ENHANCING CONTRAST SENSITIVITY WITH POLARIZED FILTERS IN SPORTS WITH GLARE PRODUCED ON FLAT SURFACES UNDER PHOTOPIC CONDITIONS.

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INTRODUCTION.
Reflections of light on flat surfaces often generate central glare during sport practice (i.e. skiing, fishing or driving). Polarized filters are mounted in googles or spectacles to neutralize the effects of glare on these situations, but only empirical data from the manufacturers and subjective evaluations probe the effectiveness of polarized filters under reflected glare on flat surfaces. There is a lack of information in literature about physiological effects of polarized filters on vision.

METHODS.
52 physically active subjects (40 male and 12 female; 22.16 ± 6.89 years) with normal vision (Visual Acuity Snellen coefficient = 1.08 ± 0.28) performed the test, seated with their head placed on a chin-rest located 1.76 meters away from a Pelli-Robson contrast sensitivity chart, which was placed on the floor. In order to generate the central glare, we projected a collimated light beam onto the chart.

Binocular contrast sensitivity was recorded with the subject wearing spectacles fitted with a standard polarized filter, with coloured filter -both of them with the same transmittance- , and without filter. The dazzling light hit the test surface first at an angle of 31.5° with respect to the horizontal (Brewster angle) and then at 46.6°, 37.6°, 23.8° and 17.2°. Both the visual and angle conditions were randomized to avoid glare, tiredness and memorization effects on the results.

RESULTS.
Results show how the effect of glare was neutralized by the polarized filter -with values close to reference levels recorded without glare- but not by the coloured filter, which gave rise to similar contrast sensitivities as for the uncovered eyes. The benefits of polarized filters were reduced -but were still significant in all the cases- as the angle of incident light was varied from the Brewster angle.

DISCUSSION.
Our ecological approach achieved controlled yet realistic, polarized reflected central glare on the test surface, which prevented subjects from properly seeing the target. This scenario differed from most reports in the literature, in which glare is generated by a diffuse light source, eccentric to the test target (1).

Our results probe by first time, in physiologically terms, the benefits of using polarized filters to improve contrast sensitivity in the presence of glare produced on horizontal surfaces under photopic light conditions.

REFERENCES

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