

CLOCK DRAWING TASK

Freehand clock drawing is a complex task that requires different abilities in addition to constructional skills.^{1,2} It has been shown to be a sensitive measure of constructional apraxia,² but also may reflect general deficits in the conception of time.¹ This task is particularly useful as a screening tool to differentiate normal elderly from individuals with cognitive impairment, and in particular with Alzheimer's disease which accounts for approximately 75% of all dementias.³ It is important to note that performance on this brief screening test does not establish criteria for dementia. However, it can be useful in determining whether further cognitive evaluations are necessary.⁴

SCORING:

Although various methods for scoring the Clock Drawing Task have been described,^{1,2,4} a 0-4 point method⁵ is presented here, which is brief, sensitive, and easy to apply⁴:

Draws closed circle:	Score 1 point
Places numbers in correct positions:	Score 1 point
Includes all 12 correct numbers:	Score 1 point
Places hands in correct positions:	Score 1 point

INTERPRETATION:

Certain errors, such as grossly distorted contour or extraneous markings, are rarely produced by cognitively intact persons.⁴ **Clinical judgment must be applied, but a low score indicates the need for further evaluation.** It is important to note that any cut-off score is subjective and arbitrary, and classification errors may occur. However, it is unlikely that a perfectly drawn clock will be drawn by a cognitively impaired person. When in doubt, multiple sources of evidence should be examined.⁴

NEXT STEP:

Performance on this brief screening test does not establish criteria for dementia, but can be useful in determining whether further cognitive evaluations are necessary.⁴ If performance on clock drawing is impaired, a complete diagnostic evaluation for dementia (eg, DSM-IV⁶ criteria) should be considered. This evaluation should include a standardized cognitive assessment such as the Mini-Mental State Examination (MMSE).⁷

References 1. Tuolisto H, Hadjistavropoulos T, Miller JA, et al. The Clock Test: a sensitive measure to differentiate normal elderly from those with Alzheimer disease. *J Am Geriatr Soc.* 1992;40:579-584. 2. Mendez MF, Ala T, Underwood KL. Development of scoring criteria for the Clock Drawing Task in Alzheimer's disease. *J Am Geriatr Soc.* 1992;40:1095-1099. 3. Morris JC. Differential diagnosis of Alzheimer's disease. *Clin Geriatr Med.* 1994;10:257-276. 4. Nolan KA, Mohs RC. Screening for dementia in family practice. In *Alzheimer's Disease: A Guide to Practical Management, Part II*. Richter RW, Blass JP, eds. St. Louis, Mos Mosby-Year Book, Inc; 1994:81-95. 5. Data on file. Pfizer Inc, New York, NY. 6. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*. 4th ed. Washington, DC: American Psychiatric Association; 1994:142,143. 7. Folstein MF, Folstein SE, McHugh PR. Mini-Mental State: a practical method for grading the cognitive state of patients for the clinician. *J Psychiat Res.* 1975;12:189-198.

Clock Drawing Test (CDT)

- Useful adjunct to the MMSE test in cognitive screening
- Tests executive function primarily
- Has widespread clinical use despite inconsistent scoring and interpretation
 - visual record for the chart
 - takes less than a minute to perform
 - reflects change in cognition over time
 - has educational impact on the family or caregivers

There are multiple scoring systems, so just use the simplest one you can remember. If you are unsure how to score it, simply describe the patient's efforts in your note.

Standard Instructions

1. Use pre-drawn circle
2. "Please draw the numbers of the clock." Allow them to complete.
3. "Please set the time at ten minutes after eleven."

In general, look first at symmetry of the numbers of the clock. This can indicate whether or not the patient was able to plan ahead. Leaving numbers out, repeating numbers, or continuing past the number 12 is also an indication of abnormality.

Secondly, look at the hands. We deliberately choose a time that is not straightforward because we are looking for disinhibition or "frontal pull." The time 'ten after eleven' requires that the patient inhibit a reflex to put the hands at the numbers 10 and 11. This also requires abstract thinking to translate the concept of time into a drawing.

Next, included instructions on five methods of scoring and following that are examples of real patients clock drawings to practice interpretation.

The patient is asked to draw a clock face with all the numbers and hands and then to state the time as drawn. The number 12 must appear on top (3 points), there must be 12 numbers present (1 point), there must be two distinguishable hands (1 point), and the time must be identified correctly (1 point) for full credit. A score less than 4 is considered impaired. Stahelin et al. Int Psychogeriatr 1997.

CAMDEX scoring system (involves drawing their own circle)

- | | |
|--|---|
| 0 No reasonable representation of a clock | —No clock face drawn
—Numbers not in correct position
—Incorrect time |
| 1 | —One of the 3 items mentioned in score 0 is correct |
| 2 | —Two of the 3 items mentioned in score 0 is correct |
| 3 Perfect clock | —All items are correctly represented |

SHULMAN scoring system (Shulman et al., 1993)

0 No reasonable representation of a clock

- No attempts at all
- No semblance of a clock at all
- Writes a word or name

1 Severe level of disorganisation as described in 2

2 Moderate visio-spatial disorganisation of times such that accurate denotation of 10 after 11 is impossible

- Moderately poor spacing
- Omits numbers
- Perseveration—repeats circle or continues on past 12 to 13, 14, 15 etc.
- Right-left reversal—numbers drawn counterclockwise
- Dysgraphia—unable to write numbers accurately

3 Inaccurate representation of 10 after 11 when visiospatial organisation is perfect or shows only minor deviations

- Minute hand points to 10
- Writes '10 after 11'
- Unable to make any denotation of time

4 Minor visiospatial errors

- A mildly impaired spacing of times
- Draws times outside circle
- Turns page while writing numbers so that some numbers appear upside down
- Draws in lines (spokes) to orient spacing

5 Perfect clock

Method for evaluating clock drawings described by Sunderland and colleagues¹⁴

Score	Criterion
10-6	Drawing of clock face with circle and number is generally intact.
10	Hands are in correct position.
9	Slight errors in placement of the hands.
8	More noticeable errors in the placement of hour and minute hands.
7	Placement of hands is significantly off course.
6	Inappropriate use of clock hands (i.e., use of digital display or circling of numbers despite repeated instructions).
5-1	Drawing of clock face with circle and numbers is <i>not</i> intact.
5	Crowding of numbers at one end of the clock or reversal of numbers. Hands may still be present in some fashion.
4	Further distortion of number sequence. Integrity of clock face is now gone (i.e., numbers missing or placed at outside of the boundaries of the clock face).
3	Numbers and clock face no longer obviously connected in the drawing. Hands are not present.
2	Drawing reveals some evidence of instructions being received but only a vague representation of a clock.
1	Either no attempt or an uninterpretable effort is made.

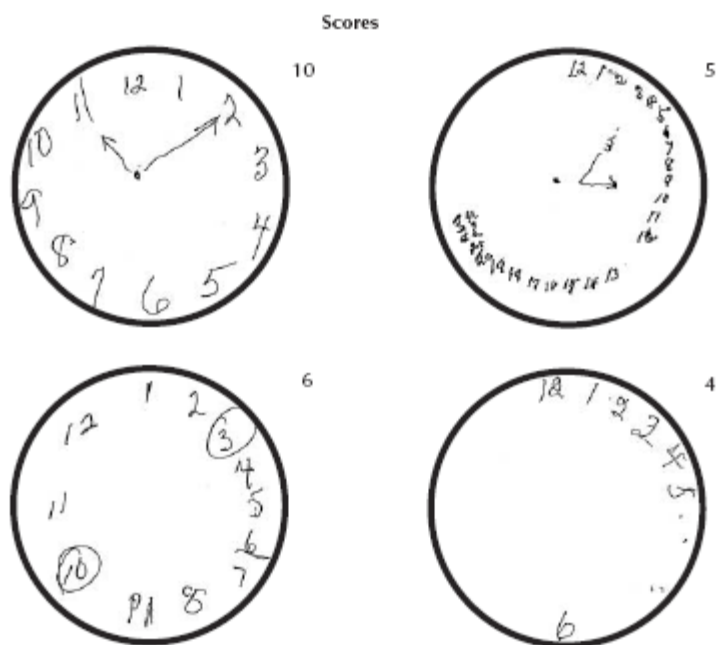


Fig. 2: Method described by Sunderland and colleagues¹⁴ for scoring clock drawings. As described in Fig. 1, patients are given a predrawn circle and asked to draw a clock and the time as "10 past 11." Top: Scoring criteria. Bottom: Examples of clock drawings and scores derived using this method. Scores of 6 or more are considered normal.

Method for evaluating clock drawings described by Watson and colleagues¹³

1. Divide the circle into 4 equal quadrants by drawing one line through the centre of the circle and the number 12 (or a mark that best corresponds to the 12) and a second line perpendicular to and bisecting the first.
2. Count the number of digits in each quadrant in the clockwise direction, beginning with the digit corresponding to the number 12. Each digit is counted only once. If a digit falls on one of the reference lines, it is included in the quadrant that is clockwise to the line. A total of 3 digits in a quadrant is considered to be correct.
3. For any error in the number of digits in the first, second or third quadrants assign a score of 1. For any error in the number of digits in the fourth quadrant assign a score of 4.
4. Normal range of score is 0–3. Abnormal (demented) range of score is 4–7.

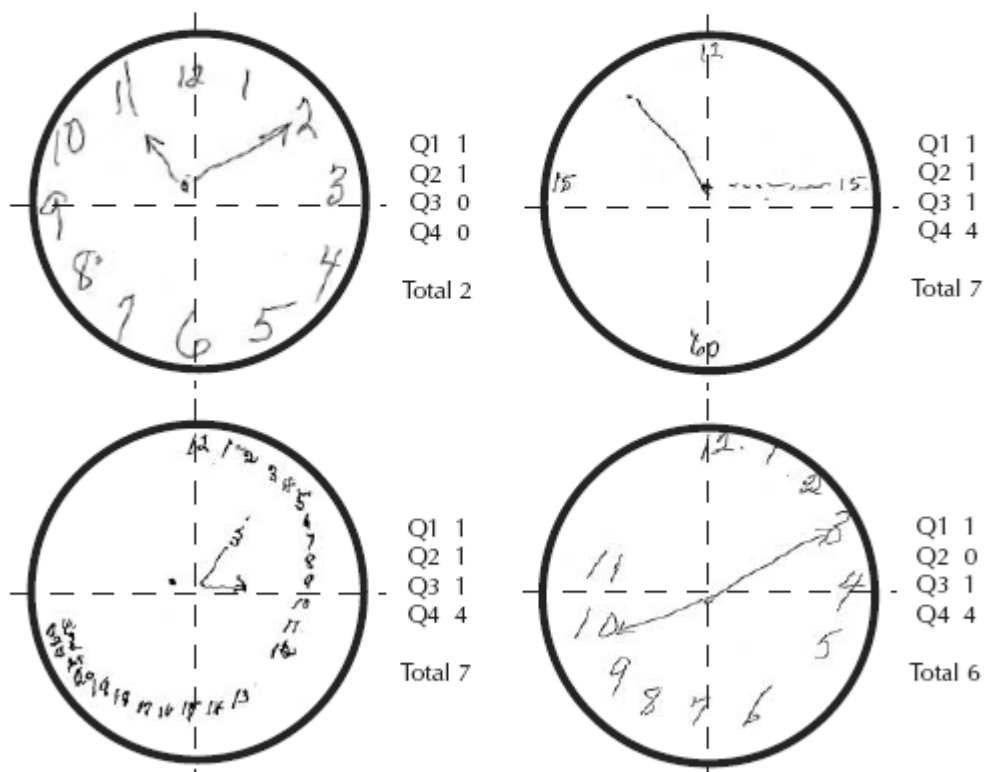


Fig. 1: Method described by Watson and colleagues¹³ for scoring clock drawings. Patients are given a predrawn circle and asked to draw numbers on it to make it look like a clock. They are then asked to draw the hands of the clock to read "10 past 11." Top: Scoring criteria. Bottom: Examples of patients' clock drawings and scores derived using this method.

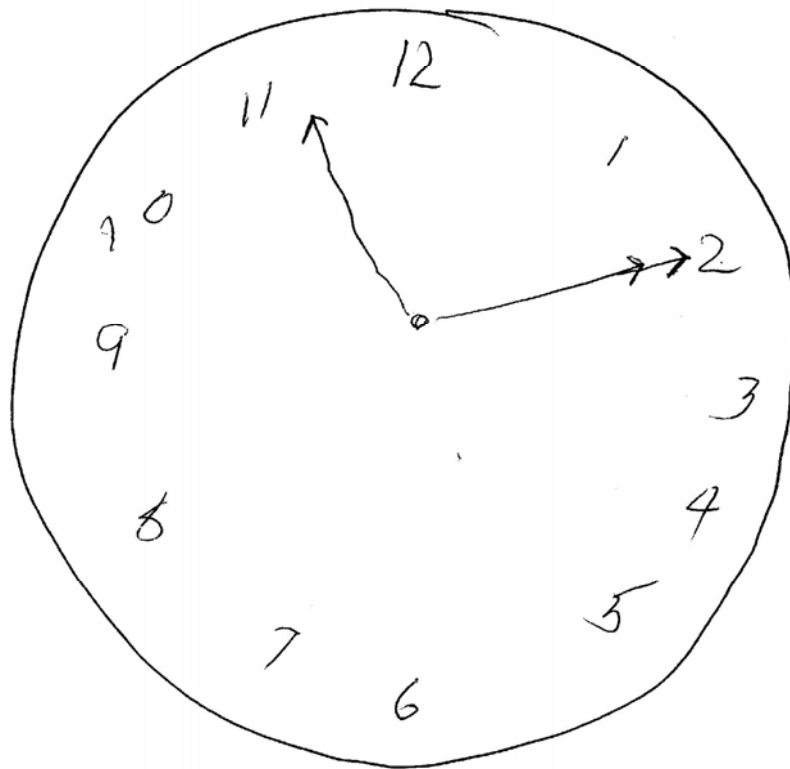
Clock Drawing Test Dr. Cramer, Initial Visit

CLOCK DRAWING TASK

INSTRUCTIONS:

In the space below, please draw the face of a clock and put the numbers in the correct positions.

Now, draw in the hands at ten minutes after eleven.



Name _____

Date _____

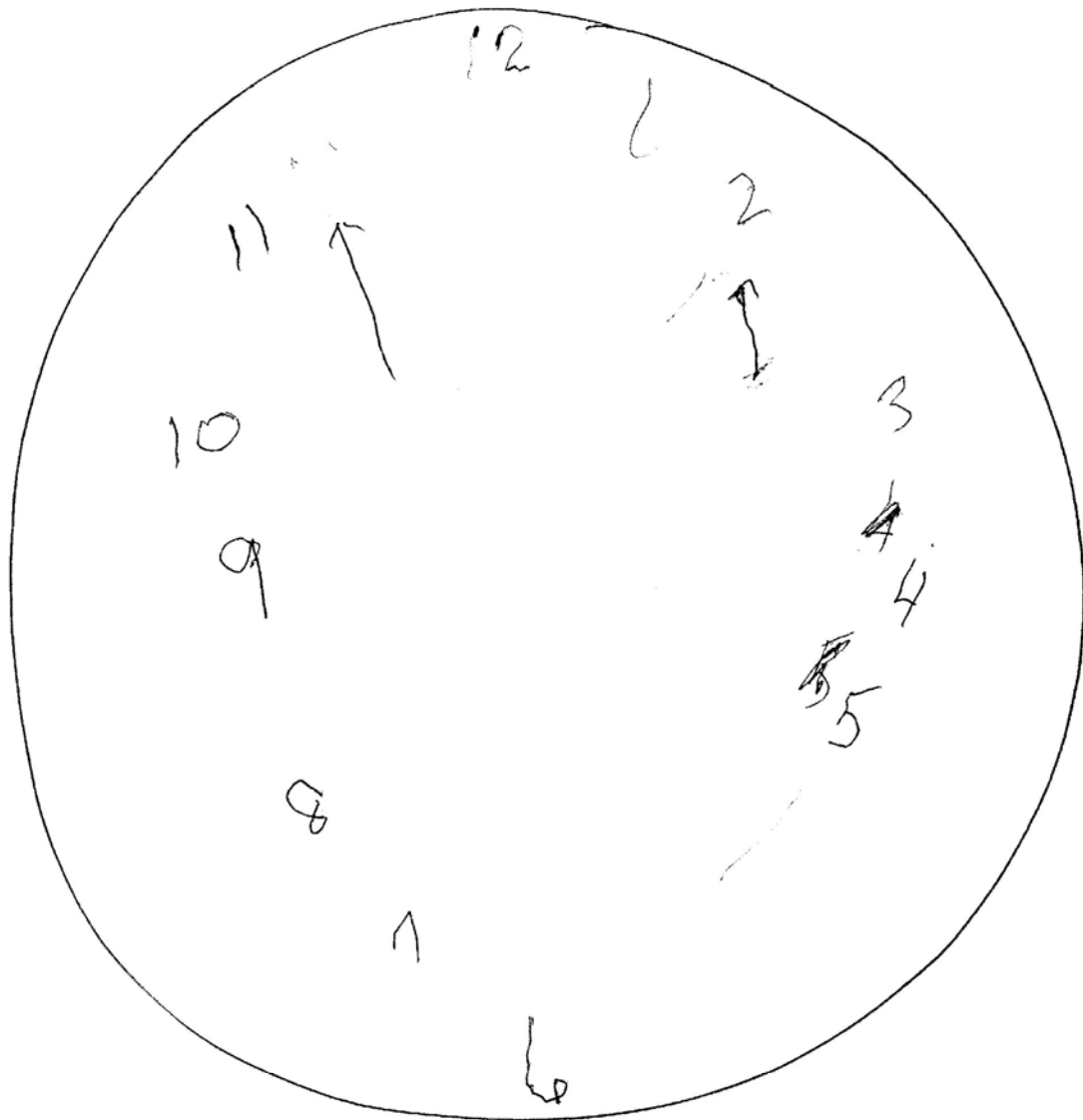
Clock Drawing Test Dr. Cramer, Follow-up Visit

Clock Drawing Task

Instructions:

In the space below, please draw the face of a clock and put the numbers in the correct positions.

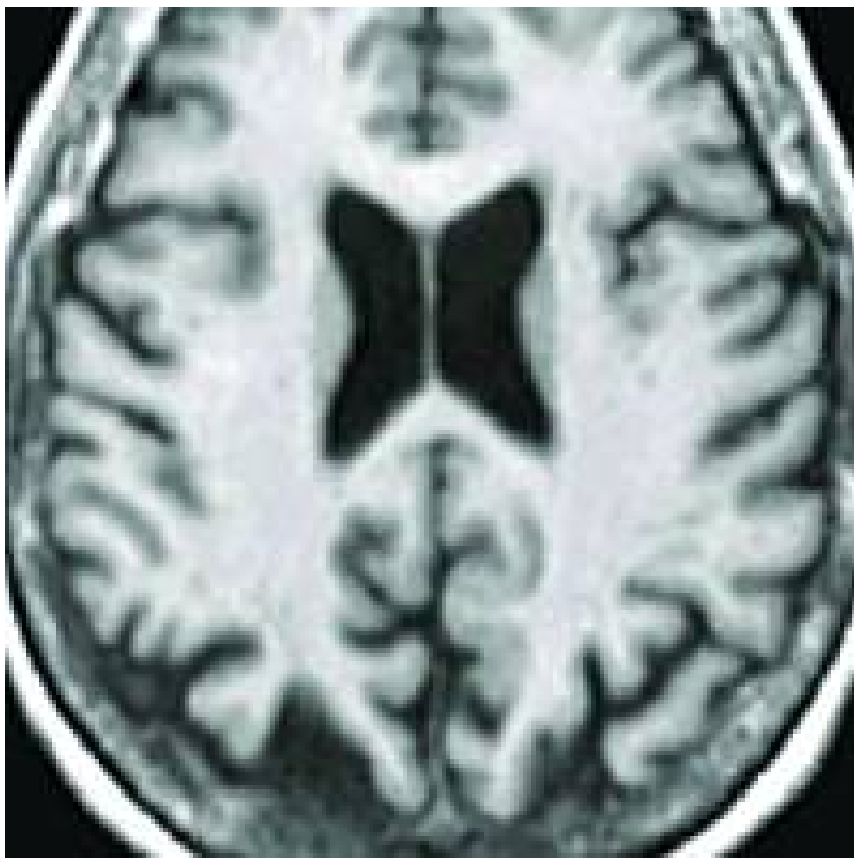
Then, draw in the hands at ten minutes after eleven.



Name: Cpm 10 after 2:35

Date: 1/5/06

CT Scan of the Brain, Dr. Cramer



CLOCK DRAWING TASK

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In the space below, please draw the face of a clock and put the numbers in the correct positions.

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Name _____

Date _____