S.M. McKay, J.E. Fraser, A.L. Peters, T.A. Lee, C.Y. Scovil, B.E. Maki. Handrail cueing to reduce risk of falling. Gerontechnology 2010;9(2):310; doi:10.4017/gt.2010.09.02.154.00 **Purpose** The central nervous system requires visuospatial information (VSI) about handrail location in order to reach and grasp the rail in response to sudden loss of balance. Age-related deficits in visual attention may impair the ability to acquire the needed VSI and this in turn may increase risk of falling by reducing ability to grasp the rail rapidly and effectively[1]. To counter this problem, we have developed a proximity-triggered cueing system[2] that provides a visual cue (flashing lights) and/or verbal cue ('attention, use the handrail') to attract attention to the handrail. **Method** The cueing system (patent pending) comprises light-emitting diodes mounted inside a translucent black railing, audio speakers and a photocell that triggers the cueing whenever a person approaches the rail (approximately 1-2 sec before the person's body becomes adjacent to the rail). The handrail was mounted on a large (2x6m) motion platform configured to simulate a real-life environment. Subjects performed a task that required walking to the end of the platform, which was triggered to perturb balance by moving suddenly and unexpectedly when subjects were adjacent to the rail. A deception was used to ensure that the perturbation was truly unexpected. To prevent learning and adaptation, subjects performed only one trial, which was their very first exposure to the perturbation and environment. Subjects were randomly assigned to one of three cueing conditions: (i) no cueing, (ii) visual cueing; (iii) combined visual-plus-verbal cueing. **Results & Discussion** 120 participants (mean age 69.9 years, SD=4.6, range=64-80) completed the protocol. The combined cueing markedly increased the tendency to grasp the rail "proactively", prior to perturbation onset (48% of subjects, versus 0% for visual-cueing and 10% for no-cueing; $p<0.001$). In the absence of the combined cueing, subjects were much more likely to rely on reactive balance control, grasping the rail in reaction to the perturbation (78% of visual-cue and 83% of no-cue subjects, versus 41% of combined-cue subjects; $p<0.001$). Analyses are in progress to determine whether the cueing influenced the speed, accuracy or effectiveness of these perturbation-evoked reach-to-grasp reactions. The preliminary results presented here support the viability of using a visual-plus-verbal cueing system to reduce fall risk by increasing 'proactive' handrail use.

References

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