

INTRODUCTION TO VISION AND DRIVER REHABILITATION

A Collaboration of Optometry and
Occupational Therapy

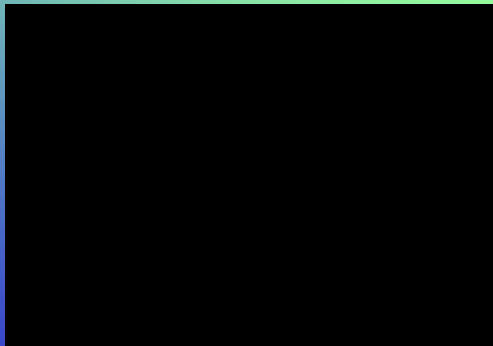
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Driving Video



Early Detection/Intervention

Early detection of
visual/perceptual deficits may
assist in the driver rehab
process

***Occupational Therapists and Vision Specialists need to
work closely together in this process**

Multi-disciplinary Approach “The Team”

Provides the patient with the best possible odds for a successful return to independent driving

Symptoms Are Often Overlooked Until They Affect

- Independence
- Safety
- Driving privileges

Occupational Therapists and
Optometrists must work
closely together to achieve
optimal success in a pt's
rehabilitation

OT ⇌ OD Referral Process

- OT evaluation is performed as per MD Rx
- Deficit areas identified affecting ADL's and safety
 - Bumping into things
 - Falls
 - Memory
 - Where are my keys
 - Difficulty recalling how to get to familiar places
 - Difficulty finding items i.e.
 - Kitchen
 - Garage
 - Driving scene
- OT refers patient for Neuro-Optometric Assessment (pending MD, insurance approval and patient cooperation)

***This Process also occurs in reverse, however, in the outpatient hospital setting the OT typically refers to Optometry**

Other Referral Sources

- Physicians
- Therapists (OT, PT, Speech, TR)
- State Analysts
- Case Managers
- Family Members
- Insurance Co., State Rehab Agencies
- Etc.

What Medical Conditions are Referred?

- Neurological
 - TBI
 - CVA
 - MS
 - Complicated Migraines
 - Parkinson's
 - Asperger's syndrome
 - Cerebral Palsy
 - Sensory Perceptual/processing Disorders
- Low Vision
 - Diabetic Retinopathy
 - ARMD
 - Albinism
- Dementia/Alzheimer's
- Cancer
- Others

Why Referred?

- **Decreased Independence with Managing the Environment**
 - Falls
 - Bumps into things/people
 - Difficulty with dressing, bathing, hygiene
 - Difficulty locating items in closets, drawers
 - Knocks things over
 - Decreased memory
 - Forgets items are in toaster oven, on stove, feed pets, take meds
- **Difficulty Driving**
 - Multiple accidents
 - Rear end collisions
 - Fender benders
 - Visual/Vestibular Sensitivities
 - Cars move too fast
 - Cars appear to move when you are stopped
 - Anxiety due to windshield wipers, fast moving snowflakes
 - Not enough space to maneuver through cars
 - Unexplained Dings/dents on car
 - Other drivers honk

Requirements for Driving Program: Referral from physician

- Medical history:
 - Medications list and side effects
 - Surgical Procedures
- Current medical conditions
 - Diabetes
 - BP
 - Balance/vestibular conditions
 - CVA
 - Addictions
- "Episode" status (especially within last 6 months)
 - Seizure
 - "Black Outs"

Visual/Driving Deficits Can Be Identified During Driver Pre-screen

- Ask for details about driving from
 - Family/friends
 - Previous driving instructor/s
 - Physician/s

*There may be many!

Driving Referral From Vision Specialist Includes:

- Acuity
- Visual field
- Oculomotor skills
- Contrast sensitivity
- Glare recovery
- Depth perception

*Must meet individual State requirements for acuity and visual fields to continue.

Driving Problems that Indicate the Need for further Visual/Perceptual Assessment May Include:

Difficulty Parking

Difficulty Parking

Difficulty Identifying Center of
Roadway

Difficulty with Lane Placement:
Driving on R or L side of lane.....

Difficulty with Divided Attention and
Judgment:

- Construction/Curves
- # of Lanes
- Pavement markings
 - i.e. arrows, double yellow lines
- Maneuvering through traffic

Stopping Distance Too Close to Vehicles/Intersections

- Decreased Spatial Orientation
- Decreased Depth Perception

Stopping/Parking Distance Too Far Back

- Decreased Spatial orientation
- Decreased Depth Perception
- Glare

Motion Sensitivity/Dizziness from Snow/Rain or windshield wipers

Decreased Functional Field of Vision

Difficult Driving Conditions

Difficult Driving Conditions Con't

- Difficulty with Shadows/
Strobing effect
- Driving Through
Trees, Tunnels,
Freeway
barricades

Difficulty Interacting with Traffic

- Objects appearing to move
too rapidly
- Reacting late to changes in
road conditions
- Misjudgment of space w/
lane changes
- Excessive braking

Visual/Vestibular/Glare Sensitivity with Mirror Use

Difficulty Scanning/Attending to Signs,
Signals and Traffic Simultaneously

Judgment of Distance, Time and
Space for Turns

Judging Turns, Curves, Hills

Scanning/Localization of Signs,
Signals and Hazards

Contrast Sensitivity

Visual/Perceptual Skills That Affect Driving

- **Pursuits**-intended path of travel
- **Scanning**-searching for signs, places, hazards
- **Saccades** - mirror use side, rearview
- **Stereopsis** -depth perception for stopping/following distance, parking,
- **Accommodation** - looking near/far from i.e. Speedometer to traffic “getting the big picture”

Other Perceptual Driving Skills

- **Spatial/Midline Orientation:** Judging curves and speed lane placement, parking, traffic light localization
- **Focal/Ambient Awareness:** Simultaneous awareness of driving situations
 - brake lights vehicles and traffic light color (may be brake lights on and green traffic light)
 - Pedestrians using crosswalks when making turns

OT Driver Pre-screen Assesses the Following:

Driver History

- Driving Record
 - Miles per year
 - Accidents
 - Tickets
- Self restrictions/No self restrictions
 - Type of traffic
 - Time of day
 - Weather conditions
- Driver Refresher Course
- Driving Needs

Visual Perception Skills Including:

Motor Free Visual Perceptual Test

- Figure Ground
- Form Constancy
- Visual Closure
- Visual Memory
- Spatial Relations

*Norms: MVPT-Revised 18-80 yrs
MVPT 3 4-94+yrs

House Flower Clock Test



Flower



Clock



H-Cancellation



Line Bisection

Modified Trail Making I & II
(or Trails A and B)

Modified Trail TBI Video

Rey-Osterrieth Complex Figure

Draw a Person Test

Draw a Person Test

Draw-a-Person Test with Intervention

Gromett Rate of Manipulation Coordination/Motor Planning

Sequencing, Timing, Bimanual Coordination and Peripheral Awareness

ROM/Balance/ Strength/FMC/
Bimanual coordination

Upper extremity Sensation

- Pain/Temperature
- Proprioception
 - Steering
- Light/Deep Touch (key pressure)
 - Secondary Controls
 - Turn Signal
 - Wipers

Lower Extremity Sensation

LE Proprioception Test

Reaction Time

Porto-clinic /Glare

Color Vision Testing

Cognitive/Processing Tests

- Short Blessed
<http://www.regionstrauma.org/blogs/sbt.pdf>
- Mini Mental Status
- Functional tasks

Reaction Time UFOV (Visual Cognitive)

Useful Field of View

The limits of this area are affected by:

- Visual sensory function
- Slower processing ability
- Difficulty dividing attention
- Difficulty ignoring distraction

UFOV Test Results

- Indicates a % of useful field of vision
- Indicates low, moderate or high risk for driving
- Indicates # of potential crashes

100% UFOV




50% Reduction



80% Reduction



90% Reduction



Therapists may modify the test
for physical impairments or
fatigue

Visual Information Processing

The UFOV challenges an individual's speed of processing with increasingly complex visual displays, therefore more closely approximating the complexity driving the task.

Pay Attention!

What Did You See???

**Visual Midline Shift
Assessments**

Functional Reach Test

**Functional Visual Midline
Shift Assessment**

Left Prisms Assessment

Visual Midline Shift (2)

Visual Midline Shift/ADL (3)



Visual Midline Shift Discussion

Visual Midline Shift (4)

Functional “Nudge/Push Test”

Visual Midline/Proprioceptive/Kinesthetic
Self Test

Proprioceptive Draw a Person
Patient Drawings

Proprioceptive Draw a Person
Continued

Functional Skills

Driver is Referred For Further
Assessment by
Optometrist/Ophthalmologist/OT

Patient is referred back to OT for
Visual/Perceptual/ADL Training
prior to resuming the driving
process

OT/OD/Physician conference on
patients frequently in person, by
phone, and written
communications



So What's Next???

VISION/ DRIVER REHABILITATION



Goal of Driver Rehab:

Make the Driver as Safe and Functional
as Possible in the Environment he/she
Needs to Drive.

Compensatory and Training
Strategies For Visual Deficits
May Include:

Scanning Strategies

- Patient and objects Stationary
- Patient stationary, objects moving
- Patient and objects moving
- Moving at various speeds
- May complete as co-pilot and active driver as indicated

Perspective...

Simulator

- Sequencing
- Visual-Vestibular integration
- Adaptive Equipment Training
- Etc.

Visual Awareness Training

UFOV Training



- Modified to patient's functional level
- Can greatly improve visual/cognitive processing for safety and judgment
- # Of sessions varies per patient

*Speed of visual information processing (UFOV®) can be increased, resulting in improved driving outcomes.

Functional Training in the Community

Midline Assessment/Training in Community

Midline to the Right



With Prism
Midline Centered



Near/Far Accommodation with
Vestibular Input

UE/LE Sensory Input Proprioception

UE/LE Proprioception, coordination

Foot control Driving Ex

UE Proprio/divided attn ex

Proprioception Tx



Eye Hand Foot Coordination



Visual/Perceptual Tasks

Central/Peripheral Awareness

Pre-Driver Training Session (approx
15 min)

Spatial Awareness

Sensory and Timing

Ambient Awareness

Strategies for Decreased Reaction
Time and Depth Perception

Fresnel prism for Field
Awareness

Tints for Contrast and Glare
Deficits Include:

Sunwear/Tints

Gray Sunwear

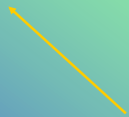
Glare Control (Drivewear)

Anifra Tints

Bioptic Driver with Tints

Slip in Shield

Red Telescopic Cap and Contact
Lens



Strategy for Diplopia

Co-pilot

Mirrors

Smart View Mirror

Mobileye

- Lane detection
 - Lane departure warning
 - Lane placement
- Vehicle detection
 - Forward collision warning
- Pedestrian collision warning
- Speed limit indicator



Training Hours Vary Due To:

“Coming of Age” (NewsVideo)



On-the-Road Driver Evaluation

On Road Evaluation

- Basic vehicle operation (i.e. PRND)
- Awareness
- Defensive driving skills
- Divided attention
- Topographical orientation

Recommendations after Pre-screen or Driver Eval May include:

- Referral to Driver Refresher course (young and elderly drivers)
 - AAA Driver Improvement Program
 - AARP “Smart Driver” Course
- Training in use of equipment or strategies on road or in clinic with simulator

Recommendations Continued

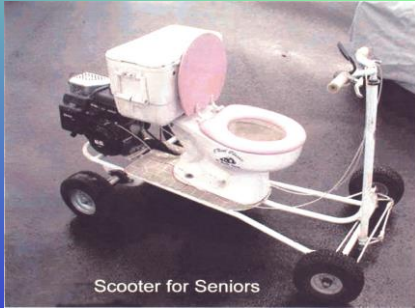
- OT/PT for physical or visual deficits
 - Mobility training
 - Visual strategies
 - Device training
 - Bioptic
 - Field awareness device
 - Adaptive mirrors
 - Electronic safety equipment
 - Hand controls
 - Spinner knob
 - Left foot accelerator
 - HEP may be provided to work on at home prior to continuing with evaluation or training

Recommendations Con't

- Removal of license via OC-88, Voluntary driver cessation and discuss other transportation options
 - Local busing system
 - Senior community van
 - Church
 - Family/Friends
 - Uber!

*Cognition is taken into account when making recommendations

And If All Else Fails.....



Case Studies

Vision and Driving Websites

- www.aota.org
- www.aded.net
- www.nora.cc
- www.biopieddriving.org
- www.albinism.org

Questions?



Thank you for your attention!