

# **Title of the PhD thesis**

A comparative analysis of 5v5 and 3x3 basketball game situation in terms of decision-making – offensive efficiency, shot selection, offensive and defensive tactical, offensive technical elements analysis.

Abstract of PhD Thesis

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## INTRODUCTION

Decision-making is a fundamental element of all sports, especially fast, dynamic team sports such as volleyball, handball, soccer, and basketball. In sports, decision-making can be considered an intellectual process during which a course of action is selected from several different options. During the decision-making on the basketball court, the alternatives that can be considered in the given game situation are identified, and the final selection is made based on the players' preferences. During the game, the decision-making process can be examined from several perspectives. In general, the decision-making process refers to how players perceive, process, and react to the information around them to be effective. Decision-making expertise refers to how quickly and efficiently players can choose the best course of action in a game.

The environment of team sports is often unpredictable, requiring players to respond effectively to uncertain situations that can vary in time and complexity. Athletes' decisions can be influenced by the phase of the match in which the given situation occurs. In a similar game situation at the beginning of the game, decisions may be made differently than at the end of the game. In the early part of the game, risk-taking usually occurs several times, and at the end of the game, the pursuit of safety is more emphasized. However, during the game, the development of the result can also influence decisions regarding the level of risk-taking. The players can make different decisions during the game if their team has an advantage or a disadvantage, and the physical and mental state of the players at the moment of decision-making can be decisive. In addition, the decisions made on the field are influenced and determined by the strategy and tactics of the team and the technical skills of the players.

If the information and environmental influences (opponent, result, rules of the game) change, it is possible that a player in the same decision situation makes a different decision than before the change. Thus, comparing two disciplines of basketball, traditional (5v5) and 3x3 basketball (3x3), is suitable for this kind of research. Many of the rules are the same in the two disciplines, but there are differences in the rules that can affect players' decisions differently. These differences can create a different environment for players to behave in decision situations, even though the goals in both disciplines are the same: getting to score more points than the opponent.

The purpose of my thesis is to analyse and compare the players' decisions in 5v5 and 3x3 basketball in terms of offensive efficiency, shot selection, offensive technical, offensive and defensive tactical elements.

## **OBJECTIVES**

Some previous studies have already found differences between the two disciplines in physical intensity. However, the players have not yet been compared in terms of their decisions on the court, offensive efficiency, and offensive value. It is important to note that the location and distance of the shots and players are "identical" in the two basketball disciplines, yet a systematic difference in shot selection can be assumed. During shooting attempts from the same distance in 5v5 and 3x3, the players must perform the shots under different physiological effects. Therefore, one of the goals of this thesis is to compare 5v5 and 3x3 basketball. The other is whether there is a difference between the two disciplines based on the relative offensive value in offensive efficiency, shot selection, shooting efficiency, and the ratio of long-distance and close shots based on the difference in the available point value of the two basketball disciplines. Another goal is whether, based on the results, we can conclude that the difference in the value ratio of the available point of the 5v5 and 3x3 basketball shots and other rule differences influences the players' decision in the shot selection. In the dissertation, the comparison of the two disciplines covers the analysis of the application of offensive tactical elements and certain defensive tactical elements, especially for 1:1 and 2:2 game situations. In addition, the research examined the use of technical elements with the ball and the frequency of their application in the games of the two disciplines. Furthermore, to explore which are the game situations that show similarities and differences in the comparison of 5v5 and 3x3, as well as what opportunities are provided for the game-like application of 3x3 basketball for the training of players in 5v5 basketball training sessions.

## **HYPOTHESES**

3x3 is based on the strategic, tactical, and technical elements of 5v5 basketball. Based on the differences in the rules that can be found in addition to the similarities in the rules of the game, the basic assumption of the thesis is that the players make different decisions in similar match situations of the two disciplines. The hypotheses of

the research were formulated based on the analysis of the relevant literature related to basketball to explore the similarities and differences between the two disciplines:

- H1: I assumed that due to the difference in the ratio of available points, the number of long-distance shot attempts in 3x3 compared to all shot attempts is more than in 5v5, and the ratio of close and long-distance shots differs between the two disciplines.
- H2: I hypothesized that in 5v5 the shooting efficiency of players is better in terms of total and long-distance shot attempts than in 3x3.
- H3: I assumed that, based on the definition of the relative offensive value, offensive efficiency differs between the two disciplines.
- H4: I assumed that individual possession is more common in 3x3, because of this the players make more decisions with the ball in their hands than in 5v5.
- H5: I assumed that making shot attempts from 1:1 situation appears more often and is more effective in 3x3.
- H6: I assumed that in 3x3 basketball, players use the tactical element of "switching" defence against on-ball screen more often than in 5v5.

## **METHODS**

Data from the 2018 women's and 2019 men's basketball World Cups (WC), both 3x3 and 5v5 discipline, were collected from the official basketball website, FIBA, and by 3x3 WC video analysis.

From the 3x3 WC, data of 20 teams in 48 games were collected, while from the 5v5 WC data of 32 teams in 92 games were available. For the sake of comparability, during the video analyses, the data of the game situations that are the same in 5v5 and 3x3 were recorded. These are offensive technical elements with the ball (n=7671), certain offensive (n=2999), and defensive (n=1931) tactical elements.

### **Data processing**

The following variables were calculated from the raw dataset: possession, points per possession, relative points per possession, shooting percentage for both the close and long-range shots and close and long-range shot attempt ratio to all field goal attempts. For 5v5 and 3x3 basketball, possession (P) was calculated with Oliver's formula used in NBA statistics,

$$P = FGA + TO - OR + 0.436 \times FTA$$

where FGA is the field goal attempt, TO is the turnover, OR is the offensive rebound and FTA is the free-throw attempts. In addition, we also applied Oliver's offensive rating formula (equation 3) to both basketball:

$$\text{Offensive rating} = \frac{\text{Points scored}}{\text{possession}}$$

Finally, we compared the relative offensive rating (Equation 4) of the two disciplines, which is the ratio of the points scored per ball possession to the maximum points achievable per ball possession, it can be calculated as follows:

$$\text{Relative offensive rating} = \frac{\text{Point/Possession}}{\text{maximum achievable points from a possession}}$$

In the case of 3x3 basketball, all games were manually analysed, thus in the previous equation, the exact number of possessions related to FTA was available. Points per possession and relative points per possession were further calculated.

Based on the statistical data and video analysis, I examined the analysis of the tactical elements at the end of the offense, which offensive tactical element was used. I considered those shooting attempts that took place within 5 seconds after the start of the offensive tactical element at getting a score. Analysis of ball decision-making, I examined the frequency of technical elements implemented by decisions made with the ball during offense (in 5v5 in the offensive halfcourt) by analysing the recordings of the matches. Analysis of the defence I examined the tactical elements that are used before shots by analysing recordings of games. As the main question, I analysed the occurrence and frequency of 1v1 and "switching" defence against the ball screen.

Statistical analysis was carried out in an R open-source (R 4.1.2, R Core Team, Vienna, Austria) environment. Descriptive statistics are given in mean and standard error of mean (SEM). Differences are indicated with mean and 95% confidence interval of mean (95% CI). Data visualization was performed with a regular boxplot showing minimum, lower quartile, median, upper quartile, and maximum while outliers were marked with dots. Mixed linear regression models were constructed to analyse the research questions. In these models, depending on the research question, fixed factors were the discipline of basketball and the range of the shots. Random effects were considered in all cases for team and game type, allowing for both random intercept and

slope. Groups defined by the fixed factors were compared using planned comparisons with one-step p-value correction. The level of significance was set at  $p < 0,05$  in all cases.

## RESULTS

To compare the relative offensive rating between the two disciplines mixed linear model was specified with a fixed effect of the discipline. The model showed that discipline affected relative offensive rating ( $F(1, 5.1) = 36.8, p = 0.002$ ). On the 5v5 WC, the relative offensive rating was greater, than that on the 3x3 WC with an average of 7.1%point (95% CI: 4.8 - 9.3%point).

Shooting efficiency was analyzed across disciplines, ranges, and their combination. For that, the mixed linear model contained discipline, range, and their interaction as fixed effects. According to the model, shooting efficiency was affected by range ( $F(1, 510.1) = 619.3, p < 0.001$ ) and the interaction of range and discipline ( $F(1, 510.1) = 41.6, p < 0.001$ ), but not discipline alone ( $F(1, 13.2) = 3.3, p = 0.094$ ). A pairwise comparison revealed that overall shooting efficiency did not differ between the disciplines. However, shooting efficiency for close-midrange shots was 21.4%points greater than long-range shots (95% CI: 18.6% - 24.1%points,  $p < 0.001$ ). In the case of discipline-range interactions, only the same ranges were contrasted between the disciplines. Close-mid range shots did not show any difference (3x3:  $54.2 \pm 1.5\%$ , 5v5:  $50.9 \pm 0.7\%$ ,  $p = 0.131$ ) between the two disciplines, while long-range shots were shot 8.6%points better in the 5v5 discipline, than in the 3x3 (95% CI: 4.5% - 12.7%points,  $p < 0.001$ ).

Shot selection by mean of ratio of close-mid and long-range shot attempts to all field attempts was modeled with a mixed linear model, where range and discipline-range interaction were the fixed effects. The percentage of all field goal attempts was affected by range ( $F(1, 556) = 459.2, p < 0.001$ ) and the interaction of range and discipline ( $F(1, 556) = 60.6, p < 0.001$ ). The overall percentage of close-mid range shots was ( $52\% \pm 0,7\%$ ) higher than long-range shots with an average of 21.3%points (95% CI: 19.2% - 23.3%points,  $p < 0.001$ ). In the case of 5v5 discipline, the percentage of long-range shot attempts from all field goal attempts was lower, than in 3x3 with an average of 6.5% points (95% CI: 3.9% - 9.2%points,  $p < 0.001$ ).

I used a mixed-effects linear model to compare the relative offensive value of the women's disciplines, the relative offensive value as a dependent variable, and a fixed

effect. Based on the model, we found no difference in the relative offensive value between the women's 3x3 (mean  $\pm$  standard deviation: 29.9 $\pm$ 12.9%) and 5v5 (30.8 $\pm$ 5.7%) basketball disciplines ( $F(1; 30.6) = 0.7; p = 0.426$ ). At the same time, in the case of 3x3, the dispersion of values is much larger: the coefficient of variation is 43.1% for the 3x3 discipline, and 18.5% for the 5v5 discipline.

In the mixed linear model used to examine the shooting efficiency of women's disciplines, I examined discipline, distance, and the interaction of the two as fixed effects. Based on the model, there was a significant effect of both discipline and distance, as well as the interaction of discipline and distance for shooting efficiency. In the 5v5, shots were more successful by an average of 4.2% points (95% confidence interval: 1.1% - 7.3%). Comparing the efficiency of shots at different distances, the efficiency of close-range shots (mean  $\pm$  standard deviation: 44.7  $\pm$  12.5%) averaged 19.4% points (95% confidence interval: 16.2 - 22.6% points) was better for long-distance shots (25.6 $\pm$ 12.8%). Regarding the combined discipline and distance, I only made a comparison by distance (close- and mid-range 3x3 vs 5v5 and long-distance 3x3 vs 5v5). There was no difference in the efficiency of close shots between the two disciplines ( $p = 0.625$ ), but for long-distance shots, they were 9.9% more effective in the 5v5 discipline than in the 3x3 discipline (95% CI: 6.1% - 13.6 %point,  $p < 0.001$ ).

I used a mixed-effects linear model to examine the ratio of close- and mid-range and long-distance shot attempts compared to all shot attempts, where distance and the interaction of discipline-distance were considered as fixed effects (disciplines were not compared). Based on the model, the ratio of shot attempts was also affected by the distance and the discipline-distance interaction. Comparing the ratio of shots at different distances, regardless of the discipline, I found that the ratio of close- and mid-range shots (67.8 $\pm$ 12.5%) averaged 35.3% points (95% CI: 32.3 - 38.3% points) was greater than the proportion of long-distance shots (32.9 $\pm$ 11.5%,  $p < 0.001$ ). In the 5v5 discipline, the ratio of long-distance shot attempts to all shot attempts was on average 5.9% points (95% CI: 1.6% - 10.2%,  $p < 0.001$ ) lower than in the 3x3 discipline, while from close shots it was an average of 4.4 %points (95% CI: 0.1 - 8.6%points,  $p < 0.001$ ) occurred more in the 5v5 discipline than in the 3x3.

In the comparison of Men's and Women's 3x3 disciplines, our starting model included as independent variables the rate of long-range attempts, the efficiency of long-

range throws, the efficiency of close-range throws, free throw attempts, the total number of rebounds and the number of turnovers. In the final model, the rate of long-distance attempts, the efficiency of close shots, and the number of turnovers were included as fixed effects. The explanatory value of the initial (AIC = 217.9) and final model (AIC = 217.3) does not differ from each other ( $\chi^2(3)=5.34$ ;  $p = 0.149$ ). Based on the analysis, the proportion of long-distance shots in the men's division was higher, close- and mid-range attempts were more efficient, and the number of turnovers was lower.

3x3 matches are played for 10 minutes or until a team reaches at least 21 points. Approximately 58% of men's games ended before 10 minutes of playing time, compared to only 35% for women. The distribution of the time of the matches is significantly different between the two genders ( $\chi^2(1)=5.06$ ;  $p = 0.024$ ): in men's games, it is more typical that the games end due to the achievement of 21 points, while in women, the expiration of the playing time is the reason for the end of the match. Welch's d test showed a significant difference in the number of decisions made with the ball between the two disciplines ( $sf=12.7$ ;  $t=13.39$ ;  $p < 0.001$ ). In the 3x3 (mean  $\pm$  standard deviation:  $2.9\pm 0.4$ ) players must make an average of 1.74 (95% CI: 1.5 - 2) more decisions with the ball per minute than in the 5v5 ( $1.2\pm 0.1$ ). What is even more striking is that the number of decisions in the 3x3 discipline shows much greater variability: the coefficient of variation is 13.7% in the case of 3x3 and 8.3% in the case of 5v5.

In the occurrence of offensive tactical elements, based on Welch's d test, the 1:1 (Drive), the pick-and-roll, the assist after 1-on-1 (1-on-1+Assist), the assist after 2-on-2 (2-on-2+Assist) and in the triangulation (Triangle) there was a difference between the two disciplines.

In the 3x3 discipline, the proportion of shots following 1:1 was on average 16% points (95% CI: 9.1-22.8%) higher than in 5v5. 5v5 the pick-and-roll by an average of 8% points (95% CI: 1.9-14.1% points), the assist after 1-on-1 by 2.8% points (95% CI: 5.2-16.7 % points), the assist after 2-on-2 by 7% points (95% CI: 1.1-4.1% points) and the triangulation by 0.3% points (95% CI: 0.0004-1.2% points) was present in a higher proportion compared to the 3x3. The effectiveness of the offensive tactical elements, based on Welch's d test, only the efficiency of the pick-and-roll was found different between the two disciplines. This tactical element is implemented more effectively by an average of 9.5% points (95% CI: 0.2-18.7% points) in 5v5. The success of shots from



assists following 2-on-2 and the success of triangulation could not be compared due to the number of elements.

Based on the Welch's d test applied to the analysis of defence forms, the ratio of defence against 2-on-2 with switching did not differ between the 3x3 ( $58.9 \pm 11.9\%$ ) and 5v5 ( $55.9 \pm 21\%$ ) disciplines ( $df = 17.5$ ;  $t = 0.43$ ;  $p = 0.670$ ).

## **CONCLUSIONS**

### **Testing of hypotheses**

The purpose of the thesis was to compare 5v5 and 3x3 basketball, to establish similarities and differences, thanks to the results of which we can get an answer to the players' behaviour in decision situations during the match. Based on the recorded data, the offensive efficiency, relative offensive value, shooting efficiency, shot selection, the relative ratio of long and close shots, certain offensive and defensive tactical elements, and the frequency of occurrence of offensive technical elements of the two disciplines were determined.

Based on the statistical data considered during the analysis of the shot selection, it can be clearly stated that the number and efficiency of long shots have become a determining factor for in 5v5 és 3x3 basketball games. In today's men's basketball teams, it can be observed that almost every players have a long shot attempt in the games. This is even more typical of 3x3 basketball, as the differences between player posts are reduced, and in 3x3 basketball, one player gets significantly more possession of the ball. As a result, I found a difference in shot selection for men between the two disciplines. In 5v5, approximately every third shot was a long-distance (3-point) shot, while in 3x3, approximately every second shot was a long-distance (2-point) shot. Regarding the shot selection of the players, based on the results of the comparison, it can be concluded that in 3x3, the players choose the higher value shots several times compared to all the shots. Accordingly, the combined ratio of close and mid-range shots also differs.

Based on the women's results, there was also a difference in the proportions of close and long-distance shots between the two disciplines. It can be stated that in 3x3 women also choose the long-distance shot more often than in 5v5. Hypothesis 1 was confirmed.

In terms of total shooting efficiency, there is no significant difference between the two disciplines in men's games. Close shots are more effective in 3x3 than in 5v5. Confirming a previous study, I found a significant difference when examining the effectiveness of long-distance shots. Even though there are more long-distance shot attempts in 3x3, these shots are more effective in 5v5. In 5v5, every third long-distance shot was successful, while in 3x3 it was only approximately every fourth. This can be explained by the longer shot lock in 5v5 and the more rational selection of a suitable shooting position from a strategic or tactical point of view. More frequent but less efficient shots can still be a rational strategy since the difference in point value between the two types of shots (close and long-distance) is greater in 3x3. In the women's games, there was no difference between the combined success of close and mid-range shots, however, there was a significant difference regarding long-distance shots. Despite this big difference, I did not find any significant differences between the two women's disciplines in the examination of all shooting efficiency. Hypothesis 2 was partially confirmed, there is no difference in all shooting efficiency, but there was a significant difference in shooting efficiency of long-distance shots.

In basketball, possession is the offense. The teams attack alternately, so they usually have almost the same number of possessions during the game. On the other hand, due to the points scored, the made-and-miss shots and the getting offensive rebounds, the disciplines' relative offensive values can be calculated.

The maximum points that can be scored during a possession are 3 points in 5v5, while 2 points are in 3x3. In the dissertation, I also applied the offensive value indicator to the 3x3 version for the efficiency of the attacks in the game 5v5. But in the comparison, due to the different scoring, I used the relative offensive values as a basis. In 5v5, the possession per match averaged approximately 77, while the average points scored by the teams in the games was 80 points, which shows an offensive value of 1.04 and confirms the previously measured offensive values of 1.02 and 1.08. In 3x3, the ball possession was approximately 30 per game, while the average points scored by the teams were 17 points, and the offensive value was 0.55. This shows that in 3x3-ban, the teams scored an average of half a point per possession. Since one shot does not score half a point, we can conclude that approximately one point was scored per two possessions. Comparing the relative offensive value of the two disciplines in the men's matches, the offensive

efficiency index in 5v5 is 35%, which means the teams scored approximately 1 point out of the maximum 3 points that can be scored during an attack. This value is 27% in 3x3, i.e. they scored approximately 1 point out of the maximum 4 points possible per two possessions. Based on these, it can be concluded in the comparison of men that 5v5 has a higher offensive value than 3x3. In the comparison of the relative offensive value of the women's discipline, I did not find any significant differences during the examination. Thus, hypothesis 3 was partially confirmed, only in the case of men's is true.

There is also a difference between the attempts inside and outside the arc in terms of shot selection in the men's and women's disciplines. Based on the results of the comparison, it can be concluded that, compared to all shots, male players choose the higher value shot in 3x3 more often than women. In addition, the effectiveness of close shots has also proven to be better. 3x3 matches last for 10 minutes of clear playing time, or whichever team reaches at least 21 points. When comparing the two genders, the importance of this also appeared in the offensive efficiency and shot selection. Approximately 58% of men's games ended before 10 minutes of playing time, compared to only 35% for women. More than half of the men's games, while approximately one-third of the women's games were finished prematurely.

Despite the difference in shooting efficiency and playing time, for both genders, it can be stated that the ratio of long-distance shots in terms of all shot attempts shows a higher value, both men and women chose the long-distance shot more often in 3x3 than in 5v5. Regarding the relative offensive value indicators, I found a difference in the case of men, while in the case of women, there is no significant difference between the two disciplines.

The decisions made by the players with the ball are influenced by how many times the player is in a decision situation, that is, how many individual ball possessions a player has. In each individual ball possession, the players must perform some technical element with the ball. These technical elements are dribbling, passing, and shooting, what usually preceded by faking. In the comparison of the two disciplines, in the 3x3 game, the average ball possession per minute of a player was significantly higher. In 3x3, the players were in a decision situation with the ball approximately three times per minute on average, while in 5v5 approximately once. As a result, in 3x3 each player made approximately

three times as many decisions and executed some technical offensive elements with ball on average as in 5v5. Based on the results, hypothesis 4 was confirmed, in terms of individual possession of the ball in 3x3, the players must make decisions with the ball several times in the game.

When examining the tactical elements of the two disciplines, I examined those elements according to their occurrence, after which a shooting attempt was made within 5 seconds. During this time, the players are able to create an immediate shooting situation in both disciplines in 1-on-1, from the relationship of two (2-on-2, on-ball screen) or three offensive players (3-on-3).

Based on the results of the occurrence of tactical elements, I found differences in the frequency of the Shot after 1-on-1, the on-ball screen (2-on-2), 1-on-1+Assist, 2-on-2+Assist and Triangle elements between the two disciplines. In the 3x3 discipline, the rate of Shots following 1-on-1 occurred in a larger number on average than in 5v5. On the contrary, in the 5v5 discipline, the shot attempts made after on-ball screen against 2-on-2 were more dominant.

In addition, there were differences between several tactical elements in the comparison. In 1-on-1+Assist, 2-on-2+Assist, and the relationship between the three offensive players, the Triangle tactical elements occurred in a higher proportion in 5v5. I found no significant difference in the frequency of offensive tactical elements Drive, Post, Cut, and Off-Ball Screen between the two majors. The 1-on-1 Drive and close-range shot attempts were approximately one in five attacking tactics in both disciplines for all tactics. In 5v5, Drive, when the attacking player does not end the action with a shot attempt but passes to the teammate in a shooting position (Drive turns into 1:1+Assist), occurred approximately 25% of the time as the end of attacks. Thus, these two tactical elements in total approached 43% of all tactical elements performed before the shooting attempt. Considering the occurrence of Post and Shot tactical elements, it can be established that 59.2% of the attacks ended after the 1:1 tactical element in 5v5. In 3x3, the same ratio is 66.2%, but the offensive tactical elements resulting from 1-on-1 appeared in a different distribution. Here, the Shot tactical element stood out in the mirror of the proportions, Drive and Post to a similar extent, while 1-on-1+Assist appeared in smaller numbers than in 5v5.

Even though in both disciplines, the game against the defense is often based on Off-Ball Screens (blocking without the ball), their low shot-attempt rate is surprising. Overall, it can be concluded that 1-on-1 tactical elements appeared to a greater extent in both disciplines compared to 2-on-2 or 3-on-3 tactical elements. In addition, the results also show that in 3x3 there is a higher rate of shot attempts from 1-on-1 than in 5v5.

Based on the results, there was only a difference between the two disciplines in the effectiveness of on-ball screen. In the 5v5 discipline, this offensive tactical element is implemented more effectively. I found no difference in the efficiency of offensive tactical elements Drive, Post, Shot, Cut, and Off-Ball Screen. The success of 2-on-2+Assist and Triangle could not be compared due to the number of elements.

In the case of the offensive technical elements, in relation to the correlation between frequency and efficiency, it can be stated that more frequent on-ball screens proved to be a more effective tactical element in 5v5. On the other hand, the shot attempt resulting from 1-on-1 found in 3x3 is dominant, not coupled with more effective execution compared to 5v5. There was no difference between the frequency and effectiveness of the other offensive tactical elements in terms of the proportions of the tactical elements performed before all shooting attempts. However, in 3x3, the Shot tactical element showed a higher number of shot attempts compared to all tactical elements, despite this there is no difference in efficiency. Although this also can be said in 5v5, in the case of more common 1:1+Assist, there is no difference in the efficiency of the two disciplines. Based on the results, hypothesis 5 was partially confirmed, 1-on-1 offensive tactical elements were more frequent in 3x3, but not more effective than in 5v5.

Variations of on-ball screen defense in 5v5: switch, break, slide, deflect, trap, weak assist, strong assist, and switch back. The application of these variants depends on the strategy and tactics of the defenders and attackers, as well as the individual skills of the attacking and defending players. Coaches must decide against which attackers, and which version can be more effective. In terms of technical execution, switching is the easiest way to immediately defend the on-ball screen. It is easier for the defenders to ensure their position between the offensive players and the rim. It does not require full team defense, in this case, the role of other defenders may be reduced. Nevertheless, it is not the most effective defensive tactic due to the mismatch situation. In the comparison of the two disciplines, I found no significant difference in their occurrence regarding the

defense of all on-ball screens. The results show that the most commonly used on-ball screen defense in both disciplines is the switching, so its dominance plays a decisive role in the defensive tactics of the teams of both disciplines. Based on the results, hypothesis 6 was not confirmed, there is no significant difference between the two disciplines in the ratio of switching as an on-ball-screen defensive tactic.

## **SUMMARY**

### **The most important new results of the thesis**

In basketball, game situations constantly change, requiring players to make appropriate decisions for success. If the information and environmental factors needed for these decisions (like the court, number of players, rules, and game intensity, the point value of each shot) change from what players are accustomed to, it's conceivable that players might make different decisions in the "same" situation than they would have before the change.

The statistical data recording and video analysis of the 5v5 and 3x3 world championship games, as well as the examination methods, corresponded to the parameters of comparing two disciplines. It was possible to calculate their shooting efficiency, shot selection, the frequency of using offensive tactical and technical elements, as well as the occurrence of defensive tactical elements. Separately, the offensive effectiveness of 5v5 and 3x3 could be determined by the collected data, but in terms of their comparison, they were not suitable due to the different rules. Therefore, as a novelty of the dissertation, the creation of the relative offensive value formula was used as a new method, which made the offensive effectiveness of the two disciplines fully comparable.

The results showed a significant difference in the selection of long-distance shots relative to all shot attempts. In 3x3, players opt for long-distance shots more frequently, despite their lower efficiency compared to 5v5. By calculating relative offensive value, it can be stated that 5v5 has better offensive efficiency. The higher intensity of 3x3, due to the smaller number of players, results in more frequent game interventions and creates approximately three times as many decision-making situations with the ball. Consequently, players make decisions more often and apply ball-handling technical

elements more frequently. In defence, there was no significant difference in the use of the switching tactic between the two disciplines.

In conclusion, players behave differently in certain "identical" decision-making situations in 5v5 and 3x3. In 3x3, the difference in the value ratio of shots encourages players to opt for long-distance shots more. In the previously established higher intensity environment, during a game, players must make decisions more frequently, and execute ball-handling technical elements more often, and 1-on-1 defence demands greater responsibility. 5v5 coaches, in the interest of effective practice, often create a match environment for players during training sessions using SSGs. Therefore, the results and conclusions of this thesis clearly show that the application of 3x3 basketball in 5v5 training can contribute to the simultaneous, complex development of players' physical, tactical, and technical skills. The 3x3 as a separate discipline also provides an opportunity for skill development for 5v5 basketball players, acting as an SSG variant of the game.

## **LIST OF OWN PUBLICATIONS**

### **Publication published on the topic of the dissertation:**

- Boros Z, Sterbenz T. (2017) Középjátékosok, centerek távoli dobásainak jelentősége, avagy ma már mindenkinek van hárompontos dobáskísérlete a kosárlabdában, *Testnevelés Sport, Tudomány*, 2(3), 18-28. DOI:10.21846/TST.2017.3.2
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**List of own publications unrelated to the topic**

Vuckovic I, Gadzic A, Sekulić Z, Mikic M, Boros Z, Stojanovic M. (2024) Reaction time and defensive sliding test versus T-test: which is better? *Revista Brasileira De Medicina Do Esporte* (1517-8692 1806-9940): 30 2 Paper e2022\_0684. [https://doi.org/10.1590/1517-8692202430022022\\_0684i](https://doi.org/10.1590/1517-8692202430022022_0684i)