2. Golas L, Manche EE. Dry eye after laser in situ keratomileusis with femtosecond laser and mechanical keratome. J Cataract Refract Surg 2011;37:1476–80.
3. Haw WW, Manche EE. Effect of preoperative pupil measurements on glare, halos, and visual function after photoastigmatic refractive keratectomy. J Cataract Refract Surg 2001; 27:907–16.
4. Schallhorn SC, Kaupp SE, Tanzer DJ, et al. Pupil size and quality of vision after LASIK. Ophthalmology 2003;110: 1606–14.

Geographic Atrophy and Visual Function

Dear Editor:

We would like to counter the suggestion that geographic atrophy (GA) visualized with spectral domain optical coherence tomography "should correlate with loss of visual function."[1] Macular perimetry with the scanning laser ophthalmoscope (SLO) has elucidated the fact that loss of visual function in dry age-related macular degeneration also occurs in areas without GA, areas that appear identical to those retaining function.

Drawing conclusions regarding loss of visual function based on areas of GA is a disservice to patients, particularly those with ring or foveal-sparing scotomas who experience increased functional difficulty despite unchanged GA and visual acuity. These patients are often reassured incorrectly that everything is stable, when in fact their scotomas have enlarged significantly, though invisibly to the examiner who does not have access to precise and accurate macular perimetry, as provided by the SLO. Several examples are available in Figures 1–5 (available at http://aaojournal.org).

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Reference

1. Yehoshua Z, Rosenfeld PJ, Gregori G, et al. Progression of geographic atrophy in age-related macular degeneration imaged with spectral domain optical coherence tomography. Ophthalmology 2011;118:679–86.

Author reply

Dear Editor:

We appreciate the interest in our recent publication, and we agree with Mogk et al that microperimetry may prove useful in reproducibly evaluating the extent of decreased visual function in eyes with geographic atrophy (GA). However, we disagree with them in their assessment of our intentions. We implied no disservice to age-related macular degeneration patients when we stated that GA results in an absolute scotoma from the loss of photoreceptors and retinal pigment epithelium, and this area of GA can be measured using spectral domain- optical coherence tomography (SD-OCT). Our research did not explore psychophysical testing and all the other hardships of diminished vision often associated with this disease. We agree with the authors that detailed psychophysical testing provides a useful adjunct to ocular imaging when trying to appreciate the full spectrum of visual disabilities. But there may be a "learning" effect in the subjective performance of microperimetry, in which participants gain more familiarity, and thus improve with repeated testing.[1] Meleth et al[2] reported that macular sensitivity and fixation quality undergo progressive change during the enlargement of GA, which likely reflects alterations in macular function extending beyond the GA lesion. Moreover, microperimetric testing has demonstrated statistically significant change as a function of time, but the growth of GA has not been associated with all microperimetric parameters.[2] We are encouraged that microperimetry might prove to be a useful, reproducible technique for following patients in clinical trials, and we encourage the authors to explore microperimetry as a clinical trial endpoint. However, until microperimetry is widely available and validated as a clinical research tool, we believe the enlargement rate using SD-OCT is far more useful as a clinical trial end point when following eyes with GA.

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References

1. Chen FK, Uppal GS, MacLaren RE, et al. Long-term visual and microperimetry outcomes following autologous retinal pigment epithelium choroid graft for neovascular age-related macular degeneration. Clin Experiment Ophthalmol 2009;37: 275–85.
2. Meleth AD, Mettu P, Agron E, et al. Changes in retinal sensitivity in geographic atrophy progression as measured by microperimetry. Invest Ophthalmol Vis Sci 2011;52:1119–26.

Myopic Optic Disc Changes in Adolescents

Dear Editor:

A population-based cross-sectional study of the adolescent children from Singapore Cohort Study of Risk Factors for Myopia (SCORM) reported that the prevalence of tilted optic disc was 37% and eyes with tilted optic discs were more myopic, astigmatic, and had longer axial lengths (AL) than eyes without tilted optic discs.[1]

In their study, the presence of optic disc tilt was assessed by stereoscopic fundus photographs; however, the degree of optic disc tilt was not evaluated quantitatively. The degree of optic disc tilt can be investigated by calculating ovality index of the optic disc (dividing the shortest diameter of the optic disc by the longest diameter)[2] or by using the cross-sectional optic nerve head images obtained by optical coherence tomography (OCT) as described in our previous

studies.[3,4] Our previous studies demonstrated that the degree of myopic optic disc tilt as determined by the cross-sectional optic nerve head images of the spectral-domain OCT in healthy young myopic eyes was associated with spherical equivalent (SE) and AL,[3,4] which was in line with the study results of SCORM.[1] We think that analyzing the quantitative association between the ovality index of optic disc and other factors, such as SE, astigmatism, or AL in the SCORM population would be interesting.

When the direction of optic disc tilt was evaluated, there were 2 main directions of optic disc tilt (temporal tilt and superotemporal tilt) in the SCORM population.[1] In contrast to their results, 2 main directions of optic disc tilt were temporal tilt and inferotemporal tilt in our previous study.[4] Differences in age, SE, or methodology for the assessment of optic disc tilt between the studies may partly account for this discrepancy. We think that demonstrating the distribution of other directions of optic disc tilt, including inferotemporal, inferonasal, or superonasal tilt in SCORM population may provide valuable information for the optic disc tilt characteristics.

With regard to the pathogenesis of optic disc tilt, we are aware of 2 possible hypotheses: (1) congenital anomaly associated with malclosure of the embryonic optic fissure,[2,5] (2) acquired progressive changes in optic disc according to the myopic elongation of the eyeball.[3,4] To verify the second hypothesis, the association between longitudinal changes in optic disc tilt and SE/AL changes needs to be investigated. In SCORM, the annual follow-up visits were conducted in 1227 children; when the mean age of them was 7.81 years, their mean SE was −0.32 diopter, whereas the mean SE changed to −2.45 diopter in the follow-up visit examination (with a median age of 14 years).[1] Longitudinal changes in the degree of optic disc tilt (ovality index of optic disc) and the axis of optic disc tilt can be evaluated by using the serial fundus photographs. We think that investigation of the association between longitudinal changes in optic disc tilt and other factors may provide important clues for the pathogenesis of myopic optic disc tilt.

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References

1. Samarawickrama C, Mitchell P, Tong L, et al. Myopia-related optic disc and retinal changes in adolescent children from Singapore. Ophthalmology 2011;118:2050–7.
2. Witmer MT, Margo CE, Drucker M. Tilted optic disks. Surv Ophthalmol 2010;55:403–28.
3. Hwang YH, Yoo C, Kim YY. Myopic optic disc tilt and the characteristics of peripapillary retinal nerve fiber layer thickness measured by spectral-domain optical coherence tomography. J Glaucoma 2011 [May 26 Epub ahead of print].
4. Hwang YH, Yoo C, Kim YY. Characteristics of peripapillary retinal nerve fiber layer thickness in eyes with myopic optic disc tilt and rotation. J Glaucoma 2011 [Sep 22 Epub ahead of print].
5. Vongphanit J, Mitchell P, Wang JJ. Population prevalence of tilted optic disks and the relationship of this sign to refractive error. Am J Ophthalmol 2002;133:679–85.

Acupuncture Therapy for Amblyopia

Dear Editor:

Standards for the conduct of clinical research were described in an editorial by Meinert, "A randomized, controlled clinical trial is an experiment designed to assess the efficacy of a test treatment by comparing it against a control treatment in comparable patients. The control treatment may be a placebo, nothing at all, or some other treatment, depending on circumstances at the time of the trial . . . ."[1]

This principle was directly contradicted in a recent article by Lam et al[2] on acupuncture therapy. These authors opted not to include sham acupuncture in their protocol because "sham acupuncture may activate the same mechanism as true acupuncture, leading to similar treatment effects."[2] They apparently also ignored placebo effects, parental pressure, or the influence of multiple visits to the acupuncturist.

Lam et al[2] acknowledge that they know little about the mechanisms of treatment but offer no explanation for why acupuncture needle placement described in their article would be more effective than needles in other locations.

In addition, the authors recorded adverse effects such as intractable pain, hemorrhage, and infection but then asserted that this treatment is essentially safe.[2]

It is surprising that this verisimilous report of a new treatment, unencumbered by physiologic explanations or scientific considerations, has access to the medical literature. So long as amblyopia treatment studies ignore fundamental scientific procedures, we are likely to be afflicted by anecdotal subjective reports masquerading as clinical evidence.

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References

1. Meinert CL. Clinical trials: the gold standard for evaluation of therapy. Ophthalmology 1996;103:869–70.
2. Lam DS, Zhao J, Chen LJ, et al. Adjunctive effect of acupuncture to refractive correction on anisometropic amblyopia: one-year results of a randomized crossover trial. Ophthalmology 2011;118:1501–11.

Author reply

Dear Editor:

We appreciate Dr. Lempert's interest in our article.[1] In our study, we compared the effectiveness of acupuncture plus refractive correction to that of refractive correction alone, and the latter served as a control.[1] We agree that a sham acupuncture group would be helpful for evaluation of the effectiveness of acupuncture. Although visual acuity testing is relatively objective so that psychological effects could be less influential to our findings, the possibility of a placebo effect from acupuncture can't be ruled out unless a sham acupuncture group is included. Therefore, in our follow-up studies, a non-acupoint acupuncture group is added at randomization, with a parental understanding that true acupoint acupuncture will be added if sham acupuncture is less effective in initial phase of the study. Such study design may also answer, at least partially, the important question raised by Dr. Lempert, "Why acupuncture needle placement described in this article would be more effective than nee-