

Smartphone Imaging in Ophthalmology: A Comparison with Traditional Methods on the Reproducibility and Usability for Anterior Segment Imaging

David ZY Chen, ^{1,2}MBBS, Clement WT Tan, ¹MMed (Ophth), FRCSEd, FAMS

Abstract

Introduction: This study aimed to determine the reproducibility and usability of anterior segment images taken from a smartphone stabilised on a slit-lamp with those taken from a custom-mounted slit-lamp camera. **Materials and Methods:** This was a prospective, single-blind comparative digital imaging validation study. Digital photographs of patients with cataract were taken using a smartphone camera (an iPhone 5) on a telescopic mount and a Canon EOS 10D anterior segment camera. Images were graded and compared according to the Lens Opacification Classification System III (LOCS III). **Results:** A total of 440 anterior segment images were graded independently by 2 ophthalmologists, 2 residents and 2 medical students. Intraclass correlation (ICC) between the iPhone and anterior segment camera images were fair for nuclear opalescence (NO) and nuclear colour (NC), and excellent for cortical (C) and posterior subcapsular (PSC) (NO: ICC 0.40, 95% CI, 0.16 to 0.57; NC: ICC 0.47, 95% CI, 0.16 to 0.66; C: ICC 0.76, 95% CI, 0.71 to 0.81; PSC: ICC 0.81, 95% CI, 0.76 to 0.85). There was no difference in grader impression of confidence and images usability between both cameras ($P = 0.66$ and $P = 0.58$, respectively). **Conclusion:** Anterior segment images taken from an iPhone have good reproducibility for retro-illuminated images, but fair reproducibility for NO and NC under low light settings. There were no differences in grader confidence and subjective image suitability.

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¹Department of Ophthalmology, National University Health System, Singapore

²Yong Loo Lin School of Medicine, National University of Singapore, Singapore

Address for Correspondence: Dr David Chen, Department of Ophthalmology, National University Health System, 1E Kent Ridge Road, Level 7, NUHS Tower Block, Singapore 119228.

Email: dzychen18@gmail.com