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STUDY ON TECHNOLOGY AS SUPPORT FOR THE ACTIVITY OF PHYSICAL EDUCATION AND SPORT TEACHERS IN THE PRIMARY AND SECONDARY EDUCATION SYSTEM OF CLUJ-NAPOCA

VĂIDĂHĂZAN REMUS^{1,*}, PRODEA COSMIN¹, KEREKI MIHAI²

ABSTRACT. Nowadays, technology is considered by older generations as the reason why a big part of young people breaks reality and chooses to spend most of their time in front of small screens. In parents' perception, this period of time could be exploited through other activities, such as increasing school performance. In spite of the multitude of accusations about the use of technology, this also has a great number of benefits in terms of the educational process. The effective teacher will need to understand that we need to guide students to use technology for educational purposes, not just for recreational leisure activities. Fast access to technology, in our everyday life, forces us to increasingly associate education with technology (Yücel & Koçak, 2010). Traditional teaching practice, learning methods and course content are all affected by the evolution of technology (Cingi, 2013). Living in the 21st century, where technology, the internet, the computers, the smartphones, and all the accessories that come with them are part of our lives every day. The fact that we have access to a huge range of information has led us to check how much, what and how teachers of Physical Education and Sport, who teach in schools of Cluj-Napoca, use these devices in order to prepare their didactic activities, but also during this didactic activity.

Key words: *technology, computer, smartphone, didactic activity, physical education, school.*

REZUMAT. *Studiu privind tehnologia ca suport pentru activitatea profesorului de Educație fizică și sport din sistemul de învățământ preuniversitar din Cluj-Napoca.* În zilele noastre tehnologia este considerată de generațiile anterioare ca fiind motivul pentru care cea mai amare parte a tinerilor se rup de realitate și aleg să își petreacă majoritatea timpului în fața micilor ecrane. În percepția părinților această perioadă de timp ar putea fi

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valorificată prin alte activități, cum ar fi creșterea performanțelor școlare. În ciuda multitudinilor de acuze aduse tehnologiei, aceasta prezintă și un număr mare de beneficii în ceea ce privește procesul instructiv-educativ. Profesorul eficient va trebui să înțeleagă că trebuie să îndrume elevii în vederea utilizării tehnologiei cu scopuri educaționale, nu doar pentru activitățile recreative desfășurate în timpul liber. Accesul rapid la tehnologie, în viața noastră de zi cu zi, ne obligă să asociem tot mai mult educația cu tehnologia (Yücel & Koçak, 2010). Practica tradițională de predare, metodele de învățare și conținutul cursurilor sunt toate afectate de evoluția tehnologiei (Cingi, 2013). Trăind în secolul XXI, unde tehnologia, internetul, calculatoarele, telefoanele și toate accesoriile care vin cu acestea fac parte din viața noastră, zi de zi. Faptul că avem acces la o gamă uriașă de informații ne-a determinat să verificăm cât, ce și cum folosesc profesorii de Educație fizică și sport, care predau în școlile din Cluj-Napoca, aceste aparate pentru pregătirea activităților didactice dar și în timpul acestor activități didactice.

Cuvinte cheie: *tehnologie, calculator, telefon „smart”, activitate didactică, educație fizică, școală.*

Objectives

The objectives of our research were:

1. To identify the extent to which Physical Education and Sport teachers use technology (smartphone, desktop computer, laptop) to prepare for the didactic activity with children;
2. To identify the extent to which Physical Education and Sport teachers rely on technology (smartphone, desktop computer, laptop) during the didactic activity with children;
3. To find out the opinion of Physical Education and Sport Teachers on the obligation for a teaching staff from 2020 to have the necessary skills for technology use when they prepare for the didactic activity with children.

Material and methods

Our study took place in 26 schools in Cluj-Napoca, where 52 Physical Education and Sport teachers were interviewed using a 13 items questionnaire. All teachers teach in the primary and secondary education system. The questionnaire we built was self-designed, and aimed to meet research objectives. All interviews were applied in May 2018.

The first item in the questionnaire measured the types of technological devices that Physical Education and Sport teachers have: smartphone, desktop computer, laptop and smart watch.

The following 3 items were of general interest for the use of each type of technology (smartphone, desktop computer, laptop) with 6 response options: Socialization (FB platforms, Instagram etc.), Communication (e-mail, messenger etc.), Games, Entertainment (movies, news, etc.), Education (articles, books, etc.), Preparation for didactic activity (attendance book, planning, etc.).

In order to achieve the first objective of our research, we introduced 2 specific items for the physical education and sport activity (items 5 and 6 of the questionnaire), item 6 being an open-ended response to find out which type of device is used to plan the didactic activity.

The second objective of the research was verified with the aid of items 7 and 8, item 8 being an open-ended response to find out which type of device is used during the didactic activity.

To meet the third objective of the survey, respondents were asked for an opinion on the effectiveness of a future teacher in 2020 who is unable to use technology to prepare for teaching.

Of the 52 interviewed teachers, 35 were male and 17 females. The 50 respondents who revealed their age belonged to the group of 36 to 50 year's old (see Figure 1). Two respondents didn't say how old they were.

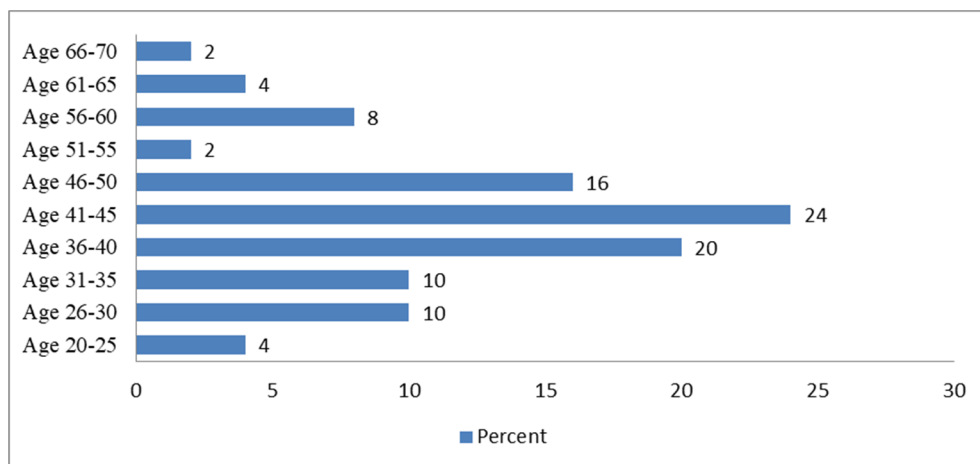


Chart 1. Age of subjects

Results

Of the interviewed teachers, they almost all have a smartphone, many of them having a laptop or a desktop computer. Details can be seen in Chart 2.

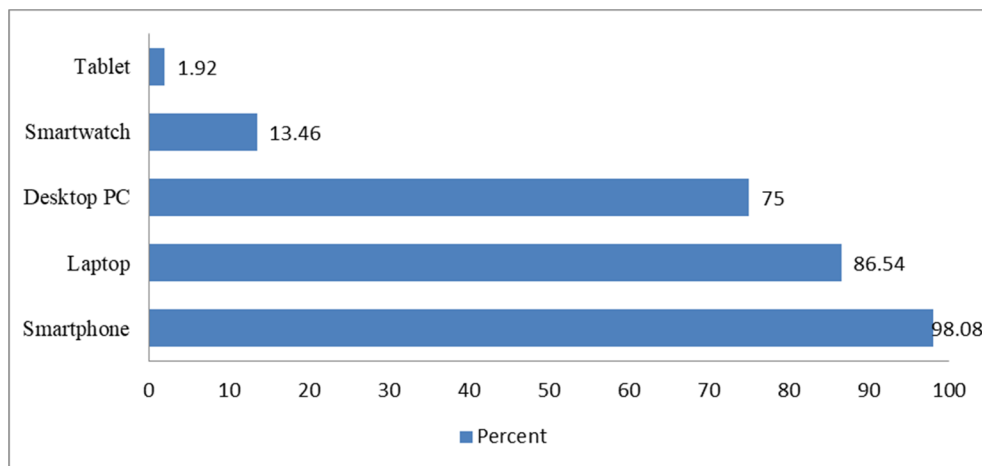


Chart 2. Types of appliances owned by respondents

The smartphone is most often used to communicate or to socialize. In order to prepare for the teaching activity, only 40% of the subjects use the smartphone. Details can be seen in Charter 3.

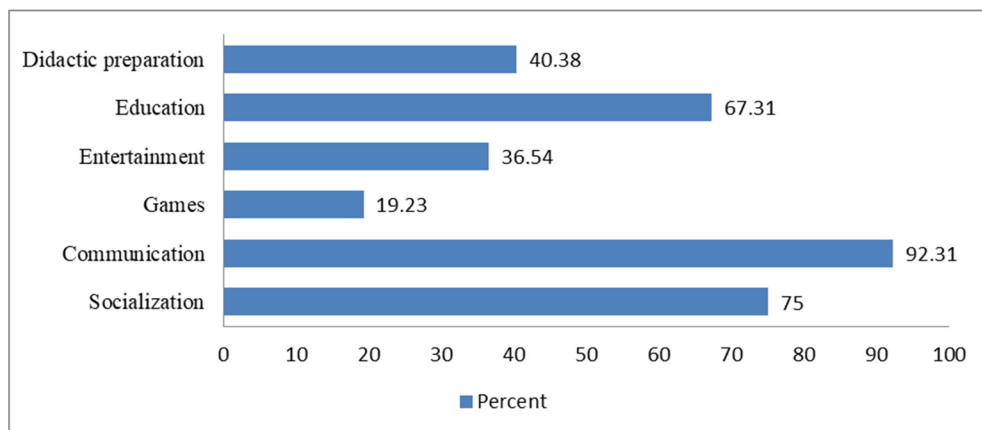


Chart 3. Activities in which subjects use the smartphone

The desktop computer is used in a high percentage for didactic preparation (almost 76% of teachers). Charter 4 provides more details.

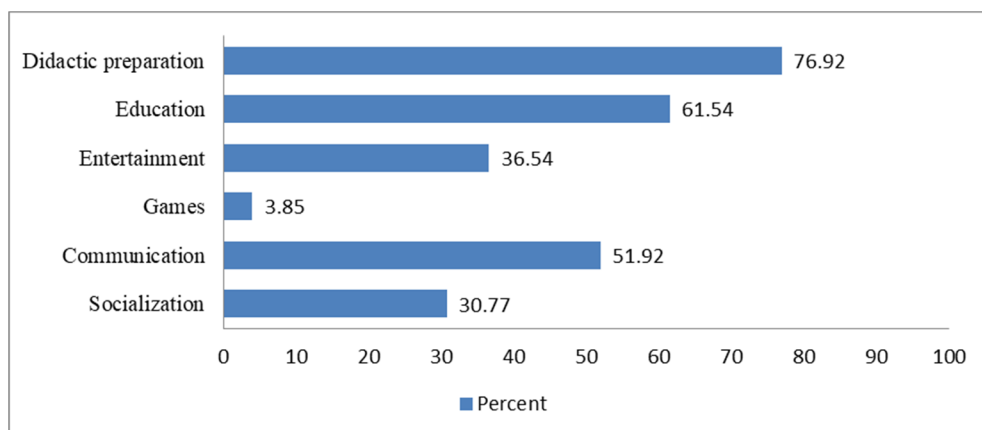


Chart 4. Activities in which subjects use the Desktop PC

The laptop is also used in a high percentage to prepare for teaching, as shown in Charter 5.

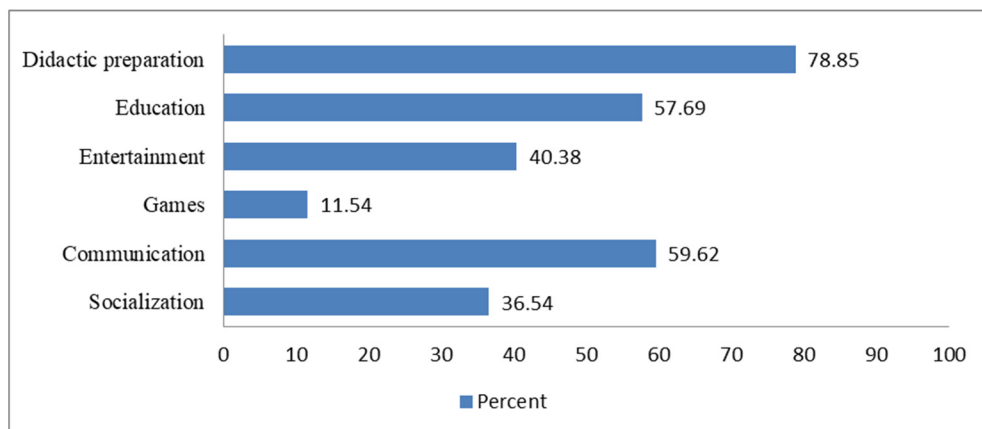


Chart 5. Activities in which subjects use the laptop

From all the operations that teachers perform when they prepare for their teaching activity, we observed that the technology they have is mostly used for planning.

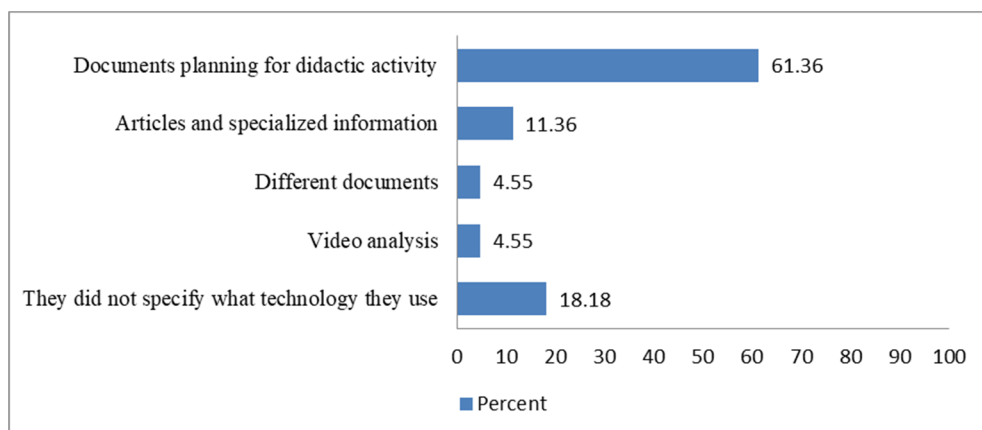


Chart 6. The purpose of using technology in teaching

As regards the use of technology as a support, during the teaching activity, 42.31% responded positively. The most common device used during the teaching activity is the laptop (almost 41% of the respondents that use the technology), the smartphone being the second (see Chart 7).

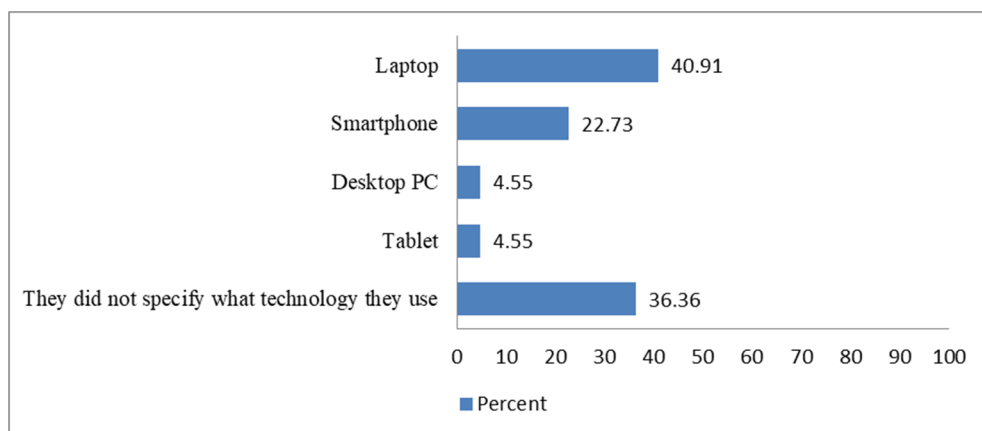


Chart 7. Type of device used during teaching (percentages refer only to those who have mentioned that they use technology during their teaching activity)

The main purpose of the use of technology for physical education teachers is for video analysis (see Chart 8).

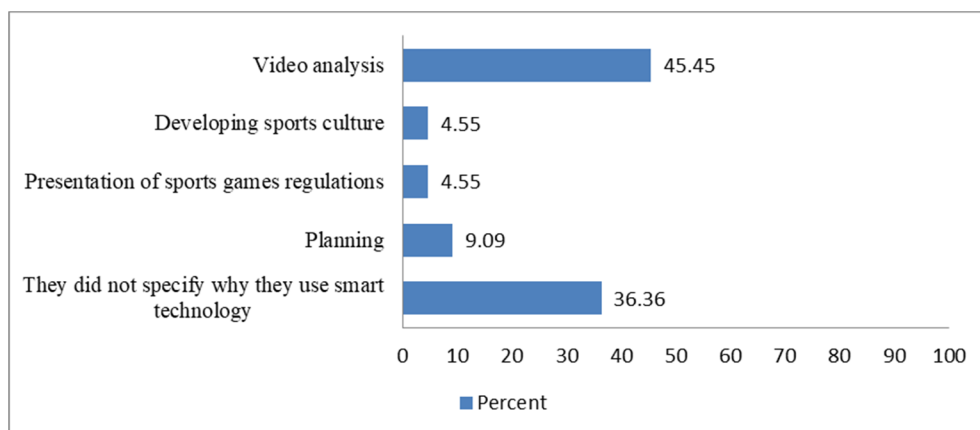


Chart 8. The purpose for which they use technology during their teaching activity

To the question "A teacher who doesn't know how to use a computer in order to prepare his (or her) teaching activity will be an efficient teacher in 2020?" A great percent of the teachers (84.62%) answered negatively. There are, however, few teachers (15.38%) who accept that they can prepare for didactic activity without the necessary skills to use a computer.

Discussions

Almost all teachers have a smartphone (98%) and many have a laptop (86%). The smartphone is used for communication and socialization, which was to be expected given the purpose for such a device and the popularity of socializing applications. However, a higher percentage of teachers (40%), more than we expected, also use the smartphone to prepare for teaching. Instead, the desktop computer and the laptop are the most used devices for the preparation of didactic activity. Both have registered a percentage close to 80% of the respondents. This is a good thing because the technology-based teachers are highly appreciated, as we already know, due to the fact that individuals with specific skills are more effective when using information, solving problems and making profitable decisions about their professional activity (Yücel & Koçak, 2010). In this highly competitive world, it is becoming increasingly important to learn more and faster (Cingi, 2013).

All three types of devices (smartphone, laptop and desktop computer) are used, without regard to preferences, especially for planning (61%). The next activity for which technology is used is to read articles and specialized

information. It is to be appreciated the large number of teachers who use technology to plan the activity, but we must point out that this is not the only activity for which technology can be used to prepare the didactic activity for physical education and sport. Effective video analysis can be done using, for example, a free, well-known application: BS Player (Văidăhăzan, 2017, p. 40). There are applications that help us to transfer information between different devices, such as transferring video from your phone to your computer to perform a video analysis recorded during your didactic activity (eg, Feem application, see Văidăhăzan, 2017, p. 61). It is highly recommended to use technology more often to analyse specialized information that is abundant in our field. We believe that the 11% of those using technology for articles and information is far too small nowadays.

As regards the use of technology during teaching, a little over 40% of teachers said they were using it. They use, in particular, the laptop (17.31% of the teachers who are using the technology) and very few use the smartphone (9.62% of the teachers who are using the technology). The main purpose for which technology is used during teaching is video analysis (45%). Technology is insufficiently used to present sports regulations or to develop sports culture (we recorded a 4.55% percentage for each).

Traditional teaching practice, learning methods and content of courses have all been affected by the introduction of technology (Cingi, 2013). Young people would not imagine their day-to-day activities and habits without technology, so why should we put technology aside when it comes to teaching and learning? On the contrary, we should exploit as much as possible the advantage of having access to information, the useful approach which technology can offer us when it comes to learning and teaching (Trepule, Tereseviciene, & Rutkiene, 2015).

It is difficult, we acknowledge, reorganizing teaching in physical education and sport so that we use a high percentage of technology. This can be done only with proper investment (money, time, goodwill) but widespread use of technology in physical education improves the teaching effect and makes the teaching process "alive" (Chen & Xia, 2012).

Among the advantages of using technology during the teachers' activity we would like to mention:

- monitoring heart rate in more demanding lessons for an accurate approach to effort dynamics (a simple and handy system is the one proposed by Văidăhăzan, Hanțiu, Pop, & Patrascu, 2015);
- providing real-time bio-feed back with a phone and a laptop and MirrorOp like app (see Văidăhăzan, 2017, p. 90);
- monitoring the execution rate of some exercises, using a metronome app (see Easy Metronome, Văidăhăzan, 2017, p. 122);

- keep track of student performance by quickly registering it on your smartphone and removing tens or even hundreds of sheets of paper.

There are many other ways of using technology during physical education and sport. Regardless of the way we choose, we are convinced that positive benefits and results in this direction will only come with the appropriate willingness and training of physical education and sport teachers in this respect, as other researchers in the field already sustained (Chen & Xia, 2012).

A high percentage of teachers involved in this research (almost 85%) believe that in 2020 a teacher who does not know how to use the personal computer is an inefficient teacher. We note, however, that not all teachers agree with this statement. There is still a percentage of 15% stating that this is not an impediment to the effectiveness of the teaching staff.

Conclusions

As a result of our research, we can state that physical education and sport teachers use technology to prepare for teaching, but this training focuses only on planning, for the most part, and little on the research for articles and specialized information.

Regarding the use of technology during didactic activity in physical education and sport, the percentage of teachers is small, and the main reason is only for video analysis. We admit that we need further research to objectively identify the factors that are an obstacle for teachers to use the technology in a diversified manner during their physical education and sport lessons.

We are a bit surprised that not all teachers agree that specific technology and skills are absolutely necessary for future teachers. It is true that there are many levels of efficiency and it is true that physical and sport education can be achieved, at some level, without the help of technology but, in our opinion, there is a huge difference that technology can bring into teaching nowadays. We hope, however, that in 2020 all teachers become aware of the added value of a smartphone or a personal computer to prepare or to carry out the didactic activity in Physical Education and Sport at school.

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ERGONOMICS IN DENTISTRY OF CLUJ-NAPOCA.

MOHOLEA ADINA^{1*}, VĂDAN ANCA LUCIA¹, VĂIDĂHĂZAN REMUS²

ABSTRACT. Stomatology is considered to be a profession with a high risk of developing Work-Related Musculoskeletal Disorders (WMSD) (Gopinadh, et al., 2013). The method through which the occurrence of WMSD can be reduced is by adopting a proper body posture, and appropriate application of ergonomics (Kierklo, Kobus, Jaworska, & Botuliński, 2011; Pîrvu, Pătraşcu, Pîrvu, & Ionescu, 2014). The objectives of this study aimed to investigate the manner in which the workspace and schedule is organised, related to ideal and neutral posture and to determine the presence of WMSD symptoms among dentists who work in Cluj-Napoca. The research took place from the 26th of February 2018 to 6th of July 2018, in Cluj Napoca's dental offices. The results obtained shows a high prevalence (90%) of WMSD specific symptoms which can be an indicator of the poorly applied ergonomics in the dentistry field (Mulimani, et al., 2014). It is, therefore, essential to raise awareness about the importance of the posture and ergonomics among dentists in Cluj-Napoca.

Key words: *Dentistry, Ergonomics, Posture, WMSD, awareness, prevention, Cluj-Napoca.*

REZUMAT. *Ergonomia în stomatologia din Cluj-Napoca.* Stomatologia este considerată o profesie cu un risc crescut de dezvoltare a leziunilor musculoscheletale asociate profesiei (WMSD) (Gopinadh, et al., 2013). Modul în care incidența WMSD poate fi redusă, este prin adoptarea unei posturi corporale potrivite și prin aplicarea corespunzătoare a ergonomiei (Kierklo, Kobus, Jaworska, & Botuliński, 2011; Pîrvu, Pătraşcu, Pîrvu, & Ionescu, 2014). Obiectivele acestui studiu au dorit să investigheze maniera în care este organizat spațiul de lucru și orarul, urmărind o postură ideală și neutră și să se determine prevalența simptomelor specifice WMSD, în rândul stomatologilor care lucrează în Cluj-Napoca. Cercetarea a avut loc din 26 Februarie 2018 până în 6 Iulie 2018, în cabinetele stomatologice din Cluj-Napoca. Rezultatele obținute prezintă o

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incidență crescută (90%) a simptomelor caracteristice WMSD, fapt ce poate fi un indicator al aplicării neeficiente a ergonomiei în domeniul stomatologiei (Mulimani, et al., 2014). Este necesară, prin urmare, conștientizarea stomatologilor din Cluj-Napoca, legată de importanța posturii și a ergonomiei.

Cuvinte cheie: *Stomatologie, Ergonomie, Postură, WMSD, conștientizare, prevenție, Cluj-Napoca.*

Introduction

Stomatology, as a branch of medicine which "evaluates, diagnoses, prevents and/or treats diseases, disorders and/or conditions of the oral cavity, maxillofacial area and/or the adjacent and associated structures" (Glossary of Dental Clinical and Administrative Terms, n.d.), is considered to be a profession with a high risk of developing Work-Related Musculoskeletal Disorders (WMSD), because through the specific operations in this profession, involving high degree of concentration and precision, the whole organism is multidirectional solicited (Gopinadh, et al., 2013).

WMSD is characterized by the "presence of discomfort, disability or persistent pain in the joints, muscles, tendons and other soft parts, caused or aggravated by repeated movements and prolonged awkward or forced body postures" (Gopinadh, et al., 2013, p. 229). WMSD does not only affect the physical side of a dentist, but in severe cases it has psychological and social repercussions, causing frequent absence from the work and in the end, early retirement (Muralidharan, Nusrath, & Margabandhu, 2013). According to Gupta, Bhat, Mohammed, Bansal, & Gupta (2014) the main reason for early retirement among dentists, is WMSD (29,5%).

The method through which the apparition of WMSD can be reduced is by adopting a proper body posture (Kierklo, Kobus, Jaworska, & Botuliński, 2011; Pîrvu, Pătrașcu, Pîrvu, & Ionescu, 2014). The dentists can be found in uncomfortable and asymmetrical positions, for long periods of time, maintaining the head, neck and shoulders in a tense manner (Kierklo, Kobus, Jaworska, & Botuliński, 2011), or twisting and tilting more in one way than the other (Valachi B. , 2008). With time, the muscles adapt, shortening themselves on one side of the spine or joint, resulting in misalignment or abnormal posture, caused by muscle imbalance and the loss of range of motion in one direction over the other (Valachi B. , 2008).

The working posture of the dentist is one of the most talked about subjects in dental ergonomics. Besides posture, ergonomics focuses on maximizing the

efficiency, in space and time, of the work of a dentist, approaching three specific domains: physical ergonomics, cognitive ergonomics and organizational ergonomics (Mulimani, et al., 2014). Ergonomics is the science which is concerned with the efficiency of people in their work environment (Gopinadh, et al., 2013).

The main purpose of ergonomics in dentistry is to support the proper posture in hope of preventing the occurrence of WMSD through interventions which target the physical, cognitive and organizational side of the dentist. Physical ergonomics addresses the adoption of the proper posture and ideal movement, appropriate handling of equipment and tools such as the ones of lighting, image amplification, mirrors etc. and proper use of patient and dentist chairs. In physical ergonomics there also exists interventions which aim for the working area design for example adequate workplace layout of a dentist space. The cognitive component of ergonomics interferes for stress management, relaxation techniques, the improvement of communication. Organizationally speaking, the rhythm and the variety of work as well as the alternation of procedures, management of the working program and the establishment of break frequency are factors which if properly adjusted can contribute to the maintenance of the proper posture for as long as possible. Two other factors are the integration of stretching and mobilization breaks and also and the efficient support of the dental assistant (Mulimani, et al., 2014).

Thus, there are many aspects of ergonomics which have to be taken into account, however unsuccessful application of ergonomics can lead to WMSD (Mulimani, et al., 2014).

Bedi, Moon, Bhatia, Sidhu, & Khan (2015) show through a study carried in multiple cities in India that the adoption of the ergonomical principles has significantly reduced the pain prevalence from 47,8% to 21,7% in the cervical area and from 39,1% to 17,3% in the shoulder area.

The investigation of WMSD symptoms is a tool for analyzing the work environment. WMSD symptoms prevalence speaks about the ways in which the ergonomical principles are applied (Kierklo, Kobus, Jaworska, & Botuliński, 2011).

One of the main reason for which ergonomics is not successfully applied is the proven fact, by multiple researches (Gopinadh, et al., 2013; Kierklo, Kobus, Jaworska, & Botuliński, 2011; Pîrvu, Pătraşcu, Pîrvu, & Ionescu, 2014; Valachi, 2003), namely the deficiency of basic knowledge of ergonomics. Awareness level regarding the correctness of different postures was seen among 59% of participants in the study conducted by Gopinadh, et al., (2013). In the article written by Rania, Salwa, Ibrahim, Sanaa, & Asmaa, (2018), 48,9% out of the studied students had fair knowledge regarding ergonomics and only 5% of students practiced it.

Hypothesis/ assumption and objectives:

Hypothesis/ assumption: The workspace and schedule management is not conceived in such a manner to sustain the neutral posture, also the approach on knowledge regarding the posture is superficial, thus WMSD characteristic symptom prevalence is increased among dentists.

Objectives:

1. We wanted to analyze the working conditions and schedule of dentistry from Cluj-Napoca.
2. We intended to observe aspects of general health related to BMI, physical activity and rest.
3. We wanted to find out the dentists' perspective on posture.
4. We aimed to notice the prevalence of WMSD specific symptoms among Cluj-Napoca's dentistry.

Methods:

The research was conducted from the 26th of February 2018 to 6th of July 2018 in Cluj Napoca's dentist's offices. The research sample consisted in 50 subjects who are dentists.

The subjects were blinded to the hypothesis and objectives of the study, with the purpose of obtaining an accurate result.

The survey used for the research was self-designed, containing 27 items, structured in 7 sections, of which the last section was based on Standardized Nordic Questionnaires for the analysis of musculoskeletal symptoms (Kuorinka, et al., 1987). It tests the presence of a WMSD specific symptoms, for example: dull pain, acute pain, discomfort, paraesthesia etc., of the following areas: neck, shoulder, elbow, wrist or hand, upper back, lower back, hip, thigh, knee, ankle or foot.

In the first section of the survey, items about demographic data were included, after which questions regarding specialization and years of practice were asked. Another section targeted the working conditions, more specifically whether or not there was any dental assistant present, the working posture and the laterality, which were followed by questions in regard to the working schedule: hours per week, and whether there exist planned breaks and also the way in which the break time was spent. In the 5th section information about the general health condition was gathered: whether any sports were practiced and the number of hours of sleep per night. The 6th paragraph consisted of questions in which the dentists perspective on posture can be observed, for example: if the

proper posture is considered important by dentists, their knowledge on this subject, the description of their own posture, whether or not there is awareness about the common risks of dentistry field and if there were any measures taken for prevention. The questionnaire was administered by the authors.

For accurate interpretation of the gathered data through the survey, statistical analysis was accomplished with the help of Microsoft Excel program, using "COUNTIF" function for monitoring the frequency of the answers.

Results

Out of the 50 subjects, 26% were male, and the other 74% were female, with ages ranging from 25 to 78 years old and an average age of 34.28 years old. According to body mass index (BMI), 30% of the subjects are situated outside of healthy BMI and 22% of these were overweight and obese. The distribution of the subjects by specialization can be noticed in the first chart while in the first table the distribution of the subjects by experience, can be observed.

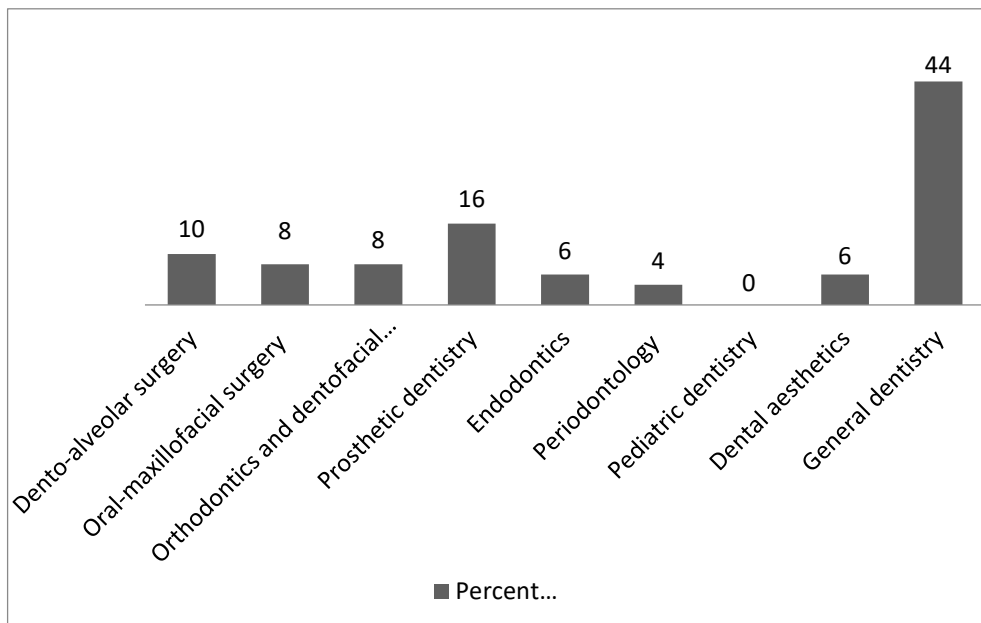


Chart 1. The distribution of the subjects by specialization

Table 1. The distribution of the subjects by experience

	<1 years	1-5 years	6-10 years	11-15 years	16-20 years	>20 years
Percentage	6	36	28	20	4	6

When asked about the intention of changing their field of work, 88% of the subjects expressed their focus on persuing and developing their career in the dentistry field.

It can be noticed that, in the section referring to the working conditions, barely 34% of the dentists often work with a chairside assistant, and in 14% of the cases the assistant does not exist. 62% of the subjects work mainly while sitting down, and from the laterality point of view 94% are right-handed, 4% are left-handed and 2% are ambidextrous.

In regard to the working schedule, almost three quarters (72%) of the dentists state that they do not have stable working hours. The number of worked days per week can be observed in the second table while the worked hours per day can be noticed in the third table. The majority of the subjects (62%) work 5 days per week. Nevertheless, more than half of dentists (52%) work less than 8 hours per day.

Table 2. Worked days per week

	< 3 days/week	3-4 days/week	5 days/week	6-7 days/week
Percentage	4	20	68	8

Table 3. Worked hours per day

	<4 hours/day	4-7 hours/day	8 hours/day	9-10 hours/day	>10 hours/day
Percentage	4	52	20	16	8

Noticeable, in the fourth table is the frequency with which the subjects take an intentional planned break of 10 minutes. A significant 68% of the dentist rarely take this break. The second highest percentage (16%) is represented by the subjects which do not take a planned break at all.

Table 4. Frequency of planned break

	Always	Sometimes	Rarely	Never
Percentage	6	10	68	16

The frequency of different types of activities during breaks can be noticed in the fifth table.

Table 5. Frequency of different types of activities during breaks

	Usually	Often	Sometimes	Rarely	Never
Preparations for upcoming patients	44%	18%	14%	6%	18%
Relaxation activity	4%	4%	26%	36%	30%
Phone usage	20%	42%	18%	6%	14%
Stretching and mobilization exercises	0%	2%	8%	24%	66%
Meal or snack	4%	10%	50%	16%	20%

Answering the section which refers the general state of health, most dentists (66%) stated that they sleep about 7 to 8 hours per night. This percentage was followed by a 30% of subjects who manage to get from 4 to 5 hours of sleep. Furthermore, the frequency of sport activity can be seen in the sixth table.

Table 6. Frequency of sport activity

	<1times /week	1times /week	2 times /week	3 times /week	4 times /week	5 times /week	6 times /week	7 times /week
Percentage	24	6	24	24	10	6	2	4

The most often referred to sport activities were: walking, fitness, jogging, swimming and hiking. Also mentioned were: aerobics, pilates, TRX, basketball, football, cycling, dancing, horse riding, gymnastics, physiotherapy, hunting, rollerblading, squash and tennis.

The subjects perspective on posture can be noticed throughout the following answers: all of the participants agreed that adopting the proper posture while operating is very important and enough important.

The way in which every dentist evaluates its working posture can be seen in the seventh table. Over half of the subjects acknowledged that their posture is demanding, but also efficient when it comes to operation performed. Barely 18% (9 of the participants) self-describe their own posture as being very close to the rules of ergonomics.

Table 7. Self-description of working posture

Self-description	Percentage
A safety posture, very close to the rules of ergonomics	18
A demanding, but also efficient posture	60
I did not pay too much attention to posture analysis	22

The eighth table represents the sources from which the subjects gather information in regard to the right posture. Over two thirds (68,49%) of the dentists accumulated their knowledge from university.

Table 8. Knowledge regarding posture

	Percentage
Knowledge from university	68.49
Knowledge gathered from occasional Internet search	13.7
Knowledge gathered from systematic studying of the research papers	8.22
Knowledge from specialized courses	9.59

Referring to the common risks in the dental medicine field of developing WMSD, every participant without exception is aware of the dangers, but 36% of the dentist admit that they do not take any measure to prevent it from happening. Among the 64% of the subjects who try to prevent WMSD, the measures of half of them were directly linked to ergonomics and posture while the others measures were: physiotherapy, massage, sport, orthopaedic shoes, yoga, or the Bowen technique.

The presence of the characteristic WMSD symptoms can be detected in the second chart, depending on the anatomical areas of which they were reported. The common WMSD symptoms with the highest prevalence is found in the lumbar area (60%), followed by the dorsal area (54%). Coming next, in percentage, are the characteristic WMSD symptoms in the neck (52%), shoulder (34%), wrist (30%), hip (18%), knee and ankle (12%). The smallest incidence of the common MSD symptoms was reportedly situated at the elbow (6%).

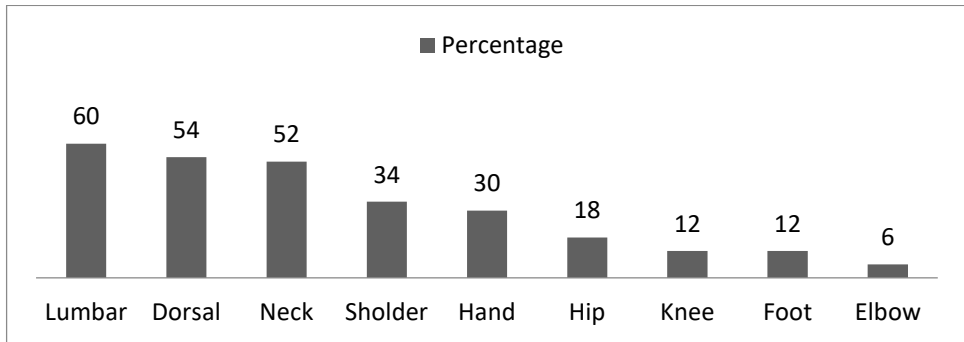


Chart 2. Distribution of WMSD characteristic symptoms

With the help of the third chart it can be noticed that only 10% of the dentists have not encountered the characteristic WMSD symptoms, and the same percentage represent the people who only feel one of the anatomical areas troubled. Over three quarters show the symptoms in multiple anatomical areas.

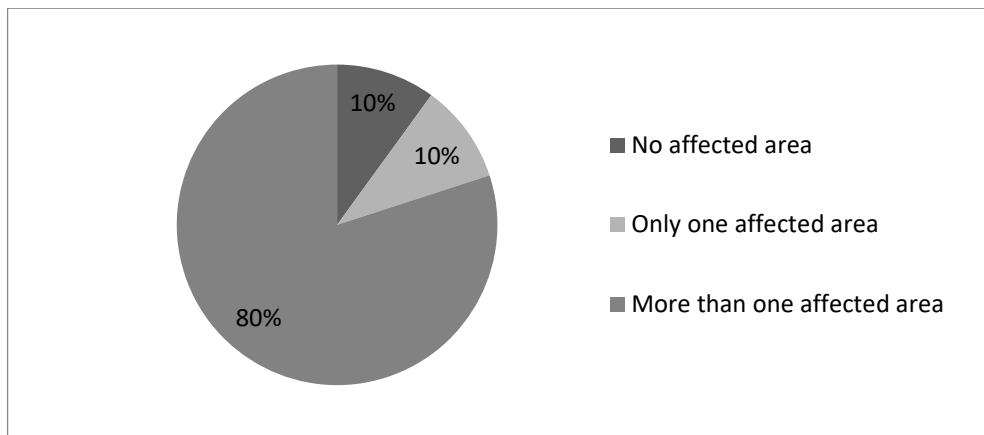


Chart 3. Number of area affected

Amongst the patients who have encountered specific WMSD symptoms, almost two thirds (64%) have not consulted a doctor for the discomfort felt, however in 77.78% of the cases these symptoms have not led to the inability to execute the different types of working activities.

Discussions

Many studies have talked about specific conditions in which a subject is exposed to the risk of developing WMSD. Statistically speaking, when it comes to personal background, women are at higher risk than man of developing WMSD (Faisal & Mathias, 2014; Khan & Chew, 2013; Sharma, Sharma, & Khattri). Furthermore, the risks are higher as the age grows (Gopinadh, et al., 2013). The occurrence of WMSD is also connected to the general health. Proper rest, a normal BMI and the physical activity can reduce the risks of developing WMSD (Gopinadh, et al., 2013). However, the majority of the participants in this study do not find themselves at these risks. 70% of the subjects are situated at a healthy weight, 66% get 7 to 8 hours of sleep per night and 70% practice physical activity at least 2 times per week.

When it comes to the specialization, the Orthodontists were at higher risks of developing WMSD in neck, shoulder and wrist area, whereas Prosthodontists were having a higher ratio of musculoskeletal symptoms at low back region (Faisal & Mathias, 2014). Our survey has shown that out of the subjects, 80% of the General Dentists and Dento-alveolar Surgeons and 100% of the Oral-maxillofacial Surgeons, Orthodontics and dento-facial Orthopedics, Prosthetic Dentists, Endodontics, Periodontologists, Pediatric Dentists and Dental Aesthetics develop characteristic WMSD symptoms. All in all, the dentists must identify the risk factors and they are responsible for the proper adjustment of their own life and work style to escape the risk zone.

Speaking from the organization of work point of view, almost three quarters (72%) of the subjects do not follow a stable work schedule, this having a negative impact on the long-term health (Boisard, Cartron, Gollac, & Valeyre, 2003). Over 62% of the participants work mostly from a sitting position, 84% rarely or never plan their breaks in between the patients and when these do exist, only 10% actually spent part of this time doing stretching exercises. These exercises could lead to the reduction of the effect caused by this workstyle (Kierklo, Kobus, Jaworska, & Botuliński, 2011). Out of the dentists only 34% work with a chairside assistant regularly. In the other cases this can lead to demanding movements for all of the segments in trying of working more efficiently. To sum it all up, there is a predominantly static posture, usually seated, when in fact, it is recommended to alternate the work position between sitting and standing (Gupta, Bhat, Mohammed, Bansal, & Gupta, 2014).

When it comes to the dentist perspective on posture, it can be noticeable that all of the involved subjects state that the proper posture is thought to be very important or at least important. Despite this fact, 22% of the participants do not pay attention to the posture and 60% describe their posture as being

demanding, but also efficient, thus neglecting an undemanding and neutral posture, in favour of the efficiency of procedures. However, the studies have shown that in fact, the proper posture gives the dentist “on one hand, optimal working conditions (access, visibility and control of the mouth) and on the other hand, physical and psychological comfort throughout the execution of the clinical acts” (Pîrvu, Pătraşcu, Pîrvu, & Ionescu, 2014, p. 177). In other words, the correct posture maintains a good professional performance for a longer time, thus influencing the quality of the medical services provided, while a non-neutral or demanding posture may induce a poor quality of work, which affects efficiency (Simu, Mesaroş, Muntean, Vincze, & Borzan, 2016; Pîrvu, Pătraşcu, Pîrvu, & Ionescu, 2014). Because of this, a superficial approach to the posture can be visible and also the low level of awareness in regard to the posture, which can be seen all around the world with the help of other surveys (Gopinadh, et al., 2013; Kierklo, Kobus, Jaworska, & Botuliński, 2011; Rania, Salwa, Ibrahim, Sanaa, & Asmaa, 2018). It can also be observed that just 31.51% of the subject in this study show interest in learning more about the neutral posture.

In addition, all of the participants confirm their knowledge in the specific risks of developing WMSD in the dentistry field, but 36% do not do anything in hope of preventing it, and only 36% act on the ergonomically factors and on the posture.

The results which were found (90%) in regard to the prevalence of WMSD symptoms are similar to other countries : Poland (92%) (Kierklo, Kobus, Jaworska, & Botuliński, 2011), Australia (87,2%) (Leggat & Smith, 2006), India (68,3%) (Bedi, Moon, Bhatia, Sidhu, & Khan, 2015) or Romania (89%) (Simu, Bocanet, Mesaroş, & Borzan, 2014).

Conclusion

In conclusion, there is a grown incidence of the common WMSD symptoms and the ergonomics in the dentistry field is poorly applied.

It can also be noticed, a fact which is also supported by Dr. Bethany Valachi (2008) that although the majority of dentists show deficiency of basic knowledge in ergonomics and demonstrate a lack of interest in the appliance of the ergonomically principles, most of them (90%) hope to maintain what could be considered a long lasting career.

It is essential to raise awareness about the importance of the posture and ergonomics and to improve the education in this area, with the purpose of ultimately maintaining a good professional performance for a longer time, influencing the quality of the medical services.

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STATINS, MYOPATHY AND PHYSICAL ACTIVITY

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ABSTRACT. Background: Cholesterol-lowering therapy (statins), associated with lifestyle modifications, have an important role in reducing atherosclerotic cardiovascular disease (ASCVD) events. **Methods:** We review the literature to explore the mechanisms of myopathy caused by statins and also to examine the effects of combining statin therapy with physical activity. **Results:** Although statins are usually well tolerated, dose dependent side effects including myopathy and others side effects were reported. Mechanism of myopathy caused by statins is unclear, but there are some theories to explain these. A large number of evidence suggests the protective effect of regular exercise against chronic diseases and this may be mediated through their anti-inflammatory effect. There are a number of factors (age, genetic factors, vitamin D) influencing the interaction between statins, skeletal muscle and exercise. It is difficult to associate statin therapy with increased aerobic fitness, because of local adverse effects (muscular or hepatic), which tend to decrease patients' physical activity levels. **Conclusion:** Caution should be taken to the combination of the statin therapy with physical activity, especially in people with increased risk of local effects.

Key words: *exercise training, statins, musculoskeletal, cardiovascular*

REZUMAT. Statinele, miopatia și activitatea fizică. Introducere: Terapia de reducere a colesterolului (statinele), asociată cu modificări ale stilului de viață, are un rol important în reducerea evenimentelor bolii cardiovasculare aterosclerotice. **Metode:** Am trecut în revistă datele din literatură pentru a explora mecanismele miopatiei cauzate de statine și totodată pentru a examina efectele combinației terapiei cu statine – activitate fizică. **Rezultate:** Deși statinele sunt în general bine tolerate, s-au raportat efecte adverse legate de doză, incluzând miopatia și alte efecte adverse. Mecanismul miopatiei cauzate de statine este neclar, dar există câteva teorii care să-l explice. Un număr mare de evidențe sugerează efectul protector al exercițiilor fizice regulate împotriva bolilor cronice, iar acesta poate fi mediat prin intermediul efectului lor antiinflamator. Există un număr de factori (vârsta, factorii genetici, vitamina D) care influențează interacțiunea

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dintre statine, mușchiul scheletic și exercițiile fizice. Este dificil de asociat terapia cu statine cu fitness-ul aerobic crescut, datorită efectelor adverse locale (musculare sau hepatice), care tind astfel să scadă nivelele de activitate fizică ale pacienților. **Concluzii:** Trebuie acordată o atenție deosebită combinării terapiei cu statine cu activitatea fizică, în special la persoanele cu risc crescut de efecte adverse locale.

Cuvinte cheie: *antrenament fizic, statine, musculoscheletal, cardiovascular*

Introduction

“The American College of Cardiology” (ACC) / “American Heart Association” (AHA) guidelines which was updated in 2013 recommended the reduction of cholesterol levels in order to reduce the risks of atherosclerotic cardiovascular disease (ASCVD) events. According to these guidelines ASCVD includes coronary heart disease (CHD), stroke and peripheral arterial diseases. Moreover, the guideline stated the importance of cholesterol-lowering therapy (statins) associated with lifestyle modifications in reducing ASCVD events (Stone et al., 2013).

With respect to the new recommendations statin therapy is recommended for individuals at increased ASCVD risk. There is a lower-intensity (lowering LDL-C by < 30%), moderate-intensity therapy (lowering LDL-C by approximately 30% to < 50%) or a high-intensity statin therapy (lowering LDL-C by approximately 50%).

The most common effects of statins include reducing inflammation, oxidative stress, changing the immunologic responses, improving endothelial function and suppressing platelet aggregation. Statins are usually well tolerated possessing a good safety profile, although dose dependent side effects of statins are associated with myopathy, diabetes mellitus, increased levels of transaminase, rhabdomyolysis, neurologic and kidney damage (Rosenson, Baker, Jacobson, Kopecky & Parker, 2014).

This review explores the mechanisms of statin-induced myopathy caused and also examines the effects of combining statin therapy with physical activity.

Mechanisms of statin-induced myopathy

Mechanism of myopathy caused by statins is unclear, but it seems that involves lowering sarcolemmal or endoplasmic reticulum cholesterol, decreased fat catabolism, decreased production of prenylated proteins, vitamin D deficiency,

increased myocellular concentrations of cholesterol and plant sterols, failure to repair damaged skeletal muscle, and inflammation (Thompson & Parker, 2013; Venero & Thompson, 2009).

Some data suggest a link between vitamin D deficiency (below 30 ng / mL of 25 hydroxyvitamin D) and statin-induced myopathy (Gupta & Thompson, 2011). They describe that the mechanism of vitamin D action on muscle include specific muscular receptors, with genomic and nongenomic effects. Vitamin D deficiency seems to cause, via this mechanism, myopathy in skeletal muscle and decrease muscle strength (Gupta & Thompson, 2011). Vitamine D deficiency may shunt the action of CYP3A4 from metabolizing statins, and also, can alter gene transcription, preventing translation of protein that repair muscle tissue structures (Gupta & Thompson, 2011; Lee, Greenfield & Campbell, 2009).

However, the relationship of vitamin D with statin-induced myopathy is questionable. Although statins should reduce serum levels of vitamin D, rather they do not influence this, or even increase these serum levels, in asymptomatic individuals (Gupta & Thompson, 2011).

On the basis of a large base of evidence 4 major statin therapies were identified, namely: 1) secondary prevention in individuals with clinical ASCVD, 2) primary prevention in individuals with primary elevations of LDL-C \geq 190 mg/dL, 3) primary prevention in individuals with diabetes, 40 to 75 years of age, who have LDL-C 70 to 189 mg/dL and 4) primary prevention in individuals without diabetes, 40 to 75 years of age, who have LDL-C 70 to 189 mg/dL (Stone et al., 2013).

The secondary prevention in individuals with clinical ASCVD refers to subjects with acute coronary syndromes, history of MI, stable or unstable angina, coronary or other arterial revascularization, stroke, transient ischemic attack, or peripheral arterial disease presumed to be of atherosclerotic origin.

For the primary prevention in individuals without clinical ASCVD or diabetes who have an LDL-C 70 to 189 mg/dL, as well as, in individuals with diabetes (diabetes mellitus type 1 and type 2) a 10-year ASCVD risk score should be estimated to guide the initiation of statin therapy. The 10-year ASCVD risk is defined as nonfatal MI, CHD death, or nonfatal and fatal stroke. It is demonstrated that high-intensity statin therapy reduces ASCVD events more than moderate-intensity statin therapy in individuals with clinical ASCVD. Thus, high-intensity statin therapy should be initiated in adults (\leq 75 years) with clinical ASCVD who are not receiving statin therapy, or the intensity should be increased in those receiving a low- or moderate-intensity statin (Stone et al., 2013).

Lifestyle factors

The term lifestyle can denote the interests, opinions, behaviors, and behavioral orientations of an individual, group or culture. Health is as a state of complete physical, mental and social well-being, not simply just the absence of disease. A healthy lifestyle involves having a good state of mind, healthy living, balanced diet and regular exercise.

According to the World Health Organization (WHO) and the United Nations (UN) more than 70% of diseases (such as heart disease, type-2-diabetes, some forms of cancer, high blood pressure and obesity) worldwide are caused by lifestyle factors (such as bad nutrition, lack of physical activity and chronic psychological stress) (WHO, 2010).

Current treatment guidelines underlined the importance of lifestyle changes as early interventions in order to reduce the risk of CVD events. The lifestyle changes include a healthy diet, regular exercise habits, avoidance of tobacco products and maintenance of an ideal weight. Moreover, lifestyle changes should be complemented with medical treatments such as the use of statins (Lysty, Burell & Westerling, 2012).

Another widely debated topic was whether patients using statins realized the importance of CVD risk factors in a different way than non-statin users. Statin users patients had a tendency to underestimate several risk factors as important for the development of cardiovascular disease, including behavioral risk factors (poor exercise habits, smoking and poor eating habits). Previous research has shown that statin users make poor dietary choices and are more sedentary because of feeling safe and protected by taking lipid-lowering medications.

However, the administration of cholesterol-lowering therapy cannot replace healthy lifestyle changes and the lack of association induces poor dietary quality and a sedentary lifestyle, which attenuates the effectiveness of this medication (Lofgren et al., 2010).

Patients who adhere to preventive drug treatment are often assumed to also have a healthier lifestyle than those with poor adherence. Accordingly, a Finish study investigated the association between lifestyle factors (body mass index, smoking status, alcohol use and physical activity) and nonadherence to statin therapy among patients with and without cardiovascular comorbidities. In this study patients with a history of cardiovascular disease or diabetes had better adherence to statin therapy than those without these comorbidities. They found in individuals without cardiovascular diseases or diabetes that overweight, obesity and former smoking were associated with good adherence to statin therapy. Among participants with cardiovascular comorbidities, high alcohol consumption, extreme drinking occasions and having 3–4 lifestyle risk factors were predictors of nonadherence (Halava et al., 2014).

Physical activity and statins

Physical inactivity has been identified as the fourth leading risk factor for global mortality (6% of deaths globally) (WHO, 2010).

In Europe, physical inactivity is considered the second actual cause of death (Brønnum-Hansen, Juel, Davidsen & Sørensen, 2007) being responsible for the increased number of chronic disease (Mokdad, Marks, Stroup & Gerberding, 2004).

The association between regular physical activity and statin therapy may decrease cardiovascular mortality and morbidity. Besides the benefits of lowering cardiovascular disease risk, other effects are: reducing LDLc, increasing HDLc, lowering blood pressure, increasing aerobic fitness, decreasing the incidence of diabetes mellitus and achieving better control of blood glucose levels in patients who already have diabetes (Green, O'Driscoll, Joyner & Cable, 2008; Myers, 2005). Regular moderate intensity physical activity can reduce the risk of cardiovascular diseases, diabetes, colon and breast cancer, as well as depression. Moreover, regular exercises can attenuate the losses in bone mass and helps to control weight (WHO, 2010).

Physical inactivity is considered an independent and strong risk factor for the accumulation of visceral fat, which is a source of systemic inflammation. Chronic inflammation is associated with the development of insulin resistance, as well as with atherosclerosis, neurodegeneration and cognitive impairment.

A large number of evidence suggests the protective effect of regular exercise against chronic diseases and this may be mediated through their anti-inflammatory effect (Handschin & Spiegelman, 2008; Zanchi et al., 2012).

Recently it has been demonstrated that myokines may contribute to exercise-induced protection against several chronic diseases. The theory that muscles produce and release myokines provides the understanding of mechanisms whereby exercise influences metabolism and exerts anti-inflammatory effects. According to this theory, skeletal muscle contraction release myokines which are muscle-derived humoral factors and therefore these muscles should be classified as "endocrine organs". Also, other myokines exerts local effects within the muscle via paracrine mechanisms and may be involved in fat oxidation (Pedersen, 2009).

As a consequence of these studies, it was demonstrated that subjects submitted to 9 months of aerobic training showed reduced plasma levels of C-reactive protein (Mattusch, Dufaux, Heine, Mertens & Rost, 2000).

Moreover, regular resistance training has demonstrated significant anti-inflammatory effects confirmed by decreased TNF- α expression both in aerobic exercised rats, strength trained rats and in humans (Lira, et al., 2009; Zanchi, Lira, Seelaender & Lancha, 2010).

American College of Sports Medicine (ACSM) recommends regular exercises in older adults in order to prevent and treat CHD and CHD-related diseases. Healthy elderly persons should perform at least 30 minutes of moderate-intensity aerobic activity five days/week or vigorous activity for at least 20 minutes three days/week. Muscle-strengthening and flexibility exercises were also recommended at least two days/week as well as balance activities (Nelson et al., 2007). Patients at risk for CHD should attempt dietary and physical activity modifications for at least three months before starting lipid-lowering medications because some individuals can maintain normal lipid levels through these methods exclusively (NCEP-ATP III, 2001).

In literature there are relatively few studies about the effect of statins on muscle, and the findings are inconsistent. (Parker & Thompson, 2012) Some research suggests that patients with myopathy caused by statin therapy, developed this damage due to a prior disturbance in fat metabolism, which was exacerbated by statin therapy (Krishnan & Thompson, 2010). However, statins have a beneficial effect on motor performance (muscle strength, aerobic contraction) in patients with heart failure and intermittent claudication, increasing the average walking distance and / or the walking time without pain (Parker & Thompson, 2012).

Considering the effects of statins on exercise training adaptations it has been suggested that the use of statins attenuates the increase in cardiorespiratory fitness and skeletal muscle citrate synthase after 12 weeks of aerobic exercise training. These data indicate that statins may reduce improvements in physical fitness in response to exercise training by impairment in skeletal muscle mitochondrial content and function. In support of these data, physiologic doses of simvastatin disrupt mitochondrial respiration, increase oxidative stress and activate mitochondrial apoptotic pathways in isolated skeletal muscle fibers after exercise training (Kwak et al., 2012).

There are a number of factors (age, genetic factors, vitamin D) influencing the interaction between statins, skeletal muscle and exercise. Age is a risk factor for skeletal muscle myopathy induced by statins, its incidence increasing with age. The explanation could be that the age increases serum or muscle concentration of statins and emphasizes their effect of increasing CK levels associated with exercises (Parker & Thompson, 2012).

Considering genetic factors, it was suggested that they may increase the individual susceptibility to statin-induced myopathy. (Parker & Thompson, 2012) Thus, myopathy is associated with the rs4363657 single nucleotide polymorphism (located in SLCO1B1), which encodes the organic anion-transporting polypeptide OATP1B1 and therefore regulates the hepatic uptake of statins (Parker & Thompson, 2012).

Unlike statins, increased aerobic fitness improves quality of life of patients including the psychic one. However, the prescribing of exercises by physicians is quite difficult (require more time for explaining the exercise program for patients, clinicians are rarely specialized in assessing the importance of exercises for various disorders, and also, there is a reluctance of the patients themselves, ignoring the causes of diseases and opting for the most comfortable solution for treatment (Myers, Kokkinos & de Araújo, 2014; Vuori, Lavie & Blair, 2013).

It is difficult to associate statin therapy with increased aerobic fitness, because of local adverse effects, muscular and hepatic, which tend to decrease patients' physical activity levels, decrease muscle strength and athletic performance, leading to fatigue and joint problems. (Deichmann et al., 2015; Myers, Kokkinos & de Araújo, 2014) Population at risk to these events is represented by: elderly, Asian race, the presence of certain genotypes, the presence of previous muscular or mitochondrial disorders, vitamin D deficiency, coenzyme Q10 deficiency (Deichmann, Lavie & Andrews, 2010; Deichmann et al., 2015; Meador & Huey, 2010; Vladutiu et al., 2006) (Table 1).

The association of statin therapy with physical training require a number of measures: adjustment of statin therapy (reassessment of the need to use statins, decreased dose of statins, changing medication with a hydrophilic statin, achieving of a pause in statin therapy), adjustment of physical training (decreasing the intensity and the length of physical training), restoring vitamin D deficiency, avoiding the combination of drugs that increase the statins toxicity (Deichmann et al., 2015).

Conclusions

In summary, statin therapy is recommended for individuals at increased ASCVD risk. Statins are usually well tolerated possessing a good safety profile, although dose dependent side effects of statins may occur. Patients at risk for CHD should attempt dietary and physical activity modifications for at least three months before starting lipid-lowering medications.

However, the prolonged use of statins may reduce improvements in physical fitness in response to exercise training by impairment in skeletal muscle mitochondrial content and function. In support of these data, physiologic doses of simvastatin induce myotube atrophy and cell loss associated with impaired mitochondrial respiratory capacity, mitochondrial oxidative stress, and apoptosis in isolated skeletal muscle fibers after exercise training, suggesting that mitochondrial dysfunction may underlie statin-induced myopathy.

Table 1. Review of the literature

Study	Methods	Results
Parker & Thompson, 2012	37 subjects treated with statins and 43 nonstatin-treated controls	Statins increase exercise-related muscle injury and this is related to age.
Krishnan & Thompson, 2010	Six studies examining the effect of statins on muscle strength and nine studies examining their effect on exercise tolerance.	Statins affect muscle strength and exercise performance (insufficient data). Also they may reduce muscle strength in older patients and alter energy metabolism during aerobic exercise.
Kwak et al., 2012	Differentiated primary human skeletal muscle cells (myotubes) were collected	Statin therapy induces myotube atrophy, decreased mitochondrial respiration, mitochondrial oxidative stress, and apoptosis in isolated skeletal muscle fibers after exercise training.
Myers, Kokkinos & de Araújo, 2014	Review of the literature	Statins attenuate the beneficial effects of exercise training by the occurrence of several side effects: liver damage, muscle pain, inflammation, and myopathy.
Deichmann et al., 2015	Review of the literature	The combination of statins and exercise training induce decreased athletic performance, muscle injury, myalgia, joint problems, decreased muscle strength and fatigue.
Vladutiu et al., 2006	110 patients with statin-induced myopathies were tested	Genetic factors may increase the individual susceptibility to statin-induced myopathy in 10% of these patients.
Deichmann, Lavie & Andrews, 2010	Review of the literature	Coenzyme Q10 deficiency, vitamin D deficiency, and underlying muscle diseases are among the factors that may predispose patients to intolerance of this combined statin therapy and exercise training.
Meador, & Huey, 2010	Review of the literature	The mechanisms for the combined statin-associated myopathy and physical activity include skeletal muscle fiber apoptosis, alterations in ubiquitin-proteasome pathway activity, mitochondrial dysfunction, and terpenoid depletion.

However, the prescribing of exercises by physicians is quite difficult. Also, it is difficult to associate statin therapy with increased aerobic fitness, because of local adverse effects, which tend to decrease patients' physical activity levels, decrease muscle strength and athletic performance. Although it has been proved that each of the two types of prescriptions, physical activity and statins, have beneficial effects in lowering the risk of cardiovascular disease, caution should be taken to the combination of these, especially in people with increased risk of local effects and cardiovascular events.

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ACTIVE COMMUTING TO FACULTY PILOT STUDY

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ABSTRACT. Nowadays active commuting represents a frequent subject in the scientific journals. Active commuting to school, as is emphasized in several studies, influences the level of physical activity and the health of young people. Obesity and some hearts issues could be prevented, as studies said, by walking and cycling to school. The aim of this study was to find how students, from Babeş-Bolyai University, commute to their faculties during a week. In the study were involved people aged 18-20 years old, n=186. The overcomes show that the main way of commuting is using a bus. Around 30% of them commute by walking, meanwhile only 3,4 students use cycling to rich their faculties.

Key Words: *Commuting, bus, walking, cycling, distance, body mass index.*

REZUMAT. *Deplasarea activă la facultate. Studiu Pilot.* Deplasarea activă, sub formă de mers sau folosind bicicleta, către și dinspre școală acasă, este un subiect frecvent abordat în zilele noastre. Majoritatea studiilor cu această tematică, scot în evidență faptul că deplasarea activă are efecte benefice asupra sănătății tinerilor. Incidența obezității și a unor probleme cardiace poate fi redusă prin deplasarea activă, spre școală/facultate, (pe jos sau cu bicicleta). Studiul de față își propune să determine felul în care o parte dintre studenții Universității Babeş-Bolyai se deplasează la facultate și dinspre facultate acasă. (sau la locul unde sunt cazați). În acest studiu au fost implicați studenți cu vârsta între 18-20 de ani, n=186. Din analiza statistică a datelor a rezultat că majoritatea studenților se deplasează, spre facultate și înapoi spre casă, folosind ca mijloc de deplasare principal autobuzul, în timp ce doar aproximativ 30% dintre ei se deplasează pe jos. Studiul arată că doar un număr redus, 3-4 studenți dintr-un total 186, folosesc bicicleta ca mijloc de deplasare.

Cuvinte cheie: *deplasare, autobuz, bicicleta, mers pe jos, indicele de masă corporală, distanță.*

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Introduction

The aim of this study is to determinate if the first year students, from different faculties, commute to faculties and back to their accommodation in an active way (walking or cycling).

Commuting to school in an active way (walking or cycling) is considered a physical activity with several implications on kids' health. (Kallio et al, 2016; Chillón, et al. 2017; Rodríguez-López et al, 2017). Active commuting to school "is a physical activity behavior occurring daily in specific frame times before and after school" (Chillón, et al. 2017, p. 613). Several studies which approach this subject emphasize that active commuting has a lot of benefits for the individual, by increasing the fitness level and their academic performance (Chillón, et al. 2017, apud Larouche et al, 2014; Van Dijk et al, 2014; Haapala et al 2014).

Active commuting influences the cardiovascular fitness level with direct influences on youths' health (Muntaner-Mas et al., 2018, p. 2). Keeping a normal weight, like some studies emphasize, could be influenced by an active commuting (Martins et al., 2016, apud Faulkner et al., 2009; Østergaard et al., 2012; Saunders, Green, Petticrew, Steinbach, & Roberts, 2013).

Some of the authors consider the active commuting to school (cycling or walking) as being prevention means against obesity and related heart disease. They were interested to find an association between active commuting, body fat and visceral adipose tissue. Those who reported that they commute active (walking and cycling) registered lower values of the body fat index and visceral adipose tissue than those who declared that they use cars for commuting (Mytton et al., 2018).

Material and Methods

The study was conducted on a sample of 186 students, boys (n=38), girls (n=148) and it was organized in June/2018.

In order to realize this study, we have used the following research methods: bibliography study, survey and statistical analysis. Collecting the data was based on "Mode and Frequency of Commuting to and from School Questionnaire" elaborated by Spanish researchers (Chillón, Herrador-Colmenero et al., 2016), from who we have asked the permission to use the questionnaire. At the initial instrument we have added few options, with the purpose to register the distance between students' accommodation and their faculties.

Results

In order to establish the body mass index, we started from the weight and the height self-reported measurements. Most of the students, 143 from 186 have a normal weight while 18 of them are overweight, as it can be seen in the Chart no.1.

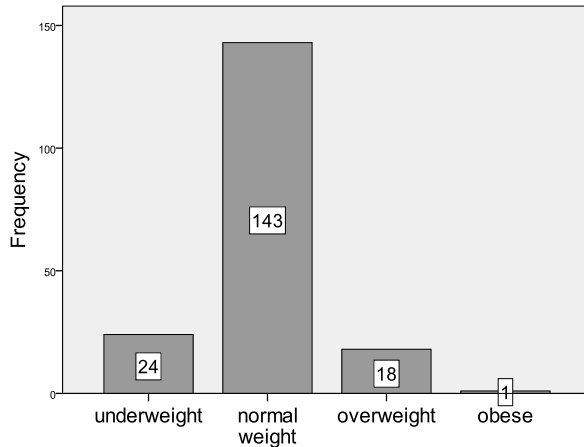


Chart no. 1 Body mass index

Every student had to declare the distance between their accommodation and faculties. As it can be observed in the Chart no.2 the most of them have to cover daily a distance between 2 and 5 km.

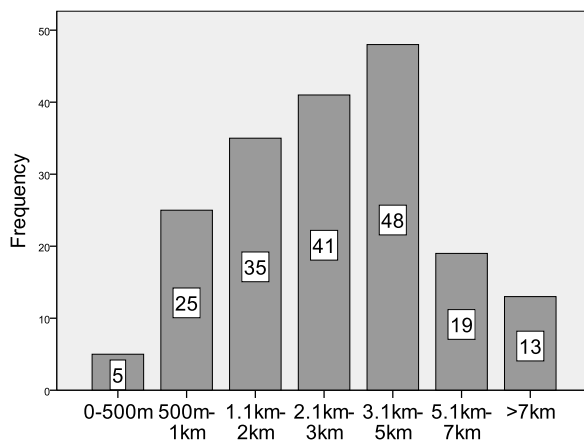


Chart no. 2 Distance to faculty (km)

The most of the students, usually, commute to their institutions, as is represented in the Chart no. 3, by bus (107 of them) while just 59 by walking and 12, of them, half walking and half by bus. Only 2 of them use a bike for commuting.

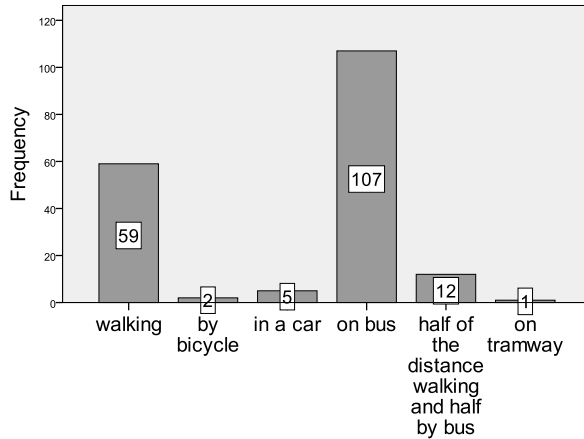


Chart no. 3 Commuting to faculty (usually)

Being asked how they come back, usually, from their institutions to the place where they live, they reported as it can be seen in Chart no 4, 115 of them use the bus and just 51 comeback, to their residence, by walking.

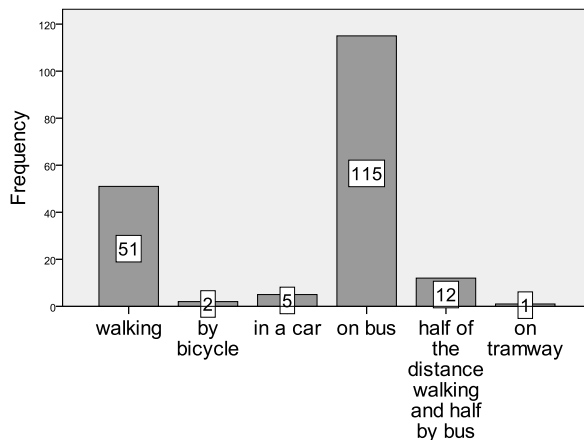


Chart no. 4 Coming home from faculty (usually)

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The ways in which they commute to faculties (go and back) on Monday is represented in the charts situated bellow (no. 5 and 10). From 186 students, 90 of them reported that they use a bus, toward their institution and 65 are more active, because they commute by walking. Some of the students, precisely 105 return to their accommodations using the bus, while just 57 return by walking.

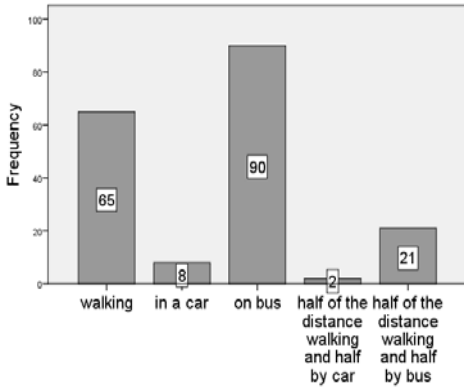


Chart no. 5 Commuting to faculty on Monday

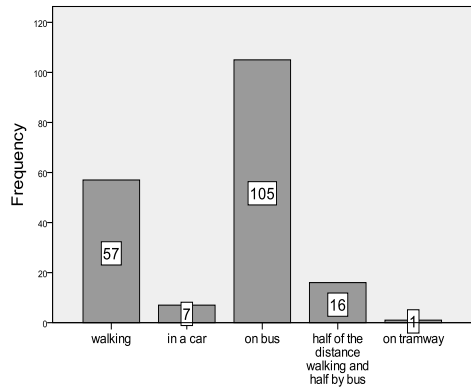


Chart no. 10 Coming home from faculty on Monday

The chart no.6 shows us that the preferred mean to rich the faculty, on Tuesday, is the bus, while 62 prefer having a walk. Only three of them use a bike. Regarding the way back, chart no.11, toward their accommodation, 103 use the bus and 61 prefer walking.

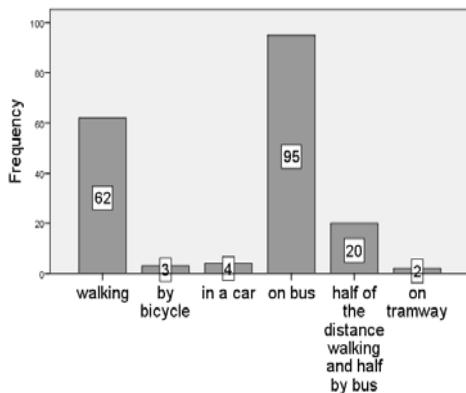


Chart no. 6 Commuting to faculty on Tuesday

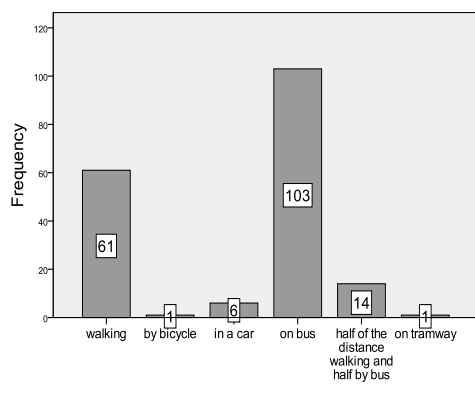


Chart no.11 Coming home from faculty on Tuesday

Wednesday, the main means to commute are the buses and walking, as it can be seen in the graphics bellow (chart no.7 and no.12).

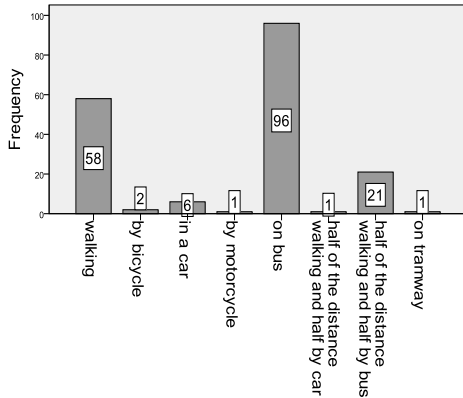


Chart no. 7 Commuting to faculty on Wednesday

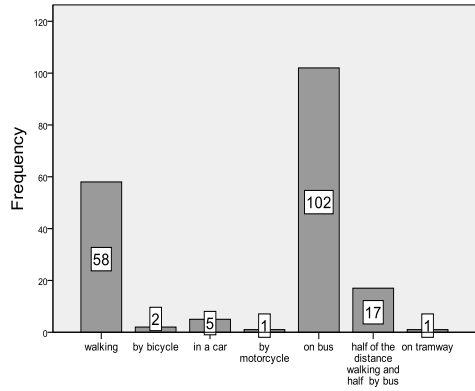


Chart no. 12 Coming home from faculty on Wednesday

The ways of reaching the faculty and back to their accommodations, on Thursday, can be seen in the charts no. 8 and 13. Most of the students use the bus, as they reported before, and some of them prefer walking. Just one of them uses the bike even if the data was collected during the summer season when usually young people use bikes in order to commute.

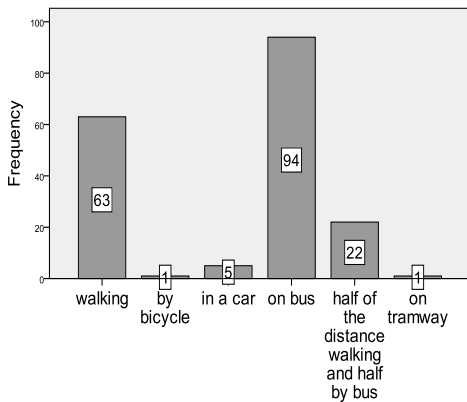


Chart no. 8 Commuting to faculty on Thursday

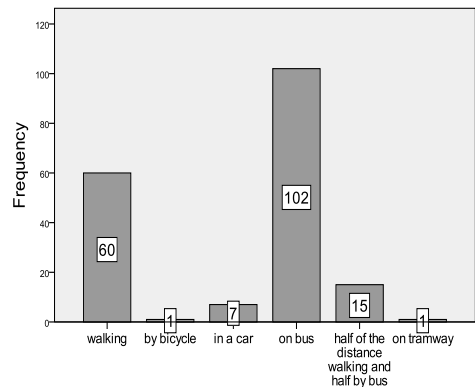


Chart no. 13 Coming home from faculty on Thursday

Seeing the charts bellow (no. 9 and 14) we realize that people, on Friday, prefer commuting by bus or walking and only few of them commute with the bike or by car.

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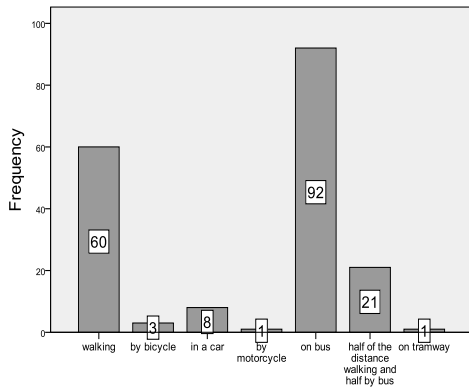


Chart no. 9 Commuting to faculty on Friday

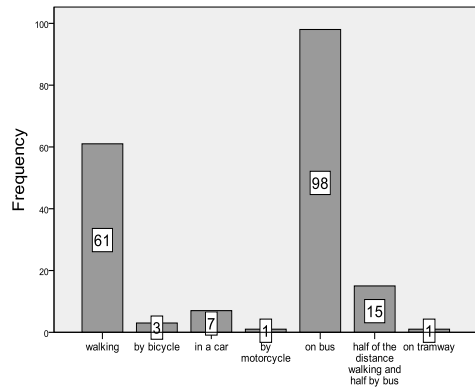


Chart no. 14 Coming home from faculty on Friday

Conclusions

Starting from outcomes we can observe, the major part of the students (143 from a total of 186) have normal BMI values, which could be considered a good news, knowing the implications of obesity diseases.

The results show us that the students should commute daily a distance between 2 and 5 km from their accommodation to their faculties.

The people involved in this study prefer to commute using the bus, while only around 30% of them commute by walking.

Regarding the interest to commute by cycling is very weak, only 3,4 of the them use the mentioned mean for commuting.

Meanwhile in the European biggest cities more and more people use active means for commuting, in our city the young people still prefer to commute by bus. The main reason could be the reduced number of cycle tracks and the lack of safety during commuting. As a short comparison between two similar cities, Nantes and Cluj-Napoca, at least at the level of population number (World population, n.d) the city of Nantes (declared velo City in 2015) has 485 km of cycle tracks, while the city of Cluj-Napoca, and its surroundings, has only around 59 km of cycle tracks (Oroş, 2015).

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STUDY CONCERNING THE EFFICIENCY OF THE USE OF DYNAMIC GAMES IN PHYSICAL EDUCATION AND SPORTS LESSONS AT 8th CLASS

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ABSTRACT. Problem statement: In this research, we want to present an experimental study demonstrating that dynamic games bring the lesson of physical education and sport a plus in terms of the results of the school curriculum control tests, but not only they have an important role in combating absenteeism at sports classes. The study was conducted during the first semester of the school year 2017-2018 at the “Mihai Viteazul” Campia-Turzii Secondary School, in the 8th grade, by introducing dynamic games of physical education and sport. The pupils’ evaluation was carried out with the help of compulsory control tests, in order to track the influence of the games on the results obtained. **Objectives:** The objectives are the implementation of dynamic games in physical education and sports lessons in the 8th grade, specific games for each subject of the lesson and quantification of the effectiveness resulting from their application by means of periodic verification. **Materials and methods:** school materials such as the meter, mattresses, milestones, the timer were used, and as a human resource, the two eighth grades were divided into the control class and the experiment class. **Conclusions and recommendations:** Following the experiment, positive results were recorded in both classes, specifying that the results of the experimental class had a higher improvement than the control class results.

Keywords: *physical education, dynamic games, 8th grade*

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REZUMAT. *Studiu privind eficiența folosirii jocurilor dinamice în lecția de educație fizică și sport la clasele a VIII-a.* **Introducere:** În lucrarea de față, dorim să prezentăm un studiu experimental prin care să demonstrăm că jocurile dinamice aduc lecției de educație fizică și sport un plus din punct de vedere al rezultatelor probelor de control din programa școlară, dar nu numai, acestea având și un rol important în combaterea absenteismului la orele de sport. **Situația problemei studiate:** Studiul s-a realizat pe parcursul semestrului I, al anului școlar 2017-2018, la Școala Gimnazială „Mihai Viteazul” Câmpia-Turzii, la clasele a VIII-a, prin introducerea în lecțiile de educație fizică și sport a jocurilor dinamice. Evaluarea elevilor s-a realizat cu ajutorul probelor de control obligatorii, cu scopul de a urmări influența jocurilor în rezultatele obținute. **Obiective:** Obiectivele sunt implementarea jocurilor dinamice în lecțiile de educație fizică și sport la clasele a VIII-a, jocuri specifice pentru fiecare tematică a lecției și cuantificarea eficienței rezultate în urma aplicării acestora cu ajutorul verificării periodice. **Materiale și metode:** s-au folosit materiale din dotarea școlii precum metrul, saltelele, jaloane, cronometrul, iar ca resursă umană, cele două clase de a VIII-a au fost împărțite în clasa control și clasa experiment. **Concluzii și recomandări:** În urma experimentului efectuat s-au înregistrat rezultate pozitive la ambele clase cu precizarea că, rezultatele clasei experiment au o îmbunătățire mai mare față de rezultatele clasei control.

Cuvinte cheie: *educație fizică, jocuri dinamice, clasa a VIII-a*

Introduction

The concept of physical education and sports comes from the general view of the life of a society and differs from one country to another. According to I. Șiclovă (1977), “physical education is a deliberately built and directed process to improve physical development, people’s motor ability, in accordance with age, gender, social integration requirements of young people.”

According to Dragnea (2006), the physical education and sports lesson must fulfill the “modern” function that is the development of the competitive spirit, a characteristic of the human being in general, and the formation of a permanent desire for “self-sufficiency” and “overcoming”, but only within the limits of rules, correct and fair-play attitudes. In this sense, it is necessary to promote in physical education - especially - the competition through bilateral sports games, games of movement, races, paths or applicative routes, competitions etc.

Once the age of the students increases, fewer and fewer attend physical education and sports classes. If in primary classes physical education is a priority for pupils, for secondary schools, especially 7th and 8th grade, it becomes a “waste

of time”, a class that can be missed. Noticing these 8th grade classes, it can be very easily observed that there is a decrease in the students’ interest for the class, the absenteeism rate being high.

Using dynamic games, the aim is to increase the efficiency of physical education and sports classes and increase their attractiveness, too (Prodea, 2010). The Explanatory Dictionary of Romanian Language explains the word “play” / “to play” as follows: “fun activity”, “childish fun” or “spending time, getting amused by different games or toys “. The word “dynamic” means “full of motion”, “action,” “that is in constant and intense movement”, “evolution”, “that is going fast”. From all these we can conclude that “dynamic play” is “a fun activity, characterized by a continuous movement and an intensive activism” (dexonline.ro).

Objectives

The main objective of the research was the implementation of dynamic games in the physical education and sports classes with the aim of increasing the motor density, the attractiveness of the lessons and the active involvement of the students (building abilities and motivation for learning).

Materials and methods

The research was carried out with the help of two 8th grades from “Mihai Viteazul” School Campia Turzii, with a total of 21, respectively 23 students. The method used was the experiment, which consists in testing students at the beginning and at the end of 1st semester.

The control tasks are done according to the school curriculum, that is: 50m speed run, long-distance jump and development of the abdominal and back force. During the semester, one class (the experiment class) takes part in at least 2 dynamic games with specific themes each lesson, while the other class (the control class) has normal, planned lessons. The tests were carried out in the gym of the school with the existing equipment. If for the dynamic games there were used: all types and sizes balls, staples, sticks, balloons, cones, etc. (necessary materials for practicing dynamic games), for the evaluation of students the materials were: two timers, milestones, mattresses, meter and chalk.

Results

For the control class, where the lessons were done normally, according to the plan, the results were the following:

Table 1. Results in initial and final testing for the control class

Testing stages		50m speed run (seconds)		Long-distance jump (cm)		Crunches 30" (repetitions)		Lower Back extensions 30" (repetitions)	
		Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Statistical indicators									
Arithmetic mean									
Initial testing		8.8	7.84	1.48	1.71	21.7	24.7	23.1	25.5
Final testing		8.5	7.6	1.55	1.80	23.5	26.6	25.5	27
Difference		0.30	0.24	7	9	1.8	1.9	2.4	1.5
Standard deviation	Initial	0.07	0.28	0	0	5.65	2.82	0.70	0.70
	Final	0.70	0.35	0.02	0.06	5.65	0.70	0	1.41
Coefficient of Variability	Initial	0	0.03	0	0	0.26	0.11	0.03	0.02
	Final	0.08	0.04	0.01	0.03	0.23	0.02	0	0.05

At the 50m speed run (as shown in Table 1), the control class achieved a progress of the arithmetic mean at the final test against the initial test of 0.24 sec. in boys and 0.30 sec. in girls.

For the explosive force test, the long-distance jump, the boys and girls in the control class achieved a 9.5 cm, respectively 7 cm arithmetic mean progress.

The progress of the arithmetic mean for crunches lift-ups 30" testing is 1.9 repetitions in boys and 1.8 repetitions in girls, at the final tests.

For the experimental class, where dynamic games were used every lesson during the 1st semester, the results are:

Table 2. Results in initial and final testing for the experimental class

Testing stages		50m speed run (seconds)		Long- distance jump (cm)		Crunches 30" (repetitions)		Lower Back extensions30" (repetitions)	
		Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Statistical indicators									
Arithmetic mean									
Initial testing		8.74	7.94	1.50	1.72	20.7	25	24.6	26
Final testing		8.18	74.2	1.61	1.86	22.8	28	26.5	29.2
Difference		0.56	0.52	11	14	2.1	3	1.9	3.2
Standard deviation	Initial	0.28	0.56	0.05	0.12	2.82	3.53	0	0
	Final	0.21	0.49	0.02	0.04	0.70	0.70	2.12	0.70
Coefficient of Variability	Initial	0.03	0.07	0.03	0.07	0.13	0.14	0	0
	Final	0.02	0.06	0.01	0.02	0.03	0.02	0.07	0.02

According to table number 2, the results of the experimental class are the following:

At the 50m speed run (as shown in Table 2), the experimental class achieved a progress of the arithmetic mean at the final test against the initial test of 0.52 sec. in boys and 0.56 sec. in girls.

For the long-distance jump, the boys and girls in the experimental class achieved a 14 cm, respectively 11 cm arithmetic mean progress.

The progress of the arithmetic mean in crunches 30" testing is 3 repetitions in boys and 2.1 repetitions in girls, at the final tests.

The arithmetic mean in back extensions30" had a plus of 3.2 in boys and 1.9 in girls at the final tests, compared to the initial ones.

After interpreting the results of the control class and the experiment class, it is very easy to notice that both grades have a visible progress.

As a result of our intervention, in the experimental class, the progress of the arithmetic mean is more significant than in the control class, almost in all the control tasks, respectively, in boys the differences of progress between the initial and final testing in the control and experimental class are:

- 0.28 seconds in 50m speed run;
- 5 cm in long-distance jump;
- 1.1 repetitions in crunches 30";
- 1.7 repetitions in back extensions 30".

As for the girls in the experimental class and the control class, the differences of the arithmetic mean are:

- 0.26 seconds in 50m speed run;
- 4 cm in long-distance jump;
- 0.3 repetitions in crunches 30" (despite the fact that the performance is higher in the control class, the experimental class has achieved higher progress!);
- 0.5 repetitions in back extensions 30" this test being the only exception because the girls in the control class had a higher progress than the girls in the experimental class.

The comparative analysis of the progress of the arithmetic mean values of the experimental and control class revealed, with a slight exception in the girls (at a control test), that the dynamic games introduced in the physical education and sports lessons during the first semester, produced a level increase on students' skills.

Discussions

Dynamic games increase the efficiency of physical education lessons, but they can also serve as a way of selecting and guiding students to practice different sports and especially sports games (Mihăilă, 2014). For the boys' groups in the research it was observed that the values of the muscular abdominal and muscular arm force showed the most significant progress. They were followed by the target throw, legs muscle strength, strength, mini-basketball skills and memory capacity, as well as correctly executing the exercise structure.

For the girls' groups, the most significant progress was achieved in the legs muscle strength and in target throw. These were followed by the values reflecting the level of specific skills in mini-basketball, the muscle strength of the arms and of the back, the ability to memorize and correctly execute the structure of the exercises, strength and abdominal muscle strength (Bălan, Shaao, 2014). The methodological approaches of these studies aimed to increase individual participation, to strengthen collective capacity to solve problems, to increase self-confidence of players, to develop psychological and functional-functional tone, to improve physical and mental state and to increase civic solidarity and responsibility. Motivational games have the quality to function in an uncertain environment and are accompanied by intensive social group processes that can lead to the awareness of individual abilities and through the scenarios they involve (selection, organization, management and evaluation), they can improve the personal development of dynamics (Mijaica, 2014).

Conclusions and recommendations

According to the results we can conclude the fact that dynamic games bring better benefits and results if they are introduced in the physical education and sports lessons. The objectives of the research were reached and indirectly, we also noticed a decrease in the absenteeism rate in students from the experimental class, where dynamic games were introduced. We recommend the use of dynamic games in physical education and sports lessons because, in addition to better results, we have also noticed that the absenteeism phenomenon in sports classes has been reduced in the experiment class.

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RESISTANCE BY FOOTBALL VS RESISTANCE THROUGH ATHLETICS

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ABSTRACT. Purpose: To study the students' opinion about their preferences regarding the development of resistance in physical education lessons by means and methods specific to athletics or football. **Objective:** Optimizing the development of resistance in physical education classes through the students' favorite means, among those belonging to athletics or football. **Hypothesis:** It is supposed that for the optimization of the development of resistance, the means of football are preferred by the pupils at the specific means of athletics, to work systematically with them in lessons during the school year. **Material and Method:** We used the questionnaire survey method on a representative sample of 681 high school students. The 28 investigative questions of the questionnaire asked the subjects of closed, free and fan dichotomic answers. These were tabulated for a synthetic and accurate presentation of the data collected for analysis and interpretation. **Results:** The collected, tabulated and interpreted data provided us information that allowed the identification of football means to be preferred by the vast majority of students (81.18%), to work with them on the development of resistance. **Conclusion:** The questionnaire survey method confirmed the assumption of the formulated hypothesis, that in order to optimize the development of the resistance of their body students prefer the training with football means.

Keywords: *Questionnaire, resistance, development, means, football.*

REZUMAT. Rezistența prin fotbal VS Rezistența prin atletism. Scop: Optimizarea dezvoltării capacității vitale prin mijloace și metode specifice jocului de fotbal.; verificarea experimentală a eficienței mijloacelor și metodelor fotbalistice în optimizarea capacității vitale; dezvoltarea rezistenței

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generale și a rezistenței specifice jocului de fotbal; dezvoltarea capacității de mișcare generală și specifică jocului de fotbal. Se presupune că implementarea sistematică și corectă în lecțiile de educație fizică și sportive a unui sistem de mijloace și metode fotbalistice poate dezvolta mai mult nivelul capacității vitale a elevilor liceeni, decât folosind mijloace tradiționale specifice atletismului. Experimentul s-a desfășurat pe nivel de studiu cu 681 subiecți din 28 de clase cumulate din patru licee. Au fost alcătuite randomizat patru eșantioane experimentale și patru de referință. Eșantioanele experimentale au lucrat în lecții cu mijloace specifice jocului de fotbal timp de un an școlar, iar cele de referință cu mijloace tradiționale specifice atletismului. Subiecții tuturor eșantioanelor au fost evaluați predictiv și sumativ la proba funcțională capacitate vitală. Urmare a implementării mijloacelor și metodelor fotbalistice subiecții eșantioanelor experimentale au obținut rezultate mai bune la evaluarea sumativă, comparativ cu subiecții eșantioanelor de referință. Diferența a fost semnificativă la pragul $p < 0,05$, deci ipoteza de nul se infirmă și se acceptă ipoteza formulată. Experimentul, prin calcule statistico-matematice, confirmă impactul major al folosirii mijloacelor și metodelor fotbalistice în optimizarea capacității vitale a elevilor liceeni, comparativ cu varianta folosirii mijloacelor tradiționale din atletism.

Cuvinte cheie: *optimizare, impact, capacitate vitală, mijloace și metode fotbalistice.*

Introduction

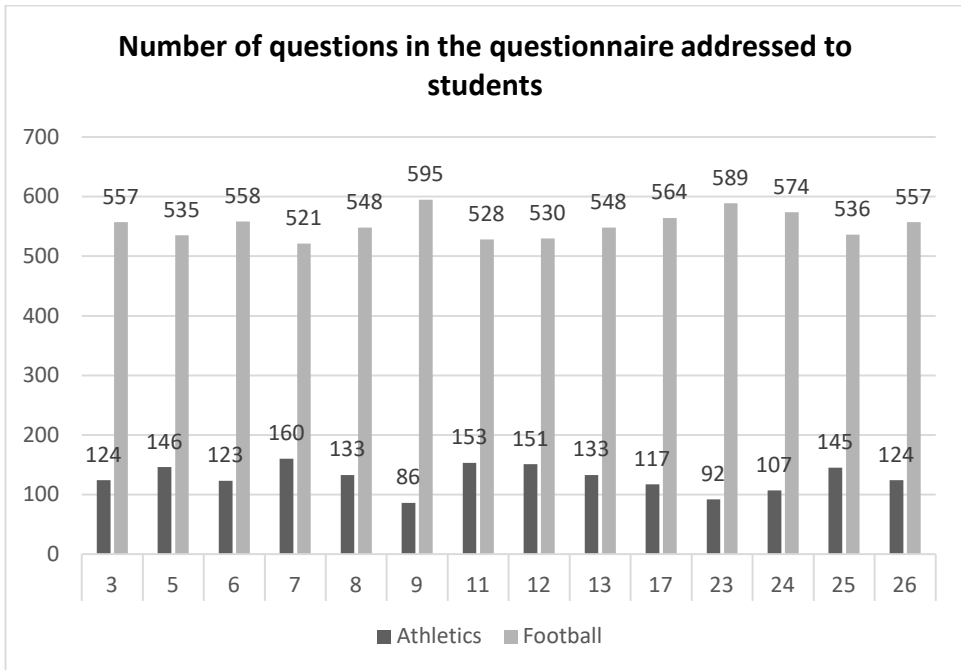
The resolution of the basis of our research was also based on the questionnaire survey method to choose the preferred means by pupils, among those specific to athletics or football, which implemented in the training would be able to optimize their vital capacity. "It is necessary to use investigative methods, especially if we are interested in their opinions, attitudes and motives, individuals or groups. For example, using the questionnaire, we can recognize" the preferences of a class of students with regard to the preferred sport" (Epuran & Marolicaru, 1998). Investigational methods in some research are and become auxiliary, and they are part of a battery of tests that satisfy complex research. When we want to find out opinions, attitudes, customs, etc." these methods are the most appropriate " (Niculescu, 2002).

In order for the resistance development activity to be attractive and effective, it must be done during the lesson by means and methods agreed by the students (a conclusion to the preliminary research), which is why we conducted the survey through a quest among them. Knowing that the problems of a social grouping are not always managed equally by all its members, we

decided to approach the questionnaire survey on a representative sample of 681 students in order to investigate and collect information about their aspirations regarding the means of training with which they would prefer to work for the development of resistance, of those specific to athletics or football. "The surveys provide the possibility to inform about a certain reality through data that can be obtained from different people, teams or groups and consists of collecting these data through the question-answer technique. They include as a means of investigating the questionnaire and the conversation" (Niculescu, 2002). The questionnaire consisting of 28 investigative questions, simple and clear, formulated in an appreciative and evaluative form, asked the students three types of answers: closed dichotomic (yes-no), free and in fan "The type of questions was established: with pre-modified closed dichotomic responses, with free, post coded answers, with fan answers." In the questionnaire survey, only simple and easy to understand questions can be formulated" (Niculescu, 2002). These were given by the author, directly and individually, to the students to check their preference in one of the boxes. "The second way of distribution is the direct application of the questionnaire by a specialized person. The application of the questionnaire can be done individually or in groups and is done under control, in limited time or at will" (Niculescu, 2002). Their responses were recorded and tabulated for analysis and to be interpreted. In order to provide more reliable data as objective, we surveyed a representative sample of 681 students from classes 9th-12th studying in four schools chosen for the experiment "The art of investigation may contain groups of individuals or collective in the broad sense of the word. In practice, it can include the whole community in the area of investigation. Thus, recourse to the sample can be selected - representative - and samples taken at random." (Epuran & Marolicaru, 1998). "Through the methods of the survey, the researcher draws particular opinions and answers of the individuals as single people or in groups. The number of the investigated subjects can be variable: from a few cases to the entire population" (Niculescu, 2002). The result of the questionnaire survey was edifying: out of the 681 students surveyed, grades 9th-12th, 81.18% asked that their body resistance to be made during the physical education classes and only by specific football and 18.82% preferred athletics means. "Since the information obtained by questionnaire interprets the relative percent, or in the form of statistical indicators, it is very important that the people surveyed were part of as many categories as possible" (Gagea, 1999). From the table and graph showing the students' preferences for football and athletics:

Table 1. Statistical table containing the answers of the 681 students asked through questions referring to the preference to work in lessons with athletics or soccer means to develop the resistance of their body.

Answers		Preferences for athletics		Football Preferences	
		Nr.	%	Nr.	%
Number of questionnaire questions addressed to students	3	124	18.209	557	81.791
	5	146	21.439	535	78.561
	6	123	18.062	558	81.938
	7	160	23.495	521	76.505
	8	133	19.530	548	80.470
	9	86	12.628	595	87.372
	11	153	22.467	528	77.533
	12	151	22.173	530	77.827
	13	133	19.530	548	80.470
	17	117	17.181	564	82.819
	23	92	13.510	589	86.490
	24	107	15.712	574	84.288
	25	145	21.292	536	78.708
	26	124	18.209	557	81.791
Average		128	18.82	553	81.18
The ranking of preferences		II		I	



Graph 1. Diagram with the statistics of the answers given by the 681 students surveyed by questions that directly refer to the preference to work in lessons with athletics or football, to develop the resistance of their body

The data obtained from the investigation gave us more certainty about the truth when we wanted to find out the opinions, and the answers of the individuals. "The data obtained from the investigation, is purified by subjectivity by investigating more people, and the data obtained through the processing can offer a great deal of certainty about their truth " (Niculescu, 2002). From the students' answers to the questionnaire regarding the notions of regulation in athletics, we found the lack of knowledge of the simplest requirements, whereas in the ones referring to the notions of football the knowledge rises to an overwhelming percentage, from which we deduce that they are family members and they like it. Example: Notions in the regulation are known to 96% of students in football, while athletics only 24% (according to questions 14-15 of the questionnaire and figures 1 and 2).

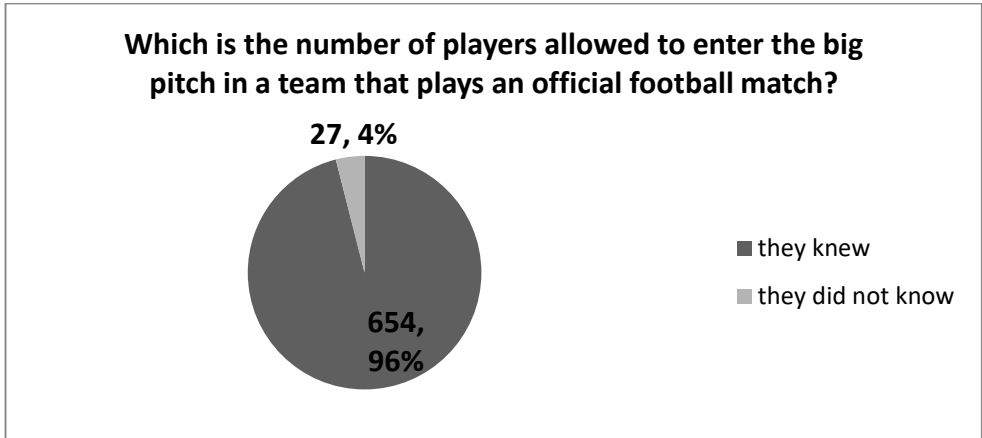


Figure 1.

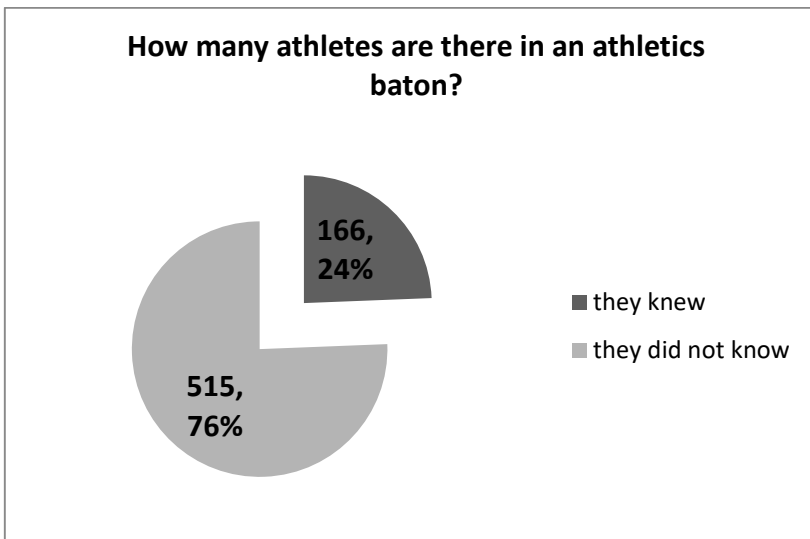


Figure 2.

Students' opinion on their preferences regarding the development of resistance in physical education lessons by means and methods specific to athletics or football.

Objectives

The sociological survey aimed to find the favorite means of students, among those belonging to athletics or football, with which to work on a more efficient development of resistance.

Methods

To solve the high school students' lack of interest in developing their resistance through classical means of athletics, and to find the way to make their preferred training more effective, we used the questionnaire survey method. In this way, we wanted to find out if students like more working with specific means of football than working with athletics. In addition to the method of the questionnaire, I have also referred to the methods of pedagogical observation, registration, graphics and comparison. "It is known that, by applying a single method, the results of the research are not conclusive, the more the use of investigative methods, we obtain information that carries a great deal of subjectivity, and it must be done alongside other methods " (Epuran & Marolicaru, 1998).

Results

The result of the answers given by the students to the 28 questions, which referred to their preference for working with the specific means of athletics in the physical and football classes, the result of the survey was conclusive, 81.18% in favor of working with football-specific means of developing resistance (see table 1 and graph 1 of the paper, previously reproduced). Depending on the answer given by the 681 students, each of the 28 questions of the questionnaire was chosen as the didactic strategy for the development of their resistance, which was the implementation of the specific means of football, which became the independent variable of our experiment.

Conclusions

Our survey of a representative sample of 681 high school students co-opted in the four high schools experiment highlighted the fact that they prefer to work with specific means of football for the development of resistance in physical education lessons.

The survey method based on the questionnaire confirmed the assumption of the formulated hypothesis, that for the development of the resistance of their body students prefer the training with football means, so the hypothesis was verified and validated. Based on the outcome of the survey, it can be argued that football-specific means are agreed by high school students compared to athletic means, when the resistance in physical education classes develops.

By the survey method we had the opportunity to convince us once again of the reality that when they work in lessons with the means they like, in our case means specific to football, efforts are made with a higher volume compared to the use of traditional means of athletics, which optimizes the development of resistance.

From the above we can state that the means specific to the football game are much more appreciated by the high school students than the traditional means specific to athletics, hence their pleasure to work with them was neglecting the great effort that demands them.

Used systematically in physical education lessons, football-specific means creates emulation by subjecting students to a high effort, effort conducive to the development of body resistance. The systematic development of exercise capacity through football means enriches the content of physical education and creates important physiological and psychological effects for general physical training, providing valuable impulses for self-improvement.

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OPTIMIZING THE COORDINATION SKILLS OF 12-YEAR- OLD TENNIS PLAYERS BY USING UNCONVENTIONAL (ADAPTED) TRAINING METHODS

MIRON FLORIN¹, ȘTEFĂNESCU HOREA²

ABSTRACT. The modern tennis is characterized by the restructuring of training content in the context of great performance of nowadays sports. Latterly, tennis implies a specific background of players' skills, which includes, first of all, a multifaceted training, the manifestation of a great level of creation, tactical inventiveness that can only be expressed by individuals who have reached a high level of technical, physical and psychological abilities. The significance of physical training is unanimously acknowledged, as it is the support of the players' activity, which can use their technical-tactical and psychological possibilities during training sessions and competitions. Under these circumstances, the need to apply "unconventional" training methods and create appropriate drills to positively influence the performance capability is, from our point of view, an essential preoccupation of the motricity specialist. Current performance training cannot be anchored in definitive template shapes.

Keywords: *tennis, performance, coordination abilities, unconventional drills*

REZUMAT. *Optimizarea capacităților coordinative în jocul de tenis utilizând metode neconvenționale la copiii de 12 ani.* Tenisul modern se caracterizează prin restructurarea conținutului pregătirii, în contextul amplificării spectacolului sportiv. Azi, tenisul presupune un fond specific de aptitudini ale jucătorilor, care include în primul rând o pregătire polivalentă, manifestarea unei mari libertăți de creație, de inventivitate tactică, ce nu poate fi exprimată decât de indivizii care au atins un înalt nivel de măiestrie tehnică, fizică și psihologică. Însemnătatea pregătirii fizice este unanim recunoscută, deoarece constituie suportul activității jucătorilor care astfel își pot valorifica posibilitățile tehnico-tactice și psihologice.

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În aceste condiții, necesitatea aplicării unor mijloace și metode de pregătire inedite, “neconvenționale” adecvate influențării pozitive a capacității de performanță, reprezintă din punctul nostru de vedere o preocupare esențială a specialistului din domeniul motricității.

Cuvinte cheie: *tenis de câmp, performanță, capacitate coordinativă, mijloc nespecific*

INTRODUCTION

The motor drills practiced and developed in the aquatic environment have specific characteristics due to the nonspecific environment (timing, balancing, modified force parameters) and all the improved motor abilities can be efficiently transferred on the tennis court (positive transfer).

The topicality of the work is that it is in line with the concerns of optimizing sports training in all its aspects (including the development of motor skills). The practical value of the paper is that it demonstrates the effectiveness of adapted unconventional drive systems and highlights the role of coordinating skills development in the sports training process.

Hypothesis

Starting from the premise that the optimization of sports training in the actual game of tennis is conditioned by the level of coordination capacities (essential elements of the motoring profile of the player) we will organize an experimental study that will confirm / invalidate the hypothesis that the use of tennis-specific motor-driven structures developed in the aquatic environment will have positive effects in optimizing the 12-year tennis player motor profile by increasing the specific parameters of the coordinating capacities .

Objectives

Selection of relevant bibliographic materials in current field of tennis training and theoretical foundation of the above mentioned topic, elaboration of an unconventional methodical line (developed in the aquatic environment) dedicated to the optimization of the coordination capacities, the means are taken and adapted from the tennis-specific motor structures, the increase of the training efficiency in the field of tennis.

Means and methods

Subjects

The subjects of the experiment were in number of 12 which were organized in two groups (experimental and control). The tennis players are aged between eleven and twelve years.

They have been training at different tennis clubs in Bistrita-Nasaud county having a five to six years of experience, currently playing tennis at advanced level. Also the junior tennis players involved in the experimental research have been participated at various national tournaments annually.

Experiment

The junior tennis players are engaged in performance activity with numerous participations competitions. While the control group carried out a standard training program according to the conventional training plan, the experimental group took part in adapted training sessions (where drills are adapted to the aquatic environment), internships included in the conventional annual plan. The experiment was conducted over a six-month period.

Table 1. Initial evaluation
Speed agility (meters/sec.) and coordination drills

Experimental group

Nr. Crt.	Name	6x20m	5m	10m	Hexagon	Diamond	Shuffle Steps
1	A. B.	4.66	1.91	2.80	10.90	21.40	8.79
2	F. N.	4.78	1.94	2.89	10.99	22.00	8.80
3	A. M.	4.39	1.79	2.77	10.48	21.10	8.39
4	V. D.	4.29	1.70	2.75	9.92	21.19	8.82
5	I. S.	4.80	1.97	2.90	10.92	24.10	9.00
6	C. N.	4.47	1.70	2.75	10.69	23.00	7.99

Control Group

Nr. Crt.	Name	6x20m	5m	10m	Hexagon	Diamond	Shuffle Steps
1	M. P.	4.96	1.99	3.00	11.10	24.90	9.10
2	D. G.	4.39	1.80	2.78	11.00	23.00	9.00
3	M. S.	4.90	1.90	2.85	11.20	23.10	8.90
4	P. P.	4.70	1.88	3.00	10.90	22.90	8.75
5	D. V.	4.35	1.77	2.70	10.50	21.45	8.60
6	G. U.	4.25	1.69	2.70	9.90	21.39	8.35

Table 2. Final evaluation, Speed agility(meters/sec.) and coordination drills

Experimental group								Control Group							
Nr. Crt.	Name	6x20m	5m	10m	Hexagon	Diamond	Shuffle Steps	Nr. Crt.	Name	6x20m	5m	10m	Hexagon	Diamond	Shuffle test
1	M. P.	4.95	2.00	3.05	11.05	24.40	9.00	1	A. B.	4.50	1.90	2.70	10.10	20.90	8.80
2	D. G.	4.30	1.77	2.73	11.09	22.95	8.92	2	F. N.	4.54	1.92	2.81	10.15	21.00	8.61
3	M. S.	4.83	1.88	2.80	11.12	23.00	8.93	3	A. M.	4.28	1.75	2.74	10.40	20.45	8.00
4	P. P.	4.75	1.84	2.96	10.88	22.79	8.41	4	V. D.	4.20	1.61	2.73	9.85	20.49	7.93
5	D. V.	4.34	1.75	2.72	10.44	21.00	8.43	5	I. S.	4.72	1.85	2.88	10.19	22.85	7.99
6	G.U.	4.22	1.68	2.66	9.92	20.90	7.90	6	C. N.	4.40	1.70	2.69	10.00	21.90	7.50

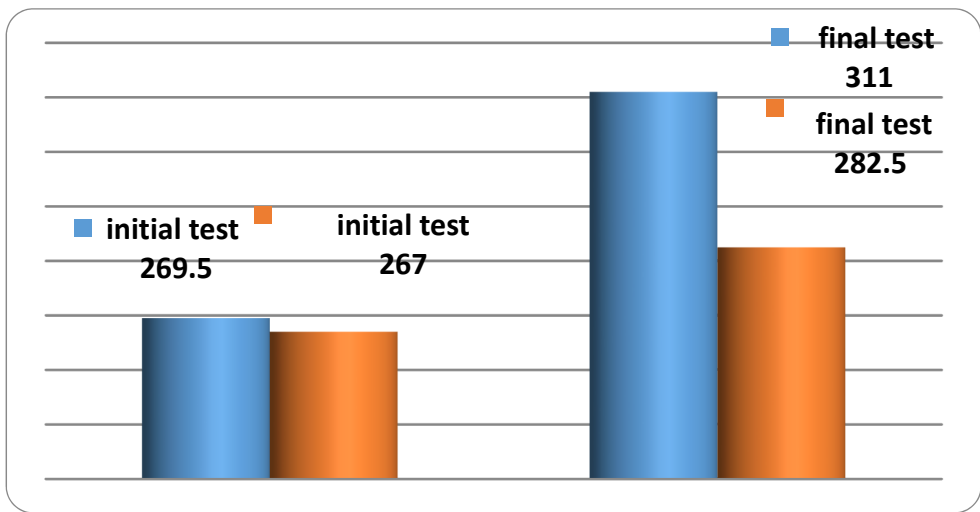


Fig. 1. Running test (6x20m) - average values

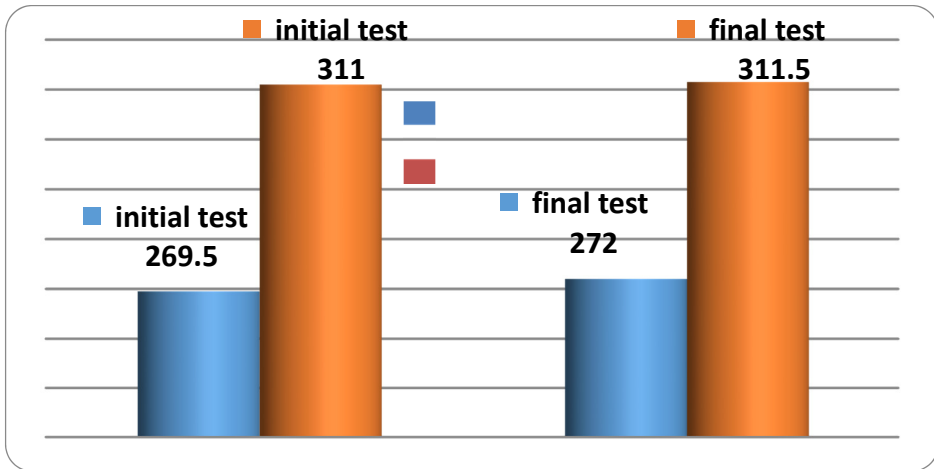


Fig. 2. Diamond test – average values

We will further demonstrate that the rate of progress and its dynamics is significantly different in the experimental group compared to the control group, evidenced by the calculated statistical indicators, but also by the diagrams built for each test.

For centralized data in the tables below, we make the following points:

- C represents the control group (control) and E the experimental group;
- IT is the initial test, and TF final testing;
- Initial-final student is the result of the T test applied to one of the groups for the two tests;
- Student Final is the T test for final testing, applied for the two groups;
- t represents the experimentally determined value at the T test;
- F represents the value recorded by the ANOVA method at the final test for the two groups;
- the critical value of F in the Fisher table used at the significance threshold of 0.05 with 1 and 18 degrees of freedom and calculated with the FINV () function of the Microsoft Excel application is 4.4138 ($F(0.05, 1, 18) = 4.4138$);
- the critical values of t in the Fisher table used at the significance threshold of 0.05 and calculated using the TINV () function in the Microsoft Excel application are as follows:
 - for initial T-test $T = 2.262$ for 9 degrees of freedom;
 - for final test T: $t = 2,1009$ for 18 degrees of freedom;
 - p represents the significance threshold (probability), the one used by us is 0.05.

Table 3. Diamond test/statistics

Diamond test											
Group		X	S	m	Cv	Student initial-final		Student final		ANOVA	
						t	P	T	P	F	P
E	TI	269.5	32.782	10.366	12.164	5.326	<0.05	2.334	<0.05	5.352	<0.05
	TF	311	29.79	9.42	9.58						
C	TI	267	25.733	8.137	9.638	2.435	<0.05				
	TF	282.5	24.54	7.76	8.68						

- mean values indicate an increase between tests by 41.5 degrees in the experimental group and by 15.5 grades in the control group, significant for both groups:

Experiment group: $t(9)=5.326>2.262$

Control group: $t(9)=2.435>2.262$

- the coefficient of variation indicates a high homogeneity in both groups is improving compared to initial testing, especially in the first group;

- the values of t and F in the final test confirm the significant differences between the two groups:

$t(18)=2.334>2.1009$

$F(1,18)=5.352>4.413$

Table 4. Running test/statistics

Running test											
Group		X	S	m	Cv	Student initial- final		Student final		ANOVA	
						t	P	t	P	F	P
E	TI	272	23.944	7.571	8.803	6.353	<0.05	3.144	<0.05	7.379	<0.05
	TF	311.5	24.72	7.81	7.93						
C	TI	264	29.135	9.213	11.036	2.143	>0.05				
	TF	274	28.48	9.01	10.39						

- mean values show an increase of 39.5 degrees in the experimental group and only 10 grades in the control group, significant only for the first group, also evidenced by the

Meaning tests:

experiment group: $t(9)=6.353>2.262$

control group: $t(9)=2.143<2.262$

-the coefficients of variation show very good values, with a slight improvement over the values from initial testing

-the values of t and F at the final testing confirms the semnificative differences between the two groups:

$t(18)=3.144>2.1009$

$F(1,18)=7.379>4.413$

Table 5. Initial evaluation - Ball speed (km/h) body and limbs coordination (experimental group)

Nr. Crt.	Name	Speed serve 1	Speed serve 2	Speed forehand	Speed backhand	High
1	A.B.	69	64	58	56	big
2	F.N.	70	66	61	57	big
3	A.M.	68	63	59	58	big
4	V.D.	71	37	60	57	big
5	I.S.	79	72	70	55	big
6	C.N.	71	65	61	59	big

Table 6. Final evaluation - Ball speed (km/h) body and limbs coordination (experimental group)

Nr. Crt.	Name	Speed serve 1	Speed serve 2	Speed forehand	Speed backhand	High
1	M.P.	67	61	61	58	big
2	D.G.	77	65	63	62	big
3	M.S.	69	62	59	59	big
4	P.P.	67	60	57	56	big
5	D.V.	67	62	60	57	big
6	G.U.	73	68	68	60	big

Table 7. Initial evaluation - Ball speed (km/h) body and limbs coordination (experimental group)

Nr. Crt.	Name	Speed serve 1	Speed serve 2	Speed forehand	Speed backhand	High
1	A.B.	84	77	74	73	Medium
2	F.N.	82	77	76	76	Medium
3	A.M.	80	71	72	71	Medium
4	V.D.	83	73	72	70	Medium
5	I.S.	89	80	85	82	Medium
6	C.N.	85	75	76	77	Medium

Table 8. Final evaluation - Ball speed (km/h) body and limbs coordination (control group)

Nr. Crt.	Name	Speed serve 1	Speed serve 2	Speed forehand	Speed backhand	High
1	M.P.	76	71	71	68	Medium
2	D.G.	83	75	70	71	Medium
3	M.S.	75	68	69	68	Medium
4	P.P.	73	67	66	64	Medium
5	D.V.	72	65	69	65	Medium
6	G.U.	79	73	75	70	Medium

Table 9. Forehand test/statistics

Forehand test											
Group		X	S	m	Cv	Student initial		Student final		ANOVA	
						t	P	t	P	F	P
E	TI	15.08	3.312	1.047	21.962	2.816	<0.05	3.231	<0.05	5.258	<0.05
	TF	14.75	3.675	1.162	24.91						
C	TI	15.27	2.86	0.904	18.729	1.869	>0.05				
	TF	15	3.093	0.978	20.62						

The average values indicate a few seconds improvement of the values recorded between the tests at both groups, significant improvement only for the experimental group:

Experiment group: $t(9)=6.353 > 2.262$

Control group: $t(9)=2.143 < 2.262$

- Homogeneity improves in both groups, more significant in the control group;
- The significant differences between the two groups from the final testing are highlighted by the values of t and F:

$T(18)=3.231 > 2.1009$

$F(1,18)=5.258 > 4.413$

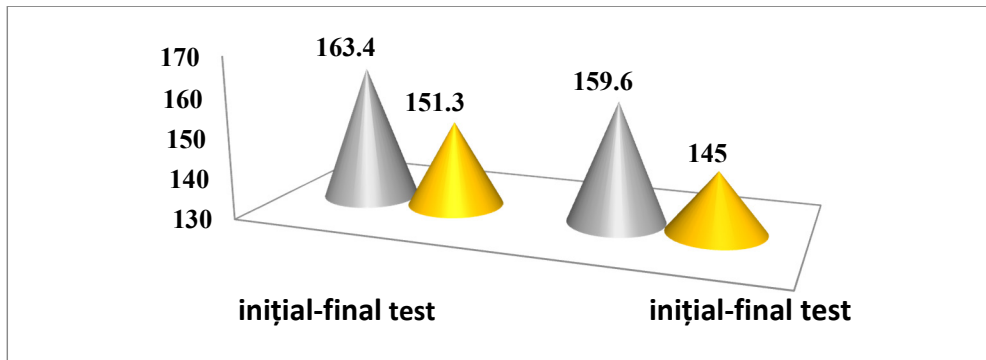


Fig. 3. Forehand/ average representation

Table 10. Backhand test/statistics

Backhand test											
Group		X	S	m	Cv	Student initial- final		Student final		ANOVA	
						t	P	t	P	F	P
E	TI	272	23.944	7.571	8.803	6.353	<0.05	3.144	<0.05	7.379	<0.05
	TF	311.5	24.72	7.81	7.93						
C	TI	264	29.135	9.213	11.036	2.143	>0.05				
	TF	274	28.48	9.01	10.39						

- mean values show an increase of 39.5 degrees in the experimental group and only 10 grades in the control group, significant only for the first group, also evidenced by the

Meaning tests:

experiment group: $t(9)=6.353>2.262$

control group: $t(9)=2.143<2.262$

- the coefficients of variation show very good values, with a slight improvement over the values from initial testings
- the values of t and F at the final testing confirms the semnificative differences between the two groups:

$t(18)=3.144>2.1009$

$F(1,18)=7.379>4.413$

The means applied by the programme adapted, unconventional synthetic refer to: trips in water, aquatic games (volleyball, water polo, badminton, imitative exercises coup state and coup state without using rockets lapel linking). All these tools are developed in the basin with water of various depths (knee, joints, elbow, coxofemural resulting in the joints of the scapular-humeral). In order to optimize the specific. Biomechanics of impact (the right shots and backhand), integrated motor components specific to these processes but adapted to the peculiarities of the aquatic environment and integrated methodological structures focused on these objectives. So I adapted the tennis racket (removing linking in the initial phase, then increasing the complexity of the executions I added linking and have increased resistance to the final stage. Equipment used: rockets, fireballs, whistle, dividing strips, radar, timer ball coach.

Results and Discussions

There were significant differences between experimental and control group, where the ball speed behind backhand and forehand stroke was significantly higher in the experimental group.

Higher values were also found in favor of experimental group regarding the speed and agility drills which are common in each sequence during point in the game of tennis.

In the present study we had used similar exercises as on the tennis court but with greater opposition involving the water in the equation. There is no unique model which can be generally applied when it comes to develop better speed and agility of the limbs, apart or as a entire unit, in the game of tennis.

Such an experiment can be used or performed easily by individuals who are not comfortable using high performance technology as long as there is no need of such things.

CONCLUSIONS

Coordinative capacities in the aquatic environment (repetitions characterized by higher concentration parameters - CNS and skeletal muscles) produce positive motor accumulations in the tennis player's profile.

The responsiveness seen in the context of the specific manifestation of the lower limbs (forms of movement in different directions) is significantly improved.

The capacity of the upper limbs in relation to the three relevant sequences of the basic technical procedures (forehand and backhand stroke) increases.

There is an improvement in the practical way of dealing with unpredictable situations in training and competition.

The motor program development has had a strong impact on the mental capacity (self-confidence, self-improvement, mental strengths).

The results obtained allow the validation of the research hypothesis and therefore the implementation of unconventional means and methods in tennis reveals beneficial effects that are found in the performances of 12 years old tennis players.

We recommend using these programs also in early stages because the motor profile of the children involved in sports performance is formed during this period, and the diversified and adapted methods and means (which succeed in capturing the interest) have to be integrated into the conventional sports training program.

Conflicts of interests

The authors have no conflicts of interests to declare.

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COMPARATIVE STUDY REGARDING THE EVOLUTION OF ROMANIAN AND FOREIGN U-BT CLUJ-NAPOCA BASKETBALL PLAYERS, IN THE 2016-2017 ROMANIAN CUP COMPETITION

MANASSES ILDIKO¹

ABSTRACT. Premises: This paper makes a significant contribution to developing a database regarding players' behaviour during competition. Also, by processing, analyzing and valorizing the available information and resources, the aim is to know the players better and to give full support to the coach so that he can make objective decisions. **Subject of research:** The research was conducted on six players, 3 foreigners and 3 Romanians, members of U-BT Cluj-Napoca basketball team, who competed in 2016/2017 in the Romanian Cup competition. **Method:** The relevant published literature was a major reference point for documenting this paper. The gathering of data was done by observing and registering basketball specific parameters. The processing of data was done using the statistical-mathematical method. **Hypothesis:** The study and acknowledgement of the players' behaviour during matches offers premises and foundations for the coach's activity and decisions. Comparing players' results and achievements leads to a better understanding and ranking of the players' contribution and role within the team's assembly mechanism, necessary in the decision making process. **Results:** In what follows, a comparison will be drawn analyzing the main parameters defining foreign players as compared to Romanian players, taking in consideration: shots, offensive rebounds, defensive rebounds, steals, blocks, decisive pass, stolen balls, scored points. The purpose of this study is to sketch a comparative model of the foreign players' behaviour during games compared to the Romanians' game behaviour. **Conclusions:** Observing, registering, analyzing and processing game related data gives the coach objective information regarding players and overall team evolution, enabling him to make better decisions. The conclusions of the study show that, in most of the cases, the foreign players perform better. Thus, they add value to the team.

Key words: *basketball, players, men's basketball, Cluj-Napoca, Romanian Cup*

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REZUMAT. Studiu comparativ privind evoluția jucătorilor români și străini de la echipa de baschet UBT Cluj-Napoca, în competiția Cupa României 2016-2017. Premize. Prin elaborarea unei asemenea lucrări se contribuie la realizarea unei baze de date. Totodată, prin prelucrare, analiză și valorificare se ajunge la o mai bună cunoaștere a jucătorilor, la sprijinirea antrenorului pentru luarea unor decizii pe baze obiective. **Subiecți.** Am făcut obiectul cercetării pe șase jucători, trei străini și trei români, componenți ai echipei de baschet UBT Cluj-Napoca, care au participat în anul competițional 2016/2017, în competiția Cupa României. **Metode.** Pentru informarea legată de tema studiată s-a utilizat studiul literaturii de specialitate. Culegerea datelor s-a realizat prin observarea și înregistrarea principalilor parametrii specifici jocului de baschet. Prelucrarea datelor s-a făcut utilizând metoda statistico-matematică. **Ipoteze.** Studiarea și cunoașterea diferitelor aspecte privind comportamentul în joc al componenților echipei oferă premise pentru ca antrenorul să-și orienteze activitatea pe baze obiective. Prin compararea performanțelor realizate de jucători în competiție se poate realiza o mai bună cunoaștere și ierarhizare a contribuției, a rolului pe care îl au aceștia în angrenajul echipei, care să conducă la luarea unor decizii optime. **Rezultate.** Sunt prezentați și analizați principalii parametri realizați de către jucătorii străini comparativ cu jucătorii români – aruncările la coș, recuperările ofensive, recuperările defensive, interceptările, capacele - blocările mingilor aruncate la coș, pasele decisive, mingile pierdute, punctele marcate. În final, s-a realizat un model comparativ privind comportamentul în competiție al jucătorilor români și cei străini. **Concluzii.** Observarea, înregistrarea, prelucrarea și analiza datelor privind o seamă de parametri ai jocului oferă antrenorului date obiective pe baza cărora acesta poate să cunoască mai bine jucătorii, evoluția de ansamblu a echipei și, astfel, să ia decizii mai corecte. Din analiza comparativă a datelor rezultă că, în majoritatea situațiilor, jucătorii străini au un comportament în joc mai bun. În acest fel contribuie la ridicarea valorii echipei.

Cuvinte cheie: *baschet, jucători, masculin, Cluj-Napoca, Cupa României*

Introduction

Basketball is a sport played between two teams whose players are characterized by remarkable somatic and genetic features. (Colibaba-Evuleț and Bota, 1997) Their physical abilities are trained to be able to withstand intense physical effort, alternating submaximal graded exercises with short maximal effort periods (Baroga, 1994) in order to achieve the highest results in direct confrontation with an adversary player, both in defense as well as attack. (Teodorescu, 1975) Due to the game's specific requirements, a very important element is the basketball shooting, which requires spatio-temporal representation,

an above-average kinesthetic sense, a high sense of precision and high efficiency. All these skills are acquired with special training over a course of time (Ionescu and Dîrjan, 1997).

Taking into consideration all these factors, in order for the basketball players to reach the level and performance of professional senior players, they need to undergo a consistent training of about ten to twelve years. That is why, the selection and initial physical preparation starts at very young ages, around seven – nine years old, while the peak performance age will be around 25 – 27 years old. The work to reach high performance levels requires a systematic long term and complex training, the intensity of which increases at regular intervals. Designed to prepare the body for intense effort and resilience in competitions, the training is built on a set of pedagogic, biologic and psychological principles and has an interdisciplinary approach. (Dragnea and Mate, 2002)

The work of a basketball coach, like any other coaching activity, is conditioned by the systematic action of objective and subjective factors that determine the training process and the participation in competitions. Some of these are: the methodology and technology used, conditions and human resources, activity coordination and management etc. (Florescu, 1985) In order to reach the high performance standards of today's competitions and maintain top technical and methodological parameters, the coach is assisted by specialists from different areas of expertise: the theory and methodology of sportive training, medicine, psychology, sociology, informatics (Epuran, 2005). Their research and guidance contribute to the maintaining of the players' health, the better choosing of efficient trainings and the right proportioning of physical effort during training (Nicu, 1993).

There are many studies and research papers focusing on the different aspects of the basketball game. Depending on the demands, the research has been conducted towards basketball learning and consolidation methods (Pop and Roman, 2003), or towards the vocational training of higher education sport specialists (Predescu and Negulescu, 1998), or the theory and methodology of physical training (Colibaba-Evuleț and Bota, 1998), progressive training (Berceanu and Moanță, 2007), the optimum exploitation of the research results in order to maximize the coach's activity (Vicenzi & a, 2007). Besides these general approaches, other issues have also been studied such as: basketball seen from a mathematical and physical point of view (Hajossy and Macura, 2011; Brancazio, 1981), the study of the biomechanics of technical procedures (Feflea, 2011), the evolution of technical elements (Schmidt and Clausmayer, 1995; Smirnov, 1973), physical exercise (Feflea and Roșca, 2013), and many others.

The research papers are based on significant statistic information, acquired as a result of observing and recording the players' behaviour during matches. (Bachner, 1998) The purpose is to offer basketball specialists relevant

data regarding different aspects of the basketball game and to build data bases for objective analyses of the teams as wholes and of the individual players. (Maroti, 1996) The researcher can come in possession of such data either by accessing the competition's organizers' website, the international federation's website, the national federation's website, or he/she can personally record and collect the information.

Methods and subjects:

The paper follows the evolution of six players of U-BT Cluj-Napoca, three foreigners and three Romanians, which in 2016/2017 competed in the Romanian Cup competition. Representative players were selected, grouped according to the position occupied in the team.

Scientific documentation was the foundation regarding information about level of knowledge and direction of interest concerning the studied theme, establishing behavioral in-game indicators for team members, gathering, processing and making full use of data.

The paper is based on data gathered by observing and recording the main parameters of the basketball game, during the three matches played in Romanian Cup Final Eight: shots, offensive rebounds, defensive recoveries, interceptions, blocks – blocked basketball throws, assists, turnovers, points scored - all related to the playing time of each team member that has been the subject of this research, downloaded from the competition's website (1).

The following abbreviations have been used in the registration process: Min / M - minutes played per game; 3PA –three points shot attempt; 3PM - scored three points shot; 2PAM – two points shot attempt; 2PM - scored two points shot; 1Pa – attempted free throws ; 1PM – scored free throws; REC / M O - offensive rebounds (attack) ; REC / MD - defense rebounds (defense), I/M - number of intercepted balls ; C / M - number of blocked balls (caps), PD/M - the number of assists, MP/M - the number of turnovers, MC/M – the number of balls won, PCT / M - Total points scored per game, EF - The players' efficiency (coefficient of efficiency).

Data processing and calculating averages, percentages, efficiency indices were achieved through the statistical-mathematical method.

Purpose:

- The objective understanding of the behavior in the game of the best components of the team;

- Comparing the results and efficiency of these players;
- Providing the coach with objective data that would help in designing and implementing the training process, optimizing the management of the team during the competition, choosing more rationally when and what players to use.

Hypotheses:

The study and acknowledgement of different aspects of the players' game behavior provide the prerequisites for the coach to have an objective foundation on which to build his training activity. By comparing the actual performance of players in the competition better knowledge and ranking is achieved, their contribution is better highlighted, resulting in the coach's ability to take better decisions.

The results and their interpretation:

Comparative study of games played and active game time shows us that we find that all players have evolved in all matches. The actual playing time of the six players involved in the study is between 58,25 and 107,59 minutes.

Table 1. Number of games and minutes played

	Foreign players			Romanian players		
	R.A.	B.U.	D.K.	M.V.	T.R.	K.N.
Matches	3	3	3	3	3	3
Minutes	92.49	69.23	81.91	107.59	58.25	60.79

Given the purpose of the basketball game, which is to score as many points as possible in the opponent team's basket, one of the important indicators of the behaviour during game is the basketball shooting efficiency index.

Analyzing the basketball shooting, the 3points shots represented 42.87% in the case of the foreign players and 33.27% in the case of Romanian players. Of the total 2 points shots, the foreign players achieved 71.06%, while the Romanian ones only 40.55%. So the foreign players clearly stand out in what concerns basketball throws. If we analyze this proportion individually, the discrepancy is significant: 58 shots (the highest achievement) versus only 14 shots (the lowest achievement). Of the total of 201 throws, 112 were made by foreign players and 89 by Romanians players. The free throw situation is changing, where the share of attempts made by foreigners players is 38.30% and much higher for Romanians players 61.70%.

Foreign players have a percentage of 56.96 % in what concerns the efficiency of throws in action while the Romanians have a percentage of 36.91 %. The successful free throws percentage of foreigners is 77.66 % and 89.64 % of the native players.

Table 2. Efficiency Index of shooting

Shots	Foreign players									Romanian players								
	R.A.			B.U.			D.K.			M.V.			T.R.			K.N.		
	AT	MA	%	AT	MA	%	AT	MA	%	AT	MA	%	AT	MA	%	AT	MA	%
3 points	20	9	45	0	0	0	8	3	37.5	14	8	57.14	6	1	16.66	13	2	15.38
2 points	5	4	80	14	9	64.28	26	18	69.23	19	7	36.84	11	4	36.36	7	4	57.14
1 point	4	4	100	8	6	75	6	4	66.66	21	20	95.23	6	6	100	2	0	0

The classification compiled based on points scored shows that the first places belongs to a Romanian player, the next three places in the hierarchy are occupied by foreign players and the last two places are returned to the Romanian players.

Table 3. Player ranking based on contributions to points

Place	Player	Statute	Scored shots			Total	Game average
			3 pct.	2 pct.	1 pct.		
I	M.V.	Romanian	24	14	20	58	19.33
II	D.K.	Foreigner	9	36	4	49	16.33
II	R.A.	Foreigner	27	8	4	39	13
IV	B.U.	Foreigner	0	18	6	24	8
V	T.R.	Romanian	3	8	6	17	5.66
VI	K.N.	Romanian	6	8	0	14	4.66

In relation to game strategy, possession of the ball is an important element in the economy of the basketball game. It is obtained after a field goal scored by the opponent as a result of misconduct, a wrong action of a defense player or as a result of a player’s individual moves (a rebound, intercepting a pass, a block, a steal etc.)

Out of all these, we have focused on offensive rebounds, given the important role they play in ball possession. The difference between two teams in what concerns possession of the ball is in tight connection with the number of offensive rebounds made by the members of each team. (Dirjan, 1974)

Table 4. Offensive and defensive rebounds

Parameter	Foreign players			Romanian players		
	R.A.	B.U.	D.K.	M.V.	T.R.	K.N.
Offensive rebounds	4	5	3	9	5	2
Defensive rebounds	6	11	5	25	6	4

From the comparison of the averages achieved on the match, it results that the foreign players have an average of 4 offensive rebounds, compared to 5,33 obtained by the Romanian players. And in case of defensive rebounds foreigners have weaker achievements 7,33 compared to Romanians 11.66. As shown in table no. 4, comparing the other ways to obtain ball possession, the Romanians players outperform the foreign players.

Table 5. Balls won through interceptions and blocks

Parameter	Foreign players			Romanian players		
	R.A.	B.U.	D.K.	M.V.	T.R.	K.N.
Interceptions	0	1	3	3	1	7
Blocks	0	4	1	2	1	0

Based on averages obtained from the studied parameters, we conducted a comparison of the Romanian and foreign players' behavior, that can be a model of their game.

Table 6. Comparative presentation of the evolution model

Parameter		Foreign players		Romanian players	
MIN/M		27.07		25.18	
3 P	M	4		3,66	
	A	9.33		11	
	%	42.87		33.27	
2P	M	10.66		5	
	A	15		12.33	
	%	71.06		40.55	
1P	M	4.66		8.66	
	A	6		9.66	
	%	77.66		89.64	
REC	O	4		5,33	
	D	7.33		11.66	
	T	11.33		16.99	
I/M		1.33		3.66	
C/M		1.66		1	
MC/M		13		21.66	
PD/M		7.66		3	
MP/M		6.33		6.66	
PCT/M					
PCT/M/JUC		37.33	12.44	30.66	10.22
EF/M					
EF/M/JUC		41.33	13.77	33	11

Conclusions

Observing, registering, and processing game related data gives the coach objective information regarding players, empowering him to build a database concerning both his own players and opponent team's players. Processing and analyzing the data leads to a better understanding and awareness of the players, resulting in better and more objective decisions.

The conclusions of the study show that, in most of the cases, the foreign players perform better, taking into consideration the following parameters: game time, attempts percentage, basketball shooting efficiency from game action and free throws, offensive rebounds, defensive rebounds, steals, blocks, efficiency in the game.

Specifications:

The data regarding the game parameters analyzed was downloaded from the official website of the competition from Romanian Basketball Federation website. We thank the players, coaches and managers of U – BT Cluj-Napoca for collaboration and support.

Conflicts of interest:

Nothing of note.

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RESEARCHES ON REDESIGNING THE MANAGEMENT SYSTEM IN SPORTS ORGANIZATIONS (NOTE II)

CUCUI GHEORGHE GABRIEL¹, CUCUI IONELA ALINA

ABSTRACT. Management is an ensemble of a methodological, decisional, informational, organizational nature that allows its approach as a system. Management finds no reason to be outside the organization, and the organization cannot run without management. In diagnosing the activity of a sports organization, it is undoubtedly necessary to use the methodological advantage of the systemic approach. From the point of view of the management of sports organizations, the system approach addresses the functioning of the whole and the parts, the relationships between the leading and the leading system and the dialectical link between the organization's systems, the organizational environment and the goal orientation. Physical, informational and psychological transformations take place within sports organizations. These are found in the organization's external environment, and are input inputs into the organization's system. In order for these transformations to take place, sports organizations must have the ability to act / react through its resources and through efficient working methods, and the result of these transformations is the output streams of the organization's system. The organization must also have the capacity to maintain and evolve under the impact of external environment demands and to adapt / re-adapt to exchanges within the internal environment.

Keywords: *management, sport organization, strategy.*

REZUMAT. *Cercetări privind reproiectarea sistemului de management în cadrul organizațiilor sportive (nota II).* Managementul este un ansamblu de natură metodologică, decizională, informațională, organizatorică ce permite abordarea sa ca și sistem. Managementul nu-și găsește rațiunea de a fi în afara organizației, iar organizația nu poate funcționa fără management. În diagnosticarea activității unei organizații sportive se impune, fără îndoială, utilizarea avantajului metodologic al abordării sistemice. Prin prisma managementului organizațiilor sportive abordarea sistemică vizează funcționarea întregului și a părților, relațiile

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dintre sistemul conducător și cel condus și legătura dialectică dintre sistemele organizației, mediul organizațional și orientarea către scop. În cadrul organizațiilor sportive au loc transformări de natură fizică, informațională și psihologică. Acestea se regăsesc în mediul extern al organizației constituind fluxuri de intrare "input-uri" în sistemul organizației. Pentru ca aceste transformări să aibă loc organizațiile sportive trebuie să dispună de capacitatea de a acționa/reacționa prin intermediul resurselor sale și prin metode de lucru eficiente iar rezultatul acestor transformări reprezintă fluxurile de ieșire "output-uri" ale sistemului organizației. Organizația trebuie să aibă totodată capacitatea de a se menține și evolua sub impactul solicitărilor mediului extern și de a se adapta/readapta la schimburile din cadrul mediului intern.

Cuvinte cheie: *management, organizație sportive, strategie.*

Introduction

The management system of the sports organization is defined in the literature as "all the organizational, decisional, informational and methodological elements through which the management processes are carried out" (Cornescu, Mihăilescu, Stanciu, 1998).

It cannot be conceived and realized without taking into account the specific elements of the organization, including: the profile, size and structure of human, material and financial resources, the potential and mentality of the staff, the position of the organization in the national or international economic context.

Analysis of any system involves: a) identifying its component parts (subsystems), inputs (inputs) and outputs (output data); b) identifying the interaction between subsystems; c) decipher the messages sent through the feedback.

The management system within the sports organization comprises several components that differ according to the nature and characteristics of the methods they use and are: the organizational subsystem, the information subsystem, the decision subsystem, the methodological-informational subsystem.

The efficiency of the sporting organization's activity is given by the way the objectives are achieved, the interaction and the functioning of its subsystems taking into account also the external factors that can intervene in this process.

Sports organizations must address the position of any organization, regardless of the field of activity (Cucui & Cucui, 2014).

Diagnosis is the managerial tool to examine organizations to identify causal strengths and weaknesses, to solve the problems they face by formulating recommendations to amplify their managerial potential.

The diagnosis focuses on the analysis of an ending period in the life of an organization, based on which the organization's strategy is projected, involving the identification of positive and negative aspects, as well as the discovery of the causes they generated in order to elaborate recommendations for redesigning the organization's strategy, various areas.

The management of sports organizations at the moment cannot be conceived without the use of scientific methods and techniques that allow efficient and rational use of resources, stimulation of staff and managers, correct assessment of the results obtained, optimization of the decision-making process and of all management functions.

The organization must be capable of maintaining and evolving beyond the requirements of the external environment and adaptability to changes in the internal environment (Cucui, 2016).

Managerial intervention will optimize the work done within the sport organizations to achieve the proposed objectives (Cucui & Cucui, 2016).

Purpose

In the idea of developing the activity of sports organizations at the level of children and juniors, it is necessary to create this desidiness by redesigning the management system of the sports organization. This is done on the basis of the thorough analysis of the existing situation (SWOT), which proposes a series of objectives aimed at solving the deficiencies in the system.

The goal is to diagnose the management system within the football club, to identify its deficiencies in order to improve the activity by conceptualizing and developing the organizational development strategy.

Methods

SWOT analysis is an effective method used in strategic planning to identify potentials, priorities, and create a common vision for achieving the development strategy. In fact, the SWOT analysis has to answer the question "Where are we?", Which involves analyzing the internal environment of the organization and the general and specific external environment.

Applying the SWOT analysis is facilitated by using a list of issues to be followed in the analysis and whose answers are relevant to assessing the environmental and organizational situation. It is advisable that the issues raised in terms of strengths, weaknesses, opportunities and threats should provide the necessary scale to truly be strategic issues, relate to strategic plans, and provide meaningful clues to assess their judiciousness and, if need be, to reconsider them.

In this context, our research will refer to the issues that are the subject of the SWOT analysis and will aim to identify the management of the studied football club.

Results

Research is presented as a set of activities, systematically deployed for the accumulation and processing of data (information) in a particular field of activity, and the use of conclusions, in order to make progress in the knowledge and practice of that field. This research is part of a broader research, aimed at identifying management perspectives in football clubs at the level of children and juniors.

In order to carry out the research, we aimed to identify the problems faced by the sports organizations in Dâmbovița County. For this, through the participation of the members of the management structure and the execution of the sports organizations, we identified and analyzed the existing problems. The problems identified are from both the internal environment and the external environment and are part of our approach to developing the SWOT analysis. A number of 30 issues have been discussed, out of which 24 have been selected, which have been punctuated and analyzed on the list of internal and external issues.

As far as the list of problems in the internal environment is concerned, the intensity and the importance of each problem were determined by giving a value on a scale from 1 to 5, where 1 signifies a very low intensity / importance and 5 a intensity / importance very big.

Table 1. Coefficients internal environment

No.	Coefficients
1.	Preparing the employees for the functions occupied in the organization.
2.	Quality of technical staff training
3.	The quality of the human resource corresponds to the job description
4.	The defined internal informational subsystem and its own IT base
5.	Information flows are in line with club goals

6.	Information and scientific documentation activity
7.	Clear decision-making system
8.	Organizational change at club level
9.	The organizational strategy of the club is determined, has clear directions and objectives
10	Financial resources to achieve the objectives
11	Using specific management methods
12	Quality and endowment of their own sports base

With regard to the problems identified for the external environment, the probability of their occurrence and their impact on sports organizations was determined on a scale of 1 to 5, where 1 meant a very low probability or impact, and 5 a very high probability or impact.

Table 2. External environment coefficients

No.	Coefficients
1.	Involve local authorities in supporting sports activities for children and juniors.
2.	Society's perception and reaction to the importance of sportive clubs for children and juniors
3.	Level of achievement of financial resources from the local budget
4.	The importance given to the development of the material base
5.	The opportunities for training and professional development that can be accessed
6.	Communication and collaboration with local authorities
7.	Applying a systemic and integrative managerial project
8.	Attracting private funds
9.	Collaborations with other sports organizations in the same field of activity
10.	Avoiding the impact of policy change on sports club development strategies
11.	Personnel with specialized training for support and service
12.	Relationship with the component of pre-university and university education

Following the centralization of the information obtained and their analysis, we conducted the structure of the SWOT analysis as well as the future strategies approached by the managerial staff in order to redesign the management system.

Table 3. SWOT analysis and proposed strategies

<p style="text-align: right;">INTERN</p> <p style="text-align: left;">EXTERN</p>	<p>Strong points:</p> <ul style="list-style-type: none"> - Employee training corresponds to the functions occupied in the organization; - The quality of the human resource corresponds to the job description; - Information flows are in line with established objectives; - Self-developed sports base. <p>Weaknesses:</p> <ul style="list-style-type: none"> - insufficiently defined information subsystem; - Insufficient organized information activity. 	<p>Weaknesses:</p> <ul style="list-style-type: none"> - insufficiently defined information subsystem; - Insufficient organized information activity.
<p>Opportunities:</p> <ul style="list-style-type: none"> - Engaging local authorities to support sports activities; - Interest for development and endowment of the sports base; - Relationship with the local administration for sport; - Attracting private funds; - Collaborations with other sports organizations in the same field of activity; - Support provided by educational institutions. 	<p>Development Strategies:</p> <ul style="list-style-type: none"> - Organizing, promoting and developing sporting activities locally. - Organization of programs on exchanges of experience and professional culture. - Organizing competitions to increase the selection area. - Attracting new funds within the private sector organization. 	<p>Growth strategies at risk:</p> <ul style="list-style-type: none"> - Attract local authorities to support the work of the organization. - Informing and stimulating the population about the objectives, results and field of activity of the organization. - Facilities for access to information within the organization.
<p>Threats:</p> <ul style="list-style-type: none"> -Decrease in financial support from the widespread economic crisis from local authorities. 	<p>Growth strategies at risk:</p> <ul style="list-style-type: none"> - Development of professional training programs. - Drawing up fundraising projects. - Strengthening relations with local institutions of common interest. 	<p>Reorientation strategies:</p> <ul style="list-style-type: none"> - Redesigning the information subsystem within the sports organization. - Increasing the financial weight.

Conclusion

By using the tools specific to the proposed research, the documentation on the management of the sports organization through the use of the SWOT analysis and the analysis of the SWOT, I was able to observe the situation of the components of the management system. The use of the SWOT analysis leads to the identification of the real situation of the sports organization, and enables the management system to be improved by direct action on its components.

Based on the diagnosis of the management system, we can say that it has led to the identification of the directions of action in order to achieve the future strategies of the management system development.

Therefore, in order to achieve the established objectives, it is necessary to plan, organize and coordinate the activity rigorously and systematically.

The issues faced by sports organizations can be improved and depend on the ability of the manager (a strategist with economic vision and managerial knowledge) to seize the essential role of scientific management, thus providing favorable premises both for the survival of sports clubs and for their development.

Applying management without solid theoretical foundation and without a systemic view within sports organizations can lead to syncope within the management system.

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