the kinematic and dynamic particularities of sports technique key elements.

Materials and methods

This study has been conducted throughout the period of National Individual Championship for juniors, Onești, 2013. The subjects of the research were 10 female gymnasts, 13 to 16 years old, included in the Olympic Team of Izvorani. The research used the following methods: bibliographic study, pedagogical observation, video biomechanical analysis, movement postural orientation method, pedagogical experiment method and statistical method (Sadovski et al, 2009).

The biomechanical study focused on the analysis of the characteristics of sports technique key elements used for the dismount by means of methods from Postural Landmarks of Movements as Main (Key) Elements of Sport Acrobatics Technique (as per Sadovski et. al, 2009, adapted for beam in women's artistic gymnastics): PM – preparatory movement (*round-off, round-off with backward flick-flack, walkover 1 foot – walkover*); body launching posture (LP) – *moment of detachment at the end of the beam, multiplication of body posture (MP) – somersault rotation and concluding posture (CP) of the body – landing (Fig. 1).*

The study analyzed 10 dismounts, executed from round-off – layout back somersault with 360°, 540°, 720° and 900° twist; from round off – back walkover – back layout somersault with 720° and 900°; from round off – double back tucked somersault and from back walkover 1 foot – back walkover – back layout somersault with 720°, 1080° twist and double back pike somersault.

Results

The most effective biomechanical indicators in movement performance were selected for making the correlative analysis after the biomechanical analysis of the dismounts off balance beam. Fig. 1 highlights the sports technique key elements used in the dismounts off balance beam executed by junior gymnasts with back layout somersault 360° – 1080° twist.

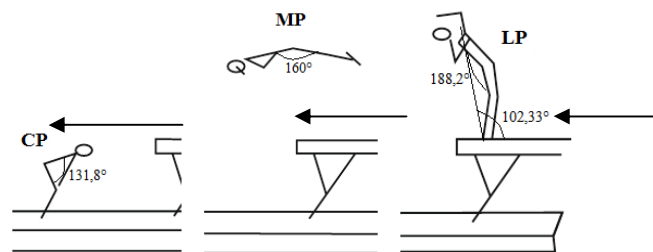


Fig.1. Key elements of sports technique used in back layout somersaults with 360° - 1080° twist

Table number 1 presents the results of linear parametric correlation between biomechanical characteristics indicators of the dismounts off balance beam and results obtained in competition on this apparatus.

Table 1. Results of linear parametric correlation between the biomechanical characteristics indicators of the dismounts off balance beam and the results achieved in competition (n = 10)

No	Coefficient correl. (R)	Indicators											
			1	2	3	4	5	6	7	8	9	10	11
1	IR (kgm ²)			-	0.12	-	0.14	-	0.01	0.037	0.145	0.475	0.420
2	Toes	-0.167		0.25	0.77	0.56	-	0.68	0.709	0.158	0.190	0.211	
3	RM, Shoul der	-	-		0.56	0.12	-	0.15	0.112	-	-	-	
4	(m) Arms	-0.398	-	-		0.48	-	0.60	0.625	0.008	-	-	
5	LP1.1	-	-	-	-		0.20	0.84	0.845	0.227	0.051	0.136	
6	CU, (grade) LP1.2	-0.114	0.19	-0.20	0.20	-		-	-	-	-	-	

7	MP	-	-	-	-	-	-0.10		0.975	0.379	0.213	0.323
8	CP	-	-	-	-	-	-0.11	-		0.400	0.295	0.394
9	Diffic ul.	-	-	-0.23	-	-	-0.42	-	-		0.385	0.721
10	IC, (points)	Execu tion	-	-	-0.48	0.28	-	-0.30	-	-		0.918
11	Final score	-	-	-0.46	0.16	-	-0.41	-	-	-	-	

Note: $p < 0.05$, $r = 0.648$; $p < 0.01$, $r = 0.818$; IR – inertia of rotation; CU – angular characteristics of body segments; IC – all-around; LPI.1 – launching body posture, angle between leg – shoulder joints; LPI.2 – angle between hip and torso; MP – multiplication of body posture, angle between hip – torso; CP – concluding posture, angle between hip – torso

Table 2. Results of non-parametric correlation between the biomechanical characteristics indicators of sports technique key element „launching posture (LP)” during execution of the dismounts off balance beam and the results achieved in competition ($n = 10$)

No.	Biomechanical indicators		Results in competition, (points)			
			All-around finals			Apparatus finals
			Difficulty	Execution	Final score	Result
1	Toes	X (m)	0.398	0.830	0.821	0.346
		Y (m)	-0.152	-0.225	0.013	-0.035
2	Shoulders	X (m)	-0.277	0.248	0.055	0.182
		Y (m)	-0.436	-0.345	-0.474	-0.310
3	Arms	X (m)	-0.117	-0.248	-0.249	0.006
		Y (m)	-0.092	-0.055	-0.164	-0.012
4	Shoulders	rad/s	0.288	-0.187	0.000	0.158
5	Arms	rad/s	-0.018	0.345	0.201	0.212
6	GCG	F (N)	0.092	-0.091	0.018	0.043
7	Toes- shoulders	(degrees)	0.267	-0.030	0.145	0.511
8	Hip-torso	(degrees)	-0.265	-0.273	-0.155	-0.219

Note: Spearman Rank Correlation

Table 3. Results of non-parametric correlation of the biomechanical characteristics indicators of sports technique key element „multiplication of body posture (MP)” in dismounts off beam and event results ($n = 10$)

No.	Biomechanical indicators		Results in competition, (points)			
			All-around finals			Apparatus finals
			Difficulty	Execution	Final score	Result
1	Toes	X (m)	0.025	0.426	0.253	-0.101
		Y (m)	0.190	0.236	0.286	0.061
2	GCG	X (m)	0.313	0.406	0.468	0.182
		Y (m)	0.129	0.393	0.328	-0.042
3	Shoulders	X (m)	0.326	0.091	0.121	0.444
		Y (m)	0.117	-0.236	0.018	0.036
4	Toes	rad/s	-0.153	-0.224	-0.055	-0.146
5	Shoulders	rad/s	-0.079	-0.175	-0.121	0.091
6	GCG	F (N)	0.178	0.224	0.261	0.103
7	Hip-torso	(degrees)	0.363	0.176	0.287	0.609

Table 4. Results of non-parametric correlation of the biomechanical characteristics indicators of sports technique key element „concluding posture (CP)” during dismounts off balance beam and the event results ($n = 10$)

No.	Biomechanical indicators		Results in competition, (points)			
			All-around finals			Apparatus finals
			Difficulty	Execution	Final score	Result
1	Toes	X (m)	0.308	-0.024	-0.058	0.248
		Y (m)	-0.264	0.139	0.146	-0.243
2	GCG	X (m)	0.313	-0.260	-0.195	0.261
		Y (m)	-0.363	0.079	0.052	-0.341
3	Shoulders	X (m)	0.411	-0.139	-0.085	0.407
		Y (m)	-0.632	-0.515	-0.620	-0.426
4	Arms	X (m)	0.301	-0.333	-0.152	0.134
		Y (m)	-0.644	-0.284	-0.426	-0.468
6	Toes	rad/s	0.141	0.042	0.170	-0.007
7	Shoulders	rad/s	0.460	0.527	0.456	0.559
8	Arms	rad/s	0.398	0.103	0.279	0.151
9	GCG	F (N)	-0.632	0.103	-0.055	-0.663
10	Hip-torso	(degrees)	0.388	0.091	0.259	0.607

Tables number 2, 3 and 4 show the results of the non-parametric correlation between the biomechanical characteristics indicators of sports technique key elements during the execution of the dismounts off balance beam and the results achieved in the National Championships for juniors Onești, 2013.

Discussions and conclusions

The biomechanical study of the dismounts off balance beam made by means of movement postural orientation method highlights the key elements of sports technique in terms of preparatory movement (*round-off, round-off with backward flick-flack, back walkover 1 foot – back walkover*); body launching posture (LP) – *moment of flipping off at beam extremity*, multiplication of body posture (MP) – somersault rotation and concluding posture (CP) of the body – landing (Fig. 1).

The results of the linear parametric correlative analysis made between the biomechanical characteristics indicators of the dismounts off balance beam and the results achieved in competition highlight closed (strong) connections at $p < 0.05$ between the radius of toes and arms movement, the angular characteristics of hip-torso segments during the basic movement – multiplication of posture at maximum height of GCG and hip – torso in the concluding phase – final posture (landing); between the angular characteristics of body postures in the phasic structure of the dismounts off balance beam LP1.1 with MP, CP and MP with CP; between the score for difficulty and the final score obtained in competition (table number 1).

Regarding the results of the nonparametric analysis between the biomechanical characteristics indicators of sports technique key elements during the execution of the dismounts off balance beam and the results achieved in competition we notice the following matters:

- during the preparatory movement phase – launching posture of body (LP) there are strong connections at $p < 0.01$ between the spatial characteristics of toes movement (X, m) and the score for execution and the final score; there are also revealed medium or weak connections between the other indicators analyzed (table number 2).

- during the basic movement phase – multiplication of body posture (MP) and maximum height of GCG there is highlighted a closed connection between the results obtained in apparatus finals (balance beam) and the angular characteristics of hip-torso segments; the connections are average or weak with the other indicators (table number 3).

- in the concluding phase – concluding posture (landing) there are revealed closed connections at $p < 0.05$ the resultant of the force of GCG movement and the final score on apparatus (balance beam), average connections between the spatial characteristics (Y, m) of shoulders and arms and the kinematic characteristics of GCG angular

speed and shoulders relation with the scores obtained in competitions; the connections with the other analyzed indicators are weak (table number 4).

In the end of the paper we can conclude that the comparative correlative analysis of the biomechanical characteristics and the performances achieved in balance beam events by junior gymnasts, analysis made by parametric and nonparametric statistic methods, reveal different degrees of connection of the studied indicators and their relationship consistent with the kinematic and dynamic particularities of sports technique key elements used in the dismounts off balance beam. The comparative analysis between dismounts execution and the technical regulations requirements included in the international Code of Points for balance beam will determine new methodological guidelines meant to improve and correct these dismounts.

Acknowledgements

We would like to express our special thanks to the Romanian Gymnastics Federation and especially to Missis Anca Grigoraş Mihailescu, federal coach and to the coaches of the Olympic Team of Izvorani, who supported us to conduct this research. This case study is part of the pedagogical experiment of the post-doctoral thesis; it is included in the research plan of Physical Education and Sport field of Ukraine for 2011 – 2015. National registration number: 0111U001726. Index UDK: 796.012.2.

References

- Andreyeva, N. (2013). Key elements of sports technique of ball throwing and catching by those engaged in rhythmic gymnastics at the stage of preliminary basic preparation. *Journal of Physical Education and Sport (JPES)*, 13(1), 46-52.
- Arkaev, L.Ja., & Suchilin, N.G. (2004). *Kak gotovit' chempionov. Teoriya i tehnologija podgotovki gimnastov vyshej kvalifikacii*. Moskva: Fizkul'tura i sport.
- Boloban, V., et al. (2013). Kinematic structure of sports technique elements of a basic acrobatic exercises sequence forward handspring – front somersault in tucked position. *Science in Olympic Sport*, 1, 76-79.
- Creţu, M., Simăn, I.I., & Bărbulescu, M. (2004). *Biomechanics of back giant on uneven bars*. Piteşti: Publishing House of Piteşti University.
- Gavardovskij Ju.K. (2002). *Tehnika gimnasticheskikh uprazhnenij*. Moskva: Terra-Sport.
- Gavardovskij Ju.K. (2007). *Obuchenie sportivnym uprazhnenijam. Biomehanika. Metodologija. Didaktika*. Moskva: Fizkul'tura i sport.
- Sadovskij, E., Boloban, V., Nizhnikovskij, T., & Mastalez A. (2009). Poznye orientiry dvizhenij kak uzlovyje jelementy sportivnoj tehniki akrobaticeskikh upazhnenij. *Teoriya i praktika fizicheskoj kul'tury*, 12, 42-47.
- Smolevskij, V.M., & Gavardovskij, Ju.K. (1999). *Sportivnaja gimnastika*. Kiev: Olimpijskaja literatura.
- Potop, V., Grad, R., & Boloban, V. (2013). Biomechanical indicators of gymnastics exercises key elements. *Pedagogies, psychology, medical-biological problems of physical training and sport*, 9, 59-72.
- Potop, V.A., Rafal G., Boloban V., & Otsupok A.P. (2013). Biomechanical characterization of the dismount off balance beam based on the analysis of key elements of sports equipment. *Pedagogy, psychology, medical-biological problems of physical training and sports*, 12, 58-66.
- Potop, V. (2014). *Theory and practice in artistic gymnastics*. Bucureşti: Discobolul.
- Vieru, N. (1997). *Manual of sports gymnastics*. Bucureşti: Driada.

METHODOLOGICAL, METHODICAL BENCHMARKS AND MOTOR PERFORMANCE IN THE PREPARATION OF GYMNASTS WITH INTELLECTUAL DISABILITIES - LEVEL B

Eugen Gabriel POPESCU^{1*}

¹National University of Physical Education and Sports, 140 Constantin Noica St., 060057, Bucharest, Romania

*Corresponding author: gabyaerogym@yahoo.com

Abstract. Compulsory level A & B routines provided in the Code of Points - Special Olympics International- 2014 of artistic gymnastics, represent a positive motivational and methodological alternative for fast initial training of future gymnasts with intellectual disabilities. The objectives, content, physical and motor requirements of the 4 apparatus: vault, low bar, low, wide beam and floor, in relation to the athletes' potential impose a special strategic, methodological, operational and original approach. Through the systematic training of two experimental groups consisting of 10 boys and 10 girls with intellectual disabilities, selected within the 4 associations of Bucharest (ages 14 – 30), that lasted 6 months (1 October 2015 -31 march 2016, one 2 hour training session/week) we were able to objectify methodological and methodical benchmarks for motor performances during the initial training of gymnasts with intellectual disabilities. The experiment was concluded with a competition. The results obtained, as well as the progress in physical and technical tests, statistically confirmed, have validated the method and ways of training, reference elements for each apparatus and individual and group performances.

Keywords: intellectual disabilities, artistic gymnastics, Special Olympics, level B, training.

Introduction

Gymnastics, with its multitude of disciplines and creative effervescence, remains the same endless source of initiation, fundamentalism, specialization and performance of human motricity (Popescu, 2015). The effects of systematic competitive artistic gymnastics training are numerous. They are also present and valid in the case of adapted sport as well. As the Special Olympics Coaching Guide says: „through sport training and competition, people with intellectual disability benefit mentally, socially and spiritually”. With gymnastics being rather special sport, we can add to the list of beneficial physical and motor effects – control, self-control and those in relation to health, bodily harmony, autonomy, “adaptation” (Winnick, 2011, p. 28) and integration. Our concerns regarding the scientific support offered to future undergraduate students, AFA master students, volunteers, instructors, teachers specialized in the preparation of gymnasts with intellectual disabilities have remained constant for almost 12 years. After successful projects based on „inclusive education – unified gymnastics, applicative circuits” (Popescu, and co.w. 2012-2016), or those of a methodical operational nature related to the training of Down Syndrome gymnasts for the level 1 floor exercise, parallel bars and rings (Popescu, 2008-2016), we focused our attention on a new category introduced in the Special Olympics artistic gymnastics system – level B. In Level B - male and female gymnasts may compete. Athletes must be able to safely perform all of the skills in that level. (Code of points – Artistic gymnastics – Special Olympics 2012). Level B was introduced into the Special Olympics artistic gymnastics program in 2012 in order to offer competition opportunities for as many male and female gymnasts with intellectual disabilities as possible, but also to provide an intermediary level to help facilitate the training needed and the advancement of future gymnasts from one category to another.

The purpose of identifying methodological, methodical and motor benchmarks in the preparation of gymnasts with disabilities for level B, is to bring as many intellectual disability sufferers as possible into this specific competition system, but also to ensure scientific, practical, methodical support in the preparation of specialists who will undertake this same process in the future.

Artistic Gymnastics - Special Olympics has six levels of competition:

- ➔ Level A Compulsory routines
- ➔ Level B Compulsory routines
- ➔ Level I Beginner compulsory routines
- ➔ Level II Intermediate compulsory routines
- ➔ Level III Advanced routines using compulsory skills made into own routines with own connections
- ➔ Level IV Optional/Voluntary routines. ART. G.-CP-SO -2012

Fig. 1. Levels of competition – artistic gymnastics – Special Olympics

Materials and methods

By analysing a program of systematic training used with the two experimental groups comprised of 10 boys and 10 girls (aged 14-30) with intellectual disabilities, selected within the four associations of Bucharest, and the results obtained in competition, we were able to identify methodological, methodical and motor performance benchmarks for initial training of male and female gymnasts with intellectual disabilities for level B.

The experiment lasted 6 months, from October 1st, 2015 to November 31st 2016. During this period the gymnasts participated in one 2-hour training session per week. As time went on, we were able to identify the most important methodical, operational and benchmark elements necessary for quality gymnastics training.

The physical and technical performances achieved by the gymnasts in tests and competitions will become systems of reference, they will validate the collective relationships between the components of training and they will demonstrate the efficiency of the training process.

The control tests included:

1. general physical conditioning tests:

GPP 1. Hanging from a bar, face down on an inclined gymnastics bench attached to the wall bars (notch 8), inclined pull ups (no. of repetitions);

GPP 2. 10m sprint (sec.);

GPP 3. Lying down with the arms lateral, straight leg lifts to 90° (no. of repetitions);

GPP 4. Lying flat, sit-ups to touch toes (no. of repetitions).

2. 4 specific physical conditioning tests:

SPP 1. Sideways walking to end of beam (deductions cf. FIG);

SPP 2. 1 point balance (optional foot and arm placement) (sec. held);

SPP 3. Walk forward to end of beam (deductions cf. FIG);

SPP 4. Straight jump off end of mat (h=0,30cm), land on with two feet, stretch (deductions);

SPP 5. 3. Stretched sideways roll (log or pencil roll) (deductions cf. Fig).

3. 4 technical preparation tests (TH):

Vaulting: TH.1. Compulsory vault (mark);

Balance Beam: TH.3. Compulsory routine (mark);

Floor Exercise: TH.4. T.2 side chasse;

TH.5. 2 foot pivot turn ;

TH.6. Compulsory routine.

The technical preparation tests were carried out at the competition organised by the Bucharest Down Syndrome Association and UNEFS, Bucharest on March 26th, 2016. They objectified the progress and execution quality of "key" elements from the exercises and the compulsory exercise on each apparatus.

The results obtained in the three categories were compared, correlated, analysed and confirmed statistically through the use of test t, the arithmetic mean or median, maximum and minimum limits, and the Pearson correlation coefficient.

Through the use of statistical analysis we were able to determine the strength and direction of direct or complex connections between the determinative components of the training, general physical conditioning, specific physical conditioning and technical training, reference values regarding the potential of and performances obtained by the gymnasts in relation to the effort sustained and methods applied, and the evaluation of significant differences between the results obtained by the boys and girls and their justification.

Results

Table 1. GPP. Reference results - girls

GIRLS	GPP 1	GPP 2	GPP 3	GPP 4
Average	8,3	3,037	10,5	19,4

Max.	15	4,3	21	37
Median	8	2,88	9	17,5
Min.	1	2,31	4	5

Table 2. GPP Reference results - boys

BOYS	GPP 1	GPP 2	GPP 3	GPP 4
Average	16,7	2,631	16,9	22,6
Max.	30	3,25	22	37
Median	15,5	2,515	15,5	20
Min.	8	2,38	12	14

Table 3. SPP Reference results – girls

GIRLS	SPP1	SPP2	SPP3	SPP4	SPP5
Average	0,37	7,1	0,33	0,15	0,39
Max.	0,8	20	0,5	0,3	0,8
Median	0,3	5	0,3	0,1	0,3
Min.	0,1	3	0,1	0	0,3

Table 4. SPP Reference results – boys

BOYS	SPP1	SPP2	SPP3	SPP4	SPP5
Average	0,21	6,7	0,22	0,14	0,26
Max.	0,5	14	0,4	0,3	0,7
Median	0,3	5	0,3	0,1	0,2
Min.	0	3	0	0	0,1

Table 5. TH. Reference results –girls

GIRLS	TH.1.	TH.2.	TH.3.	TH.4.	TH.5.	TH.6.
Average	7,87	7,86	7,96	0,15	0,07	7,85
Max.	8,4	8,3	8,8	0,3	0,1	8,7
Median	8	7,85	7,95	0,1	0,1	7,7
Min.	7,2	7,4	7,1	0	0	7,2

Table 6. TH.Reference results – boys

BOYS	TH.1.	TH.2.	TH.3.	TH.4.	TH.5.	TH.6.
Average	8,59	8,2	8,7	0,1	0,07	8,76
Max.	9,2	9,1	9,2	0,3	0,3	9,6
Median	8,65	8,05	8,7	0,05	0,05	8,75
Min.	7,8	7,6	8,2	0	0	8

Table 7. Examples of significant differences in the GPP tests

GPP1	Variable 1	Variable 2	GPP2	Variable 1	Variable 2
Mean	8,3	16,7	Mean	3,037	2,631
Variance	19,34	46,67	Variance	0,317	0,091
Observations	10	10	Observations	10	10
Pearson	0,073		Pearson Correlation	-0,079	

Correlation			
Hypothesized Mean Difference		Hypothesized Mean Difference	
	0		0
df	9	df	9
t Stat	-3,384	t Stat	1,942
P(T<=t) one-tail	0,004	P(T<=t) one-tail	0,041
t Critical one-tail	1,833	t Critical one-tail	1,833
P(T<=t) two-tail	0,008	P(T<=t) two-tail	0,083
t Critical two-tail	2,262	t Critical two-tail	2,262

In accordance with the test t results, it was observed that within the general conditioning (Fig. 1 and Table 1) and technical preparation tests, the differences between the boys and girls were significant. However, the differences were insignificant in the case of specific physical conditioning (Table 2, Table 3). The excess weight and lack of previous physical activity along with the slower rate of learning in the girls justify the differences and lead us to propose future modifications to the competition rules for this category. Although they have the same exercise, the results should be calculated separately for the boys and the girls.

The highest scores, over 8, obtained in competition and some of the minimum values obtained in the sprint event, as well as those with deductions, become reference performances for specific gymnastics training. They confirm the real potential of a person with intellectual disability, but also the methodological validity of the methods, algorithms, and monitoring and control system used.

The lowest scores were obtained in the single bar event, owing to one specific, difficult element for this level: the chin-up. As only two male gymnasts managed to complete it, and not one female gymnast, we propose that this element be made optional or a bonus element. On the other hand it confirmed that one 2-hour training session a week for 6 months is not sufficient to obtain high overall performance. The proposed modifications to the regulations will be put into effect at the national level in 2016. They will also be sent for analysis to the International Special Olympics Artistic Gymnastics Technical Committee for consideration.

Table 9. Examples of significant correlations between various tests

CORELL	GPP2-TH1	CORELL	GPP1-TH2	CORELL	GPP3 -TH2
GIRLS	-0,902	GIRLS	0,75	GIRLS	0,374
BOYS	-0,662	BOYS	0,823	BOYS	0,632
CORELL	SPP4-TH1	CORELL	SPP4-TH6	CORELL	SPP4-TH6
GIRLS	- 0,784	GIRLS	-0,297	GIRLS	-0,297
BOYS	-0,737	BOYS	-0,962	BOYS	-0,962
CORELL	SPP2-TH3	CORELL	GPP4-TH6	CORELL	SPP5-TH6
GIRLS	0,424	GIRLS	0,60	GIRLS	-0,155
BOYS	0,736	BOYS	0,844	BOYS	-0,821

Correlation values between the diverse components of linear or complex training lead to references in methodical and methodological training applications.

Discussions and conclusions

Methodological benchmarks. Initial training of beginner gymnasts with intellectual disabilities must respect the determinative, conditional relations of the components of training: general physical conditional, specific physical training, structural and apparatus technical training, and psychological training. Because of this, the training must be approached logistically and in this order temporally.

General physical conditioning at the beginning must have as its objective the optimal development of the main muscle groups: arms flexors, abdominal muscles, the muscles of the back, and leg muscles. These muscle groups need to ensure a foundation of physical strength and to sustain the development of motor skills and conditional and

coordinative capabilities which are necessary in learn the specific elements on the different apparatus in this level of artistic gymnastics. Specifically, we are referring to running speed (vault), explosiveness (vault and floor), pulling strength (bar), segmental coordination and balance (beam).

Specific physical conditioning is integrated into the learning algorithm for each element, and the combinations in the routines on each apparatus.

The objective of structural technical training is to learn the universal mechanisms (landing, hurdling onto two feet, rotating around the body's axis – both transversely and longitudinally, tucking, stretching, rocking and rolling), and control the general basics of movement.

The objective of specific physical conditioning is the learning and perfection of the elements and combinations of the compulsory routines on each apparatus (vault, bar, beam, floor) in level B.

Learning the compulsory routines of level B represents an optimal physical and technical point of accumulation for the beginning training of level 1 gymnasts (Special Olympics gymnastics system). According to the code of points this system has 6 levels: 4 with compulsory exercises, 1 with compulsory elements and 1 with an optional exercise.

The project concerning the training of gymnasts with intellectual disabilities needs to be in concordance both in action and temporally with the learning algorithms of each element, combination, routine, physical test, mechanism, technique and monitoring instrument of the learning - perfection process, both individually and as a group.

Methodical benchmarks. Selecting methodical benchmarks was based on our experience accumulated from 2004 until the present. The instruments used in the training – learning algorithms and the testing system, together with the attraction of the methods and techniques adopted proved to be very efficient in the accelerated training of the gymnasts with intellectual disabilities for level B. Because of the possibility of only one two-hour training per week, the training sessions were planned in detail. A large volume of repetitions was used for each technical structure (25 repetitions/element, 10 routines/apparatus). Unfortunately, this was not sufficient for the homogenization of superior results.

Reference motor performances in the training of gymnasts with intellectual disabilities. Both the tests and performances realized individually and as a group, confirmed statistically, become elements of reference in the 'franchise' promoted by us, which deals with the initial training of beginner gymnasts with intellectual disabilities for level B.

In determinative comparison, they are focused and oriented in accordance with the laws of determination and conditioning in 5 correlative directions: general physical conditioning – specific physical conditioning – structural technical training – technical preparation for each apparatus – competition. The experiment was finalised by means of a competition.

The results obtained in this competition, the steady progress obtained in the physical and technical tests, statistically confirmed, validate the training methodology and means, the elements of reference for each apparatus, and the individual and group performances achieved. By respecting all of these benchmarks, interested specialists can confidently begin training gymnasts with intellectual disabilities for level B of competition.

The aim of this initiative was to increase the level of scientific knowledge in this domain, which is of national, European and even world interest. It offers a valuable system of reference for coaches, instructors and volunteers in the domain of applied gymnastics. It offers a chance and hope for as many people with intellectual disabilities as possible to benefit of the complex beneficial effects of Special Olympics artistic gymnastics.

The differences in progress between the gymnasts of different ages are insignificant. The study will continue.

References

- Colton, T. (1974). *Statistics in Medicine*. New York: Little Brown and Company.
- Popescu, G. (2015). *Gimnastica artistică mijloc eficient de ridicare a calității vieții și a potențialului de integrare a persoanelor cu dizabilități intelectuale*, Volum de articole editat Special Olympics România, Activități fizice adaptate, București Special Olympics Coaching Guide General Sections pag. 3
- Popescu, G., Dina, L., Stroescu, S., & Dina, G. (2013) Gymnastics Motor Learning Particularities in Down Syndrome Children, *Procedia - Social and Behavioral Sciences*, 93, 2109–2113.
- Popescu, G. (2007). Competitive artistic gymnastics of Special Olympics critical analysis 2006, Evolution and potential, *CitiusAltiusFortius–University of Pitești*, 7(1). Retrieved from <http://efsupit.ro/archive/5/11>
- Popescu G. (2014). Performance, Reference Systems and Strategies for Balance Training in Syndrome Down Subjects Beginning Gymnastics, *Procedia - Social and Behavioral Sciences*, 117, 553–558.

- Popescu, G. (2014). Artistic Gymnastics - Special Olympics Reference elements in the Down syndrome gymnast preparati on Rings - level I. *International Congress of Physical Education, Sports and Kinetotherapy*, 4thEdition. ISBN 978-606-8294-90-2
- Winnick, J. P. (2011). *Adapted Physical Education and Sport*. Champaign, IL: Human Kinetics.
- Cod of Points Artistic gymnastics/ Special Olympics 2012 Special Olympics.org. Retrieved from <http://www.specialolympics.org/Artistic-Gymnastics.aspx>
- Special OlympicsSportsRules Special Olympics.org.

IMPROVING THE TOLERANCE TO LACTATE AND ITS EFFICIENCY IN THE END OF THE FOOTBALL GAME

Marius STOICA^{1*}, Cornel BLEJAN¹

^{1*}National University of Physical Education and Sports, 140 Constantin Noica, Bucharest, Romania

*Corresponding author: mariusstoica08@yahoo.com

Abstract. *The purpose of the paper is to adapt training content to the effects of lactic acid in the area with high concentrations of lactate 12-20 mmol. The objective is to increase the athlete's ability to tolerate the lactic acid. The research hypothesis: If we act in training to improve the tolerance to lactate, we can influence its efficiency in the endings of the games by the physical potential of the team. Participants: the components of Universitatea Craiova FC football team. The training program designed by us must comply with the specific requirements. Conclusions: The ability to eliminate the lactic acid from the bloodstream and use it as energy is an adaptive response which delays fatigue. This zone of effort should be trained independently because at the end of the game the players have to perform a great effort with fatigue.*

Keywords: tolerance to lactate, performance, football

Introduction

The training process must follow the specificity of the sport. Thus, identify the psychological demands of the game the time-motion profile of the player, the physical specificities of the player and the technical actions and tactical behaviors that are the most common in football which is important. By knowing these characteristics, it will be easier to develop the training tasks and correctly prescribe these tasks in the weekly periodization (Clemente, 2016).

In terms of physical effort, football game falls into the category of sports disciplines with a mixed effort; the energy supplied to sustain competitive effort is provided by all three energy systems in different proportions (Stoica & Blejan, 2015). The success of a training program greatly depends on reaching the performance goals associated with the program (Stoica & Blejan, 2012).

Elite football players commonly cover values of 10-12 km during a game. The majority of studies report that central midfielders and wide defenders run the longest distance during a match and central defenders and strikers the short distances. During a match each player performs 1000-1400 short activities changing every 4-6 seconds. Sprints, high-intensity running, tackles, headings, involvements with ball or passes are the common activities that intermittently occurred during a match. By having enough information about the physiological, physical and technical/tactical demands of the football it is possible to prescribe the sport training with specificity (Cazzetta, 2015).

Running at 85% HRmax is different from playing football game at 85% HRmax. The muscle participation, the coordination, agility and fundamentally the decision making based on the capacity of perceive the environment it is very different. For that reason, training football and the specific capabilities of player must be something more than just replies the internal load (Clemente, 2016, p. 15).

Materials and methods

The purpose of the paper is to adapt training content to the effects of lactic acid in the area with high concentrations of lactate 12-20 mmoles.

The objective is to increase the athlete's ability to tolerate the lactic acid.

The research hypothesis: If we act in training to improve the tolerance to lactate, we can influence its efficiency in the endings of the games by the physical potential of the team.

Participants: the components of Universitatea Craiova FC football team – 20 football players and 2 goalkeepers.

The subjects were divided into two groups. We defined the playing field into two zones, one of 35/25 meters where they played 5 vs 5 at large gates. The number of touches was restricted to 3.

In the other half of the field we created an athletic circuit (accelerations and sprints) with the active break (walking) between them. Accelerations and sprints were performed on 20-30-40 distance of 50 meters. Active break was 15 meters between each acceleration.

One round of game lasted 12 minutes: 6 minutes they played 5 vs. 5 and 6 minutes they ran. At the beep, the 2 groups were exchanged between them in maximum speed.

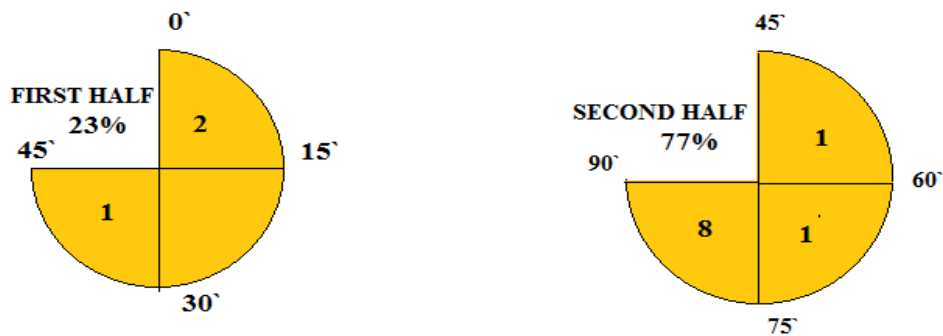


Fig. 2. Analysis of goals in each half

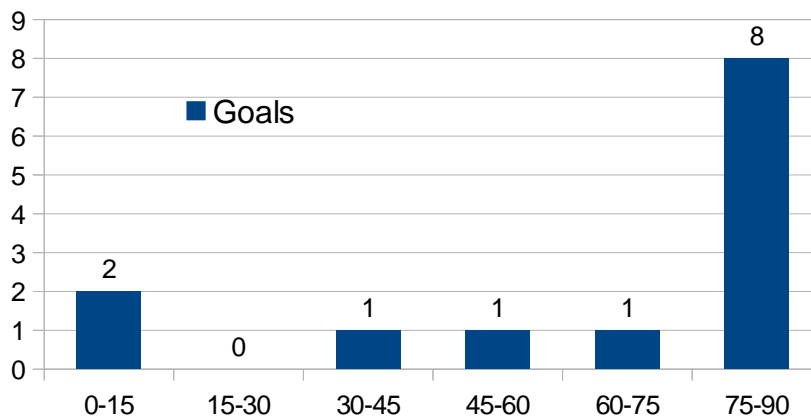


Fig. 3. Number of goals within 15 minutes

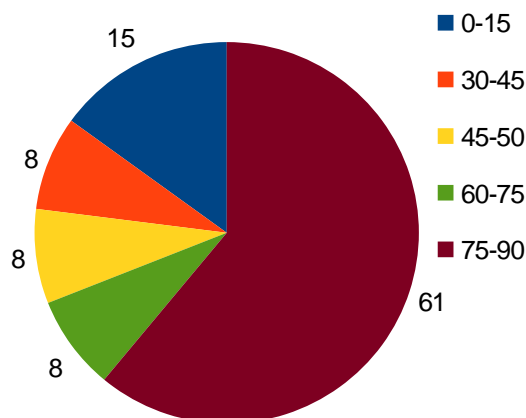


Fig. 4. Percentage of goals within 15 minutes

The effect of goals after the 75th minute:

- two of them had the effect of increasing and strengthening the score: CSU Craiova – Chiajna 2-0; CSU Craiova – Iași 2-0;
- two of them had the effect of reducing the difference: CSU Craiova – Astra 1-2; CSU Craiova – Viitorul 1-2;
- next three matches: Poli Timișoara - CSU Craiova - before the 75th minute 1-0, 1-1 after the 75th minute; FC Volunteers - CSU Craiova - before the 75th minute 1-1, 1-2 after the 75th minute; CFR Cluj - CSU Craiova – before the 75th minute 1-0, 1-2 after the 75th minute.

The importance of the 4 goals in the economy ranking:

- Poli Timișoara – CSU Craiova – before the 75th minute 1-0, after the 75th minute 1-1 = 1 point;
- Voluntari – CSU Craiova – before the 75th minute 1-1, after the 75th minute 1-2 = 2 points;
- CFR Cluj – CSU Craiova – before the 75th minute 1-0, after the 75th minute 1-2 = 3 points;

Table 2. Current standings / rankings without the 4 goals

CURRENT STANDINGS			RANKING WITHOUT THE 4 GOALS		
Position	TEAM	Points	Position	TEAM	Points
1	ASTRA GIURGIU	27	1	ASTRA GIURGIU	27
2	STEAUA BUCUREȘTI	25	2	STEAUA BUCUREȘTI	25
3	FC VIITORUL	23	3	FC VIITORUL	23
4	PANDURII TG JIU	23	4	PANDURII TG JIU	23
5	DINAMO BUCUREȘTI	21	5	DINAMO BUCUREȘTI	21
6	ASA TG MURES	19	6	ASA TG MURES	19
7	CS UNIVERSITATEA CRAIOVA	19	7	CFR CLUJ	17
8	CFR CLUJ	14	8	ACS POLI TIMISOARA	16
9	ACS POLI TIMISOARA	14	9	CS UNIVERSITATEA CRAIOVA	13
10	CSMS IASI	13	10	CSMS IASI	13
11	CONCORDIA CHIAJNA	10	11	CONCORDIA CHIAJNA	10
12	FC BOTOSANI	9	12	FC BOTOSANI	9
13	FC VOLUNTARI	6	13	FC VOLUNTARI	7
14	PETROLUL PLOIESTI	3	14	PETROLUL PLOIESTI	3

Table 3. Goals scored after the 75th minute

TEAM	GOALS SCORED AFTER THE 75 th MINUTE	% OF GOALS	
1 CSU CRAIOVA	8 X X X X X X X X X	61	13
2 CONCORDIA CHIAJNA	5 X X X X X	38	13
3 ASTRA GIURGIU	5 X X X X X	21	23
4 DINAMO BUCURESTI	4 X X X X	26	15
5 PANDURII TG. JIU	3 X X X	20	15
6 CFR CLUJ	3 X X X	17	17
7 FC VIITORUL	3 X X X	14	21
8 FC BOTOSANI	2 X X	25	8
9 CSMS IASI	2 X X	22	9
10 ASA TG. MURES	2 X X	16	12

11	STEAUA BUCURESTI	2	X	X	11	17
12	PETROLUL PLOIESTI	1	X		12	8
13	FC VOLUNTARI	1	X		12	8
14	ACS POLI TIMISOARA	1	X		11	9

Discussions and conclusions

The ability to eliminate the lactic acid from the bloodstream and use it as energy is an adaptive response which delays fatigue.

Training of these areas requires special attention because too severe acidosis, leads to fatigue and ultimately to overtraining (Hauswirth and Mujika, 2015).

The tolerance to lactate, very important in the game of football is often "tripped out" in training. Despite its percentage of participation in the effort of about 14%, many coaches not involve this area, considering that resistance training is specific enough. This zone of effort should be trained independently because at the end of the game, players have to perform a great effort with fatigue (Phillips, 2015) .

References

- Cazzetta, A. (2015). *La resistenza negli sport individuali e di squadra*. Perugia: Calzetti& Mariucci.
- Clemente, F. M. (2016), *Small-Sided and Conditioned Games in Soccer Training, The Science and Practical Applications*. New York: Springer.
- Hauswirth, C., & Mujika, I. (2015). *Recovery for Performance in Sport*. Champaign, IL: Human Kinetics.
- Phillips, S. (2015). *Fatigue in Sport and Exercise*. Oxford: Routledge.
- Stoica, M., & Blejan, C. (2012). *Optimization of the physical training by adapted specific tests in high performance football*. 3rd World Conference on Learning, Teaching and Educational Leadership, Brussels.
- Stoica, M., & Blejan, C. (2015). *Consideration regarding the guidance of the sportive shape from a weekly cycle to another using analysis software in high performance football*. 6th International Congress of Physical Education, Sports and Kinetotherapy (ICPESK), N.U.P.E.S., Bucharest.

ARM TRACTION STRENGTH TRAINING IN YOUNG SWIMMERS

Cornelia POPOVICI^{1*}, Adrian Marius SUCIU²

¹*Iuliu Hațieganu University of Medicine and Pharmacy, 6 Victor Babeș Street, Cluj-Napoca, Romania

²Faculty of Mechanical Engineering, Technical University, 103-105 Muncii Street, Cluj-Napoca, Romania

* Corresponding author: popovicicornelia@yahoo.com

Abstract. *Introduction: Muscle strength has a direct impact on the speed of execution in movements and activities that require skill and strength. When assessing the impact of training on the performance of young swimmers, muscle strength is an important source of information and a key factor supporting faster speeds. Aims: Our intention is to emphasize the importance of dry-land strength and power training in achieving swimming performance in children by using the Biometer Isokinetic Trainer- swim bench. Methods: Three tests were conducted over a period of 3 years in 2012, 2013 and 2014. Twenty-four female swimmers, aged 13 to 14 years, members of the Swim to Perfection Sports Club, from Cluj-Napoca, took part in the study. The training sessions were conducted twice a week. They consisted of sets of exercises on the device for approximately 20-30 minutes (specific movements for the butterfly stroke) before entering the water, followed by a period of rest of 2 to 3 minutes. The tests were performed for 30 seconds -the time being determined according to the approximate period corresponding to the 50m butterfly at level 5 of intensity - considered the closest to the density of water. Results: Our data shows clearly that specific training, using the biometer isokinetic trainer, improves the athletic performance of young swimmers. Conclusions: Dry-land strength and power training using the swim bench may enhance the ability to produce propulsive force in water, mainly in short distance events.*

Keywords: strength, effort, swim bench, swimmers.

Introduction

Muscle strength has a direct impact on the speed of execution in movements and activities that require skill and strength. When assessing the impact of training on the performance of young swimmers, muscle strength is an integral component and a key factor supporting faster speeds. Muscle strength can be defined as the possibility of a muscle or muscle groups voluntarily producing force or a couple against external resistance, under specific conditions defined by muscle action, speed of movement and posture (Siff, 2000, Stone et al., 2007, Zatsiorsky, 1995 and Miller, 2012, cited by Suci and Popovici, 2013). This can also be defined as the "ability to overcome internal and external resistance by muscle contraction" (Tudor, 2002), the strength parameters being recently proposed as one of the multifactorial phenomena that improve swimming performance (Barbosa et al., 2010).

We started from the hypothesis that by using the device Biometer Isokinetic Trainer for dry land training, we will develop muscular strength and increase the power of the arms; consequentially, we will correct and improve technical aspects of the butterfly stroke.

With this paper we wanted to test the neuro-muscular coordination and control of the movement on a given strength in swimmers. Evidencing the exercises will improve coordination and strength; boosting the power of the arms in water movements; and to develop the power and strength of arm traction by using the Biometer Isokinetic Trainer.

Materials and methods

Period and place of the research

The research was carried out at the Universitas Swimming Complex of the "Babeș-Bolyai" University, over a period of 3 years (2012-2013-2014).

Participants, apparatus and materials. Athletes (24 swimmers), members of the Sports Club "Swim to Perfection" Cluj-Napoca, participated in the research. The subjects undertook various exercises considered being a moderate workout specific to swimming and, additionally, underwent training with the Biometer Isokinetic Trainer. The device has 9 levels of intensity (1- low speed and high resistance; 5-medium; 9-high speed and low resistance). The training sessions were conducted twice a week, prior to entering the water. The subjects' duration of training sessions with the Biometer Isokinetic Trainer was approximately 20-30 minutes and consisted of sets of exercises on the device (specific movements for the butterfly stroke); the rest range of 2 minutes and 3 minutes between sets. The work schedule consisted of:

- a. 15-20 seconds for level 2; 15-20 seconds for level 8; 15 seconds for level 5;
- b. 15-20 seconds for level 3; 15-20 seconds for level 7; 15 seconds for level 5;
- c. 15-20 seconds for level 4; 15-20 seconds for level 6; 15 seconds for level 5;

Following the training on the swim bench, the subjects entered the water where they performed 3 sets similar to those performed on the Biometer, with compliance and fidelity to model performed on the bench. These consisted of sprints of 25 m, departing from the water:

a. 15-20 seconds butterfly stroke, with parachute and swim paddles (of different sizes);

b. 15-20 seconds butterfly stroke with an elastic chord (aided by the coach to facilitate the movement in the water and return to the wall after elongation at the maximum point of the chord);

c. 15 seconds butterfly stroke (without supporting means).

c. Tests applied

The subjects underwent a brief neuro-muscular warm up; by specific movements, on the swim bench, of 60-90 seconds, followed by the test. The tests were performed for 30 seconds (level 5 of intensity - considered the closest to the density of water), the time being determined according to the approximate period corresponding to the 50m butterfly. We conducted three tests: in 2012, 2013 and 2014.

We determined the following parameters: average strength (N) - abbreviated below as F med; mechanical work (J) - abbreviated below as L; average power (W) - abbreviated below as P med; average speed (m/s) - abbreviated below as V med; length of traction (m) - abbreviated below as Lt; time of active phase (sec) - abbreviated below as TFA; frequency of arms (no. / min) - abbreviated below as F-BR; number of arms' cycles (no.) - abbreviated below as C-BR;

d. Statistical processing

Statistical processing used the Excel application (Microsoft Office 2007) and the StatsDirect v.2.7.2 software. The results were graphically represented using the Excel application (Microsoft Office 2007). The data was uniformly distributed, to enable the Student test for paired samples to be applied. Correlation Pearson (r) between initial and final test values was also calculated. The confidence interval taken in account was $\alpha = 0.05$ (5%), considered statistically significant.

Results

Table 1 illustrates the comparative analysis for the values of the studied indicators in multiple moments and their statistical significance.

Table 1. Comparative analysis for the values of the studied indicators in three time moments and the statistical significance

Indicator/ moment	Mean	SE	Median	SD	Min.	Max.	P				
F med	2012	54,20	4,02	54	19,71	23	107	2012- 2013- 2013- 2014	9,07 x 10 ⁻⁵	2012- 2013	4,11 x 10 ⁻⁷
	2013	68,25	3,50	70	17,18	38	108			2012- 2013- 2014	1,5 x 10 ⁻⁹
	2014	77,87	3,35	81,5	16,44	48	112			2012- 2013- 2014	9,62 x 10 ⁻⁹
L	2012	2713,45	224,23	2766,5	1098,53	990	5579	2012- 2013- 2014	0,0001	2012- 2013	3,42 x 10 ⁻⁵
	2013	3538,70	228,48	3693	1119,35	1507	6026			2012- 2013- 2014	< 0,0001
	2014	4157,79	211,84	4471,5	1037,82	2441	6453			2012- 2013- 2014	< 0,0002
P med	2012	130,5	11,55	134	56,58	43	289	2012- 2013- 2014	< 0,0001	2012- 2013	< 0,0003
	2013	175,41	11,14	178	54,57	82	318			2012- 2013- 2014	< 0,0004
	2014	211,33	11,15	229	54,64	122	322			2012- 2013- 2014	< 0,0005
V med	2012	1,42	0,10	1,36	0,49	0,73	3,24	2012- 2013- 2014	0,0203	2012- 2013	0,0366
	2013	1,74	0,14	1,495	0,72	0,92	4,35			2012- 2013- 2014	0,0164
	2014	1,63	0,07	1,49	0,35	1,28	2,63			201	0,4559

										3-2014	
										201	
Lt	2012	1,10	0,02	1,14	0,14	0,82	1,31	2012-	0,4391	2-2013	0,6754
	2013	1,12	0,02	1,14	0,13	0,8	1,35	2013-		201	0,1242
	2014	1,15	0,02	1,16	0,12	0,89	1,4	2014		3-2014	0,1206
TFA	2012	0,91	0,05	0,87	0,25	0,63	1,56	2012-	0,2797	2-2013	0,1511
	2013	0,83	0,03	0,81	0,16	0,56	1,36	2013-		201	0,0563
	2014	0,79	0,01	0,79	0,07	0,67	0,96	2014		3-2014	0,4061
F-BR	2012	47,95	2,42	45,5	11,88	28	72	2012-	0,5155	2-2013	0,5965
	2013	49,25	2,12	49	10,40	21	74	2013-		201	0,2522
	2014	50,58	1,02	49	5,01	43	63	2014		3-2014	0,5446
C-BR	2012	23,33	1,15	22	5,66	14	35	2012-	0,4823	2-2013	0,5496
	2013	24,04	1,06	24	5,22	10	36	2013-		201	0,1895
	2014	24,70	0,47	24	2,31	21	30	2014		3-2014	0,4524

The statistical analysis of the values of the average strength for paired samples, identified significant statistical differences between the moments 2012-2013, 2012-2014 and 2013-2014 ($p < 0.001$), see Fig. 1.

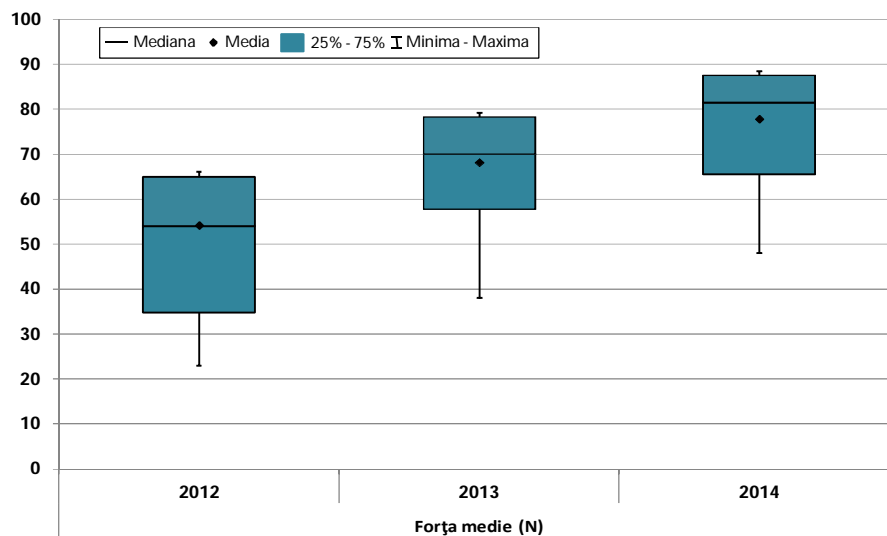


Fig.1. Average strength (N) in the studied moments

The statistical analysis of the values of the mechanical work for paired samples, identified significant statistical differences between the moments 2012-2013, 2012-2014 and 2013-2014 ($p < 0.001$), see Fig. 2.

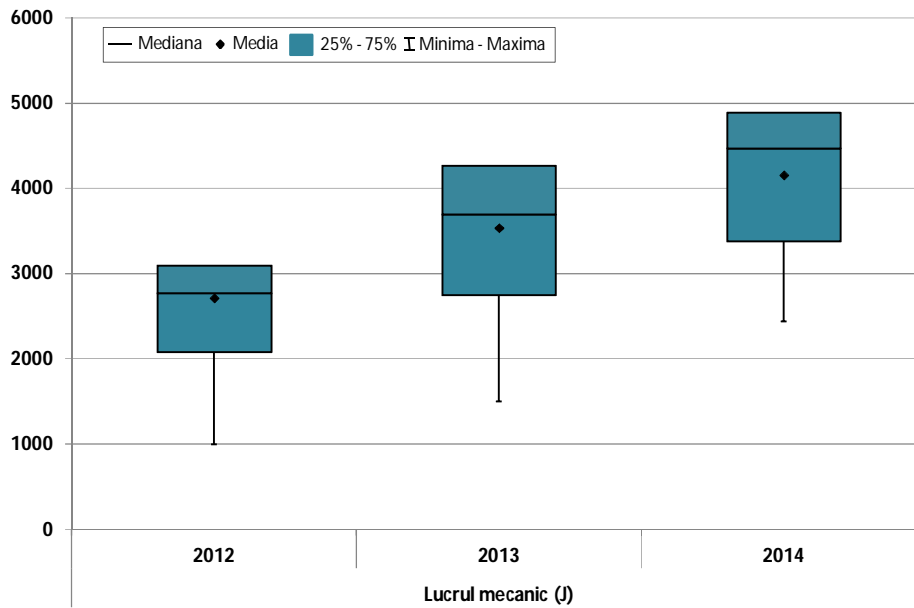


Fig. 2. Mechanical work (J) in the studied moments

The statistical analysis of the values of the average power for paired samples identified significant statistical differences between performance in 2012-2013, 2012-2014 and 2013-2014 ($p < 0.001$), see Fig. 3.

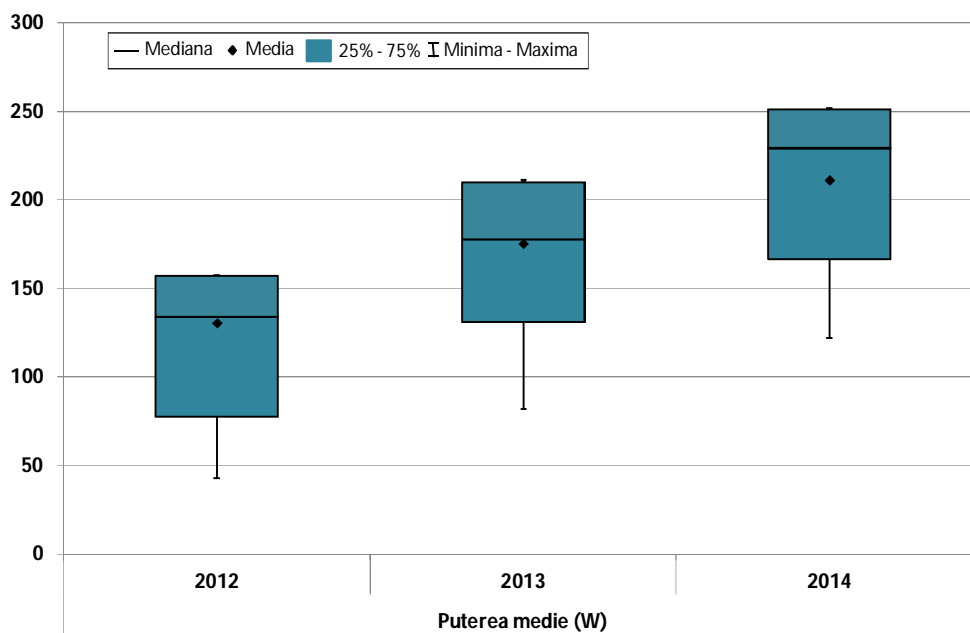


Fig. 3. Average power (W) in the studied moments

The statistical analysis of the values of the average speed for paired samples identified significant statistical differences between performance in 2012-2013 and 2012-2014 ($p < 0.05$), see Fig. 4.

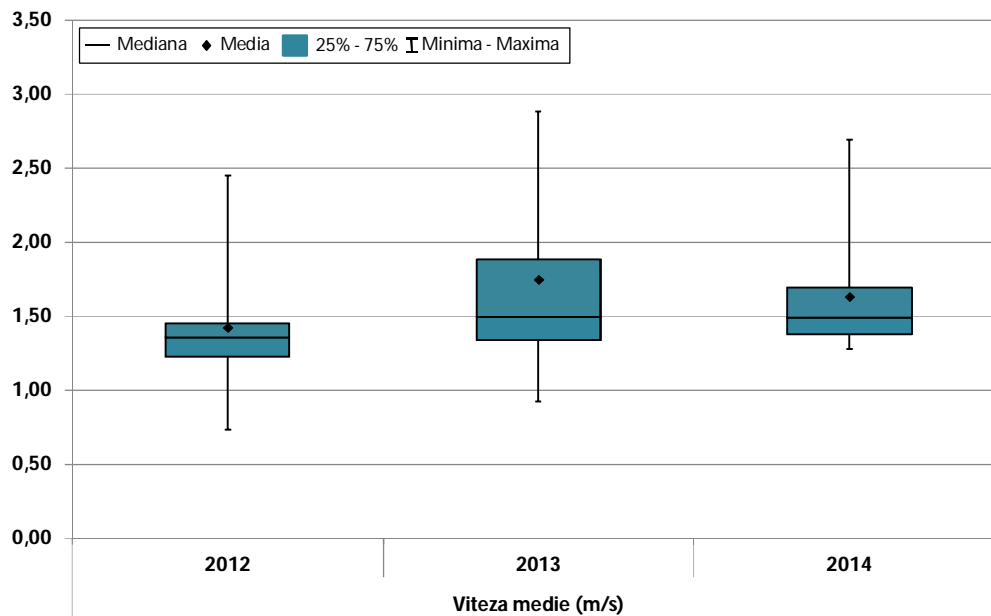


Fig. 4. Average speed (m/s) in the studied moments

The statistical analysis of the values length of traction, time during the active phase, frequency of arms, cycles of arms for paired samples, identified no significant statistical differences between any of the time periods ($p > 0.05$).

The correlation of statistical analysis between the indicators studied evidenced:

in 2012:

- very good correlation and in the same direction between F med – L, F med – P med, L – P med, Lt – TFA and F-BR – C-BR.
- good correlation and in the same direction between F med – TFA and P med – TFA.
- good correlation but in the opposite direction between V med – TFA, Lt – F-BR, Lt – C-BR, TFA – F-BR and TFA – C-BR.
- acceptable correlation between and in the same direction between L – V med, L – TFA, L – C-BR, V med – F-BR and V med – C-BR.
- acceptable correlation but in the opposite direction between F med – F-BR, P med – F-BR and V med – Lt.

in 2013:

- very good correlation and in the same direction between F med – L, F med – P med, L – P med and F-BR – C-BR;
- very good correlation, but in the opposite direction between TFA – C-BR;
- good correlation and in the same direction between F med – TFA and L – TFA;
- good correlation but in the opposite direction between Lt – F-BR and Lt – C-BR;
- acceptable correlation and in the same direction between F med – Lt, L – V med, L – Lt, L – C-BR, P med – Lt, P med – TFA and Lt – TFA;
- acceptable correlation but in the opposite direction between L – F-BR.

in 2014:

- very good correlation and in the same direction between F med – L, F med – P med, L – P med, P med – TFA and F-BR – C-BR;
- very good correlation but in the opposite direction between TFA – F-BR and TFA – C-BR;
- good correlation and in the same direction between F med – Lt, F med – TFA, L – Lt, L – TFA, P med – Lt and L – TFA;
- good correlation but in the opposite direction between Lt – F-BR and Lt – C-BR;
- acceptable correlation and in the same direction between V med – Lt;
- acceptable correlation but in the opposite direction between F med – V med and F med – C-BR.

Table 2 demonstrates the correlation between the studied indicators in multiple time periods.

Table 2. Correlation between the studied indicators in three time periods

Indicator/ year	2012		2013		2014	
F med – L	0,904	****	0,972	****	0,845	****
F med – P med	0,981	****	0,937	****	0,912	****
F med – V med	0,016	*	0,199	*	-0,348	**
F med – Lt	0,173	*	0,408	**	0,651	***
F med – TFA	0,514	***	0,593	***	0,708	***
F med – F-BR	-0,310	**	-0,138	*	0,003	*
F med – C-BR	0,008	*	0,206	*	-0,323	**
L - P med	0,894	****	0,938	****	0,819	****
L - V med	0,270	**	0,322	**	-0,207	*
L – Lt	0,156	*	0,324	**	0,668	***
L – TFA	0,374	**	0,509	***	0,628	***
L - F-BR	-0,270	**	-0,325	**	-0,010	*
L - C-BR	0,265	**	0,337	**	-0,176	*
P med – V med	0,024	*	0,1355	*	-0,191	*
P med – Lt	0,152	*	0,433	**	0,582	***
P med - TFA	0,531	***	0,496	**	0,800	****
P med – F-BR	-0,352	**	-0,194	*	-0,118	*
P med – C-BR	0,019	*	0,117	*	-0,152	*
V med - Lt	-0,277	**	-0,124	*	0,417	**
V med - TFA	-0,613	***	0,034	*	-0,227	*
V med - F-BR	0,262	**	0,117	*	0,010	*
V med – C-BR	0,273	**	-0,135	*	0,014	*
Lt – TFA	0,759	****	0,405	**	0,550	***
Lt - F-BR	-0,704	***	-0,705	***	-0,689	***
Lt - C-BR	-0,711	***	-0,711	***	-0,702	***
TFA - F-BR	-0,639	***	-0,124	*	-0,822	****
TFA - C-BR	-0,656	***	-0,953	****	-0,832	****
F-BR – C-BR	0,996	****	0,990	****	0,954	****

The statistical analysis of values of time in water (sec.) to 50 m butterfly, considering all three years, we noticed highly significant statistical differences between at least two of the years ($p = 0.0021$). According to the expectations, at the statistical analysis of the values of the time in water for 50 m butterfly for paired samples, we noticed significant statistical differences between the years 2012-2013, 2012-2014 and 2013-2014 ($p < 0.0001$), see Fig. 4.

Table 3 evidences the comparative analysis for the values of time in water (sec.), in the studied moments and the statistical significance.

Table 3. *The comparative analysis for the values of time in water (sec), in the studied periods and the statistical significance.*

Year	Mean	SE	Median	SD	Min.	Max.	P
2012	37,32	0,85	36,74	4,17	31,88	46,62	2012-2013 < 0,0001
2013	35,23	0,77	34,61	3,79	30,01	44,12	2012-2014 < 0,0001
2014	33,28	0,60	32,97	2,98	28,14	38,79	2013-2014 < 0,0001
						2012-2013-2014	0,0021

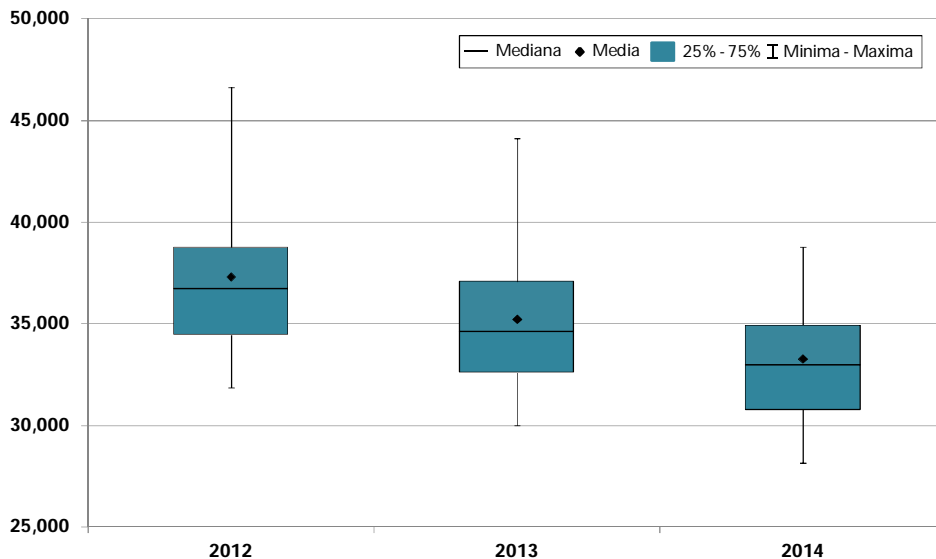


Fig. 4. The time values in water (sec.) in the studied periods

Discussions and conclusions

The use of ergometer in strength and power training has positive effects (Lawton et al., 2011). Swim bench ergometry is a reliable method for measuring the maximum traction strength of arms in surfers (Loveless and Minahan, 2010).

Swim benches are used in dry land training by a majority of swimmers to diagnose performance. These are helpful for individual performance if the mechanical power achieved over a period of time corresponds to competition times (Edelmann-Nusser et al., 2004).

Use of the swim bench in the swimmers' training is recommended in order to optimize the biomechanics of the arms' movement and the resultant mechanical power (Zamparo et al., 2014). During training on the swim bench, a great part of the muscle mass used in swimming is activated; the aerobic increases being transferred directly into the water (Gergely et al., 1984).

To improve muscle strength of the arms during the preparatory period, the training only of the arms in swimming, with a percentage of 20% of weekly training distances, is an effective method (Konstantaki et al., 2008).

Using the ergometer in training resulted in an improvement in maximum muscle power of arms in swimmers (Trinity et al., 2006).

The swim bench (Biometer Isokinetic Trainer) develops strength at speeds close to those during the event, or even higher, and improves the inter-muscular synchronization, considering that each muscle group that participates in a movement acts in a certain order and at a certain time.

Following the research, the subjects have significantly increased their strength, speed and power, also an improvement of water times for 50m distance. In most subjects, there is a significant improvement of performances in water. In addition, there are subjects who approximately maintained their speeds, marking only a slight increase (the consequence of a poor swim bench technique, lack of training). Only one subject presents stabilization of the speed and strength parameters, but with a decrease in power.

The positive results obtained on the swim bench were successfully transferred into the water. We notice an inter-dependent relationship between strength, power and mechanical work; each having an influence on the other. These intersections are highly significant when considering the importance of marginal gain in sports performance. The intensely significant differences evidenced following the comparative analysis of the following parameters: strength, power, mechanical work, during the three years of study (2012-2013-2014), demonstrates the effectiveness of training on this device.

Regarding the length of traction, frequency of arms, time of active phase and the number of arms' cycles, there are no statistically significant differences over the three years (2012-2013-2014). This is explained by the fact that we wanted to increase strength and power parameters without damaging the technique. Detection and correction of technical errors are an important aspect aimed at during the training with the Biometer and in water.

Analyzing the results obtained after training on the swim bench, we noticed that the evolution of the athletes during the study period was better than their earlier developments. This evolution is due to the formation of correct movements (stereotype) by using the machine constantly.

Acknowledgements

This paper work is part of the doctoral studies “Optimization of strength and power, performance predictors in swimming”, period 2011-2014, of the second author.

References

- Barbosa, T., Bragada, J., Reis, V., Marinho, D., Carvalho, C., & Silva, A. (2010). Energetics and biomechanics as determining factors of swimming performance: updating the state of the art. *J Sci Med Sports*, 13, 262–269.
- Edelmann-Nusser, J., Hohmann, A., Witte, K., Heller, M., Krüger, A., Sikorski, K., & Hofmann, M. (2004). Evaluation of a swim bench. *International symposium on Biomechanics in Sports, Ottawa, Canada*, 617-619.
- Gergley, T. J., McArdle, W. D., DeJesus, P., Toner, M. M., Jacobowitz, S., & Spina R. J. (1984). Specificity of arm training on aerobic power during swimming and running. *Med Sci Sports Exerc*, 16(4), 349-354.
- Konstantaki, M., Winter, E., & Swaine, I. (2008). Effects of arms-only swimming training on performance, movement economy, and aerobic power. *Int J Sports Physiol Perform*, 3(3), 294-304.
- Lawton, T. W., Cronin, J. B., McGuigan, M. R. (2011). Strength testing and training of rowers: a review. *Sports Med*, 41(5), 413-432.
- Loveless, D. J., & Minahan, C. (2010). Two reliable protocols for assessing maximal-paddling performance in surfboard riders. *J Sport Sci*, 28(7), 797-803.
- Suciu, A., & Popovici, C. (2014). Effects of vertical water training on knee extensors strength in swimmers. *Procedia-Social and Behavioral Sciences*, 117, 420-426.
- Trinity, J. D., Pahnke, M. D., Reese, E. C., Coyle, E. F. (2006). Maximal mechanical power during taper in elite swimmers. *Med Sci Sports Exerc*, 38(9), 1643-1649.
- Tudor, V., (2002). Capacitățile condiționale, coordinative și intermediare. București: R.A.I.
- Zamparo, P., Turri, E., Peterson, S., & Poli, A. (2014). The interplay between arms-only propelling efficiency power output and speed in master swimmers. *Eur J Appl Physiol*, 114, 1259-1268.

THE EFFICIENCY OF THE SPECIAL PROGRAMS DEDICATED TO THE DEVELOPMENT OF THE OLYMPIC ATHLETES

Florin MIȘCĂ^{1*}

¹National University of Physical Education and Sport, 140 Constantin Noica, Bucharest, Romania

* Corresponding author: florin.misca@gmail.com

Abstract. *One of the determining factors in obtaining medals in the Olympics is the „forced mobilization of resources” and organizational abilities. This is reflected in the managerial practice through special programs. In accordance with the legal provisions, the Romanian Olympic and Sports Committee (ROSC) financially supports the special programs dedicated to the best junior athletes aiming their future promotion in the Olympic Teams, and the national sports federations organize and coordinate these programs. The programs funded by ROSC, respectively National Olympic Centers for Junior Training (NOCJT) and the Olympic Scholarships for Juniors (OSJ) have contributed for 37 years to the formation of the Romanian Olympic Teams which participated in the Olympics. The role of NOCJT and OSJ in obtaining sports performances in the Olympic Games (including sports disciplines without NOCJT & OSJ) was established by reporting the number of athletes who have benefited from such programs to the total number of athletes composing the Olympic Teams: Sydney 2000 – 48%, Athens 2004 – 59%, Beijing 2008 – 56%, London 2012 – 66%. However, we believe that this method of calculation disregarded the performance longevity of the elite athletes who have found themselves in the Romanian Teams who have participated in the Olympics for several editions and as a result, the percentages do not indicate the current efficiency of the programs. In this context, the objective of this paper is to identify the efficiency of the processes taking place in NOCJT and OSJ and the causes that influence it.*

Keywords: sports management, Olympics, athlete development.

Introduction

One of the determining factors of the effectiveness of the Romanian elite athletes training system was and still is the „forced mobilization of resources” (Bernard and Busse, 2004, p. 413) and organizational skills. This factor is reflected in the practice of the training programs specifically dedicated to high-performance athletes, for whom certain funds are allocated („forced mobilization of resources”) and operates under certain rules and procedures (organizational skills).

The most important training program of athletes was and still is the National Olympic Junior Training Centers program (NOCJT). NOCJTs are sports units without legal personality, where the best athletes in Romania are selected for the junior age category. „NOCJT’s aim is to prepare young people with special qualities for high performance in sport, in order to further promote them to the national and Olympic teams” (Rules of organization and functioning of the National Olympic Junior Training Centers).

In accordance with the legislation applicable to the sports field, the „Romanian Olympic and Sports Committee supports financially, based on financing contracts, the activity of the national junior training centers. National sports federations manage, organize and coordinate the activity of these centers. Ministry of Youth and Sports, Ministry of National Education and Scientific Research, the central and local public administration authorities collaborate and support the activity of the national Olympic junior training centers” (Law no. 69 of April 28, 2000 – *Law on physical education and sports with subsequent amendments and completion*).

This year marks the 37th anniversary of the establishment of the first National Olympic Junior Training Center, for men's judo at Târgoviște.

In May 1998 the system of granting junior Olympic scholarships was introduced. Olympic Scholarships for Junior Training (OSJ) represents an individualized type of supporting the training of certain athletes (youth and junior category) with special qualities for performance sports, at the Olympic sport branches, in order to promote them to the national and Olympic teams.

Over time the strategy of training elite athletes developed by specialized national sport federations imposed a flexible program so that both NOCJT and OSJ versions were used for certain disciplines.

Therefore, since their implementation, NOCJT and OSJ programs were the main source for Romania's Olympic teams participating in the Summer Olympic Games. This contribution was measured by calculating the percentage of athletes who have trained in NOCJT and OSJ, out of the total number of athletes participating in the Olympic Games editions (including sports disciplines without NOCJT-OSJ). The evolution of this contribution is shown in Fig. 1.

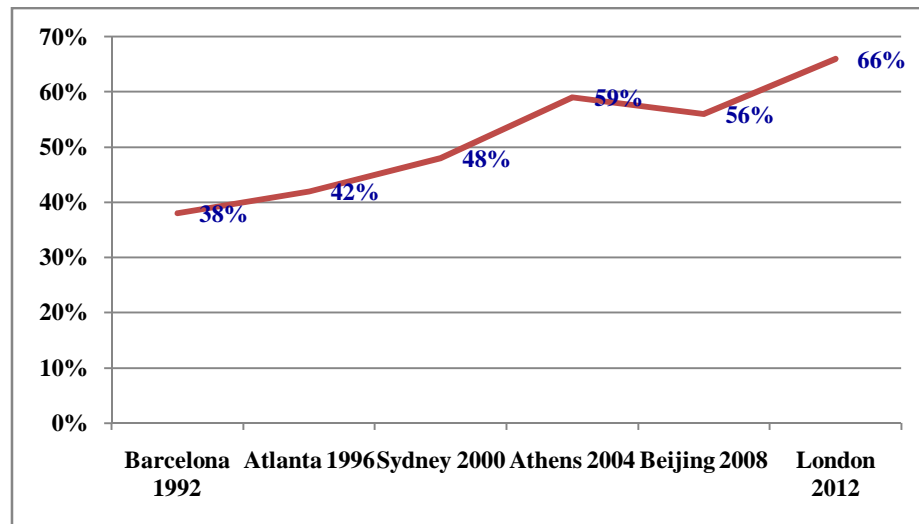


Fig. 1. The percentage of athletes participating in the Olympic Games, coming from NOCJT and OSJ program

The upward trend of the chart determined the classification of programs as a determining factor of the process of developing elite athletes in Romania and also created a justification of the efficiency of the processes run in the programs.

Given the longevity of the performance activity of certain elite athletes, they were found in Romanian delegations participating in the Olympic Games for several editions. Percentages presented above did not take into account this fact. As a result, the percentages do not indicate the current effectiveness of the programs.

In this context, the objective of this paper is to identify the efficiency of processes taking place in NOCJT and OSJ programs and the causes influencing it.

Methods

One of the applied method was the six sigma method, useful in a process performance measurement. Sigma is the value of a variable that shows the distribution of a process output characteristics. A greater value for Sigma indicates a more stable process, with less risk of rejection and lower costs.

Six sigma is a statistical measure of the performance of a process and offers opportunities to improve quality and performance, reducing the variability of the results.

The basic concept of Six Sigma is to measure and eliminate errors systematically. In the process of high performance athletes training other processes shall be distinguished, including the following, although financed by the Romanian Olympic and Sports Committee, management of the technical and methodological activities lies on the specialized national sports federations (in accordance with the legal provisions applicable in the field):

- NOCJT&OSJ program;
- youth Olympic squad program;
- senior Olympic squad program.

The task of research was the study of the training route of high-performance athletes approached by national sports federations included in NOCJT and OSJ programs, the study of the database of the Romanian Olympic and Sports Committee programs dedicated to elite athletes. The study of the Olympic Technical and for Sports Performance Commission (OTSPC) reports and of the documentation submitted to national sports federations for OTSPC analysis was also very important.

The analysis of technical reports and methodical annexes relating to financing contracts concluded between the Romanian Olympic and Sports Committee and national summer sports federations included in NOCJT and OSJ programs: athletics, boxing, rowing, gymnastics, weightlifting, aquatics (swimming, diving), judo, kayak-canoe, wrestling, rugby in 7, fencing, table tennis, shooting. According to the provisions of the financing contracts for running NOCJT and OSJ programs, the national sports federations must send to COSR a series of documents with information on the progress of the program:

- sporting activities program;
- technical reports on the progress of the program;

- athletes replacement sheets (when applicable).

The study on the documentation referred to in this chapter, sought to identify the causes of loss of athletes in NOCJT and OSJ programs. Data collected were processed by a Pareto analysis in order to highlight the importance of different information.

PARETO analysis starts from the idea that negative effects, losses are not proportional to the causes that produced them; generally, 20% of the actions determines 80% of the losses, non-conformities; 80% of the quality related problems comes from only 20% of the possible causes of failure.

PARETO chart applied in the quality sector indicates the main places of intervention on the causes producing the most common errors or highest costs, and therefore is also called A, B, C as an order to address the issues. It is a graphical representation in which causes of the problems are arranged by importance (number of errors generated, quality costs). The determining causes as support for decision making are highlighted by the graphical representation.

PARETO analysis covers the qualitative aspect of the phenomenon to be studied. It represents a method to establish the most effective changes one can make to improve a process. The Pareto principle states that 20% of resources accounts for 80% of the most important results, and the use of this analysis reveals the imbalance that always occurs between work and results, which we find in any activity.

Results

Following the study on the technical documentation relating to the contracts, respectively nominal sheets for introducing / removing athletes to / from the system and periodical technical reports, 18 causes (opportunities for non-compliance) have emerged leading to loss of athletes from NOCJT and OSJ programs before the end of the 4-year service:

1. lack of technical progress;
2. poor results;
3. failure to meet performance objectives;
4. infringements of the training program;
5. non adaptation to the team program;
6. problems with body weight;
7. transfer to a foreign club;
8. injury;
9. medical conditions (different diseases);
10. non-recovery after injury/illness in due time;
11. doping sanction;
12. failure to comply with the training camp program/ discipline;
13. misconduct/ indiscipline;
14. school related problems;
15. giving up on the performance activity for personal reasons;
16. the athlete can't stand the separation from parents;
17. parents do not agree with the performance activity;
18. family problems (rehousing, parents' divorce).

This information on the causes of the loss of athletes in the program was collected from documents (sheets, letters, reports) formally communicated by the national summer sports federations for which the NOCJT and OSJ programs operate, in the 2012-2015 period. PARETO chart that highlights the frequency of noncompliance opportunities with program requirements is shown in Fig. 2.

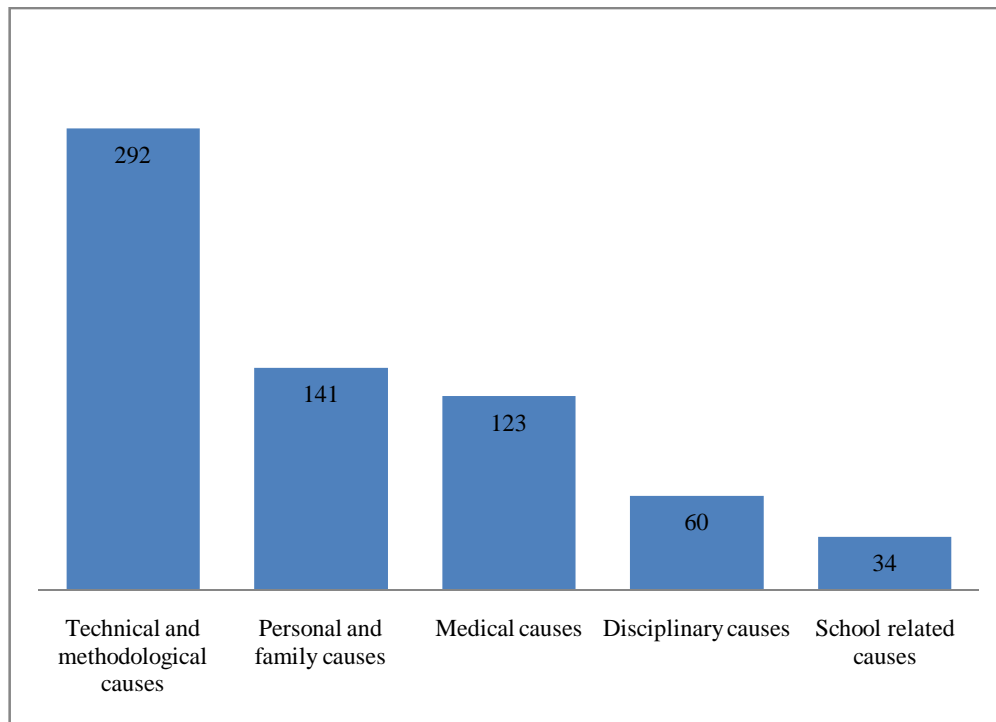


Fig. 2. PARETO chart of the causes of loss of athletes from the NOCJT-OSJ system

The causes of loss of athletes from the system that have been classified by the experts of the national sports federations in the technical and methodical category are the following:

1. lack of technical progress;
2. poor results;
3. failure to meet performance objectives;
4. infringements of the training program;
5. non adaptation to the team program;
6. problems with body weight;
7. transfer to a foreign club.

Noting the largest share of technical and methodological causes, we conducted a PARETO chart for detailing this category shown in Fig. 3.

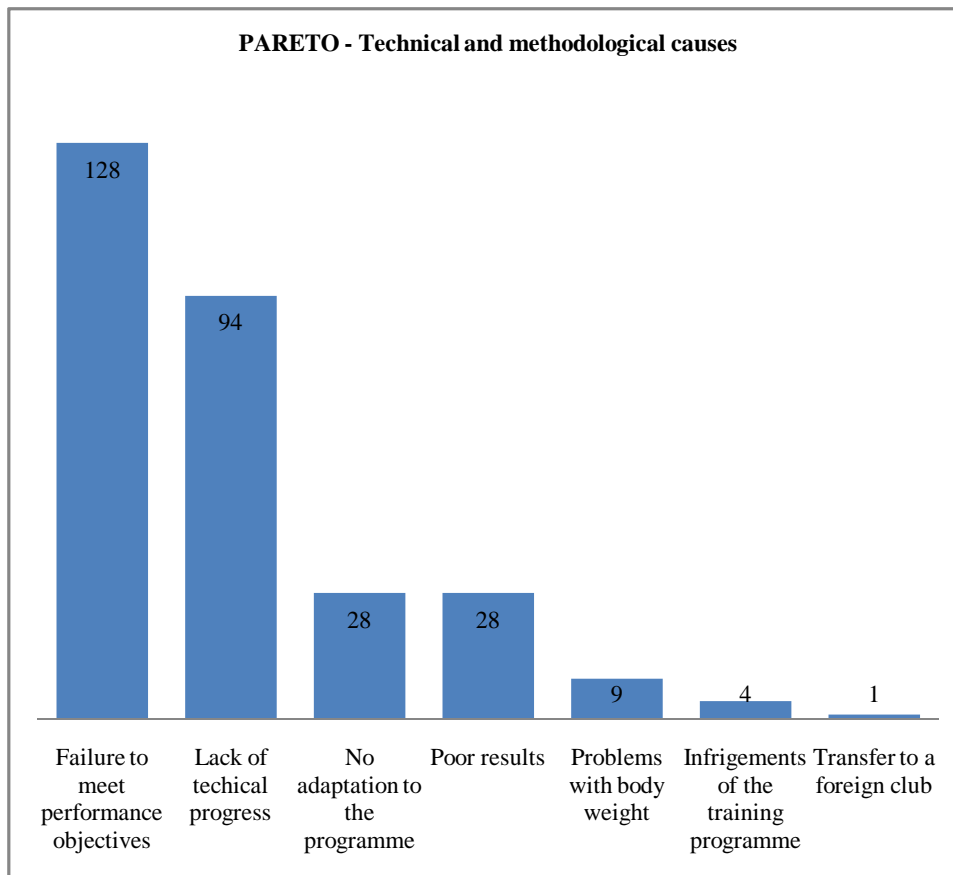


Fig.3. PARETO chart of causes form the technical and methodical category

Sigma level of the process represented by NOCJT and OSJ programs was calculated using the following method:

Determining the number of opportunities for failures (nonconformity)

$$O = \frac{\text{number of causes}}{\text{number of athletes out of the system}} = \frac{650}{638} = 1,02$$

The ratio between the number of causes (650) and the number of athletes out of the system before the end of the service (638) is 1.02. Thus, the opportunity for a nonconformity to occur at an athlete is 1. The formula for calculating the DPO used the number 1.

Determining the number of units processed (athletes who were included in the program for the 2012-2015 period) - N

Determining the total number of failures (nonconformities) - D

Calculation of failures (nonconformities) per opportunities - DPO

$$DPO = \frac{D}{N \times O}$$

Yield calculation (yield RTY)

$$RTY = (1 - DPO) \times 100$$

Searching Sigma value in Sigma Process table

$$RTY = \left(1 - \frac{D}{N \times O}\right) \times 100 = \left(1 - \frac{650}{1052 \times 1}\right) \times 100 = 38,21$$

$$RTY = \left(1 - \frac{650}{1052 \times 1}\right) \times 100 = 38,21$$

Given that the yield of the process within NOCJT-OSJ is 38.21, according to the Process Sigma table, Sigma value is 1.2.

To achieve a classification of sports, in relation to the effectiveness of processes within NOCJT-OSJ we calculated Sigma value for each sports discipline, according to table 1.

Table 1. *Table for calculating the SIGMA value per sport*

SPORT	O	N	D	DPO	RTY	SIGMA
ATHLETICS	1	163	126	0,77	22,70	0,7
ROWING	1	124	61	0,49	50,81	1,5
GYMNASTICS	1	114	62	0,54	45,61	1,4
WEIGHTLIFTING	1	85	62	0,73	27,06	0,9
JUDO	1	89	58	0,65	34,83	1,1
WRESTLING	1	177	136	0,77	23,16	0,7
AQUATICS	1	16	5	0,31	68,75	2,0
RUGBY	1	38	18	0,47	52,63	1,6
FENCING	1	94	59	0,63	37,23	1,2
TABLE TENNIS	1	28	6	0,21	78,57	2,3
BOXING	1	52	28	0,54	46,16	1,4
KAYAK-CANOE	1	64	29	0,45	54,69	1,6

Sigma value, both of the entire NOCJT-OSJ process and for each sport separately, was calculated by reference to the yield. The level of details of the collected data (from replacement sheets, reports, letters from the COSR archive, for the 2012-2015 period) allowed us to prioritize sports in terms of performance of the process developed in NOCJT-OSJ. This hierarchy is shown in Fig. 4.

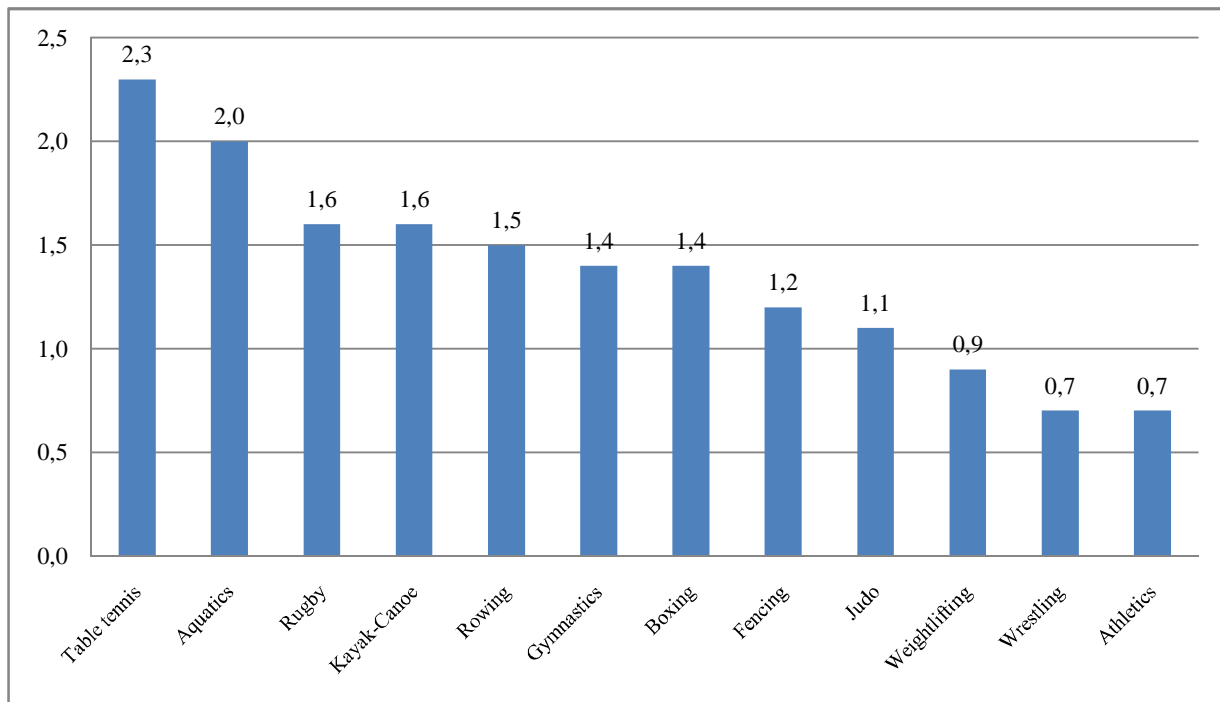


Fig. 4. PARETO chart of SIGMA values per sport for NOCJT-OSJ related processes

The research by the six sigma method will continue to thoroughly study the level of detail of the causes of loss of athletes from the system and opportunities of problem occurring in the activities of the process taking place in NOCJT and OSJ programs.

Discussion and conclusions

Currently, the identification, training and career management of high performance athletes can no longer be considered responsibilities of a single sports organization or of the specialized national sports federation. The road to high performance at the Olympic Games must be in the attention of the National Olympic Committees.

Scientific researches in the field of performance sports strengthened the assertion of Herbert Simon (Nobel laureate for his pioneering research into the decision-making process within economic organizations), "it takes ten years of extensive training to excel in something".

In sports performance specialists have concluded that it takes 8-12 years of training for a talented athlete to reach high performance levels. Thus it was formulated the ten-year rule or the 10,000-hour rule which would mean more than three hours of daily training for a period of ten years.

Sports organizations should provide optimum conditions and appropriate support in all phases of athletes training based on age-specific needs.

In the performance sports system in Romania, the first phase in an athlete's road to the Olympic Games is the NOCJT and OSJ programs.

The training period in NOCJT and OSJ would correspond to two of the athletes training phases described by the model of long-term athlete development associated with IstvanBalyi's theory, namely the "train to train" phase (age 12-16 for boys and 11-15 for girls) and the "training to compete" phase (for age 16-18 for boys and age 15-17 for girls). Therefore, specialists of the technical teams must have knowledge that allows them to adapt the training to the specific of each phase and to ensure transaction between them. The two phases differ from the point of view of the methodology of the training, the ratio between training and competition having different values between the two phases:

- in the case of "train to train" phase, the training/ competition ratio, recommended by Balyi, is 60/40 (40% percentage includes both the actual competition and the specific training for the competition);
- in the case of "training to compete" phase, the training/ competition ratio recommended by Balyi is 50/50.

Some specialists emphasize the idea of observing the optimum ratio between training and competition, considering that "overemphasis on competition in the early phases of training will always determine deficiencies in athletic abilities in the subsequent career of an athlete" (Balyi and Hamilton, 2004).

Compared to athletes training model proposed by Chelladurai and Madella, the training phase in NOCJT-OSJ corresponds to the specialization phase, whose main features are the following:

- increasing the amount and intensity of practice;
- socializing in and through sport;
- learning rules and behaviors;
- systematically introducing in the competitive activity;
- adapting the motivation to the phase-specific new conditions;
- sports activities dropout rate is high at this phase.

Another model of training of athletes that significantly influenced the sports systems in European countries, namely the development model of participation in sports, proposed by Jean Côté, would classify the training period in NOCJT-OSJ in the specializing phase corresponding to the age of 13-15, when the specificity of sports becomes an important feature of the commitment and involvement in the sports activity and the first part of the investment phase, corresponding to the age of 16 and over, phase when the child becomes dedicated to the objective of achieving a high level of performance in a particular sport and the elements of developing the skills to compete and sport-specific strategic skills, becomes the most important.

Investigating NOCJT and OSJ programs, a high fluctuation of athletes is found, respectively in four years (2012-2015) out of the 1,052 athletes who have trained under the NOCJT-OSJ system, only 414 were promoted to the next level of performance.

The technical and methodical causes represent the majority (44.92%) among the ones determining the loss of athletes from the system, before the end of the training period. Therefore, a review of the methodical procedures and method to control the technical and methodical activities is required.

Opportunities for noncompliance with the majority in this category, namely the lack of technical progress and failure to achieve the performance objectives (together amounting to 76.02%) indicate possible errors in carrying out the following activities:

- selection of athletes for co-opting them in NOCJT and OSJ;
- planning the training;
- conducting the training;
- setting activity's goals related to the age category and appropriate phase for athletes training;
- considering the windows of opportunity.

NOCJT-OSJ process performance is adversely affected, significantly, by the causes related to the quality and level of expertise of coaches and methodical and technical management of the program.

Personal-familial causes represent a high percentage (21.69%) indicating the significant impact of the extra-sports factors, from the athlete's entourage, on career performance. The uncertainty is high, namely athletes are unsure of their future in sport because they are subjected to external pressures (such as choosing between performance in sport and success in school or preparing for social skills for life, pressures of psychological nature due to some family problems)(Chelladurai and Madella, 2006, p. 77).

School-generated problems (it refers to problems arising from the school transfer, frequency of courses, pass rate) have the smallest share (5.23%) among the causes of abandonment of the performance activity in this phase of athletes training, which indicates a proper application of the International Olympic Committee's recommendation, namely: "All constituents of the Olympic Movement should endorse the importance of combining education and sport. Priority should be given to the development of programmes aimed at building athletes' lifetime skills. The Olympic Movement, in collaboration with parents, coaches and members of the athletes' entourage, should encourage and promote the participation of athletes in their career programmes, during their competitive years as well as after their retirement from high-level competition"(International Olympic Committee, XIII Olympic Congress, Copenhagen, 2009. Recommendation no. 7, p. 17).

The medical nature causes have caused a loss of 18.92% of all athletes who have trained under NOCJT and OSJ programs between 2012 and 2015. The detailed analysis of this category of causes shows that the opportunity of noncompliance with the largest negative impact is the medical issues caused by various medical conditions (52% of all health-related causes).

Sports centers that have responsibility in this phase of training athletes must pay attention to the following issues:

- providing technical specialists staff with various skills and high level of expertise (coaches, doctors, psychologists, nutritionists, consultants in matters of education, etc.);
- combining sports training with school education, thus providing dual careers of athletes and preparing them for social integration after retirement from the competitive performance;
- synergy with technical and methodical direction established nationally;
- collaboration with the external factors, namely with schools, local authorities etc.;
- creation of a database with information about athletes, pursuing the activity impact on their formation and on the performance evolution.

In the current organizational context of the performance sport in Romania, special programs dedicated to the training process for athletes participating in the Olympic Games is a necessity for the following reasons:

- training systems for performance athletes approached by the national sports federations of Olympic sports are different and relate to the strategic objectives approved by the general assemblies;
- the emergence of a large number of private clubs that have been co-opted as members at general assemblies of federations, can cause a change in the strategic orientation to the detriment of performance, emphasizing the interests of sports developing as mass and leisure type, pursuing financial profit from operating sports facility and charging the private lessons;
- the system of federations financing for the current year is determined based on a methodology which includes, among criteria, the performances of the prior year, including the results from the junior level;
- the payment system of coaches and specialists relies significantly on results in the junior and youth categories, which determines an increase in performance objectives (sometimes unjustified methodically) in these categories, thus affecting the normal evolution of the athletes;
- the double legitimation system, very useful in supporting certain young athletes with special qualities for high performance, however, affects the statistical reporting to financing entities of the sector, regarding the numerical structure of the performance basis.

The program of the National Olympic Junior Training Centers provided a constancy in strategic orientation towards athletes' development for participation in the Olympic Games.

With a seniority of 37 years, the program has contributed significantly to the composition of the Olympic Teams participating in the Olympic Games. The method of assessing the contribution of NOCJT to the numerical structure of the Olympic delegations was the calculation of percentage, namely out of the total number of athletes included in the Olympic delegation it was determined the percentage of athletes who throughout their performance careers were components of NOCJT. The dynamics of this contribution was as follows:

- for the 1992 Barcelona OG, the contribution amounted to 38%;
- for the 1996 Atlanta OG, the contribution amounted to 42%;
- for the 2000 Sydney OG, the contribution amounted to 48%;
- for the 2004 Athens OG, the contribution amounted to 59%;
- for the 2008 Beijing OG, the contribution amounted to 56%;
- for the 2012 London OG, the contribution amounted to 66%.

It is found that the indicator used had a significant increase from one edition to another, reaching to 66% for the Olympic Team participating in the 2012 London Olympic Games. The calculation of percentages did not take into account that some athletes participated in several editions of the Olympic Games (2, 3, 4 and even 5 editions). So their presence in the delegation increased the percentage.

Given the fact that for most sports, the Olympic Team selection occurs in approximately 3-4 years after completion of their training in NOCJT the percentage thus calculated constitutes a reactive system of data collection and evaluation of the process efficiency. Applying the Six Sigma method and the tools associated with it, the effectiveness of the process can be assessed in a proactive manner and also several triggering benchmarks for some corrective measures can be established.

Based on the results of the analysis phase corresponding to the six sigma method, the NOCJT operation rules can be updated, and also the procedures for selection and promotion. To maintain the identified benefits, can be prepared control plans defining the new changes (which should become daily practice), characteristics to be assessed, methods of assessment and a plan of action to be initiated if it is found that the process is out of the control limits.

Furthermore, the calculation of the sigma value allows a comparison of the performance of processes developed within the training programs of athletes from different sports.

Acknowledgements

This article is part of the research related to doctoral studies at the National University of Physical Education and Sports of Bucharest. The data used in the research were collected from the database of the Romanian Olympic and Sports Committee.

References

- Bayli, I., & Hamilton, A. (2004). Long-term athlete development: trainability in childhood and adolescence: windows of opportunity, optional trainability. *Victoria, British Colombia: National Coaching Institute and Advanced Training and Performance*, 8.
- Bernard, A., B., & Busse, M., R. (2004). Who wins the Olympic Games: Economic resources and medal totals. *Review of Economics and Statistics*, 86(1), 413-417.
- Chelladurai, P., & Madella, A. (2006). *Human resource management in Olympic sport organisations*. Champaign, IL: Human Kinetics.
- International Olympic Committee, XIII Olympic Congress, Copenhagen, 2009. Recommendation no. 7, p. 17.*
- Law no. 69 dated 28 April 2000 – Law on physical education and sports, as further amended and supplemented Rules of organization and functioning of the National Olympic Junior Training Centers.*

USE OF DIDACTIC TECHNOLOGIES FOR ACHIEVEMENT OF THE LEARNING UNITS OF ACROBATIC GYMNASTICS IN PRIMARY SCHOOL

Larisa POTOP^{1*}, Bogdan URICHIANU¹

¹State University of Physical Education and Sport, 24/1 A. Doga, Chisinau, Moldova

* Corresponding author: potop.larisa@yahoo.com

Abstract. *This paper is intended to highlight the use of didactic technologies for the achievement of the learning units of artistic gymnastics in primary school. This scientific approach has led to a comparative study conducted in the middle school located in Maldeni, Teleorman County, Romania. The following research methods were used in this study: bibliographic study of the specialized literature, pedagogical observation, ascertaining pedagogical experiment, method of algorithmic learning, method of programmed training, method of testing, statistical-mathematical method and graphical representation method for data processing and interpretation. Study results reveal the physical development of the children submitted to research, the muscle strength level and the learning of isolated or connected acrobatic elements. To achieve the purpose and the tasks of the research there were used the methods of programmed training and algorithmic learning. Following up this scientific approach it was found out that the use of didactic technologies during the training-educational process for achieving the learning units of acrobatic gymnastics included in the curriculum for 3rd and 4th grades led to improved muscle strength and to effective learning of the dynamic and static acrobatic elements (isolated or in connection).*

Keywords: primary school, gymnastics, strength, algorithmic learning, testing.

Introduction

Gymnastics is the basic discipline of the entire system of physical education and sport because it was part of all education systems throughout the development of human society: „Kalos Kai Agathos” (beautiful and good) is a precept adopted by gymnastics too. As it is an important component of the physical education for children and youth, the gymnastics mainly aims at the harmonious growth and health preservation of these ones. Under certain forms, gymnastics can be found in various activity fields as branch intended for all people, regardless of their age, gender and occupation (Băiașu, 1984; Rusu et al, 1998; Grigore, 2003; Potop, 2014).

Didactic design is an operational activity that helps to structure in advance the specific sub-competences objectives, didactical contents, methods, means and forms of organization of the instructive-educational process and evaluation systems within a school year, semester or class according to the categories of competences in order to achieve the goals of knowledge and understanding, implementation and integration in building student's personality (Grimalschi and Boian, 2011, pp. 20-25). Didactic design reflects how the teacher, the schoolmaster or physical education teacher conceives the achievement of the benchmarks for each grade from the 1st to the 8th and of the specific competences for the 9th to 12th/13th grades. Although every school teacher is in possession of unitary documents, namely: structure of school year, curriculum, physical education syllabus, National System of School Evaluation, didactical design gets a customized character, each own (Dragomir and Scarlat, 2004, pp. 16-31).

Starting from the framework and reference goals of physical education subject, the gymnastics (through its well-thought-out and selected contents and means) leads to the assimilation by pupils of motor skills and knowledge at primary school level. The specific means of gymnastics can be found out in the learning units (capacity for organization, harmonious physical development, basic motor and utility-applicative skills and acrobatic gymnastics) (Potop and Marinescu, 2014).

Special concerns for acrobatic gymnastics from the specialists are expressed in many autochthonous works dedicated to this topic. A great part of them have a strong methodical character and deal with the individual acrobatic exercises used in middle school too. Other ones, in an attractive form, try to awaken interest in two-person or group acrobatic exercises as the games or pyramids, available in school. A great interest for acrobatic exercises is also manifested in numerous countries worldwide; the importance of these exercises is unanimously acknowledged and the specialists, besides the methodical issue, try to persuade children to practice them (Rouet, 1968; Leboef, 1977; Glenn, 1978; Beliveanu, 1983; Low, 1993; Lipilova, 1993; Karkas, 1998; all cited by Pașcan, 2003, pp. 20-22).

The current period, the reform and conception of education require that educational methods are used more actively; one must pass from the teacher-centered class to the student-centered class, from teaching-verification to teaching-self evaluation, when the student is not only the object but also the subject of education. The knowledge of the characteristics of teaching-learning methods, the experience in their practical implementation guarantee the correct orientation in procedures diversification, the selection of the most effective ones for achieving the educational goals.

In gymnastics there are learnt the motor acts and actions (elements, connections) based on experimental models which lead ultimately to a motor behavior. The process of learning the gymnastics movements is a complex process that includes, besides the gestural motor learning made at the level of skills and abilities, the forms of intelligent learning consisting of assimilation of notions, concepts and creative learning. Motor learning consists essentially of compartment actions in which the stabilized responses depend on the proprioceptive sensorial components. In terms of methods, the process of learning in gymnastics can be divided into three stages: initiation, consolidation and improvement. Depending on the learning stage, a whole system of training methods and procedures will be used. The most effective among them would be the algorithmic learning, which is a sequence of logical exercises consisting of parts of the element to be learnt using three series of exercises: physical support required to execute the movement, the learning itself and the consolidation -improvement of the acrobatic element learnt (Vieru, 1997, pp. 35-36; Rusu et al, 1998; Grigore, 2003; Epuran and Stănescu, 2010, pp. 49-55; Boloban, 2013, pp. 108-110; Potop, 2014).

At the present moment, as in the past, there is the problem of formulating the basic positions of sports didactics, based on the paradigm of traditional didactics, which highlights extra the specific aspect of motor learning. With regard to the technology of guiding the learning process, professor Gaverdovskij (2007, pp. 824-845) reveals the basic principles, the types of didactic programming (linear, branched and adaptive) and the technical means of learning. Concerning the problem of specificity and systematization of the didactic principles in sport, he presents the classic didactics and learning in sport, the criteria for highlighting the principle of learning and the principles of sports exercises learning (experience of differentiated didactics).

Purpose of the paper: use of didactic technologies for achievement of learning units of acrobatic gymnastics in primary school.

Paper hypothesis supposes that the use of didactic technologies during the instructive-educational process to achieve the learning units of acrobatic gymnastics in the 3rd and 4th grades can lead to improved muscle strength and to more effective learning of the acrobatic elements included in the curriculum at this level.

Materials and methods

This scientific approach has led to a comparative study conducted in the middle school located in Maldeni, Teleorman County, Romania. The study was conducted from February to April 2016, evaluating the level of capacities and skills of 3rd and 4th grade pupils. Bi-annual evaluation included 4 test events selected from the National Evaluation System at Physical Education and Sport. These events are: speed shuttle run (5x5 m), standing long jump, rope jumping and tucked forward rollover. The evaluation of the test events during the research was performed differently at the first events; it ensured continuity in the carrying out of the training-educational process (Tables 1 and 2). In this study there were used the following research methods: bibliographic study of the specialized literature, pedagogical observation, ascertaining pedagogical experiment, method of algorithmic learning, method of programmed instruction, method of testing, statistical-mathematical method and graphical representation method for data processing and interpretation.

Results

Tables 1 and 2 present the results of the test events in 3rd and 4th grades, with different evaluation for boys and girls at rope jumping, standing long jump, shuttle run (speed running 5x5 m) and tucked forward rollover.

Table 1. Results of the test events in 3rd grade (n = 13)

Statistical indicators		Test 1 (reps)		Test 2 (cm)	Test 3 (sec)	Test 4 (points)
		Series I	Series II			
Mean	B (n=7)	7.43	7.29	149.28	5.89	9.28
	G (n=6)	6.67	6.67	134.17	6.13	8.33
SED	B (n=7)	0.61	0.17	3.85	0.08	0.28
	G (n=6)	0.71	0.67	8.00	0.11	0.56
SD	B (n=7)	1.62	1.49	10.18	0.20	0.76
	G (n=6)	1.75	1.63	19.60	0.26	1.37

CV%	B (n=7)	21.78	20.53	6.82	3.43	8.14
	G (n=6)	26.27	24.49	14.61	4.24	16.39

Note: Mean –arithmetic mean[; SED – standard errors deviation; SD – standard deviation; CV – coefficient of variability; B – boy; G – girl; Test 1 – rope jumping ; Test 2 – standing long jump; Test 3 – speed shuttle run; Test 4 – tucked forward rollover

Table 2. Results of the test events in 4th grade (n = 12)

Statistical indicators		Test 1 (cm)	Test 2 (reps)		Test 3 (sec)	Test 4 (points)
			Series I	Series II		
Mean	B (n=6)	142.50	7.75	7.75	5.05	8.75
	G (n=6)	118.75	9.00	8.25	4.95	8.75
SED	B (n=6)	6.48	0.31	0.25	0.15	0.31
	G (n=6)	3.15	0.58	0.48	0.23	0.25
SD	B (n=6)	18.32	0.89	0.71	0.43	0.89
	G (n=6)	6.29	1.15	0.96	0.47	0.50
CV%	B (n=6)	12.86	11.44	9.12	8.45	10.13
	G (n=6)	5.29	12.83	11.61	9.48	5.71

Note: table no 1; Test 1 – standing long jump; Test 2 – rope jumping; Test 3 – speed shuttle run; Test 4 – tucked forward rollover

Fig. 1 shows the elements of didactic technology in learning the acrobatic exercises depending on learning stages.

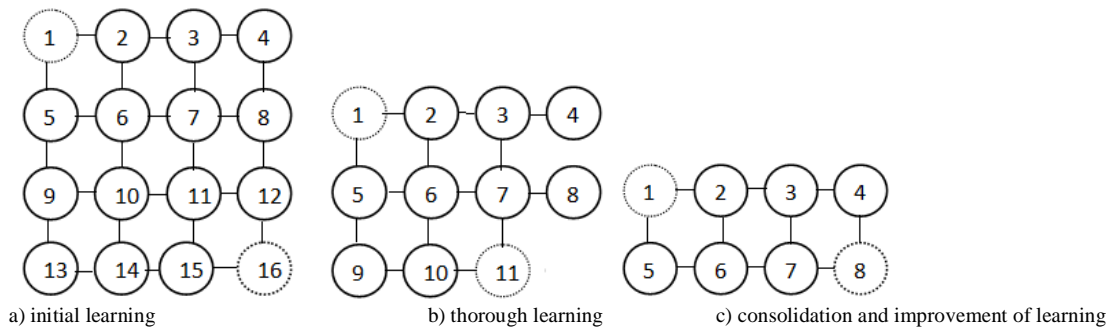


Fig. 1. Elements of didactic technology for learning the acrobatic exercises (as per Boloban, 2013, pp. 174-182)

Note:fig. 1a: 1 – purpose and tasks of learning, 2-5 particularities of motor skills development (biologic, bio-mechanical, regulatory, psycho-pedagogical); 6 –didactic principles and rules of learning; 7 – methods of learning; 8 – means of learning; 9 – forms and modality to organize the lessons; 10 – variants of learning; 11 – continuity of learning; 12 – intensification of learning; 13 – correction of mistakes; 14 – regulation of learning; 15 – control and correction of learning process and quality; 16 – result of learning; fig. 1b.: 1 – purpose and tasks of learning; 2 -5 – particularities of the development of motor skills and abilities; 7 – algorithms of linear and branching programming learning; 8 – variants, continuity, intensity of exercises learning; 9 – regulation of learning process; 10 – control and correction of learning process and quality; 11 – result of learning; fig. 1c.: 1 – purpose and tasks of learning; 2 – didactic principles, rules, methods and means of learning; 3 – interdisciplinary particulars of motor skills improvement; 4 – variants, continuity, intensity of learning; 5 –functional pedagogical equations and solving algorithms in the learning of exercises; 6 –combination of the learning programs, training programs and results of the competitive activity; 7 – regulation, control, correction of the learning process; 8 – result of learning.

Fig. 2 shows the pedagogical functional equation to learn the tucked forward rollover.

$$\rightarrow P \rightarrow DP DR \rightarrow LM \rightarrow MeL \rightarrow MFOL \rightarrow RC \leftrightarrow RL \quad (1)$$

Fig.2. Pedagogical functional equation for learning the tucked forward rollover

Note: P – purposes and tasks of learning; DP – didactic principles; DR –didactic rules; LM – learning methods; MeL – means of learning; MFOL – methods and forms of organization of lessons; RC – regulation and control of learning process; RL – results of learning

Fig. 3 presents the algorithmic diagram of linear programming of training material for learning the tucked forward rollover in terms of goal and tasks of the learning, test exercise and result of learning.

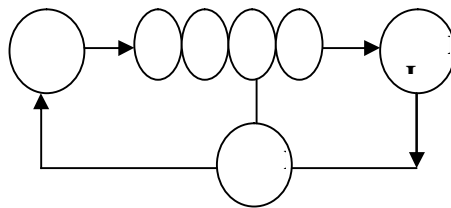


Fig. 3. Algorithmic diagram of linear programming of training material for learning the tucked forward rollover

Note: P – purpose of exercise learning – tucked forward rollover; Tasks of learning in terms of creation of motor representation on the exercise to be learnt, introducing parts of the training material P1 – P4: P1 – learning of tucked position; P2 – learning of tucked forward – backward rollover; P3 – learning of tucked rollover in declined plane; P4 – learning of tucked forward rollover on carpet for routines on the floor (acrobatic gymnastics). P3 – test exercise (K). RL – result of learning – execution of tucked forward rollover awarded with a score higher than 9 points.

Discussions and conclusions

To highlight the effective use of didactic technology in achieving the learning units of acrobatic gymnastics in primary school, we have conducted a comparative study at 3rd and 4th grade in the middle school of Maldeni, Teleorman County, Romania. This scientific approach involved the evaluation of pupils' acrobatic and physical training through differentiated and varied utilization of 4 test events in both grades.

The results of control events evaluation reveal the following matters: in rope jumping test there is a better level recorded by the 3rd grade boys (7.43 and 7.29 reps) and the 4th grade girls (9.00 and 8.25 reps), obtaining the score "good" at 3rd grade and almost "very good" at 4th grade; the standing long jump test highlighted that boys' lower limbs strength is better at both grades, with a mean of 149.29 cm in 3rd grade and 142.50 cm in 4th grade, obtaining the score "good" with a tendency towards "very good" at 4th grade (except BA – 100 cm, with score "satisfactory"); in speed shuttle run there were noticed better results of the boys in 3rd grade (5.89 sec) and girls of 4th grade (4.95 sec); as for the acrobatic test – tucked forward rollover, the evaluation result reveals a better level of the boys in 3rd grade (9.28 points) and equal for boys and girls in 4th grade (8.75 points). These differences prove the effectiveness of using didactic technologies for the learning units achievement during physical education class of primary school pupils (Tables 1 and 2).

The use of didactic technology for teaching the acrobatic exercises in primary school (Fig. 1) involves the diminution of component elements structure in accordance with learning stages (initial learning, thorough learning, consolidation and improvement of learning).

The development and solution of the pedagogical functional equations (Fig. 2) involve the technological direction, where the planned result of learning (first part of equation) is introduced in the structure of the long-term programs for sports exercises learning through the effectiveness of contents structuring and the didactic programming for education of knowledge, abilities and motor skills of the exercise to be learnt (half of the left part of equation).

Also, the algorithmic scheme development of the linear programming of the training material for learning the tucked forward rollover as isolated acrobatic element will allow using it effectively for learning other acrobatic exercises included in the curriculum. For learning more complex acrobatic elements it will be recommended to use the algorithmic schemes of linear and branching programming that will allow to solve the drawbacks in pupils' physical and acrobatic training and to achieve more effectively the units of learning.

The results of research confirm that the use of didactic technologies during the training-educational process to achieve the learning units of acrobatic gymnastics in the 3rd and 4th grades led to improved muscle strength and to more effective learning of the acrobatic elements included in the curriculum at this level.

Acknowledgements

This paper is part of the research plan themes of the Faculty of Physical Education and Sport of Bucharest Ecological University for 2015 – 2016. We express our gratitude to teacher Sima Laura for the support and help granted to achieve this experimental study.

References

- Băiașu, Gh., (1984). *Gymnastics*. Bucharest: Sport-Tourism Publishing House.
- Boloban, V. N. (2013). *Regulation of Athlete's Body Posture*. Kiev: Olympic Literature.
- Dragomir, P., &Scarlat, E. (2004). *School Physical Education. New Landmarks – Necessary Mutations*. Bucharest: Didactical and Pedagogical Publishing House.
- Epuran, M. & Stănescu, M. (2010). *Motor Learning – Applications in Body Activities*. Bucharest: "Discobolul" Publishing House.
- Gavardovskij, J.K. (2007). *Obuchenie sportivnym uprazhnenijam. Biomehanika. Metodologija. Didaktika*. Moskva: Fizkul'tura i sport.
- Grigore, V. (2003). *Gymnastics. Manual for the Basic Course*. Bucharest: "Bren" Publishing House.
- Grimalschi, T., &Boian, I. (2011). *Physical Education. Guidelines for Implementing the Modernized Curriculum for Primary and Middle School*. Chișinău: UNICEF Moldova.
- National System of School Evaluation at "Physical Education and Sport" subject* (1999), National Department for Evaluation and Examination, Bucharest: BERG Publishing House
- Pașcan I. (2003). *Development of Psychomotor Skills in Artistic Gymnastics*. Cluj-Napoca: House of Scientific Book.
- Potop, V. (2014). *Basic Gymnastics. Theory and Methods*. Bucharest: "Discobolul" Publishing House.
- Potop, V., & Marinescu S. (2014). *Gymnastics in School – Methods of Gymnastics Disciplines*. Bucharest: "Discobolul" Publishing House.
- Rusu, C.I., Pașcan, I., Grosu, E., &Cucu, B. (1998). *Gymnastics*. Cluj-Napoca: G.M.I. Publishing House.
- Vieru, N. (1997). *Manual of Sports Gymnastics*. Bucharest: "Driada" Publishing House.

SCHOOL DROPOUT, A MAJOR RISK IN DECREASING THE LEVEL OF EDUCATION

Ioan-Cosmin BOCA^{1*}, Vasile MARCU², Mirela DAN¹, Dan Constantin MATEI³

¹ Vasile Godis Western University, 94 Revolutiei, Arad, Romania

² University of Oradea, Campus Universitar, Oradea, Romania

³ Bihorul Sports High School, Matei Basarab, Oradea, Romania

* Corresponding author: icboca@yahoo.com

Abstract. *The main purpose of this work is to analyse the quantity and the causes of early school leaving in Bihor County. From this point of view the paperwork starts with a statistic analysis of this problem in the first part, followed by the causes of the phenomena in the second part. Tracking the dynamics of this phenomenon in the last four school years shows a tendency to maintain the same number of dropout students, which is a positive element with profound social implications. The higher school dropout rate is reflected in the schools enrolling students from disadvantaged groups. The percentage in this case is higher among students in secondary schools. In Bihor County, during the four school years (2008-2012), the primary and secondary school students represent the largest percentage of preuniversity levels. Thus, these levels of education comprise 57,3% - 59,1% of the registered students, but more worrying is the high percentage of early school leaving, which represents 73% and 82% of the total number of early school leaving during the above mentioned period of time.*

Keywords: decreasing the level of education, early school leaving, social vulnerability.

Introduction

Education underpins the development of society and of the human being, the lack of education affecting the whole social system through unpredictable long-term developments.

According to the paradigm “education-based society”, reconsidering the importance of education for society in general and restoring confidence in education and school are key issues for these times, issues that go beyond the theoretical sphere, as progress of large and small nations depends on education more than on the economic factor, the latter being unable to fulfill its objectives if education and its products have not paved the way (IRSCA Gifted Education, 2010).

Materials and methods

This study aims at a quantitative and causal assessment related to dropout in Bihor County. The statistical approach had as its starting point the statistics provided by Bihor County School Inspectorate for 2008-2012, statistics made using data from the 14 territorial units of education.

Table 1. *The statistical situation relevant for primary education for 2008-2012*

Years of education		2008-2009	2009-2010	2010-2011	2011-2012	Total
Total number of enrolled students		24338	23950	23520	23703	95511
Number of students who dropped	Total	352	287	301	260	1200
	From rural areas	263	253	218	217	951
	From urban areas	89	34	83	43	249
	% rural din total	74.72	88.15	72.09	83.85	79.25
Number of schools with dropout students		11	12	11	12	46
Dropout percentage		1.45	1.20	1.11	1.27	1.25

For primary education

Statistical Features

- In the four years of education the number of students enrolled in each year was relatively constant, the variation being of maximum 3.4%, between 24338 and 23520 (Fig. 1);

- The number of dropout students was between 260 and 352, which indicates a variation of 35.4% (Fig. 1);
- The dropout percentage of the total number of students enrolled was between 1.11% and 1.45% with an average of 1.25% and a variation of 30.6% in all years (Fig. 2);
- Dropout was recorded in 82.1% of all territorial units of education;
- The dropout percentage in the rural areas, compared to the total dropout, is between 72.1% and 88.15%, with a variation of 22.2% and an average of 79.25% over four years (Table 1).

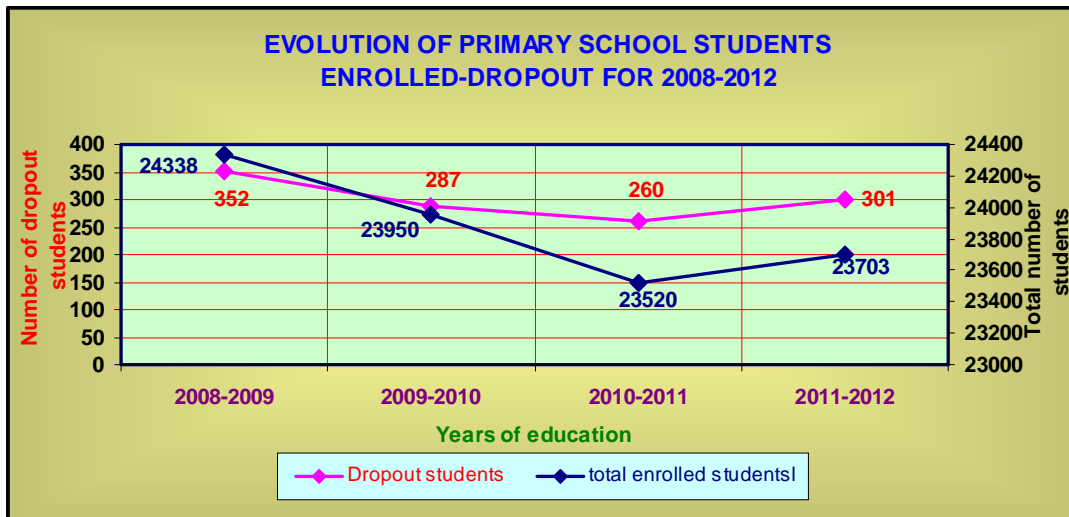


Fig. 1. Evolution of primary school students – enrolled-dropout for 2008-2012

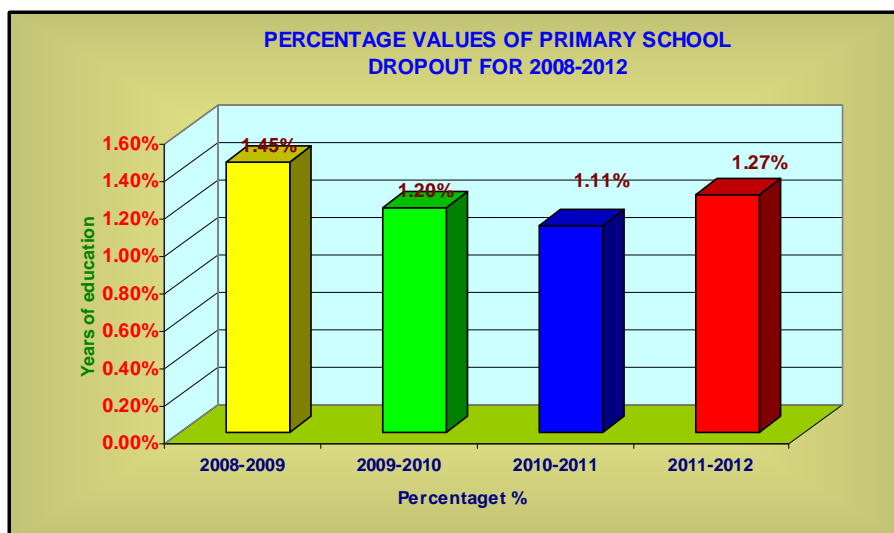


Fig. 2. Percentage values of primary school dropout for 2008-2012

For secondary education

Statistical Features

- In the four years of education the number of students enrolled in each year was relatively constant, the variation being of maximum 4,3%, between 23875 and 24921 (Fig. 3);
- The number of dropout students was between 387 and 432, which indicates a variation of 11.6% (Fig. 3);
- The dropout percentage of the total number of students enrolled was between 1.6% and 1.77% with an average of 1.68% and a variation of 10.6% in all years (Fig. 4);
- Dropout was recorded in 92.8% of all territorial units of education;

- The dropout percentage in the rural areas, compared to the total dropout, is between 71.2% and 77.5%, with a variation of 8.8% and an average of 75.1% over four years (Table 2).

Table 2. The statistical situation relevant for secondary education for 2008-2012

Years of education	2008-2009	2009-2010	2010-2011	2011-2012	Total
Total number of enrolled students	24921	23910	24189	23875	96895
Total	424	392	387	432	1635
Number of students who dropped					
From rural areas	302	304	293	329	1228
From urban areas	122	88	85	94	389
% rural din total	71.23	77.55	75.71	76.16	75.11
Number of schools with dropout students	12	13	13	14	52

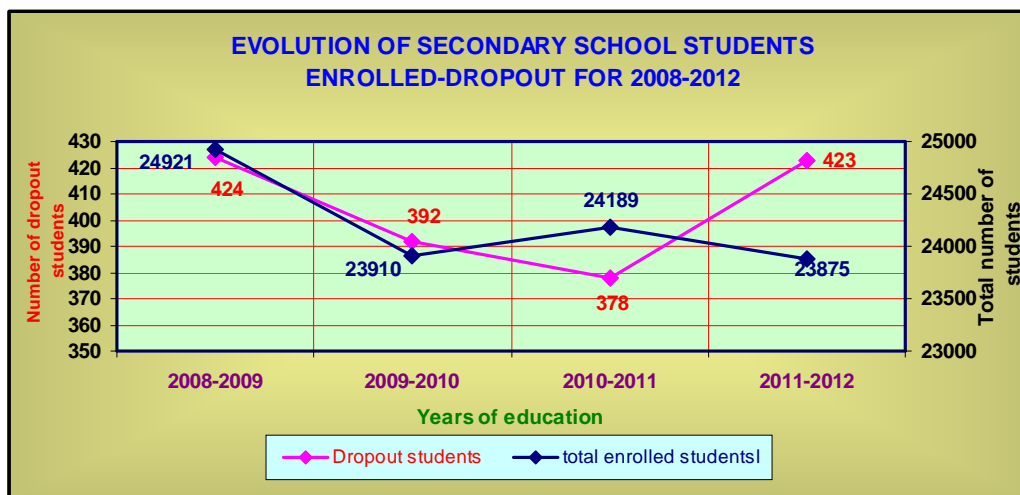


Fig. 3. Evolution of secondary school students – enrolled-dropout for 2008-2012

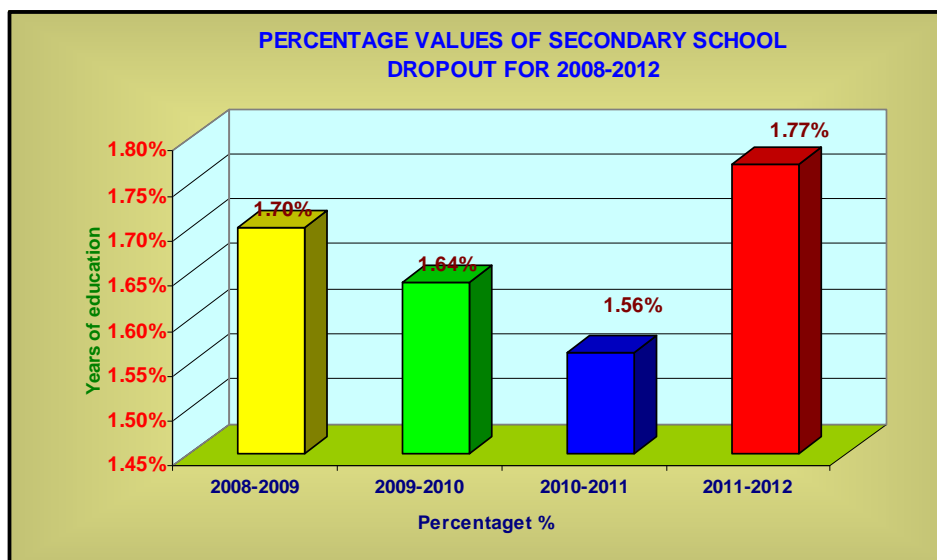


Fig. 4. Percentage values of secondary school dropout for 2008-2012

Using statistical assumptions and with the major help of the SPSS specialized program for statistical evaluation (Sava, 2011; Jaba and Grama, 2004; Bucea-Manea-Toniş, Bucea-Manea-Toniş and Epure, 2010) we concluded that among all series of dropouts, analyzed on years of education and separately for primary and secondary education, there are no significant differences for a $\alpha = 0.05$ significance level (5% is usually considered acceptable for relevance in research and statistical evaluation).

That aspect can be interpreted as follows: dropout in primary and secondary education in the years 2008-2012, in the territorial units of education in Bihor, is a constant phenomenon of this period.

Relevant statistical values that characterize school dropouts (2008-2012) in secondary education are higher than in primary education. For example, Table 3 shows the values of the trends in question:

Table 3. *The statistical situation relevant for primary and secondary education for 2008-2012*

Total Years of education 2008-2012		Primary	Secondary	Trend
Total number of enrolled students		95511	96895	+1.4%
Number of students who dropped	Total	1200	1635	+36.2%
	From rural areas	951	1228	+29.1%
	From urban areas	249	389	+56.2%
	% rural from total	79.25	75.11	- 5.2%
Number of schools with dropout students		46	52	+13%
Dropout percentage		1.25	1.68	+34.4%

Undoubtedly, increases of statistical indicators for secondary education are significantly higher than those for the primary cycle. Thus, starting from an increasing variation of only 1.4% for the total number of students enrolled in 2008-2012, significant increases were obtained for secondary schools, in:

- The total number of school dropouts, by 36.2%, and the dropout percentage (compared to the number of students enrolled) is up 34.4%;
- Dropouts in rural areas are up 29.1%, but also that in urban areas, by an almost double value of 56.2%;
- There was also an increase in the number of local schools where there were dropouts, by 13%.

The causes of non-participation in education in Bihor County

In the sense of the above mentioned aspects, there were established the causes of non-participation in education, as well as the causes for dropping out of school during schooling:

a) The socio-economic situation of families in disadvantaged communities due to non-participation in education leads to a series of consequences such as:

- adults are unable to find a stable job, a source of income;
- income only from occasional work (picking mushrooms, fruit picking, farm work);
- placing children in a situation of inferiority, due to lack of clothing, footwear, necessary school writing materials;
- low or non-existent income, the only source of income frequently being child allowances and social benefits;
- involving children in illegal activities such as begging in major towns of the county;
- abandonment of children in childcare institutions;
- placement of Roma communities on the outskirts of towns or even outside them, causing difficult access of children to school: e.g. Vad Deal, Tăşad, Ineu, Bale, Buduslău;
- inadequate living spaces, generally lacking utilities (in Săcuieni, Diosig, Ineu, Văşad, Tinca, Şilindru, Borumblaca, etc);
- lack of transportation means.

b) The low educational and cultural level of adults leads to:

- high rate of illiteracy among disadvantaged communities, causing the promotion of the same attitudes in their own children's education;
- low level of socialization of children, difficulties of integration in schools;

- still low access to education in Romani;
- low participation of children in kindergarten (in Ineu, Diosig, Salonta, Bogeii, Șoimi, Tinca, Lăzăreni, Lupoiaia, Talpoș, Bale, Vadu Crișului, Finiș, Derna);
- children's low acquisition level of cognitive and ludic behavior and of social and personal autonomy skills;
- when they come to school, children have no knowledge of Romanian and Hungarian, knowing only Romani, which causes blockings in educational communication;
- parents' low interest for school (only 2% of Roma students learn more than 2 hours a day).

Conclusions

In Bihor county the dropout phenomenon is relatively low (as shown statistically and compared to other counties).

Tracking the dynamics of this phenomenon in the last four school years shows a tendency to maintain the same number of dropout students, which is a positive element with profound social implications. The higher school dropout rate is reflected in the schools enrolling students from disadvantaged groups. The percentage in this case is higher among students in secondary schools.

Among the most common causes of school dropout in disadvantaged communities we mention:

- students and their families' disinterest and indifference towards school;
- parents' careless attitude towards their children's academic progress;
- sometimes frustrations suffered by students in school;
- adverse influences of the group of friends on the street, in the neighborhood;
- tendency to escape from the school environment as a form of school maladjustment;
- vagrancy, cause and consequence of school dropout, exposes children to:
 - Lack of care, parental and school supervision, risking their integrity, security and physical health;
 - Joining occasional groups that can lead them to antisocial actions and a criminal lifestyle;
 - School absenteeism, which opens the way to drop out. low level of education of adults;
 - early marriage age among Roma resulting in abandonment of studies;
 - precarious socio-economic situation of most families who have children with special educational needs due to:
 - ☞ Limited or inadequate housing;
 - ☞ The existence of families "in crisis", where a parent is temporarily absent (hospitalization, detention);
 - ☞ The existence of totally dissolute families - both parents chronically ill, morally debased, aggressive;
 - ☞ The existence of reconstituted families, cohabiting parents, stepparents, adoptive parents;
 - ☞ Presence of families with marital failure due to exceptional circumstances - the presence of a severely or profoundly disabled child in the family, of a terminally ill family member;
 - ☞ "Resigning parents", always busy or away from home (work abroad) who by their indifference lead to the onset of maladaptive behavior.

References

- Bucea-Manea-Toniș, R., Bucea-Manea-Toniș, R., & Epure, M.. (2010). *SPSS și EXCEL în analiza datelor statistice în domeniul economic, social, tehnic*. București: AGIR.
- ***IRSCA Gifted Education (2010). *Abandonul școlar: radiografie și soluții*. București.
- Jaba, E., & Grama, A. (2004). *Analiza statistică cu SPSS sub Windows*. Iași: Polirom.
- Sava, F. A. (2011). *Analiza datelor în cercetarea psihologică*. Cluj-Napoca: ASCER.

PHYSIOLOGICAL PATTERNS, NEUROMUSCULAR EFFICIENCY, TECHNICAL STYLE AND BIOMECHANICAL ADAPTATIONS OF THE LOWER LIMB - TRANSITION TO 110 M/400 M HURDLES

Gheorghe Adrian ONEA^{1*}, Lorand BALINT¹, Mihai PASCU²

^{1*} Faculty of Physical Education and Mountain Sport, Transilvania University, 1 Universităţii, Braşov, Romania

² Faculty of Physical Education and Mountain Sport, Transilvania University, 1 Universităţii, Braşov, Romania

³ PetroEnergia Club, 2 Milcovului, Câmpina, Romania

* Corresponding author: onea_adrian26@yahoo.co

Abstract. The purpose of this review was to create a theoretical synthesis of qualitative factors that optimize the performance of the lower limb muscles for 110 m/400 m hurdles. The qualitative factors described in the research focus on intrinsic (muscles adaptation) and extrinsic (muscles memory) parameters. The generalization of these parameters can be useful for coaches who are aiming to create adaptations of the lower limb during training sessions. Understanding how the lower limb muscles work (from the start - over the hurdles - between the hurdles - finish), coaches can develop a methodical approach when it comes to design practice. This paper examines the theoretical approach of: a) Physiological characteristics of the lower limb muscles – review; b) Neuromuscular efficiency (connections between agonist, antagonist, synergistic muscles); c) Technical style of the lower limb (leading leg and trailing leg) and stride patterns from the start to the finish; d) A review of biomechanical studies for the lower limb made on hurdler runners. Overall adapting to this factors can lead to a better understanding of the lower limb (leading leg and trailing leg) efficiency and performance.

Keywords: hurdles; physiological; neuromuscular; technical; biomechanical.

Introduction

The interface between physiological patterns, neuromuscular efficiency, technical and biomechanical aspects can be considered critical components of positive hurdles development in different stages of learning. Therefore, to create body adaptation to hurdles technique coaches need to incorporate: lower limb action (leading leg and trailing leg), position of the shoulders, trunk and lead arm action accuracy. Studies by McDonald (2002) show that "the athlete's muscle actions in the air decide which parts of the body (arms, legs, head-trunk) take up larger or smaller fractions of the total available angular momentum that is produced during ground support". When it comes to coaching young hurdles athletes we need to take into consideration the following aspects of the lower limb: muscle physiology, leg length according to Iskra (1995, 2012), muscles fiber type of the lower limb, lactate concentration and creatine kinase activity, muscles fatigability, muscles synergy, technical style of the leading/trailing leg and biomechanical research review on lower limb.

Methods used in the research

Hurdles studies were reviewed to give a comprehensive up-to-date review of this topic. We used a variety of sources and articles in this paper to help us characterize the different aspects of lower limb action in hurdles.

Review of the literature

a) Physiological characteristics of the lower limb muscles in the hurdles run:

Somatic aspects

According to Sparrey (1997), somatic aspects in hurdles are the key in identifying talent during selection process. Based on that we can prepare a "model of technical preparation" (Iskra, 1995, p.51). Bujak et al. (2014, p.47) emphasized measurements should be taken according to body height and leg length parameters. Nowadays athletes with a higher COM (center of mass) have an advantage unto an athlete with a lower COM because the latter "will need to produce greater ground reaction forces to clear the hurdle with a given posture and with a given step length" (<http://elitetrack.com/forums/topic/hurdle-technique-drilled-down>). Shavinina (2009, p.760) described how coaches in West Germany saw as an advantage in having long legs for hurdles; on the other side, Bujak et al. (2014, p.47) emphasized the fact that somatic measurements should be taken into consideration at all times. In conclusion, coaches need to use somatic characteristics of the lower limb in balance with the race rhythm and stride frequency.

Lower limb muscle physiology - adaptation for hurdles

Lower limb muscles involved in running and jumping can be bi-articular and mono-articular muscles. There are three primary muscles: rectus femoris, hamstrings and calf muscles that can be described as bi-articular muscles. These muscles have different action helping the lower limb to adapt to the new motions over the hurdles. However, we can separate muscles action during clearance in: muscles action before and during takeoff motion, muscles action during the airborne phase and muscles action after landing.

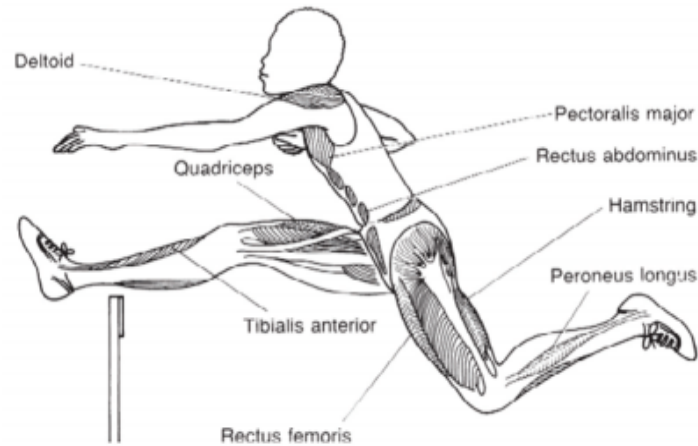


Fig. 1. Muscles involved in the hurdles clearance

<http://www.scottishathletics.org.uk/wp-content/uploads/2014/04/uka20body20in20sport20v4.pdf>

Table 1. Muscles of the lower limb involved in different motions

Actions made by the lower limb over the hurdles	Muscles involved to create actions of the lower limb
Thigh flexion of the leading leg	Iliacus/Psoas major/ Psoas minor
Extension of the lead leg knee	Vastus medius / Vastus intermedius / Vastus lateralis / Rectus femoris
Plantar flexion of the lead leg	Soleus / Gastrocnemius
Trail leg flexion	Biceps femoris/ Semitendinosus/ Semimembranosus
Extension hip of the trail leg	Gluteus maximus / Hamstring

The major muscles coming into play to achieve the hurdles airborne transition are: gluteus maximus, iliacus, upper leg region including the pectineus, the adductor brevis, upper adductor and gracilis and adductor longus. McKinnon and Comerford (2012) suggested that "the hip muscles also control the pelvis and thigh during weight bearing and propulsion, and the gluteus muscles in particular control thigh and pelvic position over the foot. Knee lift from the hip flexor muscles is important to drive the lead leg over the hurdle and to bring the trail leg through". Depending upon the nature of the task made by the gracilis and adductor longus muscles, according to McKinnon and Comerford (2012), these muscles "do not sit well with hurdles, especially those who tend to hurdle with a straight lead leg".

In summary, the lead leg and the trail leg muscles can be more efficient by improving the flexibility of the pelvis and lower limb and also by increasing power of the lower limb. On the other hand we have *intrinsic factors* that create muscles adaptations in the hurdles race and this can be assigned to metabolic response, muscle fatigue, muscle fiber type. Kryściak, Podgórski and Eichler, (2015, p.183) concluded that there are significant differences in metabolic response for 110-m and 400-m hurdles race. The authors also notice that "warm-up which exceeds the lactate threshold leads to an increase in blood lactate concentration and fatigue".

Current research made on creatine kinase has shown a "greater muscle fatigue and muscle fiber damage after a 400-m than 110-m hurdles race" (Kryściak, Podgórski and Eichler, 2015, p.179). Understanding how the lower muscles work, athletes take part in a biopsy test to determine the proportion of the slow and fast twitch fibers. The biopsy test made on athletes is testing "vastus lateralis muscle of the thigh, where the proportion of slow and fast-twitch fibers is almost the same in humans, which allows the distinction to be made between endurance and

explosive athletes" (<https://heatherjross.wordpress.com/2015/03/21/super-fast-twitch-fibres-the-secret-of-the-sprint-stars/>). Studies made on Jackson - the former hurdles runner, showed that he had "25% super-fast twitch fibers, when all previous athletes tested had only 2%" (https://en.wikipedia.org/wiki/Colin_Jackson). Research by Mason (2011, p.494) described the process of motor units recruitment during 400 m hurdles. During 400 m hurdles warm-up preceding the race the S motor units (green) are recruited first and they will last the longest, then the FR motor units (blue) and FF motor units (red) follow (Fig.2).

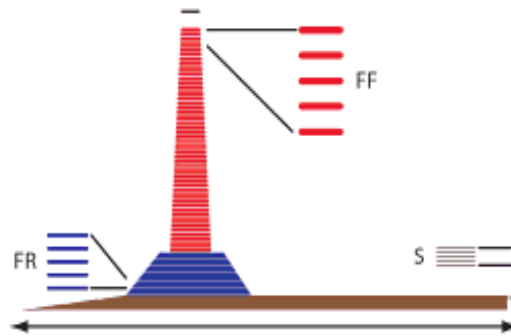


Fig 2. Motor units recruitment (S, FR, FF) process during a maximal muscle contraction lasting 2-3minute

b) Neuromuscular efficiency (connections between agonist, antagonist, synergistic muscles)

During running we can see a strong relationship between agonist, antagonist and synergist muscles; according to Tidow (1991, p.60), "a positive acceleration can only be achieved by using the hip extensors, i.e. the ischiocrural and the gluteus maximus muscle, in synergy". The calf muscles are important during takeoff whereas a stronger calf can lead to a stronger takeoff, meanwhile in the landing, calf muscle will cushion the shock of the landing. During takeoff "the calf muscles, which are eccentrically loaded during the front support phase, here reach the limit of their performance ability" (Tidow, 1991, p.55). According to the mentioned author (1991, p.60), "no compensatory action can be used by the knee joint, leads to the conclusion that there is a very high eccentric strain on the calf muscles in this phase".

c) Technical style of the lower limb (leading leg and trailing leg), lower limb and pelvis posture connections and stride patterns

In the hurdles race the lower limb acts as a leading and trailing leg; in 110 m hurdles, during the leading action athletes can use as dominant leg either the left or the right one, whereas in 400 m hurdles athletes can shift the leading leg dominance from left leg to right leg. Based on his observation, Starosta (2008) concluded that "the right lead leg was used 62.6% during a 110 m hurdling race". According to Schiffer (2012, p.9), "400m hurdler must also learn to hurdle with either lead leg, although a left lead leg is recommended because it allows the hurdler to run on the inside of the lane on both curves" and "minimizes the negative effects of centrifugal force" (Iskra and Coh, 2011, p.319).

The lead leg and trail leg main technical characteristics in the 110 meters events highlighted by Freeman (2015, p.145) are: *lead leg* - "extension of the lead leg is proximal to distal, the athlete leads with the knee the movement and the extension sequence (hip to knee/ knee to foot) and *trail leg*-the athlete, must abduct the foot to clear the trail leg over the hurdles and the trail leg is flexed tightly at the knee". According to Iskra (2012, p.28), "the term technique in 400 m hurdles includes the level of hurdles clearance (with both left and right leg) and, the most important, the so called *hurdles rhythm*". In conclusion exercises for the lead leg and trail leg can be integrated in static and dynamic *drills programs*.

Connection between lower limb and pelvis posture

The lower limb and the pelvis posture need to be in a balanced relationship to achieve a proper takeoff position. Characteristics of the pelvis posture in hurdles include: neutral and high position. If these particular characteristics of the pelvis posture are not in balance, it can generate "lead leg problems" (<http://www.sacspeed.com/pdf/hurdles.pdf>). Tidow (1991, p.60) argues that "the lateral lift of the takeoff leg causes the pelvis to be tilted to the opposite side, thus lengthening the lead leg proves to be helpful in the sense of getting into contact with the ground again as soon as possible. The tilted position produces a buffer which helps to reduce the unavoidable shock when grounding the lead leg".

Stride patterns in hurdles events

To maximize speed for hurdles the technical training will balance the following patterns: takeoff, hurdles clearance, landing, stride length and stride frequency. "The frequency of movements can indicate the technical movement and in 110 m hurdles this value is 3.6-3.7 cycle/sec, whereas in 400 m hurdles this value is about 3.3 cycle/sec according with the stride pattern" (Bubanj et al., 2008, p.38). Furthermore, the strides between hurdles have the next patterns: "the shortest is the first, after the lead leg strikes the ground; the longest is the second, which is free from special constraints; and the third, before going into the hurdle, is longer than the first but shorter than the second" (Bedini, 2012, p.80). According to Lindeman (2012), the strides between the hurdles in the 400 m hurdles event appear to have "three forms of transition. The preferable transition is a *single alternate*, an example of which would be the left lead-legged hurdler transitioning from 13 strides to 14 strides, requiring him to hurdle then with his right lead leg over every other hurdle for the rest of the race. In a *dual alternate* transition, the hurdler who is leading with his left leg and taking 13 strides between, would take 14 strides and use a right lead leg, then 14 again to get back to the preferred left lead leg, and then finish the race with his left lead leg. The *double cut down* is most often used by the inexperienced hurdler who is unable to hurdle with his alternate lead leg. In this case the hurdler who is taking 13 strides between hurdles and leading with his left lead leg would cut down to 15 strides between (so as not having to hurdle with a right lead leg)" (<http://www.coachr.org/lha.htm>).

Strides between Hurdles	Required Stride Length
12	2.68m (8'9")
13	2.45m (8'0")
14	2.27m (7'6")
15	2.13m (7'0")
16	1.98m (6'6")
17	1.85m (6'1")
18	1.72m (5'7")
19	1.60m (5'1")

Fig. 3. Relationship between the number of strides and the stride length (400 m hurdles)
(<http://www.coachr.org/lha.htm>)

d) A review of biomechanical studies for the lower limb made on hurdler runners

Biomechanical analysis of an activity can identify the specific muscles groups whose strength, power, endurance or flexibility limit performance (Ginnis, 2009, p. 317). From this aspect of biomechanics, dos Santos Lima et al. (2013) tried to understand the possible "differences between specialists in the events of 110m and 400m hurdles, focusing on establishing the ankle and knee articulation angles on the support leg and hip articulation angle of the lead leg".

Studies on foot pressure according to Cole, Finch and Ariel (2012) suggested that "relationship between heel foot pressures and horizontal velocities may have implications for the strengthening programs of the hurdler's leg strength in order to maintain a plantar flexed foot contact position at landing". In conclusion, together with the computer vision, biomechanical patterns and kinematic and kinetic analysis of the hurdles leading and trailing leg we can collect substantial data on how the hurdles technique can be improved.

Discussions and conclusions

In conclusion, we need to focus attention on data collected from the muscles analysis of lower limb and the balance between of the agonist, antagonist and synergist muscles as a quantitative and qualitative parameter.

Understanding how muscles of the lower limb work, we need "to identify the principal muscle groups that are involved in a particular skill in order to be in a better position to devise training programs and exercises specific to the athlete and event".

(see <http://www.scottishathletics.org.uk/wp-content/uploads/2014/04/uka20body20in20sport20v4.pdf>).

Moreover, "according to the classical principle of sport training theory, every year 20% of the exercises should be changed. In order to do this, it is necessary to be well acquainted with the variety of exercises available and the ways in which they can be usefully adapted" (Iskra, 1995, p.51).

References

- Bedini, R. (2012). Drills for Top-Level Hurdlers. IAAF, 27, 79-83.
- Bubanj, R., Stankovi, R., Rakovi, A., Bubanj, S., Petrovi, V., & Mladenovi, D. (2008). Comparative Biomechanical Analysis Of Hurdle Clearance Techniques On 110 M Running With Hurdles Of Elite And Non-Elite Athlete. *Serbian Journal of Sport Sciences*, 2(4), 37-44.
- Bujak, Z., Smajlović, N., Likić, S., & Omerović, M. (2014). *Predictive Contribution Of Morphological Characteristics And Motor Abilities On The Result Of Running The 60M Hurdles In Boys Aged 12-13 Years*. Retrieved from <http://elitetrack.com/forums/topic/hurdle-technique-drilled-down/> (cited 12.05.2016).
- Cole, B., Finch, A., & Ariel, G. (2012). *Relationship Between Foot Pressures And Horizontal Velocities Alterations While Hurdling*, p. 72. Retrieved from <https://ojs.ub.uni-konstanz.de/cpa/article/viewFile/5214/4789> (cited 23.05.2016).
- dos Santos Lima, M., Claudino, J. G., Mezencio, B., de Oliveira, F. R., Amadio, A. C., & CercaSerrao, J. (2013). *Comparative biomechanical analysis of hurdle techniques on 110m and 400m in elite athletes*. Retrieved from <https://isbweb.org/images/conferences/isb-congresses/2013/poster/ps1-01x.pdf>.
- Freeman, W. (2015). *Track & Field coaching essentials*. Champaign, IL: Human Kinetics.
- Ginnis, P. M. (2009). *Biomechanics of Sport and Exercise*. Champaign, IL: Human Kinetics.
- Iskra, J. (1995). *The most effective technical training for the 110 metres hurdles*, IAAF, 10: 3, Retrieved from http://www.hurdlecentral.com/Docs/Hurdles/100%26110_Hurdles/Iskra_TheMostEffectiveTechnicalTrainingFor110mHurdles.pdf (cited 23.05.2016).
- Iskra, J. (2012). *Athlete Typology and Training Strategy in the 400m Hurdles*. IAAF, 27:1/2.
- Iskra, J., & Coh, M. (2011). *Biomechanical Studies On Running The 400 M Hurdles*, 12(4), 315-323. Retrieved from [http://www.degruyter.com/dg/viewarticle.fullcontentlink:pdfeventlink/\\$002fj\\$002fhumo.2011.12.issue-4\\$002fv10038-011-0035-5\\$002fv10038-011-0035-5.pdf?t:ac=j\\$002fhumo.2011.12.issue-4\\$002fv10038-011-0035-5\\$002fv10038-011-0035-5.xml](http://www.degruyter.com/dg/viewarticle.fullcontentlink:pdfeventlink/$002fj$002fhumo.2011.12.issue-4$002fv10038-011-0035-5$002fv10038-011-0035-5.pdf?t:ac=j$002fhumo.2011.12.issue-4$002fv10038-011-0035-5$002fv10038-011-0035-5.xml), cited 23.05.2016).
- Kryściak, J., Podgórski, T., & Eichler, A. (2015). Lactate concentration and creatine kinase activity after 110-m and 400-m hurdles races. *Trends in Sport Sciences*, 22(4), 179-184.
- Lindeman, R. (2012). *400-Meter Hurdle Theory*. Retrieved from <http://www.coachr.org/lha.htm> (cited 15.05.2016).
- Mason, P. (2011). *Medical NeuroBiology*. Oxford: Oxford University Press.
- McDonald, C. (2002). The Angular Momentum Of Hurdle Clearance. Retrieved from http://www.coachr.org/angular_momentum_of_hurdle_clearance.htm (cited 21.05.2016)
- McKinnon, G., Comerford, M. (2012). Hurdle Performance: lead arm technique advancement. *Modern Athlete & Coach*, 50(1), 26-29.
- Schiffer, J. (2012). *The 400 m Hurdles*. IAAF, 27:1/2.
- Shavinina, L. (2009). *International Handbook on Giftedness, Volume 1*. New York: Springer.
- Sparrey, K. R. (1997). *Identifying And Developing Elite Hurdles In The United States*. Retrieved from https://www.trackandfieldnews.com/technique/141_Sparrey.pdf.
- Starosta, W. (2008). *Stronniezróznicowanietechnikićwiczeńzawodnikówwrozmaitychdyscyplinsportu*. Warszawa-Supraśl, Międzynarodowe Stowarzyszenie Techniki Sportowej.
- Tidow, G. (1991). *Model technique analysis sheets for the hurdles Part VII: high hurdles*. IAAF, 6:2. *Athletics Coach The Body In Sport And Athletics*. Retrieved from <http://www.scottishathletics.org.uk/wp-content/uploads/2014/04/uka20body20in20sport20v4.pdf> (cited 14.05.2016).
- Colin_Jackson – Retrieved from https://en.wikipedia.org/wiki/Colin_Jackson (cited 27.04.2016).
- Simplified Coaching in the Sprint Hurdles*. Retrieved from <http://www.sacspeed.com/pdf/hurdles.pdf> (cited 14.05.2016).
- Super fast-twitch fibers, the secret of the sprint start*. Retrieved from <https://heatherjross.wordpress.com/2015/03/21/super-fast-twitch-fibres-the-secret-of-the-sprint-stars/> (cited 23.05.2016).

THEORETICAL ASPECTS ON USING THE SOLVING PROBLEM METHOD IN PREPARING THE FOOTBALL PLAYERS

Jordan ROMAN^{1*}, Gloria RAȚĂ²

¹National University of Physical Education and Sport, 140 Constantin Noica St., 060057, Bucharest, Romania

²Vasile Alecsandri University, 157 Mărășești, 600115, Bacău, Romania

* Corresponding author: iordanroman@yahoo.com.

Abstract: *The solving problem is a teaching method that consists in presenting the player some difficulties intentionally developed by the coach, the resolution of which the player learns something new. Its essence is founded on conflict circumstances occurring between the necessity of solving the technical and tactical actions, under adversity and experience conditions of the learner. The solving problem method creates a perceptive fund favorable for the reception of that knowledge (skills and abilities) that will support the player to find solutions and overcome difficulties. By solving problems it is not meant the application of algorithms already learnt, but finding solutions to new problems. In the same extent, the problems exposed by the players must take into account of the knowledge they already have acquired, to arouse the interest and to require effort from the athlete. In other words, it is the method by which it is accumulated the greatest amount of knowledge and simultaneously requests a decision from the analysis of one or more motor or cognitive response options. Using problematize is a modern method of training that involves concern, fantasy and creativity from the coach. He must be able to cause a problem in which all aspects of the game to be harmonized with each other and simulate the players in choosing the best solution to solve difficult situations, but also to stimulate their creativity. For these reasons problematize use is very important and topical in learning how to play football, proving effectiveness in preparing athletes and gradually increasing performance.*

Keywords: *solving problem, training method, football.*

Introduction

The game of football is considered a social phenomenon that is widespread in most countries of the world, going through a long period of refining and progress from its appearance until now. A fundamental characteristic of this sport is the complexity that can be manifested either in the variability of situations and conditions of competition either in motor response given in the game development. All these are not the result of simple amounts for procurement of its characteristic items, but an interaction that includes all components of the benefit, given by: physical training, technical and tactical skills and psychological skills.

Performance football requirements have been observed in recent decades in qualities and capabilities increasingly complex that ensure physical, functional, sensory, psychological, social and ethical requirements. In this regard, in the sports training practice a number of methods were tested and summarized for developing one or more driving qualities at once, targeted at resolving clear objectives, providing concrete ways to action to players.

Sport training is the factor that can be best modeled, adapted and restructured according to the individual particularities, going all the way to the individualization in preparation. It must be conducted and analyzed as a dynamic system, taking into account all the factors that determine its efficiency. Sport training is not confined to mere biological development based on improving physical skills, the acquisition of a large bag of technical skills, but extends to the development of the entire personality and psycho-behavioral system.

Currently, the training objectives that target physical, technical and psychological preparation are organized and designed according to the requirements of the football game and the level of initial training of athletes.

Continuous player development and improvement is based upon the following characteristics: the physical characteristics regarding physical height and conformation that meet in different variations and combinations as: speed, mobility, strength, flexibility and coordination; technical skills represented by: ball control, its passing and takeover as well as intellectual skills such as: intuition, memory, perception, concentration, creativity, anticipation, abstract thinking and judgment.

In the motivational plan the player is concerned by the desire to exceed the highest level of play, by the need for acceptance and the desire of power and control. Its emotions and temperament encompass a whole sentimental range represented by courage and fear, judgment and indecision, impulsivity and prudence, self-confidence and insecurity. Technical progress had as effect also the players' versatility that reinforces the idea of *total football*. For this, coaches come up with new ideas and experience theories, principles and methods to prepare universal players for a benefit of the game brought to perfection. This accession to perfection also followed the desire of winning games in large-scale competitions like UEFA Champions League or UEFA Cup.

The evolution from mono-specialized player that observes the tasks of the position indicated by the number on the jersey to the player acting according to the phase occurred at the time of the game should be evidenced. Polyvalent player appeared by continuous changing the positions between players, for the need of rational covering the field, to support each other and create numerical superiority so important not only for the defense

phase but also in that of the attack. We can say that total football formed the profile of a new type of player through continuous exchange of places with players from other positions, cumulating in a specific way all the tasks of the game specific to their defender, midfielder and forward defining himself as a perfect player. As such, the more relates with the other players, the more develop their potential so increasing efficiency at all times of the game. Creativity and intelligence of the player must be continuously stimulated in order to improvise constantly and constructively solutions to effective solutions to unforeseen circumstances created by the opponent.

In our view the mono-specialized player can be defined by the limited character, taking into account anthropometric issues (high stature of defenders and forwarders) aspects that relate to the players' effort during the game (the player had its own area of action specific to the position), technical issues (the technical training of positions within the team may be limited, for example the defenders' technique that contained excessively the takeover, hitting of the ball, and rarely feints and dribbling) as well as inflexible and very strict tactics, with no variants to unforeseen circumstances of the game.

On the other hand, a multitude of factors contributed to the current versatility of the football player, such as:

- Research on body's behavior during the effort and not only;
- Specialists involvement in interpreting the results of research and innovation or adaptation of methods and means of other social areas (ex. problem-solving method) with the purpose to significantly improve both training and game;
- Physical skills in particular the reaction speed prevailing in front of qualities based on physical conformation;
- Near-perfect technical skills regardless of the position the player occupies within the team;
- Compliance with tactical tasks with options to unforeseen circumstances imposed by the opponent's game.

Content

The solving problem method, defined in DEX as *being method of education which triggers the independent activity of student, his thinking and personal effort*, aims to develop ways of achieving the instructional and educational process by encouraging independent activity on the basis of creating problematic situations, to prepare young footballers (DEX, 1996, p.853).

Using this method means first of all to know and understand the situation-problem term, which according to Cerghit (1997, pp. 129-130) *designates a situation contradictory, conflicting, resulting from simultaneously experiencing two realities (of cognitive and motivational type) inconsistent with each other, on the one hand the past experience, and on the other hand the novelty and surprise factor, the unknown which is faced with*. This "contradictory, conflict situation" should be resolved at the time of occurrence, solving requiring physical and psychological effort of the athlete, but also the formation of habit of thinking in terms of solving.

Solving problem, as didactic method consists in the initiation phase, in the action to present to the player some modalities/ difficulties developed intentionally by the coach, to be resolved, and based on which the player learns something new, learns to judge, choose and react in order to solve a problematic situation. During its use the player learns to choose the most appropriate way to respond.

In the Dictionary of Psychology the solving problem is defined as *intellectual operation for referral induction and formulation of problems*. Its core is founded on conflict circumstances occurring between the necessity of solving technical and tactical actions, under adversity conditions and the experience of the learner (Popescu Neveanu, 1978, p.552).

A common method in all activities and in professional sports, with predominance in sports games *requires the creation of problematic situations that require special attention on behalf of the athletes in finding the most efficient solutions for solving and also exercise by deduction and creative thinking* (Rață, 2008, p.73).

Application of this method involves: equipping the player with the skills, knowledge and attitudes consistent with the objectives specific to age and sport practiced and contributes to increasing effective participation in the development of attention and concentration, as well as for improving the level of anticipation and creation.

Necula, in 1994, states that *this method contains a number of processes by which aim to create problem situations that prepare students or trainees and offer them the opportunity to see different relationships between objects and phenomena of reality* (Nicula, 1994, p.104).

We can say that this method is the way in which the greatest amount of knowledge is accumulated and simultaneously a decision is required as a result of the analysis of one or more motor or cognitive response options. This incites the athlete to analyze and find the best solutions straining the memory, speed of analysis and decision.

Solving problem method creates a background favorable for using that perceptive theoretical and practical knowledge (skills and abilities) that will support the player to find solutions and overcome difficulties. Problem situations could be:

- the existence of a disagreement between the athlete's knowledge and requirements imposed for solving the problem;
- the possibility of choosing from a system of knowledge (sometimes incomplete) only those data necessary to solve the problem situation given;
- the need to integrate new knowledge gained from solving problems, in its own system already existing, to be complemented;
- the possibility of using previously acquired knowledge in problem solving situations, and so on.

The various objectives of athletes' training that coach must fulfill, must have a specific purpose, in order to determine in the player's body some adjustments for achieving increased efficiency in the game.

Performing physical training using solving problems as a method of training directed towards building efficient action capacity, it is an ambitious goal, because in practice it is more difficult to implement/ use compared with the analytical method or the global method, where in training, technical elements are addressed separately or assembled in structures that are part of conducting the football game, but which provide a standard, uncreative learning.

Solving problem use has become a necessity in the process of training, from an early age, and implies concern, fantasy and creativity from the coach. It must be able to create problem situations, in which all aspects of the game, which link them to each other, to stimulate the players in choosing the best solution to solve difficult situations, but also stimulate their creativity.

Solving problem application as modern method of training involves the conduct of training that ensures the adaptation to the requirements of modern football game and need for training orientation to the technical and tactical demands required by an evolution increasingly complex and faster of the game in the field.

Solving problem, in order to be effective and produce changes in thinking of athletes must meet the following conditions:

- the coach shall be concerned with creating problematic situations;
- the coach shall be concerned to follow -up practical and theoretical responses of the athletes;
- all players shall be active during the training;
- all players shall be concerned with choosing the most efficient solutions;
- players shall be accustomed to working both individually and in teams;
- players shall form their creative thinking skills to manifest at a good level;
- a positive competition feeling shall exist in the team, talented players being appreciated by the other players;
- satisfaction of discovering solutions to the problems of the game are put first, and the satisfaction of a victory on the second place.

Solving problem requires from the coach the voluntary creation of difficult situations to be resolved by the players during the trainings.

This method allows:

- coaches to create new exercises, especially in relation to their own issues specific to the team, physical, technical and tactical goals but also with the specificities of athletes included in training;
- players to express themselves in a comprehensive manner harmonizing creative and quantitative items of training in relation to their own individual characteristics and their role within the team, but also to perform an individualized training through a collective exercise.

Solving problematic situations does not mean the application of algorithms already learned but finding new solutions to problems occurred in the field during the game. In the same extent, problematic situations, created for athletes must make sense and take into account the knowledge they have already acquired, to be clearly presented by the coach, to attract interest and request physical and psychological effort from the athlete.

As an educational method of training and development, solving problem involves structuring the following points:

- *problem situation creation;*
- *development of multiple solutions;*
- *choosing the most appropriate solution;*
- *problem implementation and solving;*
- *analysis of the solution selected for solving” (Rață, 2008, p.74).*

Nationally, training in the game of football for children is based on exemplary-explanatory methods that focus on communication of information known, contributing to the development of reproductive thinking and memory. In this context training by solving problem during the practice was insufficiently approached, given the advantages that aim to develop independent and productive thinking of children. From the psychological point of view, it is considered that solving problem method develop operational schemes of divergent thinking stimulate the creative skills, while ensuring intrinsic motivation of learning. Naturally, the training's tasks also require memory, reproductive thinking, hence a ready-made pool of knowledge and operation after models given. But moments of knowledge acquisition, operating after a certain algorithm/ model can be included in the context of solving a broader cognitive task, such as solving a game situation.

A decisive role in assessing the degree of deployment of play situations is held by the quality of own information continuously supplemented with information on the corresponding path with the role of self-regulation. If positive resolving of a game situation, the player will choose in the future the same solution for similar situations. If the action has been completed unfavorably, then the player will reconsider its performance by identifying the causes and acting accordingly in the next phase of play.

Learning the game of football requires careful attention to the child approach in assimilation of the theoretical knowledge and requires a very good physical, technical and tactical preparation. During the training, it is very important to create game situations by using problem-solving, based on which technical-tactical component, and also the creative thinking of the young athlete, will develop efficiently.

So problem-solving or learning by solving problems, requires the creation of challenging theoretical and practical situations that require special attention from athletes in finding new solutions to address them. This is a modern educational method, considered perhaps the most effective and comprehensive method of players' involvement in the formation process and recognized by many experts in the field due to its effectiveness in training athletes.

The basic principle of this method is given creating a situation of "discovery" of game sequences logic presented by the coach and practiced by the players, but also of appreciation of the discovery of the best settlement of situation in a certain moment.

The coach creates a space for practicing in a given field area reproducing conditions similar to the game, leaving "hidden" the logic or variants of solving the situation in question, in order to be discovered by physical and mental efforts by players. The result in applying solving problem method is the solution discovery by the players, and therefore habituation of players with creative thinking, decision speed manifestation, with the ability to react in terms of different and unexpected situations.

The discovery consists in finding and performance by players through a process of analysis, induction, generalization, abstraction of a technical process optimal to the game phase moment so that it is a success in carrying on the game.

Thus, Lapresa, Arana and Ponce de Leon (1999, p. 89) state that *errors that are committed normally during the game, are not exclusively errors related to technical and tactical level, but are rather deficiencies related to decision making*, issue that requires not only a style of learning oriented to solving problem method, but even a reorientation of the training process.

Activity of discovery during the training is conducted by the coach training, effectiveness of the method depending on where and how it can help the player. The coach will plan what items intends to work on that training and will design the exercise so as the player works after a time grading and not by accident.

The coach must know the details of the problem situation, including *difficult areas* where players can tangle, to intervene with minimum suggestions in short moments of athletes' disorientation.

To achieve athletic performance to give the football player the chance to play in a team of a certain level, directions and the compulsoriness of issues that must be observed in the process of training must be established and clarified from the beginning of training.

The complexity and variety of problem situations addressed during the training consist of exercises designed and structured to stimulate interest and curiosity of the player who is totally involved in finding solutions using divergent type of thinking. Thinking occurs in the process of knowledge through its function of removing the cognitive obstacle resulting in problem solving. It is influenced by the quantity and quality of knowledge. Obstructing its development occurs when coaches deprive the players to exhibit their own creative ideas, repeatedly exposing personal way of solving during the game. Another risk that delays the development of thinking is caused by lack of interest in finding effective solutions to the problems of game and training. Thinking development involves the observance of certain rules especially that of evolution in steps using intuitive materials, blackboard and field.

Discussions and conclusions

In our study we want to highlight the advantages of applying the solving problem method resulting in developing creativity, imagination and capacity for analysis and decision on a problem situation, a situation that is characteristic of the game of *today* and the game of *tomorrow*.

Using this method can improve both overall psychomotor skills (motor skills formation ability) and of special ones (kinesthetic sensitivity, balance, coordination, spatial and temporal orientation, motor intelligence, and so on) of the players, and systematically using solving problem in trainings we consider that the results will also improve in competitions in which athletes will participate.

In conclusion, reaching superior athletic performance requires a continuing collaboration between the coach and athletes, but their responsibilities are different. Thus, it is necessary that the athlete understands that training is a work full of responsibility and personal motivation.

From our theoretical research, establishing a training program, focused primarily on problem solving situations in order to enrich the knowledge base, allowing the football players optimal psychomotor reactions in solving various unforeseen circumstances they face in the game of football, while developing physical, technical and tactical qualities in children and youth, emerges as a necessity of modern football. For these reasons problem-solving use is very important and topical in learning the football game, proving effectiveness in preparing athletes, gradually increasing performance.

References

- Academia Română, Institutul de Lingvistică „Iorgu Iordan” (1996). *Dicționarul explicativ al limbii române, ediția a II-a*. București: Univers Enciclopedic.
- Cerghit, I. (1997). *Metode de învățământ*. București: Didactică și Pedagogică.
- Lapresa, D., Arana, J., & Ponce de Leon, A. (1999). *Orientaciones Educativas para el desarrollo del deporte escolar*. Logroño: Universidad de La Rioja y Federación Riojana de Fútbol.
- Nicula, I. (1994). *Pedagogie*. București: Didactică și Pedagogică.
- Popescu Neveanu, P. (1978). *Dicționar de psihologie*. București: Albatros.
- Rață, G. (2008). *Didactica Educației fizice și sportului*. Iași: Pim.

THE HIGHLIGHTING OF THE LATERALITY THROUGH THE STUDY OF THE KINEMATIC PARAMETERS OF A SIMPLE TECHNIQUE EXECUTED BY A BEGINNER KARATE PRACTITIONER

Irina BĂIȚEL^{1*}, Luminița PĂTRU²

^{1*} Liceul Teoretic Dante Alighieri, 9 Aleea Fuiorului, Bucharest, Romania

² National University of Physical Education and Sports, 140 Constantin Noica, Bucharest, Romania

* Corresponding author: irina_baitel@yahoo.com

Abstract. *Lacking the possibility to directly highlight the uneven functionality of the cerebral hemispheres, we showed it in an indirect way, through its manifestation namely the execution of the same technique, with the right and the left hand, technique in which the lower limbs are also implied. With that end view, we made a test using the MOVEN equipment and we achieved data acquisitions on a beginner karate practitioner, whose duty was to execute 10 gyaku tsuki techniques with the right and then with the left hand. For each of the executions we calculated the position of the fist in space, its velocity, the extension angle of the hitting arm's elbow and the flexion angle of the forward leg's knee and the variation of these values in time. We calculated the length of the stepping with the forward leg and its duration. Also, we watched the variation of the pelvis position in time, for each execution with the right and the left arm. We calculated the average values of these parameters after the synchronization at significant increase of the fist's speed. We drew the variation curves of these time parameters and we compared them in order to show the difference between the executions with the right and the left arm.*

Keywords: laterality, cinematic parameters, technique, MOVEN.

Introduction

Dexterity is a concept which creates confusion: some consider it a complex motor quality, some consider it the individual's ability to quickly learn a new movement, and others consider it *"a capacity to restructure swiftly the movements in various conditions, depending on the specific conditions when performing them"*, quoting Epuran (2011).

In 1983 Cârstea considered coordination as a *"capacity of the human body to perform propelling acts and actions, especially in various and unusual conditions, with maximum efficiency and minimum energy consumption given by the performer"* (p. 67).

Coordination involves the development of harmonious movements, in time and space, in different directions and environmental conditions, using the correlation between the nervous, muscle and ligament systems.

Coordination is the common denominator of all the possibilities of movement, without it we cannot perform propelling acts and actions. It gives smoothness, harmony, precision and delight in kata, making it possible to implement the technique and tactics during kumite matches.

Coordination occurs at all stages of training, from beginners to advanced, from amateurs to professionals, and in all phases of the training, from warming up, the fundamental part and recovery of the body after exercise, to restoration.

Karate is a heuristic sport, in which coordination is absolutely necessary to achieve performance. It is a psychomotor capacity without which we cannot pass the primary selection. Scientists have been preoccupied with coordination since ancient times. Plato, philosopher of antiquity, wrote: „exercise the right and left alike”, anticipating the need for symmetrical training and ambidexterity, ever since.

Dragnea and Bota (1999) define the coordinative abilities as complex predominantly psycho-motor skills that involve the capacity to quickly learn new movements and, by restructuring the existing motor content the adaptation to various conditions specific to different types of activities.

For Platonov (1984) coordination is the ability to perform all complicated and unexpected actions quickly and economically. For coordination, we never work too soon or too much.

Laterality is an important component of the psychomotor function, together with the body diagram, ideomotricity, and motor intelligence. Lauzon defined laterality as *"the inner knowledge of the two parts of the body"*. Bernstein is one of the founders of kinesiology (the science of movement) and looked into the issue of the lateral differentiation as early as 1947, but he did not study the problem thoroughly. According to his opinion (1991, p. 179) *"for completely unknown and unexplained reasons, for now, his right hand dominates the left hand significantly, being far superior to the latter in terms of accuracy, ease of control of new coordination and force capacity"*.

A better approach to laterality allows us, without much effort, to become aware of this phenomenon, helping to individualize and orientate the young talents. Depending on the side preference, subjects can be classified into:

right-handed, left-handed and ambidextrous. When filling in the athlete's record, we should pay as much attention to laterality, as it is given to weight, height or aerobic capacity.

The hemispherical cerebral dominance is the characteristic of the cerebral cortex to process, in a specific manner, the information from the environment. Therefore, the way in which the two hemispheres operate, will influence the way in which it is stored and processed the information necessary to mimic motor behaviors, to imitate. For a high efficiency, coaches and teachers must combine the working styles with hemispherical dominance.

It is known that the two hemispheres communicate with each other continuously, being in a permanent conversation (Epuran, 2011). Practicing karate and also swimming, as they are ambidextrous activities, would seem to help balance the cerebral hemispheres, which increases the possibility of solving problems. Knowing the way laterality and the other components of coordination operate, represents the starting point for identifying it and using it effectively during training sessions.

Materials and methods

In order to carry out this study we monitored a Shotokan karate practitioner, aged 12, with 8 kyu level training. He was given the task to perform two series, each consisting of 10 gyakutsuki hits (direct hits with the rear arm) without completion (without contact with any target), the first series with his right arm, and the second series with the left arm. We monitored him using the MOVEN equipment, our aim being to calculate certain cinematic parameters of the used techniques, and by means of them, to identify the differences in execution of the same motor task done ambidextrously. After fitting the subject with the MOVEN equipment (equipment consisting of 17 motion sensors each consisting of a 3D accelerometer, a gyroscope and a magnetometer, interconnected through a series of cables, but which, by means of two Xbus Master, communicate wireless with a computer on which the equipment software was installed, see www.moven.com), we calibrated the equipment to the subject concerned and then we collected the actual data, while the subject was performing the two series of hits. The mvn files were turned into .mvnx and then imported into Excel 2013 in order to process them.

We started from the data collected from position of segments and we calculated the speed of the fist, the extension angle of the elbow, the knee flexion angle of the front foot, the length of the step with the front foot and the height of the pelvis and we then represented their variation in time.

After the synchronization of the performances at the time of the significant growth of speed, we calculated the average values for all the ten executions of each series and we represented the variation of the average values of the cinematic parameters already mentioned. We did this for both series of hits in order to highlight the differences between the executions on the right-hand side and those on the left-hand side.

Results

After having calculated the fist's position in time for each frame (using the theorem of Pythagoras in space), we calculated the speed of movement of the fist, frame by frame, and then we represented its variation in time. After doing these operations for each hit, we overlapped the variation curves representing the fist's speed in time, and we calculated the average speed for each frame and then we represented this curve on the time axis for each situation (migi gyaku tsuki and hidari gyaku tsuki). It is observed, on one hand, higher maximum values of the fist speed in the performances with the right hand and on the other hand, a higher growth rate of the fist velocity (the slope of the bigger curve) on the right-hand side. Related to the intersegment angles, we notice that the variation in the angle of extension of the elbow is nearly identical (the slope of the curve, the maximum values attained, the duration of the maximum extension), the only significant difference being that the performances with the left hand are a little bit more messy, and the overlapping of the curves of variation of the angle of elbow extension is not as good as in the case of the performances with the right hand (Fig. 1). Blue curves represents elbow extension and red curves represents knee flexion. With yellow and orange are represented their medium values.

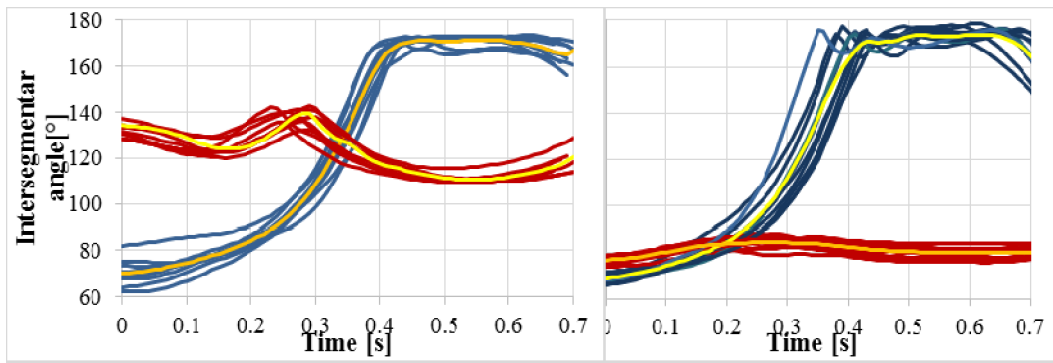


Fig. 1. Intersegmentar angles variation in time for migi gyaku tsuki (right) and hidari gyaku

All these, along with the fact that the speed of the fist’s movement indicates that the different speed of fist movement, are due to intersegment coordination which is different in the performances with the right or the left-hand side. The speed of stepping forward (the foot opposing the arm performing the hit), the speed of rotation of the hip on the side performing the hit and the speed with which the shoulder is involved in the hit (in other words, the speed of motion sequences) are different, their resultant being higher for the executions on the dominant side (right, in our case).

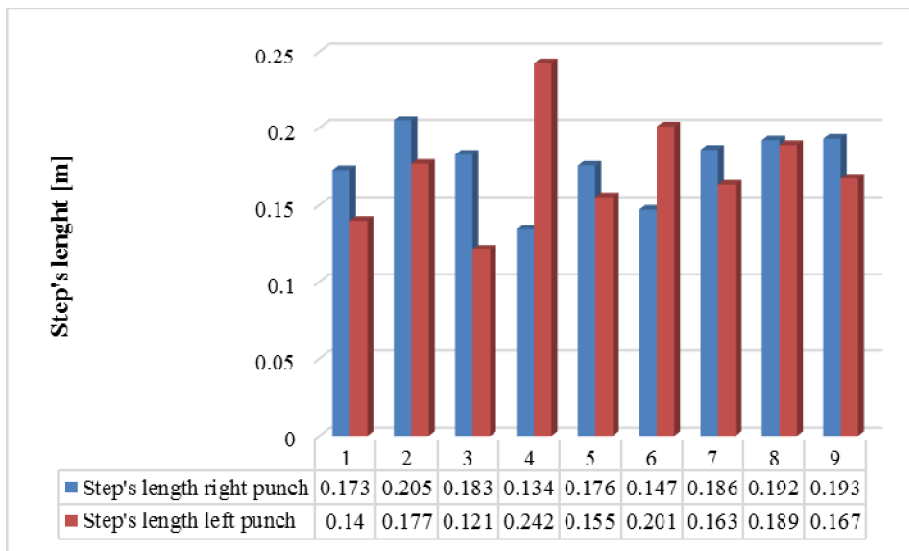


Fig. 2. Step’s length for migi gyaku tsuki (blue) and hidari gyaku tsuki (red)

The knee flexion angle of the front foot is strongly different in the case of performances on the left and right hand side. In the performances with the right-hand side, the front foot is the left one, whose level of muscular power proves weaker, by maintaining a higher flexion angle. In this context we can assume that the higher speed of the fist’s movement is given by the component of foot impulse in the control foot (the right foot, for the right arm hits, and the left foot for the left arm hits), in the case of migi gyaku tsuki hits. The results obtained after processing the data acquired using the MOVEN equipment confirm this hypothesis in 7 out of 9 cases, as shown in Fig. 2.

An additional confirmation of the hypothesis put forward by us appears after comparing the duration of stepping with the front foot (Fig. 3). In 8 out of the 9 cases, the length of stepping with the front foot is lower than in the case of performances with his right hand, situation in which the impulse foot is also the right one (right being the dominant part of our subject).

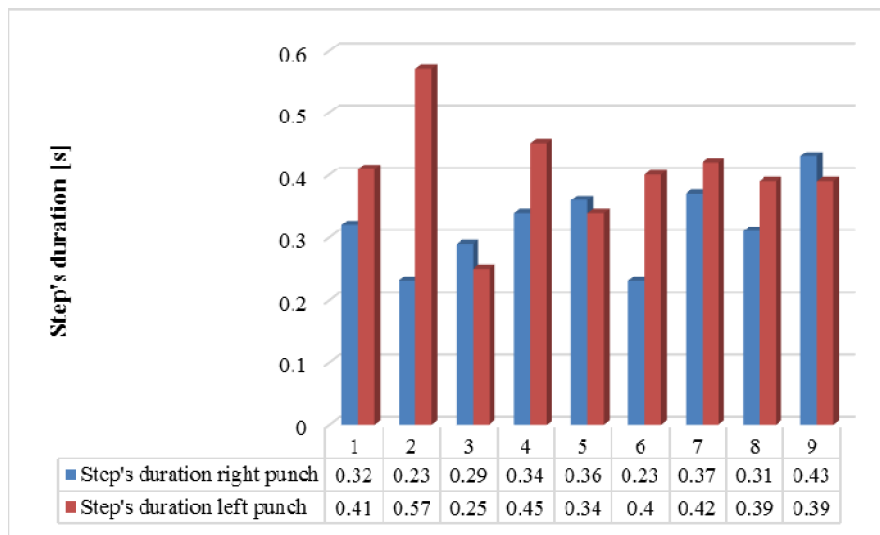


Fig. 3. Step's duration for mihi gyaku tsuki (blue) and hidari gyaku tsuki (red)

Regarding the pelvis height variation in time we find that the minimum height of the pelvis (average value) is approximately equal in both cases. However, the dispersion is higher in the performances with the left arm, as a result of a weaker general coordination on the non-dominant side. The similar values of the minimum height of the pelvis under the conditions of the high differences between the angles of knee flexion of the front foot are explained by a different behaviour, the impulse foot, the height of the position being adjusted by different flexion angles of both knees.

We emphasise laterality by highlighting the differences between performances of the gyaku tsuki technique with the right arm and with the left arm, through the averages of the cinematic parameters analysed.

It is noted the difference between the maximum speeds of the fist in the mihi/hidari performances, but also differences in the slope and amplitude of the two curves of the fist speed. It is obvious the superiority of the fist speed in the performances with the right arm (the average speed of 2.85 m/s in comparison with 2.16 m/s in performances with the left arm).

As far as the intersegment angles are concerned, the situation is as follows (Fig. 4). It is noted that the variation (average) angle extension of the elbow is almost identical in time, but there is a big difference in shape regarding the curve of the angle of flexion of the left knee (while performing with the right arm) and of the right knee (while performing with the left arm). In the key, the average right knee flexion angle refers to the front foot – namely the left one- while performing the technique with the right arm. The left knee flexion is slightly folded, unlike the performance with the left arm, when the front leg is the right one, with a strong flexion (80 degrees).

By comparing the averages of the length of stepping with the front foot for the performances with the right arm and with the left arm insignificant differences are obtained (4 mm), but the duration of stepping with the right foot (when performing with the left arm) is greater, which suggests a weaker impulse in the left leg, the supporting one in this situation.

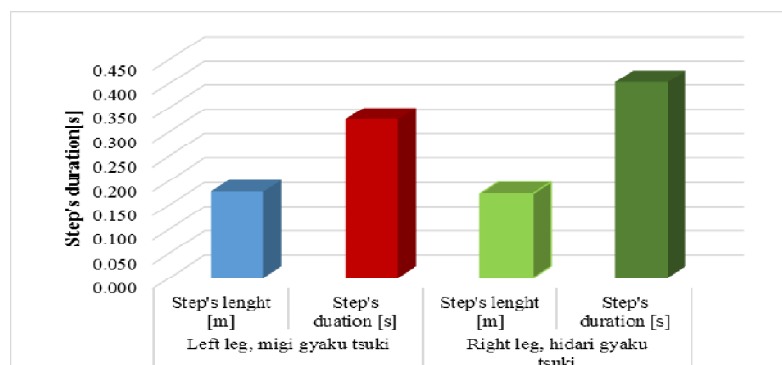


Fig. 4. Elbow extension angle (blue and green) and knee flexion angle (red and orange) for mihi and hidari gyaku tsuki

Discussions and conclusions

Through this study we join the new wave of researches in martial arts, studying laterality as an increasing factor of the motric and performance capacities. Using a bio-mechanic analysis methodology of the striking techniques in combat sports (Băițel and Deliu, 2013; Pătru et al., 2015), we managed to expose laterality's manifestation in both upper and lower body, monitoring the execution of a simple technique with the help of the MOVEN equipment.

References

- Băițel, I., & Deliu, D. (2013). Kinematic aspects of direct punch cross and jab applied in semi-contact. *The 9th International Scientific Conference eLearning and software for Education, Quality and efficiency in e-Learning*, 3, 97-103.
- Bernstein, N. A. (1991). *On Dexterity and Its Development*. Moscow: Fizkultura i Sport.
- Cîrstea, Gh. (1983). *Teoria și metodică educației fizice și sportului*. București: Universul.
- Dragnea, A., & Bota, A. (1999). *Teoria activităților motrice*. București: Didactică și Pedagogică.
- Dragnea, A., & Mate, S. (2002). *Teoria sportului*. București: Fest.
- Epuran, M. (2011). *Motricitate și psihism în activitățile corporale*. București: Fest.
- Pătru, L., Băițel, I., Negulescu, I., & Angelescu, L. (2015). *Laterality emphasizing through cinematic parameters analysis on karate shotokan athletes*. The 11th International Scientific Conference eLearning and Software for Education eLSE, 3, 273-278.
- Platonov, N.V. (1984). *Teoria și metodică antrenamentului sportiv*. Kiev: Vișa Scola.
- www.moven.com.

SPORTS AND POLITICS – FROM REGIME TO SPORTS VALUES

Ioan AUGUSTIN^{1*}

¹ National University of Physical Education and Sports, 140 Constantin Noica, Bucharest, Romania

*Corresponding author: ioan_augustin@yahoo.com

Abstract. In this paper is outlined the role of sport in society, based on the way the political system worked at a time. The benefits of sport are known, but how it has been used for propaganda purposes and not only, we will learn from the article submitted. Also, the so-called superiority of a system and automatic man new type created by this system, built by preparing physical, mental, top, based on scientific research continues, the antithesis of other organizing socio-political, administrative but also the benefits of such a period, are dotted in this material.

Keywords: sports, politics, propaganda.

Introduction

Sport being considered, amongst others, a social phenomenon should be understood and explained in its historical, political, economic and cultural. The sport itself can represent a point of view that can analyze a company from which we can deduce practices of a society, can also read nature of the political regime that state practiced.

After 90 years it is clear that the results achieved by Romanian sport abroad were increasingly weaker, and exceptional athletes, coaches, and Romanian specialists chose to leave Romania in search of opportunities designed to highlight the athletic and technical capabilities. Physical education in schools was placed by the government which succeeded to power in the background and there is a continuous and coherent policy. Many sports facilities erected under the communist regime had been left in the hands of fate, they underwent decay than expected.

This phenomenon was registered in all states of the former "communist camp". Sport German state, which is a standard propaganda superiority of the socialist system in this area, disappeared with the abolition of the German Democratic Republic. Sports for State Cuban model family of Latin American countries, it has collapsed due to the economic difficulties Cuba has faced after the fall of the "Iron Curtain" in Europe. Even soviet sport, who served as a model for promoting ideological Leninism can say that has seen a downward trend in the first decade after the collapse of the former USSR suffered structural.

It is therefore important insight into the history of sport on such interdependence between the political regime of a country and its performance in sports. Sport, under the communists, we can say that was a flagship of socialist propaganda, representing a way of promoting regime and here is a standard of performance.

Material and method

Purpose of the research. This work is a qualitative study based on analysis of the communist era that marked the history of Romanian sport, not just by the sheer number of medals and titles won by our athletes internationally, and through editorials major works in the field of sport. National Library Inventory retain around 800 titles of printed works in the 24 years of Ceausescu ruled this state. Physical education and sport culture occupied a special place in the Communist Party and programs under Gheorghiu-Dej, but so during the Ceausescu regime they enjoyed the privilege of being placed among the issues of national interest. Great impetus that the sports movement met after 1965 can be explained not only by the light of the requirements doctrinal using this sector in the service of spreading the slogan superiority of the communist system, but also by the passion harbored by the new leader in Bucharest for sport, given the fact that the youth was actively involved in organizing and developing sports resort army, as the top political officer he held at the time. Ceausescu era of openness encouraged research by western science in sports and through its local production works with sports content, translations of soviet authors as to occupy a space of increasingly limited annual catalog of publications. The concept of mass sports movement ceded more ground to the tasks of the party, which had to be translated into life by new successes, or this goal could be achieved only by sports. Unhappy with the slight downward curve registered by Romanian sports competitions abroad, Ceausescu require those responsible to operate amendment scales national sports to align them to the "highest achievements in international sport," Executive Political Committee is tasked with carrying fulfillment of this provision and the monitoring of athletes obligations will be paid over the next five years (1986, p. 39).

Passing over economic issues and over the non-compliance with civil rights and freedoms, but also other

restrictions imposed by the regime, sporting prowess "Age of Ceausescu" was a thriving reality reflected both dowry endowments sports stadiums, arenas, halls, swimming pools and the hoard of medals and titles acquired by Romanian sportsmen in competitions abroad.

In just a few decades Romania was transformed from a country almost absent on the major arenas of world sports power in a sport appreciated situated every year among the top places in the international rankings.

Romanian sport successes were due not only to facilities that have been made available in, but also scientific research results and methodologies which has enjoyed steadily through hundreds of printed works in the field. Except works belonging to industry propaganda, which by their nature have treated the phenomenon of sport in terms of ideology, all the others that they were specialized medicine, history or sociology of sport through their contents were high standards of work arising West.

From this perspective "Ceausescu era" can be perceived in a positive light, the prestige won by our country in the years that thenceforth no longer repeated.

Communist ideology emphasize the importance of sport and its importance in promoting communist principles. Sport was a good promoter of communist thinking, so hence the inclination towards the development of sports culture.

Although sport is defined as an apolitical activity, countries dominated by the communist regime took care to remind strongly political nature of sport, detaching it systematically from Western practices.

Presentation and interpretation of the research results

Using specific study materials, both from the communist period and contemporary new, trying to achieve a more accurate interpretation and presentation of sport and politics throughout history starting from the basics and stages of evolution. It can be said that physical activity is one of the essential components of human existence which, together with the intellectual ensured uniqueness, but also the evolution of our species. Unlike bourgeois practices, which suggests a certain character class, the communists supporting obstinately mass character of this activity. It is this perceived opening to the widespread practice of sport and as an effective propaganda pro-communist and anti-capitalist at the same time. "The bourgeoisie and landlords in our country, as elsewhere in the capitalist countries held working people away from physical education and sport. They have used sport as a means of cultivating bourgeois nationalism, to chauvinism and racial incitement" - it said so in a party document of the communist party (National Archives of Romania, no. 99/1949, f.1). The classics of Marxism-Leninism tried to demonstrate the important role that sport plays in the culture of communist ideology. Marx considered that the education of the young generations need to understand "education primarily mental, physical education second, and the third technical instruction" (Marx, 1962, p.199) since, as will testify later, communist regimes were interested in creating a new type of man, "more robust and efficient" (Boia, 2000, p.52). Marx believes that both mind and body must be developed equally without being injured on either of the two components. Therefore in all communist countries sport dressed and side military, which manifested itself through training programs physical and tactical various categories of population and the establishment of clubs and associations subordinated military structures, entities sport that were to play community model (Nacu, 2002). Lenin convinced that the communist youth will appear able to carry out because of communism and that in order to achieve this must prepare assiduously to become "sturdy, healthy, with nerves of steel and muscles of iron" (Apud, 1948, p.82).

Under the guise of sports associations subordinated to economic units of state schools or institutions, communist countries have developed true professional sports training centers which were raised internationally renowned athletes.

The dedication of these hundreds of champions was exploited for propaganda, attributing to them the title of "best ambassadors" of the communist system, provided that tenfold earning less than their male counterparts in the West.

Not incidentally, paraphrasing Olympic exhortation "Citius, Altius, Fortius", Stalin used to mobilize Soviet athletes urging "Further, faster, higher than all".

Because over time all political regimes, either left or right, have used various forms of sport as means of internal or external propaganda, we thought it useful to offer a brief presentation of a few examples to highlight the fact that the exploitation of sports in invoice political propaganda purposes is not an invention of a communist regime in Romania. After the success of the Soviets with the Americans at the Olympics in 1956 in Melbourne, the factors responsible for the sports movement in western countries have put the problem of finding a strategy that can be dismantled false amateurism under which presented themselves in international competitions delegations

communist countries, especially since the winter edition of Austrian skier Karl Schranz Olympics has been banned from competition by the Olympic committee because they would have benefited from sponsorship. "Athletes are subsidized communist state and all the other athletes are in one way or another help - replied Austrian - depart from the wrong principle, the Olympics should be open to all athletes"(Espy, 1981, p. 138). At the 48th General Session of the International Olympic Committee (IOC), in discussions on nationalism and the involvement of politics in sport issues, IOC President, Lord Killian sought to find a solution by saying that most national Olympic committees its budgets fed entirely or mostly from the state as a natural manifestation of nationalism. "The spirit of nationalism among competitors has always existed and will never be avoided stimulate nationalism athletes who make the effort to defeat in antiquity were fighting for their city and their nation are struggling today" (Espy, 1981, p. 138) he says.

With everything else but the question was put in question after apartheid in 1957, South Africa's Olympic Committee has banned any competition between the white settlers and indigenous mixed black on its territory.

As a result, the IOC decided to exclude South African organization Olympics, as was hastened by a series of actions taken by other states or from individual athletes, who refused to compete with representative teams and athletes come from this country, and among them is Romania's refusal to dispute Cup tennis matches in the "Davis" with South Africa (ANIC, file number 55).

In other situations, amid tensions in the political arena, competence CIO was simply circumvented by member countries. One such episode was consumed at the 1956 Olympics when Spain and the Netherlands withdrew their delegations in protest against the Soviet invasion of Hungary.

Other absences were determined over time by various divisive bilateral between some states, as happened in Asian Games edition from 1974, hosted by Pakistan, when Kuwait refused to play any meeting sports with Israel, attitude adopted by North Korea against South Korea, except volleyball match where the net embodied border which in 1948 cut the country into two political entities with diverge ideologies; or World Championship Wrestling, also, in 1974, when Albanians athletes were stopped to compete with the Soviets.

The climax was reached protests but in the first half of the '80s, when the United States and other Western countries boycotted the Moscow Olympics organized in 1980, following the Soviet invasion in Afghanistan in 1979 and in its reply, the Soviet Union and 13 other communist countries boycotted the 1984 edition of the Los Angeles (Drăgan, 1992, p. 38). On this occasion, Romania, Yugoslavia and China have not joined the Kremlin action (Cioroianu, 2007, p. 480).

Any power of any kind, in any historical epoch and in every part of the world was concerned with how institutional or improvised to control and master the media direct or mediated with the masses, trying to collect on time "signals change of attitude the moods of various socio-professional" (Mocanu, 1981). Political propaganda is today a phenomenon with far-reaching implications, not only psychosocial, ethnic, organizational, ideological but primarily social and sociological. Propaganda is not only a technical activity or a political institution but is a total social phenomenon, through the effects in the social system. Political ideas for propaganda constitutes a means to manipulate large masses of people (joining them or annihilate them) to accelerate or delay the conduct of events.

As an instrument of ideology and politics serves propaganda purposes social system, social class service that is laid, the respective nation. A "neutral propaganda is nonsense" (Pînzaru, 1975, p.14). Thus, any communist regime in Romania could not make an exception to the use of all forms (which he has at hand) to achieve an effective propaganda among the masses.

Discussion and conclusions

In the post war period the sport has influenced the social and political transformation processes of the country, it is an important means of political propaganda and attracting young people among communist organizations. Much publicized phrase "truly mass sport" had enough coverage of significant and works in attracting increasingly more young people to practice physical exercises, construction of sports where they can carry out the work, training by trained staff who guide them. Component of political education was an important task for all clubs and sports associations. Beside each sports body function a person responsible for political education of all those involved in such activity.

Political power has achieved important role, middle communist propaganda and training outside of a favorable image and Nicolae Ceausescu's Romania, which sport can play international sports movement and gave attention. Perhaps the greatest blow to the image that gave the Ceausescu regime in the West was linked to the sport phenomenon. It is misalignment together with all other countries of the Communist bloc to boycott the Olympic Games in Los Angeles in 1984. The main drivers of opinion, even in regard to the sport phenomenon were still

two central newspapers: Spark and Romania Libera, especially on sensitive issues who also had political connotations (outstanding results of Romanian athletes in competition with 'capitalists' athletes, cases of escaping abroad of some famous sports, developing preferential relations with certain countries in sportsline, etc.).

Thus, the main newspaper specialized (sports) was targeted, as was natural, to prove the performance of Romanian athletes in international competitions on popularizing technical results from all sports, technical tapes, etc. We have highlighted the concern of journalists in daily team to popularize technical results from all sports, even the least popular, with particular focus on the Olympics.

Under the guidance of the Department of Agitation and Propaganda of the C.C. the R.C.P. appeared regularly in the press thematic articles "There were positive examples", "forward", both in terms of technical and organizational issues at different levels of sportsmanship.

Could be seen constantly in the press, even critical articles (some "daring", regarded now subject to time), whether it was criticized the activity of sports associations, smaller scarcity of material resources, the selection made by some spotter materialism of athletes who recorded failures, etc.

Also, popularizing grassroots sport ("sport for all") was done with consistency both in the press and in the local. Test of time has shown it was effective (proofs are many champions of Romania selected to professional sports after such competitions). In addition to these articles with positive examples, a constant presence in the press and they had to "constructive criticism".

Assessments published in the foreign press that echo the great performances of Romanian athletes in international competitions were highlighted each time, inducing at the same time the idea that these facts are due not only to the athletes' talent and technicians' skill but rather to the political system that provides the organizational framework needed to prepare them.

Special emphasis was placed throughout the press (both the sport and the rest of publications) on highlighting the contribution of the political system to obtain Romanian athletes every success. Home was always reserved for letters of thanks for taking care of the party and extraordinary conditions of training provided. The good results obtained by the Romanian athletes in major international competitions were always presented as merit and political system were designed to demonstrate its superiority compared to other political systems. Compared to sporting successes achieved in competition with athletes from other communist countries had to demonstrate best practical application of concepts concerning the work of physical education and sport by Romania. Political power has achieved important role, middle Communist propaganda and training both inside and outside of a favorable image and Nicolae Ceausescu's Romania, which sport can play. As such phenomenon has given sports coverage in the media attention. As shown, the situation of Romanian sport was closer in terms of irregularities it down, described the work of Soviet anti-Western propaganda of the '50s. The collapse of communism in Romania was felt in the sports sector. The misery of daily living population was felt by our performers, which, however, compared to their peers in the country enjoyed some privileges offered by traveling abroad and a few other advantages offered by the care of the party. The same party, was also the author of the impermissible interference in the work of coaches and athletes, interventions that have been proven in most cases unfortunately and damaging. On the other hand, we cannot conclude without highlighting (once again) the tremendous progress that the sports movement is recording, in general, during our research subject. Sporting results registered by the Romanian athletes in major competitions, a significant increase of practitioners in sports, sports facilities and increasing the number of qualified coaches are the main reasons that lead us to make this statement.

References

- ANIC, background CC of PCR, Agitation and Propaganda Department, file number 55.
 Apud, N. M. (1948). *Sports team of businesses*. The General Confederation of Labour.
 Central Committee. Executive Political Committee. (1986). *Ceausescu era, from 1974 to 1977, the Romanian Communist Party*. Publisher Politics.
 Boia, L. (2000). *La mythologie scientifique du communisme*. Paris: Les belles Lettres.
 Cioroianu, A. (2007). *Marx on his shoulders. An introduction to the history of Romanian communism*. București: Curtea Veche.
 Drăgan, I. (1992). *Witness 8 Summer Olympics*. București: Porus.
 Espy, R. (1981). *The politics of the Olympic Games*, Los Angeles: University of California Press.
 Marx, K. (1962). *I Works*. București: Policy.
 Mocanu, M. R. (1981). *Communist censorship*. București: Albatros.
 Nacu, A. (2002). *Le corps sous controle: aperçu du sport soviétique*, în *Revue Regard sur L'Est*, janvier.
 National Archives of Romania (hereinafter ANIC), the RCP Fund, Department of Propaganda and Agitation, dos. no. 99/1949, f.1.

Pînzaru, P. (1975). *Sociology propaganda Bucharest, Diary documentary*. București: Academia “Ștefan Gheorghiu”.

*** *On 28 March, early parliamentary election day, all athletes vote Sun !, the popular sport of March 26, 1948.*

*** *The foreign press continues to commend the behavior of our gymnasts in România Liberă, 28 July 1976.*

*** *To raise to a higher level work to educate our athletes communist in Physical Culture and Sport, no. 7/1958,*

Sports Gazette, (Bucharest) 2008- 2009

Prosport, (Bucharest) 2008- 2010

România Liberă, (Bucharest) 1960-1988

Scânteia, (Bucharest) 1948-1988

Sportul, (Bucharest) 1968-1988

Sportul Popular, (Bucharest) 1944-1962

FINDINGS ON PHYSICAL ACTIVITY –INFLUENCE ON TELOMERE SHORTENING

Carmen RĂCHITĂ^{1*}

^{1*} University of Medicine and Pharmacy "Carol Davila", 8 Eroii Sanitari, Bucharest, Romania

* Corresponding author: carmenrachita@yahoo.com

Abstract. Physical activity and increased physical fitness are known to decrease the likelihood of morbidity and mortality from a variety of causes (reduced cardiovascular disease, insulin resistance and hypertension), with concomitant increases in longevity. Telomere length is a primary biomarker of cellular aging that has recently been associated with cardiovascular disease, insulin resistance and hypertension, and morbidity and mortality. This is because as telomeres shorten, there is more stress on body's tissues to function correctly. Researchers believe that exercise helps reduce damage by free radicals, allowing your body to invest its resources in maintaining health instead of repairing damage. Normal cells, after a finite number of mitotic divisions, they stop growing or they simply die. This happens mostly because of the shortening of telomeres (specialized chromosomal ends). Telomeres are biological aging markers, found in all living cells, with the major purpose of protecting chromosomes. In other words, these are DNA packages placed at the chromosomal, ends, preventing them from disintegration and delaying the process of aging. Once we get older, our telomeres shorten, cells become unprotected and they eventually die. It is said that telomeres shorten with 21 nucleotides per year.

Keywords: physical activity, telomeres, longevity.

Introduction

Physical activity is considered to be an important factor in reducing mortality of various causes (reduced cardiovascular diseases, resistance to insulin or hypertension). According to recent studies, physical activity seems to be involved in preventing telomeres shortening, promoting longevity. Shortening of telomeres appears to be correlated with an increased risk of diseases in elderly, like: hypertension, cognitive difficulties (loss of memory) and others.

It was supposed that a high level of physical activity to be associated to long telomeres and individuals with hTERT-TT genotype would have longer telomeres and an increased telomere activity, compared to CC genotype. This is due to the stress caused by telomeres shortening stress prevents the normal function of the organism. Scientists believe that physical activity reduces the number of free radicals, so with their destruction human organism is capable to invest more energy in maintaining normal functions than repairing the damages already caused. Normal cells, after a number of divisions, stop growing or simply die. This happens mostly due to the shortening of the telomeres (specialized chromosomal ends). Telomeres are biological aging markers, found in all living cells and protect the chromosomes. In other words they are DNA packages found at telomere's endings preventing their destruction, so delaying the aging process. As a person grows older, telomeres become shorter, cells are not protected anymore and finally die. It is estimated that telomeres are shortening by 21 nucleotides/per year. A research by the Kinetic Department of Public Health faculty of Maryland University, tried to establish a clear relation between the level of physical activity, length of telomeres and their activity. Definition of the relation between the energy consumed for physical activity (exercise energy expenditure EEE), the length of the telomeres and their activity for promoting hTERTC-13271 genotype.

Telomeres are DNA-protein complexes at the ends of eukaryotic chromosomes that protect the DNA that encodes genetic information from loss or instability (Blackburn, 1991). In adult human mitotic cells telomeres shorten with successive cell divisions. Critically short telomeres can send cells into replicative senescence, causing cell cycle arrest and malfunction as well as potential genomic instability. The contributors to accelerated cellular aging are complex and multifaceted; however, there is growing acceptance that telomere shortening in immune cells is a marker, and possibly a mechanism (Codd et al., 2013), underlying premature morbidity and mortality in humans.

Most important factors fighting morbidity are and always be physical activity and fitness, contributing in longevity. Unencoded DNA areas situated at chromosomes endings represent the telomeres. They are composed of hex nucleotide monomers (TTAGGG), that are repeating. Part of the telomere DNA (30-100 base pairs) are lost during each cell division. Otherwise thanks to telomeres chromosomal integrity is achieved preventing replication of defected genes. With respect to psychosocial predictors, short telomere length has been associated with a variety of psychological and behavioral factors, including psychological stress, depression, tobacco use, sedentary behavior, and obesity (Prather et al., 2013; Puterman and Epel, 2012; Shalev et al., 2013). Recently, the length and activity of the telomeres have been correlated with numerous environmental factors, example: oxidative stress, psychological stress or socioeconomic status. In addition to these factors, TERT gene that codifies catalytic

subunit activated by telomeres(human telomerase reverse transcriptase hTERT) is recognized that having a single nucleotide polymorph (SNP) in promontory zone, so hTERT genotype can play an important role in modulating the role of the environmental factors in telomeres biology.

Materials and methods

Goals and objectives. The objective of this study is to establish the relation between the level of physical activity, length of telomeres and their activity in the cells of the immune system of the elderly. Also, it was investigated the association between the hTERT genotype and telomere length and activity.

- 1.Highlighting the fact that the movement, sport can lead to telomere shortening stagnation.
- 2.Demonstration that telomerase inhibition is achieved due to physical exercise.
- 3.Human diseases are associated with telomere dysfunction and treatment approaches for identifying telomerase through sport.

Participants. A number of 70 men and women in menopause, aged 50-70 were recruited through newspaper, pamphlets or verbally. One of the subjects was dismissed, not meeting the necessary conditions, so the study's subject number was reduced to 69. All subjects were apparently healthy according to the filled questionnaires. Potential volunteers that presented symptoms of diseases (nausea, acute myopathy, infections) or those under treatment were excluded from the study, because the results would not be compromised. Maryland University approved the realization of the research, and the participants applied the participation in written.

Methods. All subjects filled in the questionnaires related to their medical history and the same did Yale's Physical Activity Survey- YPAS. Information obtained from these questionnaires were about: age, race, ethnicity of subject, current medications, presence of past or present diseases and physical activity during life and family history of mental decline due to advanced age.

Physical Activity. Physical activity was recorded according to YPAS standards, calculating total physical activity during a week(measured in Kcal) , using 2 indications:1. Time spent in each activity, in combination with 2. Intensity level of the physical activity(vigorous activity, lax walk, free movements, stand up or sitting down). Using these clues, EEE was evaluated for each subject. Subjects were also asked to evaluate similarly physical activity during their lives: between 30-39, 40-49, 50-59 and 60-69 years, using the following scale:

- 1) very active(aerobic and regular sport);
- 2) active enough (sport and lax walk);
- 3) moderate active(hobbies);
- 4) not very active (casual activities);
- 5) inactive(without physical activity) punishment.

Stress Test. Subjects also filled in a questionare with 10 questions, through which their stress level was evaluated during life, the relation between psychologic stress and shortening of the telomeres been known.

DNA isolation. Blood collection from subulnar vein, using standard methods of fleboctomy PBMCs were isolated through centrifugation- density gradient. DNA was extracted using DNAPureGene isolation system, its genetic integrity was evaluated through electrophoresis in agarose gel.

Telomeres Length . Measurement of telomeres relative length was realized with the help of the PCR (polypeptide chain reaction). In other way, through genetic amplification the relative length of the subjects telomeres could also be evaluated.

Telomerase. Enzymatic activity of telomerase was determined with a commercially, available kit, that utilizes the repeated amplification protocol of the telomeres TRAP.

Results

According to the figures below, significant differences were observed in the case of all subgroups. Subjects of the second subgroup presented telomeres longer than those from the first or fourth subgroup, but these wasn't a great difference from the third subgroup. In order to remove the possibility of sex differences, an analysis based specifically on sex was realized, but it didn't show additional differences.

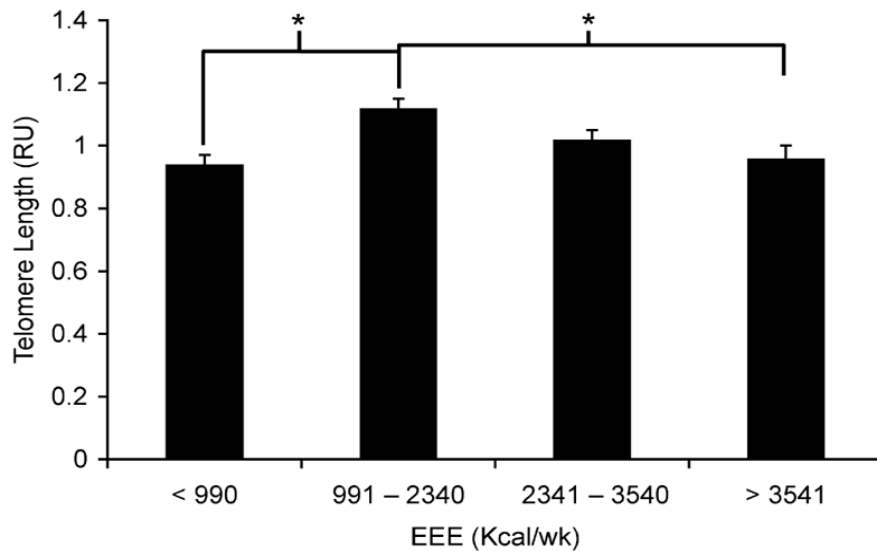


Fig.1. The relationship between the amount of physical activity and telomere length

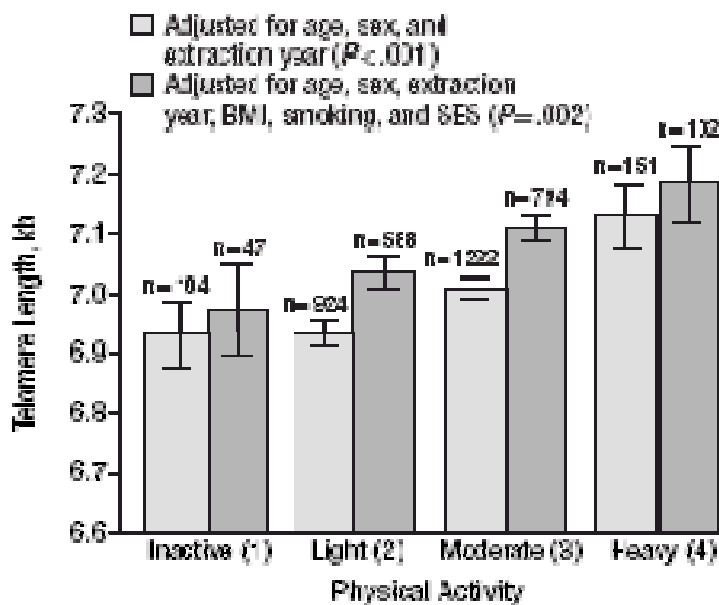


Fig.2. Telomere length and physical activity – adjusted for age, sex and extraction year

Differences in telomeres activity were significant for all 4 subgroups. But telomeres' activity could be differentiated in the case of different genotypes TT, CT, hTERTTT genotype presenting the more increased levels in telomeres activity.

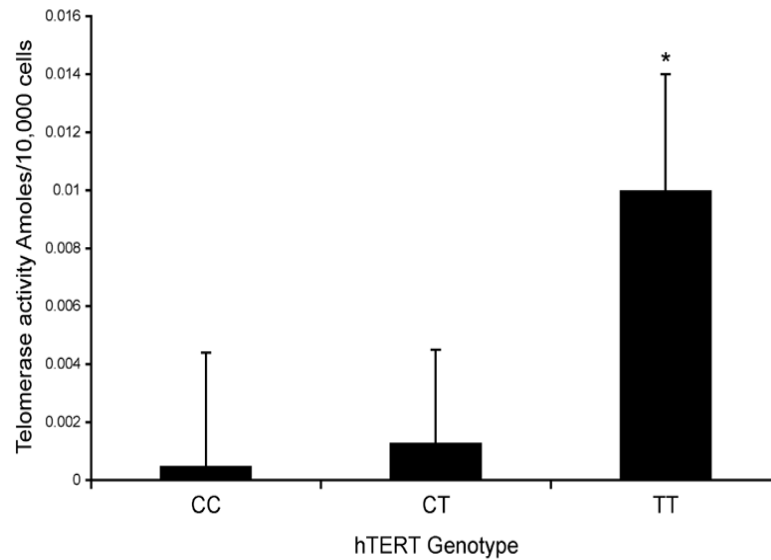


Fig.3. Telomerase activity/10.000 cells hTERT Genotype

Similarly, psychologic stress tests didn't show major differences between subjects of different subgroups, a true confirmed from the fact that physical activity 'cuts' the relation between psychological stress and telomeres length.

Discussions and conclusions

In conclusion moderate physical activity is an important factor against telomeres shortening, so a factor of longevity. Similarly those individuals with genotype hTERTTT have a greater benefit from physical activity since their immunity and telomeres activity, prevent telomerase shortening. Other important studies have shown that physical activity declines the degradation of the cellular genes' protective components, probably by reducing their fragility. Research was based on the analysis of telomeres from leukocytes collected from 2400 gems in order to demonstrate the relation between physical activity during free time of the subjects through a period of 10 years and the length of the telomeres. Research found out that the length of the telomeres was as great as the subject's physical activity. Researchers took in consideration all the possible disrupting factors of the research such as: obesity, smoking, grow status, age etc. And they achieved great results, according to which physical activity is really important. This way, gems that were doing exercise at least 3 times/week had long telomeres and they were looking 9 years younger than those doing no exercise at all. Research hasn't tested what happens with the telomeres of the sedentary people for a long period of time and that then started regular physical activity yet.

In the same way an important research realized by Hamburg's University in Germany, that involved middle aged marathonists, who had been trained for many years, revealed the fact that these athletes present a telomeres erosion level smaller than sedentary people. Young athletes as well as older marathons had an important increase of the proteins responsible for stabilizing telomeres and an equally important decrease in the expression of the apoptosis vascular regulators in leukocytes compared to individuals without a regular training. This fact is an evidence of exercise's antiaging effect. Researches involved human subjects and guinea pigs as well. Among guinea pigs that had increased physical activity and those that didn't put any physical effort existed significant differences with the following meaning: those that physical activities presented an increase in telomerase activity (enzymes involved in telomere lengthen) in thoracic aorta and in mononuclear circulatory cells, an increase in the expression of proteins stabilizing the telomeres and an important fall in the expression of apoptosis regulations. Length of the telomeres though isn't different between these 2 groups. This research was also performed in human subjects. A group of professional athletes with an average age of 51,1 years, that had been training for a period of at least 35 years was compared with a control group, that had been training very rarely. Athlete's group presented an increased telomere activity, but also of regulatory proteins and an important decrease in apoptosis inhibitors (like in the case of the guinea pigs). In this case the erosion of the telomeres of subjects with increased physical activity was significantly more reduced than that of sedentary subjects. Immune cell telomere length has

emerged as a marker, and putative mechanism, linking a variety of psychosocial and behavioral factors with premature morbidity and mortality (Puterman and Epel, 2012; Shalev et al., 2013).

At the same time studies of UCSF(University of California, San Francisco) researchers showed that psychological stress determines telomerase shortening, while physical activity prevents it. Groups of this study were represented by: women after menopause, that during life took care of family member with dementia, middle age adults with post traumatic stress disorders and non-smoking women aged between 50-65 years. What was tested were the leukocytes telomeres part of the immune system of the subjects, cells that protect against infectious agents. Sleep has gained prominence as an important behavioral contributor to physical health and well-being (Buysse, 2014), yet only a handful of studies have investigated sleep's role in telomere length attrition (Cribbet et al., 2014; Prather et al., 2013). Like in female's study with a case of family dementia in the family, for participating in physical activities, stress wasn't perpetuated and at the level of the telomeres shortening, unlike the sedentary ones. And in case of non-smoking women, physical exercise proved to be a barrier in telomeres shortening. Results have shown that sedentary women with a child abuse history had telomeres significantly shorter than non-abused and sedentary ones. But in the case of women that did physical activities, weren't important differences between those with an abuse history or not. The conclusion reached was the following: chronic stress is associated with shortening of the telomeres of the immune system cells, while physical activity can moderate its impact.

There is no denying that exercise had a powerful impact on health and an important part of the benefits lies in their ability to prevent disease. Dementia and cancer are just two of the many health problems that can arise as a consequence of chronic inactivity. Metabolic and cardiovascular health also depends largely on physical exercise. In fact, one of the main benefits of exercise is that it improves the telomere activity. Metabolic and cardiovascular health also depends largely on physical exercise. In fact, one of the benefits of exercise is that it improves the sensitivity to insulin and leptin, and insulin resistance/ leptin is a feature of most chronic diseases, including cancer. Also, exercise increases the chances of survival of patients with colon cancer. Colon cancer patients who spend more time doing physical activities have a lower risk of dying than seven or eight years after diagnosis, compared to those who are sedentary. Any type of activity, including walking, stretches and gardening, is better than no activity. Patients who did the most exercise, equivalent to two and a half hours walking the Week, before and after diagnosis had a lower risk of dying during the period after diagnosis, compared to those who were not close any exercise. Physical inactivity causes of breast cancer and colon cancer. In postmenopausal women, exercise is even more important. It was found that women who have moderate to intense exercise daily have a lower risk of developing breast cancer. It was observed in patients with solid tumors and metastases without, mainly suffering from breast cancer or prostate cancer a reduction in telomere shortening.

Thus, moderate exercise such as aerobics, walking at a moderate pace or cycling, carried out both during and after cancer treatment reduces telomere shortening.

References

- Blackburn, E.H. (1991). Structure and function of telomeres. *Nature*, 350, 569–573.
- Buysse, D.J. (2014). Sleep health: can we define it? Does it matter?. *Sleep*, 37, 9–17.
- Codd, V., Nelson, C. P., Albrecht, E., Mangino, M., Deelen, J., Buxton, J. L., ... Samani, N. J. (2013). Identification of seven loci affecting mean telomere length and their association with disease. *Nat. Genet.*, 45, 422–427.
- Cribbet, M. R., Carlisle, M., Cawthon, R.M., Uchino, B.N., Williams, P.G., Smith, T. W., ... Light, K.C. (2014). Cellular aging and restorative processes: subjective sleep quality and duration moderate the association between age and telomere length in a sample of middle-aged and older adults, *Sleep*, 37, 65–70.
- Prather, A. A., Aschbacher, K., Lustig, R.H., & Epel, E. S. (2013). Obesity and immunosenescence: psychological, behavioral, and biochemical pathways. In J. A. Bosch, A.C. Phillips, & J. Lord (Eds.), *Immunosenescence: Psychosocial and Behavioral Determinants* (pp. 179–199). New York: Springer.
- Puterman, E., & Epel, E. (2012). An intricate dance: life experience, multisystem resiliency, and rate of telomere decline throughout the lifespan. *Soc. Personal. Psychol. Compass.*, 6, 807–825.
- Shalev, I., Entringer, S., Wadhwa, P.D., Wolkowitz, O.M., Puterman, E., Lin, J., & Epel E. S. (2013). Stress and telomere biology: a lifespan perspective. *Psychoneuroendocrinology*, 38, 1835–1842.

ECONOMIC DIMENSION BY ORGANIZING A MAJOR SPORT EVENT AND THE EUROPEAN UNION. WAYS TO DO IT

Emilia Carmen TOCALĂ^{1*}

^{1*}Federatia Internațională de Baschet, Mihail Moxa Str.no 3-5, Bucharest, Romania

* Corresponding author: carmen_tocala@yahoo.com

Abstract. Sports politics of EU demonstrate the importance sport holds in perennial, harmonious development of society. It emphasizes the great potential of sport to contribute, to enhanced employability and free movement, this being achieved by a series of actions that promote social inclusion through sport, education and formation. EU sport policies take into account a series of factors, risks, challenges, that are specific to society: commercial pressure, doping practices, racism and xenophobia, violence and fixed games. It serves the interest leisure and enhanced sports educational infrastructure, it provides role models and social security. Between 2014 - 2020, for the first time sports will have possession in control of its own capital and budget (proposed by the EU 30 million euros). Mogens Kirkeby, president of ISCA emphasized in 2010 that in the following years one of the top priorities should be sports and its practice on a large scale. European Commission, as stated in Lisbon Treaty, suggests that the Member States adhere to the following: promote sports for everyone, consolidating its educational and integrative role; ensure that sports is not undermined by crisis budgetary cuts; show increased support of sports at a local/regional level; take into consideration the results of sport finance studies at regional level. Responsibility of each federation is to account and manage the various aspects of its own domain. In doing so, they hold a decisive role and need to organise and promote appropriate sports in accordance to the EU law.

Keywords: sport, management, economy.

Introduction

Accession to the European Union meant an important moment of establishing policy of interaction with the community institutions, in particular the establishment and strategic national policy making at the level of normative acts and legislation and to modernize public administration and economic development.

The issues addressed in the "*Pierre de Coubertin action plan*" in sports are in nature of: economic, social, educational and European culture. European Commission through her communication of January 2011 on the impact of the Lisbon Treaty on sports, highlights the "developing of the European Dimension in Sport" (Lisbon treaty, 2007).

The Lisbon Treaty sets out the policy of the European Union in sport (sport mentions Article 6 TFEU) considering the competence to conduct actions to support, coordinate or supplement the actions of the Member States. The European Commission points out in the White Paper on Sport 2007 "*Pierre de Coubertin Action Plan*" with the implementation of 2008 which contains actions supported by the Commission in order to fulfill the functions of sport in European society (The White Book of Sports, 2007).

Volunteering in sport, a sector of great interest for the European Union provide social and educational function of sport, will welcome European funding for the promotion of European sporting issues. The major sports event, International competition as Olympic Games, World Championship, European Championship, Balkanic, University Games are governed by the international bodies: CIO, International Sport Federation, FISU, Sport Organizations as Sport Accord it is. Each edition take place in different country, different city/ cities, on the same time could be multicountries event according to the regulation and decision of the international structure.

Highlights by general provisions of the Treaty European Economic Community in 1957, is indicated as a priority for regional development that later, in the early 1970s, to establish the European Fund for Regional Development and occurs first enlargement: Denmark, Ireland, United Kingdom. Regional sintagma of development policy designates a unitary set of measures, the areas geographically distinct, concrete objectives and appropriate principles. In the mid 1980s, Integrated Mediterranean programs are open and is extended in the Iberian Peninsula- Spain and Portugal.

In the late 80s, specifically in early 1988 was reformed regional development policy for the member countries of the European Union and the Single European Act of 1992 is showing regional development policy (Delors Package and The Structural Funds reforms, occur in 1998).

The Council of Europe brings together 21 and 22 June 1993 in Copenhagen and decide on funding support for EU accession, the regional dimension of institution building and investments (PHARE program focusing on the issues of strengthening the institutional framework for accession), in order to reduce regional imbalances. Accession requirements called Copenhagen criteria.

Treaty on European Union Economic Union, Monetary Union bring Cohesion. Treaty funds from Maastricht, economic and social cohesion has become one of the major priorities of the EU and adopt economic and social

cohesion. In 1995 join Finland, Sweden, Austria and set the objective for Structural Funds between 1997 and 1999 elaborates Agenda 2000 and enlargement bring new reform of the Structural Funds.

Communist bloc countries becoming "associated countries" and receive privileged treatment in relations with the Union (direct financial support, economic and commercial facilities). They have to make huge investments to modernize their economies and make them competitive. It includes the preparation and differentiation of labor and fixed assets. It appeared labor migration westward, the wealth and innovation.

Economic analysis of sport has been studied by several authors and presented specific aspects of the economic dimension in the context of economic development of Southeast Europe (Lozano and Huisingh, 2011; Andreff, 1989, 2001, 2007; Poupaux and Andreff, 2007).

Materials and methods

The economic dimension is given by: the organization of major sport events; indirect costs caused by the lack of physical activity (health insurance, capacity of work); intellectual right property, rights regarding image, publicity, their broadcast, author rights, commercial rights; remote access to major events, durable economic growth, competitiveness, the creation of workplaces; the creation of national statistical accounts, the creation of an European satellite; public grants from the sport sector must be found also in sport at the beginner level, determined by a massive public participation, „sport for all”; grants from tax and licensing taxes from gambling. VAT exemptions for certain sports services, VAT reduced taxes in some member states for certain fixed means in the field.

This direction proposes the identification of investment programs in human resources, of policies for intervention and scheduling in organized sports, in the major sports event as: Olympic Games, World Championship, European Championship, Balkanic, University Games governed by the international bodies - CIO, International Sport Federation, FISU, Sport Organizations as Sport Accord, each edition taking place in different country, different city/ cities, on the same time could be multicountries event according to the regulation and decision of the international structure.

The plan of action represents an analysis action, technical elaboration, political approval of the Major Event, the constitution of a service at the level of the financing authority in the domain of the plan of action, specialised service, with attributions in identifying, developing and managing the national federation's own projects towards the realisation of the economic dimension.

The key objective of this research is to determine the social and economic impact of a major sport event on host cities as well as to understand the respondents overall satisfaction with the host cities. The research was structured around 4 key themes:

- Perception of the Host City;
- Expenditure ;
- Legacy impact of major sport event – the visitors have to be very likely to return in the host city/ country for a holiday, to attend the next one sport event, to participate in more sports as results of their visit to event;
- Satisfaction with a major sport event.

To measure the economic and social impacts of the sports events, means to conduct an economic impact and benefits in the sum of the direct impact and indirect economic impact, benefits (Fig. 1) .

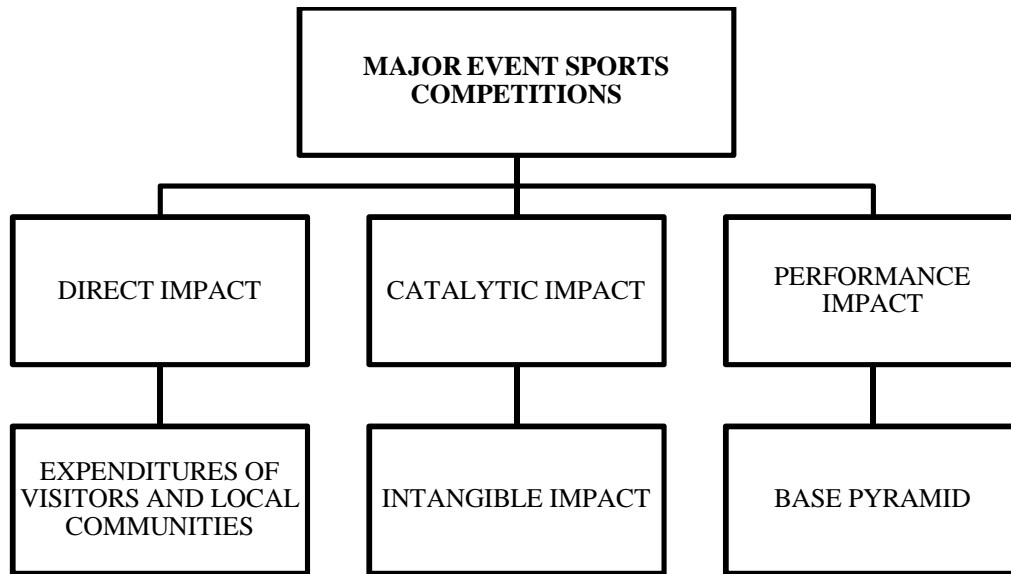


Fig.1. Economic dimension by organization of major sport event

Questions/ Proposition: **Is an official major international event/ competition affected the economics of host city/ cities and the economics of the host contry/ countries?**

If the answer is yes, can we identify the ways and number of the way to do it? We groupe the expenditure (Fig. 3) associated with the Competition/ event per stakeholders and expenditure category (Fig. 2).

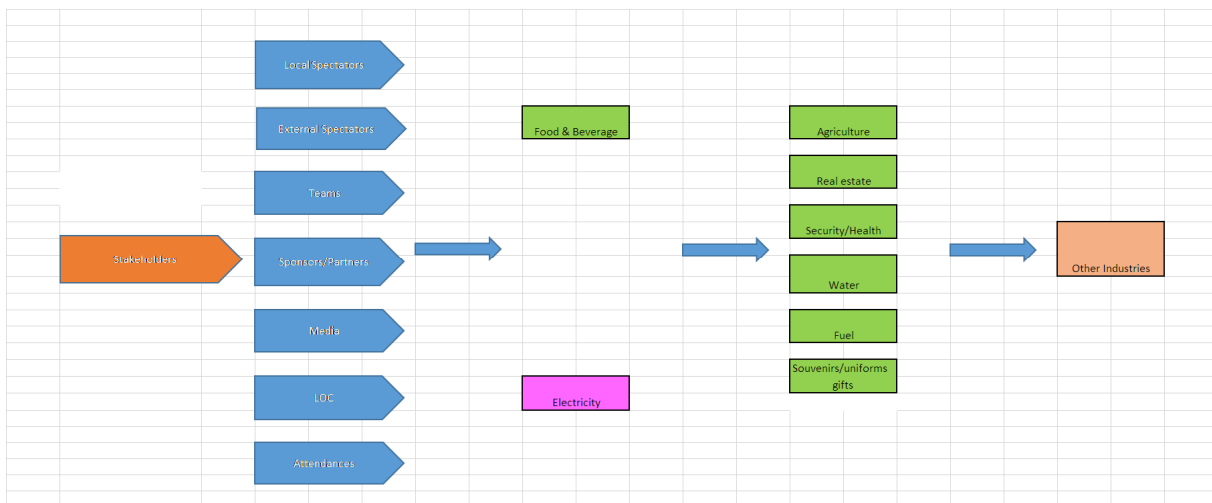


Fig. 2. Stakeholders of the event/Competition and different types of impacts associated with the Major Event

LOC - Local Organizing Committee- responsible for plans and organising the competition, logistics, infrastructure, transportation, food, social programs, translations.

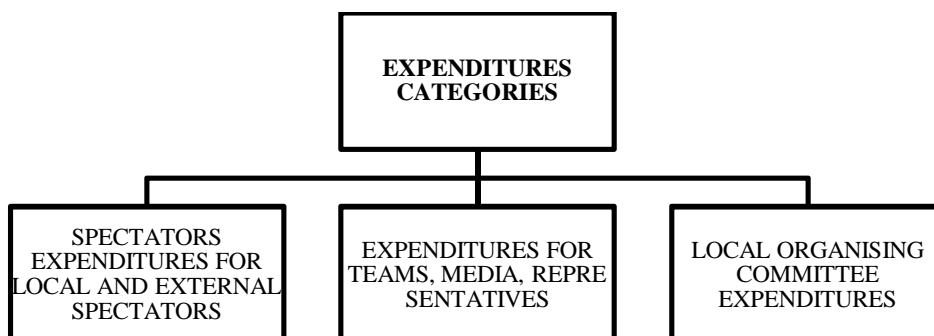


Fig.3.Expenditures categories

Expenditures categories, examples (Fig. 4):

- Hotels- visitor’s expenditures for accommodation;
- Restaurants- visitor’s expenditures for food and drink in the restaurant, coffeshops, bars;
- Retail trade- shopping, clothly, sporting goods, gifts, souvenirs;
- Inland transportation- internal transport: busses for the atletes, cars, microbus, taxis, trains, trams;
- Social and cultural services - visitor’s expenditures for museums, art gallery, historical sites;
- Social activities- visitor’s expenditures, trips, reception, Opening and Closing Ceremony.

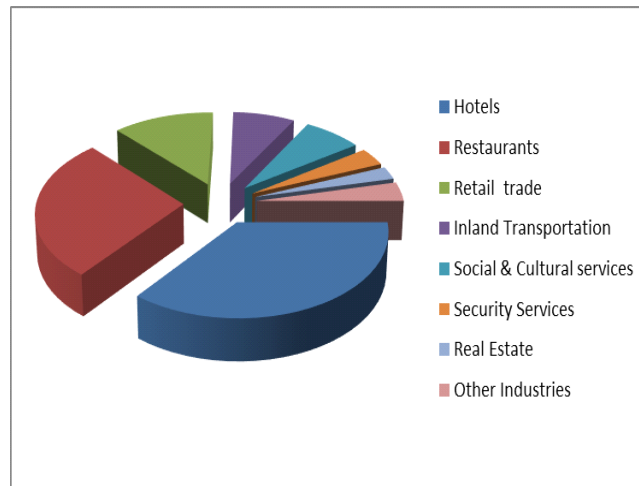


Fig.4. Expenditures categories

The continuation of the research and analysis process in the field of sports management and the coherent identification of sports goals, specific to the domain of activity and the consistency of management in the field, while based on a scientific concept that should identify all relevant sectors of the development process of sports branches, through national means, sports federations and to recover the gaps of development in raport to history, and the international development in this field (Fig. 5 and Fig. 6).

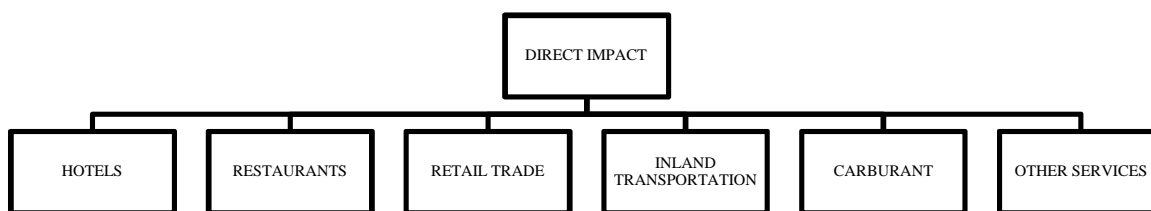


Fig. 5. Direct impact

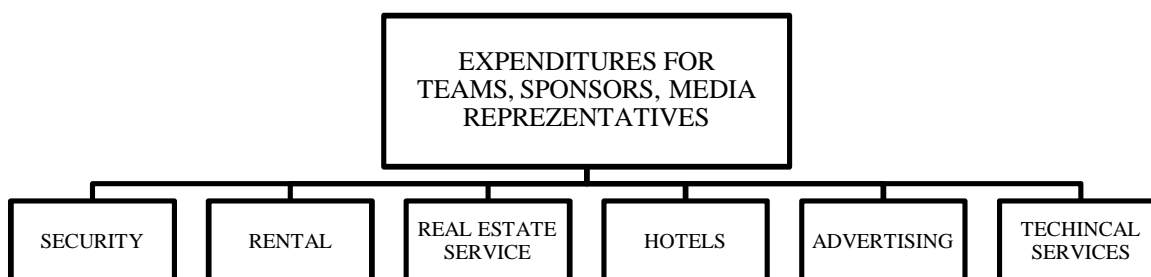


Fig. 6. Expenditures for teams, media, representatives

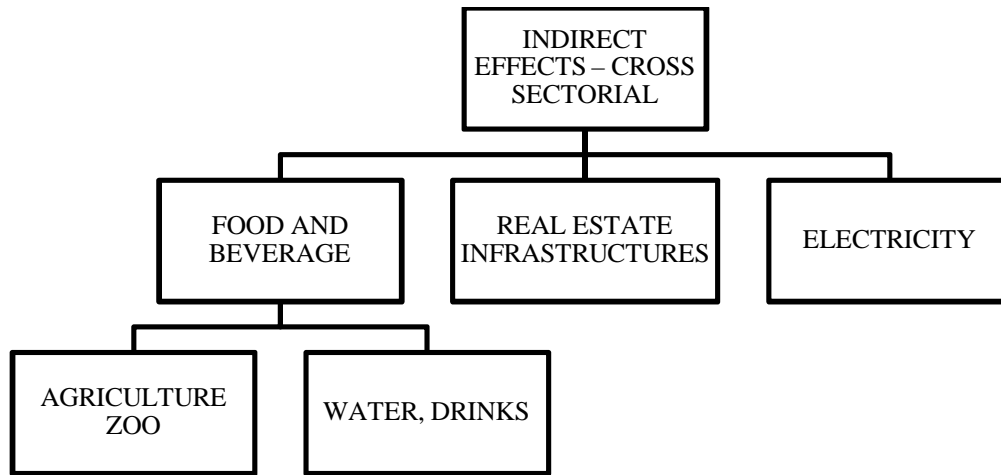


Fig. 7. Effects/ Cross sectorial

The use of an input-output model enabled the identification of cross – sectorial linkages and the quantification of indirect impacts.

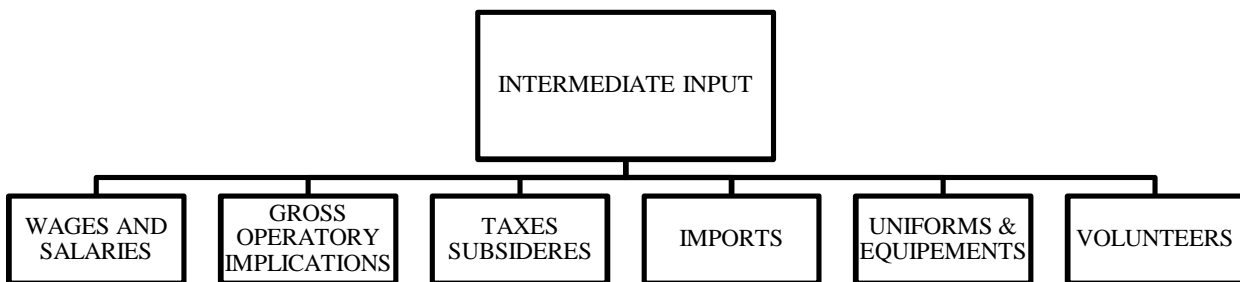


Fig. 8. Intermediate Input

The objectives of the Action Plan and economic dimension of sport with regard to the social function and financial increase by organising sports major of sport, the Commission proposes the following approaches: the indirect impact as companies require, intermediate goods and services, direct and indirect suppliers down to the supply chain (Fig. 8).

Indirect and specific impacts are effects on the direct and indirect suppliers of goods and services along the whole supply chain due increasing demand for their products (Fig. 9).

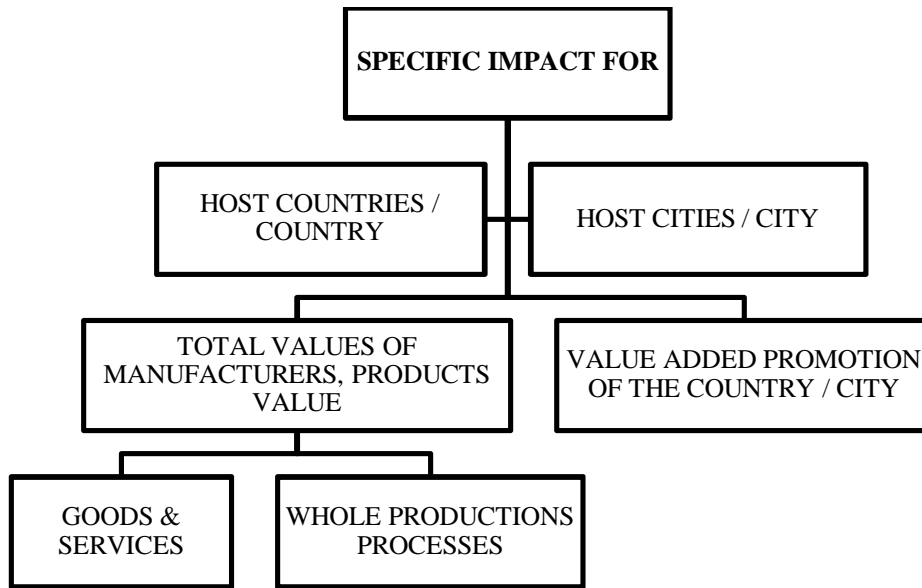


Fig. 9. Specific impact

Results

To calculate the economic impact by organizing a Major Sport Event we need to use the following: overview of the officially data, overview of survey data, representatives interview (attending the the Event), overview of provided data by organizer, number of stakeholders, expenditures per team, sponsors, media, LOC budget per host city, per host coutry (Fig. 11).

Infrastructure: attendees should be very satisfied with the stadiums, staff and atmosphere and least satisfied with the information provided to fans about the Event.

Data Collection	Analysis	Reports
Input event & county specific data Number of people taking part in the event, spending for hotels, restaurants, gifts, drinks, beverage, gas.....	Input -output model Direct effects Indirect effects Along the whole supply chain	Different expenditures categories External sources Local sources Different stakeholders

Fig.11. Approach to quantify the impact: data collection, analyses, reporting

The development of the infrastructure through ensuring exhibition and the development of existent bases with corresponding endowments, modern and durable, the construction of new bases, the creation of promenade paths, of health, of touristic orientation itineraries and the development of bases in nature, while respecting ecological norms. Also, the development of the national sports infrastructure of the highest level, to promote our country, to form models and to nourish economic growth, thus contributing to the development of the romanian society. Legislation reform in the field of sports, as well as the incidental legislation in conformity with the communitary legislation: The 69/2000 bill; The bill of volunteering; The bill of sponsorship; The fiscal code; The labour code; The civil code; Bill 320; Bill 1/education 2011; Bill 195/2006; GD 563/2009; Bill 52/2003; Bill 215/2001; GD 1447/2007; Bill 4/2008; GD 884; GD 1807/2006; GD 775/2005; HH 870/2006; GD 1721/2008; GD 1201/2011.

Sport has been an engine for interactive communication, interactive television services, free access for citizens to sport events broadcast with respecting the principles of competition for the sale of broadcast rights.

Since 1981, University Games hosted by Romania, the activity of high performance senior competitors has been regarded as a priority, which represented Romania in marquee international competitions, The Olympic

Games, World Championships, European Championships, Balkan Championships, National Championships. In the case that budget would allow, funds were allocated with the purpose of bringing medals to our country, not to organize high level competitions in our country.

Discussion and conclusion

The elaboration of the unique plan of action through financing methodology, criteria, ranking towards strengthening the administrative capacity of national sport federations, in an efficient manner.

To analyse and quantifies the economic impact, as well as visitor's attitude survey of the Major Event in field of sport, in the overall economy and the catalytic impact of the competition we have to consider that the impact assessments is based a specific methodology. In order to analyse the economic impact and benefits organizing a major Sport Event in Romania, we have to take in the consideration all the date regarding teams, representatives, staffs, media, in addition of survey of attendens. We quantify economic impacts – additional value added by Gross domestic Product, refers to the additional value of good or services over the cost of inputs used to produce it from the previous stage of production. It is essential to identify the cross-sectorial linkage to estimate all impact and impacts per category as well as the quantification of specific impact per host country, and the host city. These must include the visitor's expenditure in the host city, as well as effects on supplies located in the host city. In contract of the impact for host city impacts, for host country impact, include all impact study contribute to the economy.

The input-output Model who describes general intra-economy value, intersectorial relations in an economy is the key to input-output analysis, demonstrating the economic interdependencies among producers of goods and services and socio-economic production effects (all the sectors of the economy are buyers and sellers of).

From an algebraic perspective the main approach of the model on input-output is to determine a scalar of the indirect and direct value per sector. This basic equation includes the methodology to incorporate all domestic impact along the entire supply chain.

I = unity matrix

A = matrix of domestic technology coefficient

Y = vector of related expenditures per sector

The inverse of $(I-A)$ is known as the Leontief Inverse

$$(I-A)^{-1} y = X$$

We are ready to assume: by organizing a Major Sport the economic dimension of the national industry is growing and developing, creating good infrastructure, developing health, creating a sport industry in our country, making money, creating jobs, social activities, providing goods and services, communication, fighting against doping, racism, fixing games, creating models to follow in the social life, increasing the number of the athletes in the country, the interest for sports, for health and tourism, which represent a great exposure for the country, the biggest one ever. An input event affect the economies of the host cities and counting in number of ways.

The economic dimension of sport - sport is a domain in full globalization, a dynamic system, in perpetual movement and transformation with a macro-economical impact. Broadcasting the values of sport to the entire world – international sport competitions are activities of public diplomacy, through the functions of sport: promoting education, health, intercultural dialogue, peace and competition.

References

- Andreff, W. (1989). L'internationalisation économique du sport. In W. Andreff (Ed.). *Economie politique du sport* (pp. 203-236). Paris: Dalloz.
- Andreff, W. (2001). The correlation between economic underdevelopment and sport. *European Sport Management Quarterly*, 1(4), 251-279.
- Andreff, W. (2007). Dérives financières: une remise en cause de l'organisation du sport. *Finance et Bien Commun*, 26, 27-35.
- Lisbon Treaty, 2007, Art. 6. TFEU.*
- Lozano, R., & Huisingh, D. (2011). *Inter-linking issues and dimensions in sustainability reporting*. *Journal of Cleaner Production*, 19(2), 99-107.
- Poupaux, S., & Andreff, W. (2007). The institutional dimension of the sports economy in transition countries. In M. M. Parent & T. Slack (Eds.). *International Perspectives on the Management of Sport* (pp. 99-124). Amsterdam: Elsevier.
- The White Book of Sports (2007) Chapter 2. Art. 2.5.*
- The White Book of Sports. Chapter 1.*

DISCOBOLUL No.2/2017 (48)
April-June 2017
eISSN:2286 - 3702; pISSN: 1454 - 3907

INSTRUCTIONS FOR AUTHORS

Discobolul Journal promotes fundamental and applied research, in particular, the results obtained in national and international research projects and scientific contributions from the academic and socio-professional areas of interest related to the journal. Original materials that have not been published, in part or entirely, in other journals are allowed for publication. It is necessary that the items that have already been published to be 40% different, from those to which we refer in this section.

Articles that are found to have been plagiarized from other papers will incur **plagiarism sanctions**.

Articles will be written **in English** and will be published after going through stages of reviewing, following the decision in this regard.

Authors whose articles were rejected after the reviewing process, or requiring changes will be announced at the email address specified when sending an item in the range of 4-6 weeks.

The registration of the material for publication will be made after the payment of the subscription fee by each author, co-author and, where appropriate, additional duties.

Responsibility for the statements in the text rest exclusively with the authors. The Editor reserves the right to refuse to publish articles that do not comply with the terms given in the **Instructions for Authors** or where no changes were made to the requirements / recommendations.

The preparation of manuscripts

Articles will be written on A4 Word, using **Times New Roman font, size 10pt., 1,15.**

Illustrations. 4-5 are the maximum permissible illustration materials (tables, graphs, symbolic Fig.s), they will bear titles and should be numbered as specified in the text, it is recommended that they be given to the size that is desired by the publication. Scanned materials are not allowed except for drawings / photos.

Tables should be numbered with Arabic numerals, in order of appearance in the text, they will be in a clear and concise way mentioned above each table. Fig.s/ drawings, graphs will have a higher quality (**min.300 pixels**) they will be referred to concisely and numbered under each occurrence. The acronyms used are to be detailed in their first appearance in the text.

General structure of articles

The first page will include:

- **Title** of the article-in **Romanian** and **English**
- **Name and surname** of the author(s)
- **Institutional affiliation, address, city, country**
- **Corresponding author** (e-mail address)

Examples:

TITLE..... (TNR 12 pct)

Ion POPESCU^{1*}, Rodica STANESCU², Cornelia MIHALACHE³ (TNR 12 pct)

¹ National University of Physical Education and Sports, 140 Constantin Noica Street, Bucharest, Romania

² Polytechnic University, (address, city, country)

³ Oradea University, (address, city, country)

*Corresponding author: popescuion@gmail.com

Abstract (only in **English**). The abstract must contain between 150-200 words. (TNR 9 pct)

Keywords (in **English**). For each paper, the authors will select 3 to 5 words, representing terms used in the paper. (TNR 9 pct)

The articles should not exceed **6 pages** for **research studies**, **4 pages** for **essay works**, **1 page** reviews, information, reports of scientific events.

• The *research study* will include: **Introduction** - Provide a brief introduction to the issues addressed, stating **the purpose, the objective(s) of research and hypothesis (their) work**. **Material and methods** - This section will describe the research methodology used, the modality of selection for the samples studied, the criteria for inclusion and exclusion, the method, the technique, the Statistical Programme used in processing the data, etc. **Results** - In this section the results obtained are shown concisely, typically by means of tables and graphs. It will present the descriptive and inferential statistics, differences between measurements (initial and final between experiment group and control group, etc.). It is mandatory to specify the level of significance (**p** value or the size of **d** effect), and the statistical test used. **Discussions** - they will specify new and important aspects of the study, interpretation of their results in the context of literature. **Conclusions** - The conclusions of the study will be stated clearly, establishing a link between them and the purposes of the study. **References**- will be prepared according to APA style (see *list of references*).

• **Case studies.** There are case reports of material obtained while working with an individual, group, community or organization. The case studies illustrate a problem, indicate a means to solve a problem, and / or shed light on the future needs for research, clinical applications, and theoretical aspects. In writing the case studies, the authors examine carefully the balance between providing important illustrative material and the responsibility of confidential case materials.

• **Essay-type articles/Review of the literature** (in the field of Sports Science and Physical Education, Sports Psychology, Sports Pedagogy, Sports Sociology, etc.) - will have the following structure: **Introduction**, the current level reflected in the literature, issues addressed; **Conclusions, References.**

• **Book Reviews**

List of references. Discobolul Journal recommended that the APA style (American Psychological Association, Ed 6) of drafting a list of references should be followed. The bibliographical sources are mentioned in the text between brackets.

Examples:

- 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...
- 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, p. 57).

Check each source cited to appear in both the body text and in the reference list, while the author and the year are to be identified in terms of spelling. The list of references at the end of the scientific article provides information needed to identify each source. APA requires that each list to be indented at least double, and the list items to be indented from the second row of each element (APA Manual, sixth edition). They will mention: **author(s), year, title, city, publisher, pages**, depending on the source of citation (book, journal article, website).

Examples:

For the citation of a book

Arnheim, R. (1971). *Art and visual perception*. Berkeley, CA: University of California Press.

For the citation of a journal article

Page, E. (1968). The use of the computer in analysing student essays. *International Review of Education*, 14, 253-263.

For the citation of an article with many authors

Russel, F.D., Coppel, A.L., & Davenport, A. P. (1998). In vitro enzymatic processing of radiolabelled big ET-1 in human kidney as food ingredient. *Biochem Pharmacol*, 55(5), 697-701.

Wager, T. D., Rilling, J. K., Smith, E. E., Sokolik, A., Casey, K. L., Davidson, R. J., ... & Cohen, J. D. (2004). Placebo-induced changes in fMRI in the anticipation and experience of pain. *Science*, 303(5661), 1162-1167.

When there is no author, the title moves to the first position of the reference entry

New child vaccine gets funding boost. (2001). http://news.ninensn.com.au/health/story_13178.asp

Conflicts of interest

We ask authors to state all possible conflicts of interest: financial relationships or other. If there is no conflict of interest, please indicate this.

TO THE SPONSORS' ATTENTION

Any requests for advertising space should be addressed to the *Discobolul* Journal editors, 140 Constantin Noica Street, sector 6, Bucharest. Phone: 021-3164107, Fax: + 40/21 3120400

SUBSCRIPTIONS

*for UNEFS teaching staff – 120 lei/year (with unlimited number of articles per year);

*for teaching staff outside UNEFS – 150 lei/year (with the possibility of publishing 4 articles; for the other ones, the fee will be 100 lei/article). People outside UNEFS who do not subscribe to the Journal may publish articles by paying 100 lei/article.

*for bachelor students, master students and PhD students – 60 lei/year (with the possibility of publishing 4 articles).

BANK IDENTIFICATION DATA:**EDITURA DISCOBOLUL SRL**

Banca Romana de Dezvoltare (BRD) - Groupe Societe Generale

Agentia Stirbei Voda, Bucuresti, Romania

Str. Stirbei Voda, nr. 156-158

SWIFT BRDEROBU

Cod IBAN: **RO37BRDE410SV41065964100**

THE JOURNAL DISTRIBUTION

The distribution of the journal to the subscribers is done personally or by post to the postal address mentioned. The journal will be sent by the editorial office to the recipient only once. At the request of the subscriber, the cost of the journal referred back will be borne by the subscriber.

The articles will be sent to:

Editorial office: UNEFS, 140 Constantin Noica Street, Bucharest, Romania

Phone: 0213164107 / 224, e-mail: discobolul@gmail.com

or:

To the attention of Mrs GRIGORE VASILICA, Prof. PhD, Editor-in-chief

The Journal can be **accessed online** at:

<http://www.unefs.ro/revistadiscobolul.html>

or:

<http://www.unefs.ro/discobolulmagazine.html>