Fundus camera

Fundus cameras are widely used in clinical routine for imaging the retina as fundus photographs, reflectance photographs and fluorescein angiography.

Fundus cameras use a single flash to capture images from large retinal areas.

When confocal optics are not available, the autofluorescent signal from all the ocular structures with fluorescent properties reaches the camera, and scattered light, anterior and posterior to the plane of interest can influence the detected signal[(25-27)].

The lens contributes significantly to the autofluorescent signal when similar wavelengths are used in the blue-range, as for the cSLO (λ = 488 nm), particularly in older patients with lens yellowing and nuclear opacities.

Flashlight intensities and detector gain have to be set at relatively high levels in order to obtain reasonable FAF images.

However, the signal-to-noise ratio decreases simultaneously which may result in reduced image quality.

To reduce interference from lens fluorophores which mainly emit in the range between 510 to 670 nm, Spaide modified the excitation filter (peak 580 nm, bandwidth 500-610 nm) and the barrier filter (peak 695 nm, bandwidth 675-715 nm).

A further modification was introduced in 2007 using a slightly different filter set (excitation bandwidth 535-580 nm, emission bandwidth 615-715 nm)[(28)], thus improving signal-to-noise ratio and image quality.

Furthermore, as this setup of the fundus camera uses different excitation and emission filters compared with the cSLO, it may even visualize other retinal fluorophores.

However, a systematic comparison of different pathologies with clinico pathological correlations between cSLO and fundus camera, particularly in patients with AMD, has not yet been performed.

Originally, a fundus camera that enabled imaging with a field of 13º was used.

Recently, Spaide has obtained images of the spatial distribution of FAF intensities over larger retinal areas up to 50º with his new modified fundus camera[(25-28)].

In the near future we may improve FAF imaging with the aid of scientists and investigators developing filters and some other innovations, and increased experience.

Furthermore, it is already possible to visualise different fluorophores from the retina with the configuration of the fundus camera using excitation and emission filters for the cSLO.

A systematic comparison of clinical images with different pathologies obtained by the cSLO and the fundus camera, (especially in AMD patients) has not been performed yet.

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