Ophthalmology Times
EUROPE

Products in PRACTICE

The diagnostic power of Multicolor imaging for SPECTRALIS OCT

Issue 2
www.oteurope.com
ADVANSTAR

The diagnostic power of MultiColor imaging for SPECTRALIS OCT

By Professor Sebastian Wolf, MD, PhD, University of Bern, Bern, Switzerland.

MultiColor Scanning Laser Imaging is the new colour fundus imaging option for the SPECTRALIS OCT family of products. It adds a new dimension to the multimodality imaging platform by combining simultaneous SD-OCT and selective colour fundus imaging.

All SPECTRALIS models (OCT, OCTPlus, HRA and HRA+OCT) can now be delivered with this new feature — or be ordered with an Advanced Upgrade Package that allows an upgrade to MultiColor at a later point.

MultiColor imaging uses multiple laser colours simultaneously to selectively capture and display diagnostic information originating from different retinal structures within a single examination, revealing diagnostically relevant details that are often hard to spot in corresponding classic colour fundus photographs.

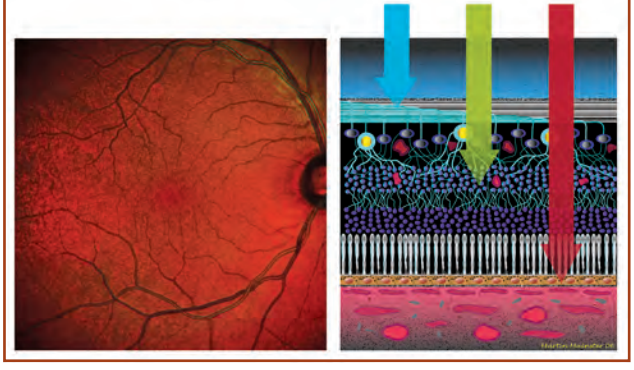
This article will outline the basics of MultiColor imaging, highlighting advantages and presenting latest experiences.

Background of MultiColor Laser Scanning Imaging

MultiColor images are composed of three reflection images that are acquired simultaneously with three separate lasers: A blue, a green and an infrared laser. Each laser penetrates to a different depth within the retina, capturing distinct information originating from different layers and structures within the retina. The infrared laser penetrates the deepest providing images of the retinal pigment epithelium (RPE) and the choroid and is particularly useful for imaging drusen. The green laser is highly absorbed by haemoglobin and provides details on blood vessels, blood and exudates. The blue laser captures details of superficial retinal structures such as epiretinal membranes, the retinal nerve fiber layer (RNFL) and macular pigment (Figure 1).

The three separate scanning laser images are combined to a MultiColor image. Due to the confocal scanning laser technology of the SPECTRALIS and the active live eye-tracking in combination with the Heidelberg noise reduction technology the images are rich in contrast, even in patients with moderate media opacities, for example with a cataract. The MultiColor images are automatically colour-balanced to match the overall appearance of a traditional colour fundus photograph, with the exception that the optic disc colour does not match its natural appearance. Users can choose to display a MultiColor image simultaneously with an OCT cross sectional image, or view the combined colour image together with the images of the individual laser colours to gain a better understanding of anatomic and pathologic detail at different depths within the retina. These options allow the user to identify abnormalities quickly and reliably. (Case 1).

Figure 1: Selective depth imaging with simultaneous blue, green and infrared laser scanning.



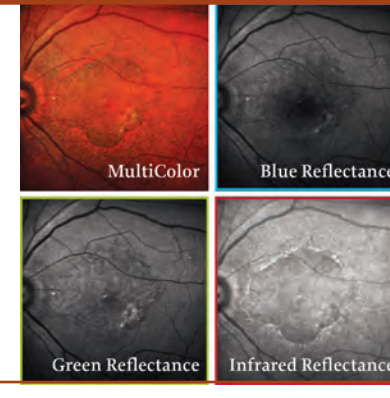
Benefits across a range of diseases

Users can acquire an OCT scan directly on the live MultiColor image. This allows to quickly analyze abnormal structures. MultiColor images can be acquired without dilating the pupils of the patient, which makes MultiColor a useful standard imaging modality in every setting. Camera alignment and acquisition of MultiColor images is easy because of the continuously scanning laser system that delivers a live fundus image.

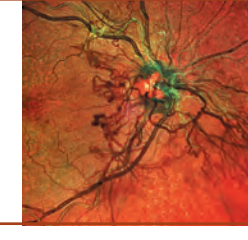
The benefit of MultiColor in clinical practice is its capability of highlighting diseases found to be more difficult to recognize in traditional colour fundus photographs.

MultiColor imaging is particularly helpful with diabetic patients, for detecting and managing retinovascular diseases and for

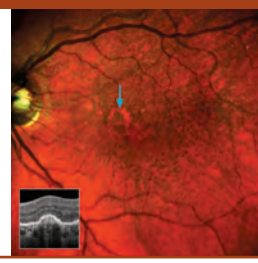
Case 1: A MultiColor image is composed of a blue, green and infrared reflectance.



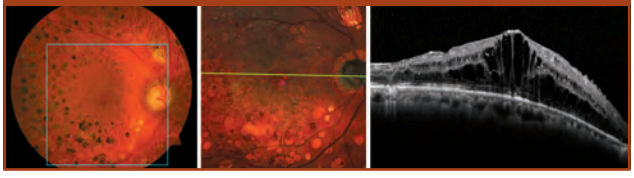
Case 2: The high contrast of the MultiColor image makes it easy to identify neovascularizations in a patient with proliferative diabetic retinopathy.



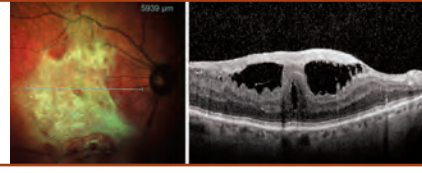
Case 3: Reticular drusen and RPE elevation.



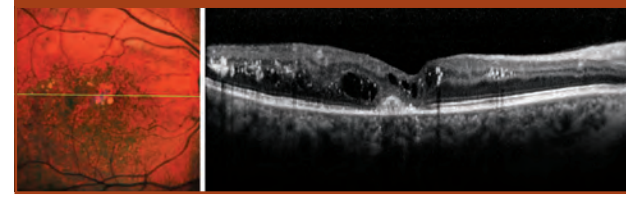
Case 4: Patient with diabetic macular oedema and fibrotic tissue after laser coagulation. The MultiColor image highlights the abnormal area in the fovea.



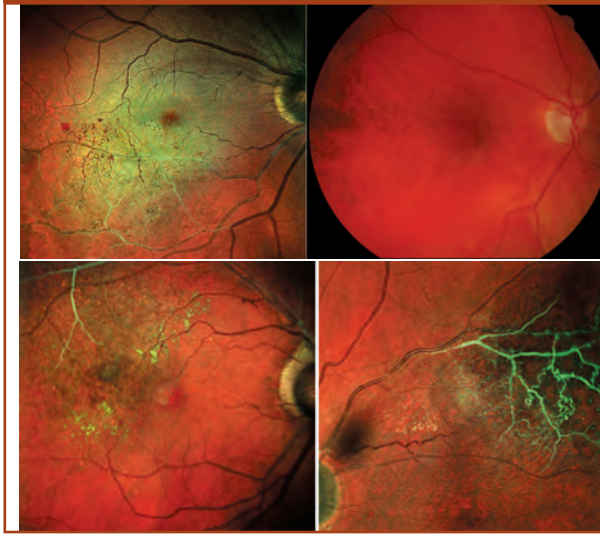
Case 5: The MultiColor image highlights an area affected by a disorder of the vitreomacular interface. (Image courtesy of M. Radda, Vienna, Austria.)



Case 6: Simultaneous MultiColor and SD-OCT image in a patient with diabetic retinopathy.



Case 7: Retinal vein occlusions are highlighted in the MultiColor image and are difficult to recognize on the colour fundus image



monitoring patients with age-related macular degeneration (AMD). In patients with diabetic retinopathy MultiColor makes detection and monitoring of microvascular changes, neovascularizations and hemorrhages easy. (Case 2)

The precision of MultiColor imaging has been demonstrated in various instances. The early stages of AMD are characterized by drusen and hyper- or hypo-pigmentation of the RPE. The deep penetrating infrared laser combined with the other colours allows excellent visualization of drusen and reticular drusen that are often difficult to spot with other imaging modalities. (Case 3)

MultiColor images highlight many structural changes in the retina. The single colour reflection images make a quick and detailed analysis of pathologies possible while the MultiColor image contains the combined information from the selective colour images. (Cases 4 and 5)

The highly detailed MultiColor images are useful for monitoring and management of patients with diabetic retinopathy. Hard exudates and signs of bleeding are visible in both fundus and MultiColor images. However, the full extent of the structural change is visible in the MultiColor image, which also shows the highly reflective macular alterations. The SD-OCT image captured simultaneously confirms intra-retinal cysts in this area (Case 6).

For patients with retinovascular diseases such as retinal vein occlusions, MultiColor imaging is superior to traditional fundus photographs, where these pathologies are often recognized with some experience of the examiner only. The high contrast and selective colour information in MultiColor images make it easy to precisely spot retinovascular changes. (Case 7)

Great possibilities — outlook

Adding MultiColor imaging to standard examinations of patients has found its entry in daily practice routine. MultiColor images are similar to fundus images and the ability to capture these at the same time as OCT images in a non-invasive, non-mydriatic way is an important benefit.

Many diseases are highlighted in MultiColor images due to the selective laser colours penetrating into different depths of the retina. In addition, the capability of viewing separate images for each laser colour makes it possible to perform a closer analysis of the information that is combined in the MultiColor image.

This innovative new imaging modality expands the diagnostic portfolio of eyecare professionals with a tool that further improves the diagnosis and management of patients.

HEIDELBERG ENGINEERING

More information:

Heidelberg Engineering GmbH
Tiergartenstrasse 15, 69121 Heidelberg, Germany
Tel.: +49 6221 64 63 0 **Fax:** +49 6221 64 63 62
E-mail: sales@HeidelbergEngineering.com
Website: www.HeidelbergEngineering.com

SPECTRALIS OCT

What an OCT should have: SPECTRALIS OCT

For accurate diagnosis and individualized treatment of patients, the precise detection of even smallest structural changes is vital.

All SPECTRALIS models offer the unique AutoRescan function that enables the system to track retinal changes with high precision. The Active Live Eye Tracker positions the follow-up OCT cross sectional scans accurately on the very same spot of the retina every time a patient is imaged. This way, the system ensures that the changes detected in morphology and thickness are associated with true pathology and not motion artifact. Changes in retinal nerve fibre layer as small as 1 µm can be reliably detected, aiding the early diagnosis of glaucoma.

MultiColor Laser Scanning Imaging and Non-Contact Ultra-Widefield Angiography are the latest options added to the modular SPECTRALIS product family.

With MultiColor laser fundus imaging, the specific laser colours capture information from different depths and structures of the retina and create detailed, high-contrast fundus images. MultiColor is available for all SPECTRALIS models.

The new Ultra-Widefield Angiography Module captures images contact-free. The result is distortion-free, high contrast FA and ICGA images that are evenly illuminated out into the far periphery — all with the simple exchange of a lens. All HRA2 and SPECTRALIS angiography models can be upgraded with the new module — a cost-effective alternative to separate widefield imaging devices.

HEIDELBERG ENGINEERING

Heidelberg Engineering GmbH
Tiergartenstr. 15, 69121, Heidelberg, Germany
Tel.: +49 6221 6463 0
E-mail: Sales@HeidelbergEngineering.com
Website: www.HeidelbergEngineering.com

A reprint from issue 2 of
Products in PRACTICE
Published by
Ophthalmology Times EUROPE
ADVANSTAR