

COMPARISON OF INSTEP KICKING BY NON-PREFERRED LEG AMONG VARIOUS STATES AND INTENSITIES IN YOUNG FOOTBALL PLAYERS

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Abstract

This research was aimed at gaining relevant knowledge about important differences with respect to compare accuracy of instep kicking by non-preferred leg depending on the different intensity (optimal and maximal) in a resting state, and in a state of fatigue. The sample included 20 respondents whose characteristics were: age (yrs) 16.7 ± 0.47 , height (cm) 178.91 ± 4.26 , and body weight (kg) 71.52 ± 5.13 . The sample of variables contained four measures that defined accuracy of instep kicking by preferred leg in various occasions: with optimal and maximal intensities and in a resting state and a state of fatigue respectively. The results of the measuring were analyzed by means of a statistical procedure labeled a significance test of two arithmetic means conducted on independent samples or popularly known a t-test. Based on the results it was affirmed that significant differences occur in the case of almost all the variables as it was expected and it was concluded that various intensities affect, while various states don't affect the accuracy of instep kicking by non-preferred leg at a significance level of $p = .05$.

Key words: accuracy, soccer, intensity, resting state, state of fatigue

Introduction

Football is the most popular sport in the world (Lees and Nolan, 1998) which involves powerful movements such as running, cutting, and kicking. It is generally known that the football kicking is the main offensive action during the game (Kellis, & Katis, 2007) and many studies are focused on this important component (Barfield et al. 2002; Dorge et al. 2002; Nunome et al. 2002; Shan, & Westerhoff, 2005; Bjelica, 2008, Scurr, & Hall, 2009; Bjelica et al. 2011). Because of the reason that team with more kicks right on the target has better chances to score and win a match, kicking accuracy is an important component of football performance and the improvement of kicking technique is one of the most important goals of training programs in young footballers (Finnoft et al. 2002). Therefore, the aim of the present study was to compare accuracy of instep kicking by non-preferred leg depending on the different intensity (optimal and maximal) in a resting state, and in a state of fatigue and explore a new perspective of this important component of football.

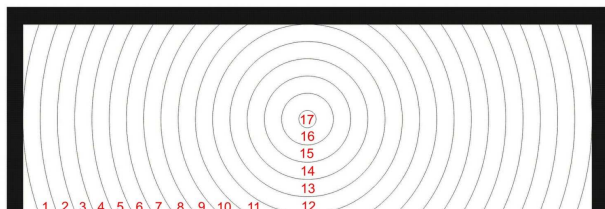
Methods

Twenty football players from the junior premier league volunteered to be subjects. The players' characteristics were: age (yrs) 16.7 ± 0.47 , height (cm) 178.91 ± 4.26 , and body weight (kg) 71.52 ± 5.13 . The criteria for selecting footballers for the sample were as follows: having a good health condition, then being a member of the team in the club for seven year at least and being under the supervision of qualified coaches all the time. For the data collecting, it was used a valid and reliable method for measuring the accuracy of instep kicking (Bjelica, 2008).

It was conducted outdoors on a natural football pitch and all subjects wore their own shorts, t-shirt and football shoes. Following a warm up, stretching exercises and familiarization trials subjects were asked to shoot on target from the distance of 20 meters with non-preferred leg within four occasions: with optimal and maximal intensities and in a resting state (The respondents had to shoot only if their heart rate is under 90 bpm) and a state of fatigue (The respondents had to shoot as soon as they do ten squats) respectively and we defined four different variables: OR (shoot with optimal intensity in a resting state), OF (shoot with optimal intensity in a state of fatigue), MR (shoot with maximal intensity in a resting state), MF (shoot with maximal intensity in a state of fatigue).

Subjects kicked a total of ten shoots, using a standard size ball, at an outlined target on a steady vertical surface in standard dimensions (7.32 x 2.44 m). The centre of the target (Picture 1.) was marked with a cross lines which divided the target to four equal rectangles. From the central point it was drawn many concentric circles and the first one had the same diameter as a standard ball (22.1 cm). All other circles were outlined with their mutual space between of a size of a standard ball diameter. The central circle brought 17 points, which was a maximal number of points for one shoot, whereas peripheral circles on the left and right brought one point. It means that every shoot closer to center brought the larger number of points, while every failure was identified by zero points. The data obtained in the research were processed using the application statistics program SPŠ 15.0 adjusted for the use on personal computers.

Descriptive statistics were the first calculated, and then it was determined whether there was significance with respect to the difference between the mean in every variable recreationally, which was done testing the difference between the mean of independent samples, using the popularly known, t-test which was set at $p < 0.05$. The analysis provided the answers to the question of whether there was and how prominent was the difference between instep kicking by non-preferred leg among various states and intensities in young football players.



Picture 1. The target

Results

This section offers the results of the descriptive statistics, as well as the results of discriminative analysis classified into two tables and six graphs. The first table, in the first three columns contains the means (M), the standard deviations (SD) and the standard errors (SE), as well as minimum (Min) and maximum (Max), range (R), Skewness (Sk.) and Kurtosis (Ku.).

Table 1. Descriptive statistics

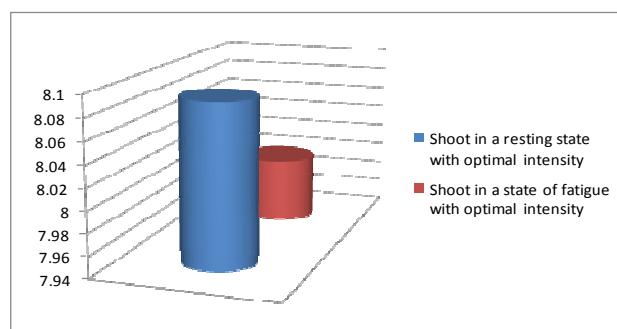
	M	SD	SE	Min	Max	R	Sk.	Ku.
Age (yrs)	16.70	0.47	0.10	16.0	17.00	1.0	-0.94	-1.24
Height (cm)	178.91	4.26	0.95	171.5	188.60	17.1	0.31	0.42
Weight (kg)	71.52	5.13	1.15	64.0	84.00	20.0	0.59	0.24
OR	8.09	0.33	4.60	0.0	17.00	17.0	-0.20	-0.88
OF	8.00	0.37	5.28	0.0	17.00	17.0	-0.34	-1.29
MR	4.94	0.38	5.30	0.0	16.00	16.0	0.59	-1.11
MF	5.97	0.37	5.18	0.0	17.00	17.0	0.13	-1.44

The second table shows the result of independent t-test and it is presented through cross tabular scheme at a significance level of $p = .05$.

Table 2. Independent t-test

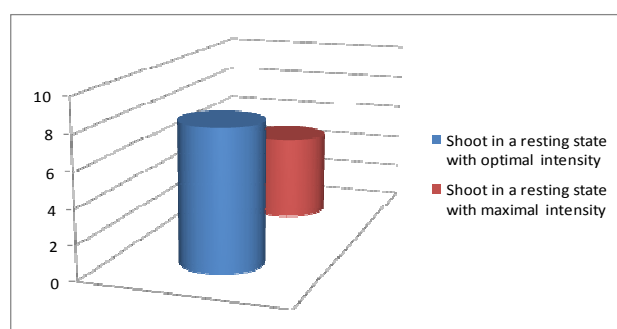
vs.	OR	OF	MR
OF	0.2		
MR	6.04*	-6.21*	
MF	4.46*	4.03*	-1.92
* $p < 0.05$			

The first graph shows the differences of instep kicking by non-preferred leg among a shoot in a resting state with optimal intensity and a shoot in a state of fatigue with optimal intensity. The value of this comparison is 0.20 and it means that there is no significant difference between these two variables at a significance level of $p = .05$. The second graph shows the differences of instep kicking by non-preferred leg among a shoot in a resting state with optimal intensity and a shoot in a resting state with maximal intensity.



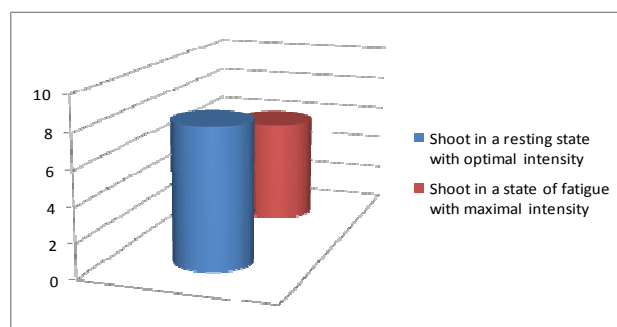
Graph 1. Comparison of instep kicking by non-preferred leg among a shoot in a resting state with optimal intensity and a shoot in a state of fatigue with optimal intensity

The value of this comparison is 6.04 and it means that there is significant difference between these two variables at a significance level of $p = .05$.



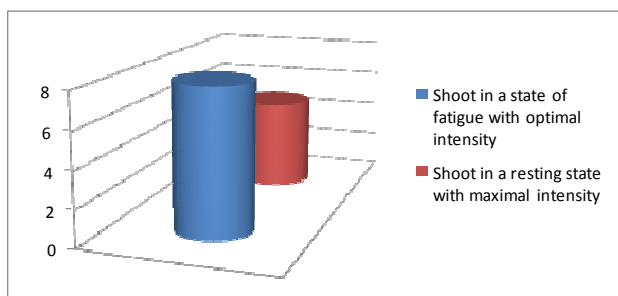
Graph 2. Comparison of instep kicking by non-preferred leg among a shoot in a resting state with optimal intensity and a shoot in a resting state with maximal intensity

The third graph shows the differences of instep kicking by non-preferred leg among a shoot in a resting state with optimal intensity and a shoot in a state of fatigue with maximal intensity. The value of this comparison is 4.46 and it means that there is significant difference between these two variables at a significance level of $p = .05$.

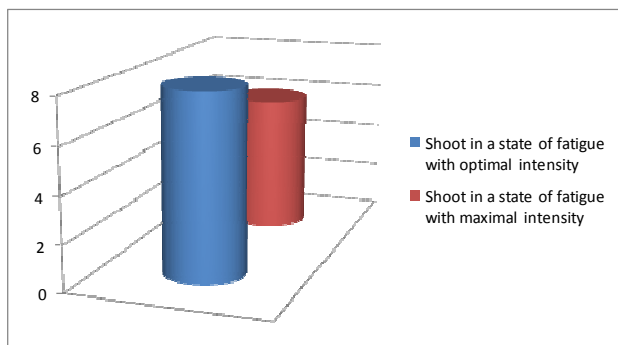


Graph 3. Comparison of instep kicking by non-preferred leg among a shoot in a resting state with optimal intensity and a shoot in a state of fatigue with maximal intensity

The fourth graph shows the differences of instep kicking by non-preferred leg among a state of fatigue with optimal intensity and a shoot in a resting state with maximal intensity. The value of this comparison is -6.21 and it means that there is significant difference between these two variables at a significance level of $p = .05$.



Graph 4. Comparison of instep kicking by non-preferred leg among a shoot in a state of fatigue - optimal intensity and a shoot in a resting state with maximal intensity



Graph 5. Comparison of instep kicking by non-preferred leg among a shoot in a state of fatigue - optimal intensity and a shoot in a state of fatigue with maximal intensity

The fifth graph shows the differences of instep kicking by preferred leg among a shoot in a state of fatigue with optimal intensity and a shoot in a state of fatigue with maximal intensity. The value of this comparison is 4.03 and it means that there is significant difference between these two variables at a significance level of $p=.05$. The sixth graph shows the differences of instep kicking by non-preferred leg among a shoot in a resting state with maximal intensity and a shoot in a state of fatigue with maximal intensity. The value of this comparison is -1.92 and it means that there is no significant difference between these two variables at a significance level of $p=.05$.

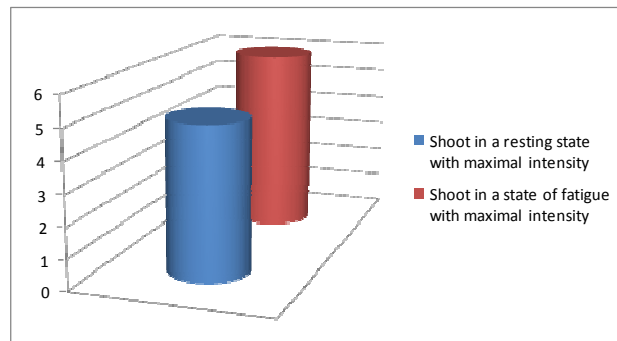
Discussion and conclusion

According to Scurr, and Hall (2009), the instep kicking has been subject to the majority of biomechanical analysis (Barfield et al. 2002; Dorge, 2002; Nunome, 2002; Shan, & Westerhoff, 2005).

Literature

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But there weren't too many studies which compare the accuracy of instep kicking (Bjelica, 2008, Bjelica et al. 2011), as well as there is no previous studies which investigate the accuracy of instep kicking by non-preferred leg depending on the different intensity (optimal and maximal) in a resting state, and in a state of fatigue.



Graph 6. Comparison of instep kicking by non-preferred leg among a shoot in a resting state - maximal intensity and a shoot in a state of fatigue with maximal intensity

It means that is not possible to discuss if there were *similar* findings or not in the *previous studies*. According to result of this study which were collected by testing 20 representative young footballers who had to shoot on target with non-preferred leg within four occasions: with optimal and maximal intensities and in a resting state and a state of fatigue respectively, it is concluded following:

- 1) The respondents showed better result when they do the test for the evaluating the accuracy with optimal intensity versus maximal intensity. The differences between the means were statistically significant in the resting state as well as in the state of fatigue;
- 2) When we compared the accuracy of non-preferred leg with optimal intensity depending of the state, the respondents showed better result in the resting state versus the state of fatigue, and we didn't find the statistically significant difference between the means, and
- 3) When we compared the accuracy of non-preferred leg with maximal intensity depending of the state, the respondents showed better result in the resting state versus the state of fatigue, but we didn't find the statistically significant difference between the means.

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USPOREDBA UDARACA UNUTRAŠNJOM STRANOM HRPTA STOPALA NEPROTEŽIRANOM NOGOM U ZAVISNOSTI OD STANJA ZAMORA I INTENZITETA RADA MLADIH NOGOMETAŠA

Sažetak

Cilj ovog istraživanja je dobivanje relevantnih znanja o značajnim razlikama kada je u pitanju usporedba udaraca unutrašnjom stranom hrpta stopala neprotežiranom nogom u zavisnosti od stanja zamora i intenziteta rada mladih nogometaša. Uzorak ispitanika je obuhvatio 20 ispitanika čije su karakteristike bile slijedeće: godine (god) 16.7 ± 0.47 , visina (cm) 178.91 ± 4.26 , i težina (kg) 71.52 ± 5.13 . Uzorak varijabli je sadržavao četiri varijable koje su definirale točnost udaraca unutrašnjom stranom hrpta stopala neprotežiranom nogom u različitim uvjetima: optimalnim i maksimalnim intenzitetom, i u odmornom stanju i u stanju zamora naizmjenično. Rezultati mjerenja su analizirani statističkom procedurom označenom kao testiranje značajnosti dvije aritmetičke sredine na nezavisnim uzorcima ili popularno, t-testom. Na osnovu dobijenih rezultata zaključeno je da se značajne razlike pojavljuju kod većine varijabli kao što je i očekivano i zaključeno je da različiti intenziteti rada utječu, dok različita stanja zamorenosti ne utječu na točnost udaraca unutrašnjom stranom hrpta stopala neprotežiranom nogom na razini značajnosti $p = .05$.

Ključne riječi: točnost, nogomet, intenzitet, odmorno stanje, stanje zamora

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