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**Purpose:** To evaluate the usefulness of a new instrument to predict the visual performance obtained with a multifocal intraocular lens prior to surgery

**INTRODUCTION:**

- Presbyopia consists on the loss of accommodative amplitude causing blur and uncomfortable vision in near objects. One of the solutions to presbyopia is the implantation of a Multifocal Intraocular Lens (MIOL). MIOLs have complex designs and therefore neural adaptation is involved. Consequently, is important to evaluate the visual performance with MIOLs before surgery.

**MATERIAL AND METHODS:**

- Patients: 10 presbyopic patients were included in this study. The mean age  $\pm$  standard deviation (SD) was  $67 \pm 10$  years (from 52 to 81 years).
- Material:
  - Mplus (Lentis® Oculentis®)
  - Visual Acuity (VA) Chart (Figure 2)
  - CSV- 1000E Test (Figure 3)
  - VirtIOL: is an open-field instrument based on projecting an IOL onto the patients' pupil plane. Thus, the patient sees through the IOL simulating the vision once the IOL is implanted (Figure 1)

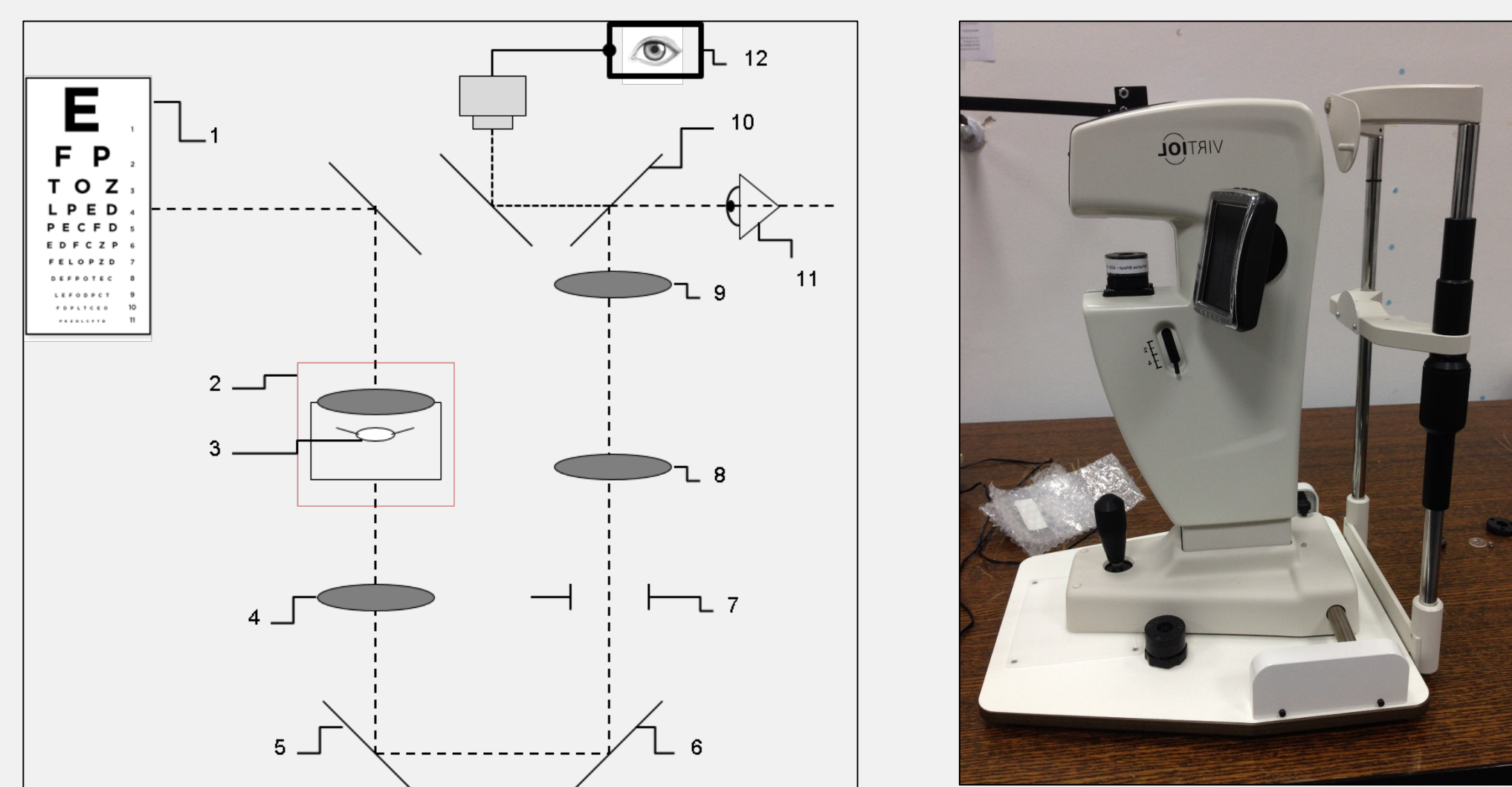


Figure 1: VirtIOL's system scheme (on the left) and VirtIOL's prototype (on the right).

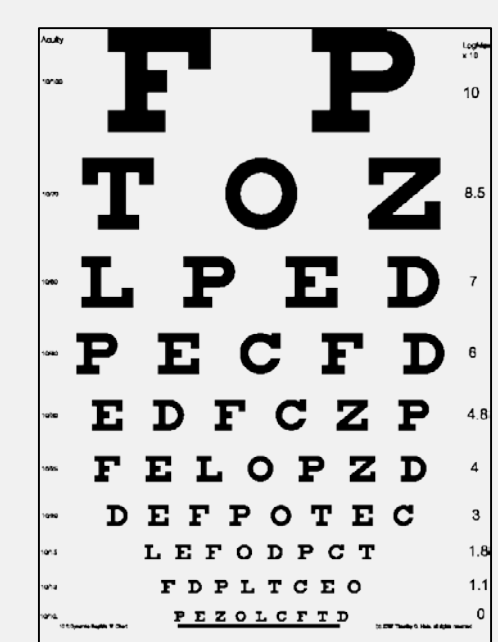


Figure 2: VA Chart

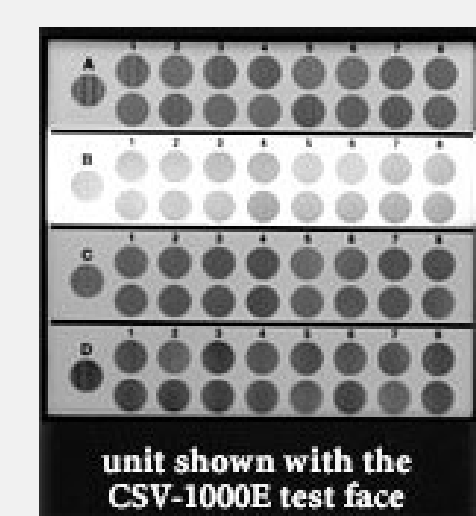
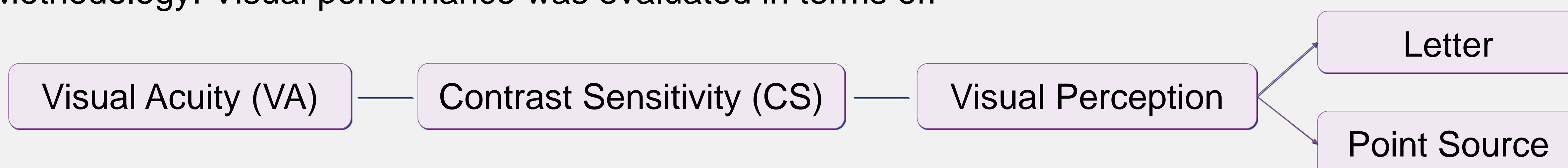


Figure 3: CSV-1000E test

- Methodology: Visual performance was evaluated in terms of:



The measurements were performed in two sessions:

- First session: Before surgery with VirtIOL and Mplus
- Second session: After surgery with MPlus.

**RESULTS:**

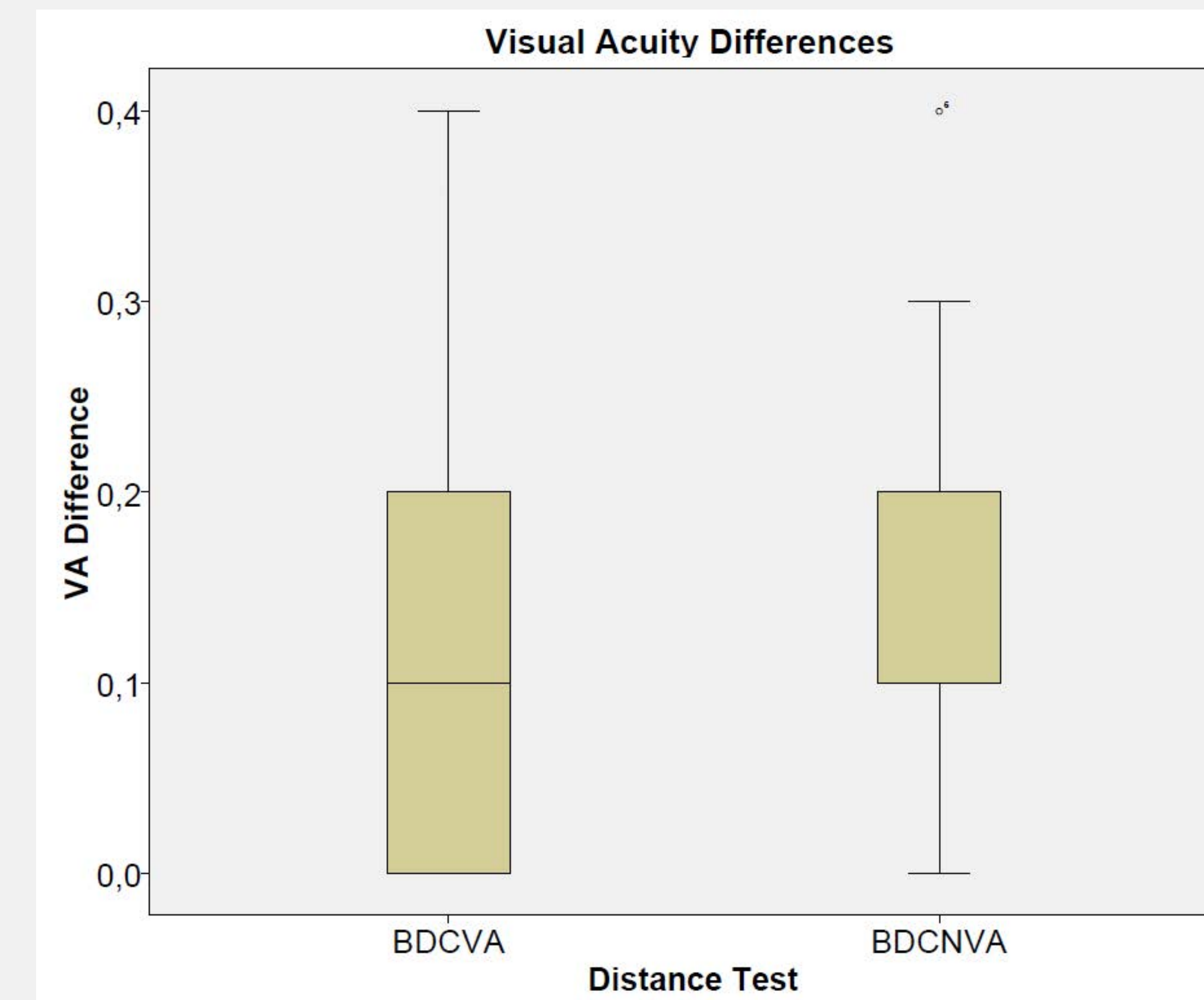


Figure 4: Visual acuity differences between first and second session for the BDCVA (Best Distance Corrected Visual Acuity) and BDCNVA (Best Distance Corrected Near Visual Acuity).

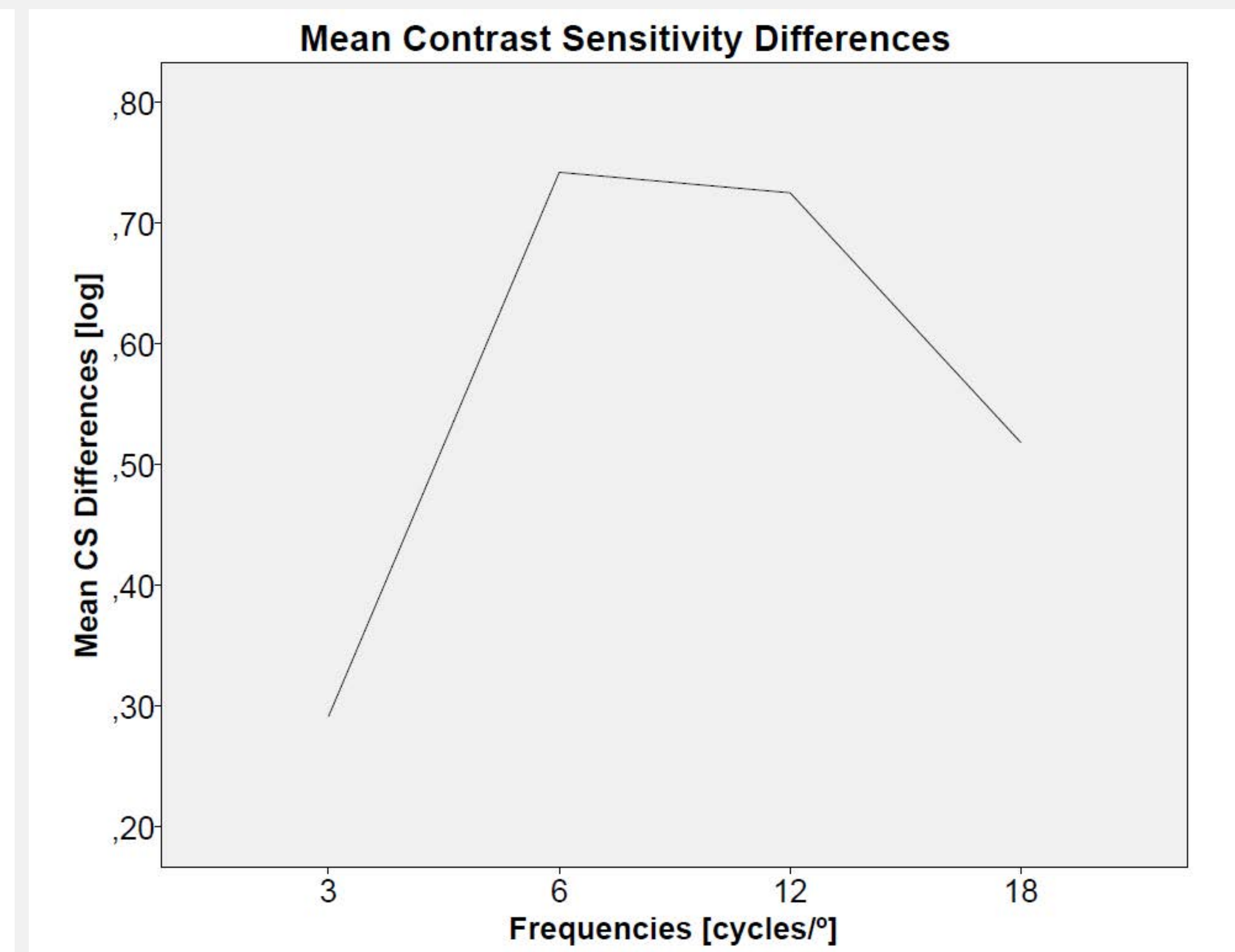


Figure 5: Mean contrast sensitivity differences curve between first and second session for BDCVA (Best Distance Corrected Visual Acuity).

	Visual Acuity		Contrast Sensitivity				Subjective Comparison	
	BDCVA	BDCNVA	A (3cyc/°)	B (6cyc/°)	C (12cyc/°)	D (18cyc/°)	Letter	Point light source
Mean								
Difference $\pm$ SD	$0.10 \pm 0.13$	$0.16 \pm 0.12$	$0.29 \pm 0.38$	$0.74 \pm 0.68$	$0.73 \pm 0.59$	$0.52 \pm 0.32$	$3.20 \pm 0.79$	$2.50 \pm 0.71$

Table 1: Mean Difference  $\pm$  SD between the first and the second session of the BDCVA (Best Distance Corrected Visual Acuity), BDCNVA (Best Distance Corrected Near Visual Acuity) in terms of Visual acuity; of each frequency in terms of Contrast Sensitivity; of both subjective comparisons.

**CONCLUSIONS:**

- The new instrument VirtIOL is a useful tool to predict the visual performance of a patient before surgery.
- Differences found between virtual and real implant are associated with a little opacification of the crystalline lens due to the age of the patients.
- The ideal candidate for MIOL simulation through VirtIOL instrument is the patient for Refractive Clear Lens Exchange.

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