Widefield Patient Care

Pete Kehoe, O.D., FAAO, FNAP, Kehoe Eye Care

KEHOE EYE CARE
A MEMBER OF VISION SOURCE

Background

Retinal imaging has long been a standard for detecting and monitoring the presence of retinal disease. For many decades, fundus cameras have provided a view of the central posterior pole of the retina. The advent of ultra-widefield (UWF) scanning laser ophthalmoscopy (optomap®) has advanced the ability to see 200˚ of the retina.

It has long been acknowledged that this technology allows for more of the retina to be captured in a single non-mydriatic image that can be easily manipulated for the evaluation of retinal pathology. Several recent studies have demonstrated the use of the technology in place of gold standard methods and the value of UWF for early detection and enhanced management of retinal disease .

One question that is frequently asked is “How much more pathology does the UWF allow you to see in an average patient?”

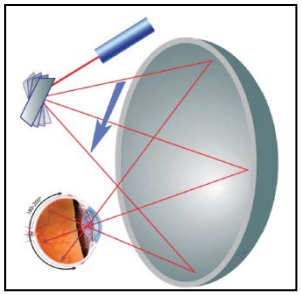
Purpose

To evaluate published literature that includes ultra-widefield retinal imaging to determine the prevalence of pathology in the peripheral retina and determine significance in clinical practice.

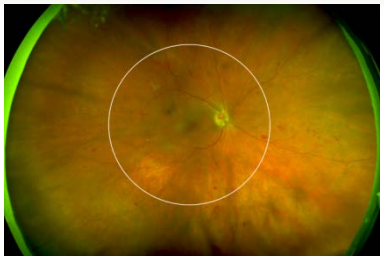
Methods

All peer-reviewed publications were reviewed from a 3 year period to determine if prevalence of peripheral pathology was reported. Peripheral pathology was defined as lesions outside of 60˚ of the optic nerve head. 222 studies were reviewed. 35 studies met inclusion criteria (specifying percentage of peripheral pathology). 3 studies were not included in final results as they did not provide a usable delineation of peripheral vs central pathology.

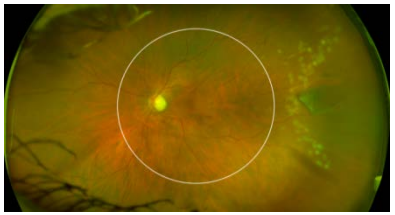
Optos Daytona device



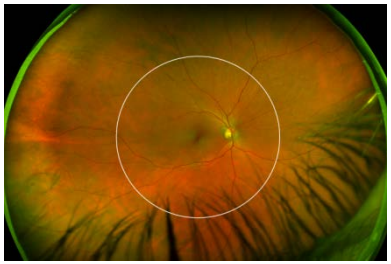
Schematic of UWF imaging using an ellipsoidal mirror. A laser light source is reflected off the galvanometer mirrors onto an ellipsoidal mirror. The second focal point of the mirror resides within the eye, which facilitates image acquisition anterior to the equator.



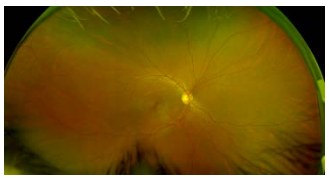
PDR with peripheral hemorrhages found outside the 60˚ field

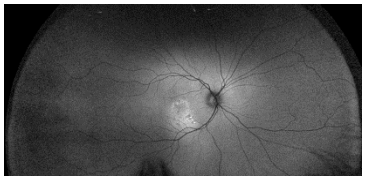


Horseshoe tear in the far periphery found outside the 60˚ field



Retinal hole found outside the 60˚ field





Daytona system also captures UWF autofluorescence which allows for assessment of additional information able to be captured during exam.

Images above show extent of damage caused by central serous chorioretinopathy, not apparent on color images.

Results

The review of 32 studies performed over a 3 year period, established that imaging of the retinal periphery found an average of **66.43**% of retinal findings fell outside of 60˚ . The analysis included 3602 eyes.

22% (7/32) of the studies evaluated the extent of peripheral retinal changes associated with age-related macular degeneration including hard and soft drusen, RPE changes, atrophy, neovascularization. An analysis of these studies concluded that optomap imaging reveals an additional 78% of retinal changes.

19% (6/32) of the studies evaluated the extent of peripheral retinal changes associated with diabetic retinopathy including hemorrhages, microaneurysms, IRMA, NVE, non-perfusion, hard exudates and venous beading. An analysis of these studies concluded that optomap imaging demonstrates an additional 37% of retinal lesions.

One study focused on the imaging of pediatric patients found that optomap imaging provided 75% more perceivable retinal disease than traditional imaging methods.

Additional studies found the following percentages of additional pathology in the periphery: Uveitis – 23%, VKH – 70%, Alzheimers – 25%, CMV retinitis – 64%, RVO - 38%.

Conclusions

The extent of research into the disease manifestations in the retinal periphery has significantly increased in recent decades. Traditional methods do not allow for easy and accurate assessment of peripheral retinal changes and as such, research in this area has been limited.

This analysis demonstrates that these changes, when quantified across various disease areas, found 66.43% retinal findings were identified outside of the retinal area captured by traditional imaging methods.

Many of these studies conclude that not only is optomap imaging an effective tool for quantifying this information, but that there is strong evidence to suggest that this additional information will impact the ability to manage disease progression.