

The Relationship between Binocular Summation in Contrast Sensitivity and Stereopsis: Cross-Sectional Study

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Original Article

Abstract

Introduction: Binocular summation occurs in the presence of normal visual function of both eyes. Stereopsis is considered to be the finest function of binocular vision. Therefore, the aim of this study was to investigate the effect of binocular summation on contrast sensitivity and its relationship with stereopsis.

Materials and Methods: In this cross-sectional study, 60 students of Zahedan University of Medical Sciences, Zahedan, Iran (17 men and 43 women) with a mean age of 21.20 ± 1.45 years were selected by convenience sampling method. Monocular and binocular contrast sensitivity were measured with the best corrected vision in photopic conditions using the Metrovision test for spatial frequencies of 0.75, 1.5, 3, 6, 13, and 20 cycles per degree. Stereopsis was also measured by TNO and Titmus tests. Statistical analysis was performed using the repeated measures analysis of variance (ANOVA) and multiple linear regression.

Results: The results of repeated measures ANOVA showed that binocular vision compared to monocular vision significantly increased contrast sensitivity ($P < 0.001$). But there was no significant difference between the contrast sensitivity of right and left eyes ($P = 0.266$). Pearson correlation test did not show a significant relationship between stereopsis measured by crossed and uncrossed methods in Titmus and TNO tests with binocular contrast sensitivity at all spatial frequencies ($P = 0.114$).

Conclusion: Binocular summation in presence of normal binocular function can improve visual functions such as the increased binocular contrast sensitivity compared to monocular contrast sensitivity which confirms the importance of treating binocular anomalies such as amblyopia.

Keywords: Contrast sensitivity; Binocular vision; Monocular vision; Stereopsis; Regression analysis

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