**Patient questions**

Say to the patient: “I would like to ask you three questions. Please try to answer them with ‘yes’ or ‘no’.”

1. “Have you experienced a recent decline in your ability to memorize new things?”

2. “Have any of your friends or relatives made remarks about your worsened memory?”

3. “Do your memory or concentration problems affect your everyday life?”

**Clock Drawing Test** (see Clock Drawing Test form on page 2)

Place the form with the Clock Drawing Test in front of the patient. Say: „Please draw a clock with all the numbers and hands.“ Do not indicate a specific time; the patient should decide him-/herself which time to draw. When the patient has finished, point to the box below and say: „Now, please write the time on your drawn clock down in numbers, as if it would be on a train schedule or in a TV guide.“

4. Are there two distinguishable clock hands (length or thickness)?

5. Is the clock, including “time in numbers”, perfect?*

* Clock drawing is perfect when the following criteria are fulfilled:
  - All 12 numbers are roughly equidistant.
  - The numbers 3, 6, 9, and 12 are placed correctly.
  - The two hands (for hour and minutes) are clearly distinguishable.
  - Analog clock time and digital clock time correspond (you may check this by covering the box and read the drawn time yourself).

Examples for correct „time in numbers“ are:

<table>
<thead>
<tr>
<th>15:00</th>
<th>15 00</th>
<th>15:00</th>
<th>15.00</th>
<th>1500</th>
<th>15h</th>
</tr>
</thead>
<tbody>
<tr>
<td>15h00</td>
<td>03.00 a.m.</td>
<td>3:00 P.M.</td>
<td>3:00 a.m.</td>
<td>03:00 PM</td>
<td></td>
</tr>
</tbody>
</table>

**Informant questionnaire** (see form on page 3)

Please have the patient’s informant complete the informant questionnaire. Add up the numbers (questions A to G) for total points.

**Total points:**
Please draw a clock:
Informant questionnaire on change in cognitive performance

We would like you to remember what the patient was like about two years ago, and to compare it with what he is like today. The following questions are about situations in which the patient had to use her/his memory or intelligence. Please tell us whether her/his behavior in these situations has improved, got worse, or stayed the same compared to two years ago.

The comparison of her/his behaviour today with her/his behavior two years ago is very important. For example, if she/he did not know how to take care of financial issues two years ago, and still does not know how to do it, please indicate this with “no change”.

Please indicate the changes you have observed by marking the appropriate answer with a cross. Please answer all questions. If you do not know the answer to a question, please indicate your best guess.

I am: [ ] spouse/partner [ ] daughter/son [ ] friend [ ] neighbor
[ ] other

Last name, first name: ___________________________ Date of birth: ___________________________

<table>
<thead>
<tr>
<th>Points/question:</th>
<th>MUCH IMPROVED</th>
<th>A BIT IMPROVED</th>
<th>NO CHANGE</th>
<th>A BIT WORSE</th>
<th>MUCH WORSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remembering things about family and friends, e.g. occupations, birthdays, addresses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remembering things that have happened recently</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recalling conversations a few days later</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remembering what day and month it is</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>E</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Remembering where to find things which have been put in a different place from usual</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning new things in general</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handling financial matters e.g. the pension, dealing with the bank</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments: ___________________________

BrainCheck evaluation without informant information

- "Have any of your friends or relatives made remarks about your worsened memory?"
  - NO
  - YES

- Administer Clock Drawing Test
  - Is the clock, including “time in numbers”, perfect?
    - NO
    - YES

- Are there two distinguishable clock hands (length or thickness)?
  - NO
  - YES

- "Have you experienced a recent decline in your ability to memorize new things?"
  - NO
  - YES

- "Do your memory or concentration problems affect your everyday life?"
  - NO
  - YES

- Sum of informant questionnaire points > 23?
  - YES
  - NO

- Further evaluation recommended
  - YES
  - NO

- Watchful waiting

BrainCheck evaluation with informant information

- "Have you experienced a recent decline in your ability to memorize new things?"
  - NO
  - YES

- "Have any of your friends or relatives made remarks about your worsened memory?"
  - NO
  - YES

- "Do your memory or concentration problems affect your everyday life?"
  - NO
  - YES

- Administer Clock Drawing Test
  - Is the clock, including “time in numbers”, perfect?
    - NO
    - YES

- Sum of informant questionnaire points > 21?
  - YES
  - NO

- Sum of informant questionnaire points > 24?
  - YES
  - NO

- Further evaluation recommended
  - YES
  - NO

- Watchful waiting

Administer Clock Drawing Test

Is the clock, including “time in numbers”, perfect?

Are there two distinguishable clock hands (length or thickness)?

"Have you experienced a recent decline in your ability to memorize new things?"

"Do your memory or concentration problems affect your everyday life?"
What is BrainCheck and when is it used?

BrainCheck is a case-finding tool for use in primary care in case of first cognitive signs or symptoms. BrainCheck is not a diagnostic tool. It was designed to help decide whether additional diagnostic procedures are indicated. BrainCheck is indicated in the following situations: Patient or informant reports cognitive symptoms or the physician suspects cognitive worsening.

The development of BrainCheck, the feasibility and validation studies are reported in:


Abstract:

Introduction: Optimal identification of subtle cognitive impairment in the primary care setting requires a very brief tool combining (1) patients’ subjective impairments, (2) cognitive testing, and (3) information from informants. The present study developed a new, very quick and easily administered case-finding tool combining these assessments (‘BrainCheck’) and tested the feasibility and validity of this instrument in two independent studies.

Methods: We developed a case-finding tool comprised of patient-directed (1) questions about memory and depression and (2) clock drawing, and (3) the informant-directed 7-item version of the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE). Feasibility study: 52 general practitioners rated the feasibility and acceptance of the patient-directed tool. Validation study: An independent group of 288 Memory Clinic patients (mean ± SD age = 76.6 ± 7.9, education = 12.0 ± 2.6; 53.8% female) with diagnoses of mild cognitive impairment (n = 80), probable Alzheimer’s disease (n = 185), or major depression (n = 23) and 126 demographically matched, cognitively healthy volunteer participants (age = 75.2 ± 8.8, education = 12.5 ± 2.7; 40% female) partook. All patient and healthy control participants were administered the patient-directed tool, and informants of 113 patient and 70 healthy control participants completed the very short IQCODE.

Results: Feasibility study: General practitioners rated the patient-directed tool as highly feasible and acceptable. Validation study: A Classification and Regression Tree analysis generated an algorithm to categorize patient-directed data which resulted in a correct classification rate (CCR) of 81.2% (sensitivity = 83.0%, specificity = 79.4%). Critically, the CCR of the combined patient- and informant-directed instruments (BrainCheck) reached nearly 90% (i.e. 89.4%; sensitivity = 97.4%, specificity = 81.6%).

Conclusion: A new and very brief instrument for general practitioners, ‘BrainCheck’, combined three sources of information deemed critical for effective case-finding (i.e., patients’ subject impairments, cognitive testing, informant information) and resulted in a nearly 90% CCR. Thus, it provides a very efficient and valid tool to aid general practitioners in deciding whether patients with suspected cognitive impairments should be further evaluated or not (‘watchful waiting’).
Clock Drawing Test – Examples

**Completely correct**
Numbers outside the circle are correct. Self-corrections are allowed as long as the valid result is clearly indicated.

![Example 1](three o'clock)

**Not completely correct**
Time is not indicated in numbers.

![Example 2](three o'clock)

**Completely correct**
Auxiliary lines are allowed as long as they are helpful and clearly distinguishable from the hands.

![Example 3](03.06)

**Not completely correct**
The time cannot be read clearly. It could be 12.30 or 01.30 or 06.05.

![Example 4](03.06)

Evaluation

On page 4 you can find a flow chart leading to the results “further evaluation recommended” or “watchful waiting”.

**Further evaluation recommended**
It is highly probable that the patient is suffering from cognitive impairment that should be evaluated more intensively. Depending on the primary care situation, a referral to a memory clinic or another interdisciplinary team is recommended; or further evaluation can take place in the doctor’s office.

**Watchful waiting**
Perhaps there are suspicious facts concerning cognitive symptoms even though the BrainCheck result is negative. It is therefore reasonable to repeat BrainCheck within about 6-12 months.

In addition, the following measures may be proposed to the patient:*
- correction of known risk factors
- physical activity
- social and cognitive stimulation
- prevention of social withdrawal
- treatment of affective symptoms
- review of medication, especially substances which can cause cognitive problems (e.g. benzodiazepines)
- consider the following treatments and evaluate their subjective clinical efficacy: Ginkgo biloba, omega-3, antioxidants, vitamins B6 and B12

http://www.memoryclinic.ch/content/view/42/62/