Driver Rehabilitation
An Introduction

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Objectives

• Understand the impact of driving and the implications on one’s independence in our society
• Recognize the basic components and different types of driver rehabilitation programs
• Appreciate the effects of disability, aging, and functional impairments that impact driver capability
• Explore adaptive driving equipment, vehicle modifications, and transportation options

The Driving Facts

• Driving is an Instrumental Activity of Daily Living—a cornerstone for independence in our society
• Rite of passage, symbol of autonomy and independence
• Car ownership and driving are highly correlated with independence and life satisfaction in older adults
• After injury or illness, safe community mobility, and driving skills can be impaired
• Lack of community mobility/driving can lead to social isolation, and is associated with a variety of health conditions including depression

1Choi et al., 2014; Fonda et al., 2001; Marottoli et al., 1997; Ragland et al., 2005
2Ragland D, Sartorius W, MacLeod K. Driving cessation and increased depressive symptoms. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences. 2005; 60(3):399-403.
Relationship to Independence

Evidence: The perception of the meaningfulness and performance of instrumental activities of daily living from the perspectives of the medically at-risk older adult and their caregiver.

Source: Dickerson, Reistetter, & Gaudy, 2012. *Journal of Applied Gerontology*

Instrumental Activities of Daily Living
- Shopping for groceries
- Planning a meal
- Cooking
- Driving
- Planning trips
- Community participation
- Home management
- Yard work
- Financial management
- Medication management
- Phone use

Driver Rehabilitation - Introduction

Consists of evaluation, training, and vehicle modification recommendations for drivers and passengers with disabilities and age-related impairments as well as counseling and supports in the pursuit of maintaining mobility within the community.

*Best Practice Guidelines for the Delivery of Driver Rehabilitation Services (2016), Association for Driver Rehabilitation Specialists (ADRS)*
Driver Rehabilitation-History

- In the US
  - Department of Veteran Affairs, 1970s
  - Association for Driver Rehabilitation Specialists (ADED), 1977
  - National Mobility Equipment Dealer’s Association (NMEDA), 1989
  - American Occupational Therapy Association (AOTA), 2003

Driver Rehabilitation

Who is involved?
Key players?

Return to Driving-Collaborative Effort

DMV
Family
MED
Physicians
Funding Sources
Healthcare Professional
Driver Rehabilitation Specialist
Vehicle Equip Rep
Driver Rehabilitation-DRS

- Driver Rehabilitation Specialist (DRS)
- Plans, develops, coordinates and implements driver rehabilitation services for individuals with disabilities.
- Work with people of all ages and abilities.
- Requires specialized training and education.
- Typically conducts clinical and on-road assessments, equipment or vehicle modification recommendations, and training.

Driver Rehabilitation-CDRS

- CDRS-Certified Driver Rehabilitation Specialist. Offered by the Association for Driver Rehabilitation Specialists. www.aded.net
- Certification validates specialist’s experience and knowledge in the field of driver rehabilitation.
- Certification maintenance requires criteria specific continuing education.

How do we assess driver capability?
Driver Capability Assessment

- AMA Physician’s Guide to Assessing and Counseling Older Drivers
- Driving Simulators
- Family and caregiver report
- Self assessment
- State Driver’s License Bureau (DMV)
- Driver Rehabilitation Programs
What do Driver Rehab programs do?

Driving Program Process

- Referral, intake, driving and medical history
- Clinical assessment
- On-road assessment
- Training—when indicated
- Vehicle and equipment assessment
- Recommendations

The Clinical Interview

- Demographics
- Medical History
- Medications
- Seizure History
- Substance Use/Abuse
The Clinical Interview
• Living Situation
• Employment
• Functional Status
• Transportation & Driving History/Needs
• Goals-client/family

Clinical Assessment
• Vision Screen
• Visual-Perceptual Assessment
• Cognition
• Communication and Behavior
• Motor/Mobility Skills (including wheelchair or mobility device)
• Knowledge of Driving

On-The-Road Assessment
Best method to determine driver performance within the context of a real traffic environment
On-The-Road Assessment

- Minimal Stimuli
  - Parking Lot
  - Neighborhoods

- Moderate Stimuli
  - 2 lane roads
  - 2-4 lane, intersections

- Maximal Stimuli
  - Highway, Interstate
  - City

Driver Rehabilitation - Introduction

- Should not drive, counseling, review options, alternatives
- Additional training
- Re-evaluation
- Resume driving with restrictions
- No concerns, resume driving
- State exam or re-examination

Driver Rehabilitation Evaluation Outcomes

- Client ability, skills, insight
- Deficit areas
- Adaptive equipment/vehicle modifications
- Need for follow-up services
- Need for training, aptitude for training
Driving is a highly complex and demanding task. Medical conditions and age related changes, either physical, visual or cognitive, can affect driving ability.
Common Clinical Diagnoses and their Implications for Driving

Driving and...
- Aging
- Neurological Conditions
- Orthopedic Conditions
- Congenital/Developmental
- Chronic Health Issues
- Other

Older Drivers: What’s the Concern?
Why are Older Drivers an Issue?

• Increasing number of older adult driving.
• From 2003 to 2013, 22% increase in drivers over age 50.
• 86% of Americans ages 65 & older continue to drive (in 2011, 16% of all licensed drivers).
• With this trend, by 2050, one in every four vehicle will be controlled by someone over 65 (and they will likely plan to drive more miles than those who drive today).


Older Drivers: What’s the Concern?

• Rely on automobile transportation while living in suburban or rural communities outside public transportation systems.
• Older drivers, especially those 65 and older, are more likely to sustain severe injuries when involved in a motor vehicle crash, especially in left-side impact crashes.


Older Drivers: What’s the Concern?

• Older drivers are safe drivers and self-regulate their driving
• Not all older drivers know when to restrict or cease driving (self reporting not reliable)

Older Driver
- Age related changes
  - Vision, Cognition, Physical
- Chronic medical conditions
  - Diabetes, Arthritis
- Progressive neurological disease
  - Dementia, Parkinson’s
- Medications

Older Adult-Cognitive Decline
- Driving too slowly, doesn’t observe signs or signals
- Difficulty interpreting traffic situations and predicting changes
- Failure to yield
- Easily frustrated or confused, frequently gets lost
- Needs instructions from passengers
- More frequent scratches/dents

Older Adult-Vision Decline
- Unable to read road sign or markings
- Difficulty in seeing things in the environment, especially on gray/overcast days-poor light conditions.
- Difficulty when light changes from light to dark (for example travel through tunnels)
- Avoid driving at night
- Poor estimation of space and time when making turns at intersections
- Lane maintenance issues-shifts
Neurological Conditions

- Traumatic Brain Injury
- Cerebral Vascular Accident
- Multiple Sclerosis
- Spinal Cord Injury

Brain Injury and Driving

- Restriction of driving remains a greater concern for clients than any other functional limitation\(^1\)
- Independent community mobility after discharge correlated with overall life satisfaction\(^2\)

\(^1\) C. Hopewell, Driving assessment issues for practicing clinicians, J Head Trauma Rehab 17 (2002), 48-61

\(^2\) M. Johnston, Y. Goverover, M. Dijkers, Community activities and individual's satisfaction with them: Quality of life in the first year after traumatic brain injury, Arch Phys Med Rehabil 86 (2005), 735-745

Brain Injury and Driving

- Physical, cognitive and emotional changes post injury: multi-faceted and complex
- Nearly half will resume driving, 66% without any formal medical, legal or driving evaluation.*
- Goal should be integrated in rehabilitation process

* M. Tamietto, et. Al., To drive or not to drive (after TBI)? A review of the literature and its implications for rehabilitation and future research, NeuroRehab 21 (2006), 81-92
Brain Injury and Driving Assessment & Training Considerations

- Various situations
- Impulsive behaviors
- Topographical orientation
- Fatigue
- Insight
- Attention and distractibility

CVA and Driving

Clinical presentation is varied and complex

- Vision: Hemianopia, neglect
- Hemiparesis, functional use of extremities
- Balance and mobility: ambulation, transfers
- Cognition: attention, impulsive behavior, memory, executive skills
- Communication: aphasia, dysarthria
Left Foot Accelerator

Parking Brake options

Steering Devices
Spinal Cord Injury and Driving

- Evaluation and training by driver rehabilitation specialist
- Consideration of functional skills, transfer ability, vehicle and adaptive equipment needs
- Always try out the adaptive equipment before prescribing or purchasing

Spinal Cord Injuries: Considerations and Issues

- Bowel and bladder dysfunction
- Autonomic dysreflexia
- Low blood pressure
- Inability to regulate body temperature
- Chronic pain
- Depression

Spinal Cord Injuries: Considerations and Issues

- Level of injury equates to functional ability
- Functional ability equates to type of driving equipment and vehicle modifications
Power Seat Base - driver's side

Wheelchair Securement

Wheelchair Securement
Orthopedic Conditions

- Amputation
- Arthritis
- Neck pain
- Low back pain

Amputation and Driving

- What is cause of the amputation? And what is the functional loss?
- Secondary issues (diabetes, vision, sensory changes/phantom pain)
- Ambulation/transfer issues (LE)
- Loss of coordination/functional skills (UE)
- Depression
Mechanical Hand Controls

Arthritis and Driving
- Primary or secondary issues
- Pain, fatigue
- Loss of range, strength
- Transfers/mobility
- Equipment is dependent on the severity of the symptoms and its impact on driving

Non-Rapid Access Secondary Control Adaptations
Non-Rapid Access Secondary Control Adaptations

Driver Rehabilitation - Introduction

- Cerebral Palsy
- Spina Bifida
- Dwarfism
- Learning Disability
- Autism Spectrum
- ADHD, PDD-NS

Car seat transfer options

Driver Rehabilitation - Introduction
Pedal Extensions

Chronic Health Conditions

- Cardiovascular issues
- Diabetes
- Sleep apnea
- Chronic vision disorders

Diabetes and Driving

- Hypoglycemia
- Diabetes complications
  - Cognitive impairment
  - Peripheral neuropathy
  - Visual disturbances, retinopathy, loss of visual acuity
Driving and....

- Aging
- Neurological Conditions
- Orthopedic Conditions
- Congenital/Developmental
- Chronic Health Issues
- Other

Technology that assists in one's quest for driving independence shows promise in promoting life satisfaction and improved quality of life.

Funding for Driver Rehabilitation

- Medicare Regulations and Fiscal Intermediary
- Office of Vocational Rehabilitation (OVR)
- Worker Compensation
- Charitable organizations (ex: National MS Society, MS Foundation)
- Other 3rd party payers
- Private business
Adaptive Driving Program

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