



SDI Review Form 1.6

Journal Name:	Ophthalmology Research: An international Journal
Manuscript Number:	2013_OR_7008
Title of the Manuscript:	Multimodal Views of the Human Retina
Type of the Article	Research Paper

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

To know the complete guideline for Peer Review process, reviewers are requested to visit this link:

(<http://www.sciencedomain.org/page.php?id=sdi-general-editorial-policy#Peer-Review-Guideline>)



SDI Review Form 1.6

PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	I suggest to rewrite the Abstract because to state the "...results are neatly organized in Figures 3 and 4" is not informative enough for the readers	This is the new results section. Results: The retinal literature is full of contradictory nomenclature. For example, clinicians use the term fovea to name the 1° diameter disk at the very center of the retina and they use the term macula to name the 5° diameter ring that surrounds it. Whereas, anatomists use the term fovea to name the 5° diameter disk at the center of the retina and they use the term macula to name the 20° diameter ring that surrounds it. The eight views of the retina that are discussed in the paper at first seem to be unrelated, but this paper shows how to map information between them. Specifically it superimposes a facial photograph, optical coherence tomography images, fundus photos and visual field diagrams
Minor REVISION comments	Again, I would like to stress a more detailed description of the results in the text, and not only referring to Figures and tables for the results. I know it saves place but at the same time makes reading more difficult. If one leaves to the reader extracting information from the above sources, they might not read the same for someone with a different background than to those who wrote the paper.	I have added the following detailed descriptions of the figures in the text. Figure 1 shows a fundus photo of the retina of the left eye. It has an arc of scar tissue (created by a laser in order to reattach a detached retina) in the upper right corner of the retina and a small area of scar tissue in the lower left corner. The optic disk is circled. Because the subject was myopic there is a sclera crescent of white outside of the optic disk. The circles in the center show the regions of the retina that are named. The rectangular inset at the bottom is a horizontal cross section of the retina, a slice right through the center of the fovea. On the left side of this rectangle the surface of the retina starts to dip down into the optic disk. First, in Figure 2, we show the subject's reported vision of a black-line target composed of concentric squares. The right eye's image (thin green lines) is the same as the visual target. The left eye's image (thick red lines) shows the distortion due to a wrinkled retina (macular pucker). The scotoma in the lower-left quadrant probably resulted from peeling the inner limiting membrane (ILM). Deriving this figure was complex and time



SDI Review Form 1.6

		consuming. This figure is the result of dozens of experiments over several years. None of our other retina viewing techniques give resolution this fine. Next, in Figure 3, we compare several other techniques for evaluating the anatomy and physiology of the retina. The clinician's view of the subject's face is shown in the top row of Figure 3. The image of the subject's right eye (OD) is on the left side of the figure, the subject's nose is in the middle of the figure, and the image of the subject's left eye (OS) is on the right side of the figure. With the exception of this top row in Figure 3, all of the data in this paper are for one subject, ATB. Figure 3 shows, from top to bottom, the clinician's view of the subject's face, OCT images of the right and left retinas, horizontal cross sections of the retinas, fundus photos of the retinas and visual fields for the left and right eyes. For each row, the nasal sides of the eyes nose is are in the middle and the temporal sides of the eyes temples are on the outside. Each column of Figure 3 has the foveae roughly aligned. The big blue arrows show corresponding locations in the different diagrams. For the right eye, the blue alignment arrow connects the temporal edges of the optic disk in the OCT image and in the fundus photo: this is meant to draw attention to the edge of the fovea in the cross section of the retina. For the left eye, this arrow connects, more naturally, the centers of the optic disks. The blue arrows show corresponding locations. Significant points were lined up as well as possible. However, a perfect mapping is impossible: because (among other reasons) the algorithms for transforming three-dimensional (3D) space into two-dimensional (2D) images are nonlinear and are different for different techniques Furthermore, the magnification scales are different for each diagram in this figure. The following section describes the procedure that was used to overlay information from fundus photos and OCT images onto visual field diagrams to produce Figure 4. First, we resized one of the images (fundus photo or visual field) so that they had the same scale (degrees of visual angle per millimeter of display). To do the calibration, if we had a clear outline of the optic disk, then we assumed that it was 6.3 degrees in diameter. Otherwise, we assumed that the width of the central retinal
--	--	---



SDI Review Form 1.6

		artery was $166 \pm 15 \mu\text{m}$ and the width of the central retinal vein was $246 \pm 18 \mu\text{m}$ [8] [Taarnhøj, 2006], but these measures had a lot of variability. Next, we flipped the fundus photo vertically and put the optic disk from the fundus photo on top of the blind spot in the visual field diagram. Then, to get the rotation correct, we put the fovea from the fundus photo on top of the fixation point (usually the center of the diagram) in the visual field diagram. This process is illustrated in Figures 3 and 4. Figure 5 was designed to show the effects of cyclorotation: it has a traditional fundus photo (top) and an image from a new instrument called the Optomap (bottom), which will be discussed in our Wide-field Imagery section. In both of these images, if we assume that the eye is not rotated, then the optic disk appears to be 15° nasal and 4° superior to the fovea. This vertical distance is larger than the normal $1.5^\circ \pm 0.9^\circ$. Therefore, we re-examined this fundus photo assuming that the eye was cyclorotated by 5°. Now, the optic disk appears to be 15.3° nasal and 2.7° superior to the fovea, which is closer to normal. Fundus photos, visual field diagrams and Optomap images all showed this same cyclorotation effect. This effect was not as prominent in OCT images, because the OCT fixation target was a ten-degree asterisk, which gave cyclorotation clues.
--	--	---



SDI Review Form 1.6

<u>Optional/General</u> comments	This is a very good paper to my opinion. I little controversial, because the results are based on one person's long term diagnostic examination and subjective reports. Scientifically nothing is new in the paper, at the same time it clearly shows that modern diagnostic devices are often less useful than the regular conversation and consultation with the patient. It will have a wide readership among the ophthalmologists and optometrists (I hope). It is less informative for scientists, but is still a worthy reading.	Thank you
--	--	-----------