REVISTA INTERNACIONAL DE DEPORTES COLECTIVOS

# RELACIÓN DE PANTALLAS DE VISUALIZACIÓN CON LA VELOCIDAD DE PROCESAMIENTO VISUAL, COORDINACIÓN BINOCULAR Y RENDIMIENTO DEPORTIVO

# RELATIONSHIP OF THE DIGITAL ELECTRONIC SCREENS WITH THE SPEED OF VISUAL PROCESSING, BINOCULAR COORDINATION AND SPORTS PERFORMANCE

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## RESUMEN

El objetivo de este trabajo es evaluar la influencia del uso de pantallas de visualización en la CB y la VPV en deportistas para poder averiguar si su uso es perjudicial para el rendimiento en la actividad deportiva. 29 porteros amateurs de balonmano y fútbol-sala son evaluados por un evaluador cegado mediante dos test: evaluación de la CB en el seguimiento ocular uniforme mediante un sistema de video-oculografía; y, evaluación de la VPV mediante el Development Eye Movement test. La CB en los movimientos horizontales y la VPV fueron significativamente alteradas después de un esfuerzo visual (p=0,006 y p=0,004). Sin embargo, la coordinación binocular en los movimientos verticales no se vio alterada.El hallazgo de la alteración de la coordinación binocular y la velocidad de procesamiento visual tras un esfuerzo visual con el ordenador indica que utilizarlo antes de una actividad deportiva puede disminuir la velocidad de reacción y, por tanto, el rendimiento deportivo.

**PALABRAS CLAVE:** coordinación binocular; velocidad de procesamiento visual; rendimiento deportivo, esfuerzo visual, developmental eye movement test.

## ABSTRACT

The objective of this work is to to evaluate the influence of the use of digital electronic screens in the BC and the VPS in athletes to be able to find out if their use is detrimental to the performance in sports activity. 29 amateur goalkeepers of handball and futsal are evaluated by a blinded evaluator by means of two tests: evaluation of the BC in the smooth pursuit eye movements tracking through a video-oculography system; and, evaluation of the VPS through the Development Eye Movement test. The CB in the horizontal eye movements and the VPV were significantly altered after a visual effort (p = 0.006 and p = 0.004). However, the BC in the vertical eye movements was not altered. The finding of the alteration of the BC and the speed of VPS after a visual effort with the computer indicates that using it before a sport activity can decrease the speed of reaction and, therefore, the sports performance.

**KEYWORDS:** binocular coordination, visual processing speed, sports performance, visual effort, developmental eye movement test.

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## 1. INTRODUCTION

Visual processing speed (VPS) and binocular coordination (BC) are related to reaction speed and sports performance. The visual effort with mobile phones, tablets and computers is very common in today's society and can lead to the Computer Vision Syndrome defined by the American Optometric Association as the set of ocular, visual and musculoskeletal symptoms associated with the prolonged use of such digital electronic screens[1][2].

## 2. OBJECTIVE

To evaluate the influence of the use of digital electronic screens in the BC and the VPS in athletes to be able to find out if their use is detrimental to the performance in sports activity.

## 3. MATERIAL AND METHODS

Observational study with blind evaluation of the response variable. 29 amateur goalkeepers of handball and futsal are evaluated by a blinded evaluator by means of two tests: evaluation of the BC in the smooth pursuit eye movements tracking through a video-oculography system[3]; and, evaluation of the VPS through the Development Eye Movement test[4]. The tests are carried out in two phases: before making any visual effort, and after reading a text for 20 minutes on a computer with a 19.5-inch monitor with contrast selection of 1280 by 1024, black font Arial 12 and a distance of 50 centimeters secured by a head support system.

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[3] CHU C, ROSENFIELD M, PORTELLO JK, BENZONI JA, Collier JD. A comparison of symptoms after viewing text on a computer screen and hardcopy. Ophthalmic Physiol Opt 2011. 31(1), p. 29–32.
[4] GOWRISANKARAN S SHEEDY J. Computer Vision Syndrome: A review. Work 2015. 52(2), p. 303-314.

## 4. RESULTS

The CB in the horizontal eye movements and the VPV were significantly altered after a visual effort ($p = 0.006$ and $p = 0.004$). However, the BC in the vertical eye movements was not altered.

## 4. CONCLUSION

The finding of the alteration of the BC and the speed of VPS after a visual effort with the computer indicates that using it before a sport activity can decrease the speed of reaction and, therefore, the sports performance.

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