Fatigue on Facility: Does Testing Duration Influence Performance?

Joellen Maurer and Emily Aslakson OD, FAAO, FCOVD

FERRIS STATE UNIVERSITY
Michigan College of Optometry

Introduction

- The purpose of accommodative facility is to measure a patient's ability to make rapid and accurate accommodative changes under monocular and or binocular conditions.

- Accommodative facility testing helps distinguish primary accommodative issues from primary binocular anomalies. (1)

- Some subjects showed improvement in results with repeated testing and with extended testing time. This improvement was largely attributed to a learning effect. (3)

- A study tested binocular facility for 120 seconds, to see if there was an effects of fatigue on results. There was no significant effect on accommodative facility from the increased testing time. (4)

Methods

- Participants took the Convergence Insufficiency Symptom Survey (CISS) and an initial questionnaire

- Saladin Near Point Balance Card was used as the near target, a +/- 2.00 lens flippers, and a cover paddle

- Saladin Near Point Balance Card was held at 40 cm by the investigator
  A lamp was on and shining on the letter card

- The participant was asked to cover their left eye first

- Instructions: I am going to put lenses in front of your eyes. I want you to read the first letter, located on the left of the card, as soon as it becomes clear. I will then flip the lens, and have you read the second letter as soon as it becomes clear. This process will continue until the time is up

- The timer for the allotted time was started as the lenses were placed in front of the patient's eyes. The lenses were changed once the participant reads the next letter. This procedure was continued until the timer signals the end of the allotted time.

- The number of cycles per minute performed by the participant was recorded. This testing procedure was repeated with the participant covering their right eye and then again with both eyes uncovered.

Results

- Data was analyzed with t-Tests.

- These showed no statistically significant difference between testing for 60 seconds vs 30 seconds.

- Paired Two Sample t-Test: OD Number of Cycles/Minute
  - In a small sample (N=17), the number of cycles/minute increased from M=14.65 (SD=4.76) in the 30 second testing time to M=14.94 (SD=5.23) in the 60 second testing time, however this change was not significant, t (16) = -0.27, p = 0.39.

- Paired Two Sample t-Test: OS Number of Cycles/Minute
  - In a small sample (N=17), the number of cycles/minute increased from M=14.59 (SD=4.57) in the 30 second testing time to M=15.26 (SD=4.33) in the 60 second testing time, however this change was not significant, t (16) = -0.76, p = 0.23.

- Paired Two Sample t-Test: OU Number of Cycles/Minute
  - In a small sample (N=17), the number of cycles/minute decreased from M=13.06 (SD=5.66) in the 30 second testing time to M=12.71 (SD=4.30) in the 60 second testing time, however this change was not significant, t (16) = 0.37, p = 0.36.

- Participants came in for two sessions of accommodation testing.

- They were randomly selected to do the 30 second testing time frame or the 60 second testing time frame for their first session.

- This was done using a random number generator. The number 1 stood for the 30 second testing time frame and the number 2 stood for the 60 second testing tie frame.

- The accommodation testing was done on their left eye only, right eye only, and both eyes at each session.

- The number of cycles per minute they reach within the allotted testing time was recorded. For the 30 second testing time frame the number of cycles attained were multiplied by two to give the number of cycles per minute the patient reached. For the 60 second testing time frame the number of cycles attained were recorded.

Conclusions

- The length of time accommodative testing is performed does not show a significant effect on findings.

- Small sample size and inclusion of participants with vision therapy history could have affected results

- Length of testing may have more effect on participants with fragile binocular vision and accommodation systems

- Future research direction
  - Exclusion of participants with VT history and strabismus/amblyopia
  - Larger sample size
  - Compare those symptomatic with CISS to those not symptomatic
  - Look deeper into patient symptoms

References

- Carlson, N. B., & Kurtz, D. (2004). Clinical Procedures for Ocular Examination (3rd ed.). New York, NY: McGraw-Hill.

- Wajuihian, S. O. (2019). Normative values for clinical measures used to classify accommodative and vergence anomalies in a sample of high school children in South Africa. Journal of Optometry, 12(3), 143–160. Retrieved from https://www.sciencedirect.com/science/article/pii/S1888429618300323

- McKenzie, K. M., Kerr, S. R., Rouse, M. W., & DeLand, P. N. (1987). Study of Accommodative Facility Testing Reliability. American Journal of Optometry & Physiological Optics, 64(3), 186–194.

- Siderov, J., & Johnston, A. W. (1990). The Importance of the Test Parameters in the Clinical assessment of Accommodative Facility. Optometry and Vision Science, 67(7), 551–557.