Author’s response to reviews

Title: Eye exercises of acupoints: their impact on refractive error and ocular symptoms in Chinese urban students

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Author’s response to reviews: see over
**Reviewer's report**

**Title:** Eye exercises of acupoints: their impact on refractive error and ocular symptoms in Chinese urban students  
**Version:** 2  
**Date:** 26 March 2013  
**Reviewer:** Eric Borsting

**Reviewer's report:**

*The purpose of the article is to investigate the impact of eye exercises on the progression of myopia and ocular discomfort in a group of Chinese school children. All items must be responded to. The term “eye exercises” is too broad and could confuse the readers of the article. Eye exercises can refer to stimulation of accommodation, vergence, or other eye movements. In this article the term eye exercises refers to bilateral acupoint self-massage. The authors should have a term that is more specific to the activity of what the students are doing each day. For example, the CITT group used the term “vergence accommodation therapy”.

- Thank you for your suggestion. Per the reviewer’s suggestion, we have revised the term “eye exercises” to “eye exercises of acupoints” in the manuscript.

The introduction and article is difficult to review because the reference list is not accurate. References 16-19 are omitted, 20 and 21 are in the wrong order, reference 22 has two different references listed, 31-39 are omitted, and 42-46 have two different references listed. Without an accurate reference list it is difficult to provide a thorough review of the article. The last statement in the introduction is confusing; It primarily aims to investigate … This statement refers to a relationship between NITM and permanent myopia which is not the purpose of this article. The last paragraph should state the two hypothesis outlined in the introduction.

- We are sorry about the wrong reference order. We have now corrected it.  
- Thank you for your suggestion. Per the reviewer’s suggestion, we have revised the last paragraph of the Introduction as below.

In the current study, we aimed to evaluate the impact of these eye exercises of acupoints on refractive error and ocular-based near symptoms among Chinese urban students (aged 6-17 years) recruited from the baseline population of the 3-year cohort Beijing Myopia Progression Study (BMPS).

**Methods**

*Why did you need to use the Myopia Questionnaire?*

- The near work/outdoor activity hours were obtained through the validated myopia questionnaire. Numerous studies reported that the near work/outdoor activity hours were associated with myopia prevalence/incidence. Hence, we would like to adjust these hours as covariates when analyzing the association between the children’s refractive error and the eye exercises.

In the CITT studies the CISS was administered by asking children the questions and they would answer while looking at a response sheet. It is not clear in this study if the children read the survey...
question on their own or were the questions read to them. This should also be addressed for the Eye exercise questionnaire.

- Thank you for your suggestion. The CISS was surveyed by the staff in our study. Per the reviewer’s suggestion, we have added this in the “Questionnaire” section of the Methods part.

Students were surveyed at the testing center by trained staff regarding their daily activities (indoor and outdoor), living environment, eye exercises of acupoints, CISS forms, etc. For very young students who could not read or understand the questionnaire very well (e.g., primary students in grade 1), help was sought from their respective parent(s) to complete the questionnaire.

Results

Why were 14 students excluded?

- We agree that these 14 students should not have been excluded. Per the reviewer’s suggestion, we have revised this through the manuscript as below.

Methods

Subjects

A total of 409 students (195 males, 47.7%) from BMPS with completed eye exercises of acupoints questionnaire, CISS questionnaire, and the cycloplegic autorefraction, were included. Of these 395 students (96.6%), 187 males and 208 females (47.3% and 52.7%) performed the eye exercises of acupoints in school.

The analysis uses outdoor activity and amount of near work in the analysis but it is not clear where the authors got this information in the methods and data analysis section.

- The near work/ outdoor activity hours were obtained through the myopia questionnaire. Per the reviewer’s suggestion, we have made some revisions in the “Myopia Questionnaire” in the Methods part to make it clearer.

This questionnaire included such topics like habitual refraction, duration of daily activities, and living environments, etc. The activities were grouped into near work and outdoor activities. The average hours spent on near work activity (<50cm working distance) were summed from questions regarding drawing, homework, reading, and handheld computer use. Time spent on outdoor activities was based on questions about playing outdoors, family picnics and barbeques, bicycle riding, hiking, and outdoor sports.

Discussion

The authors need to discuss the clinical significance of the results found with the CISS. They state that the eye exercises relieve CI like symptoms. However, the reduction in symptoms was relatively small (2.5 to 3 points) and the students did not start out with high symptom scores. This creates a floor effect so there was little room for the CISS to change. The CISS studies indicate that scores of 16 or higher are symptomatic and the overall score in this study was 14.3. In contrast, the mean
score in children with CI tends to be around 30. The results would say that the eye exercises would mildly reduce symptoms in children with high normal scores.

- Thank you for your suggestion. Per the reviewer’s suggestion, we have revised in the Discussion.

However, the reduction in symptoms was relatively small (CISS score reduced 2.5-3.5 points). Borsting et al reported that the CISS score was about 30.8 for children with convergence insufficiency, and children with CISS score of 16 or higher are considered to be symptomatic. The CISS score of current study was approximately 14, apparently less than children with convergence insufficiency. Hence, there may be a floor effect for the CISS score to reduce yet further. Our current findings suggested that the eye exercises of acupoints modestly reduce these ocular-based near symptoms in Chinese urban students with high normal scores. It would be interesting to determine if the eye exercises of acupoints have more effect on relief of near symptoms in children with convergence insufficiency or determine a higher CISS score.

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Reviewer's report

Title: Eye exercises: their impact on myopia and ocular fatigue in Chinese urban students

Version: 2 Date: 19 April 2013

Reviewer: Kathryn Rose

Reviewer's report:

1. The authors have examined the role of eye exercises as prescribed in Chinese schools for their effects on myopic refractive error and on the symptoms generated by convergence insufficiency (CI). There are some major issues with this study and its presentation. The first is the aim of the study is not clear. It is as though the authors have collected 3 disparate sets of data and tried to combine them in the one paper without thought to how they might be related, if at all. For example the utility of the CISS questionnaire in relation to myopia is not explained by the authors. It is not ideal that such unrelated issues (myopia and CI) are presented within the one paper as this has the consequence of making the conclusions drawn by the authors complex and confused.

- We agree that our primary aim of the Beijing Myopia Progression Study was not about the eye exercises and myopia/ocular fatigue. And indeed, we collected these data through different parts of the questionnaire. But this process does not invalidate the present study. Chinese eye exercises have been used to relieve ocular fatigue and reduce myopia from the early 1960s without strong evidence. Hence, the purpose of this study was to evaluate its impact on refractive error and ocular-based near symptoms among Chinese urban students. However, the relation between refractive error and CI was not the purpose of this
study, but rather a secondary aspect.
The utility of the CISS questionnaire was to assess the ocular-based near symptoms, including eyestrain, headaches, blurred vision, diplopia, difficulty in concentrating, and loss of comprehension after short periods of reading or performing close activities, but not specifically related to myopia/refractive error.
Per the reviewer’s suggestion, we have made some revision to our study purpose for clarity.

In the current study, we aimed to evaluate the impact of these eye exercises of acupoints on refractive error and ocular-based near symptoms among Chinese urban students (aged 6-17 years) recruited from the baseline population of the 3-year cohort Beijing Myopia Progression Study (BMPS).

2. In relation to prevention of myopia, there would be interest in this topic but the data presented here is insufficient for clear and unambiguous conclusions to be drawn and in fact a very different study design would be needed to answer this question, as the authors have noted in their discussion. However, in the face of no robust association found between eye exercises and myopia in this study it is unclear how the authors could conclude that a randomized control trial of eye exercises for the prevention of myopia is warranted. This statement needs to be withdrawn.

- Per the reviewer’s suggestion, we have withdrawn the statement of “randomized control trial” in the Discussion. As mentioned in the Discussion part, “the overall effect of such eye exercises of acupoints on reduction of refractive error by only 5-10 minutes of exercise each day in this population would be negligible”; and we assume further studies on the dose-effect of eye exercises are interesting.

   Finally, further studies with a larger sample size and different eye exercise schedules are warranted to understand better the dose-effect of these eye exercises of acupoints on myopia and ocular-based near symptoms.

3. A large proportion of the references used by the authors could not be accessed by the reviewer. In some cases other more accessible references could be used including a recent Cochrane review on acupuncture and myopia. Where key papers are not able to be accessed electronically and/or are only available in Chinese, the authors should make available translations of these papers to the reviewers otherwise it is difficult to make a judgment on the suitability of the references used.

- Thank you for your suggestion. We have added the recent Cochrane review in the Introduction.

- Per the reviewer’s query, we have provided the abstract of these Chinese papers on the eye exercises in the Introduction for the reviewer’s perusal.

Reference

Minor Essential Revisions
4. The title of the paper implies that the data analysis is examining cases of myopia versus non-myopia, however all the analysis is conducted on spherical equivalent (SE) refraction, so to be more precise the title should read “Eye exercises: their impact on refractive error and ocular fatigue in Chinese students.”

- Thank you for your suggestion. Indeed, most of our analysis was on children’s spherical equivalent. Per the reviewer’s suggestion, we have revised the title as “Eye exercises: their impact on refractive error and ocular fatigue in Chinese students.”
impact on refractive error and ocular fatigue in Chinese students”.

5. It is noted that the mean SE is quite myopic (-1.60D) which seems unusual in a group this age, what was the prevalence of myopia in this sample?

- The Beijing Myopia Progression Study was a hospital-based rather than a population-based study. Hence, the myopia prevalence/SE was biased towards the myopic direction.

The prevalence and SE was approximately 66.8% and -1.44 (-3.13 to 0.38) D (median, quartiles) in the overall group of children.

Reference:

6. The references list needs to be checked carefully—beyond reference 30 the numbers have become out of order.

- We are sorry about the wrong reference order. We have now corrected it.

Discretionary Revisions
7. The age range of the sample in this study is wide and at this critical age the sample is likely to demonstrate both age-related changes in the prevalence of myopia and in attitudes to doing eye exercises. This most obviously occurs in the univariate analysis of the relationship between serious attitude to eye exercises and lower odds of myopia that disappears on multivariate analysis controlling for a variety of factors including age. This is acknowledged in the second paragraph of the discussion. However, it would be worthwhile knowing the specific impact of age on all the parameters measured.

- Per the reviewer’s suggestion, we have calculated the OR (95% CI) and β coefficient of all the parameters in the Table 2 and Table 3. The effect of age was very similar among different eye exercise questionnaire items. We prefer not to present these non-essential results in the tables.

8. It is difficult to determine whether the literature cited in paragraph 6 of the discussion to describe the possible underlying mechanisms of the effects of doing eye exercises is reliable as the majority of references are unavailable. As such the discussion of this argument should be limited, particularly as it does not directly address the substance of this study.

- Per the reviewer’s suggestion, we have removed the discussion about the possible underlying mechanisms of the eye exercises reported in the Chinese literature.

Thanks for your wonderful comments and suggestions.

Best regards
Yuanbo Liang