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PhD thesis review

Author: **Maryam Mousavi**

Title: **The impact of long-term wear of modern daily disposable contact lenses on ocular physiology**

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Reviewer: **Jacek Pniewski, PhD, DSc, Academic Centre for Education of Optometrists, Faculty of Physics, University of Warsaw**

General comments

The thesis consists of five main chapters presenting the work (approx. 90 pages), references (more than 120 entries) and 9 appendices (14 pages). The overall length of the thesis is 157 pages. The first chapter presents the structure and physiology of the ocular surface and the basis of interactions between contact lenses and the tear film. The last section of this chapter includes the aims and hypotheses. The methodology used in the work is presented in the second chapter. The third chapter contains the results that are numerical data obtained during examinations along with some statistical analysis. Discussion of the results is placed in the fourth chapter, while the summary in the fifth chapter. The formal structure of the thesis conforms to the standard requirements for PhD theses. The topic of the thesis is current and relevant in the context of up-to-date research in the field of contact lenses' wear.

Detailed comments

The introduction to the subject is concise and clear, although it requires some deeper knowledge of the ocular physiology from the reader. The structure of the ocular surface, including the tear film and a number of mechanisms and interactions, is well presented and discussed with proper bibliography citations. It gives a good perspective as a starting point for the study. The aim of the study is short but informative, accompanied by a longer explanation in the paragraph at the end of the last section of the first chapter.

The author considers three hypotheses that are to be confirmed or rejected. The first hypothesis is that contact lens materials affect ocular physiology in different ways. The second – that there is no ideal contact lens material that would fit all eyes, considering that every material does not have an identical impact on the ocular physiology. The third hypothesis states that modern contact lenses have a higher degree of biocompatibility with the ocular surface.

In my opinion the formulations of the hypotheses are unnecessarily very general and, thus, could be wrongly interpreted. It is commonly expected and in some way trivial that materials and eyes can differ and interact variously. On the other hand, the further work discusses the differences and interactions in terms of a number of certain indices given by numerical values. The mentioned hypotheses could be more precise to match the actual study.

The methodology of the study is good and almost all steps are clearly presented and controlled in the measurements. My first question is about the adaptation time if a subject enters the laboratory directly from the outdoors. The second question is about the models of the contact lenses, since there is a number of

materials that can be classified as Hy or SiHy. Additionally, with the same material one can apply an additional treatment that results, e.g., in different surface properties. If one of the aims of the thesis is to provide practitioners with some valuable information some clues about the models of CLs should be included or even brand names. The applied statistical analysis is consistent with many other works. The exclusion criteria do not discuss the medicaments that could alter the ocular surface conditions.

The results start with diagrams of the environmental factors during visits. Surprisingly, the relative humidity during all visits is much lower than any standards specified by the regulatory bodies. The minimal accepted relative humidity is set at 40% and maximal at 60% with some variations allowed for specific professions or seasons. The problem of fast drying of contact lenses in such conditions is mentioned in the methodology, but the actual laboratory conditions could imply a bias in the results.

The analysis has not taken into account the potential differences between males and females resulting from the usage of make-up or the influence of hormones.

The discussion of the results is reasonable. The author also presented some valuable remarks concerning the limitations of the study.

In the summary there is a lack of clear statements confirming or rejecting the hypotheses. Nevertheless, the conclusions from both the discussion and the summary allow the reader to determine the truth by himself.

Summary

The thesis satisfies the conditions of a creative scientific work. The main objectives of the work have been set and then fulfilled. The methodology used in the thesis is considered appropriate. The conclusions seem correct, too.

In my opinion, the author of the thesis proved her ability to perform research and to achieve scientific results. Hence, I recommend the thesis for presentation with the aim of receiving the degree of Ph.D.

