

Real World Experience with the ZEISS CLARUS 500

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CLARUS® 500 from ZEISS is a new iteration of ultra-widefield imaging providing high resolution, true color imaging of the periphery and posterior pole. ZEISS CLARUS 500 can image 133 degrees in a single image or 200 degrees in a montage of two sequential images. Fundus autofluorescence, stereoscopic photography and external imaging provide auxiliary modalities to aid in disease detection and management.

In this article, Drs. Daniel Epshtein and Patricia Fulmer highlight what makes the CLARUS 500 unique in the world of ultra-widefield imaging, and share clinical cases where CLARUS 500 has been used in their practices.

How is the ZEISS CLARUS 500 different from a standard fundus camera?

Dr. Fulmer: The most obvious difference is the ability of the ZEISS CLARUS 500 to take 133° single images or 200° montaged images. A standard fundus camera is capable of acquiring images up to 50°. The increased retinal area really helps document peripheral disease without putting the patient through multiple image acquisitions and flashes.



Figure 1: Inferior temporal retinoschisis status post laser retinopexy.

Dr. Epshtein: I would like to echo Dr. Fulmer on this one; the ZEISS CLARUS 500 makes it very easy to capture a tremendous field of view while maintaining high-quality optics. The optics are especially important to me because it allows me to manage peripheral retinal disease, macular disease, and optic nerve disease without having to use multiple fundus cameras. Here I have two cases, the first (Figure 2) is an advanced case of glaucoma where one can really appreciate the cup excavation on the

stereographic photos, and the other (Figure 3) is a patient with both macular and peripheral diabetic retinopathy. The ability of one instrument to capture high-quality images of both the optic nerve and peripheral retina is astounding.

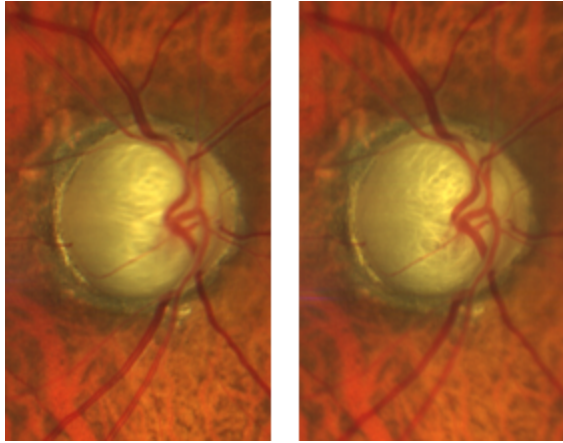


Figure 2: Stereographic images of advanced cupping in a patient with glaucoma.

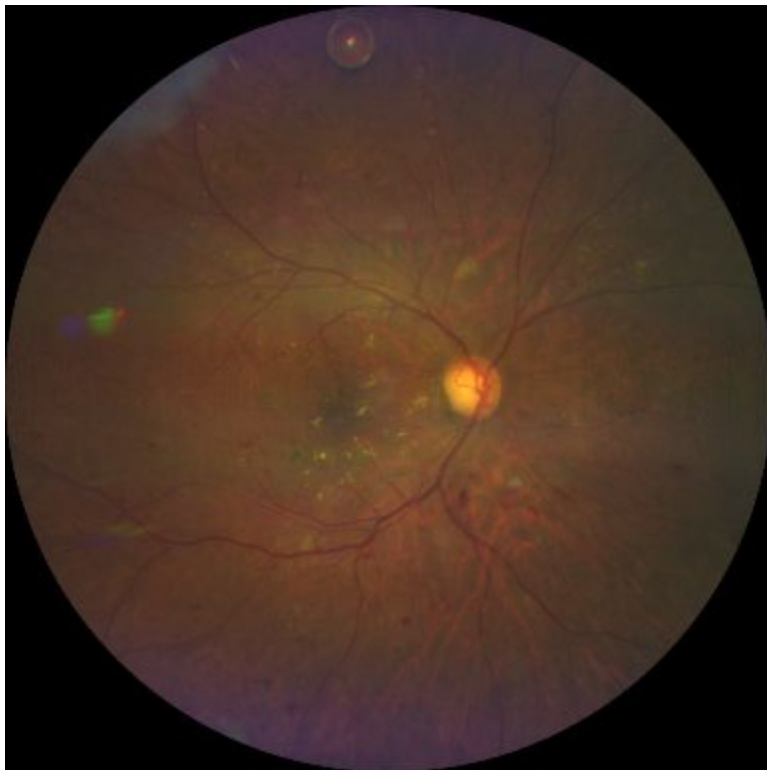


Figure 3: Central and midperipheral diabetic retinopathy imaged through a grade 3 nuclear sclerotic cataract. Note the bolus of Avastin superiorly.

How is the CLARUS 500 ultra-widefield retinal camera different from other systems?

Dr. Epshtein: The true color imaging and high-quality optics are two aspects of the CLARUS 500 that really make it a game changer for me. The images accurately depict the retina, as you would see during the dilated fundus exam, so there is no need for interpretation of the images. This removes another subjective factor when managing disease, especially in a group practice where many doctors may see one patient.

Dr. Fulmer: The ease of use of this instrument is amazing. The CLARUS 500 has a chin rest and joystick approach (Figure 4) that makes it easy to image all patients; old, young, and those with neck or back issues.



Figure 4: Real and schematic images of the ZEISS CLARUS 500.

What is your favorite aspect of the CLARUS 500?

Dr. Epshtein: My favorite aspect of the CLARUS 500 is its unique optics. This system uses partially confocal optics to reduce optic nerve head bleaching and artifacts from lids and lashes. In my practice, many of my patients have cataracts, and I have found that the images with this camera do not seem to be affected as much by media opacities as my other fundus camera.

Dr. Fulmer: The true color imaging is definitely my favorite part of using the CLARUS 500. It makes image analysis and patient education extremely easy. The ability to take anterior segment images is also a great addition, it separates this ultra-widefield system from the others on the market. Having anterior and posterior segment imaging capabilities really streamlines patient education because I no longer have to use an eye model or wordy explanations.

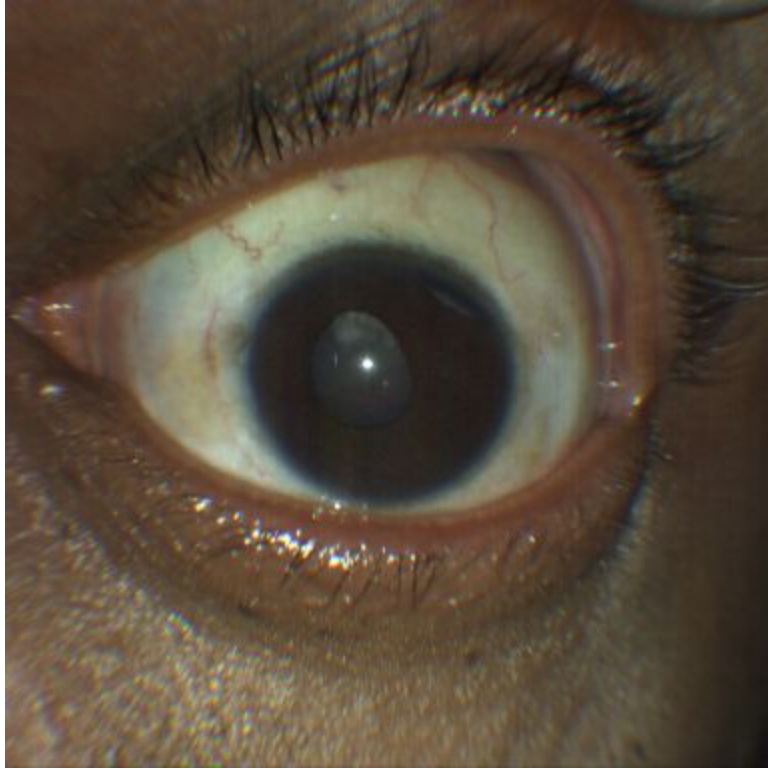


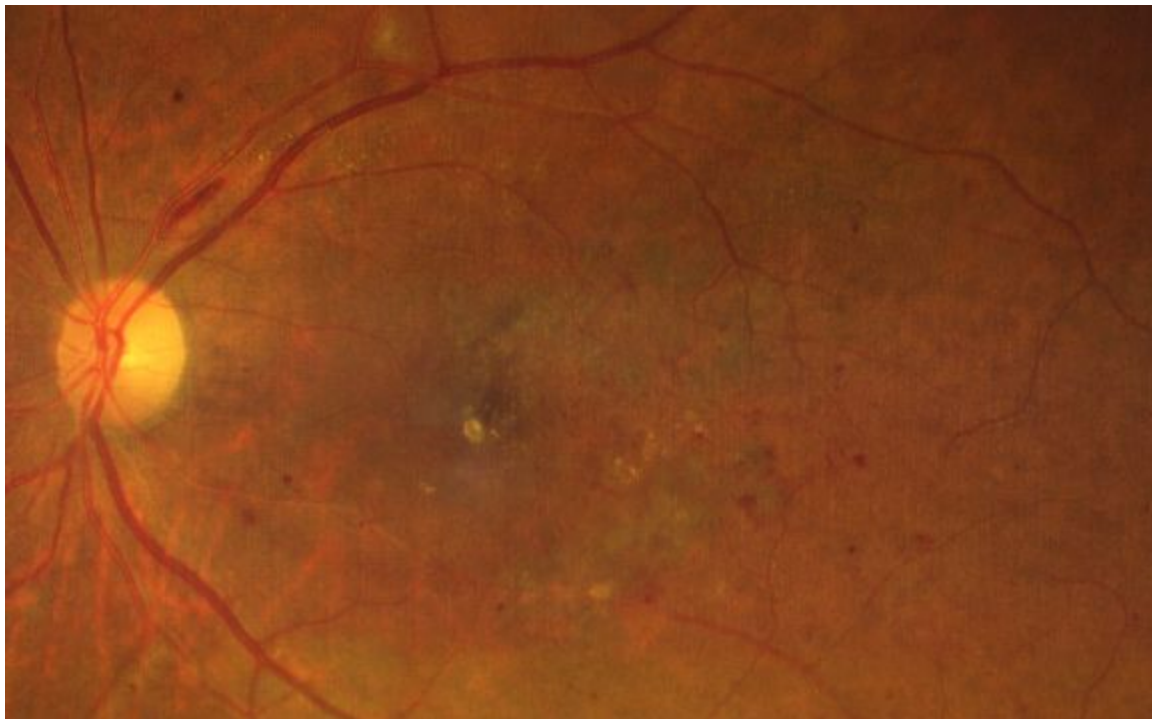
Figure 5: Anterior segment images of traumatic cataract and superior iridodialysis.

What conditions has the CLARUS 500 helped you manage?

Dr. Epshtein: I see many diabetic patients, and being able to document their retinopathy is very important to me. Patients with peripheral retinopathy or those with high microaneurysm turnover are more likely to progress to vision threatening disease compared to nonproliferative diabetic retinopathy patients without these features. I use the CLARUS 500 in combination with OCT to closely monitor my diabetic patients who are at higher risk for vision-threatening disease.



Figure 6: Above, a widefield image reveals midperipheral and central diabetic retinopathy. Below, the central portion of the same image magnified to reveal significant central pathology. (Manipulation of images can be easily performed on the CLARUS 500 unit and on a computer with the review software installed)



Dr. Fulmer: In my practice we have a lot of patients with age-related macular degeneration so the CLARUS 500's fundus autofluorescence capabilities have been fundamental to how I now manage AMD. I can accurately document RPE changes, drusen, and geographic atrophy with the true color imaging and then FAF gives me prognostic information. If there are areas of hyper autofluorescence then I know that that patient is more likely to progress. I have also found FAF useful in differentiating small areas of geographic atrophy from drusen or RPE changes

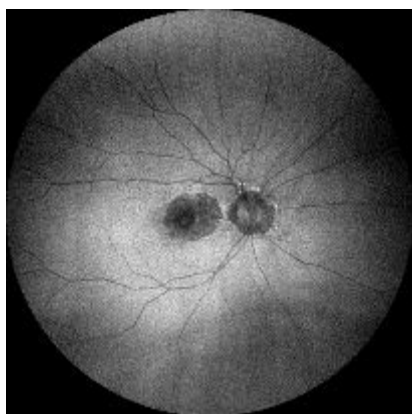


Figure 7: Widefield FAF imaging reveals hypo autofluorescence with surrounding hyper autofluorescence.

Speaking of fundus autofluorescence, Dr. Epshtein, how are you using the fundus autofluorescence capabilities of the CLARUS 500?

Dr. Epshtein: In my practice I see a lot of chorioretinal scars and pachychoroid spectrum disorders such as central serous chorioretinopathy and pigment epithelium detachments. When you first detect these retinal changes, it is hard to answer patients when they ask if this condition will lead to vision loss. Using the ultra-widefield FAF capabilities of the CLARUS 500, I am able to detect retinal damage from any previous episodes of central serous chorioretinopathy or pigment epithelium detachment in both the acutely affected eye and the fellow eye.

Oftentimes, there are signs of retinal atrophy, which are invisible to ophthalmoscopy but easily visualized with fundus autofluorescence. Depending on the amount and level of retinal atrophy, I am often able to give the patient a more accurate visual prognosis. Going along with the theme of invisible to ophthalmoscopy but identifiable with FAF, I image all chorioretinal scars with both color and FAF now. The images are easy to acquire even with peripheral lesions due to the ultra-widefield capabilities of the CLARUS 500, and I have been acquiring a lot of great information. The patient referenced below (Figures 8 and 9) had a chorioretinal scar in the left eye that I saw with funduscopy and decided to document with the CLARUS 500. The FAF image showed some hyper autofluorescence which made me a little more cautious in determining how often to monitor this patient. I then reviewed the right eye FAF image, which revealed a lesion that I missed on both funduscopy and color imaging. The fact that the patient had chorioretinal lesions in both eyes and that each lesion had hyper

autofluorescence increased my suspicion that these changes might be due to an ongoing process so I became certain that monitoring her more closely was warranted.

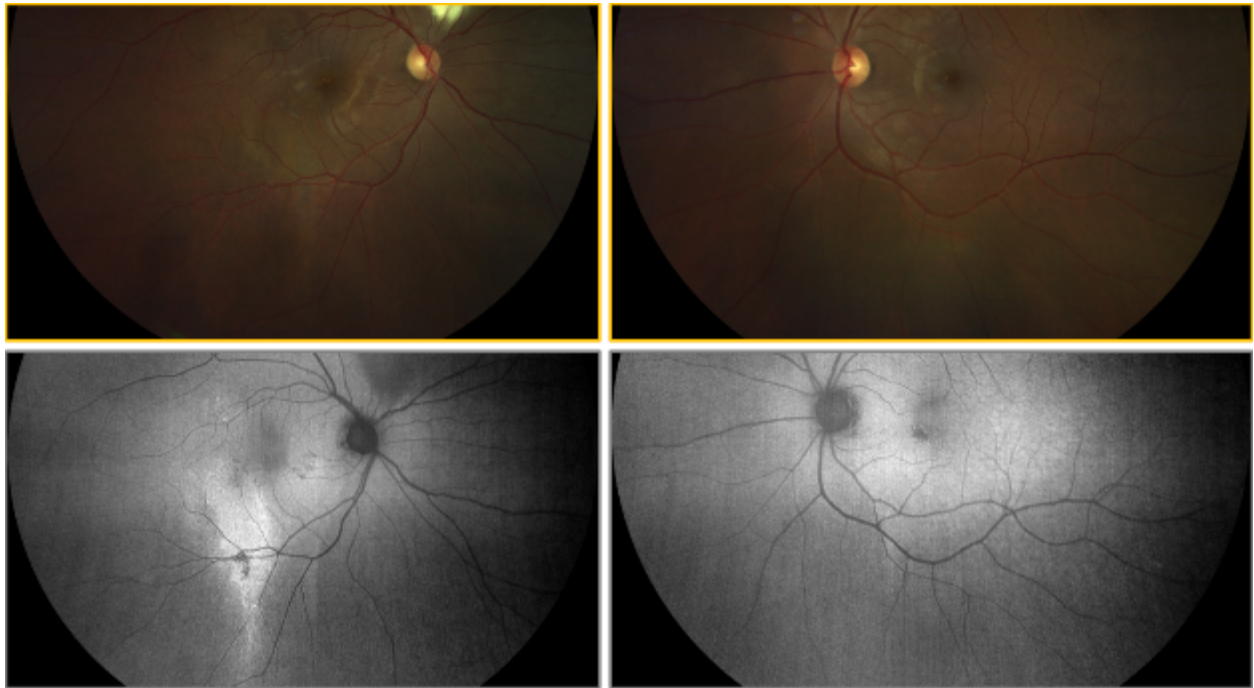


Figure 8: Widefield FAF reveals extensive RPE alterations OD. A focal area of hypo autofluorescence is noted parafoveally OS which was invisible to ophthalmoscopy and color photography.

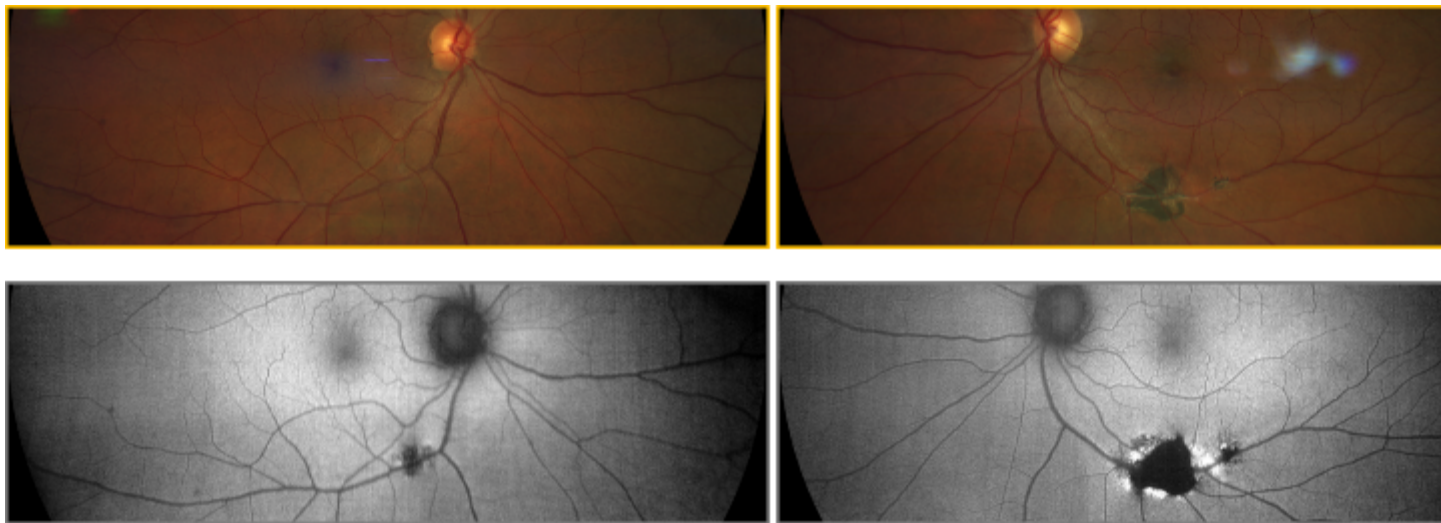


Figure 9: Cropped widefield images reveal chorioretinal scarring which was initially noted OS only during funduscopy. Subsequent, FAF imaging revealed RPE degeneration OD as well. Note the hyper autofluorescence, surrounding each area of RPE atrophy, which is often a sign of a metabolically active retina and progression.

Are there certain cases that you can think of where CLARUS 500 really made a difference in your management of that patient?

Dr. Fulmer: There was a patient in our practice due for a routine eye examination. He had refused dilation and we took undilated images with the CLARUS 500 (Figure 10) and noted a lesion on the border of the posterior pole in the left eye. The patient denied symptoms of retinal detachment, but was extensively educated on the need for a dilated fundus exam. He still deferred dilation but agreed to come in the next day at which he was dilated and an elevated retinal lesion was noted. Luckily for him, the lesion was a retinoschisis that did not require treatment. Without the widefield image, I do not think we would have been able to convince him to return for a dilated exam. Fortunately, there was no acute disease but now he understands the importance of periodic dilated funduscopy to prevent vision threatening disease.

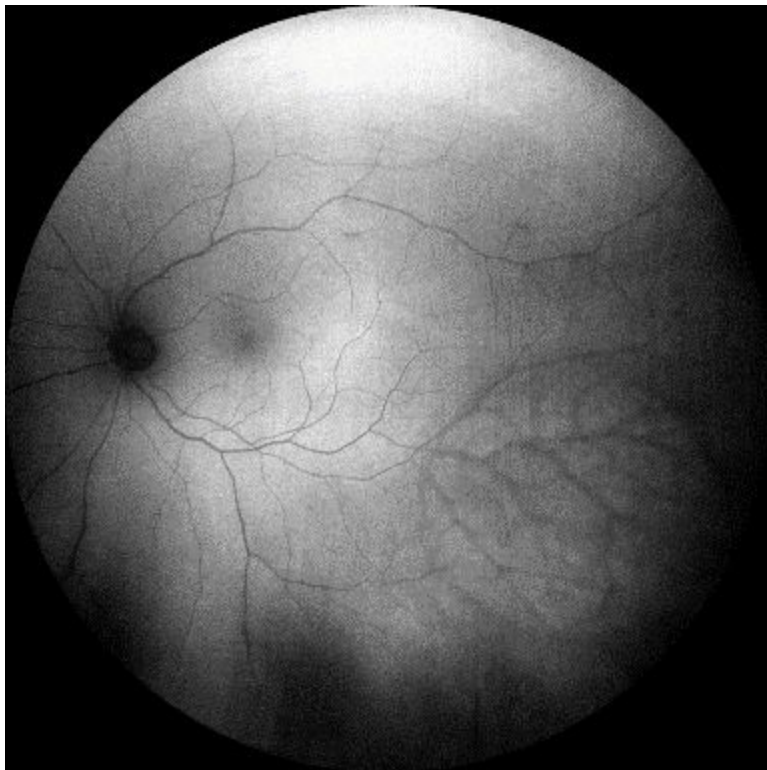


Figure 10: Inferior temporal retinoschisis in a patient who initially refused dilation.

Dr. Epshtein: I have this one case that always stands out in my mind. I had a 33 year old male complaining of longstanding redness in both eyes that had waxed and waned for about a year. Upon examination, he was extremely photophobic and difficult to examine, but it was clear he had a significant uveitis in both eyes. He had large keratic precipitates and synechiae of both eyes. I dilated him, hoping that the cycloplegia would reduce his photophobia and allow me a more thorough examination. Even after waiting for effects of full cycloplegia, the patient was extremely photophobic and I could not obtain a sufficient view of the posterior pole. I decided to take an ultra-widefield image, which revealed a vasculitis in his right eye. Seeing the posterior inflammatory changes not only helped guide my ocular inflammatory workup, it also increased my urgency in getting this patient treated. Though any fundus camera flash is bright, photophobic patients often prefer one or two quick bursts of light compared to a continuous

examination with a slit lamp; in this case ultra-widefield imaging really made a difference in patient management.

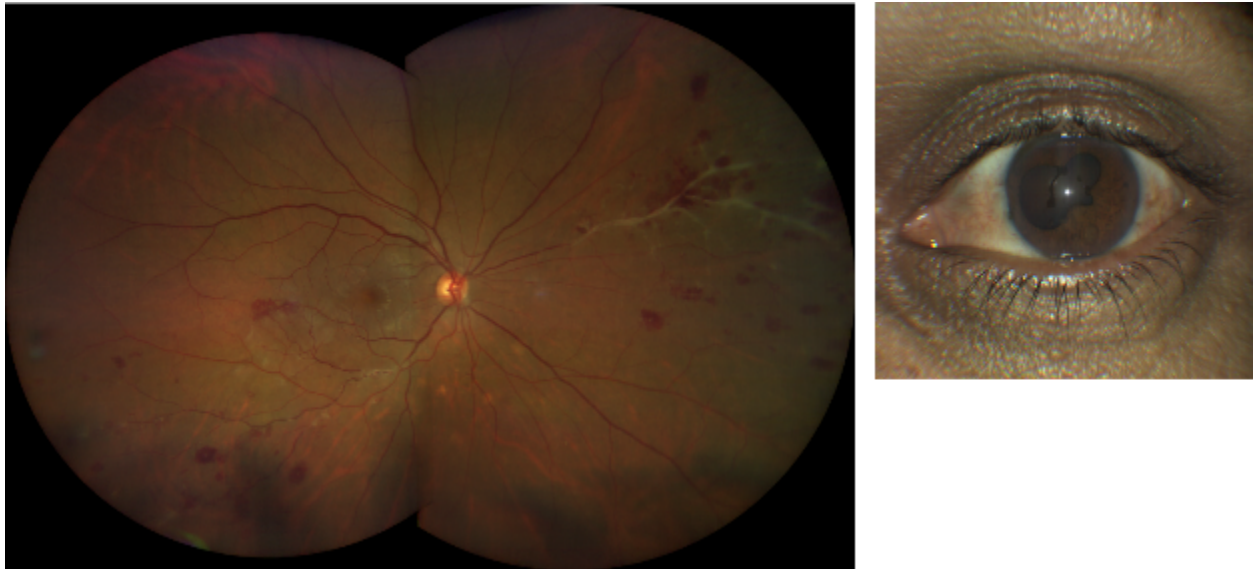


Figure 11: Left, ultra-widefield imaging reveals two areas of vasculitis in a photophobic patient. To the right, anterior segment imaging with the CLARUS 500 reveals posterior synechiae.

How did you integrate the CLARUS 500 into your respective practices?

Dr. Fulmer: In my office, we are using the CLARUS 500 for two purposes. It has become my primary fundus camera used to document pathology ranging from glaucomatous cupping, drusen, and diabetic retinopathy to lattice degeneration, retinal detachment, and retinoschisis. Secondly, we have a screening protocol where we use the CLARUS 500 in patients who refuse to be dilated. Being in Alabama, the vast majority of my patients drive themselves to their appointments. This becomes an issue because they defer dilation due to their need to drive back home. With the CLARUS 500 ultra-widefield capabilities, I am able to see a significant portion of the patient's retina without dilation. Though I always stress that dilation is imperative to evaluating one's ocular health, some patients will still refuse the dilated fundus exam. With these patients, I believe that ultra-widefield imaging gives a tremendous amount of information that I would not have otherwise and the screening protocol is another source of revenue for the practice.

Dr. Epshtein: Similar to Patricia, the CLARUS 500 became my primary fundus camera. I document an abundance of pathology with this system. At my practice, we have many different instruments and all the technicians have commented on how easy it is to get clear images with this system. This made integration of the system into our office very easy once the technicians had their initial training. The fact that my technicians are happy using the CLARUS 500 makes me also happy.

How does CLARUS 500 software assist in clinical practice?

Dr. Fulmer: I am a big fan of the CLARUS 500 review software. I work in a group practice where multiple doctors are sharing the same imaging equipment. Image review on the instrument itself is difficult because there are often patients waiting to be imaged on the device. In my office we have the CLARUS image review software installed in each exam room so that I can review images without disrupting the office workflow. I am able to zoom in on specific lesions, compare images across different exam dates, and add annotations to images as if I am viewing the images on the CLARUS itself. Having the ability to show and manipulate images in the exam room is an incredible patient education tool that really simplifies my life.

With the introduction of the CLARUS 500, ZEISS continues to advance its comprehensive suite of diagnostic equipment. Ultra-widefield technology, like OCT before it, continues to improve and the CLARUS 500 is the newest generation of this technology; offering high-quality optics in a patient- and operator-friendly system.

Disclaimers:

The statements of the doctors in this article only reflect their personal opinions and experiences and do not necessarily reflect the opinions of any institution with whom they are affiliated. The doctors interviewed in this article have a contractual relationship with Carl Zeiss Meditec and have received financial compensation.

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