AGED SPECIFIC ASSESSMENT TOOLS

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Issues in assessing the Elderly

- Association between biological, psychological, social and cultural issues

- For example:
  - Delusions and major psychosis, depression, dementia, and delirium
  - Depression and cognitive impairment
  - Dementia and psychological symptoms

Establishing a supportive and trusting relationship

- Careful listening and observation
- Patience
- Familiar environment, if possible
- Physical comfort maximised
- Sensory deficits identified

MSE – age specific issues

- Increasing prevalence of dementia
- Prevalence & reversibility of delirium
- Close association between clinical symptoms of confusion and depression
- Frequency with which physical problems present with symptoms of confusion (eg, thyroid disorders, electrolyte

- **Appearance and Behaviour**
  - Age, grooming, cleanliness, eye contact, reaction to examiner
  - Eg, appropriate for weather, garments inside out, multiple layers, dirty, dishevelled, unkempt
  - Eg, friendly, hostile, guarded, cooperative, withdrawn

- **Speech**
  - In dementia syndromes - fluency?, dysarthria (disordered articulation)?, word finding difficulties?, misuse of words (paraphasias)?

- **Mood and Affect**
  - Changes in affect frequently among the earliest features heralding onset of dementia (especially FTD)
- **Thought**
  - Onset of delusions in elderly, previously well person suggests organic issues, (eg, dementia)

- **Motor**
  - Slow and reduced movement, expressionless face, shuffling gait, and tremor often associated with Parkinson's disease and other subcortical conditions (eg, Huntington's, lacunar state)

- **Perception**
  - Hallucinations and brain abnormalities, including dementia, Lewy Body Dementia & Parkinson's disease
  - Hallucinations in delirium
  - Capgras syndrome

- **Insight & Judgement**
  - Loss of insight & impaired judgement often an early sign in dementia

- **Cognition**
  - Quick screen of potential problems, further testing may be required (delirium, dementia)
  - Disorientation and obvious memory problems would be indicators of further assessment, as may be associated with delirium or dementia

Mini Mental State Examination (MMSE)

- Issues in administration:
  - Education level
  - Serial 7's versus WORLD backwards
  - Choice of words for 3 word recall
  - Right versus left hand on comprehension task
  - Visual or hearing aids
  - Rapport building

Standardized Administration

- Ask each question a max of 3 times
- Do not hint, prompt, or provide physical cues
- Do not explain questions or engage in conversation

- Orientation
- Registration
- Attention and Calculation
- Recall
- Language
- Copying

Scoring of MMSE

- 24/30 - 30/30 - normal
- 20/30 - 24/30 - mild cognitive impairment
- 10/30 - 20/30 - moderate cognitive impairment
- 0/30 - 10/30 - severe cognitive impairment

Normative Data -issues

- Relationship b/w MMSE and premorbid intelligence, educational attainment
- High MMSE scores for particular types of dementia (FTD)
- Bias towards verbal items
- Lack of executive items
- Less ideal for some conditions
- Fundamentally a screening tool only

Clock Drawing Task

- Frequently used as a screen for dementia
- Involves visual-spatial, constructional, and executive functions
- Free drawing versus pre drawn circle
- Times used (ten past eleven)
- Scoring can be quantitative or qualitative

understand, but no other help should be given. The time taken to complete the task may be noted.

If using a predrawn circle, provide a sheet with a circle about 4 in (10 cm) in diameter (Shulman, 2000) and say: "*This circle represents a clock face. Please put in the numbers so that it looks like a clock and then set the time to 10 minutes past 11.*" Shulman (2000) recommended that the tester should not use the word "hands" in the instructions.

The instructions for administering the CLOX test (Royall et al., 1998) are provided in Figure 12–8.

Children

According to Cohen et al. (2000), the child is provided with a piece of paper and instructed to "draw the face of a clock and make the clock say 3:00." After this, the child is presented with two predrawn clocks and is asked to indicate the times of 9:30 and 10:20 (Cohen et al., 2000).

ADMINISTRATION TIME

Approximately 5 min is required.

SCORING

Quantitative Systems

Scoring systems range from a 3-point system (Goodglass & Kaplan, 1983, 2001) to more complex systems (e.g., a 20-point scale by Mendez et al., 1992). The 10-point scoring system, adapted from Sunderland et al. (1989) and Libon et al (1993) is commonly used for the freehand version and is shown in Table 12–5. The Shulman scoring system is simple and appears to be quite useful (see *Validity*); it is shown in Table 12–6. The system (CLOX) proposed by Royall et al. (1998) is presented in Figure 12–8.

For children, Cohen et al. (2000) recommend scoring clock construction and clock setting separately (see Table 12–7). Clock construction has a maximum score of 13, and clock setting is measured on a 5-point scale.

Qualitative Systems

In addition to the quantitative score, a number of authors (e.g., Cosentino et al., 2004; Libon et al., 1996; Rouleau et al. 1992; Suhr et al., 1998; Tuokko et al., 1992) have developed qualitative scoring systems that include evaluation of clock size, omissions, graphic difficulties (e.g., numbers hard to read, distortions in the hands), stimulus-bound (e.g., setting the hands on 10 and 11), conceptual (e.g., writing the time on the clock rather than setting the hands, lack of numbers on the clock), perseverative (e.g., more than two hands, writing numbers beyond "12"), and spatial/planning (e.g., neglect, gaps in number spacing, numbers outside clockface or counterclockwise) types of errors.

Table 12–5 Criteria for Evaluating Free-Drawn Clock Drawing in Adults

10	Normal drawing, numbers and hands in approximately correct positions, hour hand distinctly different from minute hand and approaching 4 o'clock.
9	Slight errors in placement of hands—not exactly on 8 and 4 (or 10 and 11), but not on one of the adjoining numbers—or one missing number on clock face.
8	More noticeable errors in placement of hour and minute hand (off by one number); number spacing shows a gap.
7	Placement of hands significantly off course (more than one number); very inappropriate spacing of numbers (e.g., all on one side).
6	Inappropriate use of clock hands (use of digital display or circling of numbers despite repeated instructions); crowding of numbers at one end of the clock or reversal of numbers.
5	Perseverative or otherwise inappropriate arrangement of numbers (e.g., numbers indicated by dots). Hands may be represented but do not clearly point at a number.
4	Numbers absent, written outside of clock, or in distorted sequence. Integrity of clock face missing. Hands not clearly represented or drawn outside of clock face.
3	Numbers and clock face no longer connected in the drawing. Hands not recognizably present.
2	Drawing reveals some evidence of instructions received, but representation of clock is only vague; inappropriate spatial arrangement of numbers.
1	Irrelevant, uninterpretable figure or no attempt.

Note: Roman numerals and embellishments of the clock (clock feet, bells) are acceptable.

Source: Adapted from Sunderland et al., 1989, and Libon et al., 1993.

DEMOGRAPHIC EFFECTS

Age

Cross-sectional studies reveal that age affects clock drawing in adults (e.g., Freedman et al., 1994; Marcopulos et al., 1997; Tuokko et al., 1995) with performance declining particularly after age 70 years (Kozora & Cullum, 1994; Marcopulos et al., 1997; but see Cahn & Kaplan, 1997, who suggested that clock drawing remains fairly preserved from age 70 to 90 years). Longitudinal examination reveals slight decline with advancing age. Ratcliff et al. (2003) examined 1208 elderly community-living individuals in southern Pennsylvania, aged 65 to 74 years and greater than 74 years, drawn from the voters' list. The testing was repeated every 2 years. The results, based on an 8-point scoring system, showed a small but significant decline (from 7.55 to 6.94 points) for "survivors" who participated in all five tests over the 10-year period.

In children, the ability to draw a clock improves significantly with age (Cohen et al., 2000; Edmonds et al., 1994; Kirk et al., 1996). For example, Cohen et al. (2000) examined public school children between the ages of 6 and 12 years and

6. **Nonspecific spatial error:** a deficit in the spatial layout of numbers, without any specific pattern in spatial disorganization.
7. **Numbers written on the outside of the clock:** numbers written either around the perimeter of the circle or on the circle itself.
8. **Numbers written counterclockwise:** arrangement of the numbers with 12 at the top of the clock face and then continuing around in a counterclockwise fashion.

Each patient's clock was scored for the presence or absence of each error type. Group differences in error types were evaluated through a χ^2 analysis. Interrater reliability for this scoring system has previously been shown to be very high, with the quantitative scoring procedure showing an interrater reliability of 0.96, and the qualitative scoring procedure showing an interrater reliability ranging from 0.73 to 1.0.[16] The two independent raters in the current study demonstrated excellent interrater reliability ($r = 1.0$) for the quantitative CDT score. There were discrepancies on only two of the eight qualitative features assessed for all of the clocks evaluated. Consensus was derived and a final rating was made on these two variables.

Examples of several error types are displayed in Figure 1.

RESULTS

Group Differences on Global CDT Score

The difference between the three subject groups on the global measure of CDT performance approached, but did not reach statistical significance [$F(2,58) = 2.4$, $p < 0.10$; $\eta^2 = 0.08$]. The mean scores of the AD, PD, and DLB groups on the CDT were 7.2 (±2.1), 6.5 (±2.7), and 5.7 (±2.0), respectively.

Group Differences on CDT Errors

The percentage of AD, PD, and DLB subjects that made each type of error on the

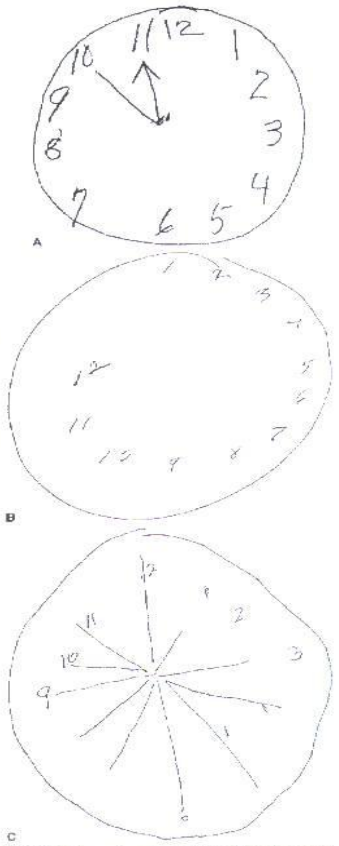

FIGURE 1. Examples of error types. Stimulus-bound response (**A**), planning deficit and conceptual deficit (**B**), perseveration and conceptual deficit (**C**).

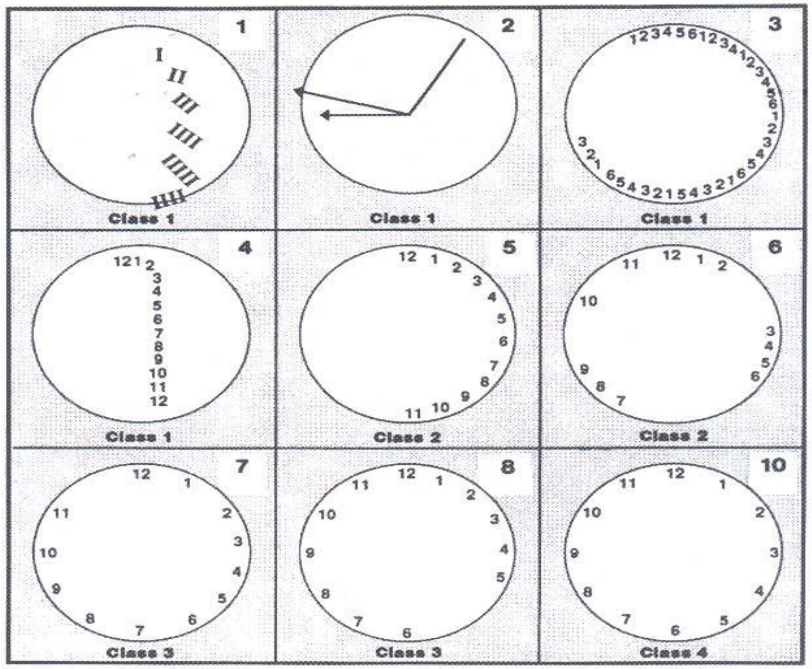

Figure 1 Classification of clocks – class 1 to 4.

Table I Classification of clocks for MMSE scores of less than 23 or greater than 24

Clock score	*MMSE score* ⩽ *23*	⩾ *24*	*Total*
1 or 2	27	11	38
3 or 4	8	71	79
Total	35	82	117
Sensitivity		= 77%	
Specificity		= 87%	
Positive predictive value		= 71%	
Negative predictive value		= 90%	

are just as important in the ability of the test to detect the cognitively impaired as the former. If an elderly patient draws a normal clock or one with minor spacing abnormalities, the patient has a good chance of being cognitively normal. Finding 'normal' clock drawing ability in elderly, recently admitted patients reasonably excludes significant cognitive impairment. It is a test that is easy to use and easy to remember. Finding 'abnormal' clock drawing ability necessitates further assessment of cognition and affect. The difficult classification of many of the clearly abnormal clocks[3,4] is not necessary. A minor spacing abnormality or a spontaneously corrected spacing abnormality is all that needs to be recognized.

The method described is easy for the visually impaired to follow: a large thick circle rather than their own hand writing. The instruction used by Wolff-Klein *et al.*[3] was modified because quite reasonable questions are generated by just instructing the patient to 'draw a clock'. Still there were 11 cognitively normal patients without evidence of cerebral insult who could not do this seemingly

- Studies have found improvement in clock drawing from command to copy conditions in Alzheimer's and not in vascular dementia (reflects greater deficits in semantic memory systems)
- Greater executive impairments in vascular dementia, Huntington's and Parkinson's disease
- Impact of depression controversial
- Impact of schizophrenia on performance

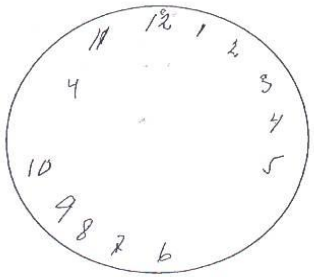

Figure 1. A clock-drawing test with a pre-drawn circle 10 cm in diameter performed by in a 76-year-old woman with Alzheimer's disease. Her Mini Mental State Examination score was 17, she belonged to Katz index grade E [33] and was classified as severity class 3 (needs direction to function but can respond appropriately to instruction) on the Berger scale [34]. She had seven error scores according to the method of Watson *et al.* [17].

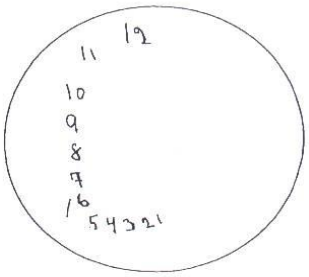

Figure 2. A clock-drawing test with a pre-drawn circle 10 cm in diameter performed by a 79-year-old woman with vascular dementia. Her Mini Mental State Examination score was 19, she belonged to Katz index grade C [33] and was classified as severity class 4 (needs assistance to function and cannot respond to direction alone) on the Berger scale [34] and did not show any clinical signs of neglect. She had seven error scores according to the method of Watson *et al.* [17].

clock drawing (score range 1–4) also correlates significantly with the MMSE [11]. Clock drawing (score range 1–31) could correctly classify 86% of patients with Alzheimer's disease and 92% of elderly controls [6] in an outpatient clinic. In both outpatients and hospitalized patients with and without dementia, the test (score range 1–10) could correctly classify 77% of patients with Alzheimer's disease, 89% of patients with multi-infarct and mixed dementias and 78% of normal elderly people [4]. There have been fewer clock-drawing studies in patients with vascular dementia than in patients with Alzheimer's disease [4, 12]. Patients with vascular dementia, diagnosed by the Hachinski ischaemic scale [21], the Dementia Rating Scale [22] and the MMSE, made more errors in spacing, while patients with Alzheimer's disease showed a wider variety of errors (score range 1–10) [12]. In cases of very mild Alzheimer's disease, the clock-drawing test (score range 1–10) can be normal [23]. The sensitivity of the test thus may vary according to the level of cognitive impairment [23].

In a study of poorly educated people, Ainslie and Murden [2] found that the value of the test as a single screening instrument for dementia was questionable. In that study three different scoring systems were used—those of Shulman *et al.* [9] (score range 1–5), Sunderland *et al.* [13] (score range 1–10) and Wolf-Klein *et al.* [12] (score range 1–10). The scoring method of Wolf-Klein *et al.* was least affected by education and maximized specificity but it had a low sensitivity. On the other hand, Ferrucci *et al.* [24] found the clock-drawing test (score range 1–10) to be a sensitive and specific tool for the detection of patients with mild cognitive impairment as diagnosed with the MMSE and the Dementia Rating Scale [22].

The test (score range 1–5) can be used during follow-up as a sensitive measure of deterioration of dementia [25], diagnosed using the MMSE and the Short Mental Status Questionnaire [26]. Examples of the test are shown in Figures 1 and 2.

Neglect

Constructional apraxia may occur with lesions in either the left or right parietal lobe, although it is more frequent after right parietal damage [14]. It can also be observed early in the course of Alzheimer's disease [14]. The clock-drawing test correlates strongly with tests of constructional apraxia and to a global deterioration scale [10].

The clock-drawing test is a part of a visual neglect battery of six pencil and pen tests from the Behavioural Inattention Test [27]. Many authors [19, 28–32] have

Delirium - assessment

- Reliable diagnosis comes from careful and deliberate examination
- Also important to gain information from carers and nursing staff
- Rating Scales
- Physical examination and work-up

Confusion Assessment Method (CAM) Inouye et al 1990

- Compatible with DSM-1V
- Quick and easy to administer
- Evaluates for evidence of delirium based on observations made before, during or after interview, and based on clinical features of delirium (eg, course, inattention, disorganised thinking, altered consciousness, disorientation, memory impairment, psychomotor changes, sleep changes)

1: Acute Onset and Fluctuating Course
2: Inattention
3: Disorganised thinking
4: Altered Level of Consciousness
5: Disorientation
6: Memory Impairment
7: Perceptual Disturbances
8A: Psychomotor Agitation
8B: Psychomotor Retardation
9: Altered sleep/wake cycle

CAM Diagnostic Algorithm

- Feature 1: Acute onset & fluctuating Course
- Feature 2: Inattention
- Feature 3: Disorganised thinking
- Feature 4: Altered level of consciousness
- The diagnosis of delirium requires the presence of 1 and 2, and & either 3 or 4.

Delirium Rating Scale

1. Temporal onset of symptoms
2. Sensory disturbances
3. Hallucination Type (visual, auditory, tactile)
4. Delusions
5. Motor Behaviour
6. Clarity of Thinking

7. Physical illness
8. Sleep Wake cycle
9. Lability of Mood
10. Variability of Symptoms