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Differences in the Motor Abilities of Male and Female 6th Grade Elementary School Students

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Abstract: The motor abilities of elementary school students have often been the subject matter of research in physical culture. Furthermore, authors have dealt with the differences in motor abilities between male and female students of different age groups. The basic aim of this research was to determine the differences in motor abilities between male and female 6th grade elementary school students. The sample of respondents in this research was a group of 124 students from the 6th grade (66 boys of the average age of 12.91 and 58 girls, average age 12.86. Some 12 motor tests were applied for assessing the following motor abilities: precision, balance, speed, flexibility and strength. Based on the results of the canon discriminative analysis, the conclusion was reached that there are statistically significant differences between the tested groups in regards to motor abilities. The boys were more successful in tests for assessing strength, precision, and coordination of the entire body and the speed of alternative leg movements. Girls were more dominant in flexibility and the speed of alternative arm movements. Boys had better results on balance tests and the girls on others, so this can be seen as consistent results in regards to this ability. The obtained results mostly reflect the natural pace of developing motor abilities considering gender and point to a compatibility with the sensitive periods for displaying certain abilities in regards to the gender of the respondents.

Key words: motor abilities, boys, girls, elementary school

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INTRODUCTION

The motor abilities of elementary school students have often been a topic of research in physical culture. Authors have researched the motor abilities of students from various aspects. Several authors dealt with the trend of developing the motor abilities of pre-school children (Popović, Cvetković, & Grujičić, 2006; Trajkovski, Tomac, & Marić, 2014), and adolescents (Janz, Dawson, & Mahoney, 2000; Gajević, 2009; Badrić, Sporiš, Trklja, & Petrović, 2012; Milojević, Marković, Gadžić, & Stanković, 2014). Other aspects of research in the area of student motor skills are related to the contemporary problems of the reduction of the level of physical activities which is consequently reflected on the development of motor abilities (Tomkinson, Olds, & Gulbin, 2003; Wedderkopp, Froberg, Hansen, & Andersen, 2004; Šiljeg, Zečić, Morgan, & Kević, 2008; Strel, Bizjak, Starc, & Kovač, 2009). Along with this, authors also researched the differences between the motor abilities of male and female students of different age groups (Gelemanović, Svoboda, & Tomas, 2006; Mladineo, 2006; Mikalački, & Čokorilo, 2007; Georgiev, Aleksandrović, & Petrov, 2009; Badrić, 2011; Kraljević, Gadžić, & Vučković, 2013; Pelemiš, Pelemiš, Mitrović, & Đžinović, 2014; Kerić & Ujsaši, 2014).

An interesting and considerable research of the differences in physical development and motor abilities of 4th grade elementary school students in three different generations (1983/84, 1994/95 and 2005/06) was carried out by Jovanović and Jovanović (2008). The total sample consisted of 700 pupils (331 boys and 369 girls), and the authors concluded that boys of the 1983/84 generation were better in all the tests except for the flexibility test and the speed of alternative movements. In the 1994/95 generation, boys were more successful in all tests except for the flexibility test. The same results were repeated for the 2005/06 generation, where girls did better only on the flexibility tests.

It is a fact that motor abilities are an important and complex system which is manifested by movements in everyday activities as well as in more complex situations which are characteristic for various physical activities. The individuality of the changes incites a special interest, especially considering the demands on the organism which are imposed by physical activities (Mišigoj-Duraković, 2008). The level of motor abilities increases with the age of the students - with girls it reaches a plateau at about 14 years of age, and somewhat later with boys. Biologically, more mature boys react better to physical training than girls (Malina, 1994). It is necessary for all those who guide children towards physical activity to know the laws of growth and development, as well as the morphological and functional-physiological changes which occur in childhood. Namely, it is known that physical activity, if well chosen and dosed, can be a stimulating factor in growth and development, although at an excessive age an inappropriate physical activity can have a negative impact (Mišigoj-Duraković, 2008).
Along with the mentioned understanding which every P.E. teacher should have in order to contribute to an adequate teaching process, it should be said that this information is also important during the evaluating of student achievements in physical education. In accordance with the Rulebook on grading students in elementary education (Off. Gazette of the RS, no. 72/09, 52/11 and 55/13), grading the subject of P.E. is carried out based on the abilities of students, the degree of expertise and skills. It is very important for the P.E. teacher in that context to also bear in mind gender differences in the scale of the displayed motor abilities of the students.

The main aim of this research is to establish the differences in motor abilities between male and female 6th grade elementary school students.

**METHOD**

**Sample**

The sample of respondents in this research was a group of 124 students of the 6th grade attending the elementary schools Jovo Kursula and Čibukovački partizani from Kraljevo. Of this number, 66 respondents were male, average age 12.91 years (±0.29), and 58 respondents were female, average age 12.86 (±0.40).

**Variables**

For the sample of variables which assess motor abilities, applied was a set of 12 variables which assessed the following motor abilities: precision, balance, coordination, flexibility and strength.

The tests for assessing motor abilities are separated from the battery which consists of 110 tests (Gredelj, Metikoš, Hošek and Momirović, 1975):

a) For assessing precision (striking the horizontal target with the hand – GHCR and striking the vertical aim with the foot - GVCN)
b) For assessing balance (standing on one foot alongside the balance bench - SJUK and standing on one foot with closed eyes - SZOJ)
c) For assessing coordination (a figure eight with bending - OSAS and drumming with the hands and the feet - BURN)
d) For assessing speed (tapping with the hand - TAPR and tapping with the foot - TAPN)
e) For assessing flexibility (deep bend on the bench - DPKL and stick exercises - ISKP)
f) For assessing strength (standing long jump - SUDM and chin-ups - VISZ).
Method of data processing

The measuring results are statistically processed and the basic central and dispersion parameters are calculated. The normality of distribution was assessed with Skewness and Kurtosis. Along with descriptive statistics, also applied was a canonical discriminant analysis in order to determine the differences in the motor abilities of the respondents.

RESULTS

Table 1. Basic physical features of the respondents

<table>
<thead>
<tr>
<th>Physical features</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AS (SD)</td>
<td>AS (SD)</td>
</tr>
<tr>
<td>Body height</td>
<td>158.07 (7.02)</td>
<td>159.03 (7.22)</td>
</tr>
<tr>
<td>Body weight</td>
<td>50.92 (10.73)</td>
<td>50.30 (8.84)</td>
</tr>
</tbody>
</table>

The average values of body weight and height of the respondents (Table 1) are within the expected ranges and values for the tested age (Gajević, 2009).

Table 2. Central and dispersion parameters of the variables for assessing the motor abilities of boys

<table>
<thead>
<tr>
<th>Variable</th>
<th>AS (SD)</th>
<th>Min - Max</th>
<th>Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHCR</td>
<td>16.55 (5.27)</td>
<td>5 - 36</td>
<td>31</td>
<td>0.75</td>
<td>1.68</td>
</tr>
<tr>
<td>GVCN</td>
<td>11.73 (3.71)</td>
<td>3 - 20</td>
<td>17</td>
<td>0.18</td>
<td>-0.45</td>
</tr>
<tr>
<td>SJUK</td>
<td>8.98 (5.31)</td>
<td>3.10 – 34.30</td>
<td>31.20</td>
<td>2.39</td>
<td>7.69</td>
</tr>
<tr>
<td>SZOJ</td>
<td>18.81 (12.75)</td>
<td>5.10 – 61.20</td>
<td>56.10</td>
<td>1.34</td>
<td>1.15</td>
</tr>
<tr>
<td>OSAS</td>
<td>58.36 (4.69)</td>
<td>49.80 – 71.20</td>
<td>21.40</td>
<td>0.51</td>
<td>0.14</td>
</tr>
<tr>
<td>BURN</td>
<td>6.38 (2.97)</td>
<td>0 - 15</td>
<td>15</td>
<td>0.68</td>
<td>0.39</td>
</tr>
<tr>
<td>TAPR</td>
<td>35.82 (4.54)</td>
<td>25 - 48</td>
<td>23</td>
<td>-0.11</td>
<td>0.14</td>
</tr>
<tr>
<td>TAPN</td>
<td>29.32 (3.19)</td>
<td>22 - 35</td>
<td>13</td>
<td>-0.04</td>
<td>-0.70</td>
</tr>
<tr>
<td>ISKP</td>
<td>85.20 (15.79)</td>
<td>52 - 125</td>
<td>72</td>
<td>0.23</td>
<td>-0.67</td>
</tr>
<tr>
<td>DPKL</td>
<td>34.02 (6.91)</td>
<td>17 – 45</td>
<td>28</td>
<td>-0.46</td>
<td>-0.26</td>
</tr>
<tr>
<td>SUDM</td>
<td>164.86 (25.01)</td>
<td>94 - 212</td>
<td>118</td>
<td>-0.70</td>
<td>0.17</td>
</tr>
<tr>
<td>VISZ</td>
<td>26.47 (18.44)</td>
<td>1.10 – 85.90</td>
<td>84.80</td>
<td>0.59</td>
<td>0.28</td>
</tr>
</tbody>
</table>

AS – arithmetic mean, SD – standard deviation, Min – minimum result, Max – maximum result, Range – difference between the minimum and maximum results, Skewness – parameter of asymmetry of the distribution results, Kurtosis – parameter of the tailedness of the results compared to normal distribution
Based on the results from Table 2, it can be seen that the distribution of results by the majority of the assessed variables does not significantly deviate from normal distribution. The exception is the variable for assessing balance (SJUK) where distribution is of an exceptionally positive direction which points to the fact that the majority of respondents had weaker results. At the same time, the value of the coefficient of roundness for this variable is somewhat higher and indicates some extreme results which significantly deviate from the average. The values of the standard deviation and the range of results point to the fact that a somewhat greater heterogeneousness is also evident in variables for assessing statistical and explosive strength (VISZ and SUDM), as well as the flexibility of the shoulder area (ISKP) and balance (SZOJ).

These kinds of results are to be expected in the tested age (high school age) as the biological development of students is intense, unequal and heterochronous, which is also reflected on the motor abilities. There are periods when some abilities develop more quickly (sensitive stages of development), in order to be followed by periods of slower development (Radovanović and associates, 2009).

Table 3. Central and dispersion parameters of variables for assessing the motor abilities of girls.

<table>
<thead>
<tr>
<th>Variable</th>
<th>AS (SD)</th>
<th>Min - Max</th>
<th>Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHCR</td>
<td>14.21 (5.36)</td>
<td>3 - 26</td>
<td>23</td>
<td>0.10</td>
<td>-0.68</td>
</tr>
<tr>
<td>GVCN</td>
<td>9.28 (3.96)</td>
<td>2 - 22</td>
<td>20</td>
<td>0.60</td>
<td>0.87</td>
</tr>
<tr>
<td>SJUK</td>
<td>8.81 (4.67)</td>
<td>3.30 – 27.20</td>
<td>23.90</td>
<td>1.67</td>
<td>3.44</td>
</tr>
<tr>
<td>SZOJ</td>
<td>24.35 (15.64)</td>
<td>3.50 – 76.10</td>
<td>72.60</td>
<td>1.08</td>
<td>1.12</td>
</tr>
<tr>
<td>OSAS</td>
<td>61.98 (4.07)</td>
<td>52.10 – 75.20</td>
<td>23.10</td>
<td>0.76</td>
<td>1.40</td>
</tr>
<tr>
<td>BURN</td>
<td>6.57 (2.92)</td>
<td>0 - 13</td>
<td>13</td>
<td>-0.15</td>
<td>-0.07</td>
</tr>
<tr>
<td>TAPR</td>
<td>36.02 (4.69)</td>
<td>25 - 50</td>
<td>25</td>
<td>-0.09</td>
<td>0.77</td>
</tr>
<tr>
<td>TAPN</td>
<td>29.64 (3.80)</td>
<td>21 - 38</td>
<td>17</td>
<td>-0.46</td>
<td>0.04</td>
</tr>
<tr>
<td>ISKP</td>
<td>74.79 (7.75)</td>
<td>48 - 110</td>
<td>62</td>
<td>-0.36</td>
<td>-0.46</td>
</tr>
<tr>
<td>DPKL</td>
<td>38.79 (7.75)</td>
<td>20 – 52</td>
<td>32</td>
<td>-0.60</td>
<td>-0.08</td>
</tr>
<tr>
<td>SUDM</td>
<td>148.54 (19.34)</td>
<td>109 – 204.5</td>
<td>95.50</td>
<td>0.64</td>
<td>0.46</td>
</tr>
<tr>
<td>VISZ</td>
<td>15.29 (12.00)</td>
<td>1.30 – 63.80</td>
<td>62.50</td>
<td>2.00</td>
<td>5.28</td>
</tr>
</tbody>
</table>

AS – arithmetic mean SD – standard deviation, Min – minimum result, Max – maximum result, Range – difference between minimum and maximum results, Skewness – parameter of asymmetry of the distribution results, Kurtosis – parameter of the tailedness of the results compared to normal distribution

The results from Table 3 show that the majority of the variables have a normal distribution. The variables for assessing static strength (VISZ) and balance (SZOJ) have a somewhat weaker distribution. Based on the values of the standard deviation and the range of the results, the greatest heterogeneousness...
was noticed in the variables of the standing long jump (SUDM), standing on one foot with closed eyes (SZOJ) and stick exercises (ISKP). These values show there are greater individual differences in displaying explosive strength, balance and flexibility in girls, which is to be expected for the tested age (Radovanović and associates, 2009).

**Table 4. The significance of an isolated discriminative function**

<table>
<thead>
<tr>
<th>Function</th>
<th>Eigenvalue</th>
<th>Wilks' Lambda</th>
<th>Chi-Sq</th>
<th>Canonical Corr.</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.23</td>
<td>0.45</td>
<td>93.23</td>
<td>.74</td>
<td>12.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Eigenvalue – R-squared or coefficient of determination, Wilks' Lambda - Wilks’ lambda distribution test, Chi-Sq – Bartlett’s chi-square test, Canonical R – coefficient of canonical correlation, df – degrees of freedom, p – level of relevance

The results of the applied canonical discriminative analysis show that there are significant differences in the tested motor abilities between 6th grade elementary school boys and girls, which are shown by a significant extracted discriminative function (Table 4). The table shows that the separated statistically significant functions at the degree of a statistical assessment Sig.=.000 is of a higher intensity (CR=.74). The discriminative strength of the variables (Wilks' Lambda=.45) is moderate and indicates that these are differences between the group of respondents. The obtained results speak in favor of the fact that motor abilities also significantly contribute to discrimination regarding the gender of the respondents.

**Table 5. Structure of the isolated discriminative function of student motor abilities**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Function</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>-22</td>
</tr>
<tr>
<td>GHCR</td>
<td></td>
<td>-44</td>
</tr>
<tr>
<td>GVCN</td>
<td></td>
<td>-27</td>
</tr>
<tr>
<td>SJUK</td>
<td></td>
<td>-38</td>
</tr>
<tr>
<td>OSAS</td>
<td></td>
<td>.15</td>
</tr>
<tr>
<td>BURN</td>
<td></td>
<td>-.05</td>
</tr>
<tr>
<td>ISKP</td>
<td></td>
<td>-.36</td>
</tr>
<tr>
<td>DPKL</td>
<td></td>
<td>.79</td>
</tr>
<tr>
<td>SUDM</td>
<td></td>
<td>-.27</td>
</tr>
<tr>
<td>VISZ</td>
<td></td>
<td>-.38</td>
</tr>
</tbody>
</table>
Table 5 shows the matrix of the structure of the identified discriminative function from which it is obvious that the coefficients range from -.44 to .79. The greatest contribution to the discriminative function is given by the deep bend on the bench (DPKL=.79) and the figure eight with bending (OSAS=.54), and the least by the drumming of hands and feet (BURN=.00).

The obtained statistical data on the relative size and position of the group centroid in a discriminative area ranges from .03 to 1.18 (Table 6), which points to the fact that the analyzed groups were statistically significantly different regarding the canonical discriminative function.

**Tabela 6. Centroidi grupa**

<table>
<thead>
<tr>
<th>Pol</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>1.18</td>
</tr>
<tr>
<td>M</td>
<td>-1.03</td>
</tr>
</tbody>
</table>

Considering the position of the group centroids and the coefficients of the discriminative function of motor abilities of boys and girls, and the forerunner of the group centroids, it is obvious that boys realized better results in a number of motor tests: both tests for assessing precision (GHCR and GVCN), tests for assessing strength (SUDM and VISZ), the speed of alternative movements of legs (TAPN), one test for assessing balance (SJUK) and the coordination of the entire body (OSAS). Here we should also mention that along with the fact that the forerunner in the structure matrix of the isolated function for this test is positive and only ostensibly corresponds with a better result of the girls, the enhanced result represents a smaller value as the test is constructed in such a way that the respondents should carry out a motor task in as short a time as possible. On the other hand, girls were more successful at the following tests: the flexibility of the lower extremities (DPKL) and the flexibility of the shoulder area (ISKP), balance (SZOI) and the speed of alternative arm movements (TAPR). For the stick exercise test (ISKp) the same is valid as for the coordination test (OSAS) which shows better results for boys, but in this case, by the same analogy, the girls have better test results. There were no differences established between the genders at one coordination test (BURN). The success of discrimination was also presented via the value of the total percentile amounting to 85.5%, which represents a percent of the correctly classified respondents in the group.

**DISCUSSION**

Motor abilities are a very important factor in the proper growth and development of children. In several researches dealing with the motor abilities
of elementary school children, the authors came to the conclusion that there are differences between boys and girls in various age periods (Gelemanović, Svođina, & Tomas, 2006; Mladineo, 2006; Georgiev, Aleksandrović, & Petrov, 2009; Badrić, 2011; Kraljević, Gadić, & Vučković, 2013; Pelemić, Pelemić, Mitrović, & Đinović, 2014; Kerić & Ujšaši, 2014).

Adolescence is a specific period which to a significant extent coincides with the so called sensitive period for the developing of a large number of motor abilities (Balyi & Way, 2005). A current research was carried out with the aim to establish the differences in motor abilities between boys and girls in the adolescent age (the 6th grade of elementary school). The conclusions reached are important in the context of evaluating the achievement of pupils in physical education, as P.E. teachers should also have in mind gender differences in displaying the motor abilities of students.

The results obtained point to the fact that boys were more successful in tests for assessing strength (standing long jump and chin-ups), precision (aiming for the horizontal target with the hands and aiming for the vertical target with the feet), the coordination of the entire body (the figure eight with bending), the speed of alternative foot movements (foot tapping). Girls were more dominant in displaying flexibility (a deep bend on the bench and stick exercises), a test of balance (standing on one foot with eyes closed) and the speed of alternative hand movements (hand tapping).

The research results largely correspond with the results of Kraljević, Gadić and Vučković (2013) whereupon the authors established that boys have significantly better results in strength (standing long jump and chin-ups), precision (aiming for the horizontal target with the hands and aiming for the vertical target with the feet), coordination of the entire body (the figure eight with bending), while the girls were more convincing at the tests for assessing flexibility (deep bend on the bench and stick exercises).

A significant congruence is also evident in the results by Mikalacki and Čokorilo (2007), where the authors concluded that boys were more dominant in displaying strength (standing long jump, chin-ups and raising the trunk), coordination of the entire body (slalom with three medicine balls and the backwards polygon), and the girls in flexibility (bending while seated).

Similar results were noted by Kršmanović and Radosav (2008), who established a statistically significant difference in the 20m run, backwards polygon, spread leg bending, standing long jump, pull-ups and slalom with three medicine balls. In all the tests except for the leg bending, the boys showed better results than the girls.

The results obtained in this research are largely concurrent with the research by Badrić (2011) who determined differences on the level of motor abilities in respondents of the same age. The mentioned differences showed that boys were more successful with tests for assessing explosive strength
(standing long jump, throwing medicine balls while lying on the back and a 20m sprint with a running start), the coordination of the entire body (the backwards polygon, sidestepping and slalom running), while girls were more convincing at tests for assessing flexibility (spread leg bending, bending on the bench and hand thrust behind the back upwards). In the given research, there were no significant differences in the tests of the speed of alternative movements (hand tapping, foot tapping and feet tapping against the wall), while somewhat surprising are the results of the tests of repetitive strength where girls had better results in two of a total of three applied tests (squats and raising the trunk from the back).

Taking into consideration the results of current, as well as the earlier mentioned researches, the differences in the displayed motor abilities of the respondents considering the gender are evident. Boys have more stressed abilities of strength, precision and coordination, while girls dominate in flexibility. It is interesting that girls were better at the test of the speed of alternating arms movements (hand tapping), while as expected, boys had better results on the tests for assessing the speed of alternative foot movements (foot tapping). On one test of balance, boys had the better results, and girls on the other, so that it can be viewed as a congruent result in this ability. The obtained results mostly reflect the natural pace of the development of motor abilities considering the gender and indicate compatibility with the sensitive periods for displaying certain abilities compared to the gender of the respondents.

CONCLUSION

In researching the differences between the motor abilities of the 6th grade male and female students, it was concluded that there were some statistically significant differences in the tested sample. Thus, based on the obtained results it can be concluded that motor abilities differ significantly in the sample. Along with these facts, it should be stressed that the research has certain limitations. Primarily, this pertains to the size of the sample and the number of applicable tests for assessing motor abilities.
REFERENCES


Abstract: The aim of this scientific work is in the primacy of determining the numeric complaint – what is the type and range, in modern European and world handball, of manifesting differences between successful and unsuccessful defenses, as well as a number of other supporting factors which are generally presented through systems of zones, complex combinations, having more or less players, i.e. a goalkeeper defense, organizing counter attacks and half-counter attacks, shots from 7 meters, etc. The analysis included five key matches in the fight for medals at the 21st World Handball Championship for Women, which was held in 2013 in Serbia. Examined were three matches of the teams of Serbia and Brazil played in the first stage of the competition, quarter-final schedule and the final show. By the conducted analysis of the tactical and technical elements, the following results have been obtained: the largest representation in both teams was found in the variable of successful defensive formations 6:0 (SDF 6:0) of value 20.33 of Serbia and 12.66 of Brazil, and then for the successful defense formations 5:1 (SDF 5:1) of value 9.33 of Serbia and 12.33 of Brazil, while the unsuccessful defense formations were the most in variable (NDF 6:0) of value 9.66 of Serbia and 6.33 of Brazil. Therefore, the analyzed teams to a large extent successfully used the ‘deep zone systems’ in defense of their goal, with a significant number of errors of the same. In other important factors for successful results, differences in the variables of successful and unsuccessful defense of the goalkeeper were found, and in Serbia (SGD) it is expressed as the value of 22.66, and in Brazil by 18.66, while in (NGD) the value was equal and amounted to 23. The differences of arithmetic means of observed variables are displayed by the t-test at a significance level of p<0.05, and significant
difference indicators of the total successful-unsuccessful defense combined 5+1 (TSUDC 5+1) were 0.04, while in other variables the compared differences of arithmetic means did not significantly differ statistically. In the variable of total successful-unsuccessful defensive formations 6:0 (TSUDF 6:0), the t-test had a value of 0.10, total successful-unsuccessful organizing of counterattacks and half counter attacks (TSUOC-HC) 0.80 and total successful-unsuccessful defenses with a man more or less (TSUMM-ML) 0.84. All of the above parameters and the results show full convenience, because by their observation and differentiation, with utmost certainty, the winning national team is separated from the defeated ones in the competition.

Key words: handball game, zone defense systems, combined defenses, man more and man less in defense, other technical parameters, competition evaluation system

INTRODUCTION

Handball as an excellent sports game takes on the features of a comprehensive integrated composition, and thus to define the system in addition to its structural aspects, it is necessary to apply its functional aspect as well, which defines the process flow in the said system and the importance of the individual parts of the system (Zaciorski, 1975).

The sport belongs to the group of semi-structural sports, and therefore, to a greater or lesser extent, represents a satisfactory factor of all aspects of human motivation, both biological and sociological (Kovač, Mandić & Lolić, 2009).

In order to achieve the set requirements, morphological constitutional traits that give appropriate priority in the game to a player with regard to the requirements of modern handball games and positions in the team, are necessary (Pokrajac, 1983).

The key problem of almost all team sports is to increase the efficiency of the individual techniques of each player in specific competitive situations and improve the quality of implementation of individual and team tactical ideas in competitive conditions (Dopsaj, 1994).

Modern handball is characterized, therefore, by a large number of accelerations, sprints, jumps and rapid changes of direction and contact between players. Lately, female handball has taken on a more intense character which inevitably leads to increased fatigue, which in turn hinders more a pronounced tactical-technical manifestation of players (Ronglan et al., 2006).

The part of the game tactics in defense, also the most studied, practiced and used is the system of different zones. There is no team in the world today that does not build a basis for the defensive play on one of the zones. The main feature of the game in zonal formation is that the defender guards the space and
the attackers in it and is not in charge (as in an individual defense) of only one man-attacker, but there is almost a pattern of movement. In addition, handball also has a defense in which some of the players play the zone system, and some of them an individual defense, which is why we call it a combined defense. It is very often the case in defense game tactics, and at least one of the variants is used by almost all the world’s teams.

In the principle one man more generally the coach reaches for a combined defense, while playing with a man less in defense for some of the zone systems. After the steal, the same team can organize a quick counter-attack, which is the basis of a modern attack in handball. Such a counter-attack which involves two or more players is called counter, and the slower variant is a half-counter (Tomljanović & Malić, 1982).

A good goalie in handball represents half the victory, and therefore the most appropriate division is Pavlin’s (1981) into three types of goalkeepers: classic, contemporary and combined using all the available handball techniques of their positions, and applying them in different ways and modes of application.

The aim of this study was to determine the differences in the implementation of tactical and technical elements, two quite opposing handball ‘climates,’ which would have a statistically significant overall contribution to the realization of positive results in the competition, in order to get with their help practically the most applicable conclusions in the future shaping of the training process. By the appointed hypothesis we assume that there are no statistically significant differences of means in tactical and technical variables of the Brazilian national team and the national team of Serbia, regardless of the fact that Serbia suffered two defeats by minimum result from the aforementioned opponents.

**METHOD**

**The sample**

The sample of this study consists of two of the most successful women’s handball teams at the 21st World Championship, which was held in 2013 in Serbia, these being the national team of Serbia (Serbia) and the team of Brazil (Brazil). A total of five games in the World Championship were analyzed, being the three most important games played by these teams. The first games were selected based on the model of the strongest and toughest opponent of the first phase of the competition and the other matches were quarterfinals, which were also the most difficult while fighting for medals, and finally the ’final gold match, where these two teams met. The teams in the competition observed had the role of host and guest, depending on the will of the draw.
The sample of variables

Table 1 presents the monitored variables. They relate to the established types of successful and unsuccessful defenses in handball (zone systems, combined defense, as well as ways to defend with more or less one or two players) and also the undeniable and very significant technical factors of the results in handball (success or failure of balls defended by the goalkeeper, successfully or unsuccessfully organized counter attacks and half-counter attacks, successful or unsuccessful shots from 7 meters and exclusions of players for 2 minutes).

All of these formed defenses and related important factors were analyzed from the moment of their installation, or the beginning, with all the reported specificities. Data was collected by observing the video recordings of matches for which purpose a special observation list was created.

Table 1. Monitored variables in relation to the technically and tactically formed types of handball defenses and other related factors in achieving a successful outcome of the match

<table>
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<tr>
<th>Variables</th>
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<td>UDF 6:0</td>
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<td>UDF 5:1</td>
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<td>UDFMM</td>
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<td>UDG</td>
</tr>
<tr>
<td>Counter attack organization</td>
<td>SCO</td>
<td>UCO</td>
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Statistical data processing procedure

The data was analyzed by descriptive statistics, with the determination of the distribution frequency of each variable shown in the form of a nominal statistical scale. The arithmetic mean (AM) as a measure of central tendencies and standard deviation (SD), coefficient of variation (cV) and the minimum and maximum values of observed parameters (MIN, MAX) as measures of dispersion were calculated.

In the field of comparative statistics, the parametric and nonparametric discriminant procedure was used. Once a hypothesis that the observed values of the parameters are not significantly different in both teams is set, the significant differences of their arithmetic means were tested, where each team is seen through the prism of three games. In determining the differences of arithmetic means the t-test was used, at the level of significance of p<0.05.

RESULTS

The results obtained by descriptive statistics are presented in Tables 2, 3, 4, 5, 6, 7.

Table 2. Formed types of successful and unsuccessful handball defenses against the attacks of opponents and other TE-TA factors of the first stage of the competition at the World Championship in the match Serbia - Denmark 23:22 (12:12), which was played at the Sports Centre Cair in Niš, 11/12/2013

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In the analyzed variables (Table 2), the highest values of formed defenses of Serbia were at SFD 6:0 - 12 same or (46%), UFD 6:0 - 10 or (67%), SDF 5:1 - 10 i.e. (42%) and 10 also SFDM i.e. (62%), while the highest values of the variables of Denmark were SFD 6:0 with 14 same or (54%), SFD 5:1 same 14, or (58%), SFD 4:2 - 8, i.e. (80%) and SFDM and UFDML - 6 or 38 (60%).

In other variables, the important factors of success in the handball game, significant values of SGD were found, of which 18 (49%) were in Serbia, compared to 19 of SFD (51%) in Denmark, as well as in variable UGD, which is also almost evenly distributed with 22 (49%) and 23 (51%). Significant differences were observed with the variable of unsuccessfully organized counterattacks, where Denmark had even 12 (71%), compared to 5 or (29%) of Serbia, while the difference between the successfully executed penalty shots is noticeable in proportion 5 vs. 3 (62 vs. 38%), of Serbia and Denmark.
Denmark had two suspensions more than Serbia, which are stated in values 6 (60%) versus 4 (40%)

**Table 3.** Formed types of successful and unsuccessful handball defenses in relation to the attacks of opponents and other factors TE-TA in the World Championship quarter final match Serbia - Norway 28:25 (15:16), which was played in the Belgrade Arena in Belgrade on 18/12/2013

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Table 3 shows that the highest values of the formed defenses occurred in Serbia and in the variable SDF 6:0, which had as many as 26 of the same (70%) compared with 11 by Norway (30%), that is, with an equally large value in comparison with other variables, but not the highest.

With Norway, an extremely large number of formed zone systems was found, 5:1 in value 15 (68%) versus 7 in Serbia (32%). Also, distinct differences in successful and unsuccessful combined defenses were established - 5+1 and in particular in favor of Norway of the diameter of SDF 5+1 - 8 (89%) versus 1 (11%) of Serbia and UDF 5+1 – 5 (83%) versus 1 (17%).

Other significantly found factors of success were in variables SGD of value 22 (49%) of Serbia versus 23 (51%) of Norway as well as UGD of proportion 25 (47%) versus 28 (53%) of these two teams. Important parameters were set with values 4 or SOHC (80%) versus 1 (20%) of Serbia and Norway as well as with SS7M of diameter 4 of the same (67%) versus 2 (33%) between these two teams. Exclusions of players occurred only in the Serbian team - 2 times.

Table 4. Formed types of successful and unsuccessful handball defenses in relation to the attacks of opponents and other factors TE-TA of the first stage of the competition at the World Championship in the match Brazil - Serbia 25:23 (14:11), which was played at the Sports Centre Cair in Niš, on 10/12/2013

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At the analyzed match of the World Handball Championship for women (Table 4), Brazil was determined as having the highest number of successfully established zone systems 5:1 in value 17 (63%) versus 10 of SDF 5:1 (37%) of Serbia, which represents one of the major parameters in relation to the other variables. In Brazil, a significant amount was found in the variables SDF 5+1 value 8 (67%), as well as SDFNL - 10 (91%), compared to Serbia where significant values were reported in variables SDF 6:0 with 14 of the same (67%), UDF 5:1 - 8 (80%) and SDFMM - 11 (79%).

Significant factors in the performance of handball teams have also been established in variables SGD where Brazil had a value of 12 (60%) and Serbia 8 (40%) and UGD of the presented proportion 23 (48%) of Brazil and 25 (52%) of Serbia. Significant differences were established in the failure of organized counter attacks and half-counter attacks which were significantly higher in Serbia with 5 UOC (83%) to 1 UOC (17%) and 5 UOHC (71%) versus 2 UOHC (29%) of Brazil. Also, significant differences were shown in the total exclusion of the players for 2 minutes, of volume 7 TE2M (70%) vs. 3 TE2M (30%) in favor of Brazil.
Table 5. Formed types of successful and unsuccessful handball defenses in relation to the attacks of opponents and other TE-TA factors in the quarter final match of the World Championship Brazil - Hungary 33:31 after two overtimes played. The regular match part was finished with the result 26:26 (12:11) after the first overtime 29:29 and after the second already stated value. The match was played in the Kombank Arena in Belgrade, on 18/12/2013

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<table>
<thead>
<tr>
<th>Variables</th>
<th>Brazil</th>
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By a thorough analysis of Table 5, the maximum value established of the formed defenses of the match in both observed national teams was in variable SDF 6:0, whereupon with Brazil the values 22 of the established zone systems (42%) were found compared to an even 31 of Hungary (58%). Significant values in Brazil were found also in SDF 5:1 - 10 (43%), SDF 4:2 and SDFMM of the same values 12 (86 and 48%) and in variable SDF 5+1 - 14 (74%), while in Hungary the significant values were found in in UDF 6:0 - 12 (60%), SDF 5:1 and SDFMM of the same values of 13 (57 and 52%), as well as with SDF 5+1 - 5 (26%).

In the result-significant-successful factors, what was also found were the differences in the values of variables: SGD at Brazil - 33 (61%) versus 21 (39%) in Hungary, UGD with 31 (48%) versus 33 or (52%) in favor of Hungary, the proportion of SOC 6 (75%) of Brazil versus 2 of SOC (25%) of Hungary, as well as SS7M of the proportion 5 (62%) of Brazil vs. 3 (38%) of Hungary.

A significant difference was also found in variable TE2M where Brazil had as many as 9 exclusions (82%) versus 2 (18%) of Hungary.

### Table 6. Formed types of successful and unsuccessful handball defenses in relation to the attacks of opponents and other factors TE-TA in the final game of the World Championship Brazil - Serbia 22:20 (13:11), which was played in the Kombank Arena in Belgrade on 22/12/201

<table>
<thead>
<tr>
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<th>%</th>
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<td>0</td>
<td>3</td>
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<td>1</td>
<td>20</td>
<td>5</td>
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<td>1</td>
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</table>
The highest recorded value of the observed variables in Table 6, in terms of the defense formed by both national teams is found in SDF 6:0 of proportion of 16 (41%) of Brazil versus 23 (59%) of Serbia. Significant values in Brazil are defined also in variables SDF 5:1 with 12 of the same (52%), then SDF 5+1 - 9 (82%) and in SDFML - 8 (62%), while in Serbia UDF was 6:0 - 12 (71%), SDF 5:1 - 11 (48%), as well as the same values in variables SDFMM and SDFML - 5 (62 and 38%).

The significance of the differences of other factors of success in handball was found in variables: SGD of value 19 (40%) of Brazil versus 28 (60%) of Serbia, UGD of diameter 20 (48%) of Brazil versus 22 of UGD (52%) of Serbia and with SOC, UOK and US7M presented with 5 (83%), 2 (29%) and 2 (100%) in Brazil versus 1 (17%) and 5 (71%) and without unsuccessfully carried out penalty shots from 7 meters in Serbia. Parameters of the exclusion...
of players for 2 minutes were almost evenly distributed in volume - 5 (56%) versus 4 (44%) in favor of Brazil.

Table 7. Descriptive indicators of the stated variables (i.e. tactical-technical elements) that are sorted and distributed in relation to the two presented teams and three games (two quarter-finals and the final match)

<table>
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<tr>
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<td>Σ</td>
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<td>SD</td>
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<tr>
<td>TUPC-HC</td>
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<td>7.0</td>
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</tbody>
</table>

*TSFZS - total successfully formed zone systems (zones taken into consideration 6:0, 5:1 and 4:2); TUFZS - total unsuccessfully formed zone systems; TTFCD – total successfully formed combined defenses (defenses taken into account 5+1 and 4+2); TUFCD – total unsuccessfully formed combined defenses; TSMM-ML – total successfully conducted defenses with a man more or less; TUMM-ML – total unsuccessfully conducted defenses with a man extra or less; TSPC-HC – total successfully played counterattacks or half-counter attacks; TUPC-HC – total unsuccessfully played counter attacks or half-counter attacks.

(** The match Brazil-Hungary in this table is considered in the ‘regular part’ of its duration, i.e. without the extra time played so that all observed parameters can be correctly and equally distributed).

Chart 1 shows that the highest values of arithmetic means were found in the variables TSUDG - 45.7 of Serbia versus 41.0 of Brazil, TSUDF 6:0 - 30.0 of Serbia and 19.0 of Brazil, while the lowest values were recorded in TSUCD 4+2 - 1.0 of Serbia and 4.3 of Brazil and in variable TSUS7M - 5.7 of Serbia and 5.0 of Brazil. The greatest value of the differences of the mentioned arithmetic means of the two teams, which are reported by a student t-test, were found in the variables TSUMM-ML - 0.84 and TSUOC-CK - 0.80, and the lowest for TSUCD 5+1 – 0.04 and in variable TSUDF 6:0 – 0.10.
Chart 1. Shows the difference in the arithmetic means of the observed variables and their tested statistical significance stated by a t-test between women’s handball teams of Serbia and Brazil in the 21st World Championship.

<table>
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<td>TSUS7M</td>
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</tbody>
</table>

(* The match Brazil-Hungary on this chart is considered in its ‘regular part,’ i.e. without the extra time played so that all the observed parameters can be presented and distributed evaluatively.)

DISCUSSION

Based on the results in Table 2, the two observed national teams in the set defenses had the overall highest number of set zone systems of 6:0, both successful and unsuccessful (12 SDF 6:0 and 10 UDF 6:0 of Serbia and 14 SDF 6:0 and 5 UDF 6:0 of Denmark). The found indicators suggest that expert committees opted, in the preparation of the match, largely for cleanly blocked characters of defense, with a small number of predictions of exits to outer shooters, which in totality would have the effect of a small number of scored goals. The distance of the thus set defenders was quite moderate and narrow (about 1.5 meters) with good lateral mobility in the blockades, although a loss of concentration caused mistakes.

Also, important indicators were determined with the defense 5:1 and 4:2 (Serbia had 10 SDF 5:1 and 3 UDF 5:1 and 2 SDF 4:2, while Denmark...
had 14 SDF 5:1 and 4 UDF 5:1 and 8 SDF 4:2 and 3 UDF 4:2), which can be explained by the almost uniformly distributed ‘shallow’ zonal formations of both teams with a ‘forward’ quick-turn movement and prevention of a shot from secondary positions, while a significantly higher number of defense with Denmark with two protruding defensive players was established in order to solve the long shots. In this setting by Denmark, the emphasis was on a greater aggressiveness in defense tasks, which is considered partly justified, looking at the end result.

Although there were a total of ten exclusions in two minutes, significantly more successful and unsuccessful defenses with an extra player was found in Serbia (10 versus 6 SDFMM and 4 versus 1 UDFMM), which indicates that in compact and numerically stronger defenses defending the Serbian was quite effective and important in the victory, primarily due to the imposed confidence of the players. The indicators of goalkeeper defenses had nearly equal values (18 vs. 19 SGD and 22 vs. 23 UGD of Serbia and Denmark) but with a marked contrast of unsuccessfully organized counterattacks by Denmark (even in the value of 12 versus 5), which can be explained by a marked decrease in concentration created by the nature of the game itself and the added pressure of the audience in the stands. The final comment is such that both teams in the future should show a significantly higher level of organization and the use of variable zones in the defense in order to confuse the opponent and make him lose his ball more easily.

The results presented in Table 3 show that Serbia, in relation to Norway during the formation of defensive lines had the highest representation of variable SDF 6:0 (26 vs. 11), while in the reverse case Norway expressed the highest value in the SDF 5:1 (15 to 7). There were unsuccessfully set stated systems by Serbia and Norway in proportions 7 versus 9 of UDF 6:0 and 6 versus 7 of UDF 5:1.

These results support the fact that the Serbian team played quite a deep zone, properly covering the axis of its goal with a fair number of blockages, while Norway had the primary commitment, along with having five players on the goalkeeper space line, to also have a "projecting" one in the relatively vulnerable position of the goal center. However, despite such successfully set systems, there have been mistakes of a nearly equal volume, most likely caused by a loss of concentration, irregular space closure and subsequent exhaustion.

When forming a combined defense, we found a marked difference in the formation of 5+1 in favor of Norway (SDF 5+1 values of 8 to 1, and UDF 5+1 values 5 to 1), which is explained by the fact that the coaching staff of the Scandinavians had in mind an exclusion from the game of the best opponent player and organizer of the attacks (Andrea Lekić), but the end result shows that they failed in the tactical totality, primarily due to the skills of the other team members of Serbia and the great support of the audience in the stands.
Other recognizable parameters can be discussed, perhaps the most important variables in the handball game – the goalkeeper defense expressed in proportions (22 SGD of Serbia versus 23 of Norway and 24 UGD vs. 29), which speaks of the equal success of both goalkeepers, and therefore it did not play a key role in the victory, as did the game in the field and the organization of quick half-attacks presented by proportions of values (4 Serbia and only 1 Denmark).

From all the stated and observed, it is concluded that this was a very attractive game, in all its parameters, and only now can it be seen what kind of success the Serbian national team had at home, because in 2015 Norway became the new world champion in women's handball.

At the women's World Handball Championship match (Table 4), Brazil had the greatest value of defensive variable SDF 5:1 - 17, and Serbia 6:0 - 14, which is explained by the prevailing setting of both coaches with deep zones in the defense, with the difference of a ‘projecting’ Serbian player. Movable zones and good blocks tried to "narrow down" the space to the opponent’s attack, which due to a low ‘flow’ of the ball ensued in a greater number of unsuccessful shots from a distance.

The significant value of ‘defensive variables’ with Brazil was also in SDF 5+1 – 8, in SDFML - 10, and in Serbia SDFMM - 11, which speaks of a quite a number of distractions and exclusions from the game of the best player of Serbia, as well as of a skilful defending and setting up of defensive formations with a player less, while Serbia has shown significant success with an extra player. The numerical difference of exclusion of players was in favor of Brazil (7 versus 3).

A ratio was found with the unsuccessful and most applied defensive formations in both teams: UDF 6:0 Brazil and Serbia - 7 versus 5, UDF 5:1 - 2 versus 8 and UDF 4:2 – 3 versus 1, which can be explained by the same number of errors in the two teams that have formed defense systems, made primarily due to less successful individual techniques, special physical training (usually very important for these zones), as well as somewhat shorter work on mastering the laws of motion and a high degree of practice of the team as factors of cohesion development, as studied by (Carron, 1982), and which must include different sources of influence - from the most general and less relevant to specific direct and very important factors.

The successful defenses of goalkeepers were in the approximate value of (12 Brazil, 8 Serbia), while there were significantly more unsuccessful defenses, indicated by the given results. This figure represents a considerable loss of concentration in both teams’ goalkeepers (especially Maisé Pessoa of Brazil and Katarina Tomašević of Serbia), imposed by the character of the match and the high expectations of the players and the coach, while in the field of technical components there was a greater number of unsuccessfully
organized counterattacks and half-attacks by Serbia, in the values of (5 versus 1 and 5 versus 2). The end result of the mentioned must be in the essential inclusion of a somewhat better psychological preparation of both the national team’s goalkeepers, who, despite the importance of the match must show their full potential.

The results in Table 5 showed generally larger differences of all variables, due to the two played overtimes in the game. Both Brazil and Hungary had the highest number of defensive formations SDF 6:0 - 22 and 31, as well as many other successful formations stated by parameters (SDF 5:1 - 10 versus 13, SDF 4:2 - 12 versus 2, SDF 5+1 - 14 versus 5, SDF 4+2 - 7 versus 0 and SDFMM - 12 versus 13). All of the above indicators show a real ‘trench’ fight and battle in the quarterfinals of the World Cup which eventually resulted in a possible division of the medals in the competition.

The preponderance of match results, according to the indicators, was brought by the variables SDF 4:2 and SDF 5+1 and 4+2, which shows that in the use of the model for resorting to the ‘most dangerous’ shooter players and organizers of the attacks of Hungary, the team of Brazil ‘dulled’ their attack with the ultimate goal of victory. The failure of forming defensive formations was shown in the variables (UDF 6:0 8 versus 12, UDFMM 0 versus 4, UDFML 6 versus 1 and UDF2ML 3 versus 0). The exposed parameters indicate that, compared with the mentioned Hungarian ‘minuses,’ their ‘pluses’ in coping and ultimately ending with an extra player in the field were presented here, as it was Brazil that received a large number of goals with one and two players less in defense.

Successful goalkeeper defenses occurred significantly more in Brazil (33 vs. 21) which ultimately took precedence in the match, with the conclusion that a goalkeeper in handball is crucial for the outcome, while the unsuccessful defenses occurred (31 vs. 33), which is testified by the end result. The difference in successfully organized counterattacks stated by the value of 6 vs. 2 in favor of Brazil, which once again proved the team’s tactical readiness for rapid transformations from the field of defense into the field of attack.

The comment of the observed World Cup match was such that it showed the full diversity and necessary content and cost-effectiveness in the game of defense and the game of attack.

The parameters of situational efficiency in handball have become the subject of interest only in the last two decades, although the sport was conceived in the 19th century (Czerwinski, 2000), and a substantial progress in the research of technical and tactical elements is primarily due to technological advances, particularly in the field of computer and video technology (Bon, 2001).

The results obtained are, in a way, the synchronization of previous researches which stress the primary importance of adequate training technology
and team skills in a technical and tactical plan in order to express a wide range of different actions (in both the defense and the attack phases). The attempt at a thorough research of the parameters of situational efficiency and a precise link gives the team a chance to fight for a high placement. Due to all the mentioned, top coaches have shown interest for a scientific approach to the study of the performative abilities of male and female handball players i.e. their technical and tactical skills, which have occurred rarely thus far (Costantini et al., 2008).

In the final World Cup match (Table 6), both teams had the greatest value of a defensive variable SDF 6:0 reported by values (Brazil 16, Serbia 23), while the more significant values of success were in variables (SDF 5+1 - 9 versus 2, SDF 4+2 – 6 versus 2 and SDFML – 8 versus 5), which indicates that the stated parameters are key in achieving the final victory and the end success of Brazil in the championship.

Namely, Brazil used a more established formula in this championship to exclude from the game one or two key Serbian players in the organization of attacks and shoots at the goal, which would bring the final predominance in the game. Also, the team used a good setting and covering the defense area with a lot of ferocity, fighting and concentration in the key moments with a player less.

The results show that Brazil succeeded in this, but nonetheless, in the defense there was a series of mistakes incurred by both teams found in variables UDF 6:0 (5 Brazil vs. 12 Serbia), UDF 5:1 (3 vs. 0), UDFML (4 vs. 0) and UDF2ML (0 vs. 2 in favor of Serbia).

All of these values can be explained by the fact that with key set zones with six players on the line of the goalkeeper area, there were significantly more mistakes made by the team of Serbia, which must have had the ultimate effect of defeat. With other important factors, inconsistencies were found in the variables SGD (19 Brazil and 28 Serbia), as well as in UGD (20 vs. 22), which confirms the fact that the goalkeepers of both teams had remarkable results, particularly Serbia, but poor play in the field leveled that and eventually led to defeat.

The difference was noted in the organization of counter attacks and half-counter attacks, so with Brazil it was 5 SOC and 2 UOK, and in Serbia 1 SOK and 5 UOK, which shows that Brazil, by a rapid transformation of the game, confused the opponents and achieved a significant number of goals, while in Serbia the number of mistakes in the rapid transformation of the game from the defense phase to the phase of attack was manifested primarily by the loss of concentration in the players.

The lesson of the game is to reduce the number of mistakes in forming the system of zones 6:0 for the national team of Serbia, primarily using situational trainings and better defensive player interaction (as such, a formed system was one of the most applied defense systems of Serbia in the
championship), and reducing the number of mistakes in organizing a counter-attack with a significantly greater accuracy thereof.

Table 7 presents the expected scale of, above all, the successful and unsuccessful zone systems, combined defenses, coping with a player extra or less in the formation and also, quick organizing of counterattacks and half-attacks at the three most important observed Championship matches. Almost all the mentioned indicators had the highest values in the observed match Brazil-Hungary, which due to its dynamism deserves to hold the title of the best representation of women's handball at the World Championship in Serbia.

Chart 1 shows a t-test at a significance level of p<0.05, with the following data: the arithmetic mean found in the variable of total successful-unsuccessful defensive formations 6:0 for Serbia was 30.0, and 19.0 for Brazil, while the value of the t-test for differences of the mentioned (AM) was 0.10, suggesting that the hypothesis is accepted, that is, that the values are not significantly different.

With the set variable TSUDF 5:1, Serbia had the arithmetic mean value at the three observed matches of 12.3, while Brazil had the value of 15.0, and thus their difference in the procedure of the t-test was at a 0.37 value, which can be interpreted by the acceptance of the hypothesis, i.e. that the arithmetic means compared statistically do not differ significantly.

In the variable of successful-unsuccessful combined defenses 5+1, it was noted that Serbia in the observed matches performed the same at an average of 2.7, unlike Brazil, which had a value of 12.0 of such established defenses. The value of t-test for the means difference of this variable is 0.04 suggesting that the hypothesis is not accepted i.e. that these values show significant differences.

The totality of successful and unsuccessful combined defenses (TSUCD 4+2) with Serbia had the arithmetic mean value of 1.0, unlike Brazil, which had a value of 4.3. The value of the t-test for the means difference of this variable is 0.19, which speaks in favor of the hypothesis being accepted, that is, that the values do not show significant differences.

The arithmetic mean of the variable TSUMM-ML with Serbia had a value of 13.0, and with Brazil 14.3, so their difference is represented by the t-test in the value of 0.84, which may be discussed by the fact that hypothesis is also accepted, or that the compared arithmetic means were not statistically significantly different.

The total successful-unsuccessful organized half-attacks and counterattacks at the three observed matches with Serbia are presented by the value (AM) - 11.0, and with Brazil 10.3. The value of the t-test for the means differences of this variable is 0.80, which confirms the acceptance of the proposed hypothesis whereupon values show no significant differences.
A very significant variable in the handball game TSUGD found the value of the arithmetic mean with Serbia - 45.7, and with Brazil 41.0, while the value of the t-test was 0.42, which is interpreted as accepting the proposed hypothesis, i.e. claiming that the compared arithmetic means were statistically indistinguishable.

Also, one of the major factors in handball was introduced by the TSUS7M variable, where the value (AS) in Serbia was -5.7, and in Brazil 5.0. The presented parameters were also covered by their differences i.e., the t-test which had the value of 0.67, which is explained by the fact that the hypothesis is accepted, i.e. that the values show no significant differences.

All the described and clarified team results in the fight for medals are in line with some previous studies (Gardašević, & Terzić, 2011; Gardašević, 1999), where the shown values of the effectiveness of the shots, that is, the realized assistances and situational efficiency show no significant differences, while in comparison with the finally placed teams this difference is extremely large and significant. Such a correlation between successful and unsuccessful teams is expected, which can ultimately be attributed to a comprehensive conducting of training of the best ranked players and a considerably better preparation of the workforce.

CONCLUSION

The study analyzed the total representation of successful-unsuccessful tactical and technical repercussions of the two best women’s handball teams at the 21st World Championship held in Serbia. Based on the results, it can be concluded that there was a very small difference in the observed matches regarding the number of goals scored and goals received by the two teams; namely, Serbia in the three observed matches achieved (71 goals, an average of 23.66) and Brazil (73 or 80 if the two extensions are analyzed, or an average of 24.33 or 26.66). The goals received by Serbia were 69 (23 in average) and with Brazil (the same 69 or 74, or an average of 23 or 24.66).

The most important parameters at handball matches speak in favor of the fact that there were no major discrepancies in the defense and attack in both teams, and that by such an open and solid game the teams managed to reach the battle for the gold medal, as in the games there were no significant differences in the results (the biggest goal difference being three goals).

Everything said in this paper points to certain regularities that can and should be used in future analyses of the very structure of the game of handball and can be quite important, as the results obtained have direct practical implications, both in the training technology and in the direct preparation for competing.
The final conclusion is that in the future, a large number of teams among which is also Serbia, handball experts and educators should be guided to observe the countries which have founded the modern handball game (Denmark and Norway), which did not achieve remarkable results at this competition, but not give up their distinctive style. In fact, they have a very organized and tough defense with ‘atomic’ fast counter attacks and half-counter attacks, with which they crush their opponents and also optimize the beauty of the game, with the great support of their fans – this relates to both the national team and the clubs.

This statement is corroborated by the results of the last World Cup held in Denmark and completed a few days ago, at which Norway became the world champion by defeating the Netherlands in the finals.

REFERENCES

Abstract: Transversal research was carried out on a sample of real aikido practitioners made up of males aged from 30 (± 5 years) who train three times a week. During the selection of the respondents, the criterion, along with the age structure and gender, was also the degree of knowledge of the technique of real aikido, and thus participating in the research were the respondents who have been training real aikido at least three, and at most four years. The aim of the research was to establish the significance of retreating from the line of attack as a relevant prerequisite for a successful defense. The aim of the research was the skill of real aikido which consists of a combination of individual techniques. The respondents in pairs via an arranged sparring carried out the technique of “downwards hand” blocks as a response to the “direct” foot strike and the “inner upper arm outwards” block as a response to the “fist straight ahead” strike along
with a simultaneous retreating from the line of attack by a “side movement” technique. In the following variant, the respondents who defended themselves from an identical strike used the previously mentioned blocks which they did not carry out in combination with movement but rather, remained in the line of attack. The obtained results confirm the presumption that the number of successfully realized blocking techniques which precede the realization of the latter individual techniques in real aikido (most often, levers) will depend on the fact whether the defender has retreated from the line of attack using the movement technique.

Key words: line of attack, strike, movement, block, real aikido.

INTRODUCTION

Real aikido is a relatively new martial art founded by soke (founder) Ljubomir Vračarević. This is an authentic martial art which took elements from traditional aikido, jiu jitsu, judo, etc., in such a way that the master promotes learning techniques, removes all mystification and religiosity, considering them inappropriate for the Balkan spirit, and adopts and perfects the elements which increase efficiency and applicability in real life situations (Milosavljević, Matavulj and Trunić, 2013). The basic premise of real aikido is to defeat the attacker efficiently, and not to be physically injured. This is a defensive, extremely flexible system of defense techniques whose basic features are the following: counterpartering the opponent’s attack, a continuity of carrying out techniques and a total final dominating of the attacker (Milosavljević & Vračarević, 2011). In real aikido, the dominating of the attacker is most often carried out by a technique of levers with which the attacker is “controlled” by dosed pain. Pain is an unpleasant sensory or emotional experience which is caused by possible or existing tissue damage or which can be described to match the mentioned damage (Arlov, 2007).

The topic of this research of this paper is the skill of real aikido, which consists of a combination of individual techniques.

The aim of the research is establishing the significance of retreating from the line of attack as a relevant prerequisite for a successful defense.

METHOD

In this research, the experimental factor were the techniques of movement realized with the aim of retreating from the line of attack which are within the framework of the “agreed sparring” realized directly after the attacker starts carrying out the technique of strikes, along with a simultaneous carrying out of
the block technique. All the strikes with the hands as well as the feet within an agreed sparring are realized by using the maximum strength of the respondents carrying out the strikes and with the aim to realize contact with the defender’s abdomen, during which the practitioners who were defending themselves wore the chest protectors used in taekwondo in order for the research to be carried out safely. In the system of real aikido training, as the word ‘real’ implies, there is much insistence on a real attack by the partner. The founder of real aikido aspired for this kind of training to master defense techniques which would be applicable in real life situations (Vračarević, 2007). Strikes are mobile structures which can be realized with the hands and feet with the participation of other body parts, and which have the aim to obliterate the opponent via a tactical design in whose realization various abilities participate (Milošević, Zulić and Božić, 1989). The efficiency of the strike techniques are directly connected with timeliness and speed realization (Blagojević, Vučković and Dopsaj, 2012). Those practitioners which had the task to defend themselves from strike techniques carried out the block along with a simultaneous movement, with the aim of retreating from the line of attack. Movement is realized when it is necessary to overcome a certain space and/or maintain an adequate distance, as well as when it is necessary to retreat from the direction of an eventual attack (Blagojević, Vučković and Dopsaj, 2012).

Sample of respondents

The sample of respondents in this transversal research was taken from the practitioners of real aikido and is made up of males aged from 30 (± 5 years) who train three times a week. While selecting the respondents, the criterion, along with the age structure and gender, was also the degree of knowledge of the technique of real aikido, and thus respondents who train real aikido at least three, and at most four years took part in the research. Along with this, the respondents did not belong to one single club but were from different clubs, as well as from different cities. The mentioned training period secured a quality realization of individual techniques, as well as a combination of individual techniques which were realized within this research. Thus, the research involved a systematic sample. “We form systematic samples by using personal conviction from the units of the group as typical or representative for a given gathering” (Žižić and associates, 1993, p. 142). In total, at the beginning, some 40 male respondents were under observation (20 pairs) of which no less than 36 respondents (20 pairs) were planned at the final observing during the assessing of the efficiency of carrying out levers while the sample, due to fluctuation, cannot be any less than 36 respondents (18 pairs). All the respondents are in good health, without injuries which would cause difficulties for taking part in this research, regularly train and volunteered for assessing the success of the realization of the block techniques through agreed sparring.
Observable variables

An observable variable is the technique of blocks which can be realized in a combination with or without the technique of moving. The term block implies the technique which can be used as a defense from an attack carried out by hand or foot (Mudrić, 2005). Using this research, the authors tried to point out the significance of the technique of movement which would increase the number of successfully realized block techniques for which it is presumed would not be sufficient to successfully block the attacker’s hands or feet, i.e. to stop a strike directed towards them in the chest area, unless the defender fails to retreat from the line of attack at least partly.

The process of establishing the success of realizing the block techniques which can be carried out independently or in combination with the movement technique

By means of agreed sparring, the respondents carried out all the planned attacks in pairs and on one occasion.

This research included the following variants of attack and defense:
1. One partner attempts to defend himself from the attacker by a strike with the foot “straight ahead”, and while remaining in the line of attack he carries out the block “with the palm downwards” attempting to disable the attacker from making any foot contact with his chest (BKNAPNOG1).
2. One partner attempts to defend himself from the attacker by a strike with the foot “straight ahead”, during which he retreats from the line of attack with the movement technique “moving to the side” along with a simultaneous carrying out of a block “with the palm downwards” attempting to disable the attacker from from making any foot contact with his chest (SKNAPNOG2).
3. One partner attempts to defend himself from the attacker by “punching,” during which he remains in the line of attack and carries out the “inner side of the upper arm outwards” block, trying to disable the attacker from from making any hand contact with his chest (BKNAPRUK1).
4. One partner attempts to defend himself from the attacker by “punching,” retreating from the line of attack with the movement technique of “sidestepping” with a simultaneous carrying out of the “inner upper arm outwards” block, trying to disable the attacker from from making any hand contact with his chest (SKNAPRUK2).
Statistical analysis

Considering that the variables were analyzed according to the principle task being carried out successfully-unsuccessfully (value 1 for successful – 2 for unsuccessful), the Wilcoxon test for the dependent samples for determining the statistically significant differences was used, during which compared were the variables BKNANOG1 and BKNAPNOG2 and BKNAPRUK1 and SKNAPRUK2, as well as the Friedman test for multiple samples. The observed level of statistical significance was p=0.05.

BKNAPNOG1 – without movement, the one defending himself carries out a block as a response to foot strike 1
SKNAPNOG2 – with movement, the one defending himself carries out a block as a response to foot strike 2
BKNAPRUK1 – without movement, the one defending himself carries out a block as a response to hand strike 1
SKNAPRUK2 - with movement, the one defending himself carries out a block as a response to hand strike 2

RESULTS

The results of the statistical analysis are given in tables 1, 2 and 3.

Table 1. of statistical analysis for variables BKNANOG1 and SKNAPNOG2

| Wilcoxon Matched Pairs Test Marked tests are significant at p <.05000 |
|---------------------|-------|--------|-------|
|                     | Valid - N | T     | Z     | p-level   |
| BKNAPNOG1 & SKNAPNOG2 | 40     | 56.00000 | 3.195325 | 0.001397 |

As can be seen from Table 1, the results for the variable BKNANOG1 were statistically significantly different (p=0.001) and on the level p=0.001 from variable SKNAPNOG2. Considering that in the case of SKNAPNOG2 the number of successfully realized techniques is far greater than BKNANOG1, we have concluded that the realized technique which follows the retreating from the line of attack is a far more efficient method of defense and as such, it is recommended in the training of the mentioned techniques.

Table 2. Results of the statistical analysis for the variables BKNAPRUK1 and SKNAPRUK2

| Wilcoxon Matched Pairs Test Marked tests are significant at p <.05000 |
|---------------------|-------|--------|-------|
|                     | Valid - N | T     | Z     | p-level   |
| BKNAPRUK1 & SKNAPRUK2 | 40     | 0.00   | 3.723555 | 0.000196 |

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As can be seen from Table 2, the results for the variable BKNAPRUK1 are statistically significantly different \( (p=0.0019) \) and on level \( p=0.001 \) from the variable. Considering that in the case of SKNAPNOG2 the number of successfully realized techniques is far greater than BKNAPRUK1, we have concluded that the realized technique which follows the retreating from the line of attack is far more efficient as a defense method and as such recommended in training of the mentioned techniques.

With the aim of determining the difference on the level of technique, carried out was a Friedman test for all four observable SKNAPRUK2 variables. The Friedman test pointed to a significant difference between the observable variables (techniques) during which the results were shown from worse to better (Table 3), so that the SKNAPRUK2 technique is the most successful one, and BKNAPNOG1 is the least successful. The percentage of success ranged from 25% of the successfully carried out technique BKNAPNOG1 to over 90% for SKNAPRUK2.

### DISCUSSION

It is important to stress that hitherto this topic has not been researched in real aikido as a defensive martial art, and thus it is important to shed light on the significance of retreating from the line of defense. The obtained results point to the fact that the movement technique with the aim of retreating from the line of attack as an experimental factor contributes to a large number of successfully realized defenses. In the specific case of this research, the phrase “successful defense” implies preventing contact of the attacker’s extremities with the chest of the defender, during which the one defending himself has the possibility to prevent the mentioned contact with a block technique or a combination of movement techniques and blocks. An unsuccessful block implies any kind of contact of the attacker’s extremities with which he is attempting to strike the chest of the defender. Even though dominant
in real aikido, levers in the greatest number of cases are carried out after preventing the attacker’s strike with a block and/or retreating from the line of attack, and thus it is important to stress the significance of the technique of movement used in this aim, which this research confirms. The obtained results point out that the number of successful defenses were carried out by foot, during which the one defending himself remained in the line of attack trying to disable the block technique of the attacker achieving contact with the defender’s chest. An explanation of the results obtained thus is in the fact that the attacker’s foot is heavier, and the muscle groups which are used to carry out a concrete strike are much stronger than the hand of the attacker carrying out the block. Somewhat more successful was the defense from the hand strike, during which the defender remained in the line of attack trying to disable the attacker to realize a contact with the defender’s chest with the blocking technique. The explanation is in the fact that the attacker carries out the strike with the hand, while the defender also carries out the block with the hand, and thus the ratio of the weight of the extremities and the strength of the muscle groups which move the mentioned extremities are more equivalent than in the previous case. Even more successful is the combination of the technique of movement and the block as a response to the foot strike, while the most successful was the combination of the technique of movement and the block technique as a response to the hand strike. The ensuing difference in the last two mentioned defenses can be explained again by a weaker hand strike which is easier to block than the foot strike which is much stronger. In any case, the results obtained point to the large significance of retreating from the line of attack, whether it involves defense from a hand or a foot strike.

**CONCLUSION**

The aim objective of this research is the martial art of real aikido which consists of a combination of individual techniques. This research had the aim to determine the significance of retreating from the line of attack as a significant prerequisite of a successful defense. The results obtained speak in favor of the fact that retreating from the line of attack increases the percentage of successfully carried out defenses which have as the aim to prevent contact with the attacker’s extremities and the defender’s chest. As in every other martial art whose aim is to promote the efficiency of techniques applied, thus also in real aikido all the combination of techniques which are carried out can be combined in numerous ways in order to overcome the attacker efficiently, and thus this research points to the variants of defense whereupon the defender had the possibility to use only blocking techniques in one case, and in another a combination of movement and block techniques which gave
incomparably better results and confirmed the presumptions of the research. The future researches which would be aimed at this problem could analyze the efficiency of rectilinear and circular movements with the aim of retreating from the line of attack, which can determine whether and from which strokes an advantage during the retreating from the line of attack can be given to rectilinear or circular movements. Such researches would surely contribute to positive transformations of real aikido which is, as every other martial art, alive, i.e. submits to positive changes and is directed towards efficient solutions to certain problematic situations.

REFERENCES

Abstract: The subject of this paper is the analysis of theoretical postulates relevant for the area of sports marketing and management including: the role of the location and distribution of the intangible sports products (experience, event, result, image, brand) which are created and delivered at a sports facility. The objective of this paper is to explain the manner of functioning and maintaining the strategy of a sports entity by adopting the concept of the sports marketing culture. The analysis of sports products starts from the consumers’ needs, competition, the company and the environment. The analysis of the sports products’ consumers is carried out for the purpose of making strategic decisions about what the consumers want, how much they can pay, where they usually shop, as well as what promotional methods and messages influence the consumers to make these and desired decision more easily. The analysis of the environment is necessary for the purpose of reviewing the economic and political climate in which the sports facility is present, in the light of the Sports Law, rulebooks, social and cultural trends, business and safety risks, conflict situations etc. The analysis explains the role of a sports facility as a sales point for the intangible sports products which jointly with the production, pricing and promotional strategies make the part of a comprehensive sports marketing mix.

Key words: sports marketing, distribution of a sports product, sports facility

INTRODUCTION

A sports product is an aggregate of tangible and intangible elements (sports events, clubs, discipline, players, etc.) of a psychological nature giving meaning to the consumer (Dugalić, 2005). An inconsistent sports product (non-material,
intangible) offers a complex of benefits to the participants; it is unpredictable by nature and mainly spontaneously exhibited. Sports products offered at the market could be segmented as follows: physical goods, services, persons, venues, organizations (entities) and ideas (Pitts and Stotlar, 1996). Sports offer of the inconsistent products could be segmented as follows: sports experience, sports event, sports result, image (of a club, athlete or a sports facility), and sports brand. The main product within the inconsistent offer is the game (the experience created for the spectators by the players, organizers, sponsors) in the environment which includes the accompanying products: atmosphere, goodwill, idea, venue, supporting and auxiliary programs etc. It is important to understand that the sports talents have the most direct impact on the creation of a sports event, whereas sports professionals and professionals in sports only provide expert, logistic support to develop this resource and then capitalize on it.

The classification of sports products is the most important strategy for identifying the consumers’ needs and wishes in order to create and offer products which will fully meet the expectations of the visitors. Industrial segments (fitness, recreation and professional sport) share some homogenous characteristics, and their consumers as a group share – exact, mutually resembling expectations. The mandate of the sports management is the continuous analysis of consumers’ understanding of functionality and benefits of these products, so as to enable timely preparation of the development strategy and characteristics diversification, successful price strategy, distribution methods and promotional campaign. The first step is defining a sports product, followed by the assessments of prospects and threats, development of the relevant marketing plans, determination of the right time for product differentiation or removal from the offer. Sports facilities, equipment and tools, materials used for making the sports tools, clothes, shoes, products intended for athletes’ nutrition and other consistent products could be included in the composition of the broader sports offer on the occasion of a single one sports event, so it is required to understand their production technology and evaluate quality to avoid that the consumer evaluating the final product observes product defects which should have been noticed and removed by the organizer himself.

The sports market structure as per Gašović (2009) comprises main customer groups interested in the sports organizations’ offers: 1/ active and future athletes, supporters, fans, users of sports services (facilities, professionals etc.), users of sports equipment, sports community, mass-media, scientists, experts in any field, professional and scientific institutions and other sports organizations; 2/ market of sponsors and patrons as profit organizations (corporate organizations, producers of sports equipment etc.); and 3/ non-market segment includes budget structures (state) and other non-profit organizations (amateurs and volunteers) whose decisions and standpoints are influencing results and the state of the domestic sport. These are the following: Sports Law (2011), article 145-155: provisions on sports facilities, and article 139: part IV, Categorisation in Sports; Rulebook
on monitoring professional activities in the area of sports (2011), Rulebook on
detailed conditions for carrying out of sport activities and sport professions
(2013), Rulebook on national categorization of sports facilities (2013), regulations
published by the international associations in regards to the minimum norms to
be met by the sports facilities in order to qualify for sports competitions, various
guidelines, recommendations etc. The national categorization of sports facilities
determines criteria and standards for ranking the sports facilities based on the
type of sports activities, technical characteristics of a sports facility and the level
of competition for which the conditions are met. The categorization is prepared by
the expert commissions appointed by the Minister. The Strategy for development
of sports in the Republic of Serbia for the period 2014–2018 (2014) mentions sports
facilities under items 3.5: Sports facilities and 7.4: Development and improvement
of sports infrastructure. The Action Plan for the implementation of the Strategy
contains detailed description of these tasks per holder and deadline.

**METHOD**

The research procedure was based on the information and data gathered
from the theoretical sources, laws, rulebooks, internal documents and other
sources (clubs’ data). In view of the theoretical character of the paper, the
gathered information were organized by logical flow with the use of various
methods: observation, historical method when observing the analysed event in
time cycles, induction and other scientific methods. For the purpose of summing
up the results, the methods of synthesis and deduction were used (for comparing
the analyses results in order to reach the conclusion and formulate the message
of the paper promoting sports marketing and management, and their stronger
promotion in the Serbian sports practice). For the preparation of this paper, the
data analysis explaining the role of a sports facility in light of the distribution
mix was primarily used with the aim of reaching useful conclusions for the
preparation of distribution strategies and improvement of operations of a sports
facility.

**RESULTS**

The distribution as an instrument of a sport marketing mix is a system
of sports organizations’ distribution channels; agents selling the intangible
sports products, and the position (location) of a sports facility. Placing
intangible sports products (and all sports services) is happening exactly at the
sports facility, which is a most valuable solid, infrastructure sports resource
with the added value of reputation due to which it becomes an iconic place, the so called 'sports shrine'. Specific characteristics of some of the products within the sports industry (activities-services, persons, ideas) require special ways and places for delivery (being produced and used at the same time). In a sports game, a consumer is also a participant; even when he is buying a sports tool (a souvenir), it does not need to be put in use immediately (for a specific date and time), and it is often purchased during a media spectacle while still under the impression of a sports event and the image of a sports facility, but not to be used at all (e.g. when the irrational views dominate). Most sports products (services, entities) do not need to be transported or stored, therefore, in the area of sports, specific decisions related to the delivery are reached (agencies and media as the means).

Sports facilities are solid constructions and accompanying flat surfaces used for achieving sports results aimed at delivering satisfaction to the audience at the sports event (Dugalić, 2007). Sports facilities (stadiums, halls, arenas, pools, ice halls, playgrounds, fields, sports centres etc.) represent places and locations where sports organizations, clubs and individual athletes distribute i.e. display their sports offer to the spectators, supporters and other members of the sports audience. Some sports organizations possess their own sports facilities, whereas others lease venues for their sports events. Mullin, Hardy and Sutton (2000) determined that sports facilities must have: regulated land around the sports facility; venue design; history and memories; ideology; experience; aesthetics and theme. Sports facilities differ by purpose (type of sports, a single purpose or multi-purpose facility), by architectural form (civil engineering or building construction) and by ownership (private, school-owned, state-owned, public, owned by corporations, shared ownership etc.). Ownership of a sport facility is the key factor in selecting the managing model and manner of its financing. Modern sports facilities are characterised by multifunctional features, the private-public partnership model in construction and operations (e.g. construction of the stadium in France for the European Football Championship 2016), sale of the naming rights (the sports facility image, e.g. Kombank Arena) etc. (Dugalić and Krsteska, 2014).

At a sports facility, there is a wide range of sports services being delivered. The sports services are a part of the offer of the sports-recreational organizations (e.g. fitness clubs) at the sports market. They refer to enabling meeting the needs of the wide sports audience for physical exercise and sports. A particularly important area within the sports marketing is the consumer behaviour (in this case – audience).

The segmentation of sports products per consumer as a method is more frequently used in the sports industry. In addition to the products intended for the consumers, there is also a wide range of business products used in the production of other products or services, in the course of a business process or
intended for further sales in the same or advanced form. Even the consistent sports products intended for personal use or use at home most often include additional activities (supporting programme) such as: 1/ rented services (fitness, recreational services and equipment based on the membership); 2/ services for the products having different owner (designing a sports facility and field, construction, repairing works, maintenance, cleaning of tennis fields, grass surfaces, pools etc.); and 3/ non-goods sports services (agency, marketing, coaching services etc.). For these services, the price is expressed through the lease (rent) and varies within a wide range including: renting of a video cassette featuring fitness program, renting of a sports equipment, gym or a time slot within one of the branches or areas of the recreational sports. For example, sports fields could be rented per hour, ski equipment per day, boats for a weekend or a week, some of the sports tools up to a month, and stadiums for a period of several years. This set of products includes also services based on membership (golf clubs), laundry, ironing, marking/labelling, printing names and logos on the sports uniforms; balls maintenance, boats maintenance; car fuelling and servicing at moto races and many other services related to the various sports branches, level of market development and consumers’ awareness, as well as the inventiveness of sports managers. In addition to the material processes, a sports facility necessarily comprises all other non-material processes. Once purchased sports products (services) must have a continuous support from the producers’ side (delivery, maintenance...).

Non-material services have achieved the highest growth rate in the sports sector (Farmer, Mulrooney, and Ammon, 1996). They are provided by the sports management through the organization of the following: tennis lessons, summer basketball camps, ski and swimming schools, looking after children in the clubs or fitness centres, organization of sports events (city races, non-professional marathon runs), intellectual services for professional athletes (coaching, medical, physiotherapeutic, managerial) etc. The profit growth trend in the sports industry, as per the same authors, shows that the highest profit rate comes from the intellectual services, construction of golf routes and ski routes, building of stadiums and arenas, publishing and licencing. When it comes to sports facilities, the higher profit rate could be achieved from parking services (30-40%), however it requires great investments (parking floors, underground parking area etc.).

Internet is a very powerful communication medium for sports marketing and its relevance is steadily growing. This power is mainly based on providing content and information about a sports facility; devoted supporters actively searching for information about their favourite club and the related news. Users are mainly young people, and the effect of the Internet communication on sports organizations reflects mainly through the enhanced image of a club, sports brand, team, athletes and sports facilities.
A functional organizational structure of a sports organization in addition to the sports, marketing, financial or a membership function, includes also the function of the sports facilities (organization of sports competitions and the related preparations of the sports facilities, tools and equipment for a sports event and its management).

**DISCUSSION**

The task of sports managers is to develop the distribution methods deciding which way the sports products will be delivered to the consumers. However, while the basic type of product delivery refers to the consistent products, the delivery of sports products including services, places, ideas and people require that the consumers come to a specific place in order to take part in a (for example) game or be spectators. Thus, when purchasing the annual tickets, such tickets are only valid for the domestic sports events and the prices differ depending on the position of the seats at the stadium, exclusivity, location, competition ranking, time of purchase and the importance of the game. Sports facilities thus become an immovable site where the visitors and other participants gather, and purchasing of the television broadcasting rights enables distributors to bring closed such specific events to the consumers at different places via mass media in various design forms (TV broadcast, CD, video cassette, magazine). With time, other immovable facilities have also become integral parts of the sports offer including hotels, shops selling equipment and souvenirs, attractions, fitness centres, fun and theme parks. Sales of sports products in such a complex way can affect and change other factors in the manner of distribution to consumers.

Development of successful strategies via specific planned processes at the target markets is done by the managers in order to survive and remain successful using the following formula: to offer sports products which will be sold per the price which will be charged at a place where it can be purchased in the manner attractive to consumers. Interdependence between elements and decision-making in a marketing mix exists and is used based on the relation between what the consumer of a sports products wants and the competition offer, improved existing advantages, but also alignment with the legal, ethical and political elements. The consumer of a sports products does not expect to see spoiled idols and sports champions, but to accomplish satisfaction of all needs and wishes within the right product (a comprehensive game, experience) based on the right price purchased at the best location (sports facility). The benefit acquired by the visitor at a sport facility is based on socialising, identification, emotions etc.

At the sports organizations, the sales methods are created for the sports offer, as well as for the related products and services. The goal is to make
the related services available to the sports audience at the right time and at the right place in the right manner. The sports organizations are using direct and indirect distribution channels; direct channels are used when directly communicating with the persons interested in their sports offer through the sales of tickets, direct sponsorship negotiations, sales of TV rights, events broadcasting etc. The same applies to all other cases when the price is agreed directly with the buyer for any level of the sports offer, as well as for the sports-related products and services. However, in view of the numerous factors affecting the selection of the distribution channel including the characteristics and the size of the sports market, character and the type of the sports offer, personal abilities, competition and the professional qualities of an agent, many sports organizations are using indirect distribution channels and agencies to place their offer.

The distribution of the sports offer could be presented in the following simplified manner: the first level of the sports offer related to the hierarchy of values provided to the visitor is the sports experience. Sports events draw and attract fans to buy the tickets for the sports events at the sales points at the organizers’ facilities or through the agents. Still, a sports experience is not possible without a sports event as the second level of the sports offer. The sports events attract the media interested to buy the rights from the organizers to present their sports offer in the media outlets. Sports events attract the advertisers i.e. business organizations interested in displaying or advertising their brand names (trademarks, logos, slogans) in the sports arenas. Good sports results as the third level of the sports offer and the expectations of the audience bring more visitors, advertisers, as well as the potential sponsors willing to invest money, i.e. to sponsor a sports event. Continuous excellent sports results over a period of time represent a prerequisite for the strong image of sports organizations, clubs, and individual athletes and sports facilities. Such image could be transferred i.e. sold to the interested companies wishing to increase sales of their products and services. The strong image, huge number of supporters and extensive sports market make the basis for creating a brand name out of the top sports club or individual sports professionals. By the sales of a copyright of a sports facility, the owners and users generate significant income used for the reconstruction and modernization activities. A sports organization and the owner of a sports brand may via a licence agreement and with the adequate compensation, transfer the rights of trademark use to other organizations.

An important factor related to the location is the accessibility of a sports facility as it affects the size of the territory from which the potential visitors come (the power of attraction). This means that the quality of road network and traffic reduces the effort and time i.e. facilitates easier access to the sports arenas. The turnout at a sports event is also dependant on the
club, importance, the specific features and the frequency (or the lack of it) of a sports event, the expected image and attractiveness of the participants, age, income and profession of the visitors. The location of a sports facility is directly related to the parking space available. In regards to the stadiums and sports halls, for each four seats, one parking place should be provided. The adequate parking space can bring significant income to sports organizations. Also, sports organization must establish a plan for the communication with the citizens and organizations living or doing business in the vicinity of a sports facility. The objective of such communicating is resolving the possible issues related to the noise, traffic jam, crowds, fans etc. The location of a sports facility should guarantee security contributing to the higher turnout to a sports event.

The quality and recognizable design of a sports facility is one of the factors attracting visitors to a sports event and it is affecting the visitors’ perception through following features: simplicity of access, entrance and exit in view of less queuing and crowding; visibility of the field and players; comfortable seats; security services; location and design of serving points (refreshment beverages, fast food, souvenirs, fan tools etc.); aesthetics (seats colour), stands, field, lights; electronic equipment and display and the hygiene of the sports facility. These elements are directly related to the physical surrounding created through ambience conditions, space/function and signs/symbols. The ambience conditions are achieved by temperature, air quality, music, smells and noise. Sports facilities with their location, surrounding, atmosphere, parking, seats quality, equipment, lights, colours, music, marks, security, catering services, history evoking memories to significant sports successes and wins represent sports shrines or mythical places with the strong image attracting the huge numbers of sports fans (Gašović, 2009).

The questions related to investing into a sports facility differ depending on whether the facility already exists (modernization, strategy towards competition, reconstruction) or it should be built. As their constructions are most often financed from the budget funds, the place and time of the works is most often related to the country or a city candidacy for organizing big sports events (Olympic Games, World and European championships). As the costs of developing a sports facility are significant, the construction project, technical-technological and economic elements are analysed and elaborated. Selected location and the finance construction are very important factors. The key parameters include: the requirements related to the regulation and supply of the facility, expenses, existing and potential sources of funds, availability of space, number of visitors, structure of the ticketing arrangements, level of utilization of business and (air - promotional) space, market research (competition) etc. These activities include a great number of associates: sports
consultants, constructing team, Government representatives, sub-contractors, investors, marketing agencies, media etc.

Unfamiliarity with the distribution strategies and the essence of a sports product (when neglected for a long time) by the management could lead to the state of apathy, stagnation and bad operations of the sports facility. Also, it could seem uncooperative and put off potential business partners who wish to achieve a concrete form of cooperation (sponsors, lessors, suppliers). This justifies the need for introducing the purpose of a sports facility within a sports organization to which this material resource has been given for managing by the society (Dugalić, 2013).

**CONCLUSION**

A sports product represents a key element of a marketing mix. A sports product defines via which media the promotion mix will be presented. The price of a sports product significantly affects its availability. In case of intangible sports products, the role of a place is given to the sport facility, it being a venue within which the 'entire set' of a sports event is delivered. The importance of distribution as an element of a sports marketing mix refers to the design and location of a sports facility for the distribution of a sports product and the sports-related products and service as an (in)direct manner of sports product delivery.

The image of a sports facility affects the perception of the quality of a sports product. This being positive, it becomes attractive to sponsors, lessees and visitors. This way, it creates its own material value which materializes at the market through the increase of sales, turnout and the image which can be the subject of sales and purchase in the form the sales of the rights of a sports facility for a specific period of time in order to collect the funds for its reconstruction and modernization. It can be concluded that managing sports facilities characteristic for the developed countries which is based on the expert know-how contributes to achieving and maintaining the comparative advantage of sports and society in such a manner that the effects of the capitalization on top sports results become higher and more visible.
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Abstract: Jiyu waza is one of the most complex movement structures in real aikido. It entails avoidance of multiple attackers by means of very complex combinations of movement techniques. The exercise of jiyu waza aims at perturbing attacker’s balance. Jiyu waza exists in traditional, as well as in real aikido, but with great differences between the ways it is exercised. Its primary form is owed to Soke Ljubomir Vračarević, while the credits for the jiyu waza described in this paper go to Radojica Spasović, a real aikido master 9th Dan. Jiyu waza with slight modifications is used as a model of avoidance of two or more attackers. For the purpose of simplified understanding of complex movement structures, this paper presents a model of avoidance of two attackers, and jiyu waza is divided in two parts. This model includes a defender, as well as two attackers. In order to make the exercise scheme clearer, all three practitioners are at a single step distance, thus forming an equilateral triangle.

Key words: avoidance, attack, movement, real aikido, jiyu waza, destabilization.
INTRODUCTION

Throughout the history of its genesis and in all the stages of its development, humankind has been linked to fight, above all the existential one. The fight was first embodied in a struggle for living space, survival and subsistence. Precisely these elements prove that fighting represents one of the most significant factors in human evolution. Man’s fighting abilities were perfected above all thanks to the urge for self-preservation. The martial arts and sports available to people today represent a sublimation of man’s fighting experience and development. By analyzing the available records, one can note that the first fighting movements exercised by our ancestors in order to defend their lives were actually reactions similar to those of animals (scratching, biting, neck grabbing…). Even then man instinctively felt that the most sensitive spots on their opponent’s body were above all head and neck. Therefore, they attacked precisely those body parts of their opponent. It was only later, after the development of upright posture and arm coordination that man increasingly used grabs and locks to knock down their opponent and finish the fight on the ground. Somewhat later, with the development of hand, man started using objects (such as bones, stones and wood) to strike, throw and stab. Fighting for survival led to man’s improvement of martial arts moves. Relying on their natural movements and becoming acquainted with human anatomy, man restructured the natural movements into martial arts techniques (levers, throws, strikes…). They realized that there are other vulnerable “vital” parts of their opponent’s body (genitalia, stomach, heart…), apart from the aforementioned ones (head and neck), where these techniques can be efficiently implemented. This is how elementary martial arts styles emerged thanks to the evolution and sublimation of man’s experience. It is also important to underline that basic martial arts moves (grab, strike, lever, throw), as well as elementary forms of fighting, emerged indigenously almost in all places where man lived (Ćirković, Jovanović and Kasum, 2010).

Everything mentioned above represents the roots of modern martial arts and sports. The difference between certain martial arts and sports is based on the selection of groups of techniques, individual techniques and their interconnecting combinations. One of these is aikido, a martial art where lever and circular movement techniques are dominant moves.

The origins and development of aikido

It is considered that original (traditional) aikido was founded in 1925. Morihei Ueshiba (1883-1969) carried out the systematization and partial modification of various Eastern martial arts techniques. Based on the available records, the roots of the earliest aikido martial art can be traced back to aiki-jiu-jitsu, which was founded in the 9th century in Japan. At that time, the
mentioned skill was just one of many martial arts which could be practiced. It was created by Prince Teijun, the 6th son of the Emperor Seiwa (859-880). His skill consisted of hand strikes which were carried out as sword blows in the gaps of samurai shields. The skill developed slowly until General Saburo Yoshimitsu, the progenitor of various Japanese martial arts and an avid devotee of the medical sciences, modified aiki-jiu-jitsu, creating a system called Daito-ryu-aiki-jiu-jitsu. As an 18-year-old, Morihei Ueshiba studied jiu-jitsu in the Kito School in Tokyo. He also studied aiki-jiu-jitsu in the Daito School from 1911 to 1916. Also, he practiced Kenjutsu (Japanese swordsmanship) in the Yagyu School. After the Daito School, he studied jiu-jitsu in the Ashinkage School in 1922, and in 1924 he studied jarijitsu (spear fighting). Even though he knew many martial arts, he was essentially dissatisfied with all of them due to the excessive violence associated with them. He came to the idea to create a style of fighting which could lead to the opponent’s defeat without harming him. In other words, he wanted to prove to the opponent that the use of physical force is senseless. In accordance with this idea, in 1925 he created his very own martial art - aikido. Until the year 1948, aikido was an art practiced by relatively few people, as Ueshiba did not wish a large number of people to master an art which could be abused. Only after 1948 did aikido spread around the world. At the very end of Ueshiba’s life, several styles of this art were formed, although with very little difference between them. The aikido which was founded by Ueshiba was mostly continued by the following martial artists: Hiroshi Tada, Tadashi Abe, Morihiro Saito, Moriteru Ueshiba, Yoshimitsu Yamada, and his son Kisshomaru Uieshiba who is the figurehead of the Aikikai Federation. Ueshiba’s student Gozo Shioda (1915-1994) founded the Yoshinkan Institute for Aikido, today called the IYAF (International Yoshinkan Aikido Federation) which is the most prestigious school of aikido. This school produced the famous martial artists Tsutomu Chida, Kancho Inoue, Takashi Kushida and Sieshi Tekada. One of the students of Moriehi Ueshiba in 1930 was also Master Kenji Tomiki who made an attempt to connect aikido and judo, and is thus considered to be the founder of the modern style of self-defense in judo. Other famous styles are the following: Daito-ryu (Nakamura), Yoseikan (Mochizuki), Harai style, Takeda-ryu-takeda and Tendoryu (Kenji Shimizu). Today aikido attracts a great number of practitioners of all ages (Milosavljević, Matavulj and Lazarević, 2014).

The origins and development of real aikido

Real aikido is an authentic martial art which ensued from traditional aikido (Milosavljević, Matavulj and Trunić, 2013). The mentioned defense martial art was founded by Soke (soke: founder of the martial art) Ljubomir Vračarević. Soke Vračarević studied with the greatest masters of the age, including: Kishomoru Ueshiba, Gozo Shioda, Tsutomu Chida, Kenji Shimizu,
and Hiroshi Tada. He came to the idea of founding his own aikido style by desiring to remove all religious elements and elements of mystification from aikido, especially insisting on style efficiency. This is an authentic Serbian martial art (Milosavljević & Vračarević, 2011), and the main features and attributes of this art in regards to aikido are the existence of strikes which in the majority of cases are inflicted upon the attacker’s vital areas prior to the realization of the lever technique. The system of training real aikido, as the name itself implies, puts an emphasis on a real attack by the opponent. The founder of real aikido created training sessions which aimed to master the defense techniques which would be applied in real life situations (Vračarević, 2007). Real aikido is used in the special training processes of army, police and bodyguards. Soke Ljubomir Vračarević used real aikido techniques to train security service members and bodyguards in Zimbabwe, Libya, Macedonia, Republika Srpska, Kazakhstan and Slovenia. Real aikido courses were held for members of special units all over the world, and especially mentioned should be working with the Russian Alpha unit, for which Master Ljubomir Vračarević received a high military decoration from General Fetisov. The following also passed through the real aikido training programs: the special units MČS, MVD, Wolf commando units and the special units for presidential security. Along with the application of this martial art for the training of special units, it was also implemented in the training of bodyguards and protective security services according to IBSSA standards, and licensed martial artists are at the moment securing around 80 heads of states all over the world. One of the most important activities of real aikido is working with children, which is carried out via a special program called “Playing toward Mastery”. The program has been adapted to the psychological and physical attributes of children between the ages 5 and 12 and has produced excellent results. Today, real aikido is practiced by the very young as well as the elderly, so the number of practitioners is assessed to be around 15,000 in some 200 clubs all over the world.

The subject of this paper is the martial art of real aikido, whose efficiency largely depends on the quality of the realization of movement techniques.

The aim of this paper is a detailed analysis of the “jiyu waza” technique.

Movements in real aikido

When it comes to real aikido, practically none of the combinations of defense techniques is performed statically. The dynamics and quality of selection of technique combinations are primarily embodied in the best possible utilization of the force of the attacker who initiated the attack. Most combinations of techniques which utilize the attacker’s force to put him under control are impossible without adequate and timely movement. Movements used in real aikido, although seemingly similar to traditional aikido, are largely different
from other sports and martial arts. Therefore, the classification of movement techniques in real aikido, just like the names of individual movement techniques, has no resemblance to other martial arts and sports. It is very difficult to make the classification of movements, i.e. their division that would be generally accepted in martial arts and sports, because specific demands are the very reason why the movements in certain martial arts and sports differ from each other (Mudrić, 2005). Complex movement “step, turn, small turn” contains several simpler movements used in real aikido, so it is important to clarify individual movement structures that constitute it. “Step, turn, small turn” from left posture is performed in the following way: the exerciser makes a semicircular move forward by 180 degrees with their right leg, setting it in front of their left leg, which represents the “step”. Then, they make a semicircular move with their left leg by drawing the leg toward their back by 180 degrees, which corresponds to the part of the movement called “turn”. In the end, they rotate around their axis by 180 degrees, whereby the rotation axis is on the exerciser’s heel, which corresponds to the movement part called “small turn” (Matavulj, Milosavljević, Lazarević and Ivanovski, 2014). This movement, and especially its final part, the “small turn”, represents the moment when the person defending themselves by means of this movement combination and other individual techniques perturbs the attacker’s balance by using the force they used to perform a strike, push, etc. The described movement, either complete or its individual parts, together with sliding movement to the side, represents the backbone of movements used in the realization of jiyu waza.

Jiyu waza

Avoiding multiple attacks or jiyu waza is one of the most complex movement structures studied in real aikido. As its name implies, it refers to the avoidance of multiple attacks by means of very complex combinations of movement techniques, which aim at perturbing attackers’ balance. Jiyu waza exists in traditional, as well as in real aikido, but with great differences between the ways it is exercised. When it comes to the jiyu waza exercised in real aikido, it is important to underline that its primary form was established by Soke Ljubomir Vračarević, while the credits for the jiyu waza described in this paper go to Radojica Spasović, a real aikido master 9th Dan. Jiyu waza with slight modifications is used as a model of avoidance of two or more attackers. For the purpose of simplified understanding of complex movement structures, this paper presents a model of avoidance of two attackers. Also for a simpler overview and understanding, jiyu waza is divided in two parts. The jiyu waza model described in this paper includes a defender, as well as two attackers. In order to make the exercise scheme clearer, all three practitioners are at a single step distance, thus forming an equilateral triangle.
Part 1

The 1st attacker is in left posture. They then make a “full step forward” movement, switching to right posture, at the same time performing a “right hand straight forward” strike, trying to strike the defender’s trunk straight forward with the front of their fist. The defender is in right posture and maintains the characteristic real aikido guard, after which he begins the “step, turn, small turn” movement. As soon as the attacker initiates the strike, the defender steps forward with their left leg, lifting their left elbow up to their shoulder, and keeping the back of their left hand at the height of their chest, thus making contact with the attacker’s right forearm using their left palm. When this is over, the defender continues realizing the aforementioned movement, which finishes with a somewhat greater change of angle at small turn so that the defender ends up in right posture facing the second attacker when the movement is over. During that time, the first attacker makes a “full step forward” movement, switching from right to left posture, and then making a “turn on foot” by 180 degrees, after which they find themselves in right posture.

Part 2

The defender is in right posture and the 2nd attacker in left posture. The 2nd attacker makes a “full step” movement, reaching right posture while simultaneously striking the defender’s trunk straight forward with the front of their right fist. The defender makes a “semicircular step forward with left leg”, avoiding the 2nd attacker’s strike, after which they find themselves behind the 2nd attacker’s back. The defender places their palms on top of the 2nd attacker’s chest, drawing them toward their right hip, thus fully destabilizing the 2nd attacker. While doing this, the defender does not interrupt the aforementioned movement. The moment of full destabilization of the 2nd attacker coincides with the second part of the “step, turn” movement – i.e. with the “turn”. Upon finishing the “step, turn” movement and fully destabilizing the attacker, the defender is in left posture, performing “sliding movement” with their left leg in the opposite direction by making a step to the right by about 45 degrees with their left leg first, and then stepping straight forward by half a step with their right leg in order to parallel their feet. It is important to underline that while performing the “sliding movement” with their left leg in the opposite direction, the defender passes between the 1st and the 2nd attacker, thus removing themselves from the attack line of the 1st attacker, and then, as described above, makes a step forward with their right leg, reaching a parallel position which coincides the 2nd attacker’s attack, thus representing the end of the full jiyu waza cycle. When all this is over, the 1st and the 2nd attacker, as well as the defender are at the corners of an imaginary equilateral triangle, in opposite positions to the starting ones.
The described movement structures which together comprise jiyu waza can be continued uninterruptedly and a greater number of repetitions can be executed.

CONCLUSION

Real aikido is an authentic, defensive and flexible martial art which ensued from traditional aikido. It was founded by Soke Ljubomir Vračarević who studied with the greatest masters of the age, some of which are the following: Kishomoru Ueshiba, Gozo Shioda, Tsutomu Chida, Kenji Shimitsu, and Hiroshi Tada. He founded his own aikido style because he wished to remove all religious elements and elements of mystification from aikido, especially insisting on style efficiency. This is an authentic Serbian martial art. The main feature and difference of this art in comparison to traditional aikido is the existence of strikes which in the majority of cases are inflicted upon the attacker’s vital areas prior to realizing lever techniques. The system of training real aikido, as the name itself implies, puts an emphasis on a real attack by the opponent. The founder of real aikido created training sessions which aimed to master the defense techniques which would be applicable in real life situations.

One of the elements of this noble martial art which is gradually learned and mastered is jiyu waza, which undoubtedly represents one of the most complex movement structures studied in this martial art. It entails avoidance of multiple attacks by means of very complex combinations of movement techniques. The execution of jiyu waza aims at perturbing attackers’ balance.

Jiyu waza exists in traditional, as well as in real aikido, but with great differences between the ways it is exercised. Its primary form was established by Soke Ljubomir Vračarević, while the credits for the jiyu waza described in this paper go to Radojica Spasović, a real aikido master 9th Dan. Jiyu waza is used as a model of avoidance of two or more attackers. For the purpose of simplified understanding of complex movement structures, this paper presents a model of avoidance of two attackers, and jiyu waza is divided in two parts. The jiyu waza model described in this paper includes a defender, as well as two attackers. In order to make the exercise scheme clearer, all three practitioners are at a single step distance, thus forming an equilateral triangle. Minimum modifications of the movement structures used to describe the avoidance of two attackers’ attacks are enough to restructure it and implement it in fight against more than two attackers, which represents not only a part of higher ranked practitioners’ training, but is also included in compulsory examination program for higher ranks.
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THE IMPORTANCE OF SELECTION IN BASKETBALL

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Abstract: The selection for top basketball achievements implies accurately defined goals, criteria, time periods and methods of realization. Talent identification is the first step in the process of planning, programming and realization of selection and training processes. Selection criteria are conditioned in multidisciplinary way, and have to cover the entire anthropological plane of a basketball player. The crucial aspects for top basketball results are morphological body type, genetic predisposition, functional and motor abilities, specific technical and tactical abilities, psychological and sociological characteristics and complex abilities of a basketball player, as a synthesis of all of the above. The complexity of talent identification process and the defining of selection criteria implicitly require involvement of certain types of professionals: basketball coaches (experts for physical, technical and tactical preparation), doctors specializing in various areas, biomechanics, kinesiologists, and psychologists. This paper presents selection goals, talent identification processes and realization subjects.

Key words: selection, basketball, talent identification.

INTRODUCTION

The long-term program of selection and quality development of young basketball players, through the processes of talent identification and training technology, aims at preparing young players for senior training and competition demands (Trunić, 2007). Since the ability to play top-quality basketball depends

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on polyvalent qualities of basketball players, it is clear that the prerequisite for top results in modern basketball is timely talent identification. Predisposed children should be monitored at all stages of anthropological development, and optimally prepared in line with their age characteristics. The competitive result of the selected child-basketball player is a reflection of their real potential.

That is why systematic influence should be made on their development abilities and attributes throughout the multiannual sports preparation process on all levels of their sports specialization, and they should also be taught specific motor skills.

Talent identification at the initial stage of organized basketball training aims at precisely determining which motor abilities, psychological attributes, as well as technical and tactical knowledge should be systematically stimulated by means of training influences. On the other side, continued control of training effects reduces the risk of injuries and represents a condition for optimal sports development of a child-basketball player.

Basketball practice demands timely selection process and the analysis of potential abilities of young basketball players in order to enable the realization of the complete potential of basketball players in senior competition rank. The process of talent identification and selection in basketball involves an evaluation of abilities, attributes, knowledge, skill and habits significant for a successful basketball career.

**Selection benefits**

The goals of diagnostic procedures in different anthropological aspects are useful for: the identification of children and directing them to basketball as sport, the direction and specialization for specific roles in a team (from 1 to 5), the selection of basketball players at higher selection stages at certain age- or quality-specified categories, and the creation of a composition of basketball teams (the selection of club and representation teams). The priority of science in basketball (from the diagnostic aspect) is to perfect measuring instruments and methods for the improvement of quality of diagnostic procedure implementation and the prediction of sports preparation results. The diagnostics of the initial state of motor, functional abilities and morphological characteristics represents a training programming base with conditioning, as well as technical and tactical content. The goals, tasks and time dynamics of their realization are determined based on these indicators. The second, but equally important goal of the diagnostic procedures in basketball is: a selective correction of training plan and program at all stages of basketball preparation, the control of effects of applied training technology, and the analysis of the development state of certain organic systems, abilities and skills, as well as habits in play. An insight into how much a young basketball player deviates from the expected, planned or desired test values is gained based on these procedures. The gained information is used to select and
direct children according to a specific quality group in basketball, for training plan and program optimization, and they also enable the monitoring of the growth and development of certain attributes, abilities and knowledge (Trunić, 2007).

There are numerous reasons why testing (the diagnostics of the level of training) holds vital importance for sports scientists, coaches and sports people. The most significant reasons are: to identify talented children and direct them toward basketball; the identification of “strong and weak points” in the individual structure of anthropological abilities; the monitoring of development (progress) dynamics in all aspects of the level of training; getting feedback about the effects of the applied training technology; the education of coaches and sports people; the prediction of success at competitions. Talent could be characterized as “a specific characteristic of an individual or an outstanding predisposition for certain function(s)” (Mladenović, 2011). In order to develop specific and outstanding predispositions of children for top basketball achievements into abilities, it is crucial to apply adequate training technology at all stages of anthropological and basketball development (Trninić, 2006). The basic characteristics of talent are: complex nature, determination by genetic factors, partial covertness of the attributes necessary for success in basketball at an early age, and the existence of early indicators for certain abilities.

The genetic conditionality of anthropological factors

The implementation of human genetics in basketball has a relatively short historical development, but its understanding and application have become a very significant component in the selection of children for top-quality basketball. Having in mind that very complex and dynamic transformations of anthropological abilities and characteristics of young basketball players take place during the training process in basketball, a particular stress is placed on the priority of the following goals of talent identification process: the detection of attributes, the abilities and characteristics of the anthropological status of children that are under genetic control and transferring inheritance; a selection of resources, methods and load for all age categories in order to achieve an adequate transformation of anthropological status; the identification of limits and advantages in terms of the transformations of certain primary and relevant anthropological abilities for basketball, and later for a position in a basketball team.

The heritability coefficient of anthropological characteristics represents the size of variance of every anthropological attribute influenced by genetic components (genotype), i.e. the unchangeable part of the variance. Holtzinger’s ratio, i.e. Holtzinger’s heritability coefficient (H2) is used for that purpose. Morphological characteristics showed rather high genetic conditionality. The highest one is found in the dimensionality of skeleton (H2 = .98), while a somewhat lower one exists in body voluminosity (H2 = .90), and the lowest one is found in fat tissue (H2 = .50). However, skeletal musculature holds crucial
importance for success in basketball, and is considered to be the basis for potential motor ability.

**Functional abilities** are also under the influence of hereditary abilities, which are not of equal size for all abilities ($H^2 = .60-.80$). A higher degree of genetic conditionality was noted in cardiovascular system compared to respiratory system.

**Motor abilities** are still at the stage of empirical research, so it is very hard to make any conclusions with certainty, because they show great differences, which are most likely caused by the implementation of different methods.

However, the prevailing opinions are those that speed ($H^2 = .90-.95$), explosive power, coordination, balance and precision ($H^2 = .80-.85$), as primary determinants of success in top-quality basketball are very saturated. In the examination of the ontogenetic development of individuals, it was found that motor abilities are mostly developed at the age from 10 to 17, but also that the periods of the highest boost of certain motor abilities are not equal. The highest growth of speed is achieved at the age of 10-13, of strength at 13-17 years, explosive power at the age of 12-13, aerobic stamina from 10-13, and anaerobic stamina from 13-16 years.

**Cognitive abilities** are also genetically limited, because their heritability coefficient is very high ($H^2 = .85-.92$). Development reaches its maximum at about 16 years of age and is maintained up to the age of 25, after which it starts decreasing.

**Conative characteristics** show that the heritability coefficient of normal conative characteristics is rather low ($H^2 = .50$), which means that they can be developed, especially at younger age. However, the heritability coefficient of pathological conative characteristics is quite high ($H^2 = .80-.85$), and research has shown that even the latest therapeutic procedures and treatment methods cannot definitely reduce pathological factors. What can most often be done is to reduce some of the pathological factors to a tolerable extent, and it is very difficult to reduce them to a normal level (Malina, Bouchard, Bar-Orr, 2004).

Not knowing and not following adequate fundamental genetic rules and conditionalities will not only result in a lack of optimal desired transformations of anthropological characteristics, but inadequate actions during management of sports people and manifestation of maximum abilities may have undesired consequences on the physical and mental health of sports people.

**THE SELECTION LEVELS IN BASKETBALL**

The goals of implementation of diagnostic procedures in basketball selection are: to detect weaknesses and individual variations of children, to monitor response to training, to educate coaches and basketball players, to predict competitive potential, to monitor the impact of the environment to growth and
development, to monitor potential injuries caused by basketball, to understand children’s acute responses to training. Due to the given reasons, it is clear that talent identification in basketball is not solely related to the beginnings of organized basketball training, but represents a continuous activity of experts on different age and competitive levels of basketball players. This means that selection processes in basketball should be realized on multiple levels. (Trunić & Mladenović, 2014a):

- An initial selection at the beginning of organized basketball training (ages 7-8; mini-basket).
- A selection at the age of 12 (competitive age of younger pioneers).
- A selection at the age of 14 (competitive age of pioneers).
- A selection at the age of 16 with introduction of the criteria for position in game (1-5).
- A selection at the age of 18 with emphasis on the criteria of international standards.

Talent identification for top-quality basketball achievements should be realized much sooner than it is currently done. The beginning of organized training or inclusion into mini-basket programs (from the age of 6 to 8) is the right time to make the first step in basketball selection. That is the time when it is already possible to notice indicators that can provide information whether children have the potential to become top basketball players or not. That is an initial step with the following long-term goals: the early identification of children’s performances desirable in basketball, the prediction of future playing potential of children, the selection of players who will be able to fulfill future basketball demands (when the selected children become seniors), a focus on the players who can develop properly in team surroundings, team selection according to positions and roles in the team, a selection on the level of clubs, national team (representation) a selection for different ages. Precisely defined and realized goals of selection process are efficient from the economic aspect, because that way player base is reduced to those with predispositions necessary for success. It is much easier to include new players on higher selection levels than to eliminate players from an enormous base (as is usually done in practice). Such approach also boosts confidence of the selected children, which is important for the development of an emotionally stable personality at the age when it is formed. The inclusion of the selected children into organized basketball environments also takes the competitive character of training to a higher level, which leads to faster development on all basketball levels.

The structure of team of experts for the planning and realization of selection process

Only competent staff and qualified persons can define children’s future in basketball and in life with limited possibility of error. Therefore, experts from various domains (doctors specializing in different areas, biomechanics, kinesiologists,
psychologists, conditioning coaches, experts for technical and tactical preparation) need to manage the process of selection in basketball (Trunić, 2007).

Genius players cannot be recognized by a coach and people with narrow and low level of knowledge, experience and anticipation. The demand of basketball prognostics is that future top players become better than the top players today. For that reason, only coaches with a vision, who use multidisciplinary knowledge, can approach such a complex process as selection in a creative, synthetic way.

Generally speaking, the subject of their interest should be the following fields: defining a profile or model of a successful basketball player in the future, the analysis of player activity during play, the prediction of basketball development from the conditioning as well as technical and tactical aspect, the defining the selection criteria, the comparison of the selected children with the anthropological characteristics of the model, the planning and realization of an adequate training technology with all age categories of the selected children, periodical diagnostics and the control of the development of young basketball players and comparison with planned tendencies (Mladenović & Trunić, 2014b).

The analysis of player activity during play and the tendencies of basketball development

Observed from the current perspective, it is assumed that the future changes in basketball will be made in the following directions: approaching the FIBA rules to the NBA rules: moving three-point line from 6,75 m to 7,24 m, playing 4 quarters of 12 minutes, most likely increasing the number of personal fouls to 6 per player; toward tendency to maintain balance between all stages of the course of the game (defense, offense and transition in both directions); improving controlled transition defenses and controlled transition offenses; individual and team adaptation to various systems and changes of the tempo of the game; the need to execute basketball technique at a maximum speed alongside high levels of tactical manifestation at all stages of the game; the tendency (still present) of continuous crossing of outer players from perimetric into the inner space, and the crossing of inner players into outer offense zones in order to additionally burden the defense defending from outer shots and movements in both directions; the retention of ball progress; the prevention and protraction of movement and passing lines; the prevention of breach of front defense line in all zones of the court; conditioning the opponent to play longer in transition offense; preventing quick shot in transition offense and conditioning opponent to score from play 5:5 on the center of the court. The analysis of players’ movement structure during games is a component that must be taken into account in the process of planning training technology in basketball.

Basketball is composed of the following types of movement: fast and precise movement in small space, opposition to the opponent, precise
implementation of technical and tactical elements in the conditions of time and space limitations, exclusively acyclic movements, alternative or variable intensity dominated by the abilities of explosive power, coordination, speed, agility, flexibility, functional demands in terms of anaerobic and aerobic stamina, high demands of the CNS. The volume of basketball players’ activity during play is set into 4 quarters that last 10 or 12 minutes (FIBA or NBA rules, respectively), with breaks of 2 minutes between quarters and 15 minutes during halftime.

The analysis of movement structure during play shows that players move in the following way: standing or walking for about 4 minutes, jogging for around 4 minutes, medium-intensity running (pulse at 130-155) for around 4 minutes, sprinting for around 3 minutes, side movement in basketball posture of low or medium intensity for about 9 minutes, intense movement in basketball posture for around 2 minutes, jumping for around 75 seconds. During play, the type of movement is changed every two seconds. The complex and changeable structure of movement is manifested through around 1000 different movements during the course of a game. This information provides us with concrete tasks to plan training technology and conduct player selection for top-quality basketball.

Further play analysis defines around 105 maximum intensity efforts during the game with players exercising high-intensity activities every 21 second. In regard to the direction of movement, analysis shows that side movement occupies 31% and that movement in basketball posture lasts from 1 to 4 seconds. Two thirds of movement is intense movement. Sprints last from 1 to 5 seconds. Low-intensity jumps (shots or jumps without opponent pressure) take up around 30% of the total number of jumps. Medium-intensity jumps (a majority of jump shots with defense and block of jump shots) occupy around 45% and high-intensity jumps (blocks or jump shots against defense) take up around 25%. The average number of jumps is 85 (around 65 by backs, 80 by forwards and around 120 by centers).

The analysis of the scope of activities during games shows that NBA basketball players run between 5.5 and 9 km (depending on the game tempo) over the course of a game. As for the typical injuries that occur during basketball activities, about 52% of them are lower extremity fractures (the most common one is the fracture of heel and metatarsal bone; Mc Clay et al. 1994); 92% of injuries are those of one foot. The given data explicitly show that basketball is an intermittent or interval sport, with high-intensity activities of changeable movement direction. The stated description of the activities directs toward stamina training through the development programs of aerobic stamina and the development of specific stamina through interval specific basketball exercise. A well-planned development program must not jeopardize the development of lower extremity’s explosive power, as the most important motor ability for top-quality basketball achievements (Trunić, 2014).
Observing the shortening of offense from 30 to 24 seconds, the following activity variations occurred: before the rule change, a professional basketball player realized an average of 105 high-intensity periods per game, with a recovery period of around 21 second; whereby, 95% of sprints took less than 4 seconds (an average of 1.7 seconds). With the change of rule, the number of offenses increased by around 20%, but the average duration of high-intensity periods remained unchanged.

Further analyses show that the ability for repeated high-intensity periods \((\text{RSA- repeated sprint ability})\), not speed stamina, represents a very significant determinant of condition preparedness of basketball players. The change of rules led to an increase of such activities, a drop of recovery period between two high-intensity periods, which boosts the significance of aerobic abilities in basketball. In addition, it seems that the importance of anaerobic (speed) stamina is still reducing. Rather, it can be said that the importance of this ability is placed in real terms (it is a significant, but not the most important ability). The results of a decade-long monitoring of basketball players (Cormery et al, 2008) confirm the increase of basketball players’ aerobic abilities under the impact of the rule change (VO2max- 8%, anaerobic threshold - 12.8 %). The change mostly impacted backs. Therefore, aerobic ability is gaining greater importance.

The criteria of selection for basketball players

Defining selection criteria, i.e. the variables that will particularly be taken into account in the process of selection is one of the hardest steps, because potential errors may be difficult to correct in later training stages. Therefore, the first step in talent identification and the profiling of a top basketball player in the future is to precisely determine which anthropological characteristic differ top basketball players from the less successful ones. (Mladenović & Trunić, 2014c). An imperative is to precisely define the type and structure of movement in basketball, the nature of the functional and motor needs of basketball players, the psychological characteristics of players as individuals and in interaction with team mates, opponents, coach, referees, audience, and players’ technical and tactical activities during play. Predicting the development of basketball as a sport and defining selection criteria entails all anthropological categories:

1. The morphological characteristics of basketball players
2. The functional abilities of basketball players
3. The motor abilities of basketball players
4. The specific technical and tactical abilities of basketball players
5. The psychological and social characteristics of all participants in basketball

Multilateral approach is the only way to reduce errors, as a normal phenomenon in the process of selection in basketball. The studies conducted by
Delextrat et al (2008), who engaged in the comparative analysis of elite and non-elite basketball players taking into account motor abilities, led to the conclusion that top players differ in explosive power, agility, the isokinetic strength of knees and the absolute strength of upper body. The factors that lead to success in basketball are above all related to an **aerobic power**, not capacity. A training recommendation would be: to dedicate more attention to short-term maximum-intensity activities. Top players have the following functional qualities: acceleration, explosive power, agility and, increasingly, aerobic stamina. Consequently, selection must take into account the following characteristics of basketball players:

- Health status: personal, family and sports anamnesis, EKG and heart US, TA of left and right arm, pulse, tonsils, teeth, balance skin.
- Blood test results: RBC, HGB, HCT, MCV, MCH, RDW, PLT, MPV, PCT, PDW.
- Biochemical monitoring: glucose, cholesterol, triglycerides, urea, creatinine, AST, ALT, proteins, iron, total bilirubin, direct bilirubin.
- Anthropometric measures: body mass, body height, seating height, extremity length, foot length, chest and extremity perimeters, thickness of skin wrinkles or subcutaneous fat tissue, bone spans, arm and hand span (with age percentiles).
- Body composition: body mass index (BMI), the percentage of bone and muscle in total body mass.
- Biological age: determining bone age (Greulich-Pyle, Fels, Tanner).
- Functional abilities: spirometry during inaction, ergospirometric stress test (HR max and estimate of HR max, stress EKG, TA max, VO2 max, lactates during inaction, after 4 minutes and 10 minutes of recovery, maximum multilevel 20-m shuttle run test. Speed stamina: RAST - Running Anaerobic Sprint test.
- Muscle characteristics: typization of muscle fibers (biopsy vs. Bosco Ergojump), measuring cross section of a muscle.
- Motor abilities: flexibility (split with left and right leg, deep bend), speed (10m sprint, 10m sprint from flying start, 20m sprint), agility (T-test, running forward 10m, running back 10m, side running 20m); strength: CMJ (jump from semi-squat with hands on hips, jump with semi-squat with arm swing, seven jumps in a row with hands on hips), standing long jump, standing high jump, explosive power of one leg, 1RM bench press, deep squat, seated shoulder lift, a seated 2kg medicine ball throw, the repetitive strength of abdominal region and lower back.
- Psychological characteristics: ACSI-Athletic Coping Skills Inventory, TEOSQ-Task and Ego Orientation in Sport Questionnaire, General Self-Efficacy (GSE), Sport-Confidence Inventory (SCI), Sport Competition Anxiety Test (SCAT), CSAI-2 Competitive State Anxiety Inventory, test F1 – the speed of perceptual identification.
and differentiation, D-48, test matrix, Raven’s progressive matrices in color, brick test.

- The situational success of basketball players; defense: the control of defense position and the level of pressure in defense, the level of assistance, defense on player with ball and without ball, rotation in defense, winning balls, jumping success, defense from fast breaks, polyvalence in defense; offense: ball control, the ability to pass, breakthrough with ball, forcing personal errors, movement without ball, the ability to set up blocks and open from blocks, the quality of play in transitional offense, polyvalence in offense.

- Complex abilities: “talent” to learn motor and verbal material, work ethics, “basketball IQ”, anticipation, efficiency in situational conditions, the ability to recognize situations and make decisions.

As mentioned before, in order to act in a timely manner and identify children’s potentials that should be brought to the level of exact abilities to play top-quality basketball with adequate training, it is essential to conduct periodical testing of basketball players, both at the beginning and in later stages of training. Therefore, to determine their current status, the potential of the selected abilities, the effects of prior training, and gain direction for further planning of training technology, one should make a selection of tests relevant for the estimation of real value of basketball players on all morphological and competitive levels. For that reason, battery of tests must treat: health status, body sizes and composition, aerobic ability, anaerobic ability and capacity, flexibility, muscular characteristics, biochemical monitoring (Trunić & Mladenović, 2014c).

**Anthropometric measures and body structure as selection criteria for basketball**

**Anthropometric measures and body structure** that have to be selection criteria are: body mass, body height, seating height, extremity length, chest and extremity perimeters, thickness of skin wrinkles or subcutaneous fat tissue, bone spans, arm and hand span. Measuring body structure includes: BMI, the percentage of bone and muscle in total body mass.

**Determining biological age** – In the process of talent identification and training of younger categories of basketball players, it is crucial to determine biological age of children, since children, and especially tall ones, who are selected for basketball, are shown as heterogeneous in relation to biological age. Since training groups in basketball are usually formed from children of different chronological age (usually children of two birth years are put together), and there is a difference of biological age, fatal errors can be made in talent assessment and training. Experience has shown that numerous top basketball players were biologically behind their chronological groups, and that the
selection of accelerants at an early stage of organized training usually led to errors in selection. Because of this, it is crucial to determine the biological age of children and young basketball players during selection processes on different levels. The methods used for this are: determining bone age (Greulich-Pyle, Fels, Tanner), determining pubescence (Tanner, Ross & Marfell-Jones, Johnson et al.), and measuring biochemical markers (DHEAS). When the testing results come in, it is imperative to sort young basketball players into groups according to their biological, not chronological age (Trunić & Mladenović, 2014a).

**Functional abilities as selection criteria for basketball**

**Anaerobic capacity** – Basketball players’ activities during training and competitive activities are, above all, anaerobic. It was mentioned before that the factors that differ elite basketball players from the less successful ones are determined by anaerobic capacity. It is clear that testing anaerobic capacity of children and young basketball players represents one of the most important criteria of talent identification and additional selection at later stages of training. However, the movement structure and the character of activities during play provide precise information which components of anaerobic capacity should be tested to get indicators which are compatible with playing activities. Of course, starting a dribble, making the first step in offense and defense, as well as jumping ability are conditioned by the speed and explosive abilities of players, and they need to be prioritized in selective and diagnostic procedures. The battery of tests in basketball needs to valorize abilities: measuring speed (5, 10, 20 m), agility (505 run, zig-zag), speed stamina (WAnT, RAST, 60-sec VJ), strength (DJ, CMJ, VJ) and specific tests with ball on basketball court. Success factors in basketball from the aspect of general motor abilities that need to be diagnosed and monitored are (Trunić, 2007): lower extremity explosive power (standing long jump, standing high jump, the explosive power of one leg, intermuscular leg balance: Counter Movement Jump Test), the explosive power of arms and shoulders (isolated throw of “heavy – medicine ball that weighs 2-5 kg), static strength (endurance in pull-ups...), repetitive strength through body core strength, (abdominal region and lower back, push-ups...), the speed of sensory-motor reaction to visual or audio signals, coordination, the variable exercise of technical and tactical elements in play conditions, eye-hand coordination when shooting or passing the ball, “timing”, the anticipation of opponents’ and team mates’ intentions, fast change of subjects in the field of perception, the coordination of movement stereotype change…), flexibility; active and passive, the prevention of injuries (indirect methods; deep bend, Cureton, etc., direct methods; goniometer, FL-Photography...).

**Aerobic stamina** – standard tests and methods are used to estimate the level of aerobic ability, and they measure maximal oxygen uptake (VO2 max),
anaerobic threshold (AnT, VT, OBLA), mechanical efficiency (running efficiency), oxygen kinetics, spirometry, multi-component testing, as well as heart frequency measuring and EKG. The current tests are: 20-m Multistage Fitness Test, Shuttle-run Test, Beep Test (Leger & Lambert 1982). Maximum multi-level 20-m shuttle run stress test is simple, brief and allows testing of multiple persons at the same time. It enables the estimation of maximal oxygen uptake (VO2 max), and the activity is identical to competitive circumstances. The required equipment includes 20m of dry, flat surface, a stopwatch and an audio recording. Examinees follow the audio tape (disc) signal, and when it sounds off, they touch the marked band on 20m with their foot. The signal frequency and the examinees’ speed increased by 0.5 km/h every 2 minutes. The test is over when an examinee is not capable of following the signal from the tape.

Muscular characteristics and biochemical monitoring in the process of selection in basketball

Muscular characteristics – Explosive and fast movements, very saturated by the time and space component of limitation and reaction in the conditions of technical and tactical outsmarting, imply precisely defined muscular characteristics of basketball players (Bosco, 1997). Since the degree of genetic conditioning of muscular characteristics is high, it is of great importance to assess children’s potential in a timely and adequate manner. The assessment and measuring of muscular characteristics is conducted by: the typization of muscle fibers (biopsy vs. Bosco Ergojump), measuring cross section of muscles, measuring muscular capillarization, analyzing enzymes (i.e. PFK, hexokinase, SDH), and measuring substrate concentration (i.e. glycogen, lactates).

Biochemical monitoring is intended for the diagnostics of physiological processes that take place in body before, during and after training and competitive efforts, but also serves to assess the metabolic characteristics of basketball players (as a significant component in the process of talent identification). Whether a child can endure the demands of top-quality basketball, and whether their metabolism can answer to the energy and motor characteristics of training and competitive activities is found based on the results of biochemical monitoring, which should encompass: measuring metabolites and substrates (lactates, free amino acids, fatty acids, glycerol, glucose...), hormonal status (catecholamines, cortisol, insulin, GH...), immunology indicators (immunoglobulins...), water and electrolyte balance.

Psychological characteristics as the selection criteria for top basketball achievements

The assessment of psychological characteristics of children in the process of selection and basketball players at later stages of their career is a factor
that largely determines the possibility to achieve success in basketball. Just like with the previously mentioned abilities, it is important to understand that the results of psychological diagnostics must be used in the initial selection for talent identification, as well as at later stages of training, in order to see the impact of (in)adequate training on the development of personality of sportspeople. Today’s basketball has been brought to high levels of interest in various fields, there are numerous commercial competitions and challenges offered by basketball, so it is clear that only persons with adequate psychological and sociological characteristics can achieve success. Success factors in basketball in terms of psychological abilities are: high levels of emotional stability, behavior without neurotic characteristics, tendency to dominate, frustration tolerance ability, a low level of competitive anxiety, pronounced drive for sports achievements, controlled aggression ability, high levels of crystallized intelligence, developed perceptive abilities, strong ego, high levels of self-confidence, pronounced motivation factor, socialization and team work ability (Mladenović, 2011). The tests that can be used for the diagnostics of psychological and sociological characteristics are: test of general intellectual ability D-48, test of general intellectual abilities – test matrix, Raven’s progressive matrices in color - RPM, test of perceptive abilities – brick test, SCAT and STAI tests for assessment of trait and state of anxiety, etc. (Mladenović & Trunić, 2014c).

Specific basketball abilities as criterion for top-quality basketball

The assessment of specific basketball abilities – the assessment of real potential and quality of a basketball player also encompasses the detection of the extent to which technical and tactical elements of offense and defense have been learnt, as well as the possibility of their implementation in situational conditions. Of course, the assessment of basketball knowledge cannot be conducted at the initial stage of basketball practice, because children are not trained enough, but at later stages it becomes one of the dominant selection criteria on the level of clubs and representation (Trunić, 2007). An initial testing should assess the speed of learning and precision of imitation of the demonstrated technical and tactical elements, which indirectly indicates children’s intelligence and coordination abilities. In later selection processes, (at the age of 12, 14, 16, 18) the extent of acquisition of specific basketball motor functions becomes the crucial criterion for the selection of players according to the positions and roles in the team. Specific basketball abilities that should be valorized through selective and training process can be divided into (Trunić, 2014):

• Defense abilities and skills (parallel and diagonal basketball posture and movement, defense on player with ball, defense from dribble and breakthrough, defense on player without ball, defense from fast break, low-post defense, defense from blocks on player with or without ball, defense on the side of ball and the side of assistance, blocking the hoop …)
• Offense abilities and skills (ball control, dribble, passing and catching, pivoting, moving without ball, demarcation, different types of shots, solving handicap situations, using blocks, offensive jump, individual, group and collective tactics).

The assessment of complex abilities of basketball players implies the implementation of the synthetic principle on all the given criteria. When evaluating the given abilities from all previously described anthropological areas, the synthesis of the obtained results is required. It is clear that there is no certainty about which selection criteria are more important than others, but what is certain is that a greater fund of information and knowledge greatly reduces the probability of error in the assessment of talent and selection of players in later selection processes. In order to make good use of the obtained information, experts from all fields need to reach conclusions, i.e. process the information from all relevant fields adequately before making a decision about the selection of children. From that perspective, it can be concluded that it is necessary to define complex abilities (which represent synthesis and adequate relations of certain anthropological fields), which treat the notion of talent more comprehensively. Maximum achievements in basketball are not realized by players with maximum values of all treated variables, but players with balanced relations and an adequate correlation between abilities from all the given fields. The decisions made in those situations need to be a result of cooperation and agreement between experts from all fields and coaches (competent and experienced). That provides a realistic assessment of the current state of selected children, and offers precise notes for planning and programming training process on all age and competitive levels. A proposal for the definition of complex abilities could include the following elements (Trunić & Mladenović, 2014a):

• “Talent” to learning motor and verbal material
• Work ethics
• Basketball IQ
• Anticipation ability
• Technical and tactical abilities for all five positions in the team (1-5)
• The influence of conditioning abilities to basketball skills
• Efficiency in situational conditions
• The ability to recognize situations and make decisions
• Knowing one’s own virtues and flaws
• The speed of tactical thinking

CONCLUSION

By analyzing the given criteria and tendencies of basketball development, it is clear that successful basketball players in the future will be polyvalent players with developed abilities for which they have genetic
predisposition from all anthropological aspects. The strategy to create top basketball players in the future must be based on: the study and analysis of the structure of competitive and training activity in basketball, creating a strategically oriented profile of a successful basketball player in the future, and finding a way for his improvement quality-wise, diagnosing the individual initial and potential characteristics and abilities of future successful basketball players, comparing the individual characteristics of the selected children with the characteristics of an actual profile, creating a training strategy with goals, tasks, periodization and the necessary material and technical conditions for realization, the operational programming of training with the selection of means, methods and load as part of long-term, medium-term and short-term planning, the transversal and longitudinal control of training effects, and the potential correction of the process of training.

Summing up the research results related to the selection process in basketball from all relevant anthropological aspects, it is clear that successful basketball players in the future will be polyvalent players. The beginning of lab selection for top-quality basketball is recommended for children aged seven. Those children are organized socially and on a higher level for the first time. They have already achieved certain psychological and physical maturity, which enables the beginning of training and communication on a higher level. Gifted children usually mature and develop faster, more commonly psychologically than physically. Another important reason to start the training process in basketball at the age of 7-8 is that before that age children do not possess the ability to estimate the characteristics (speed, height and depth orientation in space) of the flight of the objects in sagittal plane (ball). It is worth keeping in mind that the training process of talented children takes longer due to the need to perfect basic basketball motor features on the highest possible level (Trunić & Mladenović, 2014b).

The given approach to the talent identification process in basketball could find practical application in the following segments of basketball training technology and management:

- Directing young players (especially at specialization stage) to certain primary and secondary positions and roles in play, by examining the current success of play on certain positions,
- Player selection within certain positions in team,
- Monitoring the state of situational efficiency according to positions in team,
- The monitoring and control of training effects,
- Selecting individual and team play according to team dispositions,
- Shaping the picture about a player and their special qualities,
- Selecting training programs that enable perfection of strong and correction of weak points of play,
• Player comparison according to positions in play within their team and in relation to the players on the same positions in other teams (provided that their roles are precisely defined),
• Comparing the changes of a player’s situational efficiency at different stages of their career,
• Motivating players to conduct self-estimation during training and competitive activities,
• Creating new ideas in the assessment of children’s predispositions for basketball,
• Analyzing management administration of a basketball team from the aspect of competitive success,
• Finding an economically justified way to manage a basketball club,
• Distributing basketball players as products of successful prognostics into better and economically stronger clubs and counties, for an adequate financial compensation.

The prognostics and strategy of creating top basketball players in the future needs to have a starting point in lab selection and be based on rationalization and optimization of training technology, constructed and implemented by coaches-experts. The given approach is imperatively based on specific conditioning, which will contribute to high levels of technical and tactical manifestation, with a particular stress on players’ creativity for the sake of the given goal, and as a synthesis of maximally developed dispositions from all anthropological aspects. The basic postulates of training for top basketball achievements should be: children-basketball players should “learn the game”, not the affairs on the positions they play; “early specialization” should not be allowed; selection and training of children with genetic predispositions for basketball; continuous optimization of training and competitive loads, respect of morphological and functional, motor and psychological periods of development in all age categories, to train basketball players in situational conditions, to provide “the magic of the game” to children for motivational, educational and innovative reasons.

Regardless of future criteria in the assessment of success of players and teams in basketball, a vital distance will always be made by “specific differences” between players and teams, which will be determined by nuances in play and conduct that will be noticed only by rare people. A high level of all abilities significant for basketball – above all a harmony of different qualitative characteristics, attributes, knowledge and skills – is what makes top players and teams dominant. All those included in talent identification and selection are tasked with finding innovative methods in all segments of basketball, especially prognostics, as a “cradle” for basketball players in the future.
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Abstract: Japanese martial arts have gained immense popularity and have spread all over the world. They are a favored recreation, as well as a profession to millions of practitioners. However, the martial arts considered in the article – Judo, Karate and Aikido, bear within them the tradition and culture of their place of origin. The key question is this: are they liberated from their mystical, in fact religious past and ancient practice, in the form of philosophy and methods of training. The article gives a critical analysis of the ideas of the founders of the stated martial arts: Jigoro Kano, Gichin Funakoshi and Morihei Ueshiba and checks to what extent their very ideas and ultimate goals of martial arts are determined by Eastern mysticism, mainly in the form of Zen Buddhism and Shintoism. Besides that, the literature of distinguished domestic authors has also been analyzed in order to see whether the practice of the founders have been neglected or faithfully preserved. Judo has proved itself to be completely secular while the situation with Karate and Aikido is more complex. Funakoshi has preached modern methods of training, the road which is followed by the majority of Karate masters, while some have gone back to older practices: a mystical, irrational approach to martial art and to everyday training. On the other hand, in its essence, Aikido represents a religion and Morihei Ueshiba is its Prophet. In fact, the martial art is yields to the purpose of its final, completely religious goal. Still, by analyzing some Serbian authors, it is evident that this practice has been given up and that the practical part of Aikido as a martial art is dominant. Still, it is possible to also find Serbian authors who devotedly follow the path of Ueshiba and accept his philosophy in its entirety. This article aims to point out the significance of this problem, which does not only affect the philosophies of these martial arts, primarily in the form of defining the “ultimate goal” of the martial art.

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itself, but also spreads its influence on the training methods. It is important to know for every practitioner whether his trainer or “sensei” views the martial art as a form of recreation, aiming to promote it as such, with modern training methods, or if there is a mystical approach to training with religious elements prevailing.

**Key words:** Judo, Karate, Aikido, martial arts, mysticism

**INTRODUCTION**

Originating from distant Japan, the martial arts and sports of Judo, Karate and Aikido in their essence have incorporated the tradition, philosophy as well as the religion of their native soil. Zen Buddhism and Shintoism, as traditional Japanese religions, have influenced the whole of society, and consequently, they left their marks on martial arts. All of the stated martial arts in their names have the word “Do” which points to the essence of the martial art itself, that lays not in the physical exercise or in the practical use, which actually only represent the path to a higher, philosophical goal (De Majo, 2010, 83). The sports aspects of Judo and Karate will be overlooked in this paper, minding the fact that these issues do not apply here. Considering that it was these martial arts that have spread all over the world and are practiced by millions of practitioners, the issue of the correlations of the philosophies of these martial arts and religiousness is surely significant. In Serbia, according to a 2011 census, some 6,779,319 (94.32%) citizens recognized themselves as believers of the traditional monotheistic religions. On the other hand, 84,063 (1.16%) citizens declared themselves atheists or agnostics (Republic of Serbia, the Republican Institute for Statistics: 2011 census). Also, the stated martial arts are greatly popular in Serbia which makes this topic relevant. For the individual practitioner of martial art, whether a believer or an atheist, the correlation of the chosen martial art and religion is surely important. A different approach, the correlation between Christianity and sport as a whole, has been the topic of former researches (Radoš, 2010).

In the end, every practitioner of martial arts individually opts for the level of commitment to the martial art itself, but he is obliged to know whether his martial art in its extremity is confronted with his religious beliefs. The major responsibility is on the coaches of these martial arts who are obliged to know the philosophical aspects of their martial arts and introduce it to their students (if there is a need, in fact, a religious orientation of the practitioners)

**METHOD**

Judo, Karate and Aikido carry the mark of their time, a time of deep social changes. Each of these martial arts was dominantly formed by the founder of the art who had his ideas, along with the philosophy, incorporated
in the martial art itself. Jigoro Kano, Gichin Funakoshi and Morihei Ueshiba were the individuals who founded, ideologically and practically formed and promoted their martial art all around the world.

Analyzing their ideas at the very “source” or more precisely their written marks, the correlation with religion cannot be perceived well. Minding the fact that they were the founders of the then modern martial art, the very question of breaking or not with the former tradition of martial arts was present. Zen Buddhism, along with Shintoism, has deeply influenced the ideas of old martial arts as well as everyday training practice. The basic question is whether or not there are traces of eastern mysticism in the martial art itself. Not only can the philosophy of the martial art be marked with religious connotations but the concrete, practical methods of training can as well. In the paper, the attitude of the founders of these martial arts will be analyzed in light with the ultimate goal of the art and the methods of training.

Luckily, the founders have left behind significant written material, available to the broader public. Besides practical advice for practicing these martial arts, their works are rich with philosophical attitudes in the form of guides for practicing Judo, Karate and Aikido outside the training facility, in everyday life. Adding to this, the correlation will be analyzed in the works of distinguished masters of these arts in their written works. Minding the fact that religion and the religiousness of the individual also influence everyday life (depending on the level of commitment) a mutual interaction of the ideas of the founders, and consequently the martial arts themselves and religion is inevitable. The aim of the paper is, by analyzing these ideas, to perceive the correlation of these martial arts and religion and to indicate the problem.

From their founding, the stated martial arts have gone through various transformations and adjustments. The research would not be complete if it was to stop exclusively on the ideas of the founders. Consequently, the latest literature will be consulted, especially by Serbian authors, in order to spot any eventual traces of religiousness in the practicing of martial arts. Although the topic seems abstract at first glimpse, the concrete methods of the training process are impacted. In reality it is a question of submitting to the laws of the training process or the “belief” in the irrational, the mystical learning of previous martial arts masters and an uncritical acceptance of their method.

RESULTS

Judo

Emerging in 1882 at the peak of the Meiji restoration and founded by an educator and a president of a higher school, Jigoro Kano, judo has
some special characteristics. The restoration itself was aiming to transform Japanese society in order keep up with history and make Japan a modern state (Stojanović, 2015, 57). Far from being a mystical “sensei,” Kano was a pragmatic intellectual who strived to adjust jiu jitsu (more accurately ju jutsu) to modern times, in the spirit of the ever-present restoration of the Japanese society.

The art of self–defense, which had as its goal the overcoming of the opponent at all cost, had been on the brink of extinction due to the fact that there just was no place for it in the emerging modern Japanese society. Kano, as a distinguished master of jiu jitsu, embarked on a mission to transform it into a modern martial art, not just for Japan but for the whole world. It was then that he founded Kodokan and judo began its journey as the first modern martial art of Japan (De Majo, 2010, 96). Jiu jitsu itself, which the name (“jutsu” – adaptable) itself implies, was orientated towards practical uses. The techniques were realistic, efficient with the aim of self–defense or even attack. Consequently, jiu jutsu itself was practically without a profound philosophy or religiousness.

Kano had not neglected the complex spirit of martial arts: “Judo is not just a martial art, it is a way of behaving… It is wrong to think that judo ends as a training facility.” As the final goal of martial art he took the principle of Maximum Efficiency, the principle which would impact everyday life. As Kano himself stated: “It can be said that judo is ‘the learning of the method,’ and its use is the learning of the best method in order to reach any kind of success” (Kano, 2007, 73, 110).

Still, are there traces of Zen Buddhism or Shintoism in the philosophy of judo? Kano had overlooked religiousness and mysticism in the techniques of martial arts. Being himself a scientist, he focused on concrete, empirically provable exercises with the aim of the physical development of the practitioner. Within its numerous techniques, judo also has katas, which are an integrated part of Zen Buddhism arts. On the other hand, Kano had constructed judo katas first and foremost as a form of exercise, a way of perfecting techniques and physical fitness, especially for older practitioners. Kato ignored the mystical and religious background of katas and formed them exclusively as a method of perfecting the technique, in fact a method of training which retained an esthetic element (Kano, 2007, 32, 126).

Finally, in his numerous journeys Kano had the opportunity to become acquainted with different religions, as well as their leading representatives. He considered them and their teachings as allies in the struggle to make a better world. Kano stated: “So, through judo we learn the principle which can be used and applied the same as the highest principles of Buddhism, Christianity or profound philosophical teachings – a principle which, like all the other great philosophies and religions, is applicable” (Kano, 2007, 78-79).
Today judo has not drastically changed in its essence from the ideas of its founder. The development of this martial art as a sport has especially influenced a definitive break with the “mystical” past and the implementation of modern training methods, as well as the philosophy which has made Judo a truly world phenomenon. In the contemporary works of some of the distinguished masters of the art, traces of religiousness can practically not be found. The most popular manual of Kazuho Kudo (1969) is entirely orientated toward practical use. The same approach can be found in the works of distinguished Serbian authors such as Dragić (1980; n.d.), Mandić (1996) and Ćirković (1991).

Karate

Ginchin Funakoshi systematized and spread the ancient Okinawan martial art of “the empty hand” firstly through Japan and then all over the world. He dedicated his entire life to teaching karate as well as preaching. Karate itself, before Funakoshi, was an integrative segment of Zen Buddhist arts (De Majo, 2010, 47). Thanks to Funakoshi, the modern martial art emerged, later also a sport. In order to become just that, a radical break with old mysticism and religiousness was needed.

Born in the year of the turning point of Japanese history – 1868 (the year of the beginning of the Meiji restoration) the very life of Funakoshi represented the cessation with tradition. He cut off his chonmage (a unique samurai hair style), the symbol of manhood, tradition and social status, aware of the new era. His ignored his father’s objection: “What have you done of yourself? You, son of a samurai!” and bravely stepped into the new era, the era of modern Japan, in which he endeavored to find a place for karate (Funakoshi, 1988, 18).

A rational and scientific attitude characterized Funakoshi’s understanding of karate. He critiqued ancient legends, basically myths about deeds of karate masters. He also preached to his students: “There is not a living person who can, no matter how much he exercises and trains, overcome the natural limitations of the human body” (Funakoshi, 1988, 20). There was no place for eastern mysticism in Funakoshi’s karate, as he subordinated it to the laws of training methods: “It is true that a karate master has the power to break a thick board or several pilled tiles with the blow of one hand, but I assure the reader that anyone is capable of doing the exact same thing after going through a sufficient amount of training. There is nothing unnatural in such an achievement” (Funakoshi, 1988, 21).

The very name of ‘Shotokan’ is also without a religious or mystical background. An admirer of the pine forests surrounding his native town of Shuri, Funakoshi enjoyed the melodies produced by the wind harmonizing
with the pine trees. The rustling of these pines for him was like “heavenly music.” The word ‘shoto’ in Japanese particularly signifies the hum of pine trees but is without “a profound symbolical meaning” (Funakoshi, 1988, 76).

Although he conducted Buddhist customs, Funakoshi himself had deeply accepted the Meiji restoration and to the end of his life remained a devoted patriot and admirer of the Japanese Emperor. Minding the fact that the restoration itself meant the secularizing of society, Funakoshi had accepted that aspect. He saw in karate the significance of physical exercise, the nurturing of the individual, and as the ultimate goal of martial arts he saw the very aspect of self-defense and the ability of the individual to protect himself in moments of danger. Consequently, it is no wonder that of the numerous masters of martial arts it was Funakoshi who was recognized as significant by the then already old Jigoro Kano who invited him to Kodokan for the purpose of demonstrating the art, surely having in mind their similar attitudes (Funakoshi, 1988, 27, 63, 65, 66, 86).

Still, karate is surely famous for its numerous katas, with a persistent training improved to perfection. Are there any traces of religious practices? Funakoshi himself looked upon katas as a part of training, both physical and mental, and practiced them without any religious connotations (Funakoshi, 1988, 91, 92).

Funakoshi’s students have faithfully followed the road of their founder and have spread karate across the world. Furthermore, by doing so, they made it one of the most popular martial arts and sports. A scientific view of the martial is also a characteristic among the distinguished domestic masters. A strict denial of mysticism and religious influences can be found in the works of Mudrić (1987), the brothers Jorga and Đurić (1985) as well as Jovanović (1992). Still, traces of the irrational, in fact, an abandonment of Funakoshi’s methods, can be found in the works of Gigov and Janjić: “In the karate technique, a person is always an individual, eye to eye with himself, striving to identify himself for what he really is... This refers to a liberation from national, religious, professional, biological affiliation, to the state of the ‘empty mind’... In that case, the karate technique represents a method” (Gigov & Janjić, 1984a, 12). As well as this: “The essence of a human is meditative and returning to its original, and not expressing actuality is one of the goals of karate” (Gigov & Janjić, 1984b, 45).

**Aikido**

It shares the same origin as judo, forming itself in the same years as Funakoshi’s karate, but in fact, in the aspects of religiousness, aikido is quite different. Mastering a couple of jiu jitsu styles, among them also the brutal style of Sokaku Takeda, the founder of aikido Morihei Ueshiba decided to form a radically different martial art.
The very coming to life of aikido (or “the way of peace”) is shrouded in the veil of mysticism. Ueshiba stated that in that moment, “…suddenly the Earth began to tremble. Golden dust was rising from the soil, engulfing me. I felt I was transformed into some kind of golden statue and my body was as light as a feather. I could understand the language of birds. In a moment I understood the nature of creation: the way of the warrior is to manifest divine love, a spirit that spans through everything and nurtures all existing.” He saw the origin of martial art in the “divine form and the divine hearth of existence” as well as “the divine works of Odo” (Ueshiba, 2008a, pp. 18, 54; Ueshiba, 2008b, pp. 29, 57). Ueshiba did not overlook Shintoism and Buddhism but incorporated them in aikido in a specific way.

Ueshiba devoted his life to the way of the warrior (Budo) transforming it into aikido, a unique martial art. Still, Ueshiba did not view aikido or “the way of peace” as merely a martial art or even as a way of life, but a specific (in fact religious) path to a better world (“an upcoming era”) – the creation of the Kingdom of God on Earth itself, and by so denied the Hebrew, Christian and Islamic teachings, and at the same time, paradoxically, coincided with the teachings of Communist revolutionaries. To the journalist’s question “Is aikido the path to peace?” he answered the following: “The final goal of aikido is to create the Kingdom of God on Earth” (Ueshiba, 2008b, 144). He went beyond the title of sensei by giving himself the role of a “Prophet” (Ueshiba, 2008a, 25). He looked upon the martial art as a way of cleansing, which itself is the work of “the divine Odo” (Ueshiba, 2008b, 94).

Systematizing the brutal techniques of jiu jitsu, Ueshiba came up with a new martial art, whose very techniques are merciful and focused on overcoming the attacker in such a mode that the attacker himself remains uninjured yet defeated. Also, the characteristic of aikido is a lack of katas, about which the founder himself stated: “In aikido there are no forms. And since there are none, aikido is therefore the study of the soul” (Ueshiba, 2008a, 45).

However, are there in every-day practice of aikido traces of Ueshiba’s “divine plan”? At training, the practitioners meditate in a specific position called seiza, which is followed by the bowing to the founder himself, and in fact his picture is a necessary detail of aikido training facilities. The very training facility, or dojo, is recognized by the founder as a place of “cleansing” which leads to the fulfillment of the “principles of the Universe” (Ueshiba, 2008b, 91). Ueshiba was direct by saying the following: “Practicing ‘the way of peace’ is an act of faith”, “The way of peace is a form of religion which produces light and warmth.” In the techniques of self-defense, Ueshiba saw the manifestation of the “merciful deeds” of the goddess of mercy Kanoni (Ueshiba, 2008a, 43, 56, 105). Ueshiba did not just recognize the significance of every-day training in the sole improvement of techniques or similar, but in order to “…remain on the divine path of Odo for the sake of the whole world
and the Universe. Aikido is a divine work of Odo, or more accurately, a divine work of Izanagi, Izanami and Takami musubi.” He accepted Zen meditation as an ally in practicing aikido. For that very goal, he chose “the unification of God and humans, the same in quality” (Ueshiba, 2008b, 47, 91, 104).

Ueshiba was not immune to other religions, as he had to look upon their teachings as well: “We cannot rely any more on the external teachings of Buddha, Confucius or Christ. The era of organized religion which controls every aspect of human life is gone. No religion individually has all the answers. It is not enough to build churches and temples. Become a living embodiment of Buda. We all should transform ourselves into goddesses of mercy and victorious Buddhas” (Ueshiba, 2008a, 105). He went even further, trying to interpret religions through martial art practice: “The path of great religions, including Christianity, has for its goal love, whose essence lies in the practices of martial arts” (Ueshiba, 2008b, 91).

The ideas and with them also the ultimate goal of aikido were not abandoned with the death of Ueshiba in 1969. His son Kisshomara Ueshiba continued to spread aikido according to the conceptions of his father. Except for him, faithful to the ideas of the founder were his famous students who spread aikido through the world: Hiroshi Tada and Tadashi Abe (De Majo, 2010, 90, 91).

But what is the situation today, primarily in Serbia? In the works of distinguished masters there are those which are orientated exclusively towards the practical aspect of aikido, without any religiousness (Stanojević, 1985; Jovandić, 2000). Still, it is possible to find works that faithfully follows and interprets the teaching of Ueshiba, as for example: “When a man unites his mind and body and harmonizes it with the spirit of the Universe, perfect aikido is achieved” (Šturanović & Dimitrijević, 1994, 18).

**DISCUSSION**

By analyzing the ideas of the founders, as well as the practice of later masters, judo and karate can be characterized as secular. Modern methods of training were the main feature from the very beginning. Even in their philosophical extreme, their teachings do not confront the possible religious attitudes of a practitioner.

However, due to their “mystical” past, certain karate masters made a step back (from the ideas of Funakoshi), and reestablished an older training practice. Still, the stated is marginal due to the development of karate as a sport whereupon every training method is put to the test. A problem still exists with religiousness, mainly in the form of Zen Buddhism, which surely should not be found in modern Shotokan karate. It is the works of such masters, which insist on the irrational, which harm karate as a sport as well as a martial art.
The situation is even more complex in aikido. Morihei subordinated everything to its ultimate goal, the Kingdom of Heaven on Earth and techniques are just a method for the accomplishment of that goal. Faithfully spread by its followers, the philosophy of aikido, in its essence, remained the same. Even with Serbian authors, speculation about the “Universe, “Spirit” etc. is obvious. Still, there are some who are orientated toward the practical aspects of the martial art and strive to proceed in that direction. The final conclusion is hard to form, as it, in reality, depends on each club, trainer and individual practitioner.

CONCLUSION

The correlation between religion and judo, karate and aikido has proved itself complex. While it could be said for judo that it is completely rational, certain authors find a dose of mysticism and religiousness in karate. In its extreme, aikido represents a religion, with its teachings and a Prophet. However, it is up to the individual to choose the level of commitment.

The research itself is not complete as it is just the tip of the iceberg. The further direction of researches should surely consider some kind of field research, examining clubs, interviewing trainers as well as practitioners, and a statistical analysis of the gathered data. By doing so, a clearer view of the martial art, can be perceived by the ones who practice it. It would be wrong to accuse every aikido club, every trainer or practitioner of denominationalism, as a deeper understanding is needed.

The analysis of other martial arts popular in Serbia would be a step beyond, such as other styles of karate (Shito-ryu, Goju-ryu, Wado-ryu, Uechi-ryu, Kyokushinkai, etc.) as well as aikido (Ki aikido). Special topics are Chinese martial arts like Wushu or Kung fu, who never had their ‘Meiji restoration.’

What is surely important, and this is something this paper aims to point out, is the significance of this problem. It is up to every trainer to explain the chosen martial art to his practitioners, and in the case of dealing with children, to their parents or guardians. Adding to this, every individual has the right to devote himself to a martial art in the manner he chooses, to accept or not its philosophical teaching, as long as his decision does not affect his progressing in the martial art itself.

The method of training remains as a practical problem, or the possibility of the irrational element prevailing in it. The solution is in the educating of trainers, as well as practitioners. By systematizing trainer licenses, a stricter control of national martial arts associations and providing the possibility of adequate trainer education, modern training techniques would surely prevail in the “mystical” training processes of ancient Japan.
REFERENCES

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CONCLUSION

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