

Stroboscopic Vision Training for Athletes: A Literature Review

Bryn Langenderfer & Rachel Bruinsma, Michigan College of Optometry

Introduction

- In the competitive world of athletics, athletes of all sports and levels are constantly on the lookout for ways to elevate their performance. One area of training which athletes are becoming more aware of is visual training.
- Stroboscopic vision training is a method thought to improve sports performance. Stroboscopic vision training involves the intermittent occluding of a subject's vision with goggles that alternate between transparent and semi opaque states.
- Stroboscopic training has been shown to improve visual-perceptual abilities including central field motion sensitivity and anticipatory timing. Visual perceptual skills have been shown to be crucial for athletes' success. However, the capacity of improved visual perceptual abilities to transfer to sports performance and specific skills is not fully known. (Wilkins et al, 2015)

Conclusions

- Overall, there has not been an overwhelming number of research studies on the benefits of stroboscopic vision training in athletics. However, the few studies that have been done support the idea that improvement in perceptual-cognitive performance can transfer to improved athletic performance.
- Athletes are competitive in nature and their drive to be the best is also driving sports vision training. With the demand for new technologies to challenge athletes in all aspects of their training, it will be no surprise if stroboscopic training becomes increasingly utilized.
- While these studies have shown the potential for improvement in athletic skills; it is important to note that the research of stroboscopic goggles needs to be expanded.

Study	Methods	Results
Stroboscopic Vision When Interacting With Multiple Moving Objects	<ul style="list-style-type: none"> • Compared Nike Vapor Strobe goggles, PLATO visual occlusion eyewear and normal vision conditions • Young adults were divided into three groups above • Participants completed multiple object tracking tasks and responded to an auditory tone 	<ul style="list-style-type: none"> • Nike Vapor participants maintained their performance regardless of the strobe rate • The other two conditions showed performance decrease as strobe rate decreased • Nike Vapor can better facilitate acquisition of perceptual motor skills
High-Performance Vision Training Improves Batting Statistics for University of Cincinnati Baseball Players	<ul style="list-style-type: none"> • Players completed stroboscopic training 3 times a week for six weeks during preseason amongst other visual training • 30-minute training sessions included Dynavision, Tachistoscope, Brock String, Eyeport, Rotary, Strobe Glasses, Near Far Training, and Saccades • During the season athletes had vision training twice a week 	<ul style="list-style-type: none"> • Improvement in batting percentage compared to the previous year while all other Big East baseball teams showed a decrease in batting average • Slugging percentage and on base percentage also showed significant improvement
The Effect of 4-Week Stroboscopic Training on Visual Function and Sport-Specific Visuomotor Performance in Top-Level Badminton Players	<ul style="list-style-type: none"> • 10 German badminton players were placed into a control group and an intervention group with shutter glasses • Over a 4-week period players performed behavioral smash-defense tests and were assessed 	<ul style="list-style-type: none"> • Stroboscopic training resulted in superior post training performance • No significant difference between the groups concerning visual perception speed
Enhancing Ice Hockey Skills Through Stroboscopic Visual Training: A Pilot Study	<ul style="list-style-type: none"> • 11 NHL hockey players were evenly split into control and experimental groups • All players participated in preseason training and those in the experimental group wore Nike Vapor Strobe goggles one time each day for a minimum of 10 minutes for 16 days 	<ul style="list-style-type: none"> • Players in the experimental group performed better at relevant hockey skills for normal practice activities • Demonstration that skill enhancements can transfer to sport performance
Effects of Stroboscopic Visual Training on Visual Attention, Motion Perception, and Catching Performance	<ul style="list-style-type: none"> • 30 athletes were divided into a variable strobe rate group and a constant strobe rate (pseudo-control) group • Both groups utilized the PLATO Visual Occlusion Spectacles • Pre and post testing sessions assessed a ball catching task, the Useful Field of View (UFOV), and the Motion in Depth Sensitivity (MIDS) tests 	<ul style="list-style-type: none"> • No significant differences in any of the tests between the two groups • Subjects whose perceptual-cognitive performance improved in the post test were significantly more likely to improve in catching performance

References

- Bennett, S., Hayes, S., and Uji, M. (2018, July) Stroboscopic Vision When Interacting With Multiple Moving Objects: Perturbation Is Not the Same as Elimination. *Front. Psychol.* 9, 1290.
- Clark J., Ellis J., Bench J., Khoury J., Graman P. (2012) High-Performance Vision Training Improves Batting Statistics for University of Cincinnati Baseball Players. *PLoS ONE*, 7(1), e29109.
- Hülsdünker, T., Rentz, C., Ruhnow, D., Käsbauer, H., Strüder, H. K., & Mierau, A. (2019). The Effect of 4-Week Stroboscopic Training on Visual Function and Sport- Specific Visuomotor Performance in Top-Level Badminton Players. *International journal of sports physiology and performance*, 14(3), 343–350.
- Mitroff, S., Friesen, P., Bennett, D., Yoo, H., and Reichow, A. (2013, November). Enhancing Ice Hockey Skills Through Stroboscopic Visual Training: A Pilot Study. *Athletic Training and Sports Health Care*, 5(6), 261-264.
- Wilkins, L., & Gray, R. (2015). Effects of Stroboscopic Visual Training on Visual Attention, Motion Perception, and Catching Performance. *Perceptual & Motor Skills: Learning and Memory*, 121(1), 57-79.

Acknowledgements

- Thank you to Dr. Jenerou for her guidance with this research project/paper.