Author’s response to reviews

Title: Convergence Insufficiency and Accommodative Insufficiency in Children

Authors:
Amelia Nunes (amnunes@ubi.pt)
Pedro Monteiro (pmm@ubi.pt)
Francisco Ferreira (fbardo@ubi.pt)
António Nunes (anunes@ubi.pt)

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Convergence Insufficiency and Accommodative Insufficiency in Children
Amelia Fernandes Nunes, Ph.D; Pedro Lourenço Monteiro, Ph.D; Francisco Brardo Ferreira, Ph.D; António Santos Nunes, Ph.D

BMC Ophthalmology

Fiona Rowe (Reviewer 1):

Dear Dr. Rowe, thank you for your comments.

1. Please correct typographical and grammatical errors in the abstract and main text as indicated in the attached file.

Typographical and grammatical errors corrected, as requested.

2. Results section; the paper would benefit from additional subgroup analysis to compare general rural versus urban groups. There is mention of this in relation to the published literature in the Discussion section so it would be useful to provide information from the current study data to enable further comparison.

We agree that this analysis would improve the manuscript. The school where this study was conducted is the only elementary school within the City of Covilhã. It mainly integrates students
from urban areas, therefore the number of students from rural areas is low and so this parameter was not taken into account at the time of data collection. At present that parameter is being taken into account for future studies.

3. Table 3 is cited before table 2 in the results - please renumber.

Table numbering was corrected.

4. Please ensure consistency with the use of abbreviations and formatting of references within the main text.

Concluded

5. Please replace the term phoria with heterophoria throughout the main text - for accuracy.

Concluded

6. In table 3, suggest keeping all the USA studies together for comparison so move Menjivar study up 2 rows.

Concluded

7. In figure 1, please improve the clarity as the text is blurred. It would be helpful to add in the numbers of cases included/excluded at each stage.

Concluded

8. For figures 2 and 3, please provide a brief explanation of the data. Figures should be relatively self-explanatory without recourse to the main text.

Corrected
Dear Dr. Horwood, thank you for your comments.

1. I really think that we should be questioning the ever increasing impression that CI and AI are significant public health issues. This is an extreme example of taking very mild deviations from typical values to suggest a significant problem, when it probably is not. It uses abnormal values derived largely from the optometry literature, and I don't think such values are more widely accepted among ophthalmologists or orthoptists. There are multiple methodological weaknesses and assumptions that do not appear to have been considered by the authors, so in its current form I do not feel these data add much to the literature. The only data I feel are clinically significant are the basic country-specific data on "definite CI and AI" - and even then, this could include many people with extremely mild problems.

The majority of studies in this field have been conducted by the same group of authors in the USA. In our opinion other studies in different regions and subjects are useful to improve current knowledge in the field.

2. To make sense of the data, we would also need to know the exact instruction set used to test the children ("tell me when it first goes blurred/double", on a test a child had never done before, is very different from "try as hard as you can to STOP it going blurred/double". They can produce dramatically different results). Were the same instructions used throughout by the same people?

Yes, a protocol for clinical procedures was designed and applied to all subjects. The binocular and accommodative tests were stopped at the point of consistent blur/diplopia, not the first blur.

3. There are some English language issues (e.g. "transversal" and use of commas rather than full stops for the decimal point).
4. The CISS was never designed as a screening tool, so it needs to be confirmed that it was only used to document symptoms in patients primarily selected on another criterion. It is hardly surprising to find that a questionnaire designed to capture the severity of symptoms in CI, found that symptoms were worse in more severe cases.

There is an overall assumption that CI and AI cause problems with school work, and that the CISS picks up visual symptoms and nothing else - they are certainly all associated, but causal relationships are NOT proven in many cases. It is very plausible that poor concentration, poor engagement with school work or literacy issues can cause mild deficiencies in convergence and accommodation, so eye exercises do not address the problem.

In our work, the CISS questionnaire was only used as an additional tool, the criterion to classify the cases was based in clinical tests. We agree with the reviewer; our results show children with normal binocular vision displaying low and high CISS scores. Figure 2 shows this situation.

5. Cases have been labelled as abnormal on very minimally reduced measures (anything worse than one of these - 6cm NPC, 8-8.5cm NPA, 4PD near exophoria); many clinicians would never treat such mild deficiencies. Monocular accommodative facility is a particularly tricky skill for some people, despite normal binocular values normal because some people drive their accommodation by disparity-driven CA/C linkages, but it improves quickly with a very little practice.

The normative values for clinical measures were according to recent scientific literature in binocular vision, used by several authors, which were used for comparison in the present study. Using Hoffsteter’s minimum age formula for AA, yields NPA’s ranging from 9.5 to 10.5 cm (10 to 14 years old).

6. What were the OBD’s. Again were they really significant problems, and were they actually more important than the CI?
OBD’s include children with only one test outside normal limits and other binocular and accommodative disorders like convergence excess, fusional vergence disfunction, accommodative excess and accommodative infacility. Some cases lead to more significant symptoms than CI, but the number of subjects in each condition did not justify an additional analysis.