Squinting while staring at a computer monitor can cause painful dry eye

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Squinting at a computer screen can cut in half the number of times someone blinks each minute. And that could lead to an irritating condition called dry eye, new research suggests.

The more that the participants in this study squinted their eyes, the less they blinked. And the less they blinked, the more their eyes ached or burned, and the more they reported sensations of dryness, irritation and tearing.

Just a slight amount of squinting reduced blink rates by half, from 15 blinks a minute to 7.5 blinks a minute.

"People tend to squint when they read a book or a computer display, and that squinting makes the blink rate go way down," said James Sheedy, the study's lead author and a professor of optometry at Ohio State University. "Blinking rewets the eyes. So if your job requires a lot of reading or other visually intense work, you may be blinking far less than normal, which may cause eye strain and dry eye."

Squinting serves two purposes: It improves eyesight by helping to more clearly define objects that are out of focus. It also cuts down on the brightness from sources of glare. It may be voluntary or involuntary – a person working at a computer may not realize that he is squinting.

Dry eye is usually treatable with over-the-counter eye drops. It's rarely a debilitating condition, but it can be irritating and painful.

The results appear in a recent issue of the journal Optometry and Vision Science. Sheedy conducted the study with Ohio State colleagues Sowjanya Gowrisankaran, a graduate student, and John Hayes, a research scientist in optometry.

The researchers asked 10 college students to squint at different levels. All participants had 20/20 vision in both eyes. The researchers attached two tiny electrodes to the lower eyelids of each student. The electrodes were also attached to an electromyogram, a machine that records the electrical activity of muscles. In this case, the researchers wanted to record the action of the orbicularis oculi muscle, which encircles the eye socket and allows the eye to both blink and squint. The electromyogram measured the different degrees of squint.

The researchers also videotaped the blinking students.

Participants were situated in a chin and forehead rest – doing so let them relax their head and neck while squinting at the various levels. Subjects were asked to look directly at a computer screen situated about two feet in front of their eyes.

The researchers recorded data from five trials. For the first trial, participants were asked to completely relax their eyes. For the next four trials, students squinted in increments ranging from 5 percent (barely squinting) to 50 percent (eyes closed about half-way.)

Participants were also instructed to continuously look at a black dot in the center of a computer display. They listened to music while a changing pattern, which was driven by the music, moved around the black dot.

At the end of the trials, the researchers watched the videotapes and counted the number of times each student had blinked during the trials.

Blink rates decreased from an average of 15 blinks per minute when the eyes were relaxed to 7.5 blinks a minute when students squinted just 5 percent. That number was reduced to four blinks a minute when participants squinted at the 50 percent level.

Sheedy said that the next step is to figure out the physiological mechanisms behind eye strain and dry eye.

"The neural pathways leading to eyelid blink aren't completely understood," he said. "And the mechanisms controlling blink seem numerous and complex."

Source: Ohio State University