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ELIZABETH
HEALTH CARE

Driving After Brain Injury

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CARE TO BE AMAZED

Objectives

Participants will:

- Have an increase awareness of brain injury related impairments and the impact on driving performance.
- Be informed of the Ministry of Transportation (MTO) medical review processes.
- Understand the role of specialized assessment, training and adaptive equipment in driving.

Michon Model of Driving (Michon J.A., 1979)

- Strategic Level
 - what happens before you are in the car
 - planning time of day, route etc
- Tactical Level
 - behaviour and decisions in traffic
 - adapting speed, deciding to pass etc
- Operational Level
 - common actions and decisions
 - use of controls, perception of traffic etc.

What Does it Take to Drive?

- Cognitive skills – processing speed; multi-tasking; orientation; problem solving etc.
- Visual function – acuity; field; scanning
- Neck & trunk mobility for observation
- Postural control
- 2 hands to steer – one hand can manage secondary controls while the other continues to steer; AROM; strength; sensation; coordination
- 1 or 2 feet to manage pedals – AROM; strength sensation; coordination

Medical Conditions

Any medical condition that results in a change of physical, sensory, mental or emotional abilities has the potential to compromise driving performance.

- **Physical** (weakness; limited movement etc)
- **Sensory** (vision loss; proprioception etc)
- **Cognitive/Perceptual** (slowed thinking; attention etc)
- **Emotional** (anxiety etc)

Cognitive Function

- Insight and responsibility
- Self regulation
- Knowledge
- Planning & problem solving
- Judgment
- Visual motor coordination
- Visual perception
- Processing speed
- Attention/concentration
- Level of arousal

Cognitive Related Errors

- Getting lost
- Unable to alter performance (e.g. construction, congestion etc.)
- Unsure of right of way.
- Unable to sequence tasks (e.g. lane change – mirrors, signal, shoulder check)
- "Near miss" and collisions
- Other driver's becoming annoyed (honking, passing)
- Driving too slow or too fast
- Appropriate actions at inappropriate times (e.g. shoulder checking wrong direction; stopping for green lights etc)
- Late or lack of response to signals, signs, vehicles etc.
- Unable to maintain lane position (straight and turning).
- Deteriorating performance over time
- Drowsiness

Cognitive Function

- The lack of consensus on measurement of cognitive indicators and ability indices continues to make this a problematic issue. If medical assessment alone is not sufficient to determine driving suitability, then further evaluation by medical specialists, neuropsychological testing or formal comprehensive driving assessment may give a more accurate evaluation and help to a better understanding of specific driving problems.
- CMA Driver's Guide; 7th Edition

Emotional Function

- Anxiety related to driving or traveling in a vehicle
 - panic attacks
 - limited community mobility
- Loss of emotional control
 - road rage
 - aggressive driving
- Treatments such as counseling CMA Driver's Guide; 7th Edition

Visual Function

- Recommended visual acuity
 - 20/50 with both eyes opened and examined together
- Recommended visual field
 - 120° continuous along horizontal meridian and 15° continuous above and below fixation with both eyes open examined together
 - Vision Waiver Program for those who do not meet this requirement

CMA Driver's Guide; 7th Edition

Visual Function

- Diplopia
 - Double vision within the central 40° (i.e. 20° to the left, right, above and below fixation) of primary gaze is incompatible with safe driving.
 - If the diplopia can be completely corrected with a patch or prisms to meet the standards for acuity and fields, the individual may be eligible to drive.
 - Before resuming driving with a patch, there should be an adjustment period of 3 months.

CMA Driver's Guide; 7th Edition

Visual Function

- Colour Vision – no standards; client should be aware; should be able to discriminate traffic lights.
- Contrast sensitivity – no standards; may cause difficulty when driving; client should be aware of any significant reduction; also associated with age, cataracts and refractive surgery.
- Depth perception – clients can adjust to driving after a loss of stereopsis by using other cues (relative size of objects, interposition of objects etc.)

CMA Driver's Guide; 7th Edition

Dizziness, Seizures & Sleeping

- Dizziness should be assessed by a physician for the underlying cause – recommendations regarding driving will vary
- Seizures of traumatic injury – refrain from driving for at least 3 months and neurological assessment required
- Sleeping – no specific recommendations regarding fatigue (only sleep apnea and narcolepsy)
- CMA Driver's Guide; 7th edition

Physical Impairments

- Neck & trunk mobility – required for observation
- Postural control – required to maintain position in seat (e.g. on curves in the road; during emergency maneuvers etc)
- Upper extremity function – ignition; gear shift; steering; operation of secondary controls (signals, wipers etc); climate controls etc.
- Lower extremity function – acceleration and braking.
- After adaptive controls have been installed, the driver must undergo a road test and satisfy the examiner that he or she can drive safely. CMA Driver's Guide; 7th Edition

Visual Aids



Reverse Sensor System



Blind Spot Side Mirrors



Extended Rear View Mirrors

Steering



Tri Pin
(single pin also available)



Quad Fork

Reduced Effort Steering

Pedal Modifications

Left Foot Accelerator



Reduced Effort Braking Also Available

Hand Controls



Sure Grip



Right
Angle Push



Push Pull

Secondary Controls

Signals; Wiper; Washer; Horn; Dimmer



Cross over levers for signals and gear shift are also available.

Adaptive Equipment

NMEDA - The National Mobility Dealers Association

A voluntary association that sets standards in the field of vehicle modification.

A voluntary Quality Assurance Program (QAP) that involves auditing the work of the modifiers.

www.nmeda.org

Who Needs Assessment?



Guidelines

- There is no quick screen to determine who should be assessed
- Include driving as a part of your standard assessment
- Review premorbid driving patterns and the possibility that the client may return to driving
- Review impairments and the possible impact on driving ability
- Provide client and family with information

Issues to Consider

- Severity of original trauma may not correlate with degree of persisting deficit – you cannot judge need for further assessment based on initial injury
- “If cognitive or significant physical deficits are found, consider referral for rehabilitation assessment.” CMA Driver’s Guide; 7th edition
- Do not assume the physician has addressed the issue.

Highway Traffic Act 1990 c. H. 8

Doctor reports to the Ministry of Transportation of Ontario (MTO)

Section 203, (1) Mandatory Reporting for:

“Every person 16 yrs. of age or over, attending upon the medical practitioner for medical services who, in the opinion of the medical practitioner, is suffering from a condition that may make it dangerous for the person to operate a motor vehicle.”

When MTO is Informed

- Physician is notified of receiving the report.
- A file is opened with the Medical Review Section.
- The case is reviewed by an analyst.
- MTO will determine the next course of action.
- Once report is made it can take 4-6 weeks for response.

MTO Process

- MTO will determine course of action
 - may suspend license on a medical basis
 - may request medical information
 - go through the standard licensing procedure
 - may request a driving assessment from an approved rehabilitation facility
 - temporary licenses can be obtained for assessment and/or training

MTO Approved Rehab Assessment

- List is provided by the MTO - Medical Review Section.
- An occupational therapist conducts the assessment in conjunction with a driving instructor.
- Typically includes an in-clinic and on-road assessment.
- Vary in scope of practice.
- Any other on-road "driving assessment" is not considered valid by the MTO.

Specialized Assessment

The role of a Rehabilitation Driving Assessment:

- Determine the impact of a medical condition on driving.
- Recommend training and adaptive equipment if appropriate.
- Determine potential to benefit from rehabilitation.

The Assessment

In the Clinic (1.5-2 hrs):

- Medical and Driving History
- Vision
- Affect
- Cognitive/Perceptual Assessment
- Physical Assessment

On the Road (45 min - 1 hr):

- Driving Performance
- Ability to respond to feedback

Assessment is tailored to the needs of the client.

The Assessment

Recommendations are given and a report provided. Possible recommendations include:

- Resume Driving
- Driving Cessation
- Driver Training
- Progress Assessment
- Adaptive Equipment Prescription

What Rehabilitation Can Do

- Retrain clients in appropriate driving practices and compensatory strategies
- Give the opportunity to refresh and reintegrate into driving
- Desensitize and employ cognitive behavioural strategies for anxiety
- Assess performance over time
- Assess abilities to return to work.
