

## Commentary: Call for innovative indigenous ideas in smartphone ophthalmic imaging

The authors have highlighted an innovative concept of ocular imaging using smartphones alone, the approach is commendable for any ophthalmic setup in our country.<sup>[1]</sup> In literature, various techniques of anterior, as well as posterior segment imaging methods, have been described,<sup>[2]</sup> however, the major limitation of these techniques is the need for additional attachable tools.

In the above-described technique, image quality degradation concerning finer corneal and iris details are inevitable with induced magnification, however, this limitation in the future can be addressed by the evolving smartphone camera qualities. In ophthalmology, as far as possible we need magnified and clearer images to appreciate the clinical findings. At present using some or other forms of attachable tools we can acquire better quality images, one such example is the commercially available macro lens. It is a 10 × magnifying lens that can be clipped along the smartphone camera with an appropriate clip holder. This method provides better quality anterior segment images with minimally degraded clinical details even with increased magnification.<sup>[3]</sup> Similarly, assessment of anterior chamber angle,<sup>[4]</sup> iris torsion,<sup>[5]</sup> and toric intraocular lens alignment<sup>[6]</sup> is also possible using this technique. The above-described technique with smartphones alone can be explored in these areas to make the concept of comprehensive ocular examination using smartphones alone a reality.

In our field, in addition to anterior segment imaging, posterior segment imaging also carries equal importance. Quick and effective optic disc and retinal imaging are necessary for documentation, teaching, and also for comparison during follow-ups. In this aspect several sophisticated, customized optical attachments have been described and marketed (a few); however, as compared to anterior segment imaging posterior segment imaging is quite challenging, therefore, it requires a much simpler tool to make it an easy task. The iPhone X model comes handy in this aspect, due to the proximity of the camera and the light source, optic disc, retinal imaging from arcade to the arcade, and even montage creation is possible with this smartphone alone.<sup>[7]</sup> This utility has been extrapolated to video documentation (and standstill image acquisition as well) in adults as well in pediatric patients (more specifically during evaluation under anesthesia).<sup>[8]</sup> This concept is in line with the above-described technique of smartphones alone for ocular imaging. Therefore, smartphone alone based ocular imaging is not far from reality provided innovators across our nation work constructively and competitively to reach the goal.

It is high time for all our ophthalmic colleagues in India to develop, adopt, and showcase their innovative techniques of ophthalmic imaging, however, it requires certain prerequisites which makes them a globally valued concept. For example, 1) the ideas need to be innovative (most important), simple and should be replicable by any ophthalmologist with no less than standard qualities, 2) Cost of the imaging technique needs to be minimum which may or may not include an attachable tool, 3) the described attachable tools including smartphones should be widely available in the markets, 4) ophthalmic imaging using these tools if possible should be simple to be performed by a caregiver or paramedical personnel for better telemedicine consultations, and 5) easy internet storage and

online assessment need to be incorporated whenever possible. Therefore, by following these fundamentals technically appreciable innovations are possible.

At present, during this coronavirus pandemic, teleconsultations in the field of ophthalmology as well as in other medical subspecialties are often discussed. Therefore, constant, continuous, and constructive efforts by all the innovators and the clinicians will make the patient care easy and quick in coming days.

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Access this article online	
Quick Response Code:	Website: www.ijo.in
	DOI: 10.4103/ijo.IJO_920_20

Cite this article as: Pujari A, Sharma N, Bafna RK, Rani D. Commentary: Call for innovative indigenous ideas in smartphone ophthalmic imaging. *Indian J Ophthalmol* 2020;68:2250.