FUNCTIONAL STRESS IN LATIN AMERICAN DANCESPORT DANCES – PILOT STUDY

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Introduction

Dancesport is an attractive sports branch created by isolating certain dances from their original context, with intentionally altered dance steps and performing techniques (Katarinčić, 2012), their harmonisation, introduction of rules and elements of holding partners in a couple, as well as dancers’ movement paths in space (Kostić & Uzunović, 2012). In the official world dancesport competition programme, there are four competition disciplines: ballroom dance, Latin-American dances, combination (10 dances) and formation. Regardless of the competition discipline, movements of dancers in every single dance represent their basic means of artistic expression and communication, striving towards creating these movements with high aesthetic value and ever more impeccable performance (Mandarić & Jovančević, 2017).

According to the competition programme, Latin American dances comprise samba, cha-cha-cha, rumba, paso doble and jive. Each given dance has clearly defined dance moves, melody, rhythm and tempo of musical accompaniment. With regard to this, according to the applicable rules of the World Dancesport Federation (WDSF), musical accompaniment has to be of prescribed performing duration and tempo at all dancesport competitions. Consequently, the duration of musical accompaniment during the performance of samba, cha-cha-cha, rumba and paso doble is two minutes, and as for jive, it is one minute and thirty seconds. It should be pointed out that during a dance tournament, depending on the size of the dance floor and the number of dance couples on it in the competition rounds before the finals, the duration of musical accompaniment may be shortened or lengthened for up to 20 seconds. The tempo of musical accompaniment in dancesport is expressed by number of bars per minute, so for samba, it is 50-52 bars, for cha-cha-cha 30-32 bars, for rumba 25-27 bars, for paso doble 60-62 bars and for jive 42-44 bars. Bearing in mind the number of bars for each dance, it is necessary to emphasise that as far as the tempo of dance structure performance is concerned, dancers make two to three steps within one bar.

Dancesport is an anaerobic activity of high stress intensity in which, according to the research in this area, heart frequency ranges between 80-100% of maximum heart frequency (Banini & Despot, 2003; Baillie, Wyon, & Head, 2007; Massidda, Cugusi, Ibba, Tradori, & Calo, 2011). In fact, as Karanov (2017) states, if for instance, 48 dance couples participate in the competition’s eights finals, contestants shall be divided into four groups of 12 couples. Then each group, one behind the other, performs a dance until they finish all five dances. With such competition system, a dance couple waits for approximately ten minutes until stepping on the dance floor again. Having in mind that each performance of a single dance lasts for up to two minutes, we might say that it is an anaerobic activity (Karanov, 2017, p. 72). However, during the final performance lasting for ten minutes in total, dance couples perform all five dances one after the other with breaks of 15 to 20 seconds. In such case, dancesport falls into an aerobic-anaerobic activity (Karanov, 2017, p. 72).

According to the abovementioned, we can agree that successful performance of dance skills in dancesport depends on functional (Bria et al., 2011; Liiv et al., 2013; Liiv et al., 2014; Vaczi et al., 2016) and motor abilities (Franklin, 2003; Li et al., 2015; Srhoj et al., 2006; Watson, 2017), as well as sense of rhythm, space orientation and musical interpretation (Kattenstroth et al., 2011; Štrbová, 2002).

In accordance with the given specificities of stress intensity in dancesport, it should be pointed out that the zone of submaximal intensity is common for the intensive activity lasting from 20 to 30 seconds up to 3-4 minutes and it coincides with the duration period of glycogen-lactate energy source, where the activity is being implemented at the expense of anaerobic glycolitic processes. The zone of maximal intensity is typical of the intensive activity lasting for up to 20 seconds, while its duration coincides with the duration period of alactate source where re-synthesis of ATP is occurring, mainly due
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to the energy generated through degradation of creatine phosphate. Bearing in mind the nature and specificity of movement activities applied in dancesport, the stress intensity is mainly determined in relation to the heart frequency.

Therefore, the subject matter of this research was the stress intensity in dancesport while the aim of the research was to determine the level of functional stress during each Latin American dance, as well as during their simulated competition performance.

Method

The research was conducted on a sample of 5 senior dance couples (n=10) from "Vračar" Dance Club from Belgrade, aged between 20.17±2.25. According to the gender, the respondents’ sample was divided into two groups: female respondents (n=5) and male respondents (n=5). Respondents have been engaged in dancesport 11.16±2.76, and have dance training sessions five times a week. The research included respondents with no health issues and who voluntarily took part in this research.

Staring from the set aim of the research, functional stress was determined based on the monitoring of heart frequency by using Polar pulsimeters (S720, Finland). Variables’ sample included: heart frequency before dance, heart frequency after dance and average heart frequency as well as stress zones. Measurement was conducted in the hall of the Faculty of Sport and Physical Education at the University of Belgrade.

Statistical software IBM SPSS 20.0 was used in the research. All obtained results were processed by means of descriptive statistics and the following values have been defined: minimum value – Min; maximum value – Max; arithmetic mean – Mean; standard deviation – SD.

Research protocol

Assessment of stress intensity during the performance of Latin American dances included two phases. The heart frequency during the performance of each individual dance was measured first and afterwards the heart frequency during the simulated dance competition, organised in accordance with the rules of competition finals at dance tournaments.

After the warm-up of 30 minutes, dance couples performed each Latin American dance in the following order: samba, cha-cha-cha, rumba, paso doble and jive. The first four dances were performed for one minute and 40 seconds, and jive for one minute and 20 seconds. The break between dances lasted for five minutes. Heart frequency was measured before the beginning of each dance, and after they were finished, the maximum and average frequencies were defined. After individual danced had been presented, a 15-minute-break followed, after which the simulated dance competition commenced.

The simulated dance competition implied the performance of Latin American dances in the following order: samba, cha-cha-cha, rumba, paso doble and jive. The first four dances were performed for one minute and 40 seconds, and jive for one minute and 20 seconds. There was a 15-second break between each dance. Heart frequency was measured at the beginning and when the performance of all five dances was finished. In order to create competition-like conditions during the simulated dance competition, the audience was invited to observe the dancers.

Results

Table 1 shows descriptive statistical indicators of heart frequency before each Latin American dance and simulated competition.

<table>
<thead>
<tr>
<th>Dance name</th>
<th>Male dancers</th>
<th>Female dancers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Samba</td>
<td>110</td>
<td>122</td>
</tr>
<tr>
<td>Cha-cha-cha</td>
<td>130</td>
<td>120</td>
</tr>
<tr>
<td>Rumba</td>
<td>110</td>
<td>132</td>
</tr>
<tr>
<td>Paso doble</td>
<td>110</td>
<td>126</td>
</tr>
<tr>
<td>Jive</td>
<td>110</td>
<td>118</td>
</tr>
<tr>
<td>Simulation</td>
<td>110</td>
<td>123</td>
</tr>
</tbody>
</table>
Descriptive statistical indicators provided in Table 1 show lower average heart frequency values before each dance, as well as simulations of dance competitions measured in dancers. If we analyse the results for male dancers, we notice that the lowest value was measured before the performance of samba (117.33±5.67), and the highest value before the performance of rumba (121.33±11.01). Unlike with male dancers, the lowest value of female dancers was detected before the performance of cha-cha-cha (122.67±6.50), and the highest value before rumba, just like with male dancers (132±11.02).

![Average heart frequency](image)

**Graph 1** Mean values for average heart frequency

Research results shown in Graph 1 indicate that the highest average heart frequency value for female dancers was detected during the performance of samba (M=175), and during the performance of cha-cha-cha in female dancers (M=182). By comparing the results between genders, we notice that the greatest difference in the average heart frequency is during the performance of rumba, while the lowest value is detected during the performance of samba. During the simulated competition when all five dances were performed, a great difference in the average heart frequency is detected between genders.

![Maximum heart frequency](image)

**Graph 2** Mean values for maximum heart frequency

Based on the results presented in Graph 2, we notice that female dancers had higher values for maximum heart frequency with each individual dance, as well as during the simulated competition. The given results indicate that the lowest average maximum heart frequency in male dancers was during their performance of rumba (189), and the highest during cha-cha-cha (192). Also, we notice that the same average value for the maximum heart frequency was during the performance of paso doble and jive (191). In female dancers, the lowest average maximum heart frequency was measured during the performance of samba (194) and the highest (197) during the performance of three dances – cha-cha-cha, rumba and jive. The average value for the maximum heart frequency during the performance of all five competition dances was lower in male dancers than in female, with little deviation compared to the values during the performance of individual dances.
Table 2 shows descriptive statistical indicators of heart frequency in male and female dancers during the simulated dance competition, as well as the obtained values in different stress zones.

<table>
<thead>
<tr>
<th>Dance name</th>
<th>Male dancers</th>
<th></th>
<th>Female dancers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
<td>Mean±SD</td>
<td>Min</td>
</tr>
<tr>
<td>Average heart frequency (number of heartbeats)</td>
<td>170</td>
<td>183</td>
<td>176.33±6.50</td>
<td>188</td>
</tr>
<tr>
<td>Maximum heart frequency (number of heartbeats)</td>
<td>188</td>
<td>195</td>
<td>191.00±3.60</td>
<td>203</td>
</tr>
<tr>
<td>Zone 1 (%)</td>
<td>2.00</td>
<td>9.00</td>
<td>4.67±3.78</td>
<td>0.00</td>
</tr>
<tr>
<td>Zone 2 (%)</td>
<td>0.00</td>
<td>19.00</td>
<td>8.33±9.71</td>
<td>2.00</td>
</tr>
<tr>
<td>Zone 3 (%)</td>
<td>7.00</td>
<td>83.00</td>
<td>46.33±38.07</td>
<td>5.00</td>
</tr>
<tr>
<td>Above (%)</td>
<td>9.00</td>
<td>84.00</td>
<td>40.67±38.83</td>
<td>79.00</td>
</tr>
</tbody>
</table>

Based on the results presented in Table 2, we notice lower average and maximum heart frequency values in male dancers. Also, we see that maximum average heart frequency values in male dancers were lower compared to minimum average values in female dancers. The same ratio between the results is detected in maximum heart frequency values where the maximum measured value for male dancers (195) was lower compared to the minimum value of female dancers (203).

The research results shown in Graph 3 and Table 2 indicate that according to the rules of the Dance Federation of Serbia, the functional stress was variously distributed during the performance of all five Latin American dances, both in terms of the intensity zones as well as the gender. In fact, measured values indicate that dancers of both genders were in the zone of submaximal and maximal stress, with male dancers having the stress equally distributed between two zones while with female dancers, it was dominantly in the maximal stress zone (87%). Descriptive statistical indicators (Table 2) show the presence of great range between the measured values in male dancers in the zone of submaximal (zone 3) and maximal stress (above).

**Graph 3** Average values in stress zones during the simulated competition

**Discussion**

The research results obtained during individual Latin American dancesport dances show that the results differ by gender and between dances. Therefore, average heart frequency values before the beginning and after the completion of each dance were lower in male dancers, as well as their average and maximum values during their performance. Based on the obtained results, we can conclude that the stress intensity during the performance of Latin American dances is higher in female dancers. It is a well-known fact that during the performance of the same dance, male and female dancers in a couple perform choreography comprising different dance figures. While distancing ourselves from
misinterpretation and wrong conclusion, we might say that dance figures, the principles of their matching into a choreographic entity as well as the “roles” in a dance couple affect the higher stress intensity in female dancers than in male dancers. These specificities of dance structures and requirements in dancesport may be the result of obtained differences in the stress intensity between genders. The obtained results are in line with the results obtained by Karanov (2017) and Baillie, Wyon and Head (2007).

The analysis of average values measured in female dancers shows that the same heart frequency values were obtained during the performance of samba and rumba (M= 180), and that jive measured one heartbeat less. The obtained values during the performance of samba and rumba are in line with the research conducted by Karanov (2017), and they can be explained with the same tempo of musical accompaniment (if heartbeats per minute are counted), but from the aspect of dance technique, they are unexplainable. According to the analysis of the most intensive dance – jive (Banini & Despot, 2003; Bria et al., 2011; Liiv et al., 2013; Liiv et al., 2014), both from the aspect of dance technique and musical accompaniment, the measured lower value indicates the need for conducting a research on a larger sample of dance couples. With male dancers, the lowest average value was measured during the performance of rumba (M= 169), which can be explained with the dance technique and the structure of dance choreography. Interestingly, during the performance of rumba, the male dancers reached the lowest and female dancers the highest average heart frequency value. These measured values may be explained with different dance figures in the choreography and somewhat more static “role” of male dancers during the performance of rumba (Wyon et al., 2007). Unlike with rumba, during the performance of samba, the average heart frequency value of male and female dancers was most similar, which is in line with the results of Karanov (2017).

Based on the analysis of average maximum heart frequency values, we may conclude that equal, highest values were measured in female dancers during the performance of cha-cha-cha, rumba and jive, while for the male dancers, the highest values were detected during cha-cha-cha, paso doble and jive. The obtained results indicate that a dance couple reaches maximum values during the performance of cha-cha-cha and jive, which may be explained with similar choreographic requirements.

Results obtained during the simulated dance competition according to the rules of competition finals indicate that dance couples were in the zone of submaximal and maximal stress intensity, which is in accordance with the research in this area made so far (Baillie et al., 2007; Karanov, 2017; Massidda et al., 2011). However, if we analyse the results obtained by gender, we notice that in case of male dancers, the intensity is in the zone of submaximal and maximal stress intensity, and in case of female dancers, it is predominantly in the maximal zone. The obtained results during the simulated dance competition are in line with measured heart frequency values obtained during the performance of individual Latin American dances. Therefore, the results indicated that in all dances, female dancers had higher average and maximum heart frequency values compared to male dancers. In addition to this, while interpreting these results, one should bear in mind the fact that it was a simulated dance competition and not the real competition. With regard to this, Wyon et al. (2004), as well as Baillie et al. (2007), confirmed that the atmosphere at the competition affects stress intensity and that there are statistically significant differences between the functional stress during a class, a rehearsal or a competition itself.

**Conclusion**

Dancesport is an attractive sports branch which strives to create movements meeting high aesthetic criteria. From the point of view of dancer’s functional stress, performing aesthetically modelled dance structures falls into high-intensity activities, which is confirmed by the results of this research. Therefore, we can conclude that Latin American dancesport dances are high-intensity activities. In all dances, as well as during the simulated dance competition, functional stress was higher in female dancers, which may be explained with different choreographic requirements. Apart from this, we may also conclude that different obtained average and maximum heart frequency values for both genders during the performance of each individual Latin American dance were the result of a specific dance structure and performance tempo. Having in mind the size of the sample used in the research and the fact the results were obtained in training conditions, we can say that there is a need for conducting the research on a larger sample of dance couples in competition conditions. Such research would provide more reliable results regarding the functional stress of dancers.
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References


Dancesport denotes competitive ballroom dancing,[1] as contrasted to social or exhibition dancing. In the case of wheelchair dancesport at least one of the dancers is in a wheelchair. The World Dance Sport Committee regulates professional dancesport at the international level. The World Social Dance Committee "deals with all matters of the dance profession that relate to the activities of Dance Schools and Dance Teachers".[12] It does not regulate social dance directly â€“ that is the business of individual organisers, the dance teacher organisations, such as the Imperial Society of Teachers of Dancing, and the chains of dance teaching schools in the United States.