

components may aid in generalization of skills to the road setting. (Marmeleira, 2009).

DRIVING SIMULATION AND PERFORMANCE FEEDBACK

Driving simulation is an emerging area that may assist senior drivers in staying on the road longer. It has been shown to increase the chances of a driver looking for a hazard when making a turn by almost 100%. (Lavallière, 2012). This more active style of training has been shown to translate to actual on-road skills, perhaps due to allowing for more specific and real-time feedback to be given. (Lavallière, 2012). It has been shown to increase performance with a variety of cognitive-visual skills, such as checking blind spots, rearview mirror, and side mirrors. Additionally, it has been found to be more effective than written practice. (Lavallière, 2012). Older drivers have been shown to be largely unaware of their deficits. Similar to young drivers, they are able to identify hazards in theory, but do not visualize themselves being susceptible to these situations. This sort of self-concept can be very dangerous. One way to combat this involves video recording during active practice sessions. With this recording, older drivers are more easily able to identify their errors and improve on them in future sessions. While on-road practice is still considered the best way to ensure safe driving, advances in technology make the combination of driving simulators and real-time feedback an efficient and cost-saving option. (Lavallière, 2012).

After practice, a Comprehensive Driving Evaluation (CDE) may be performed. An occupational therapist with specialized training may be an administrator for this type of testing. A evaluation will generally consist of two parts. The first is a preliminary examination, usually taking place in office, that will assess physical, visual, and cognitive abilities necessary to operate a vehicle. After passing this, a driver will also have to complete a skills-based component actually done on the road. This will typically be in a specialized vehicle equipped with safety features like an instructor's brake. After initial assessment, an occupational therapist may choose to include adaptive equipment as part of the testing. (American Occupational Therapy Association, 2016)

Once the entire evaluation is complete, an occupational therapist can make recommendations if the driver could benefit from adaptations, increased training, or other strategies. An occupational therapist may also make the determination that it would be in the adult's best interest to cease driving. If this is the case, the occupational therapist may help the adult learn coping strategies and other ways to access community mobility, or they may refer out for this service. (American Occupational Therapy Association, 2016)

MEDICATION

Medications can influence the ability to drive safely. “At high doses, Tramadol is known to affect balance [and] poor balance has been linked to an increased risk of motor vehicle collision, particularly in older populations. [In fact, in one study,] those taking Tramadol were at a significantly increased risk of motor vehicle collision if they took this substance 14 days prior to collision compared to control times. [This same] analysis also showed that approximately 50% of patients had a traceable prescription for benzodiazepine or opiates within the year before collision. Numerous other medications in this study were also trending toward an increased risk of motor vehicle collision, but were not found statistically significant, including: Clopidogrel, Gabapentin, Citalopram, Insulin, Hydrochlorothiazide, Metoprolol, Zolpidem, and Nitroglycerin. The findings from this analysis have several key clinical implications.” (Rudisill, 2016). An occupational therapist may work with a patient on medication management, such as taking certain medications during the evening versus the morning to offset side effects. They may also suggest speaking with a physician or pharmacist on medication modifications.

TESTS FOR PREDICTING UNSAFE DRIVING

People who administer CDEs, such as occupational therapists or certified driver rehabilitation specialists (CDRSs) require standardized and quick assessments that can aid in determining fitness to drive. (American Occupational Therapy Association, 2016). Ideally, one comprehensive assessment will be used to save both money and time. Several such assessments exist. The Occupational Therapy Driver Off-Road Assessment (OT-DORA) Battery is a collection of various assessments that test an individual’s mental, perceptual, physical, sensory, and behavioral skills that affect driving. (American Occupational Therapy Association, 2016). It also includes a section that collects medical history and current medications. This assessment is done in office before getting on the road, and has a process for screening drivers out who should not progress to the practical component of the evaluation. The assessment can also be done as a start to treatment for driver rehabilitation to determine areas of strengths and weaknesses and aid in goal setting. (American Occupational Therapy Association, 2016).

Assessments are also important because they allow evaluators to examine the individual effect that a disease or disorder has on a driver. “Although age itself is not a predictive factor of an increased risk for dangerous driving, the prevalence of medical conditions that may impair driving ability increases with age. The need for valid and reliable screening tools applies to: 1) the diagnosis of the medical conditions; 2) the detection of unsafe behaviors due to this medical condition; and 3) the prediction of the actual risk of collision of a driver diagnosed unsafe. The main issue lies in the availability of tools to detect unsafe driving due to the medical condition and to predict the real-condition risk of collision of the driver considered unsafe. [Therefore,] the aim of the screening test is not only to distinguish drivers

who pass or fail the test but to detect drivers who are really at risk of severe collisions” (Leproust, 2008).

Contrary to what one may think, memory has been shown to have little effect on safe driving. However, visual processing speed has been shown to have a strong correlation. The Trail Making Test (TMT) is a short (less than 5 minute) screen that assesses this skill. “Studies have shown the TMT to be one of the best performing paper-and-pencil-based neuropsychological tests in predicting driving difficulties. The first part of the TMT measures the time participants need to connect 25 numbered circles in an ascending order (part A). In the second part (B), 13 numbers and 12 letters have to be alternately connected in their numerical and alphabetical order. Participants [are] notified of errors immediately and required to correct them without assistance with the clock running.” (Vaucher, 2014).

Adults not affected by cognitive decline can pass both sections of the TMT in about two minutes. If the assessment takes longer to complete, it is likely that that test-taker may be more affected and thus have poor road skills. However, evaluators should take caution to not use this measure alone in determining whether an adult should remain a driver. It is instead a valuable tool in a comprehensive evaluation. (Vaucher, 2014).

RANGE OF MOTION AND EXERCISE TRAINING

Besides cognitive benefits, exercise has obvious physical benefits such as improving range of motion. “Exercising daily not only contributes to a more positive driving experience overall, but also may improve the types of driving-related movements that many people find challenging” (AARP, 2013). An occupational therapist can help each driver tailor an exercise program to meet his or her individual needs. The styles of exercises and their respective influence on driving ability are as follows (AARP, 2013):

- **Strength Exercises:** *Strength is important for many driving tasks, such as pressing down on a brake pedal. Exercises like biceps curls and squats can help enhance a driver’s strength.*
- **Range of Motion Exercises:** *Range of motion is central to actions such as putting on your seatbelt easily. Performing exercises such as back stretches and heel drops can improve your range of motion.*
- **Flexibility Exercises:** *Flexibility is necessary for movements such as getting in and out of your car easily. To enhance your flexibility, consider exercises such as chest and shoulder expansions and shoulder stretches.*
- **Coordination Exercises:** *Coordination can help with the integration of movement in your upper and lower body, such as simultaneously braking*

and turning. Soccer kicks and lateral steps are good exercises for boosting your coordination.

Another common area that occupational therapists assess, falls and mobility, is related to driving performance. Older adults who have a history of falls are often unsafe drivers. (Marmeleira, 2009). Difficulty with overall joint mobility may cause increased likelihood to crash. (Marmeleira, 2009). As one may be able to guess, many older drivers who have limited neck and back flexibility are less likely to turn to check blind spots. (Marmeleira, 2009). Exercise that focuses on range of motion, especially of the spine, has been shown to improve flexibility required for safe driving. (Marmeleira, 2009). An occupational therapist can help a client develop a home program on activities that will promote and increase functional range of motion.

CONCLUSION

Driving is an occupation. Although driving is essential for well-being and quality of life, older drivers are at higher risk of collision because of function impairment. Occupational therapists can help by administering comprehensive driving evaluations and developing a plan to address found deficits. (American Occupational Therapy Association, 2016). Osteoarthritis of the lower extremities is one such deficit and requires close monitoring from the OT. Visual attention has also been proven to be a problem in the elderly, and the Useful Field of View test is the best developed screening measure for visual attention, while the Trail Making Test is an indicator of reduced visual processing speed. Finally, it has been demonstrated that physical activity can promote several skills that are associated with driving performance in older drivers. With the help of an occupational therapist, older adults experiencing these deficits can remain as independent as possible for as long as possible.

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