Reviewer's report

Title: The ChromaTest, a Digital Color Contrast Sensitivity Analyzer, for Diabetic Maculopathy

Version: 1 Date: 16 November 2007

Reviewer: Deborah Broadbent

Reviewer's report:

General

This is an interesting paper presenting the use of a relatively well established technology in a new field. The authors have demonstrated that in a limited group of patients the test is effective at detecting diabetic maculopathy, but have not really indicated how they think that the test can be used to improve the detection of maculopathy and possibly referable retinopathy in view of the fact that there exists a national screening programme based on a more effective method. It may well be that the ChromaTest could be used as an adjunct to improve detection of clinically significant macular oedema once surrogate markers have been identified by digital photography, but this is not discussed. This is alluded to in the abstract but not explored in the discussion.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

It is not acceptable to refer to people with diabetes as “diabetics”. Please change this throughout the document. The correct notation is people / patients with Type 1 or Type 2 diabetes.

Abstract Results

The first sentence is not clear. Please indicate that after exclusion only 115 eyes in 150 patients were recruited into the study and that of these 22 eyes had clinically significant macular oedema on slit lamp biomicroscopy.

Background

Para1, Line 2. The authors state that various studies have looked at cost-effectiveness but only quote one relatively old paper. Suggest add more references.

Para 1, Line 3. 7 field 30 degree stereo colour photographs is the gold standard for detection of diabetic retinopathy. Neither stereomacular colour photographs nor fluorescein angiography are the standard for screening for DR. In the UK the National Screening Programme for Diabetic Retinopathy utilises non-stereo digital photography as this meets the Diabetes UK standards for sensitivity and specificity.
Para 1. Line 7. In the discussion protan colour vision is also cited as being affected in diabetic maculopathy. The development of a blue-yellow defect has previously been described in diabetic retinopathy. The authors do not refer to this. A blue-yellow defect can also occur in glaucoma. How do the authors think the ChromaTest distinguish between diabetic retinopathy and glaucoma since patients with glaucoma and other eye conditions have been excluded from this study?

Methods
Para 3. The authors need to give the normal responses for the ChromaTest. Without them it is difficult to interpret the results.

Results
Although standard deviations are given confidence limits should be quoted as the numbers in the study are small.

Para 4. This paragraph is confusing. Do the authors mean in the first sentence that overall, whatever the BCVA, the sensitivity and specificity for detection of CSMO are as given? Does the second sentence refer to all patients with a logMAR of 0.1 or better? Were there any patients with CSMO and logMAR 0.1 or better? In which case is the ChromaTest better at detecting CSMO in patients with good vision than those with poor vision?

Para 5. What does this sentence signify? Are the authors referring to sensitivity for detection of NPDR alone?

Conclusion
This is actually discussion!

Para 2. Last sentence. Why might the use of smaller letters give better results for CSMO? What is the evidence to back up this statement?

Para 3. Line 2. Is likely to be identical to what?

Para 4. Why was congenital colour blindness not confirmed by other means?

Para 4. How do the authors account for the poor results in 4 eyes without severe NPDR? What concurrent but undiagnosed disease do the authors think they might have had? Would fundus fluorescein angiography have helped?

Para 5. Please give the correct definition for CSMO for the 7 eyes quoted. The definition of CSMO should also be quoted earlier in the paper.

Para 5. What evidence do the authors have for their speculation that patients had learned responses?

Para 9. I am very unclear as to where the authors see the role of the ChromaTest. They discuss the fact that physicians are less good than ophthalmologists at detecting retinopathy. However they have completely ignored
the fact that all patients with diabetes in the UK are regularly screened for diabetic retinopathy using digital photography. The authors need to consider how the use of the ChromaTest will augment this methodology since it clearly does not have the sensitivity or specificity to replace it. The discussion could also usefully consider the use of optical coherence tomography in this regard.

References
These are incorrectly cited in the paper and there are typos.

There is also a better reference for the “Exeter Standards” for sensitivity and specificity in Diabetes Medicine. The British Diabetes Association is now known as Diabetes UK.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
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Discretionary Revisions (which the author can choose to ignore)

I would prefer to see anglicised English throughout the manuscript. In particular, although CSME is correct as the ETDRS studies were conducted in the US, convention in the UK refers to CSMO.

Methods
Para 1. What is the relevance of collection of risk factor data to this paper?

Para 3. It might be useful to describe in non-technical terms how the ChromaTest assesses and reports proton and tritan colour defects.

Results
Para 1. It would be useful to indicate from “Fifty eyes..” onward that these patients were exclusions. Why were the patients with proliferative retinopathy excluded?

Para 4. Conventionally sensitivity is quoted before specificity.

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published
Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests