

**Scientific Paper**

## **DANCES AS A PE CLASS CURRICULAR ACTIVITY**

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**Abstract.** *A sample of 13 male students of The Faculty of Sports and Physical Education in Novi Sad aged between 19 and 23 was used to examine the possibilities of training load dosage by means of the tempi of various dances such as the Moravac, Devojačko kolo, Čačak, Vienna waltz, Samba and Jive. The physical work capacity was evaluated by Von Döblen's method for indirect measuring of the maximal oxygen uptake and by Conconi's method for measuring anaerobic threshold. The aim was to make the group homogenous and evaluate the level of their fitness. The results of the intensity achieved by means of the dances were compared with the help of ANOVA. Statistically important differences were noticed between the following: the first and the third, the second and the third Moravac tempi, between each of the tempi of Devojačko kolo, between each of the tempi of Čačak, the first and the second as well as the first and the third Vienna waltz tempi, the first and the third, the second and the third Samba tempi, and between each of the Jive tempi. All these indicate that dance can be used as the main part of a PE lesson, since the physiological load can be dosed successfully.*

**Key words:** *dance, physiological load, training load dosage*

### 1. INTRODUCTION

As part of PE classes, dances are used as a final part of the lesson in order to lower cardio-respiratory functions (although, in Serbia, they are almost never used), while for recreational purposes, they are used for unloading emotional tension and for mere fun (Blagajac, 1981).

In 1980, Wingaeus & Kilbom tested the intensity achieved during a Swedish folk dance (Hambo). They measured heart rates as high as 170 beats per minute among the men. Blanksby & Reidy (1988), simulating a competition, measured the pulse of the men during Modern and Latino dances and their results were 170 beats per minute during Modern dances and 168 during the Latino ones. Banin & Despot (2003) observed ten

couples dancing and came up with similar results: 170 beats per min while dancing Standard dances and 168 while dancing Latino dances, all measured among the men. The thing that all these tests have in common is that they only measured temporary states.

However, no one has contemplated the possibility of varying the dance tension (Karanov, 2005), which would provide further possibilities for dancing to be included as the main part of a PE lesson. Furthermore, no one has discussed the opportunity that each student has for higher involvement and participation in the lesson which dancing provides. This is not the case with the usual PE curricular activities, such as basketball, volleyball, soccer, gymnastics, athletics and running, which can be used only when the weather is nice and on special tracks. The students usually do not like it, since it is monotonous.

The topic of the research is the level of intensity that can be achieved by social and folk dances by varying their tempi as well as the possibility for varying the intensity by means of the dance tempi.

The aim of this research is to analyze the differences of the intensities achieved by dancing to different tempi.

## 2. METHODS

### The sample of examinees

Thirteen male students of The Faculty of Sport and Physical Education in Novi Sad aged between 19 and 23 were used as a sample for this research. It was made homogenous according to the maximal oxygen uptake and the MFR index.

### The sample of variables

The **MFR** (muscle-fat relation) **index** was given with two decimals, according to Mateigka (Eremija, 1997) and that way, the morphological status of each participant was established. The weight was given with an accuracy of 0.5 kg, the height was given with an accuracy of 1 cm. The following are necessary for calculating the MFR index: Height (H), Body weight (BW), Upper arm circumference (UAC), Forearm circumference (FAC), Upper leg circumference (ULC), Lower leg circumference (LLC), Thickness of the subcutaneous fat of the upper arm (TUFUA), Thickness of the subcutaneous fat of the forearm (TUFFA), Thickness of the subcutaneous fat of the upper leg (TUFUL), Thickness of the subcutaneous fat of the lower leg (TUFL), Thickness of the subcutaneous fat of the stomach (TUFS), Thickness of the subcutaneous fat of the chest (TUFC).

**Maximal oxygen uptake** – measured by Van Döblen's indirect method, given in liters per minute (L/min).

The **anaerobic threshold** was indirectly established by the application of Conconi's test (Conconi et al., 1982).

The **physiological load** during the dance (heart rate) was measured at all the levels of intensity- during each tempo of each dance. For each level of intensity, the participants danced for three minutes to each tempo of each dance. After they had danced to each tempo, there was a five-minute break.

The dances: the Moravac, Čačak and Devojačko kolo were performed according to Koturović and Marinković (1982). Their notes are used in performing folk dances at Rhythmic Gymnastics lessons at The Faculty of Sport and Physical Education in Novi

Sad. The tempo for each dance is given in beat value (1/4) per minute according to Melcel's metronome (M.M.).

1. The **Moravac** has five variations (according to Koturović and Marinković, 1982) that are used at Rhythmic Gymnastics lessons at The Faculty of Sport and Physical Education in Novi Sad. For the needs of this research, the fourth variation of the Moravac was used. It is the most difficult one, both in the sense of rhythm and technique, and its tempo is very fast. It was performed in the following way:

- the first level was performed in M.M.  $\frac{1}{4}$  =100
- the second level was performed in M.M.  $\frac{1}{4}$  =115
- the third level was performed in M.M.  $\frac{1}{4}$  =130

2. The **Čačak** was performed in the following way:

- the first level was performed in M.M.  $\frac{1}{4}$  =136
- the second level was performed in M.M.  $\frac{1}{4}$  =162
- the third level was performed in M.M.  $\frac{1}{4}$  =192

3. **Devojačko kolo** was performed in the following way:

- the first level was performed in M.M.  $\frac{1}{4}$  =80
- the second level was performed in M.M.  $\frac{1}{4}$  =95
- the third level was performed in M.M.  $\frac{1}{4}$  =110

4. The **Samba** was performed in the following way:

- the first level was performed in M.M.  $\frac{1}{4}$  =100
- the second level was performed in M.M.  $\frac{1}{4}$  =110
- the third level was performed in M.M.  $\frac{1}{4}$  =129

5. The **Jive** was performed in the following way:

- the first level was performed in M.M.  $\frac{1}{4}$  =132
- the second level was performed in M.M.  $\frac{1}{4}$  =152
- the third level was performed in M.M.  $\frac{1}{4}$  =172

6. The **Vienna Waltz** was performed in the following way:

- the first level was performed in M.M.  $\frac{1}{4}$  =180
- the second level was performed in M.M.  $\frac{1}{4}$  =190
- the third level was performed in M.M.  $\frac{1}{4}$  =200

### The statistical method

The results of the research underwent processes of descriptive and comparative statistics. The descriptive element gave the following: mean (M), maximum (Max) and minimum (Min), standard deviation (S), and variation quotient (V%), (Table 1), the F – test (F) and the probability (P) (Table 2).

The One-way Analysis of variance (ANOVA) was used to determinate the significance of the differences among the groups of variables. The mean difference (MD) and source of variability was determined by the Scheff F – test (Table 3).

## 3. THE RESULTS AND THE DISCUSSION

The individuals taken as the sample are the students at The Faculty of Sports and Physical Education, all of whom are between the ages of 19 and 23. They are all young males, physically fit, which indicates that the results measured mark nearly the minimum of physiological load that can be achieved while dancing. If this kind of research were carried out with, for example, older people (who dance for recreational purposes), much

younger people (lower grade students in a primary school) or, finally, with females, it is speculated that the physiological load would be much higher.

The results measured during the dancing will be compared with the heart rate target zones set according to the maximum heart rate (HRmax) suggested by Janssen (1987), which are presented in Table 4. HRmax measured with this sample is 200, according to the following formula:  $HR_{max} = 220 - \text{age}$ . In theory, the anaerobic threshold lies at 80 – 90% of the HRmax. The anaerobic threshold, as the first criterion for the homogenization of the sample group, was set by Conconi's method and is at 184.306 heart beats per min for this sample (Table 1). This matches the theoretical speculation and therefore makes the use of Janssen's systematization of intensity possible. The maximal oxygen uptake was the second criterion, and it rated at 6.413 L/min.

Table 1. Descriptive statistics

Variables	M	Min	Max	S	V%
MFR	3.223	1.839	5.656	1.079	33.475
Aps. VO2 (L/min)	5.487	5	6.413	.546	9.953
Conconi	184.308	175	193	4.803	2.606
Mor1	130.692	114	151	11.243	8.602
Mor2	134	117	147	9.772	7.293
Mor3	142	127	162	10.878	7.661
Dev1	134.692	121	152	11.183	8.303
Dev2	145.538	122	173	12.176	9.053
Dev3	154.385	129	176	12.142	7.865
Cac1	129.692	115	153	10.331	7.966
Cac2	135.385	114	148	9.691	7.158
Cac3	152.007	130	168	11.449	7.528
Bec1	133.077	118	161	12.513	9.403
Bec2	137.846	119	163	13.723	9.955
Bec3	139.615	123	165	13.426	9.616
Sam1	118.846	98	147	14.542	12.236
Sam2	120.231	88	140	13.078	10.877
Sam3	127.154	100	142	11.415	8.978
Jiv1	123.385	106	145	10.453	8.472
Jiv2	128.384	116	149	9.341	7.276
Jiv3	136.923	112	166	15.478	11.304

Statistically significant differences were noticed between the following: the first and the third, the second and the third Moravac tempi, between each of the tempi of Devo-jačko kolo, between each of the tempi of the Čačak, the first and the second as well as the first and the third Vienna waltz tempi, the first and the third, the second and the third Samba tempi, and between each of the Jive tempi (Table 3), at a very low level of probability (Table 2). All these indicate that dance can be used as the main part of a PE lesson, since the physiological load can be dosed successfully.

Table 2. Probability

Variables	F	P
Mor	30.97	.0001
Dev	59.812	.0001
Cac	67.944	.0001
Bec	7.725	.0026
Sam	5.669	.0096
Jiv	15.937	.0001

Table 3. Comparison

Comparison	MD	Schef F-test
Mor1 vs. Mor2	-3.308	2.506
Mor1 vs. Mor3	-11.308	29.289*
Mor2 vs. Mor3	-8	14.66 *
Dev1 vs. Dev2	-10.846	18.085*
Dev1 vs. Dev3	-19.692	59.614*
Dev2 vs. Dev3	-8.846	12.03 *
Cac1 vs. Cac2	-5.692	4.066*
Cac1 vs. Cac3	-22.385	62.882*
Cac2 vs. Cac3	-16.692	34.967*
Bec1 vs. Bec2	-4.769	3.841*
Bec1 vs. Bec3	-6.538	7.219*
Bec2 vs. Bec3	-1.769	.529
Sam1 vs. Sam2	-1.385	.137
Sam1 vs. Sam3	-8.308	4.938*
Sam2 vs. Sam3	-6.923	3.429*
Jiv1 vs. Jiv2	-5	2.125
Jiv1 vs. Jiv3	-13.538	15.582*
Jiv2 vs. Jiv3	-8.538	6.198*

Most of the dances provoke 60 – 70 % of the HRmax (Table 4), meaning that they can be used for developing aerobic abilities. This is also the reason why they can be the main part of a Physical Education (PE) class. Some dances can even lead to a physiological load as high as 70 – 80 % of the HRmax, which makes it possible to influence the development of maximal oxygen uptake and the anaerobic threshold (Table 4).

The dances that cause a rise in the heartbeat of up to 120 heart beats per min (Table 4) can be used during PE classes as their main part, since the physiological load which is necessary for the development of aerobic power can be achieved. These dances are the Moravac, Čačak and Devojačko kolo, the Vienna waltz and the Jive (all three tempi) and the Samba (the third tempo).

One of the advantages of the use of dances as a curricular activity is that the physiological load can be controlled successfully. The number of steps in the dance pattern is predetermined, while the music dictates the tempo – a very important intensity factor. This makes dancing more dynamic and much different from other teaching activities used for developing aerobic power (running, for example). When the students become familiar with the steps, the intensity can be varied by altering the distance covered by a dancing pattern as well as insisting on style (the examples in this research are the Jive and the Samba). However, another detail must be brought to our attention. Dances are particularly convenient for the frontal organization of work in any kind of formation (dancing in pairs, in a *kolo* or in a straight line – "lesa"). It is impossible for all of the students in a class to play basketball, volleyball or practise gymnastics at the same time, due to the lack of apparatuses. Dancing is the solution for both boys and girls (girls are not neglected). The whole class simultaneously performs the same dance pattern. Here, we can notice one of the phenomena of mass behavior in its positive sense: their behavior is homogenous, the intensity of their emotions rises (emotions dominate), the level of activity rises and there is mutual encouragement to maintain this kind of state (Rot, 1983). All

these contribute to a positive feeling during the lesson, which on the other hand, provides a higher level of physiological load. Rot also notes that when in a mass, people tend to control their behavior less, and that it is different from their usual behavior. While dancing, this characteristic is relevant not only for achieving emotional ease, but also due to the fact that it becomes irrelevant whether a person has learnt to dance or not, which is usually an obstacle. It is also known that when people dance for recreational purposes, the dancing is used for unloading emotional tension. The use of various folk dances is recommended, since we are familiar with them and they provoke us to move.

Table 4. Mean values of heart rate while dancing in various tempi; the percentage of exercise intensity expressed according to the maximum heart rate (HRmax) suggested by Jansen (1987) and approximate heart rate values; average period of time used during PE lessons with the mean heart rate, suggested by Krsmanović (1999).

Dance	Tempo	Heart rate during the dancing	Heart rate target zones				PE curricular activity	The average time used during the PE class (min)	Heart rate during the lesson
			<i>Low level aerobic fitness</i> 50-60 % MP	<b>Recovery zone</b> 60-70% MP	<b>Aerobic range zone</b> 70-80% MP	Anaerobic threshold zone 80-90 % MP			
Moravac	1	130.692	100 to 120	120 to 140	<u>140</u> to <u>160</u>	160 to 180	Gymnastics	8.15	124.4 to 150.0
	2	134							
	3	142							
Čačak	1	129.692							
	2	135.385					Athletics	15.24	
	3	152.077							
Devojačko kolo	1	134.692							
	2	145.538					Basketball	18	
	3	154.385							
Vienna Waltz	1	133.077							104.1 to 147.5
	2	137.846							
	3	139.615							
Samba	1	118.846					Volleyball	14.2	
	2	120.231							
	3	127.154							
Jive	1	123.385							
	2	128.385							
	3	136.923							

Apart from the reasons mentioned above, the use of various dances in PE classes is recommended, since they give each student the opportunity to actively participate in the lesson. The average time used during the PE class is shown in Table 4, according to curricular activities. The dances used for this research provoke the heart rate to rise even

higher than gymnastics does. Taking into consideration that a single dance lasts for three minutes, if we use three of them, we will cover the same period of time that we cover with gymnastics. If we choose the dances adequately, we will be able to cover the whole class. Again, we recommend the use of folk dances. The first reason for this is that they provide an opportunity for frontal work. Furthermore, it is not necessary that the same number of boys and girls participate (which can be a problem for social dances) nor is it obligatory to have an even number of students (as opposed to all sports that involve the use of a ball). In addition, when talking about social dances, it is impossible to provoke a higher functional intensity if the partners have not learnt the steps and coordinated their moves. The reason why this is so is that partners disrupt each other's dancing (they stumble, step on each other's feet, or push one another), which results in frequent interruptions in dancing. It takes a long time for a pair to adjust. The second reason is that students are sometimes absent from classes and it is, therefore, not always possible to match the same pair – in order to be able to dance with various partners, it is necessary for one to know the steps very well, but limited time does not allow this to be achieved.

All these facts speak in favor of folk dances. On the other hand, if social dances were used with students of lower grades in primary schools, they could successfully influence individual socialization and equality of genders. Here, natural motions are used and even the less capable students can perform them. These are the reasons why dance should be used with lower grade students in primary schools, while the most important one is the possibility of adjusting the training load dosage by the tempo or the kind of dance.

Apart from their influence on aerobic power and maximal oxygen uptake, these dances can influence the development of a sense of rhythm. According to some authors (Kršić, 1964), rhythm can be successfully developed and it is necessary for many sports. Therefore, folk dances are recommended, since their rhythmic structure is much more complex than that of social dances. Depending on the dancing figures used, one can influence space coordination. Social dances have the advantage over folk dances here, since the folk dances used here involve only movements to the left and right while standing in a straight line. Social dances, on the other hand, involve a variety of turns and movements through space.

#### 4. CONCLUSION

A sample of 13 male students of The Faculty of Sports and Physical Education aged between 19 and 23 was used to examine the possibilities of training load dosage by means of the tempi of various dances. The physical work capacity was evaluated by Von Döblen's method for indirect measuring of maximal oxygen uptake and by Conconi's method for measuring the anaerobic threshold. The aim was to make the group homogeneous and evaluate their level of their fitness. The results of the intensity achieved by the dances were compared by ANOVA. According to the results, we can conclude that:

1. Different tempi in performing the folk dance Moravac, Čačak and Devojačko kolo have different influences on the physiological load.
2. Different tempi in performing social dances such as the Vienna Waltz, the Samba and the Jive have different influences on physiological load.

## REFERENCES

1. Banini, I.Š.A., & Despot, T. (2003). Kondicijski trening u sportskom plesu (Condition Training in Sport Dances). *Zbornik radova, Kondicijska priprema sportaša* (466-472). Zagreb: Kineziološki fakultet.
2. Blagajac, M. (1994). *Teorija sportske rekreacije (Theory of Sports Recreation)*. Totovo Selo: Autorsko izdanje.
3. Blanksby, B.A., & Reidy, P.W. (1988). Heart rate and estimated energy expenditure during ballroom dancing. *British Journal of Sports Medicine*, 22 (2), 57-60.
4. Conconi, F. et al. (1982). Determination of Anaerobic Treshold by a Noninvisible Field Test in Runners. *Journal of Applied Physiology*, 52 (4), 869-873.
5. Eremija, M. (1997). *Biologija razvoja čoveka sa osnovama sportske medicine. (Biology of human development with basis of sport medicine)*. Beograd: Fakultet fizičke kulture.
6. Janssen, P. G. J. M. (1987). *Training – Lactate – Puls rate*. Plar Electro, Oy, Finland
7. Karanov, B. (2005). *Funkcionalno opterećenje kod plesova različite vrste i tempa (Physiological Load in Dances of Various Tupes and Temp)*. Magistarski rad, Novi Sad: Fakultet fizičke kulture.
8. Koturović, B., & Marinković, A. (1982). *Narodne igre Jugoslavije (Folk Dances of Yugoslavia)*. Beograd: NIŠRO "Jež
9. Krsmanović, B., & Berković, L. (1999). *Teorija i metodika fizičkog vaspitanja (Physical Education Theory and Methodology)*. Novi Sad: Fakultet fizičke kulture.
10. Kršić, J. (1964). *Ritam – priručnik za nastavu klavira (Rhythm - A Handbook for Piano Lesson)*. Beograd: Udruženje muzičkih pedagoga SR Srbije.
11. Rot, N. (1983). *Psihologija grupa (The Psychology of Groups)*. Beograd: Zavod za udžbenike i nastavna sredstva.
12. Wigaeus, E & Kilbom, A (1980). Physical demands during folk dancing. *European Journal of Applied Physiology*, 45(2-3), 177-183.

## PLESOVI KAO SADRŽAJ ČASA FIZIČKOG VASPITANJA

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*Na uzorku od 13 studenata Fakulteta sporta i fizičkog vaspitanja u Novom Sadu starosti između 19 i 24 godine, ispitivane su mogućnosti doziranja opterećenja putem promene tempa različitih plesova: Moravac, Devojačko kolo, Čačak, Bečki valcer, Samba i Džajv. Svaki ples je izvođen u tri tempa po tri minuta, sa pauzama od 5 minuta. Radna sposobnost je procenjivana Von Döblenovim testom za indirektno merenje maksimalne potrošnje kiseonika i Konkonijevim testom za određivanje anaerobnog praga s ciljem homogenizovanja grupe i procene nivoa treniranosti ispitanika. Rezultati su upoređeni univarijantnom analizom varijanse. Statistički značajne razlike dobijene su između: prvog i trćeg i drugog i trećeg tempa Moravca, svakog tempa Devojačkog kola, svakog tempa Čačka, prvog i drugog i prvog i trećeg tempa Bečkog valcera, prvog i trećeg i drugog i trećeg tempa Sambe i svakog tempa Džajva. Znači da se ples može koristiti kao glavni sadržaj časa, jer se opterećenje može uspešno dozirati.*

*Ključne reči: ples, funkcionalno opterećenje, doziranje opterećenja*