Effect of First Year of Optometric Education on Binocular Vision Measurements

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INTRODUCTION

First year optometry students are faced with a rigorous academic demand associated with a high amount of near work and near point stress. This population, possibly as a result of increased near visual demand, has been shown to have a high prevalence of accommodative excess which can lead to an esophoric eye posture.[1,2] Esophoria at near can accompany lower base in vergence ability and symptoms such as headaches and eye strain.[1] This study was designed to investigate whether there is a significant difference between binocular vision (BV) measurements, particularly phoria and vergences, at the start of optometry school versus at the end of the first academic year.

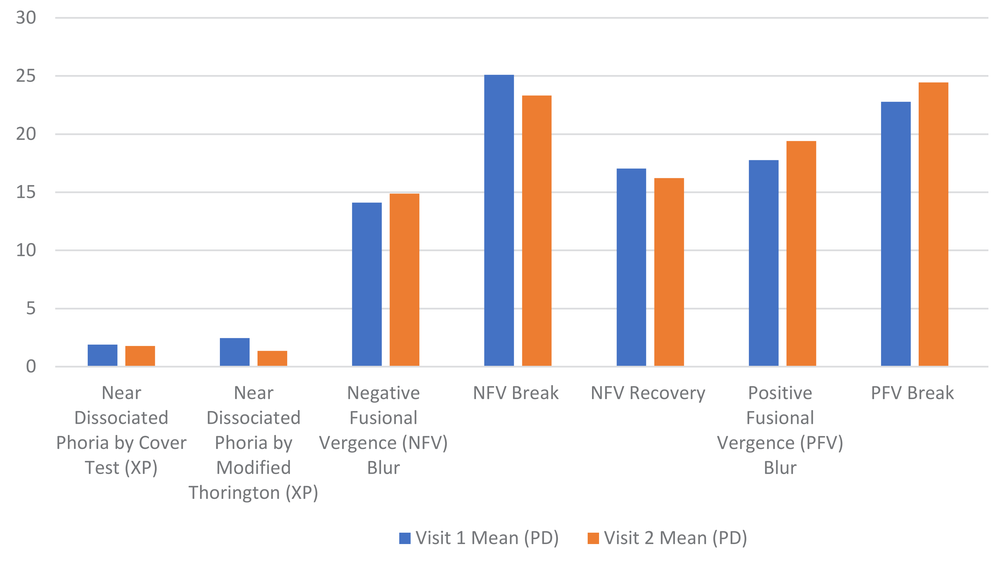
METHODS

First year students from the Illinois College of Optometry were subjects in this study and all voluntarily participated and provided informed consent. The study consisted of 19 participants greater than 18 years of age with no sex or race predilection. Exclusion criteria consisted of any student who had a history of strabismus; nystagmus; amblyopia; known accommodative excess or insufficiency; or near visual acuity worse than 20/25 in either eye. Visit 1 occurred at the beginning of participants' fall quarter and consisted of near visual acuity, dissociated phoria by near cover test, Modified Thorington (MT), and near positive and negative fusional vergence (PFV & NFV) using Risley Prism (RP). All testing was performed through the participants' best correction. Visit 2 occurred at the end of participants' spring quarter and all tests were repeated by the same examiner. The examiners ensured that none of the participants met the exclusion criteria and none had received vision therapy or binocular vision treatment prior to Visit 2.

TABLE 1
Binocular Vision Test Results

Test	Visit 1		Visit 2		P Values
	Mean (PD)	Std. Deviation (PD)	Mean (PD)	Std. Deviation (PD)	
Near Dissociated Phoria by Cover Test	1.89 exo	4.24	1.78 exo	5.17	0.641
Near Dissociated Phoria by Modified Thorington	2.47 exo	3.66	1.36 exo	4.23	0.297
Negative Fusional Vergence (NFV) Blur	14.11	7.18	14.89	5.32	0.633
NFV Break	25.11	5.19	22.33	5.41	0.008
NFV Recovery	17.05	5.18	16.22	5.40	0.607
Positive Fusional Vergence (PFV) Blur	17.76	8.15	19.41	9.64	0.540
PFV Break	22.78	8.06	24.44	11.69	0.534
PFV Recovery	10.06	5.07	14.33	8.85	0.028

FIGURE 1
Comparison of Binocular Vision Measurments



RESULTS

A paired t-test was performed to compare the BV measurements of participants at the beginning and end of their first year of optometric education. The following BV measurements were not normally distributed: phoria by cover test, phoria by MT, and negative fusional vergence recovery value, thus Wilcoxon Signed ranks test was used to analyze the difference at two administrations.

Table 1 outlines the test results during Visits 1 and 2. The average changes (in prism diopters) were: cover test 0.11 (4.99), Modified Thorington 1.03 (4.62), NFV blur 0.78 (6.80), NFV break -2.78 (3.89), NFV recovery -0.44 (3.97), PFV blur 2.44 (11.05), PFV break 1.67 (11.13), PFV recovery -7.22 (8.63). Overall, the change in binocular vision measurements was not statistically significant (Ps>0.05) except NFV break (Ps=0.008) and PFV recovery (Ps=0.028). Figure 1 visually demonstrates the average for each clinical test performed at Visits 1 & 2.

CONCLUSION

Within academic optometry communities, students and faculty often state anecdotally that due to the high near demand in optometry curricula, optometry students may become more esophoric or less exophoric and have reduced vergence ranges with time. In this particular study, binocular vision measurements did not significantly change when comparing the start and end of the subjects' first academic year, except NFV break and PFV recovery values. Study limitations include a small sample size, and for this reason the investigators hope to repeat the study with a larger cohort in the future.

REFERENCES

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