Response to comments on: Comparison of higher order aberrations in amblyopic and non-amblyopic eyes in pediatric patients with anisometric amblyopia

At the outset, we would like to thank Solanki et al. for taking an active interest in our work and starting this discussion.

In their correspondence, the authors have voiced concerns that comparing higher-order aberrations (HOAs) of amblyopic eyes to those of nonamblyopic eyes of the same study subjects can lead to a spurious association between HOAs and amblyopia, whereas the actual association is between the HOAs and the degree of ametropia.[1]

In rebuttal, we would like to present the following points. Firstly, the objective of our study was to demonstrate that there were differences in the optical system, in the form of differences in HOAs, of the two eyes of an anisometric amblyope beyond the routinely measured spherical and cylindrical refractive errors. We have clearly stated in the last few lines of our paper that the role of these increased HOAs in the amblyopic eye in the genesis of amblyopia is uncertain.[1]

Secondly, it has been amply demonstrated through various studies, done on adult and pediatric subjects alike, that there is no consistent correlation between HOAs and the degree of refractive error.[2-5] Therefore, the authors’ concern that the higher HOAs seen in the amblyopic eyes is just a function of the higher degree of ametropia in these eyes can be laid to rest. This also precludes the need to compare HOAs in amblyopic eyes with eyes having a similar degree of ametropia sans amblyopia.

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We welcome the tabulated data presented by the authors, which show that the HOAs in the amblyopic eyes were higher than those in the eyes with a similar degree of ametropia sans amblyopia. Unfortunately, we could not access this information during the course of our study as it is unavailable for perusal and scientific scrutiny on any online database.

In the table, the amblyopes have consistently higher root mean square (RMS) values for the HOAs, the difference being statistically significant, except for sixth order tetrafoil. This data proves the point that HOAs do not correlate with the degree of ametropia because otherwise both these groups should have had comparable HOAs as they were matched for the refractive error.

In the last segment of their correspondence, the authors have asked some very pertinent questions; answering which compels us to steer into uncharted waters and make informed guesses. However, we would like to attempt the same.

1. Our study clearly demonstrated that there were higher HOAs in anisometric amblyopia. The authors themselves have found similar results. We believe more studies with larger study samples, which maintain stringent definitions of anisometric amblyopia will consolidate our findings. Although we have not studied the same, we do not expect to find similar results in other form of amblyopia because in them a faulty optical system is not the primary cause.

2. Whether higher HOAs are a cause for partial or nonimprovement of vision is a subject matter of a randomized control trial. One can only imagine the methodical and ethical complexity of such a trial. We know that the order of the aberration is inversely related to its influence on visual acuity and quality. Furthermore, not all aberrations are detrimental to the visual function. Hence, a targeted approach in treating the detrimental aberrations might be the way forward. However, we do not believe that treating (if we can) aberrations beyond the fifth order will have any significant effect on visual acuity.

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Conflicts of interest
There are no conflicts of interest.

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