

THE EFFECT OF 4 HOURS OF CONSTANT GAMING ON THE PRODUCTION OF DRY EYE SYMPTOMS IN COLLEGE AGE STUDENTS

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Dr. Farris is a founder, investor, and Chief Medical Officer of Myze, LLC.

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PURPOSE

To examine the effects that consistent gaming over a four-hour period in a controlled environment has on the development of dry eye symptoms in college age students.

METHODS

This study involved a cohort of 40 college students and was completed under an IRB from Quinnipiac University. Students were over 18 years of age, without previous history of eye surgery, steroid use or autoimmune disorders or history of previous treatment for dry eye. No eye drops were permitted prior to beginning the study, but students were encouraged to eat and drink fluid prior to the study at the request of the IRB. Informed consent was obtained from all students. Responses to the Standardized Patient Evaluation of Eye Dryness (SPEED) and Ocular Surface Disease Index (OSDI) questionnaires were obtained. Snellen visual acuity tests at distance and near, Tear osmolarity (Tear Lab, Escondito, CA) and Matrix-Metalloproteinase-9 levels (Quidel, San Diego, CA) were measured. An unanesthetized Schirmer test (UST) was performed soon afterwards. After all the tests were performed, study participants were placed in the Quinnipiac University Gaming Lab to play video games continuously over a four-hour period, with a five-minute break every hour and a maximum fluid intake of 500cc total during the four hours. Temperature and humidity within the room was measured every hour during the five-minute breaks. Immediately after all students completed the four hours of gaming, the same tests were administered, and results were collected.

RESULTS

36% of the participants who had normal levels of MMP-9 before gaming had elevated levels of MMP-9 after gaming.

The average SPEED score increased by **1.84 times** (baseline: 2.76 ± 3.43 , final: 5.07 ± 4.97 , $p = 0.001$). More specifically, the average frequency of soreness/irritation increased by more than 3x (baseline: 0.2 ± 0.46 , final: 0.63 ± 0.86 , $p = 0.001$), and the average severity increased by 2 1/2x (baseline: 0.22 ± 0.47 , final: 0.56 ± 0.84 , $p = 0.009$). The frequency of average eye fatigue nearly doubled (baseline: 0.56 ± 0.87 , final: 1.02 ± 0.96 , $p = 0.007$), and the average severity increased by a factor of 2.4 (baseline: 0.46 ± 0.67 , final: 1.1 ± 1.11 , $p < 0.001$).

RESULTS

23 PARTICIPANTS HAD AN INCREASE
IN THEIR SPEED SCORES
(AVERAGE INCREASE 4.82 POINTS)

ONLY 5 PARTICIPANTS HAD A DECREASE
IN SPEED SCORES
(AVERAGE 3.2 POINTS)

12 PARTICIPANTS SPEED SCORES
REMAINED THE SAME

Temperature and Humidity levels remained constant throughout the study

CONCLUSIONS

Our study suggests that prolonged periods of gaming in front of a digital screen can lead to an increase in inflammation as measured by MMP-9 levels.

Prolonged gaming can lead to the development of dry eye symptoms, specifically soreness/irritation and eye fatigue and an increase in SPEED scores in a majority of subjects.

To our knowledge, this is the first study to show the production of dry eye signs and symptoms specifically focused on the gaming community.

Further studies are required to attempt to duplicate our results and to assess the potential benefit of intervention in this population.

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