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Original Article

Which Orthoptic Visual Approach Evaluates Shooting Skill Accuracy in Soccer Players?

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Abstract
Because of the importance of goals in competition ranking, we estimated the accuracy of the Impact of Visual Information, which is an important factor for the control and production of shooting movement. Our sample consisted of 20 players, and their average age was 20,21 ± 0,23, which represented the team of Sidi Lakhdar Mostaganem Algeria for the year of 2014-2015 in Regional Championships. We tested three situations (eye and foot domination, weak eye and foot domination, and binocular and foot domination) based on statistical analysis, computed calculations, Paired t-tests, and correlations. The most important finding of our study included the factors that influence the accuracy of the shooting skills. Visual and cognitive functions are very important factors to evaluate the progression of the soccer player, whereas the development of accurate shooting skills requires most of the visual input from the dominant eye.
Keywords: Orthoptists Visual Approach, evaluation of accuracy, shooting skills, soccer player

Introduction

Successful goals typically come from shots that have both pace and accuracy, and a review of the literature confirmed that soccer performance in regards to shooting depends upon many factors, such as technical/biomechanical, tactical, mental and physiological factors. In our case, we refer to American sport education programs in which the most important components of shooting include a balanced stance and focusing on the target. Although (Kathy McGee 2007) Andersen TB (Andersen TB, Dorge HC 2009) confirmed that the optimal approach for shooting skill return combines speed and accuracy, the National Soccer Coaches Association of America (national soccer coaches association of america 2004) indicates that the key for the player will be to identify certain visual cues that point toward the right decision. Based on the study by (Peter Stewart 1995), the perfect shooting technique is a combination of balance, control, accuracy and power. Our background is based on the confirmation by (National Alliance for Youth Sports 2011) that players must work on their accuracy, distance and technique. Our research aims to determine the influence of binocular vision, which refers to normal vision and implies the simultaneous use of both eyes (Sunita Agarwal, Athiya Agarwal, David J. Apple 2002) with no fusion binocular rivalry (David Stidwill, Robert Fletcher 2010) or to single vision in which each eye views images that are so different that they cannot be fused (William MacCracken, William Bates 2011). This inability can lead to depth perception problems and difficulties with effectively judging distances, and the eye dominance determines the ocular dominance (Musálek, Martin 2014). Our sample consisted of 20 specialist players who volunteered to participate in this study. Their average age was 20,21 ± 0,23, and they represented the team of Sidi lakhdar Mostaganem Algeria for the year of 2014-2015 in Regional Championships. Normal vision was considered 10/10 in each eye (William H. Bates, Clark Night 2015). The homogeneity was calculated based on an ophthalmological examination of 10/10 vision in each eye, a total mastery of shoots, and the amount of pro training, which varied between 5 and 7 years (35% had 5 years; 35% had 6 years; 30% had 7 years). We tested three situations (eye and foot domination, weak eye and foot domination, and binocular and foot domination) based on selected tests used in this study to anticipate their strategy under two deference visual plans (Debra laParth 2009) to delineate the role of visual information. The literature review confirmed the following:

A) For the role of vision on performance skills and locomotion,

- the actions of expert soccer players are hierarchically organized and contain cognitive motor units, which act to guide the planning and execution of the actions (Schack. T, Mechsner F 2006), and
- the actions of novices have been shown to be less hierarchically organized (Schack T., Hackfort D. 2007).

B) For binocular vision deficiencies,

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- the eye, which provides the brain with the clearer image (closer to 20/20), typically becomes the dominant eye (Ashok Garg, Jorge L Alio 2011) and
- the eyes are pointing in different directions, resulting in difficulties focusing on one particular point at the same time. However, the amplitude of the response is affected by any process that results in poor fixation on the stimulus screen or that affects the visual acuity (William W. Hay, Anthony R. Hayward, Myron J. Levin 2002).

Methodology

Subjects

Our research sample consisted of 20 specialist players who volunteered to participate in this study. Their average age was 20,21 ± 0,23, and they represented the Sidi lakhdar Mostaganem Algeria team for the year of 2014-2015 in Regional Championships, and all had normal 10/10 vision in each eye. Their homogeneity was calculate based on an ophthalmological examination, which showed 10/10 vision in each eye, a total mastery of shoots, and the amount of pro training, which varied between 5 and 7 years (35% had 5 years; 35% had 6 years; 30% had 7 years); see Table 1. All participants were informed of the procedures, and all provided their written consent. As experts in the study protocol and methods, we choose the OPAPS laboratory of the Institute of Physical Education in our university, and the football and neuropsychology professors approved it.

Testing Protocol

Our sample included 3 groups, which were separated based on their amount of training, and they were tested in three situations (eye and foot domination, weak eye and foot domination, and binocular and foot domination) based on their accuracy of shooting.

Fig 1. Measure accuracy in our study

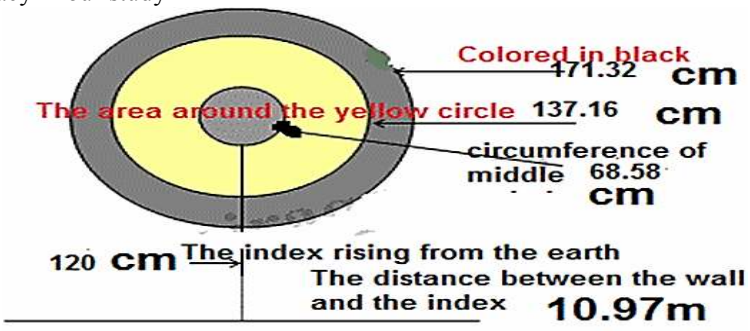

Fig 1. Method used to measure the accuracy of the shooting skill.

Procedure

The soccer player stands 10.97 m from the distance between the walls in which the index increases horizontally by 1,20 m from the surface of the Earth, and for the index circle shown in Fig 1, we counted 3 shots for each player. When eye dominance existed, we observed crowding of the weak eye, and the opposite situation occurred in the weak eye.

Scoring

If the ball hit the middle circle, 3 points were awarded. If the ball hit the yellow circle, 2 points were awarded. If the ball hit the black circle, 1 point was awarded. For other hits, 0 points were awarded.

Statistical Analysis Data analysis was performed using SPSS 22.0 for Windows (32BIT). Data was obtained from the tests that showed a normal distribution and were presented as the mean ± the standard deviation. ANOVA, Levene Statistics (W), and Paired sample t-tests were conducted to combine the results obtained from the two cases. The relationship between the three proposed situations were analysed using Pearson correlations (r).

Results

Table 1. Homogeneity of variances of the participants based on their amount of training

Experience (yr)		N	means□±□SD	W	sing	F	sing	variables	means□±□SD	W	sing	F	sing
Weight (kg)	5	7	65,88 ± 3,05	2,13	,14	,54	,59	eye domination	6,71□± ,95	,63	,54	,96	,40
	6	7	66,51 ± 6,22						7,28 ± ,75				
	7	6	69,39 ± 8,96						6,66 ± 1,03				
	Total	20	67,15 ± 6,21						6,90□± ,91				
Height	5	7	173,85 ± 5,49	1,60	,23	,25	,77	binocular	4,71□± 1,49	,67	,52	,25	,77

(cm)	6	7	173,71 ± 3,03						4,42□± ,97				
	7	6	175,33 ± 4,54						4,16□± 1,60				
	Total	20	174,25 ± 4,29						4,45□± 1,32				
Age	5	7	19,85 ± 1,57	1,38	,27	,67	,52	weak eye	2,57□± ,78	1,88	,18	,36	,69
	6	7	20,14 ± ,89						2,85□± ,69				
	7	6	20,66 ± 1,21						3,00□± 1,26				
	Total	20	20,21 ± ,23						2,80□± ,89				

Table 1 shows the mean (± SD), the Levene Statistics (W), and ANOVA results. All of comparisons were not significant at p≤0,05 based on the experience training, which confirmed the equality and homogeneity of the sample variables in our study. However, the paired sample t-test, which was calculated for the particular situations shown in Table 2, shows that all the comparisons benefit the dominate eye compared with the binocular and weak eye situations, which were the most unfavourable situations. Based on these differences, we calculated the correlations; see Table 2. The Pearson correlations (r) are strongly positive between eye dominance and the other situations (binocular - weak eye). However, the correlation between the binocular and weak eye is not significant at p≤0,05, which we confirmed to be due to a problem with our binocular sample. We observed binocular rivalry, which is defined as a phenomenon of visual perception in which perception alternates between different images that are presented to each eye (Gerard Obrecht, Lawrence W. Stark 2013) A prior study (Nicholas J. Wade, Nicholas Wade 2000) noted (section 6.2) that it can be difficult to distinguish between seeing two similar images and seeing one image.

Table 2. Paired sample t-test for the proposed situations in this study

	T	N	P≤0.05
Eye domination and binocular	10,97	19	0.00
Eye domination and weak eye	23,26		0.00
Binocular and weak eye	6,02		0.00

Table 3. Paired Sample Correlations for the proposed situations in this study

		Eye domination	Eye domination	Eye domination
Eye domination	Pearson correlation	1	,653**	,619**
Binocular	Pearson correlation	,653**	1	,438
Weak eye	Pearson correlation	,619**	,438	1
	Sig. (2-tailed)	,004	,053	
	N	20	20	20
**. Correlation is significant at the 0.01 level (2-tailed).				

Discussion

Based on the paired sample t-test, we determined that there was a difference in the mean of the visual information for eye dominance, and all of the comparisons did not benefit the typical situation (Zerf Mohammed 2015), as in the other cases that we chose to study. However, our results agree with the confirmation of prior studies (R. K. Mishra, RK Mishra 2013) in which the principal problem for binocular vision was described as: "how is the world viewed as single when we have two different views of it?" Thus, we agree with the study by Itay Basevitch (Itay Basevitch, Gershon Tenenbaum, Paul Ward 2015), which showed that soccer players must perform their skills under three visual conditions: normal, occluded, and distorted vision (Zerf Mohammed, Bengoua Ali 2015). Based on the different responses of the sample within the proposed positions of Scurr and Hall, they confirmed the specifics related to the kick accuracy and suggested that the skill had not been fully described. We agree with the opinion of Davids K (Davids K., Lees A., Burwitz L 2000), who suggested that kicking performance increases with training and skill is developed due to the experience of the player (Zerf Mohammed 2015), whereas the weakness of our sample lies in the visual perception (Ajay Kumar Bhootra 2014) due to the coordination between the two eyes in binocular vision (Martin Turner, John Rack 2006).However, we confirmed the importance of the dominant eye as the aiming eye to achieve the objective (Deborah Charles 2015).

Conclusions

Our results show that that an evaluation of shooting and training accuracy must be applied under non-typical conditions (Zerf Mohammed 2015), (Wayne Harrison 2005). Thomas Dooley (Thomas Dooley, Christian Titz 2012) confirmed that good conditioning and technique combined with mental toughness are good basic prerequisites for successful goal scoring. Based on our results, we suggest that the poor research sample is due to the weak eye, which is the dominant eye in binocular vision. However, our protocol confirms the following statements.

The weakness of our sample for the binocular situation supports the notion that any conflict in visual information causes a defect in the motor system to compose and adjust the outcome (Mann D. L., Ho N. Y., De Souza N. J., Watson D. R., Taylor S. J 2007) because the shooting outcome is influenced by the quality of vision. However, a prior study (Randall K. Harley, G. Allen Lawrence, LaRhea D. Sanford 2000) confirmed that many individuals have difficulty or appear awkward when performing tasks that involve accuracy of targeting if their weaker eye is their dominant eye.

Our sample showed success for the eye dominance situation. Thus, we agree with the work of William and Petersen (Scott Williams, Randy Petersen 2000). The research shows that the dominant eye's connection with the brain is 10 to 13 times faster than that of the other eye. We also agree with other results (Edward Spooner 2012): these factors are crucial for determining the type and amount of training required to achieve the chosen goals (Convergence • Binocularity • Eye dominance axial orientation • Hand-eye coordination • Court orientation • Ball-to-body) (Schack T., Hackfort D. 2007). We will explain the use of sensory information (Duane V. Knudson 2013) when we evaluate the role of vision for the production of sports movement.

In our experiment, we confirmed the problems that are related to the hand-brain relationship (David F. Chang 2008) for combined objects that are seen differently with each eye (William MacCracken, William Bates 2011). However, the effect of the weaker eye on the perception-to-action (M. Denis, Johannes Engelkamp, John Richardson 2012).

Our findings confirmed the idea provided by Davids K (Davids K., Lees A., Burwitz L 2000) that further interdisciplinary work is required to increase the understanding of coordination and control related to soccer skills:

- Eye dominance or master eye is a personal variable that must be established in training (Jack J. Kanski, Brad Bowling 2011)
- The target is aimed at when the player is determined to have an eye and foot that dominate. (John Steinbreder 2014)
- The player's vision must serve a dual-purpose optimal approach feedback when there are confusing visual indicators (Garland, Jim 2014).
- To master the shooting skill, important skills include intercepting actions (input) to anticipate the result (output) in a low-pressure practice-type of environment (Simon Bennett, Keith Davids, Geert J.P. Savelsbergh 2004).

Due to the above conclusions, we recommended that our coaches and players determine the dominant eye and relate it to the conflict in the weak eye in binocular vision.

References

Ajay Kumar Bhootra. 2014. Clinical Refraction Guide. New Delhi: Jaypee Brothers Miducal Publishers.

Andersen TB, Dorge HC. 2009. "The influence of speed of approach and accuracy constraint on the maximal speed of the ball in soccer kicking." Scandinavian Journal of Medicine and Science in Sports. doi:10.1111/j.1600-0838.2009.01024.x.

Ashok Garg, Jorge L Alio. 2011. Surgical Techniques in Ophthalmology: Strabismus Surgery. US: Medicine & Health Science Books.

David F. Chang. 2008. Mastering Refractive IOLs: The Art and Science. US: SLACK Incorporated.

David Stidwill, Robert Fletcher. 2010. Normal Binocular Vision: Theory, Investigation and Practical Aspects. US: Wiley.com.

Davids K., Lees A., Burwitz L. 2000. "Understanding and measuring coordination and control in kicking skills in soccer: Implications for talent identification and skill acquisition." Journal of Sports Sciences 18 (9): 703-714.

Deborah Charles. 2015. Archery: Skills. Tactics. Techniques. UK: Crowood Press.

Debra laParth. 2009. Coaching Girls' Soccer Successfully. USA: Human Kinetics.

Duane V. Knudson. 2013. Qualitative Diagnosis of Human Movement: Improving Performance in Sport and exercise. USA: Human Kinetics.

Edward Spooner. 2012. The Science of Volleyball Practice Development and Drill Design. US: iUniverse.

Garland, Jim. 2014. Youth Soccer Drills-3rd Edition. USA: Human Kinetics.

Gerard Obrecht, Lawrence W. Stark. 2013. Presbyopia Research: From Molecular Biology to Visual Adaptation. UK: Springer Shop.

Itay Basevitch, Gershon Tenenbaum, Paul Ward. 2015. "Visual and skill effects on soccer passing performance, kinematics, and outcome estimations." frontiers psychology 6 (198): 1-19. doi:10.3389/fpsyg.2015.00198.

Jack J. Kanski, Brad Bowling . 2011. Clinical Ophthalmology: A Systematic Approach. UK: Elsevier Health Sciences.

Joanna Scurr and Ben Hall. 2009. "The Effects of Approach Angle on Penalty Kicking Accuracy and Kick Kinematics with Recreational Soccer Players." J Sports Sci Med 8 (2): 230–234.

John Steinbreder. 2014. 18 Ways to Play a Better 18 Holes. UK: Rowman & Littlefield.

Kathy McGee. 2007. Coaching Basketball Technical and Tactical Skills. USA: Human Kinetics.

M. Denis, Johannes Engelkamp, John Richardson. 2012. Cognitive and Neuropsychological Approaches to Mental Imagery. USA: Springer Shop.

Mann D. L., Ho N. Y., De Souza N. J., Watson D. R., Taylor S. J. 2007. "Is optimal vision required for the successful execution of an interceptive task?" Hum. Mov. Sci. 26 343–356. doi:10.1016/j.humov.2006.12.003 [PubMed] [Cross Ref].

Martin Turner, John Rack . 2006. The Study of Dyslexia. UK: Springer Shop.

Musálek, Martin. 2014. Development of Test Baterries for Diagnostics of Motor Laterality. UK: Karolinum Press.

National Alliance for Youth Sports. 2011. Coaching Soccer For Dummies. USA: Wiley.com.

national soccer coaches association of america. 2004. Soccer Coaching Bible. USA: Human Kinetics.

Nicholas J. Wade, Nicholas Wade. 2000. A Natural History of Vision. UK: The MIT Press.

Peter Stewart. 1995. Way to Play Soccer: The Full-color Guide to Maximizing Your Skills. USA: Prima Pub.

R. K. Mishra, RK Mishra. 2013. Laparoscopic Hernia Repair. UK: JP Brouthers Medical Publishers.

Randall K. Harley, G. Allen Lawrence, LaRhea D. Sanford. 2000. Visual impairment in the schools. US: Charles C Thomas Publisher.

Schack T., Hackfort D. 2007. Action-theory approach to applied sport psychology. Handbook of Sport Psychology, eds Tenenbaum G., Eklund R. C., editors. (Hoboken, NJ: Wiley;).

Schack. T, Mechsner F. 2006. "Representation of motor skills in human long-term memory. Neurosci." Neurosci. lett. 391 77–81. doi:10.1016/j.neulet.2005.10.009 [PubMed] [Cross Ref].

Scott Williams, Randy Petersen. 2000. Serious Tennis. US: Human Kinetics.

Simon Bennett, Keith Davids, Geert J.P. Savelsbergh. 2004. Interceptive Actions in Sport: Information and Movement. USA: Routledge.

Sunita Agarwal, Athiya Agarwal, David J. Apple. 2002. Textbook of Ophthalmology - Volume 1. New Delhi: Jayper Brothers Medical publishers.

Thomas Dooley, Christian Titz. 2012. Soccer - Perfect Shooting Techniques. USA: Meyer & Meyer Verlag.

Wayne Harrison. 2005. Game Situation Training for Soccer: Themed Exercises and Small Sided Games. USA: Reedswain Inc.

William H. Bates, Clark Night. 2015. Better eyesight. US: Clearsight Publishing Co.

William MacCracken, William Bates. 2011. Use Your Own Eyes, Normal Sight Without Glasses and Strengthening the Eyes. US: Clearsight Publishing Co.

—. 2011. Use Your Own Eyes, Normal Sight Without Glasses and Strengthening the Eyes. US: Clearsight Publishing Co.

William W. Hay, Anthony R. Hayward, Myron J. Levin . 2002. Current Pediatric Diagnosis and Treatment. US: McGraw-Hil.

Zerf Mohammed. 2015. "Impact of environmental method training on the accuracy shoot fixed in basketball." The Swedish Journal of Scientific Research 2 (8): 29-32.

Zerf Mohammed, Bengoua Ali. 2015. "Effect dimensional of delimiters on implementationof speed, balance and the agility in dribbling among soccer (under 15 year)." International Journal of Educational Science and Research (IJESR) 67- 72.

Zerf Mohammed, Bengoua Ali. 2015. "The impact dimensional of delimiters on testing and training duels dribbling in young soccer (under 15 year)." European Journal of Scientific SPECIAL/ edition Vol.1: 200-208.