

## Ophthalmoscope: Is It Still Relevant Imaging Device?

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The invention of the ophthalmoscope by Helmholtz has a long history starting from 1851 [1-3] and it was highly evaluated by American physician Edward Loring, who wrote in his Textbook of Ophthalmology in 1892. "In whole history of medicine there is no more beautiful episode than the invention of the ophthalmoscope, and physiology has few greater triumphs" [4].

Despite developmental changes during more than 150 years after the invention it is an important instrument in ophthalmic diagnostic armamentarium used by medical students, residents, general practitioners, optometrists, general ophthalmologists. It is impossible to overestimate the significance of ophthalmoscopy for accurately diagnosis of myriad of posterior segment diseases, ocular manifestations of systemic diseases (diabetes mellitus, systemic hypertension), and at the same time an unique visualization of the alive person's vessels taken into account that the retina is a window into the brain. Additional advantages of the direct ophthalmoscope are the following: portable, non-heavy, rechargeable, non-expensive.

However, there are several limitations for the device: it requires dilated examination for detailed view of the macula and retinal periphery, which could predispose to iatrogenic angle-closure attack, cause transiently blurred vision and subsequent driving difficulties, furthermore requires dilating drops and increasing waiting time, and the most significant from the medical point of view, this exam results are monocular with lack of stereopsis, non-recordable with no objective value for the patient management and monitoring. These findings underscores the importance of addressing new approaches to fundus exam. Throughout recent decades, an exponential development of new technologies, specifically such as OCT, OCT-angiography [5-8] has revolutionized the way ophthalmologists detect and treat diseases back of the eye. The spread of these new technologies enables novel ways of delivering treatment, monitoring compliance, and measuring outcomes, but aforementioned impactful imaging devices could not to replace an ophthalmoscopy. The question is how the technological innovations will be incorporated in the process of ophthalmoscopy as an instrument of telemedicine in teleretinal screening and telemonitoring. In the long run, this would provide earlier detection of referable eye disease increasing the discoverability and decrease overall healthcare costs taken into account the aging population.

At present, we need a modern non-invasive (without dilation), time-saving, cost-effective retinal exam. For this purpose, was invented and is currently available the non-mydratic automatic fundus camera, which gives an opportunity to view the fundus on an electronic screen and keep the records for follow-up and send the image on-line for remote consultation, and is a user-friendly [9], but the main obstacle in wide use of this device is a high cost.

Another non-expensive option is the Portable Eye and Retinal Imaging System - Fundus Smartphone Adapter easily attached to an Apple or Samsung smartphone [10], which serves to aforementioned purposes. Proposed millennial-minded approach will allow an affordability, improved eligibility for timely intervention in ophthalmic patients with posterior segment diseases and heighten an efficacy of human resources (general practitioner and other primary health care providers, ophthalmologists) exploitation finalized by high visual outcomes in patients and decrease of visually disabled handicaps, with high economic impact.

Answering the title question, the classic direct ophthalmoscope is not currently relevant imaging device, it will be replaced by portable digital retinal imaging devices, as a phone invented by Bell is replaced by cellular phones, but despite this replacement ophthalmoscopy will remain the universal method of eye examination.

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