The Effects of a Driving Simulator on Driving-Related Skills Necessary for ADL and IADL Function

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Background
Returning to driving is often a goal for an individual following a neurological impairment. Critical skills for success in returning to driving include intact cognition, visual, and visual-perceptual skills which are skills that are commonly compromised in individuals who have had a neurological accident. In addition, these skills are necessary for other areas of instrumental activities of daily living (IADLs), as well as activities of daily living (ADL) performance (Crotty & George, 2009). Emerging evidence has shown the use of driving simulator training as an intervention to increase on-road driving performance (Bedard et al., 2008). There is little evidence on the effects of driving simulators on specific skills, such as visual skills, and the generalizability this may have on ADL function and other areas of IADLs. It is prudent to investigate the effects of a driving simulator on skills crucial to everyday function.

1 Ask: Research Question
Does the use of a driving simulator improve visual, cognitive, and visual-perceptual skills that are necessary for ADL and IADL function?

2a Acquire: Search Terms

Databases: Scopus, PubMed, ClinicalKey, Medline
Search Terms: driving reintegration, therapy outcomes, cognition, neurological impairments, visual attention, stroke, community mobility, driving simulator, driving intervention, driving training, traumatic brain injury

2b Acquire: Selected Articles

Akinwuntan et al. (2010): Randomized Controlled Trial. Compared the effects of driving simulation training versus a control group who received cognitive rehabilitation training on driving-related visual attention skills in moderately impaired stroke survivors. Evidence demonstrates a positive effect on the use of driving simulation on visual skills, but little evidence to show the effectiveness of a driving simulator on cognitive skills, suggesting safe driving skill is independent of cognitive function. In addition, strong evidence was not found to support the use of a driving simulator over other forms of visual and cognitive training. Further research is needed to determine effectiveness and if this intervention generalizes to other areas of ADL and IADL performance. Future research should focus on on-road driving and its effects on ADL/IADL performance.

Shimada et al. (2018): 146 participants completed the 3-month follow-up. Dependent variable was measured by completion of an on-road driving evaluation. Driving performance was rated on a 28-item scale with a total score ranging from 100 (best) to no lower limit (worst). Secondary outcome measures were the number of critical errors of safe disconfirmations and dangerous driving. Results were statistically significant between groups. Dynamic vision showed significant improvement (p<0.04) but cognitive performance did not, suggesting that driving skill is independent of cognitive function.

4 Apply: Conclusions for Practice
Evidence demonstrates a positive effect on the use of driving simulation on visual skills, but little evidence to show the effectiveness of a driving simulator on cognitive skills, suggesting safe driving skill is independent of cognitive function. In addition, strong evidence was not found to support the use of a driving simulator over other forms of visual and cognitive training. Further research is needed to determine effectiveness and if this intervention generalizes to other areas of ADL and IADL performance. Future research should focus on on-road driving and its effects on ADL/IADL performance.

References:

Evidence supports the use of driving simulation training on visual skills related to ADL/IADL performance.