

Quincy file TRC
4/1/93

**THE USE OF EYE DOMINANCE AND CONTRAST
IN WOMEN'S VOLLEYBALL**

Lisa Farkas
Rob Finlay

The following information comes from a study which took place over a year and a half period of time with the women's volleyball team at Ferris State University. The purpose of this study was to improve visual skills in such a way as to give the team a competitive edge over opposing teams.

The idea for this study began when the volleyball coach contacted us for ideas on how to improve the team performance. The players were noticing a difficulty with distinguishing the position of the volleyball under varying conditions. This was especially true when they were playing in a gym with white walls. The ball is easily lost in empty space because it is white and it blends in with the walls. This can cause the players to lose the ball as it comes over the net or misjudge the distance of the ball from the player and/or the net. These problems seem to be at a minimum when the gym walls are darker such as black or blue.

To alleviate these problems: (1) We considered painting the gym walls or (2) changing the color of the volleyball. However, the volleyball is white by NCAA rules so it is not changeable and painting the walls would also help the opposing team. To give only our team an edge we considered: (3) Changing the contrast of the surroundings or (4) Utilizing eye dominance to allow the players to pick up the ball quicker as it comes over the net. In this pilot project we will determine if (1) eye dominance and (2) contrast of the surrounding will increase the visual performance of the volleyball players.

EYE DOMINANCE

The theory is that as with an individual having one hand that is more dexterous than the other, one also has an eye which picks up information slightly quicker than its fellow.

Information from one eye tends to arrive at the cortical level of the brain earlier and obtains a processing priority which becomes habitual.¹ If a player is aware of her dominant eye she may be able to better position herself to allow for a quicker reaction to the ball. For instance, if a player demonstrates right eye dominance she would either stand tilted to the right or turn her head slightly left to allow the dominant eye to be closest to the ball.

CONTRAST

Of particular importance is the ability of the player to detect the ball under varying lighting and surrounding conditions. The only way to accomplish this, without also giving the opposing team an advantage, is by enhancing individual player contrast. The change in contrast would allow the player to distinguish the ball from the surroundings quicker. It was felt that this could be accomplished by using different colored safety lenses. This may help to increase player performance.

METHODS

We met with the volleyball team and coaches to teach them how to test for and utilize eye dominance to their advantage. Eye dominance was determined using the "hole in the hand" method. It was also determined by having the player hold out their forefinger over a distant object. Then close their right eye

and then the left. The eye which when open allows for little or no movement of the finger off the distant object is the dominant eye.

Then, we obtained six pair of NOIR shields for the team to use as demonstration colors for two weeks during practice. Those colors were red, yellow, gray, and green. Prior to this, the senior interns tried the shields out with different volleyball techniques. It was predicted based on observations made that the red and gray shields improved the contrast the most. However, the volleyball team reported that the red and green shields, which were equal to a shade #4, seemed to help the most. The problem with the gray lenses was that the ball would blend in with the walls too much. The walls got washed out with the gray because the upper half of the practice gym at Ferris is also gray. The yellow shield seemed to brighten up the surrounding too much.

PROBLEMS

In order for the athletes to use these lenses in competition they would have to be in safety frames. Also, safety frames have to have safety approved lenses which unfortunately only come in shade numbers of 1 or 2 which may not be dark enough. Special safety lenses may be needed in order to obtain the correct shade. The women were also hesitant initially about this because of the cosmetic appearance of safety frames. After much discussion with them, however, the team decided to give these techniques a try because the potential benefits could out way the inconvenience. Then the athletes posed a question

if colored contact lenses would alter contrast in the same way. If this technique worked it would eliminate the cosmetic appearance of the safety frames.

RESULTS

As far as eye dominance is concerned, 50% of the players believed that the knowledge of their dominant eye helped them to set up for an oncoming ball. The other 50% did not feel this method increased their performance.

The goggles were used in the following manner: the players were given the goggles (3 pair red, 3 pair green) to wear during practice for a total of four days of experimentation. The first day the green goggles were worn by three athletes and the red by the remaining three. The goggles were worn for the entire practice period. The next day the athletes practiced without any goggles. The third day those athletes who had previously worn green goggles wore red goggles and vice versa for the remaining three athletes. Once again, on the last day of practice, no goggles were worn. The results are shown in the graph located on the next page.

Overall, on average, the players felt their performance in all areas may have increased while wearing the green goggles. The greatest amount of improvement came from the goggles decreasing the glare from overhead lighting. Also, their serving ability was improved with both the red and green goggles. The athletes performance, however, seemed to decrease the most when attempting to pick up an oncoming served volleyball while wearing either pair of goggles.

		red goggles	green goggles
passing	no change	33%	16%
	increase	--	50%
	decrease	67%	34%
serving	no change	50%	33%
	increase	50%	67%
	decrease	--	--
receiving oncoming ball	no change	16%	16%
	increase	16%	34%
	decrease	68%	50%
defense against spiked ball	no change	34%	16%
	increase	50%	68%
	decrease	16%	16%
glare	no change	16%	--
	increase	68%	84%
	decrease	16%	16%
Overall effectiveness	no change	--	--
	increase	50%	67%
	decrease	50%	33%

CONCLUSIONS

The results of performance while utilizing eye dominance was determined subjectively by each player, therefore, the success was also determined by the player. In many situations if the athlete believes eye dominance will increase performance subjectively, this in fact, will occur. For this reason eye dominance should be tested and explained to every new volleyball player.

Even though the green goggles were reported to increase performance the most, the overall utilization of these type of goggles during competition is unlikely. The goggles themselves made the players feel uncomfortable because of their appearance. Also, they felt that their peripheral vision was reduced while wearing the goggles. The comfort of the goggles

overall was reported as poor but better than goggles they had tried in the past.

Perhaps in the future contact lenses will be developed which will change contrast and eliminate the problems created by wearing goggles; but presently, this is not possible.

The data in this experiment suggests that eye dominance and contrast improvement may help with athletic performance. Further experimentation over a longer period of time and with more subjects would provide more conclusive information.

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