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An Objective Classification Scheme for Cataracts

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Abstract

Purpose: To propose a new objective scatter index (OSI) to rank and classify cataract patients. This classification scheme will be compared with a current subjective system.

Methods: We selected a population including a group of normal young eyes as reference, and patients diagnosed nuclear cataract (grades II, III and IV) according to the Lens Opacities Classification System (LOCS III). For each eye, we obtained an objective scatter index (OSI) by subtracting the relative intensity at an eccentric location from a pair of double-pass images: one registered by the OQAS instrument (Visiometrics SL, Spain), and other simulated considering only the eye's aberrations. Visual acuity was also measured using a forced-choice computer controlled procedure.

Results: We used the OSI values to classify each eye according to the degree of scatter. Young normal eyes had OSI values below 1, while the OSI for subjects in LOCS grade II were around 1 to 2. The use of the objective index showed some of the weakness of current subjective classification schemes. In particular, several subjects initially classified independently as grade II or III had similar OSI values, and in some cases even higher than subjects classified as grade IV. The objective data provided a better correlation with the measured visual acuity: OSI ($r2=0.35$) versus LOCS III ($r2=0.21$).

Conclusions: We propose an objective index based in analyzing double-pass retinal images to classify

cataract patients. The method is robust, fully based in objective measurements; i.e., not depending on subjective decisions. This index could be used to objectively select patients for cataract surgery.

Keywords: cataract • visual acuity