

Assessment of Visual Skills Impact on Motor Performance of Soccer Players in Ethiopian Youth Sport Academy

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Abstract

The purpose of the study was to assess the impact of visual skills on motor performance of soccer players in Ethiopian youth sport academy. Cross-sectional study design was employed and 62 subjects (28 male and 34 female) were participated using purposive and availability sampling methods. The primary sources of data such as demographic characteristics, the visual skill tests and motor performance were measured. The results presented as mean \pm SD, and Frequency proportions were used to show the visual skill status. A Multivariate Roy's Largest Root Tests was used to examine the impacts of visual skills on motor performance and one way ANOVA was used to show the difference of visual skills and motor performance in playing positions. Whereas, Pearson product moment correlation coefficient was used to test the relationship between visual skills and motor performances. SPSS version 20 software was used to analyze the data and the significance values set at p-value 0.05 levels to all statistical analysis. The result indicates that 26(42%) of players had no color blindness, 32(52%) had some degree of color blindness and 4(6%) of them had weak color blindness status. There was significant differences of eye foot coordination test between playing position in score of $F = 3.669, P < 0.05 (0.017)$. Color blindness has a positive significant correlation with motor performance in reaction time ($r = 0.343, r^2 = 0.1176, P < 0.01$). Based on the result the researcher concluded that there was significant difference in eye foot coordination between playing positions. Color blindness significantly and positively correlated with motor performance to reaction time. And also visual acuity significantly and positively correlated with motor performance to eye hand coordination.

Key words: Motor, Performance, Soccer, Visual skills

INTRODUCTION

Vision involves two basic categories of function: visual motor and visual perceptual skill. Visual motor skill is probably the easiest category to relate to sport-specific performance. If athletes cannot move their eyes quickly and effectively, they cannot perform sport-specific tasks optimally. In any position of any sport, vision provides the athlete with information regarding where, when and what to do the ability to quickly and correctly process visual information; regardless of physical strength, speed, and technical skill of an individual. It is estimated that 85–90% of sensory information regarding the external environment is obtained visually (1).

The vast majority of studies reported that developed visual skills (or sports vision) would play

a positive role in sports performance (2,3,4,5). Improvements in the athlete's visual skills can lead to quicker decision making and faster motor response. ⁶ Thus, an advanced visual skills set is likely to have a positive effect on athletes' performance in many different sports (5).

Coordination is the ability to repeatedly execute a sequence of movements smoothly and accurately. This may involve the senses, muscular contractions and joint movements. Everything that we participate in requires the ability to coordinate our limbs to achieve a successful outcome from walking to the more complex movements of athletic events like the pole vault. All sports require the coordination of eyes, hands and or feet and may be an implement and a ball. Racket sports (e.g. tennis and squash) require the coordination of hand, eyes and

racket to connect the rackets with the incoming ball as well as position our body in an appropriate position to return the ball in an efficient and effective manner. Hockey requires the coordination of hands, eyes and hockey sticks to connect with the ball. Football primarily requires the coordination of feet, eyes and ball and Rugby the coordination of hands, eyes and ball (7).

Few studies conducted about visual skills done in soccer refer to goalkeepers, (8,9,10) and other study conducted the visual skill of outfield players focused on childes rather than elite players (11) Those studies were deal with perceptual skills, eye-foot coordination or reaction time instead of visual skills (12,13,14,15). Some other studies conducted on elite soccer players, investigated visual search (eye movement) instead of visual skills (16,17) But, study was not conducted regarding visual skills impact on motor performance of youth soccer players, and not computed with playing position, furthermore, study had not been conducted so far on the subject in Ethiopia. Therefore, the purpose of the study was to assess the impact of visual skills on motor performance of soccer players in Ethiopian youth sport academy. Furthermore, this study was also aimed to compare impact of visual skills on motor performance in different sex, age groups and playing positions.

MATERIALS AND METHODOLOGY

The study was takes place on Ethiopian youth sport academy, which is found in the capital of Ethiopia (Addis Ababa). Cross-sectional study design had been involved to assess the visual skills impact on motor performance of soccer players in Ethiopian youth sport academy; using a range of participants with different backgrounds, age group, sex and playing position.

Purposive and availability sampling techniques were employed. Based on the nature the game which need to identify the teammate and needs the coordinative ability football game was selected using purposive sampling technique and based on the availability sampling method 62 junior soccer players were participated in the current study.

The primary source of data was used because of the nature of the problem. The primary data such as demographic characteristics (age group, sex, and playing position), the visual skill tests (visual acuity and color vision) and motor performance (eye hand

coordination, eye foot coordination and reaction time) of the players were measured.

Quantitative data was collected through the appropriate demography test (age group, sex, and playing position) to know the demographic characteristics of the study participant.

The visual skill tests (visual acuity, and color vision) were used to assess the visual skill of the players. Visual acuity was assessed using Snellen VA chart at a test distance of six (6) meters obtained by Buys and Ferreira¹⁸ for athletes. The color vision test was assessed with the pseudo-isochromatic Ishihara plates, which are most useful for detection of red-green congenital anomalies. Subjects were asked to seat in a room with sufficient light and read the chart keeping it 33cm away from the eyes. Then the types of color blindness will be differentiated and categorized. For absolute judgment only about 30 colours can be identified reliably (19).

The motor performance of the players (eye hand coordination, eye foot coordination and reaction time) was measured to examine the impacts of visual skill on motor performance of the players. Eye hand coordination test objective is to monitor the ability of the athlete's vision system to coordinate the information received through the eyes to control, guide, and direct the hands in the accomplishment of catching a ball (hand-eye coordination and eye foot coordination). Reaction Time assessed using the Yardstick test is an established test for measuring reaction time.²⁰ To ensure the data quality, only standardized tests was used and to minimize the mistake replication method was used by the researcher.

Descriptive statistics was produced for each of the parameters. The results were presented as mean \pm SD, and Frequency proportions. Multivariate Roy's Largest Root Tests was used to examine the impacts of visual skills on motor performance and ANOVA was used to see the difference of visual skills and motor performance in playing positions. Whereas, Pearson product moment correlation coefficient was used to test the relationship between visual skills and motor performance. The significance level was set at 0.05 levels for each of the statistical tests. SPSS 20 software was used for the statistical analysis.

Results

Demographic Characteristic of the respondents: The sex distribution of the study participants shown that 28(45%) were male and 34(55%) were female. To this effects, it was been female subjects have larger number than male subjects. The players age group/team distribution on this study was shown that 28(45%) were U15 and 34(55%) were U17. The out puts of player playing position demonstrates that 5(8%), 21(34%), 28(4%), and 8(13%) were goalkeepers, defense, midfield and striker respectively.

Visual Skill and Motor performance of the Players

Players color blindness status: The result can show that 26(42%) of players had no color blindness, 32(52%) had some degree of color blindness and 4(6%) of them had weak color blindness status. The largest number of players found under the status of some degree of color blindness. While, few were under the weak degree of identifying the red green colors.

Players visual acuity status: The result can shows that the players right eye visual acuity results 4 (6.50%) players were scored 6/18, 2 (3.20%) players were scored 6/12, 10 (16.10%) players were scored 6/9 and 46(74.20%) players were scored 6/6. The left eye visual acuity result indicated that 3 (4.80%) players were scored 6/18, 8(12.90%) players were scored 6/12, 5(8.10%) players were scored 6/9 and

46(74.20%) players were scored 6/6. And also both eye visual acuity result 3(4.80%) players were scored 6/12, 8(12.90%) players were scored 6/9 and 51(82.30%) players were scored 6/6. This can show that the majority players had normal visual acuity status in right, left and both eyes.

Players eye hands coordination status: The result can shows that 2(3%) of the players were scored above average, 2(3%) were scored average, 17(28%) of the players were scored below average and 41(66%) of the players were score low score. From the result we can understand that more than half of the players had low performance in eye hands coordination.

Players eye foot coordination status: The result can shows that 1(1.5%) was scored above average, 55(89%) of the players were scored average, 5(8%) of the players were scored below average and 1(1.5%) was scored low. From the result we can understand that more than half of the players perform average in eye foot coordination.

Players reaction time status: The result can shows that 12(20%) of the players were scored excellent, 33(53%) of the players were scored above average, 12(19%) of the players were scored average, and 5(8%) of the players were scored below average. From the result we understand that half of the players perform above average in reaction time.

Table: 1. Effect of visual skills on motor performance status

Multivariate Roy's Largest Root Tests ^a					
Effect	Value	F	Hypothesis df	Error df	Sig.
Correct Model	16.807	296.917 ^b	3.000	53.000	0.000
Color Blindness	0.078	1.400 ^c	3.000	54.000	0.253
Visual Acuity	0.117	2.100 ^c	3.000	54.000	0.111
Color Blindness * Visual Acuity	0.049	.881 ^c	3.000	54.000	0.457

a. Design: Intercept + Color Blindness + Visual Acuity + Color Blindness * Visual Acuity
 b. Exact statistic
 c. The statistic is an upper bound on F that yields a lower bound on the significance level.

The multivariate Roy's Largest Root test summary table for the split effect visual skill on motor performance is shown in table 1. The color blindness status of the players were insignificantly different from the correct model $P > 0.253$, similarly the visual acuity was insignificantly different from the correct model $P > 0.111$, and also insignificant difference

were observed between both color blindness and visual acuity on motor performance at $p > 0.457$.

The result indicated that, disagreement both color blindness and visual acuity, exercising independently and in group couldn't bring significant change on players motor performance.

Table: 2. Visual skills and motor performance differences

		ANOVA in Playing Position				
		Sum of Squares	df	Mean Square	F	Sig.
Color Blindness Test	Between Groups	0.529	3	0.176	0.472	0.703
	Within Groups	21.664	58	0.374		
	Total	22.194	61			
Visual Acuity Test	Between Groups	0.478	3	0.159	0.565	0.640
	Within Groups	16.361	58	0.282		
	Total	16.839	61			
Eye Hands Coordination	Between Groups	2.367	3	0.789	1.585	0.203
	Within Groups	28.875	58	0.498		
	Total	31.242	61			
Eye Foot Coordination	Between Groups	1031.331	3	343.777	3.669	0.017
	Within Groups	5434.218	58	93.693		
	Total	6465.548	61			
Reaction Time	Between Groups	0.742	3	0.247	0.344	0.793
	Within Groups	41.645	58	0.718		
	Total	42.387	61			

As illustrated in table 2, the ANOVA revealed that there was no significant differences of color blindness test between playing position in score of $F = 0.472$, $P > 0.05$, visual acuity test between playing position in score of $F = 0.640$, $P > 0.05$, eye hands coordination test between playing position in score of $F = 1.585$, $P > 0.05$ and reaction time test between playing position in score of $F = 0.344$, $P > 0.05$

whereas, there was significant differences of eye foot coordination test between playing position in score of $F = 3.669$, $P < 0.05$ (0.017).

From the aforementioned result we can easily understand that there was no difference between the playing positions in color blindness, visual acuity, eye hand coordination and reaction time tests, while there was significant difference between the playing positions in eye foot coordination tests.

Table: 3. Relationship between Visual skills and motor performance status

Pearson product moment correlation coefficient matrix between Visual Skill and Motor Performance Tests		
Subscale	Color Blindness	Visual Acuity
Eye Hands Coordination	-0.108	0.317*
Eye Foot Coordination	-0.027	-0.021
Reaction Time	0.343**	-0.050

*.05 level (2-tailed) and **.01 level (2-tailed)

Table 3 can shows that color blindness has a positive significant correlation with motor performance in reaction time ($r = 0.343$, $r^2 = 0.1176$, $P < 0.01$), whereas, insignificant negative correlation has shown with motor performance in eye hands coordination ($r = -0.108$, $r^2 = 0.0116$, $P > 0.05$). Visual acuity has shown that a positive significant correlation with motor performance in eye hands coordination ($r = 0.317$, $r^2 = 0.1004$, $P < 0.05$), whereas, insignificantly correlated negatively with motor performance in reaction time ($r = -0.050$, $r^2 = 0.0025$, $P > 0.05$), in contrast with this both color blindness and visual acuity insignificantly correlated negatively with motor performance to

eye foot coordination ($r = -0.027$, $r^2 = 0.00072$ and $r = -0.021$, $r^2 = 0.00044$ respectively at $P > 0.05$).

For the above analysis we can understand that color blindness significantly and positively correlated with motor performance to reaction time. This could mean that color blindness can decrease the motor performance specially reaction time. And also visual acuity significantly and positively correlated with motor performance to eye hand coordination. This could mean that visual acuity can decrease the motor performance specially eye hand coordination.

DISCUSSION

The multivariate Roy's Largest Root test summary table for the split effect visual skill on motor performance is shown that disagreement with independently exercising and in group couldn't bring significant change on players motor performance. In contrast with these result children who are having visual problem they are lacking in motor activities such as eye hand coordination, eye foot coordination and reaction time (/).

The result of the current study can shows that there was no difference between the playing positions of the player in color blindness, visual acuity, eye hand coordination and reaction time tests, while there was significant difference between the playing positions of the player in eye foot coordination tests. In contrast with the current study, the previous research indicated that, a significant

CONCLUSIONS

The purpose of the present research was to assess the impact of visual skills on motor performance of soccer players in Ethiopian youth sport academy. To this effect, the investigator draws, the below conclusions.

The majority of the players had some complication of color blindness. Half of the players had shown low performance in eye hand coordination while average and above average performance in eye foot coordination and reaction time respectively. Visual skills of the players independently and in group couldn't bring significant change on players' motor

RECOMMENDATIONS

From the results and conclusion of the study the following points have been listed as recommendations: The players should re-check and start color blindness treatment. The coaches should help the players to give care in color blindness and visual acuity. To develop the players' motor performance additional motor training should be delivered. Finally, the Ethiopian youth sport academy should give

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difference in performance with regard to visualization ($p=0.006$), tracking ($p=0.048$), reflexes ($p=0.0001$) and sequencing ($p=0.046$).²³

From the results of this study one can be understand that color blindness significantly and positively correlated with motor performance to reaction time. So that color blindness may decrease the motor performance specially reaction time. And also visual acuity significantly and positively correlated with motor performance to eye hand coordination. Thus, visual acuity may decrease the motor performance specially eye hand coordination. In contrast with the current study some research studies show no benefits in sport performance from enhanced visual skills (21, 22) while, the vast majority of studies reported that developed visual skills (or sports vision) would play a

positive role in sports performance (2,3,5,24,25).

performance. There was no difference in visual skills and motor performance (eye hand coordination and reaction time) in playing positions, while there was difference in eye foot coordination between playing positions. Color blindness significantly and positively correlated with motor performance to reaction time. This could mean that color blindness can decrease the motor performance specially reaction time. And also visual acuity significantly and positively correlated with motor performance to eye hand coordination. This could mean that visual acuity can decrease the motor performance specially eye hand coordination.

emphasis visual skill as well as their motor performance during recruitment of the players.

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