Background

- Blinking essential to ocular surface homeostasis.
- Blink assessment hampered in part by the lack of a gold standard measurement.
- Blink repeatability measurement not been reported.
- Spontaneous blink parameters vary between tasks.
- Measurements often occur in lab settings not representative of real-life situations.

AIM:

- To measure blinking in situ in a real-life setting, during various reading and non-reading tasks.
- Secondary aim: To examine day to day repeatability of blinking.

Methods

Study design: randomised, cross-over, open label.

During the study:
- Eight randomly assigned tasks (35min each) completed over 2 visits: A) Conversation; B) reading from B) printed text; C) laptop screen; D) smartphone; E) smart TV at 6m; F) smartphone at 50% brightness; G) smartphone (more complex text); and H) walking indoors.
- Task E completed twice, before other tasks, two days apart, to determine day-to-day repeatability.

Participants: Twenty-four healthy adults (28.6±6.3 years; 8M:16F); university students.

Exclusion criteria: Ametropia, contact lens or spectacle wear, abnormal binocular vision, ocular or systemic condition, or use of medications likely to impact blinking.

Measurements:
- Blinking assessed from videos recorded with wearable eye tracking headset (Pupil Labs, GmbH Berlin, Germany) connected to a laptop/phone.

Methods:
- Blinking assessed from videos recorded with wearable eye tracking headset (Pupil Labs, GmbH Berlin, Germany) connected to a laptop/phone (Figures 1 and 2).

Statistical analysis:
- Blink rate and interblink interval compared between tasks using repeated measures ANOVA, post hoc comparisons with Bonferroni correction.
- Associations between blinking and change in symptoms examined using Pearson correlation with Bonferroni adjustment.
- Repeatability assessed using Bland & Altman method (Coefficient of Repeatability, CoR).

Results

- Blink rate was reduced with all reading tasks compared to conversation and walking (p≤0.05).
- No differences in blink rate between conversation and walking, nor between any of the reading tasks.

Ocular symptoms before and after tasks

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<th>Conversation</th>
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<th>Laptop</th>
<th>Smart TV (in situ)</th>
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<th>Smartphone (50% brightness)</th>
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Discussion

- Blink rate was reduced during reading compared to conversation and walking and the magnitude of the difference was similar to previous reports.
- Reading task complexity, working distance or device used, did not affect blink rate in contrast to other studies; this may be due to blink measurement diversity or task duration.
- Increase in blink rate during more difficult task has been linked to factors such as time on task, a measure of fatigue, and blink observation methods.
- Screen brightness did not affect blink rate; this aligns with Lowes’s study and may be due to good background illumination.
- Interblink interval, sparsely reported has been described as dynamic and unconsciously adjusted; and H) walking indoors.

Conclusions

- Blink rate is repeatable day to day and can reliably be measured in situ using the wearable eye tracking headset.
- In a real-life setting, blink rate was reduced during reading compared to conversation or walking, irrespective of reading task complexity, screen brightness, working distance or device used.

References


Disclosures: None

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