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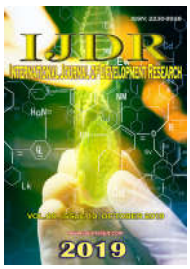

RESEARCH ARTICLE OPEN ACCESS

USE OF PRISMES IN NARROWING OF VISUAL FIELD

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ABSTRACT

Tunnel vision is the lost of peripheral visual field associated to a normal central visual field. It is due to glaucoma, retinitis pigmentosa, choroideremia a/or Usher syndrome. The visual field narrows up to 20°. Apical scotoma is due to prismes. Field extension is a field substitution, field expansion is an increase of the total area of visual field. Our goal is to avoid diplopia. The use of prism may be responsible of: spatial distortion, chromatic aberration, image alteration and astigmatic error. Fresnel prism is thinner and lighter but it reduces visual acuity and contrast more than CR39 conventional prism. Sectorial prismes are usual Fresnel prismes. The Author wants to stress the use of In Wave lenses, Fresnel multiple prismes, and TRI-FIELD lenses to reduce the clinical effects of the tunnel vision. The Author describes advantages and disadvantages of these lenses.

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INTRODUCTION

Tunnel vision is the concentric reduction of visual field maintaining the central area. This disease may be caused by glaucoma, retinitis pigmentosa, choroideremia and Usher syndrome. Movements are difficult and unsafe. Many patients realize this discomfort whene the visual field reduces under 40 degrees and they become visual handicapped under 20 degrees. Not prismatic devices and lenses give a reduction of acuity (Drasdo 1976; Krefman 1981; Hoeft *et al*., 1985; Brilliant *et al*., 1987; Szlyk *et al*., 1998; Geruschat e Turano 2002). In this paper we stress only modern devices such as In Wave and Trifield lenses (Peli 2001; Woods *et al*., 2010), their advantages and disadvantages. Apical scotoma is caused by a prism inside visual field. Field expansion is an increase of the total area of the visual field. Double vision causes binocular visual confusion and diplopia. Diplopia must be avoided while confusion may cause an increase of visual field. Prismes may help patients to discriminate an object in the periphery of the visual field. Prism efficacy is characterized by three factors: prismatic power, their position and the distance from an object (Perlin e Dziadul, 1991; Cohen, 1993). Prism may increase the visual field even if there may be some side-effects such as distortion, chromatic aberration and astigmatic error.

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Prismatic power usually ranges between 15 and 40 diopters even if some ophthalmolofist prefer to start with power ranging between 20 and 25 prismatic diopters (Dickinson, 1998). Fresnel prism is commonly used. It is made of of polivinilclorur (PVC), 1 mm width and refractive power of 1.52. (Cheng e Woods, 2001). Fresnel prism is lighter than traditional prism but can cause distortion and chromatic aberration. The position of sectorial prism is important. In patients affected by tunnel vision the Fresnel prism must be placed with their base towards the border of the lens.

In Wave lens

In Wave lenses were designed by a Kodak engineer in the 90s. They are an evolution of Fresnel prism. This lens has a 12 prismatic diopter with external base in the temporal area and another with internal base in the nasal area. There is a 8 prismatic diopter in the inferior area. There is the possibility to add + 4 diopters to correct presbyopia.

In Wave prismatic lenses are usually bilateral.

TRI-FIELD lens

The TRI-FIELD lens was designed by Woods and Peli in 2002. It is a monocular lens. It is used in the weaker eye. TRI-FIELD lens may increase the visual field. It may increase visual confusion and spatial distortion. It may not be used by monocular patients or affected by strabismus and amblyopia. It

is possible to use multiplexing system, that is to discriminate two different images coming from two different directions (Peli, 2001). Patients wearing TRI-FIELD lenses report some difficulties mostly in overcrowded places.

Conclusions

Prismatic lenses, such as TRI-FIELD lenses may help patients to look centrally but they do not increase their visual field. They do not have diplopia. Standard perimetry may evaluate their visual field.

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