

American Academy of Optometry 2016
Anaheim, USA

E-abstract # 160099

**Polar and non-polar lipid deposition on
monthly replacement contact lens materials**

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PURPOSE: To evaluate the relationship between task difficulty and blink rate (BR) in silicone hydrogel contact lens (SiHy CL) wearers who use digital devices (DD).

METHODS: Thirty-seven habitual soft CL wearers wore 3 different reusable SiHy CLs for three 4-wk study periods (randomized order). Participants attended Day 1 and 28 study visits after 6 hrs of DD use while wearing CLs, where they performed 4 differing DD tasks for a duration of 7 mins/task. Tasks were completed on a PC with 24" HD LED monitor (watching a Ted Talk; completing a wordsearch puzzle) and on an iPad mini tablet (reading Wikipedia articles; playing Tetris), in a randomized order. To simulate real-life conditions, 4 HD webcams (2 each for the PC and tablet tasks) were used to record videos of participants at 30 f/sec. Custom-built software was used to identify the first frame associated with each individual blink for the last 5 minutes (=9000 frames) of each task. Statistical analysis was performed using a linear mixed model.

RESULTS: BR depended on the DD task ($p < 0.001$), with the average number of blinks/minute (b/m) for the Ted Talk (LS Mean [StErr] = 30.1 [1.3] b/m) being significantly higher than for the Wordsearch (21.4 [1.3]), Wikipedia (20.0 [1.3]) and Tetris tasks (18.2 [1.3]; all $p < 0.001$). Similarly, a lower BR was found for Tetris compared to Wikipedia ($p = 0.03$) and Wordsearch ($p < 0.001$). There was no interaction between BR and visit ($p = 0.99$), with similar BR at Day 1 and Day 28 for each task. Similar differences in BR between tasks were found after 6h of spectacle wear; compared to CL wear, there were significantly fewer blinks with spectacles ($p < 0.001$) for each task (e.g. 7.4 [1.5] for Tetris).

CONCLUSION: CL wearers using SiHy CLs exhibit reduced BR for DD tasks associated with increased concentration. Given the increased visual demand of such tasks, CL wearers who spend extended time on DD may benefit from wearing SiHy CLs that help with longer inter-blink intervals.

