

Measurement of the intraocular scattering in cataractous patients, using different instruments and parameters. Comparative study.

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Purpose: To perform clinical measurements of intraocular scattering in cataractous patients by means of different available commercial instruments that have become common in clinical practice

Introduction:

- The cataract is a very common pathology and assessing their level of maturity is essential for determining when surgery should be performed.
- Up to date, the evaluation of the cataract is mainly performed by subjective methods such as Lens Opacities Classification System (LOCS III).
- Recently two new commercial instruments that can provide more reliable measures of the degree of cataract from the analysis of the intraocular scattered light have been developed: OQAS and C-QUANT

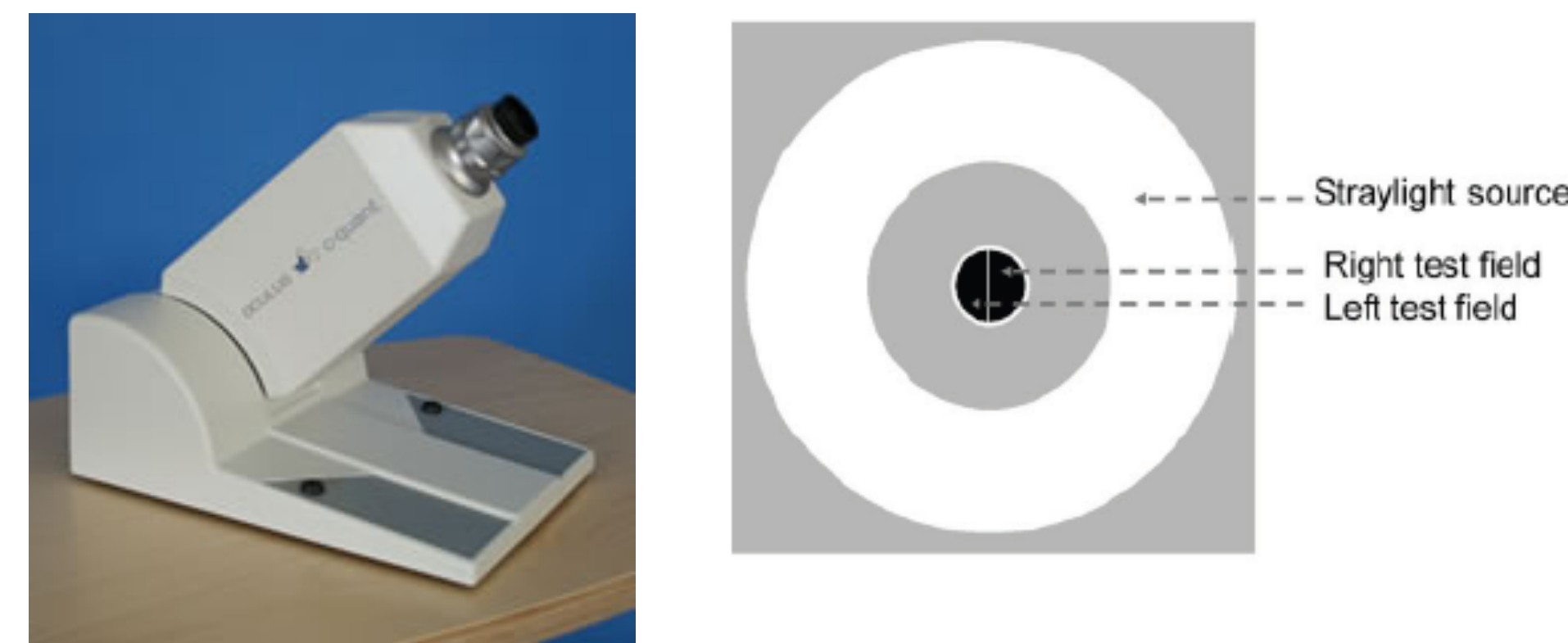


Figure 1: C-Quant Instrument and straylight log(s) parameter

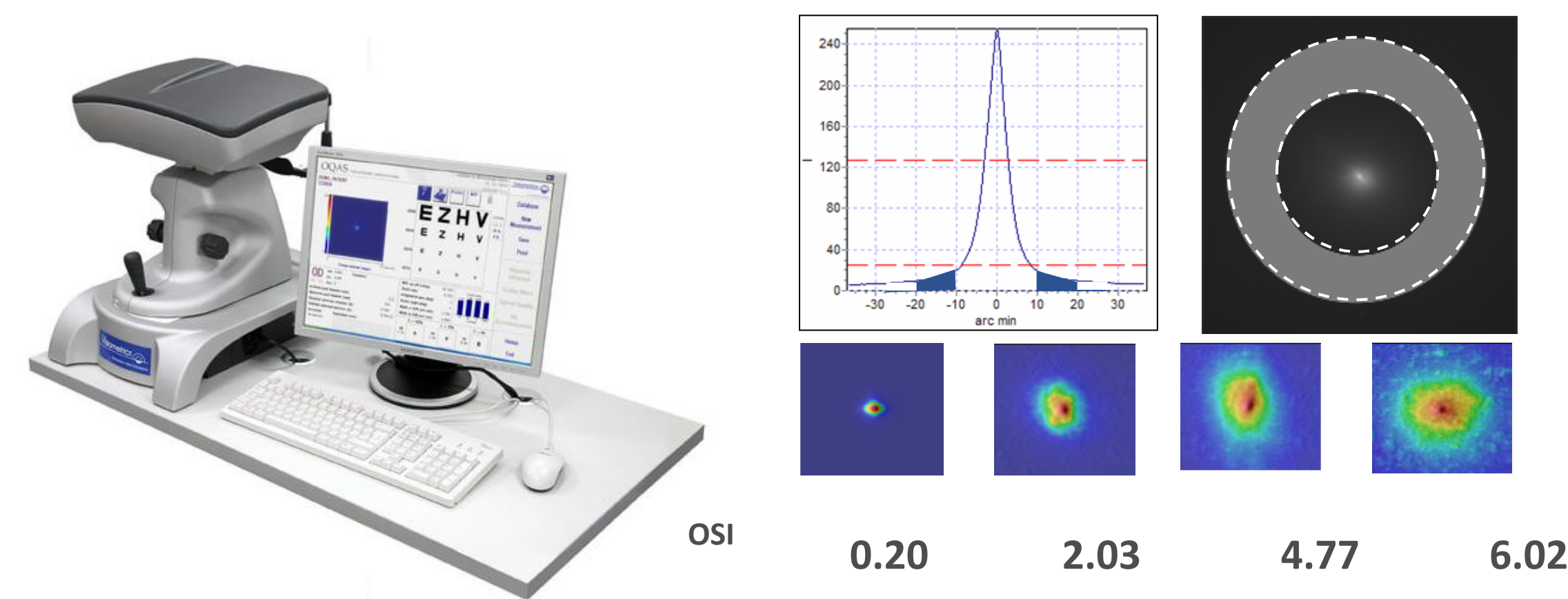


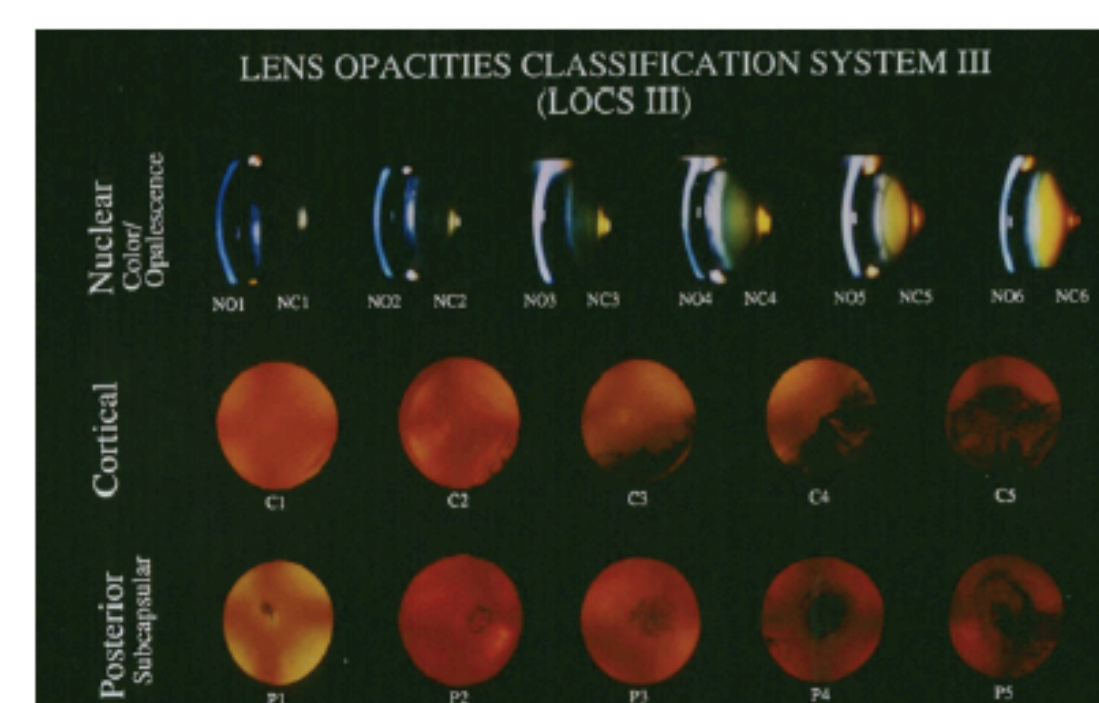
Figure 2: OQAS Instrument and OSI parameter

Methods:

- Intraocular scattered light was measured using C-QUANT (Oculus) (Fig. 1), which provides an absolute intraocular scattering value (log(s)¹, and OQAS (Visiometrics) (Fig. 2), which uses the Objective Scatter Index (OSI) parameter² obtained from the double-pass retinal image.
- 78 eyes with cataracts of 52 patients were included in the study (37 right eyes, and 41 left eyes), 41 female and 37 male with a mean ± SD in age of 68.24 ± 8.3 years (range: 47 to 85 years), spherical manifest refraction ranged from -8.00 to +5.75D and the cylinder from 0.00 to 3.00D, best spectacle-corrected visual acuity in the logMAR scale of 0.17±0.27 (1.25 to -0.20).
- The types of cataracts were: 24 eyes of nuclear cataract (30.4%), 27 of mixed nuclear (34.2%), 9 eyes of cortical (11.4%) and 18 of posterior subcapsular (24.1%). Grade of cataract was classified using LOCS III (Fig. 3, Table 1).



Figure 3: Lens Opacities Cataracts System III



n	Nuclear Opalescence					Nuclear Colour					
	NO2	NO3	NO4	NO5	NO6	NC2	NC3	NC4	NC5	NC6	
Nuclear Cataract	24	2	4	13	5	0	2	6	8	7	1
Mixed Cataract	27	3	5	13	5	1	9	9	6	2	
Cortical Cataract						Posterior Subcapsular Cataract					
n	C1	C2	C3			n	P1	P2	P3		
9	4	3	2			18	7	6	5		

Table 1: Distribution of the number of eyes classified according the groups with LOCS III

Results:

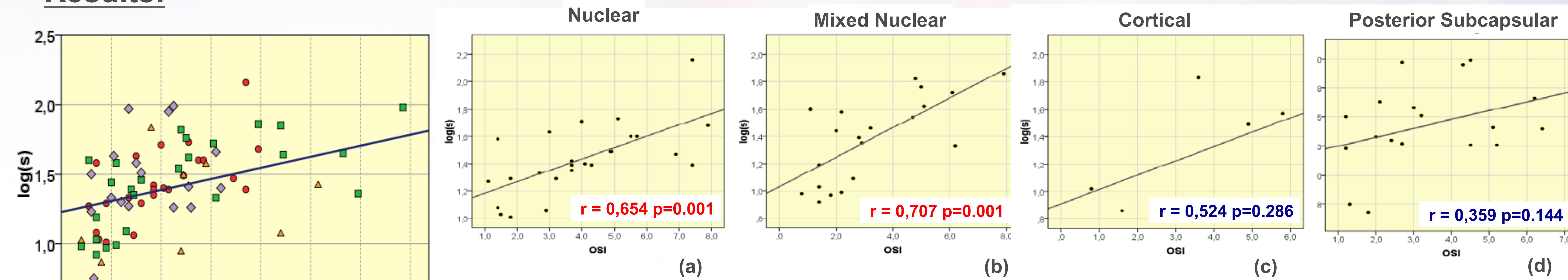


Figure 5. OSI and log(s) values for nuclear (a), mixed nuclear (b), cortical (c) and posterior subcapsular cataract (d).

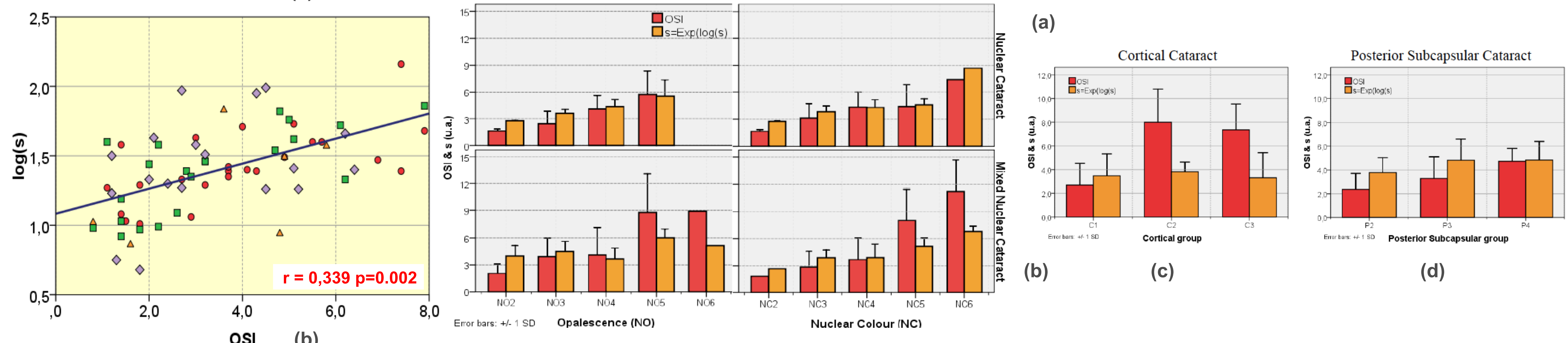


Figure 4. OSI and log(s) values (a) taking into account all analyzed eyes and (b) taking into account the eyes with OSI values <8.

Figure 6. Average OSI values and (s) values for the different degrees of cataracts according LOCS III classification: (a) Nuclear and (b) mixed nuclear (according opalescence (NO) and nuclear color (NC), (c) Cortical) and (d) Posterior Subcapsular.

Conclusions:

1. OSI and log(s) are useful parameters to grade different levels of cataracts in clinical practice.
2. Both parameters show good correlations for *incipient and moderate degrees* of cataracts (OSI <8). In severe cataracts OSI results allow a better discrimination.
3. Both parameters show good correlations for all type of cataracts.
4. Future work will be focused on increase the number of patients with cortical and posterior subcapsular cataracts.

References:

1. Van der Berg et al. (2009). Straylight in the human eye: testing objectivity and optical character of the psychophysical measurement. *Ophthal Physiol Opt.* 29: 345-350.
2. Artal et al. (2011). An Objective Scatter Index Based on Double-Pass Retinal Images of a Point Source to Classify Cataracts *Plos*, 6, e16823