

## The Effects of Accute Fatigue on Football Players' Left and Right Shots Deflection Ratio

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**Abstract:** This study was performed on the under armour elite football players, with an age range of 14-18, in order to determine whether the players' fatigue status during the match has caused any deflection on the shots that hit and miss the target towards left and right. 30 right-footed and 30 left-footed and in total 60 SamsunSpor licensed players were participated to this study. After a 20-minute warm-up and post-training, football players had shot 10 penalties to the target and during that measurements were taken. The measurements taken after the warm-up were compared to the after training measurements. Comparison of the difference between the measurements was performed using the SPSS. Measurement results are presented as mean and standard deviation. Binomial test was used to compare the groups ( $p < 0,05$ ). It was determined in this study that the shots to the right and left which hits the target, the right dominant players' shots' right side deflection statistically inclined to be higher ( $p < .05$ ). It was seen that left dominant players' shots were statistically no meaningful. In conclusion, it was considered that the deviation occurred during the shots to the target were due to the exhaustion. During the game, the fatigue causes deflection on the shots and right-footed soccer players seen as a tendency to slide toward the right because of dominance effect. We suggest that coaches would get the correct display of managerial behavior according to findings. Still, very repetitive and very similar-subject studies are needed.

**Key words:** Football player • Shooting • Fatigue

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### INTRODUCTION

Fatigue is classically defined as a reduction in the capacity of skeletal muscle to generate force or power [1, 2]. Fatigue may occur in the human body, muscle or muscle group as a result of the loss of the effectiveness of some or all of the different mechanisms of neuromuscular. It has emphasized that voluntary muscle contractility fatigue caused by the motor nerves that contained in motor unit which transmits nervous warnings, the motor endplate that motor nerve muscle fiber transmits the warning neural, the mechanism which generates force and the inadequacies in the central nervous system that responsible for sending nerve stimulation [3].

One of the most important cause of physical activity related fatigue in a lot of sports branches is the repetitive contractions caused by maximal intensity sprint, jump and change direction movements during the match. It was thought that trainings that based on the motion pattern of

the actual match may cause muscle damage and this may cause performance degradation and therefore may lead to long term fatigue [4].

Cerebral lateralization means morphological and functional differences between the two hemispheres of the brain. Handedness is regarded as a functional cerebral laterality [5]. It is considered that on both sides human brain typically contains regions that are different in size. Left brain manages right hands; right brain manages left hands [6].

Then, left brain is dominant in right handeds; right brain is dominant in left handeds. Therefore, it can easily be said that the right-brain skills in the left handeds superior to the right handeds and the left -brain skills in the right handeds superior to the left handeds. Yakovlev *et al* determined that the pyramidal fiber numbers came to alpha motor neurons with regard to the right hand were higher than the pyramidal fiber numbers that came to alpha motor neurons with regard to the left hand [7].

According to the recovery curves that belonged to Hoffman Reflex that acquired when Gastrocnemiussoleus nerve stimulated on the left and the right side it was shown that for the right handed left recovery curve higher compared to the right; for the left handed right recovery curve higher compared to the left. For ambidextrous group, after spinalization on both sides dominance did not change for the first two groups but it in the last group right or left dominance occurred [8].

This study was performed on the under armour elite football players, with an age range of 14-18, in order to determine whether the players' fatigue status during the match has caused any deflection on the shots that hit and miss the target towards left and right.

**MATERIALS AND METHODS**

For this study from Samsunspor's under armour elite players 30 right and 30 left foot dominant, in total 60, players who were 14-18 years old and at least two years of training experience participated voluntarily. The subjects were measured after filling out and signing the voluntary participation information form.

General and private warm-ups were done for 20 minutes to the participating players. Players made 20 penalty shots from penalty point using the technique of top of the foot kick shot after warm-up, before and after the training. 10 cm wide target above the goal line was identified as a target. To avoid throwing players to relax moderate jogging was applied. In this study the penalty shots were recorded with the camera and then the camera records inspected and the numerical values were obtained. In order to determine whether there was a normal distribution of the data One-Sample Kolmogorov-Smirnov test was tested. It was found that there was no normal distribution of the data and the SPSS program was used for the statistical analysis of the data. Binomial test was used to compare the groups and P <0.05 was considered significant.

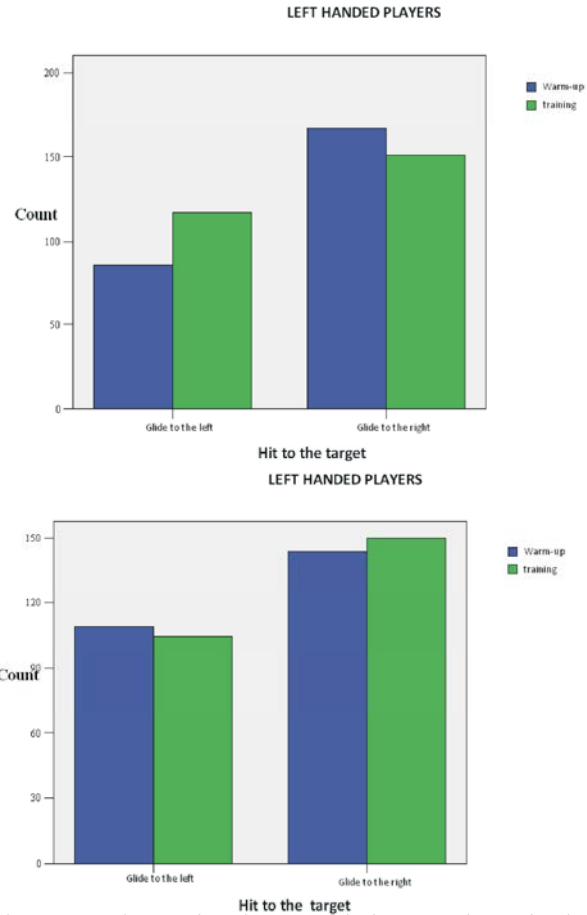


Fig. 1: Service Direction Deviation Ratio of the participating subjects after 1. and 2. Measurements.

**Findings:** It was determined in this study that the shots to the target, the right dominant players' shots' right side deflection statistically inclined to be higher (p <.05). This shows that the dominant side shows more resistance to the influence of fatigue. For this reason, after the fatigue occurred and until it reaches to higher point dominant side comes to forefront for the players.

Table 1: Deviation Ratios of Service Directions for the subjects participating in the study

		Number of Hits	%	p		
Left foot players	Hit the left	Warm-up	85	42	0.029*	
		Training	117	58		
	Total shots	202	100			
	Hit the right	Warm-up	167	53		0.400
		Training	151	47		
	Total shots	318	100			
Right foot players	Hit the left	Warm-up	109	51	0.838	
		Training	105	49		
	Total shots	214	100			
	Hit the right	Warm-up	144	49		0.771
		Training	150	51		
	Total shots	294	100			

## DISCUSSION AND CONCLUSION

This study was performed on the under armour elite football players, with an age range of 14-18, in order to determine whether the players' fatigue status during the match has caused any deflection on the shots that hit and miss the target towards left and right.

When the literature data analyzed, according to the study of Dangelmaier and Coward it was found out that after 50 dunks women volleyball players', towards the end and due to fatigue, motion segments slowed, the size of their movements narrowed, the movement angles changed and the movement wideness reduced. The ball speed and hitting accuracy were dropped. These changes can lead to errors in the match. It was also determined that the fatigue occurred during the match changed the performance of Volleyball players [9].

Börklü, P300's evaluation brings forward an objective and quantitative approach for higher brain function evaluation. P300, because it is determiner of the function of neural cognitive has been studied intensely from psycho physiological aspects. Several researchers reported that P300 formed as a determiner of decision-making, as symptom of ambiguities and as a result of the fulfillment of the task. How hormones affect the brain is not yet known [10]. Geschwind and Behan reported that gyruses and occipital sulcus appears right hemisphere earlier than the left. According to Geschwind testosterone hormone has a depressant effect on the left hemisphere. This hormone in fetal life causes delays in the growth of the left hemisphere and causes the dominance to shift to the right hemisphere [11].

Kolb and his friends found that left and right frontal operculum is organized in a different way, visible area on the surface of the brain is 1/3 bigger right on the right and the area that sulcus buried deep is wider on the left. This asymmetry reflects the asymmetry of the frontal operculum functional. Probably, the left side participates in the production of grammar in the language; right side affects the tone of the sound. Again, Kolb and his friends determined that the right hemisphere extends more towards the front, while the left hemisphere extends further towards to rear. They saw lateral horns of lateral ventricles in the occipital area were five times longer [12]. Scheibel reported that the dendritic tree in Broca's area being shaped in a few years after birth and the right side matured earlier [12]. In the study of Polich and Lardon that investigated the effects of physical exercise to P300 visual and audio oddball the paradigm was used. As a result, it was found out that with increasing frequency and severity of exercise P300 amplitude increased [13].

When the studies in this area compared with the findings, similarities and differences were observed. According to Ziyagil's [14] study the average time of different rounds of the game depended on the laterality factor that showed changing trends. First, second, eighth in the final round, the right and left hand techniques the average time to close to each other, while other tours the average duration of time decreased when the techniques committed from right, the average duration of time increased when the techniques committed from left. Depending on the rate of recovery it was stated that until third and fourth place running game the use of the techniques from right came forward. It was reported that in Third and fourth place running game and in the final competition the use of the left side increased.

Also Ziyagil reported that the average technical scores that taken according to the left and right laterality continued until semi-finals but after that round changes happened in favor of the left laterality. According to the explanations above, it could be claimed that due to fatigue caused by intensive use of the dominant party, for the purpose of recovery, in the progressive tours and in technical applications putting the left side forward provides resting but our study showed that forward until the athletes reached to high fatigue level they brought forward their dominant parts and they also inclined to their more powerful side. This might be due to the fact that the athletes tired and they did not want to take the risk. Psychological factors may be involved because of the effect of fatigue.

P300 wave shifting to a more frontal bone with increasing age. Picton and friends stated that P300 amplitude is highest in teenagers in the central regions compared to frontal-parietal regions and for elderly there were equal amplitude in all these areas. It was reported that by aging reduction happened in the amplitude of the P300 in the vertex [15].

As a result, it was seen that the effect of fatigue had influence on the service shots thrown the target and factor of fatigue caused by right-handed players to shot towards the right dominant side during the game. This result shows that depending on the fatigue the dominant hemispheres and laterite influences the right handed players' right side deviation ratio.

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