Reviewer’s report

Title: Overnight Orthokeratology is Comparable with Atropine in Controlling Myopia

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Reviewer: J M Gonzalez-Meijome

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The topic is interesting and timely considering the interest in reducing myopia progression. Furthermore, this is the first study addressing a direct comparison of Ortho-k and Atropine, the methods that have been shown the highest efficacy compared to spectacles and other contact lens treatments.

Despite this, several methodological concerns exist. The more obvious one is the retrospective design. However, other aspects related with statistical analysis need to be better explained too.

English writing and grammar needs to be revised. I will mention only some examples during my review, but deeper revision is required.

Abstract:

The period of follow-up must be mentioned in the Methods section.

Results of progression should be reported as the average increase in axial length per year over the period of follow-up.

Despite significant, the correlations between progression and baseline myopia are weak. This fact rather than the statistical significance should be emphasized. The emphasis on these correlations as presented is misleading.

Introduction:

First statement is probably not true if we consider others such as cataract.

Is the term “aftermaths” correctly used here?

Reference 19 reports pirenzepine treatment instead of atropine. Include the most recent results from the ATOM 1 and ATOM 2 studies on the efficacy of normal and low dose Atropine as the last results suggest that low dose might be even more efficacious than regular 1% dose.

All these statements need citation “Atropine has proved useful both in animal studies and human clinical trials and is now widely used to control progression of myopia. However, myopia is never completely resolved. In atropine users, increasing intraocular pressure and photo-stress of the crystalline lens and retina are often concerned; photophobia and poor near vision are often to be confronted
Rebound effect after atropine cessation has to be mentioned as a drawback of atropine treatment, at least with the normal doses.

Page 4, 2nd paragraph: needs to be revised for writing style.

Methods:
Correct this sentence “This is a retrospective cohort study, the patients using myopia or OK lens were grouped according…”

Indicated the follow-up time.

Use “informed consent form…” instead of “informed consult …”.

Authors use both eyes of the same patient. This is not correct and statistical analysis should consider this or use only one eye from each individual.

Authors included myopia above -6.00 and astigmatism up to 2.75. These patients can be clearly treated with atropine but most readers will recognize these values as excessive for regular Ortho-k treatment. Considering this, were the patients fully corrected with Ortho-k?, which lenses were used?, which is the recommended treatment range and fitting protocol?, which is the lens design and parameters?, which are the intended/achieved treatment zones as the treatment zone size might influence the efficacy of the anti-myopia treatment.

In the next paragraph, the authors state they used the Emerald lenses which has an FDA approval for -5.00 diopters and up to -1.50 of with the rule astigmatism.

Analysis of astigmatism in terms of refractive cylinder (positive or negative) and axis is not adequate. Vector analysis is preferred.

Was endothelial analysis made in automatic or semi-automatic mode?

Specify the type of Student T-test done (paired samples, independent samples?). Specify which analysis was conducted with each test.

Results
The method to report annual progression (derived from the regression analysis) seems not be adequate as will provide rough information. Average values of axial length or changes from baseline must be presented for each one of the yearly visits. Myopia progression is not linear over the range of the study and an overall progression rate for the whole period might be misleading.

Astigmatism analysis requires decomposition into vectorial components.

Again, do not emphasize the weak correlations between baseline myopia and axial length elongation.

Specify what you mean with regression coefficient. Is this the slope, the intercept of the regression line?.

Clarity of tables could be improved. Graphs showing the yearly change in axial length would be of help.
Discussion:
Discuss on the limitations of availability for low dose atropine and the difficulties in preparing such small concentrations in chemist or hospital basis.
Discuss the limitations of the study. I do not consider that the short time of follow-up after discontinuation of OK treatment might be the major limitation of this study.
Discuss present results and limitations in the context of ALL the previous studies previously conducted with ortho-k and atropine.

The authors report somewhat poor results for UCVA values in the Discussion section. Anatomical factors are pointed as causative effects. However, the impossibility of this lens to correct higher refractive errors must be also considered as a potential cause. The authors must check the more recent work from Cho et al about the effect of partial correction of high myopia in axial elongation.

When the authors mention that the efficacy of atropine is undoubted must consider the already mentioned rebound effect.

Reference List
Considering the nature of the study, it is expected to find in this article a complete overview of all the clinical trials conducted with Ortho-k (Several are missing now) and atropine (already mentioned that some are missing).

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

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