MILD COGNITIVE IMPAIRMENT (MCI): CLINICAL IMPLICATIONS FOR ASSESSMENT AND INTERVENTION

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Christy Fleck and Melinda Corwin have no relevant financial or nonfinancial relationship(s) within the products or services described, reviewed, evaluated or compared in this presentation.

Elisabeth Wiig is the co-author of *A Quick Test of Cognitive Speed (AQT)*. She has a contractual agreement with Pearson Publishing.
LEARNER OUTCOMES

As a result of this presentation, the participant will be able to:

- list the diagnostic criteria for mild cognitive impairment (MCI).
- identify appropriate screening and assessment measures for MCI.
- identify intervention techniques which may prevent cognitive decline.
WHAT IS MILD COGNITIVE IMPAIRMENT (MCI)?

- An early, but abnormal, state of cognitive impairment (Petersen, 2004)
- Originally intended to refer to stage 3 of the Global Deterioration Scale (GDS) (Petersen et al., 2009)
DIAGNOSIS OF MCI

- Only a medical doctor is qualified to make the diagnosis of MCI (Key-DeLyria, 2013).

- SLPs should understand how cognitive-communication assessments contribute to a diagnosis of MCI and possibly provide early detection of MCI in the aging population.
DIAGNOSTIC CRITERIA FOR MCI

- A memory complaint that was verified by an informant
- Objective memory impairment for age
- Relatively preserved general cognition for age
- Relatively no difficulty with activities of daily living
- Not demented

(Petersen et al., 1999; Petersen, 2004)
CLINICAL SUBTYPES OF MCI

- Amnestic MCI (aMCI) - Individuals with significant memory impairment and relatively intact other cognitive domains
  - Single domain aMCI
  - Multiple domain aMCI
- Nonamnestic MCI (naMCI) - Subtle decline in cognitive functions not related to memory
  - Single domain naMCI
  - Multiple domain naMCI

(Petersen, 2004; Petersen et al, 2009; Petersen, 2011)
ASSESSMENT OF MCI

- Typically conducted by a neurologist or neuropsychiatrist
- A variety of tests are used to test various domains of cognitive functioning
- Standardized cutoff scores for MCI are not available on all assessment batteries
WHAT IS THE SLP’s ROLE IN MCI

- Early detection, intervention, and education!
  - Using reliable and valid screening measures
  - Providing evidence-based (EB) interventions
  - Educating patients and caregivers about EB interventions and recommendations
**SCREENING TOOLS**

*Montreal Cognitive Assessment (MoCA)*

- Translated to 36 languages and dialects
- 10-15 minutes to administer

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<table>
<thead>
<tr>
<th>VISUOSPATIAL/EXECUTIVE</th>
<th>Copy cube</th>
<th>Draw CLOCK (Ten past eleven)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3 points</td>
</tr>
</tbody>
</table>

| MEMORY                  | Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes. |
|                        | 1st trial | 2nd trial                   |
|                        | [ ]       |                             |
|                        | [ ]       |                             |
|                        | [ ]       |                             |

| ATTENTION               | Read list of digits (1 digit/sec). Subject has to repeat them in the forward order. Subject has to repeat them in the backward order |
|                        | 1st trial | 2nd trial                   |
|                        | [ ]       |                             |
|                        | [ ]       |                             |

| LANGUAGE                | Read list of letters. The subject must tap with his hand at each letter. No points if ≥ 2 errors |
|                        | [ ] FBACMNAAJKLBAFKDEAAMOFAB |                             |
|                        | [ ] 93 |                             |
|                        | [ ] 86 |                             |
|                        | [ ] 79 |                             |
|                        | [ ] 72 |                             |
|                        | [ ] 65 |                             |

| ABSTRACTION             | Similarity between e.g. banana - orange = fruit |
|                        | train - bicycle |
|                        | watch - ruler |

| DELAYED RECALL          | How to recall words |
|                        | WITH NO CUE |
|                        | FACE VELVET CHURCH DAISY RED |
|                        | [ ] [ ] [ ] [ ] [ ] [ ] [ ] |

| ORIENTATION             | Date Month Year Day Place City |
|                        | [ ] [ ] [ ] [ ] [ ] [ ] [ ] |

© Z. Nasreddine MD www.mocatest.org Normal ≥ 26 / 30

Add 1 point if ≥ 26 or edu

Nasreddine et al. (2005)
## ST. LOUIS UNIVERSITY MENTAL STATUS EXAM (SLUMS)

**Translated in English and Spanish**

**10-15 minutes to administer**

### SCREENING TOOLS

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Is patient alert?</th>
<th>Level of education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tariq, N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tumosa, JT</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chibnall, HM</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perry III, JE</td>
<td>67</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Questions

1. What day of the week is it?
2. What is the year?
3. What state are we in?
4. Please remember these five objects. I will ask you what they are later.
   - Apple
   - Pen
   - Tie
   - House
   - Car
5. You have $100 and you go to the store and buy a dozen apples for $3 and a tricycle for $20.
   - How much did you spend?
   - How much do you have left?
6. Please name as many animals as you can in one minute.
7. What were the five objects I asked you to remember? 1 point for each one correct.
8. I am going to give you a series of numbers and I would like you to give them to me backwards. For example, if I say 42, you would say 24.
   - 87
   - 649
   - 8537
9. This is a clock face. Please put in the hour markers and the time at ten minutes to eleven o’clock.
   - Hour markers okay
   - Time correct
10. Please place an X in the triangle.
    - Which of the above figures is largest?
11. I am going to tell you a story. Please listen carefully because afterwards, I’m going to ask you some questions about it.
    - Jill was a very successful stockbroker. She made a lot of money on the stock market. She then met Jack, a devastatingly handsome man. She married him and had three children. They lived in Chicago. She then stopped work and stayed at home to bring up her children. When they were teenagers, she went back to work. She and Jack lived happily ever after.
    - What was the female’s name?
    - What work did she do?
    - When did she go back to work?
    - What state did she live in?

### Scoring

<table>
<thead>
<tr>
<th>High School Education</th>
<th>Less than High School Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>27-30</td>
<td>Normal</td>
</tr>
<tr>
<td>21-26</td>
<td>MNC*D</td>
</tr>
<tr>
<td>1-20</td>
<td>Dementia</td>
</tr>
<tr>
<td>* Mild Neurocognitive Disorder</td>
<td></td>
</tr>
</tbody>
</table>


Tariq et al. (2006)
SCREENING TOOLS

A Quick Test of Cognitive Speed (AQT)

- 3-5 minutes to administer
- Can be used across languages
- Provides specialized measures of processing speed that require rapid naming of dual-dimension stimuli (e.g., color + form combinations).
- Evaluates cognitive functions that underlie recognition, executive attention, and working memory.

(Wiig et al., 2002)
AQT SINGLE & DUAL-DIMENSION NAMING

- Single-dimension stimuli (e.g., colors and forms) - measure reaction + retrieval + response time (i.e., perceptual speed)

- Dual-dimension stimuli (e.g., color + form combinations) - measure perceptual speed + overhead from executive demands on attention, working memory, and set shifting (i.e., cognitive speed)
AQT COLOR-FORM NAMING TEST

AQT Color-Form Test Plates (40 items each)

Test 1
Processing Speed for Color Naming
(Single-dimension stimuli)

Test 2
Processing Speed for Form Naming
(Single-dimension stimuli)

Test 3
Processing Speed for Color-Form Naming
(Dual-dimension stimuli)

## NORMATIVE RANGES FOR AQT NAMING TIMES (sec.)

<table>
<thead>
<tr>
<th>AQT</th>
<th>Mean (SD)</th>
<th>Normal</th>
<th>Atypical</th>
<th>Test-retest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>21.83 (3.60)</td>
<td>&lt; 25 sec.</td>
<td>&gt; 35 sec.</td>
<td>0.91</td>
</tr>
<tr>
<td>Form</td>
<td>25.23 (5.00)</td>
<td>&lt; 30 sec.</td>
<td>&gt; 35 sec.</td>
<td>0.92</td>
</tr>
<tr>
<td>C+F</td>
<td>49.50 (8.50)</td>
<td>&lt; 60 sec.</td>
<td>&gt; 70 sec.</td>
<td>0.95</td>
</tr>
</tbody>
</table>

Effects of age for 300 normal adults, ages 15 to 85 yrs. Color+form times increase about 1 sec. per decade. (C+F = 41.64 + .10 x Age)

SUMMARY OF COGNITIVE SCREENINGS

MoCA
- orientation
- memory
- attention
- executive functions
- visuoconstructional skills
- verbal fluency
- conceptual thinking
- calculations
- sentence repetition

SLUMS
- orientation
- memory
- attention
- executive functions
- visuoconstructional skills
- verbal fluency
- auditory comprehension
  (word problem & paragraph information)

AQT
- attention
- working memory
- perceptual speed
- cognitive processing speed
THEORETICAL MODEL FOR INTERVENTION

- A conceptual framework to inform development and implementation of cognitive rehabilitation programs
- Defines the differences between healthy age-related cognitive decline, MCI, and dementia
- Three types of symptoms characterize MCI
  - Mild cognitive compromise
  - Mild functional compromise
  - Neuropsychiatric issues

Huckans et al. (2013)
Types of Intervention

- **Restorative cognitive training** - utilizes structured and repeated practice of specific tasks or exercises
  - e.g., recalling names of common objects used during daily routines
  - Targets mild cognitive compromise
- **Compensatory cognitive training** - teaches strategies or skills that can be used to compensate for functional cognitive deficits
  - e.g., using an association strategy to recall items on a grocery list
  - Targets mild functional compromise
- **Traditional psychotherapy techniques** –
  - e.g., relaxation exercises and stress management strategies
  - Targets neuropsychiatric issues

Huckans et al. (2013)
EXAMPLES OF RESTORATIVE COGNITIVE TRAINING

Oral Reading Task

Harry Houdini was a man who astonished and enthralled many people during his life. Whether he was escaping from a padlocked box or making things disappear and reappear, he definitely was entertaining. People thought that he must truly have some supernatural powers, but in fact, what Harry really had was drive.

Harry was born in Budapest, Hungary, in 1874. His real name was Ehrich Weiss and he was the third of five children. His family moved to Wisconsin not long after he was born and by the time he was nine, he was tying ropes all over his backyard and learning amazing trapeze tricks to show his friends and neighbors. He visited the local locksmith, and when he had reached his teens he could pick almost any lock that was made. He also learned how to do card tricks. He and his brother, Theo, would often entertain at local parties and clubs for extra money.

When Ehrich was 16, he came across a book that would literally change his life: the biography of France’s greatest magician, Jean Eugene Robert-Houdini. It showed Ehrich that his hobby of magic and tricks could also be a career. Immediately, he changed his name to Harry Houdini. He and Theo headed out to make a living as magicians. Theo grew restless, however, as the jobs became scarce, so he left.

His timing was perfect since Harry had just fallen in love with a lovely woman named Bess. However, no matter what tricks they did or how hard they tried, Bess and Harry were not doing well. They tried to sell their shows for seven

Fleck & Corwin (2013); Levy et al., 1997; Wiig et al., 2000; Wolf & Segal (1992)
EXAMPLES OF COMPENSATORY COGNITIVE TRAINING

Hampstead et al. (2013)
EXAMPLES OF TRADITIONAL PSYCHOTHERAPY TECHNIQUES

- Relaxation techniques
- Stress management
- Nutrition
- Physical exercise

Kinsella et al. (2009); Troyer et al. (2008)
CONCLUSIONS

- MCI is an early, but abnormal, state of cognitive impairment
- The AQT, in conjunction with the MoCA or SLUMS, could be used to screen for MCI
- Huckans et al. (2013) provides a solid intervention framework which can guide clinicians when selecting therapeutic tasks
REFERENCES


REFERENCES


