

Contact Lens Update

CLINICAL INSIGHTS BASED IN CURRENT RESEARCH

Lid wiper epitheliopathy and dry eye symptoms in contact lens wearers: A review

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In 1904, Parsons suggested that “it is only the marginal area of the conjunctiva of the upper lid that comes in close contact with the ocular surface, as opposed to the entire tarsal conjunctiva”.¹ This portion of the marginal conjunctiva of the upper eyelid that brushes over the ocular surface and also acts as a wiping surface to spread the tear film over the ocular surface (or the surface of contact lenses) is called the “wiper” region. As there is no specific term for this wiping surface of the upper eyelid, Korb et al. chose the name “lid wiper” as an appropriate descriptor of this entity.²

An alteration of the epithelium in that region of the conjunctiva is diagnosed with vital dyes such as sodium fluorescein and rose bengal, and the resulting staining is termed “lid wiper epitheliopathy” (LWE).² Korb and co-workers were the first to describe this phenomenon and to date there only few publications available in the literature on this topic.

A 2002 article by Korb et al. describes a study evaluating whether dry eye symptoms (dryness, grittiness or scratchiness, soreness or irritation, and burning or watering) are associated with LWE in contact lens wearers. The following is a review of that paper.

Korb DR, Greiner JV, Herman JP, et al.. A review of lid-wiper epitheliopathy and dry-eye symptoms in contact lens wearers. CLAO J. 2002 Oct;28(4):211-6.

One hundred and fifteen soft contact lens wearers (asymptomatic n=75, symptomatic n=30) participated in this study. They were categorized into two groups based on the presence or absence of symptoms in their response to a dry eye questionnaire. Participants who experienced symptoms of dryness, grittiness or scratchiness, soreness or irritation, or burning or watering during the first four hours of contact lens wear and also reported to have a score of 4 or more points on the frequency scale (sometimes=1; often =2 and constantly=3) were categorized as being symptomatic. The asymptomatic group consisted of participants who reported a score of 0 or 1.

Dye administration and LWE assessment

A 40µL drop of 2% unpreserved fluorescein solution was instilled onto the inferior palpebral conjunctiva of the right eye. Following a five-minute wait period, a second drop of unpreserved fluorescein solution was administered. The upper eye lid was everted after one minute and LWE staining was evaluated. Cobalt blue filter was used to enhance the fluorescein staining.

The length or the linear area of staining was assessed (Grade 0 = <2mm; Grade 1 = 2-4mm; Grade 2 = 5-9mm; Grade 3 = >10mm), as well as its severity (Grade 0 = absent; Grade 1 = mild; Grade 2 = moderate; Grade 3 =

severe). The final grade of fluorescein LWE staining was the average of the length and severity grades.

Two 50µL drops of sterile saline were used to wet the rose bengal strip and the excess saline was allowed to drip off the strip. Following staining of the tears with rose bengal dye, LWE was examined with white and red-free light. Final grade for rose bengal staining was calculated as described above.

For each study participant, the fluorescein and rose bengal staining scores were averaged to obtain a final score. The final score was classified as: Grade 1 LWE: 0.5 to 1.0 (mild); Grade 2 LWE: 1.25 to 2.0 (moderate); and Grade 3 LWE: 2.25 to 3.0 (severe).

Results

There was a significant difference in LWE between the symptomatic and asymptomatic participants ($P < 0.0001$) with 80% of the symptomatic subjects showing lid-wiper staining when compared to asymptomatic participants (13%). Of the symptomatic subjects, 20% showed no LWE; Grade 1 LWE=26.6%; Grade 2 LWE= 36.6%; and Grade 3 LWE= 16.6%. The majority of the asymptomatic subjects, exhibited no staining (87%). The remaining participants showed variable grades of LWE (Grade 1= 9%; Grade 2=3%; Grade 3= 1%). Some participants exhibited staining with only one dye and not the other.

Conclusions

This study was the first to describe a clinical condition called lid-wiper epitheliopathy. It appears that vital dyes are useful in determining the status of LWE. As the lid wiper region involves both conjunctival tissue and stratified squamous epithelium, Korb et al. have chosen to use both fluorescein and rose bengal dyes in this study although they possess different staining properties. Recent studies have also shown that lissamine green stain is useful to visualize LWE.^{3,4}

LWE has been observed in contact lens and non-contact lens wearers. It is however necessary to understand the potential cellular mechanisms that may be involved in lid wiper staining. There is a lack of research to fully support the mechanisms involved in the interaction of the wiper region with the ocular surface and or/contact lens. Staining of the lid wiper region may occur due to a multitude of reasons, including the lid-contact lens surface interactions, altered quality and quantity of tears that sandwich between the lid wiper region and contact lens surface and more complex interactions, which remain to be investigated. Hence it is important to note that further work is required to establish the causative mechanisms of lid wiper staining in contact lens wearers and non-contact lens wearers who are symptomatic and asymptomatic of dry eye and its relationship to symptoms and other signs of ocular dryness. It would also be of interest to study LWE in individuals wearing specific lens types, with different wearing periods and care regimens.

REFERENCES

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