Driver evaluation guidelines for right hemiplegics

Terrilou Hansen

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DRIVER EVALUATION GUIDELINES FOR
RIGHT HEMIPLEGICS

By
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B.A., University of Montana, 1972

Presented in partial fulfillment of the requirements for the degree of
Master of Communication Sciences and Disorders
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CHAPTER I

INTRODUCTION

People with right hemiplegia are often required to undergo re-evaluation of their driving skills in order to retain their driving permit. Justification for this requirement is difficult to find in the literature but some support for re-evaluation is found in research on chronic medical conditions and traffic violations. There is no research dealing specifically with the incidence of traffic violations by persons who have right hemiplegia but there are a few studies that discuss stroke and cerebrovascular disease.

Waller (1965) compared the driving records of drivers in California who are known to have chronic medical conditions with the driving records of people not known to have chronic medical conditions. The chronic disease group included 95 cases of cerebrovascular disease under the category of cardiovascular disease. Results of the comparison showed that the accident rates for the drivers with cardiovascular disease averaged twice as many accidents per 1,000,000 miles of driving and 1.3 to 1.8 times as many violations per 100,000 miles as drivers in the comparison group. The study also noted that the driving record of persons with a medical condition, particularly cardiovascular disease, often began to deteriorate a year or two before their first known episode of illness.

A similar comparison of Washington State motorists, whose driving privileges were restricted because of certain physical, medical and mental conditions (Crancer and McMurray, 1968), included stroke under the category of "other illnesses." Results of the comparison showed drivers in the "other illnesses" category had statistically higher rates of traffic violations than drivers in
the corresponding non-medically restricted population.

In a comparison of Oklahoma drivers (Davis, Wehling, and Carpenter, 1973), stroke was grouped with chronic brain syndrome in a category called "neurological disorders." Results showed that persons in the "neurological disorders" category had higher violation rates and higher accident rates (in all groups except 17 to 21-year-old males). Persons in the "neurological disorders" category had more violations for reckless, careless or negligent driving than any of the other disease groups. The authors concluded that "drivers with some diseases apparently were unable to drive as well as the average driver because of their medical condition. This may be true of persons in the 'neurological disorders' category." (p. 326)

Matsko, Boblitz, Glass and Rosenthal (1975) compared 25 adult stroke patients with right hemiplegia and aphasia to 25 non-brain injured drivers. All subjects participated in a simulated driving exercise and their response patterns were monitored and recorded electronically. The results showed that the stroke patients who had questionable or non-functional communication skills had significantly poorer performances than both the control group and stroke patients who had functional communication.

Because these studies do not deal specifically with the driving records of people with right hemiplegia, to conclude that people with right hemiplegia have deteriorated driving skills because of their chronic condition would be misleading. These studies, however, do suggest a higher risk for traffic violations and accidents by people with right hemiplegia.
Studies dealing specifically with traffic records of persons with right hemiplegia contrasted with their pre-onset records and the records of unimpaired drivers are needed to be able to make conclusions about the effects of right hemiplegia on driving. Until such studies are done re-evaluation of the driving abilities of persons with right hemiplegia is a precautionary measure to protect the public and the driver from accidents possibly resulting from deteriorated driving skills secondary to right hemiplegia.

In Colorado and most other states, there are no mandatory reporting procedures for persons who have a medical condition such as physical disability or chronic disease. This means that persons who have right hemiplegia are not automatically disqualified from driving and that they may renew their driver license routinely when it expires. (Note, 1)

The majority of drivers subject to medical restrictions are identified when driving examiners notice that the applicant has answered "yes" to the routine question regarding known physical or mental disabilities on the license renewal form. Two Oklahoma studies (Davis, 1969, p. 326)(Carpenter and Margo, 1969, p. 398) and a Washington study (Crancer and McMurray, 1968, p. 75-76) showed that when reporting procedures were not mandatory only a few of the drivers with medical conditions were referred by physicians to the Department of Motor Vehicles because the physicians did not wish to violate the patient's confidential rights. Davis speculates "the majority of Oklahoma drivers suffering from a medical condition that could affect driving, have not been brought to the attention
Once people with right hemiplegia are identified, the driving examiner has the responsibility of deciding whether the person with right hemiplegia merits re-examination. He may require the person to take the written and road tests. If the examiner does not believe he is able to adequately determine the physical fitness of an individual, he can refer the person to a private physician or medical advisory board. (Note 1)

This decision made by driving examiners represents a weak link in the evaluation of handicapped drivers. There are no guidelines for the examiners to follow. As a result, some examiners overreact to the person's handicaps and require excessive testing and examinations while other examiners make the mistake of underestimating the effect of a person's handicaps on driving skills and consequently do not require as thorough an evaluation as would be desirable. The treatment of handicapped drivers varies widely from examiner to examiner within the same office as well as from county to county.

The Federal Highway Safety Program standards of the National Highway Safety Bureau requires that each state provide a system of "medical evaluation of persons whom a driver licensing agency has reason to believe may have mental or physical conditions which might impair their driving ability." (Driver licensing...1970)

These standards also require the states furnish "a medical advisory board or equivalent allied health professional unit composed of qualified personnel to advise the driver license agency on medical criteria and vision standards...These medical advisory boards
have been established in most states, but they lack uniformity in organizations, policies and procedures." (Driver licensing...1970)

In an effort to develop uniformity in evaluations by medical advisory boards, the U.S. Department of Health, Education and Welfare published criteria for use by medical advisory boards, for evaluation of driving capability.

These criteria are grouped according to symptoms of illnesses believed to directly affect driving capability. These groups are alteration of consciousness, cardiovascular function, hearing, mental condition, musculoskeletal performance, respiratory function and vision. Hypertensive vascular disease, vascular disease affecting the extremities and vascular aneurisms are considered under cardiovascular function. Depending on the severity of the condition in question, these guidelines allow for a systematic way of determining whether the applicant should be licensed. (Driver licensing...1970)

The combination of evaluation by the Department of Motor Vehicles and medical advisors is a good effort toward refining the re-evaluation process for people with right hemiplegia. It seems, however, that more basic skills than those evaluated in this system may affect driving behavior in persons with right hemiplegia.

In a discussion of the psychological factors affecting driving in the disabled Bardach (1969) relates problems often associated with hemiplegia such as poor body image, perseveration, difficulty distinguishing foreground from background and restrictions of the visual fields to driving skills discussed by Abt, Brody, Tassman and Berens. Bardach concludes that these problems affect the driving performance
of persons with hemiplegia and need to be considered by rehabilitation personnel.

Unfortunately, there is no research that quantitatively specifies the basic mental and physical skills involved in driving that the person with right hemiplegia may lack. Perhaps the most extensive analysis available of the basic skills involved in driving has been done by rehabilitation centers in establishing handicapped-driver training programs. In these programs skilled occupational, physical and speech therapists have attempted to analyze many of the physical and mental components associated with the various steps of driving. This was done by carefully observing every step in the driving process and determining the physical and mental abilities required to accomplish these steps.

The purpose of this paper is to use the analysis of basic driving skills done by rehabilitation programs to develop guidelines for evaluating the basic driving skills of people with right hemiplegia and illustrate the need for changes in some of the existing test procedures to accurately assess the driving abilities of people with right hemiplegia.

Handicapped-driver training programs from five rehabilitation centers in the United States will be described briefly. Skills from each, which are commonly associated with right hemiplegia, will be selected. The methods of evaluating these skills in the various programs will be selected. The methods of evaluating these skills in the various programs will be compared and synthesized to
formulate guidelines which provide for a thorough assessment of the basic physical and mental skills which may be impaired in people with right hemiplegia, will be selected. The methods of evaluating these skills in the various programs will be compared and synthesized to formulate guidelines which provide for a thorough assessment of the basic physical and mental skills which may be impaired in people with right hemiplegia. The language problems people with right hemiplegia may have and how this can affect performance on the Department of Motor Vehicle's written driving test and visual acuity test will be discussed. An alternative method of assessing knowledge of traffic rules and visual acuity will be suggested.

By adding to the current method of driving re-evaluations for right hemiplegics more of the unsafe drivers may be identified and have their driving privilege restricted. Successful completion of such a driving evaluation, on the other hand, may help assure the applicant, his physician and the Department of Motor Vehicles that despite his handicaps the individual is safe for driving.

II. HANDICAPPED-DRIVER TRAINING PROGRAMS

The five handicapped-driver training programs used to develop evaluation guidelines are from the following rehabilitation centers: Rancho Los Amigos Hospital in Downey, California, Rehabilitation Institute Incorporated in Detroit, Michigan, Craig Rehabilitation Hospital in Englewood, Colorado, St. Jude Hospital and Rehabilitation Center in Fullerton, California, Kessler Institute for Rehabilitation in West Orange, New Jersey. These five programs were used because
they were known to the author through her experience with the Craig Hospital program or were cited in the literature. Pre-driving screening forms from each center are included in Appendix A. These forms list the skills evaluated at the beginning of each program. In some cases methods of evaluation are given.

All five programs evaluate the physical and perceptual skills of the individual. Visual skills are evaluated by three programs. Language, behavior and general attitude are evaluated by two programs and cognition is evaluated by one program.

The basic skills listed and methods of evaluation by each program are very similar in many cases, making the following proposed evaluation guidelines a composite of all the programs. There are, however, major contributors in each area. The physical and perceptual skills guidelines are primarily drawn from the Rancho Los Amigos and Rehabilitation Institute programs. The guidelines for evaluation of visual and language skills are mainly from the Craig program while the cognitive skills and general attitude and behavior guidelines are from the Craig and Kessler programs.

The guidelines proposed in this paper would be appropriate for use in a rehabilitation center but they are primarily intended for use by the agencies who license drivers. These agencies should use the guidelines whenever a driver with right hemiplegia is identified. These drivers should be required to have a yearly re-evaluation also. The actual evaluation process could be done through the established medical advisory boards or by supplying these guidelines to rehabilitation centers or qualified therapists in the community.
It is recommended that, whenever possible, a physical therapist evaluate lower extremity physical skills, an occupational therapist evaluate upper extremity physical skills and perception and a speech therapist evaluate language skills, cognition and behavior. Visual screening can be done by an occupational therapist or speech therapist but detailed visual evaluation should be done by an ophthalmologist. In situations where personnel resources are limited an occupational therapist would probably be best qualified to evaluate all areas.

III. EVALUATION GUIDELINES OF BASIC SKILLS

A driving evaluation for persons with right hemiplegia should cover the following basic skill areas that pinpoint where a variety of problems affecting driving skills could surface:

1. physical skills
2. perceptual skills
3. language skills
4. visual skills
5. cognitive skills and behavior

PHYSICAL SKILLS

Right hemiplegia is characterized by poor muscle control involving the right arm and leg. Therefore, the following physical factors are vital in determining physical aspects of driving safety:

1. presence of periodic involuntary motor activity in the arms or legs (e.g. spasms);
2. upper and lower extremity motor control (e.g. ataxia or tremor);
3. spasticity in major upper and lower extremity muscle groups;
4. proprioception in the upper and lower extremities;
5. amount of strength in motions used when driving--
   - shoulder abduction
   - shoulder horizontal adduction
   - elbow flexion
   - wrist extension
   - hip flexion
   - knee extension
   - ankle plantar flexion;
6. any significant limitations in extremity joint range of motion;
7. need for the individual to wear any orthotic or prosthetic devices while driving.

Because the symptoms vary in severity from person to person, each driver should be evaluated based on his ability to perform with consistent motor control. The evaluator should avoid making assumptions about an individual's ability to drive on the basis of initial appearance.

When physical problems interfere with the right hemiplegic's ability to drive, minor driving aids may be employed to improve driving performance and reduce driving strain on the individual.

Examples of minor aids are steering devices attached to the steering wheel, left foot accelerator, turn signal/shift lever extensions, and hand-operated dimmer switch. A driver with some right upper extremity dysfunction may not be able to steer with both hands effectively gripping the wheel rim. A spinner knob or other steering device will enable this driver to steer successfully using the left hand. A right hemiplegic may not be able to operate the accelerator and brake pedals with his left foot because of interference from the affected right foot. A left-foot accelerator pedal, easily installed on the vehicle, may be the one thing required to enable the person to control the brake and throttle adequately. A turn signal lever extension or hand operated dimmer switch may improve the driving performance of the person unable to comfortably operate the standard vehicle controls. (Note 2)
A list of companies that produce adaptive equipment, adapted from the Rancho Los Amigos driving program handbook (Note 3) can be found in Appendix B. The address given is for company headquarters where catalogues of equipment, listing of local distributors and sales representatives may be obtained.

People with right hemiplegia generally have normal muscle strength and motion on the left side. However, when there are additional deficits on the left side, additional equipment, such as hand controls and sensitized steering, may be required. These devices will not be discussed in detail, because they rarely are needed by right hemiplegics.

PERCEPTUAL SKILLS

Right hemiplegics may have perceptual problems affecting their skills in the following areas: visual-motor coordination, figure-ground, spatial relations.

Visual-motor coordination - This is the use of the eyes and hands together in unified actions, in which visual information guides motor responses of the body. Visual-motor coordination is used for smooth operation of the motor vehicle. Limb apraxia may occur with right hemiplegia resulting in impairment of this ability. This impairment may become evident when the person begins operating a motor vehicle, e.g. the person may make groping, erratic or jerky movements. Limb apraxia also may interfere with a person's ability to adapt to equipment changes. This ability can be tested by using the Developmental Test of Visual Perception, eye-motor coordination test. (Frostig, 1966)
**Figure-ground** - This is the ability to focus attention on a given stimulus, such as a road sign or traffic light, while other stimuli remain as dimly perceived background. If there is a deficit in this area, the person may be inattentive during the driving tasks because he is distracted by every stimuli with equal intensity. He may seem disorganized and careless, unable to focus on the important elements in a traffic situation, and will react inappropriately. This ability can be tested by using the Developmental Test of Visual Perception, figure-ground test. (Frostig, 1966)

**Spatial relations** - This involves visual organization of points in space as they relate first to the self and then to each other. Perception of space affects the ability to move through space without bumping objects. It affects the ability to find starting and stopping points. Lack of right/left discrimination leads to improper signaling and attempts to turn from improper lanes. Faulty perception of written symbols can contribute to confusion in reading traffic signs. For example, 25 MPH could be read 52 MPH. This ability can be tested by employing the Developmental Test of Visual Perception, spatial relations test. (Frostig, 1966)

**LANGUAGE SKILLS**

The person with right hemiplegia may have a communication problem called aphasia. The term aphasia refers to a loss of part of the ability to speak, gesture, understand the spoken word, read, write or calculate according to Sarno & Sarno. (1969) Three of these functions have to do with expressing or sending information and two of them have to do with receiving information. Most people with aphasia have trouble in both expression and reception. With
the inability to understand and use words, the person is unable to respond adequately to things previously handles without difficulty.

The following areas of language should be evaluated with respect to driving; auditory comprehension, verbal expression and reading.

**Auditory comprehension** - This is the ability to understand the spoken word. The person with auditory comprehension problems knows when someone is talking to him because he can hear the voice, but some or all the words the speaker says are meaningless. Verbal comprehension problems may interfere with driving when the person needs to follow verbal directions. Very simple and explicit verbal directions supplemented by demonstration and gestures is the most effective method of giving directions to the person with aphasia. Ability to comprehend directions can be done using the following directions portion of the Minnesota Test for Differential Diagnosis of Aphasia. (Schuell, 1965)

**Verbal expression** - This is the ability of a person to make thoughts or wants known to others through speaking. The person with aphasia often knows what he wants to say, but is prevented by his aphasia from doing so.

The words are often small ones like by and or, but any type of word can be lost. Some people lose only nouns, but others lose all types of words. You may hear a person say table for chair, repeat a sound over and over, put sounds together which come out sounding like a foreign language, use the opposite word to the one intended, or attempt to describe something he cannot say the word for. Writing and gesturing are similar to verbal expression. They may be lost or incorrectly used. Someone may say "yes" for "no" or make a gesture which seems to have no meaning. (Sarno & Sarno, 1969)
The inability to use verbal expression normally in itself seems to cause little difficulty in driving. Persons with aphasia are advised to carry a card with a brief explanation of their difficulty with speech and language. The card also should include names and phone numbers of friends and family to reach in case of an accident.

Reading - The person with aphasia who has a reading impairment will be able to see all the words and may be able to read them aloud, but he may not understand what he is reading. It is similar to reading words in a foreign language and not knowing what they mean. Reading can be evaluated by using the portions of the Minnesota Test for Differential Diagnosis of Aphasia which requires matching printed to spoken words and reading comprehension of sentences. (Schuell, 1965)

People with aphasia may be unable to pass the written driving examination because of their language deficits. Previously, persons with severe aphasia were able to request a verbal examination or an appointment with special examiners if verbal instructions were confusing. (Note 3, p. 79) Although this system appears to be a commendable effort toward providing an alternative to the written test, it also has disadvantages because there are no established guidelines for these special examiners to follow when evaluating these individuals. Consequently, decision on whether to restrict driving privileges vary from examiner to examiner for persons with similar deficits.

In some cases the examiner waives the test entirely if a speech therapist or relative vouches for the person's knowledge of
traffic rules. Other examiners try to develop picture tests to determine the individual's knowledge. In any case, the examiner takes the responsibility of licensing the individual without the individual passing the required written test. This is a responsibility few examiners are willing to take because of the question of liability should these handicapped persons become involved in an accident. (Note 1)

A method of evaluating the person's knowledge of traffic rules is needed. The evaluation should not confound the individual with written or verbal questions and instructions he cannot understand, but also should not give preferential treatment or relax mandatory passing standards.

One way of testing knowledge of driving rules and regulations without using written or verbal questions may be to use a driving simulator. Simulators are not widely used in high schools to instruct pupils in basic driving skills.

The type of simulator used presents the road environment as a film projection...giving a faithful representation of the visual inputs and conveying a life-like feeling of being in an actual traffic stream...The controls in the units are similar to those found in cars, and the way in which they are used can be registered for subsequent assessment...With the help of a driving simulator an instructor can expose the pupil to exactly the situations which he considers necessary, and he can measure exactly the pupil's reaction. (McGlade, 1970, pp. 173-179)

It should be possible using a simulator of this type to develop situational problems that would require knowledge of the same driving rules and regulations tested on the written driving examination. From the person's performance in the simulated situations, a driving examiner could determine whether the individual has adequate knowledge of the rules being tested. There may even
be an advantage to using simulators because "it permits evaluation
of several aspects of typical performance: (1) possession of the
necessary behaviors; (2) recognition of the need to apply any one,
or a combination, of these behaviors at appropriate times; and
(3) motivation to apply the behavior."

The cost of such driving simulators is high. To offset the
expense, cooperative ownership or shared hire-use between the
Department of Motor Vehicles and driver training programs could
be pursued.

VISUAL SKILLS

Visual acuity - Physicians and the Department of Motor Vehicles
usually assess visual acuity by having the person identify a series
of letters that become smaller and smaller. Testing of visual
acuity is mentioned in these guidelines because a right hemiplegic
who has aphasia may not be able to name the letters because of his
language impairment. For these people the E chart used for visual
testing of illiterate people will probably give a more accurate
estimate of visual acuity.

Visual fields - Hemianopia may occur after a stroke. This
results in loss of vision in a portion of the visual field in one
or both eyes. In people with right hemiplegia, the right visual
field more frequently is affected. Hemianopia becomes apparent
when persons cannot adequately scan. This can cause difficulty in
driving while following moving vehicles and analyzing traffic flow
and movement. It can cause difficulty in being able to see traffic
moving adjacent to the person's vehicle. It also can cause difficulty
in seeing all vehicles at intersections or at any point where viewing the entire visual field is important. Visual field can be evaluated using the Kephart Ocular Pursuit Test. (Godfrey & Kephart, 1969)

COGNITION AND BEHAVIOR

It is also possible a person with right hemiplegia will have problems with thinking capacity and emotion reactions, although not everyone who has right hemiplegia will experience these results. "Individuals who sustain right hemiplegia and aphasia do not usually have the judgement and distractibility associated with some other types of brain damage." (Sarno & Sarno, 1969, p. 116)

abstract thinking - "This is the ability to reason, to solve problems...This does not happen in all stroke patients and in those to whom it does occur it may be mild. Fortunately, in the majority of cases it improves with time." (Sarno, 1969, p. 118) Deficits in abstract thinking may interfere with the person's ability to react to emergency situations. The person may not recognize a potentially dangerous situation in traffic and may not be able to plan a way to avoid an accident. Deficits in abstract thinking are difficult to evaluate in persons with right hemiplegia because they may not have the language skills needed to interpret proverbs, explain similarities and differences, discuss solutions to hypothetical problems or other commonly used tasks. The Developmental Learning Materials sequential picture cards and association picture cards can be used as a non-verbal method of evaluating abstract thinking. (Developmental...1974)
Judgement - "This is closely related to abstract thinking because one must be able to reason to arrive at good judgements. Judgement problems usually occur along with reasoning or abstract thinking impairments and parallel them in severity and persistence." (Sarno & Sarno, 1969, p. 119) In driving, a person with poor judgement may try to pass other motor vehicles, even though there is a double yellow line, repeatedly despite the fact he has been warned of the consequences. Poor judgement frequently can be detected in the person's disregard for his personal safety and in the inappropriate-ness of his social behavior. The Developmental Learning Materials problem solving picture cards (Developmental...1974) may be used to evaluate judgement skills.

Memory - "It is quite common for a person to be able to recall things that happened many years ago but be unable to recall recent events." (Sarno & Sarno, 1969, p. 119) Memory deficits can interfere with driving if the person forgets such things as whether he put gas in the car, where he stored his keys, or even why and where he is going. To avoid confusing memory deficits with the person's aphasia, memory is best evaluated using visual stimuli. Reproducing line drawings from memory is one way of evaluating memory skills.

Orientation for time, place and person - "These are not lost after a stroke, but there may be some confusion in the person's mind about them. He may not know the correct month or date or perhaps not be sure of where he is. This rarely persists beyond the first few weeks." (Sarno & Sarno, 1969, p. 120) In driving, orientation deficits may cause the person to become easily lost.
After a few minutes of driving, he may not be able to determine where he started from and the direction he must go to reach his destination, even though he may remember the name of the place he needs to go to and the reasons he needs to go there. Orientation can best be evaluated simply by asking questions about name, date and address but may be difficult if language impairment is severe. In these cases, observations of the person's ability to keep appointments and go from place to place independently during the evaluation will give some indication of his orientation.

Behavior - It is not uncommon, particularly immediately after the stroke, for right hemiplegics to have emotional liability. This is characterized by laughing, crying and anger, which is inappropriate or out of proportion to the stimuli. As with cognitive deficits, this condition tends to disappear in time. These emotional upsets while driving may interfere with the person's ability to make use of otherwise good driving skills. Behavioral problems cannot be detected by a particular evaluation tool, but signs of emotional outbursts should be observed and noted throughout the evaluation process.

The five driver training programs, used to devise these guidelines, are very similar in the skills they evaluate but not in the evaluation tools they use or their methods for determining who should and who should not drive. The Rancho Los Amigos, Craig and Kessler Institute programs arrive at specific number scores in each area. This has been done in an effort to make decisions based on objective data. There are two drawbacks to this approach.
None of these programs have been able to illustrate, with data collected from their programs, that a particular score in any area corresponds with driving skills. Therefore, the validity of deciding whether or not a person should drive based on any given score is questionable. In addition, there is the possibility, with these objective tests, of overlooking skills the person has developed to compensate for his deficits.

Conversely, the St. Jude and Rehabilitation Institute programs rely almost entirely on subjective observations by therapists to determine whether a person should drive. These programs don't use any particular examination tools or any systematic approach to evaluating each area. The problem in subjective evaluations is that they may allow personal bias toward a person influence the decisions of whether or not the person should drive.

A combination of the objective and subjective evaluations is given in the guidelines proposed in this paper. Specific skills are tested using objective measures but the specific scores on these tests are not used to determine whether a person should be advised to drive. The results are only used to identify any deficits that may create driving hazards. These deficits can then be compared to the actual activities of driving to determine whether they would interfere with safe driving. Unless there are indications in the evaluation that a road test in the car would endanger the driver and examiner, there should always be a chance for the person to actually show his driving skills.

Conditions which would contraindicate such a road evaluation
would include lack of physical control of the automobile even with adaptive equipment, inability to follow simple commands with the benefit of visual cues, visual acuity below the established standards or a visual field deficit the person does not show awareness or or ability to compensate for, or inability to perform simple maneuvers in a driving simulator.

The primary benefit of the guidelines proposed in this paper is in the information it can provide the driving examiner who accompanies the person on the road test. If the examiner is aware the person has a visual field deficit, for example, he can design the road test to be particularly sensitive in that area and he can watch more carefully for any signs of interference or for the person's compensating skills. In turn, the driving examiner who has been alerted to the person's problem areas may help in making suggestions for driving lessons before the person attempts to take the test again.

Persons with right hemiplegia are usually forty years of age or older and have been drivers prior to the onset of their disability. Driving skills have become deeply ingrained and this may help these individuals to relearn to drive. Most of the time, these individuals need much practice and repetition during training because of low confidence and self-esteem. If they fail the driving test the first time, they are usually advised to return for a second evaluation in six months to a year.
Mobility is often an acute necessity for right hemiplegics in vocational as well as avocational pursuits. Possessing the ability and credentials to drive an automobile can often mean the difference between the right hemiplegic becoming a self-esteeming member of the community or remaining a completely dependent individual.
IV. SUMMARY

Traffic accidents present a serious economic and health liability to the community. On the other hand, revocation of a driving license represents a similar liability if a person with right hemiplegia is given an additional handicap because he cannot accept employment or pursue social activities that require the ability to drive. These conflicting problems have created a need for a thorough means of evaluating the driving skills of people with right hemiplegia.

This paper suggests guidelines requiring an evaluation of physical limitations, perceptual, language, visual, cognitive and behavioral skills that frequently are impaired in persons with right hemiplegia.

This evaluation may be used by rehabilitation centers in their driver training programs but should also be required by the driver licensing agencies whenever a driver with right hemiplegia is identified.
APPENDIX A:

Pre-driving Screening Forms from Five Rehabilitation Centers
RANCHO LOS AMIGOS HOSPITAL

PHYSICALLY HANDICAPPED DRIVER'S EVALUATION AND TRAINING PROGRAM

OT/PT EVALUATION

FOR OFFICE USE ONLY
Patient's I.D. #: (1-5)
Card#: (80) 2

OCCUPATIONAL THERAPY EVALUATION

Patient's Name ____________________________ Date: (4-9) ______/____/____
Referring OTR: ____________________________
Ext.: ________________________

Diagnosis: ________________________________

Comments to driving instructors - (special reason for referral, special precautions, deadline for training, special problems which may need attention).

______________________________

Please complete the following information by circling the number of the appropriate response.

A. What is your primary purpose for referring the patient to the driving program? (Please circle most appropriate answer. You may circle as many as 3 items). (10-12)
1 = Patient needs training as a new driver.
2 = Patient needs re-training for driving with special equipment.
3 = Patient's ability to use his lower extremities for driving needs to be evaluated.
4 = Patient's physical ability to be a safe driver needs to be evaluated.
5 = Patient's cognitive ability for driving needs to be evaluated.
6 = Patient needs to gain confidence regarding his potential for driving.
7 = other ______________________

B. Does this patient have medical clearance to drive now? (13)
1 = yes
2 = no
3 = other ______________________ (specify)

C. Does this patient have a seizure disorder or a history of seizures as a result of the onset of his disability? (14)
1 = yes
2 = no

D. Is this patient taking regular medication which might interfere with his driving performance? (15)
1 = no
2 = yes (specify)

E. When was the onset of this patient's disability? (16-21)

F. Please describe patient's endurance. (22)
1 = Patient spends less than 4 hours out of bed a day.
2 = Patient is out of bed between 4 and 8 hours a day.
3 = Patient is usually out of bed between 8 and 12 hours a day.
4 = Patient usually spends all day (13 hours or more) out of bed.
5 = other ______________________

(Please answer every item.)
**G. Diagnosis: (23-25)**

**Directions**
Please indicate the patient's diagnosis by circling one of the four following categories: spinal cord injury, brain damage, amputees or miscellaneous. Select the category which most clearly reflects the patient's primary limitation to driving. Then circle the subcategory which best describes the patient's diagnosis.

1 = Spinal Cord Injury
   01 = paraplegia - essentially complete
   02 = quadriplegia - essentially complete
   03 = other (specify)

2 = Brain Damage
   01 = left hemiplegia
   02 = right hemiplegia
   03 = post head trauma
   04 = cerebral palsy
   05 = other (specify)

3 = Amputees
   01 = left LE amputation
   02 = right LE amputation
   03 = bilateral LE amputations
   04 = one UE amputation
   05 = bilateral US amputations
   06 = other (specify)

4 = Miscellaneous handicaps:
   01 = burns
   02 = arthritis
   03 = multiple sclerosis
   04 = cardiac
   05 = other (specify)

**H. Does this patient have "muscle spasms" in his UE's?**

On the left? (26)  
1 = no  
2 = yes  
3 = does not apply

On the right? (27)  
1 = no  
2 = yes  
3 = does not apply

**I. Does this patient have any involuntary motion in his upper extremities? (i.e., ataxia, tremor, athetosis).**

On the left? (28)  
1 = no  
2 = mild involuntary motion  
3 = marked involuntary motion  
4 = other  
5 = does not apply

On the right? (29)  
1 = no  
2 = mild involuntary motion  
3 = marked involuntary motion  
4 = other  
5 = does not apply

**J. Spasticity Evaluation:**

Head and Neck musculature: (30)  
1 = absent  
2 = present but not functionally interfering  
3 = functionally interfering

Left Shoulder musculature: (31)  
1 = absent  
2 = present but not functionally interfering  
3 = functionally interfering  
4 = does not apply

Right Shoulder musculature (32)  
1 = absent  
2 = present but not functionally interfering  
3 = functionally interfering  
4 = does not apply

Left Elbow musculature: (33)  
1 = absent  
2 = present but not functionally interfering  
3 = functionally interfering  
4 = does not apply

Right Elbow musculature (34)  
1 = absent  
2 = present but not functionally interfering  
3 = functionally interfering  
4 = does not apply

Left Wrist musculature (35)  
1 = absent  
2 = present but not functionally interfering  
3 = functionally interfering  
4 = does not apply

Right Wrist musculature (36)  
1 = absent  
2 = present but not functionally interfering  
3 = functionally interfering  
4 = does not apply

**K. Proprioception Evaluation**

Left Shoulder (37)  
1 = intact  
2 = present but impaired  
3 = absent  
4 = does not apply

Right Shoulder (38)  
1 = intact  
2 = present but impaired  
3 = absent  
4 = does not apply

(please answer every item)
K. Proprioception Evaluation - continued

Left Elbow (39)

1 = intact
2 = present but impaired
3 = absent
4 = does not apply

Right Elbow (40)

1 = intact
2 = present but impaired
3 = absent
4 = does not apply

Left Wrist (41)

1 = intact
2 = present but impaired
3 = absent
4 = does not apply

Right Wrist (42)

1 = intact
2 = present but impaired
3 = absent
4 = does not apply

L. Muscle Strength Evaluation:

(follow procedure set forth in Muscle Test-Daniels, Williams & Worthingham)

Left shoulder abduction - mid. deltoid: (43)

1 = normal
2 = above fair or good
3 = fair, poor or trace
4 = zero
5 = motion in patterns only
6 = does not apply

Right shoulder abduction - mid. deltoid: (44)

1 = normal
2 = above fair or good
3 = fair, poor or trace
4 = zero
5 = motion in patterns only
6 = does not apply

Left sh. Horiz. Add-clav. part of Pectoralis Maj: (45)

1 = normal
2 = above fair or good
3 = fair, poor or trace
4 = zero
5 = motion in patterns only
6 = does not apply

Right sh. Horiz. Add-clav. part of Pectoralis Maj: (46)

1 = normal
2 = above fair or good
3 = fair, poor or trace
4 = zero
5 = motion in patterns only
6 = does not apply

L. Left elbow flexion - biceps: (47)

1 = normal
2 = above fair or good
3 = fair, poor or trace
4 = zero
5 = motion in patterns only
6 = does not apply

Right elbow flexion - biceps: (48)

1 = normal
2 = above fair or good
3 = fair, poor or trace
4 = zero
5 = motion in patterns only
6 = does not apply

Left wrist extension-ECRL, ECNR & ECU: (49)

1 = normal
2 = above fair or good
3 = fair, poor or trace
4 = zero
5 = motion in patterns only
6 = does not apply

Right wrist extension-ECRL, ECNR, & ECU (50)

1 = normal
2 = above fair or good
3 = fair, poor or trace
4 = zero
5 = motion in patterns only
6 = does not apply

M. Does patient behavior or diagnosis indicate cerebral involvement or a perceptual problem? (51)

1 = yes
2 = no

N. Hooper Visual Organization Test (52-54)

If patient does have cerebral involvement or a perceptual problem, please have patient complete this test and record his score below; follow directions in VOT manual.

score... = score
88S = test not given

O. Frostig Developmental Test of Visual Perception

If patient does have cerebral involvement or a perceptual problem, please have patient complete 2 sheets of the Frostig Test; score according to directions in Frostig manual. (see next page)

(Please answer every item.)
OT/PT EVALUATION - continued

O. Frostig - continued

Figure Ground (55)
1 = correct
2 = incorrect
7 = test not given due to patient's lack of motor control
8 = test not given

Spatial Relationships (56)
1 = correct
2 = incorrect
7 = test not given due to patient's lack of motor control
8 = test not given

PHYSICAL THERAPY EVALUATION

Please complete the following information by circling the number of the correct response.

A. Functional Status

What is the ability of this patient to transfer into a standard car? (57)
1 = independent (safe alone)
2 = assisted (with minimal assist of 1 person)
3 = unable (maximally assisted or requires lift equipment)

Do you expect this patient's transfer ability to change a whole functional level (e.g., from assist to independent or unable to lift equipment) within the next 6 weeks? (58)
1 = yes
2 = no

What is the ability of this patient to get his wheelchair into and out of a car? (59)
1 = independent
2 = unable (requires assist of another person)
3 = not applicable

B. Does this patient have LE "muscle spasms"? (60)
1 = no
2 = yes
3 = does not apply
4 = other (specify)

C. Spasticity Evaluation (61)

Left Hip musculature
1 = absent
2 = present but not functionally interfering
3 = functionally interfering
4 = does not apply

Right Hip musculature (62)
1 = absent
2 = present but not functionally interfering
3 = functionally interfering
4 = does not apply

Left Knee musculature (63)
1 = absent
2 = present but not functionally interfering
3 = functionally interfering
4 = does not apply

Right Knee musculature (64)
1 = absent
2 = present but not functionally interfering
3 = functionally interfering
4 = does not apply

Left Ankle musculature (65)
1 = absent
2 = present but not functionally interfering
3 = functionally interfering
4 = does not apply

Right Ankle musculature (66)
1 = absent
2 = present but not functionally interfering
3 = functionally interfering
4 = does not apply

D. Proprioception Evaluation

Left Hip (67)
1 = intact
2 = present but impaired
3 = absent
4 = does not apply

Right Hip (68)
1 = intact
2 = present but impaired
3 = absent
4 = does not apply
**D. Proprioception Evaluation - continued**

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<thead>
<tr>
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<th>Score</th>
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<td>Right Knee</td>
<td>70</td>
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<tr>
<td>Left Ankle</td>
<td>71</td>
</tr>
<tr>
<td>Right Ankle</td>
<td>72</td>
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**E. Muscle Strength Evaluation**

(follow procedure specified in Muscle Testing, Daniels, Williams & Worthingham)

<table>
<thead>
<tr>
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<th>Score</th>
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<tbody>
<tr>
<td>Left Hip Flexors</td>
<td>73</td>
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<tr>
<td>Right Hip Flexors</td>
<td>74</td>
</tr>
<tr>
<td>Left Quadriceps</td>
<td>75</td>
</tr>
<tr>
<td>Right Quadriceps</td>
<td>76</td>
</tr>
<tr>
<td>Left Ankle plantar flexors</td>
<td>76</td>
</tr>
<tr>
<td>Right Ankle plantar flexors</td>
<td>77</td>
</tr>
</tbody>
</table>

**F. Does this patient have lower extremity bracing? (78)**

<table>
<thead>
<tr>
<th>Bracing Type</th>
<th>Score</th>
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<tbody>
<tr>
<td>Left AFO</td>
<td>1</td>
</tr>
<tr>
<td>Left KAFO</td>
<td>2</td>
</tr>
<tr>
<td>Right AFO</td>
<td>3</td>
</tr>
<tr>
<td>Right KAFO</td>
<td>4</td>
</tr>
<tr>
<td>Bilateral AFO's</td>
<td>5</td>
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<tr>
<td>Bilateral KAFO's</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
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<tr>
<td>Does not apply</td>
<td>8</td>
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</tbody>
</table>

**G. Does this patient have involuntary motion in his lower extremities? (i.e., ataxia, tremor, athetosis) (79)**

<table>
<thead>
<tr>
<th>Motion Type</th>
<th>Score</th>
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<tbody>
<tr>
<td>No</td>
<td>1</td>
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<tr>
<td>Slight</td>
<td>2</td>
</tr>
<tr>
<td>Marked</td>
<td>3</td>
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<td>Other</td>
<td>4</td>
</tr>
<tr>
<td>Does not apply</td>
<td>5</td>
</tr>
</tbody>
</table>

**H. Special comments to the driving instructor:**

---

Referring RFT:  
Ext.
Name: ___________________________ Age: _______ Sex: _______

Diagnosis: ________________________________________________

I Upper Extremity Strength (good, fair, etc....) _______________________
Upper Extremity Range of Motion: Normal ______ Limited _______
If a weakness or limited R.O.M. is present describe: __________________________

II Lower Extremity Strength (good, fair, etc....) _______________________
Lower Extremity Range of Motion: Normal ______ Limited _______
If a weakness or limited R.O.M. is present describe: __________________________

III Is spasticity, rigidity, tremor, or ataxia present in any extremity? _______
If yes, indicate location and frequency: __________________________

IV Vehicle Transfer

Code I - Independent
Code II - Stand-by Assistance needed
Code III - Minimal Physical Assistance needed
Code IV - Moderate Physical Assistance needed
Code V - Maximal Physical Assistance needed

Transfer to and from car: ____________________________
Get w/c in and out of car: ____________________________

V Sensation

<table>
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<tr>
<th></th>
<th>Dulled</th>
<th>Intact</th>
<th>Absent</th>
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<tbody>
<tr>
<td>A. Lower Extremity</td>
<td>______</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>B. Upper Extremity</td>
<td>______</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>C. Proprioception</td>
<td>______</td>
<td>______</td>
<td>______</td>
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<tr>
<td>D. Hemiagnosia?</td>
<td>______</td>
<td>Explain:</td>
<td>______</td>
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</tbody>
</table>

RI-939 A 11/75
IV Endurance - Does client display symptoms of Diaphoresis, Angina, Dyspnea, Palpitation or Fatigue?

What is client's sitting tolerance?

VII Reaction Time

(Right, Left) Foot ____________ (Right, Left) Foot ____________

VIII Perception

Figure Ground - Persons with deficits in this area may have difficulty distinguishing foreground from insignificant background; for example, distinguishing signs and traffic lights from background objects.

Within Normal Limits Slightly Impaired Moderately Impaired Markedly Impaired

Comments:

Spatial Relationships - Difficulty in this area may mean problems in right-left discrimination (laterality and directionality). Also, the person may have difficulty recognizing angles or following curves, or interpreting crossroads that intersect at angles. Maneuvering in traffic, especially crossing lanes at angles, angle parking, etc. may be difficult.

Within Normal Limits Slightly Impaired Moderately Impaired Markedly Impaired

Comments:

Perception of Vertical and Horizontal - Difficulty in this area may mean difficulty in steering, following curves or interpreting intersections correctly.

Within Normal Limits Slightly Impaired Moderately Impaired Markedly Impaired

Comments:

Ocular Pursuit - Inadequate ocular pursuit will cause difficulty in following moving vehicles, keeping track of traffic flow and movement, etc.

Within Normal Limits Slightly Impaired Moderately Impaired Markedly Impaired

Comments:

RI-939 B 11/75
Visual Field - Limited peripheral vision will cause difficulty in being able to see traffic moving alongside the person's vehicle or will cause difficulty in seeing all vehicles at intersections or at any point where viewing the entire visual field is important. This means that a person with limited field of vision should slow down at corners and turn his head frequently to observe traffic coming from the sides.

Within Normal Limits Slightly Impaired Moderately Impaired Markedly Impaired

Comments:

Distance Judgement - Limitations in this area will cause difficulty in parking and maneuvering in traffic. A person with poor or below average distance judgement should allow ample distance when following, overtaking or passing and should use extra care in parking.

Within Normal Limits Slightly Impaired Moderately Impaired Markedly Impaired

Comments:

Visual Acuity - Persons with below average visual acuity should have their vision re-checked by specialist if this has not been done recently. If vision is corrected to its maximum the person must use caution when driving. He will probably have difficulty in distance judgement also. He should learn to recognize the shapes of common road signs if vision is not within the average range. Persons with poor visual acuity also may have difficulty with night driving or in driving in bad weather and should use caution.

Within Normal Limits Slightly Impaired Moderately Impaired Markedly Impaired

Comments:

IX Cognition - Can client comprehend one step directions?

Can client comprehend multiple directions?

Can client retain previous instructions?

Therapist ___________________________ Date _____________

RI-939 C 11/75
PRE-DRIVING EVALUATION FOR BRAIN INJURED PATIENTS

Name: ___________________________ Unit: ___________________________

Age: __________ Valid License: yes __________ no _________

Dominance: ___________________________ Pre-Onset Dominance: ________________

Date of Onset: __________ Disability: ___________________________

Past Driving Experience: _________________________________________

Pre-Injury Driving Record: _________________________________________

Need for Driving: ______________________________________________

Date of Evaluation: ___________________________

1. UE FUNCTION:

A. Muscle Picture
   - Bilateral function
   - Unilateral function
     - right
     - left

   - strength WNL
   - weakness
     - shoulder
     - elbow
     - wrist, hand

   Comments: (spasticity, synergy weakness, etc.)

B. ROM
   - Functional limitation
     - R
     - L
     - shoulder
     - elbow
     - wrist, hand

   Comments: (how will affect function)

C. Sensory
   - Minimally impaired
     - R
     - L
   - Moderately impaired
     - R
     - L
   - Severe impaired
     - R
     - L
C. Sensory (Continued)

**Comments:** (Type of impairment, position sense, pain, touch, etc.)

D. Coordination

- Low functional problem
  - Slowed response
  - Tremors
  - Spasticity

**Comments:** (Explain how may affect function if unilateral, bilateral)

E. Equipment (Indicated or)

- Sling
- Sling and splint
- Other (describe)
- Dye

### II. PERCEPTION-MOTOR FUNCTION:

A. Testing:

1. Initiation of Postures
2. Figure Ground (first part)
3. Right-left Discrimination
4. Wagner

**Raw Scores**

Optional:
5. Minnesota Rate of Manipulation
6. Double Tactile Stimulation
7. Other

B. ADL Evaluation (Describe typical problems)

C. From the above testing indicate where there may be a functional deficit:

- Figure ground
- Motor planning
- Crossing midline
- Directionality
- Bilateral integration
- Spatial relationships
- Sequencing
- perseveration
- Aversion
- Short term
- Long term
IV. BEHAVIOR AND GENERAL ATTITUDES

1. Normal - no problems
2. Mild problems - interferes occasionally
3. Moderate problems - interferes frequently
4. Severe problems - interferes constantly

<table>
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<tr>
<td>Reaction time</td>
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Additional Information:
PRE-DRIVING EVALUATION FOR BRAIN INJURED PATIENTS

Name: ___________________________  Unit # __________
Age: __________  Valid License: yes  no

Dominance: ______________________  Pre-Onset Dominance: ______________________
Date of Onset: __________  Disability: ______________________
Past Driving Experience: ______________________
Pre-Injury Driving Record: ______________________
Need for Driving: ______________________
Date of Evaluation: __________

I. MOTOR STATUS

A. Lower Extremity Strength
   normal  ______  Comment: ______
   good  ______  ______
   fair  ______  ______
   poor  ______  ______
   absent  ______  ______
   LEFT  ______  ______
   RIGHT  ______  ______

B. Lower Extremity Range of Motion
   normal  ______  Comment: ______
   limited  ______  ______

C. Reflex Patterns
   present  ______  Comment: ______
   absent  ______  ______

D. Reaction Time
   normal  ______  Comment: ______
   slowed  ______  ______

E. Endurance
   normal  ______  Comment: ______
   decreased  ______  ______
II. CEREBELLAR SIGNS
A. Coordination of Lower Extremities
   normal
   impaired

B. Tremor
   present
   absent

C. Spasticity
   present
   absent

III. EQUIPMENT REQUIRED

IV. MOBILITY
A. Transfers
   independent
   assist required

B. Walking
   independent
   assist required
V. BEHAVIOR AND GENERAL ATTITUDES

1. Normal - no problems
2. Mild problems - interferes occasionally
3. Moderate problems - interferes frequently
4. Severe problems - interferes constantly

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<td>Reaction Time</td>
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Additional Information:

____________________________  
Physical Therapist

2073c 3/77
PRE-DRIVING EVALUATION FOR BRAIN INJURED PATIENTS

Name: ___________________________ Unit #: __________________
Age: ___________________________ Valid License: yes __ no __
Dominance: ______________________ Pre-Onset Dominance: ____________
Date of Onset: __________________ Disability: _________________________
Past Driving Experience: ________________________________
Pre-Injury Driving Record: ________________________________
Need for Driving: ________________________________
Date of Evaluation: ________________________________

I. HEARING ACUITY:
- within normal limits
- mildly impaired
- moderately impaired
- severely impaired

II. VISION:
A. VISUAL ACUITY
- within normal limits
- corrected with glasses to

Comments

Glasses needed:
- all the time
- for reading and/or driving

B. VISUAL FIELDS
- no deficit
- field deficit present

Comments

C. COLOR PERCEPTION
- adequate
- deficit

Comments
III. COMMUNICATION SKILLS:

A. AUDITORY RECEPTION

- no observable impairment
- follows conversation with mild difficulty
- follows most conversation but sometimes fails to grasp essentials
- follows simple conversation but requires repetition
- follows brief statements with considerable repetition
- usually responds inappropriately because he does not understand

Comments:

B. FOLLOWS DIRECTIONS

- 1
- 2
- 3
- greater than three

Comments:

C. SPEECH-LANGUAGE

- no observable impairment
- converses easily with occasional difficulty
- conversational speech, with mild difficulty finding words or expressing ideas
- some conversational speech but marked difficulty in expressing long or complex ideas
- ready communication with single words and short phrases
- expresses needs in a limited or defective manner
- no functional speech

Comments:

D. DYSARTHIA

- not present
- mild impairment
- moderate impairment
- severe impairment

Comments:
E. READING

- no observable impairment
- reads average adult materials with only minimal difficulty
- reads newspaper and short magazine articles
- reads simple sentences and simple paragraph materials
- reading vocabulary of 100 or more words; reads some phrases and sentences
- matches words to pictures and some printed to spoken words
- no functional reading

Comments:

F. ABILITY TO READ ROAD SIGNS

- adequate
- inadequate

Comments:

G. ABILITY TO TAKE THE WRITTEN DRIVER'S EXAMINATION

- capable
- incapable

Comments:

H. MEMORY

- no impairment
- mild impairment
- moderate impairment
- severe impairment

Comments:
f. BEHAVIOR AND GENERAL ATTITUDES

1. Normal - no problems
2. Mild problems - interferes occasionally
3. Moderate problems - interferes frequently
4. Severe problems - interferes constantly

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<tr>
<td>Reaction Time</td>
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Additional Information:

Speech Pathologist
**OCCUPATIONAL THERAPY**
**DRIVER SCREENING**

**NAME:**

**AGE:**

How long have you had license? __________

Do you feel you could drive safely now? ______

Do you wear glasses or contacts? ________

**DIAGNOSIS:**

**ONSET:**

How long since you last drove? __________

Meds? ____________________________________

Did you have any traffic violations or accidents one month prior to disability? ________

**BASIC PHYSICAL ABILITIES:**

<table>
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<tr>
<th>S = satisfactory - no adaptations</th>
<th>A = could perform task with adaptive device</th>
<th>U = unsatisfactory</th>
<th>NA = not applicable</th>
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</thead>
</table>

Ability to:

- (1) fasten seatbelt
- (2) turn key, start engine
- (3) parking brake
- (4) gear shift
- (5) steering wheel
- (6) gas and brake pedals
- (7) turn signals

**VISUAL:**

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<tr>
<th>Peripheral Field:</th>
<th>Far point acuity:</th>
<th>Near point acuity:</th>
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Color: ________________

Visual coordination: ________________

**PERCEPTION:**

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<th>Spatial Relations: Normal</th>
<th>Impaired</th>
<th>CONSIDER:</th>
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<td>Figure Ground: Normal</td>
<td>Impaired</td>
<td>CONSIDER:</td>
</tr>
<tr>
<td>Position in Space: Normal</td>
<td>Impaired</td>
<td>CONSIDER:</td>
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**PURE REACTION TIME**

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**DRIVING REACTION TIME**
SIGNALING AND TURNING:

BRAKING AND ACCELERATING:

EYE AND HEAD MOVEMENTS:

OTHER OBSERVATIONS:

SPECIAL EQUIPMENT:

RECOMMENDATIONS:

SJH RC
8/1975
### Pre-Driving Evaluation

**Occupational Therapy Dept.**

**Kessler Institute for Rehabilitation**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Disability:</th>
<th>Age:</th>
<th>Previous Driving Experience:</th>
<th>Glasses:</th>
<th>Date Administered:</th>
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### I. Physical Considerations

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<th>Adaptations:</th>
<th>Trans. Activities:</th>
<th>Sitting Balance:</th>
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### II. Perceptual Tests

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<td>Fail</td>
<td>Comments</td>
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<td>Fail</td>
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### III. Language

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<th>Test</th>
<th>Rec. of signs</th>
<th>Inter. of signs</th>
<th>Word recog.</th>
<th>Sign recog.</th>
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### IV. Vision

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<th>Test</th>
<th>Acuity (both)</th>
<th>Visual Fields</th>
<th>Depth Per. (aver. min. standard 3&quot;)</th>
<th>Peripheral vis. right</th>
<th>Peripheral vis. left</th>
<th>Reaction time (aver. 3 trials: stand. .55 of a sec.)</th>
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<td>Score</td>
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### V. General Attitudes & Behavior

- Hostile
- Slow
- Confused
- Inattention to detail
- Impulsive
- Impulsive
- Anxious
- Diff. following direct

**Comments:**

### VI. Summary of Test Performance:

### VII. Recommendations:

*Therapist:*

**Occupational Therapy Department**

**Distribution:** White Medical Charts; Canary Physical Therapy (Driving); Pink Occupational Therapy
APPENDIX B:

Commercial Resources for
Adaptive Equipment for Automobiles
<table>
<thead>
<tr>
<th>Manufacturer or Distributor</th>
<th>Hand Control Accelerator Only</th>
<th>Brake Only (Hand)</th>
<th>Clutch Only (Hand)</th>
<th>Left Foot Accelerator</th>
<th>Right Foot Control</th>
<th>Steering Brake (Hand Operated)</th>
<th>Cruise Control</th>
<th>Seat Adjustments</th>
<th>Van Lifts and Tailgates</th>
<th>Van Conversions for Wheelchair</th>
<th>Miscellaneous Driving Aids</th>
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Note: X signifies availability of the device or modification.
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<thead>
<tr>
<th>MANUFACTURER OR DISTRIBUTOR</th>
<th>BRAKE CONTROL</th>
<th>ACCELERATOR GEAR</th>
<th>GEAR SHIFT</th>
<th>LEFT FOOT ACCELERATOR</th>
<th>RIGHT FOOT ACCELERATOR</th>
<th>PADDLE BRAKE (SIDE HAND)</th>
<th>PADDLE BRAKE (HAND CONTROL)</th>
<th>GEAR AND SHIFTER REPELLENTS AND SPURS</th>
<th>SEATING SERVICES</th>
<th>KNEE SUPPORTS</th>
<th>FOOTRESTS</th>
<th>SHOULDER PADS</th>
<th>CAN 'T BE SEEN</th>
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* Manufacturer of a "Full Power" brake, which permits full control of braking action all the way from free coasting to a panic stop by using only the accelerator.
Table 2. COMMERCIAL SOURCES OF DEVICES, CONTROLS AND MODIFICATIONS FOR THE HANDICAPPED DRIVER cont.

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<tr>
<th>MANUFACTURER OF DISTRIBUTOR</th>
<th>HAND CONTROL</th>
<th>FEET-OPERATED PEDAL</th>
<th>LEFT FOOT BRAKE</th>
<th>RIGHT FOOT BRAKE</th>
<th>LEFT FOOT ACCELERATOR</th>
<th>RIGHT FOOT ACCELERATOR</th>
<th>PUSHER SWITCH</th>
<th>PARKING BRAKE (Rear Operated)</th>
<th>SEAT BELTS AND SEAT BELT AID</th>
<th>WINDSHIELD WIPERS</th>
<th>DOOR LOCKS AND STOW SYSTEMS</th>
<th>CUSTOM WORK BY REQUEST</th>
<th>MISCELLANEOUS DRIVING AIDS</th>
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<td>MANUFACTURER OR DISTRIBUTOR</td>
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<td>BRAKE CONTROL (LONG)</td>
<td>BRAKE CABLE (SPOOL)</td>
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<td>STEER FOR ACC.</td>
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BIBLIOGRAPHY


NOTES


2. Gurgold, G. D., Harden, D. H. Handicapped driver training and the therapist's assessment of driving potential. Unpublished manuscript. (Available from Rehabilitation Institute, Inc., Occupational Therapy Department, 261 Mack Blvd., Detroit, MI 48201)

3. Langran, S. S., Evans, L. Handbook for the establishment of a driving program for the physically handicapped. Unpublished. (Available from Department of Occupational Therapy, Rancho Los Amigos Hospital, 7601 East Imperial Highway, Downey California)