Gap detection and fixation behavior when crossing the street by persons with advanced retinitis pigmentosa

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Purpose: Some people with retinitis pigmentosa (RP) self-report difficulty with crossing the street due to their severe visual field (VF) loss. In this study, we compared the gap detection ability and fixation behavior of fully sighted and RP subjects during street-crossing judgments to determine whether either of these factors are adversely affected in RP.

Methods:
Two subjects with normal vision (NV) and four subjects with advanced RP (binocular VF less than 20°) made judgments of crossable gaps at a street crossing. Gap detection was measured with a hand held push button indicating the safe time to cross and compared with the objectively determined crossable gaps. An eye tracking system captured images of the subject’s eye and the scene. Movies of the eye-on-scene were made offline, and fixations were classified into 5 categories.

Results:
All subjects were able to detect more than 75% of safe crossable gaps. However, subjects with RP made more than twice the errors as the NV subjects. The percent of fixations allocated on vehicles and crossing elements by subjects with RP was approximately half
(48.9%) of that made by subjects with NV (86.48%). Instead, subjects with RP fixated more on the general environment (43.7%).

Conclusion:
Judgments of safe crossable gaps by people with significant peripheral field loss was significantly worse than those with NV which may be related to decreased percent of fixations on vehicles at time of judgment. Persons with RP may be at greater risk when crossing the street because of their poor gap detection.