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Five simple tests that could point to cognitive decline

Is it dementia? A US neurologist reveals how he gauges the health of a patient's brain

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I watched my mother draw a clock while she was in a brain rehabilitation centre after her stroke. Until then, I did not know how common a test it was, how often it was used – or why.

The clock drawing test – or CDT – is used regularly to assess several mental processes. It has become a key tool in early screening for cognitive impairment – especially dementia. You might expect it to be simple: drawing a clock that shows the time, say, at six o'clock: a circle, numbers, a big hand, a little hand.

Our cognitive functions include perception, memory, learning, attention, decision making and language abilities.

The value of this ostensibly simple test is that it requires using several of these functions at once.

This test is becoming valuable in assessing people with dementia, since they often have difficulty reading the time on a traditional clock: it requires them to be able to interpret the placement of the hands in relation to the numbers, an ability often lost in people in the early stages of dementia.

US-based neurologist Dr Baibing Chen says the clock-drawing test is especially useful in judging brain health.

There are many different ways to score the clock-drawing test: • are the the numbers all there and in the right sequence?

• is the time correct?
• are numbers missing, or outside the face?
• are the hands placed correctly?
• are the hands missing?

According to the UK's National Health Service, if a patient can draw a clock accurately it almost rules out dementia, because the task requires the person to execute a range of cognitive skills simultaneously.

Chen describes four other simple tests that can gauge the status of a person's cognition:

1. The balance test

This test evaluates balance and coordination, primarily governed by the cerebellum and the motor cortex, with input from sensory systems. Ask the person to stand on one leg for up to 30 seconds, ensuring they have support nearby. Difficulty maintaining balance can indicate problems with motor coordination or even early signs of neurodegenerative conditions, such as Parkinson's disease, which may sometimes coexist with dementia.

2. The smell test

The sense of smell is closely linked to the olfactory bulb and temporal lobe, particularly the entorhinal cortex, one of the first areas affected in Alzheimer's disease. In this test, the individual is

asked to identify familiar scents like coffee or vanilla. A diminished sense of smell, known as hyposmia, is often one of the earliest signs of Alzheimer's or
Parkinson's disease, sometimes predating symptoms by years.

3. Dual gait task

This evaluates the brain's ability to divide attention between two tasks. For example, the individual is asked to walk while performing a cognitive task, such as counting backwards. Impaired performance, such as slowing down significantly or making more mistakes, reflects potential issues with the brain's frontal lobe and its role in attention and executive function.

4. Verbal fluency test

I might or might not do any or all of these tests on patients I suspect have dementia DR BAIBING CHEN, NEUROLOGIST

This test assesses language and executive function associated with the frontal and temporal lobes. The individual is asked to name as many words as possible in one minute that fit a category (such as "animals"), or start with a specific letter.

Difficulty generating words may point to frontal or temporal lobe dysfunction, which can be seen in Alzheimer's disease or frontotemporal dementia.

These tests must be conducted in the context of the patient's overall health, history, and current symptoms, Chen says.

Failure does not point only to dementia

Just as not all memory lapses mean someone has dementia, "failing" these tests does not necessarily either. Chen cites the examples of a tumour in the cerebellum that could cause coordination issues, a stroke in the inferior frontal lobe that might affect speech, and having Covid-19, which can affect someone's senses of smell and taste.

Other conditions can affect the test results, too, such as low vitamin B12 levels, an underactive thyroid gland, or side effects from taking medications. Although not primary neurological causes, Chen says they can produce dementia-like symptoms.

"If we establish that the cause is neurological, we then work to pinpoint its location in the brain. From there, we develop a list of possible diagnoses to explain the patient's symptoms, which helps us decide on appropriate tests and treatments.

"This process is intricate, requiring careful thought and attention to detail. This is what makes being a neurologist difficult but stimulating."

It is vital to consider "pretest probability" – the likelihood that a patient has dementia based on their history, symptoms and risk factors – when interpreting the results of any of these tests, and when a neurologist decides whether the patient should take the tests in the first place.

"I might or might not do any or all of these tests on patients that I suspect have dementia. It all depends on what symptoms the patient presents with," Chen says.