

Alzheimer's / Dementia Clock-Drawing Test: Everything Caregivers Need to Know

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What is the Alzheimer's Clock-Drawing Test?

The Alzheimer's Clock-Drawing Test (CDT) is a fast, simple way of spotting warning signs for Alzheimer's disease and other related dementias that can be administered by non-professionals in the comfort of one's home. While a true diagnosis of Alzheimer's or dementia obviously requires more than a few minutes of drawing with a pencil and paper, the CDT is useful for identifying issues in thinking ability that might indicate the presence of these illnesses.

The CDT also provides a powerful visual for families to see that something is wrong with their loved one. Although the test may not seem scientific, it is backed by science and has contributed to earlier diagnoses and improved quality of life for persons with dementia.

It's important to remember that no true diagnosis can be made without further tests from a doctor. If the clock is drawn incorrectly (see "Reading the CDT" below), that is not cause for despair. It simply means you need to make a doctor's appointment so your loved one can be evaluated by an expert.

How the Clock-Drawing Test Works

Someone who may have dementia is asked to draw a clock showing the time as "10 minutes past 11." Sometimes the subject is provided a pre-drawn circle and asked to fill in the numbers and hands. Other times, the tester will not provide the circle, nor say the words "number" or "hands," to avoid giving hints. (Both methods have been shown as effective. For more on the difference between pre-drawing the circle and not, see below.) If the clock is drawn abnormally, for example if the numbers are in the wrong places, this indicates the possibility of dementia and a need for further evaluation by a qualified doctor.

There can be elaborate scoring methods, assigning points based on positioning of numbers and hands, but simple pass/fail scoring has been shown as effective. If the clock is drawn correctly, that's a pass; if there are mistakes, the person drawing has failed. Studies (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5619209/>) are mixed on whether complicated scoring, to determine the severity or stage of dementia, is more effective than simple pass/fail, but the consensus among experts is that the CDT is useful for figuring out if further testing is required, regardless of how it's scored.

Why the Clock-Drawing Test Works

Drawing a clock sounds basic and simple, but consider what's required:

- Verbal understanding
- Spatial knowledge
- Visual memory
- Abstract thinking

First, a person has to hear the instruction and then turn those words into the correct action. It takes thinking ability to turn "Draw a clock" into the act itself. Unfortunately for people with Alzheimer's disease and other dementias, this thinking ability is compromised. Hearing an instruction and acting on it are difficult.

It also takes planning, or an understanding of the steps involved. The brain has to be able to know to first draw a circle, then numbers, then the hands. This also requires visual memory, or remembering what a clock looks like because you've seen one before.

Finally, there's abstract thinking. The reason it's a good idea to ask for "10 minutes after 11," is because the mind has some work to do. Someone whose brain doesn't correctly process information might draw hands pointing to the 10 and the 11. It takes a little more effort to know that the "10 after" means drawing an arrow toward the 2.

A drawn clock is also a powerful symbol for friends and loved ones to see. That single image can represent a loved one's mental state, while the numbered score on a Q-and-A test just doesn't have the impact of a clock with obvious mistakes.

Why Early Diagnosis is Best

The Clock-Drawing Test does not turn you into a clinician, able to expertly assess whether a loved one has Alzheimer's disease. It does, however, help show whether a doctor's appointment and further testing are necessary. This is why it's a good idea if you have concerns. Alzheimer's disease and other dementias are progressive, meaning they get worse over time, and early detection is important because medications and therapies are more effective the sooner they begin. There is no cure for Alzheimer's disease and related dementias, but there are ways to make symptoms less destructive by preserving memory and focus. Someone whose illness is caught earlier will manage symptoms better than someone who waits longer to be diagnosed.



Early Signs of Dementia. These are the first signs that someone may have Alzheimer's or another dementia. If you spot these symptoms, consider testing your loved one:

- Difficulty planning or problem solving
- Difficulty completing familiar tasks
- Losing track of time and place
- Misplacing items
- Problems speaking or writing
- Mood swings and changes in personality (becoming less social)

Benefits of the Clock-Drawing Test

The CDT was originally developed in the 1900s to evaluate soldiers with head injuries. While it is still used to assess the severity of traumatic brain injury (TBI), since the 1980s it has been more often used to gauge whether someone may be developing Alzheimer's disease or another related dementia. The scientific community, including the Alzheimer's Association, widely agrees that the CDT is a useful component of screening for cognition problems including dementia.

There are significant benefits to the Clock-Drawing Test when compared to receiving a traditional medical diagnosis.

- Speed – The test only takes a few minutes to administer and interpret.
- Simplicity – You don't need training to ask someone to draw a clock and determine whether it's correct or not.
- Cost – No expensive equipment or appointments required, just a pen or pencil and paper.
- Tolerability – Someone who bristles at testing may not mind being asked to perform this simple task.

How to Administer the Clock Drawing Test

Step 1	Find a table and chair in a room that is familiar or free of distractions. Sit your loved one down at the table and provide a single sheet of paper (a blank 8.5-by-11-inches sheet is fine) and a writing utensil. It is best to provide a pencil with an eraser as this may help to lessen any frustration for the test taker. Note that it's also OK to pre-draw a 10-inch circle for your loved one, rather than starting with a blank page. (See Provide the Circle? box below.)
Step 2	Say "Draw a clock that shows the time as 10 minutes after 11." If further prompting is needed, it's OK to be more specific: "Draw a circle to represent the face of the clock, then add the numbers, and then the hands." The test will still work this way.
Step 3	Allow as much time as needed to complete the task. Rarely will the task take more than 10 minutes. It is suggested that one might put themselves out of visual range of the test taker in order to discourage questions. If questions are asked, either refrain from answering or simply say "just do as you think best".
Step 4	Assess the clock, looking for abnormalities. If your loved one is distracted, or refuses to draw after having agreed to do so, you might consider these actions as a fail and seek further assessment from a doctor. More on how to assess the Clock-Drawing Test results below.

 **Provide the Circle?** Some clinicians say to give the circle and then ask your loved one to fill in the numbers and hands. There are benefits, however, to providing a blank piece of paper and asking for a clock that shows 10 minutes past 11. If your loved one has to draw the circle, for instance, it is easier to assess "graphical difficulties," like wavy lines, when more drawing is required. Also, if you don't use the words "hands" and "numbers," then more visual memory is required to remember that those are parts of a clock.

How to Read the Clock-Drawing Test Results

It is first important to say that while the CDT is useful and widely embraced by the medical community, it is just a small step in evaluating whether someone is developing dementia. Further testing by a physician is essential before definitively saying that someone has Alzheimer's disease or another dementia.

After your loved one draws the clock, you need to evaluate the image. You'll be able to tell if it's right or not, but because different dementias impact different parts of the brain, several aspects of the drawing are revealing:

The Size of the Clock. Patients with Parkinson's disease dementia and Huntington's disease, a rarer dementia that can develop in a person's 30s and 40s, are prone to draw a smaller clock (less than two inches), while people with Alzheimer's disease tend to draw bigger (more than 10 inches) clocks. This is because size awareness is affected differently depending on which illness is present.

Fixating on Time. If the person being tested is focused mostly on the time aspect—getting the hands pointed the right way so the clock is correct—to the detriment of the rest of the clock, this is more common in Alzheimer's disease and Parkinson's disease dementia than with other dementias.

Graphical Errors. If the clock looks essentially correct, but is messy (wavy or broken lines), this is more common in Huntington's disease and vascular dementia than Alzheimer's disease.

Radical Wrongness. If the clock doesn't even look like a clock, like if there are letters or incorrect shapes added, this suggests confusion that is more indicative of Alzheimer's disease than Huntington's, Parkinson's, vascular dementia or frontotemporal dementia.

Spatial Errors. If there are big gaps, numbers outside the circle, or numbers on only one side of the circle, this is more common in Parkinson's disease with dementia, Lewy body dementia and vascular dementia, and less common in people with Alzheimer's.

See images of other individuals Clock-Drawing Tests results here.

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Did You Know? Technological advances have taken the clock drawing test digital. As smartphone screens and digital pen technologies improve, researchers are working on apps that ask the subject to draw a clock onto a screen for electronic assessment. As artificial technology advances, it's possible these evaluations will reveal more and more about the mental state of people taking the CDT.

Alternatives to the Clock Drawing Test

The Modified Clinical Dementia Rating (CDR) – this is another test that is fast, easy, and can be taken by family members and caregivers without medical training. It simply involves answering questions about a loved one's behavior, nothing is required of the individual who may have dementia. Our organization has created an online version of the CDR Test here (<https://www.dementiacarecentral.com/alzheimers-online-test/start-page>).

The Mini-Mental State Exam (MMSE) – the MMSE is a multi-question test that asks the subject to demonstrate a wider array of knowledge and mental skills. This takes longer and can be distressing to the test-taker, and so the CDT usually comes before the MMSE. A physical examination and brain scans are also part of the diagnosing procedure, and can also be both time-consuming and distressing. This is why it's best to begin with the simple CDT.

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