



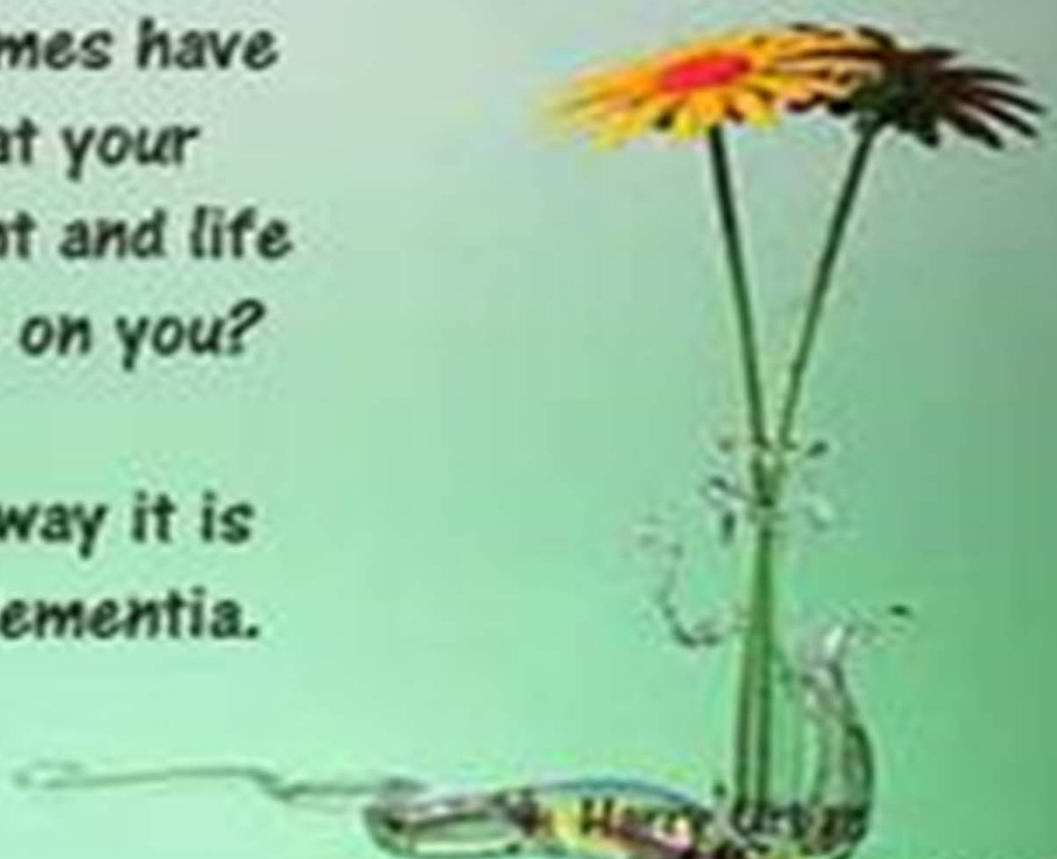
# Dementia : An Overview

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**MMA, 21.01.18**

How many times have  
you been at your  
breaking point and life  
dumps more on you?

That is the way it is  
living with dementia.



mythoughtsondementia.com ©

# Contents

- Definition
- Types of Dementia
- Diagnosis of Dementia
- Management of Dementia

# Forgetfulness $\neq$ Dementia



# Definition of Dementia

A clinical syndrome of cognitive decline that is sufficiently severe to interfere with social or occupational functioning.



I am getting more forgetful these days !!!  
Is it because of age or am I demented?



Forgetting is intrinsically human and increases with aging.

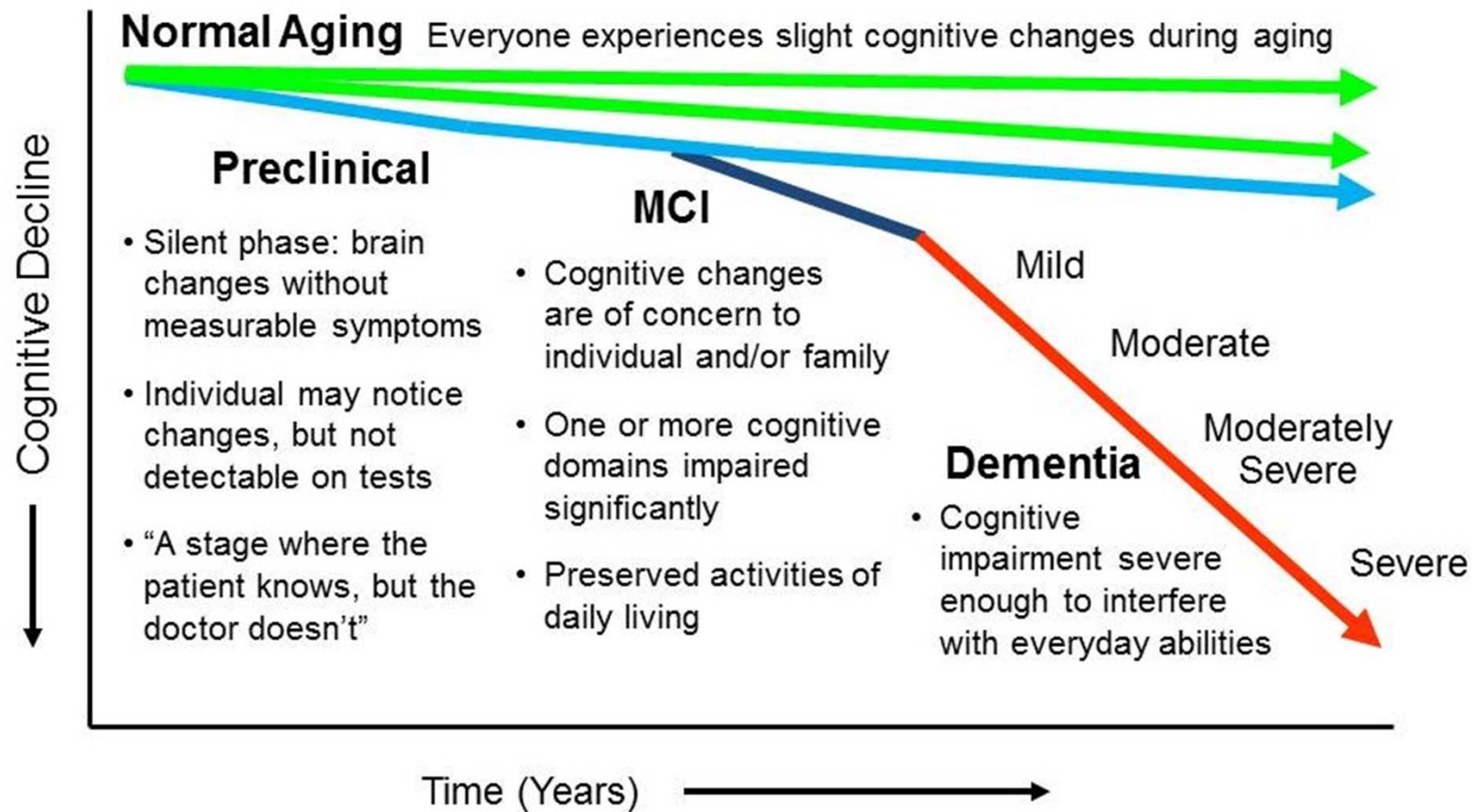


## Mild Cognitive Impairment (MCI)

Clinical syndrome defined as cognitive decline greater than that expected for a person's age and education level but does not affect notably with activities of daily life.

(Gauthier S, et al ,lancet 2006)

# Age related cognitive decline < MCI < Dementia





# DSM IV criteria for Dementia

Impairment of memory and at least one of the following domains:

- language,
  - praxias,
  - gnosis, or
  - executive functioning
- 
- sufficiently severe to impair social or professional life
  - must not occur as a consequence of a delirium, or be caused by another medical, neurological or psychiatric condition.

## Normal Brain



## Normal Function



## Atrophic Brain



## Reduced function



# Causes of Dementia

Reversible

Irreversible

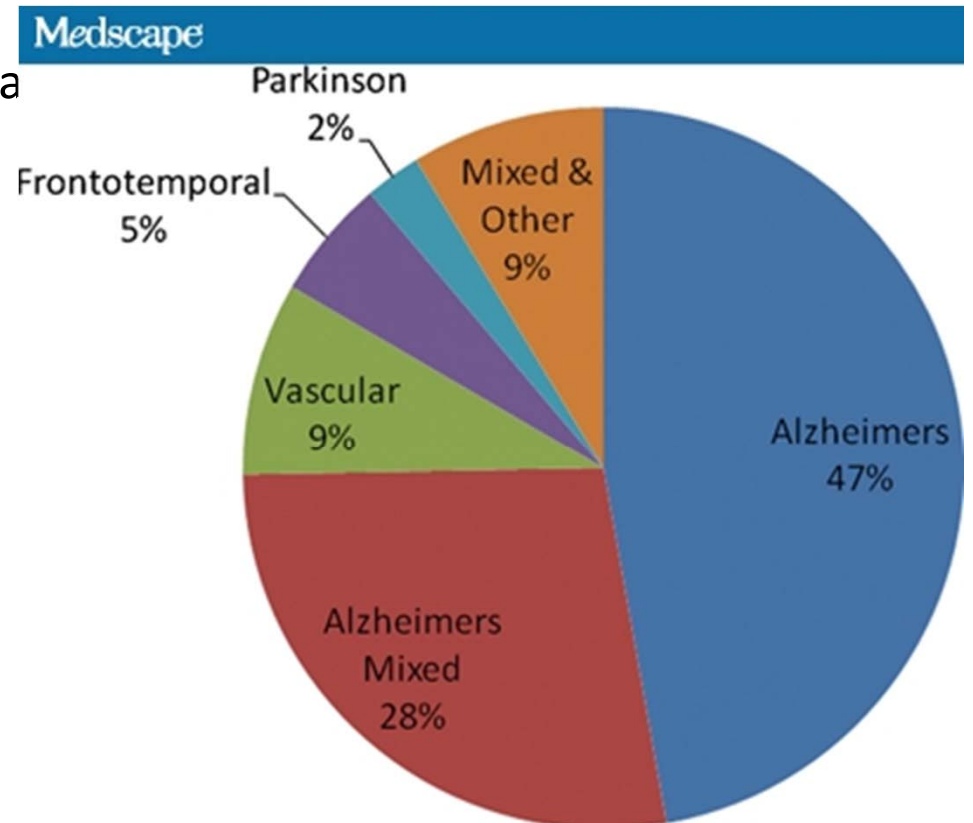
# Irreversible Causes of Dementia

## Primary dementia (neurodegenerative)

- Alzheimer's disease
- Dementia with Lewy bodies
- Frontal or fronto-temporal dementia
- Parkinson-dementia
- Corticobasal degeneration
- Huntington's disease

## Vascular dementia

- Infarction
- Haemorrhage
- Cardiovascular disease
- Binswanger's encephalopathy



Source: Semin Reprod Med © 2009 Thieme Medical Publishers



# Reversible causes of Dementia

## Infectious

- HIV
- Syphilis
- Lyme disease
- Meningoencephalitides including TB

## Inflammatory

- Cerebral vasculitis
- Hashimoto's encephalopathy
- Limbic encephalitis
  - paraneoplastic
  - non-paraneoplastic, including VGKC, anti-NMDAR
- Multiple sclerosis

## Neoplastic/space occupying

- Lymphoma
- Glioblastoma multiforme
- Subdural haematoma

## Toxic & Metabolic

- Ethanol
- Drugs

## Endocrine disorders

- **Diabetes**
- Thyroid disease
- Parathyroid disease
- Cushing's disease
- Addison's disease
- 

## Vitamin deficiencies

- B12, thiamine and nicotinic acid

# Diagnosis of Dementia

- History
- Clinical assessment
  - Physical/neurological examination
  - Cognitive assessment
  - Neuropsychiatric assessment
- Laboratory Evaluation
- Neuroimaging

# Diagnosis of Dementia – History

- **Onset**
  - Acute/insidious
- **Course**
  - Progressive/fluctuating/stepwise
- **Memory**
  - Almost all patients present with poor memory
  - Memory span: rapid forgetting, lose track (parietal)

# Diagnosis of Dementia – History

- **Language**

- word finding ↓ (fronto/subcortical)
- wrong words, severe naming difficulty, comprehending, poor literacy [reading, writing] (perisylvian parietotemporal)
- echolalia (frontal)

- **Calculation**

- reckon change, finances (fronto, subcortical or parietal)

# Diagnosis of Dementia – History

- **Spatial**
  - lost in unfamiliar &/or familiar surroundings; unable to lay table, disoriented while dressing (biparietal)
- **Perception**
  - unable to recognise faces, objects [agnosia] (temporal)
- **Personality change**
  - change in social, personal conduct; disinhibition, apathy/amotivational state (frontal cortical)



# Diagnosis of Dementia – History

- Ritualistic, stereotypic behaviours (temporal)
- Depression (distinguish from apathy)  
hallucinations, illusions, misperceptions,  
delusions, anxiety

# Diagnosis of Dementia – History

- **Physical**
  - focal symptoms, poor balance, gait, tremor, myoclonus, seizures, incontinence, TIAs
- **Sleep disturbances**
  - sleep apnoea, insomnia, sleep associated movement disorder
- **Medical history**
  - hypertension, diabetes, strokes, heart disease, smoking, alcohol
- **Family history**
  - dementia, psychiatric, Parkinson's etc.

# Diagnosis of Dementia – Clinical assessment(physical/neurological)

Thorough physical examination

- Look for signs of nervous system involvement (specific neurological examination in dementia)
  - observe behaviour, myoclonus, chorea etc.
  - eye movements, rigidity/spasticity,
  - focal weakness/signs (brisk reflexes, Babinski), ataxia, tactile localisation/attention, primitive reflexes, hand postures (spatial/praxis), gait
- Signs of systemic diseases
  - metabolic, infection, skin manifestation etc.

# Diagnosis of Dementia – Clinical assessment (cognitive assessment)

Primary purpose is to document objectively cognitive deficits inferred to be present from the history or chief complaint

1. Formal testing by using cognitive assessment tests
2. Informal testing

# Cognitive assessment- Formal testing

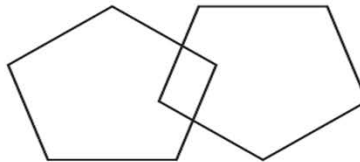
## MMSE

### The Mini-Mental State Exam

Patient \_\_\_\_\_ Examiner \_\_\_\_\_ Date \_\_\_\_\_

Maximum Score

- |   |     |  |
|---|-----|--|
| 5 | ( ) | <b>Orientation</b>   |
| 5 | ( ) | What is the (year) (season) (date) (day) (month)?<br>Where are we (state) (country) (town) (hospital) (floor)?   |
| 3 | ( ) | <b>Registration</b><br>Name 3 objects: 1 second to say each. Then ask the patient all 3 after you have said them. Give 1 point for each correct answer. Then repeat them until he/she learns all 3. Count trials and record.<br>Trials _____ |
| 5 | ( ) | <b>Attention and Calculation</b><br>Serial 7's. 1 point for each correct answer. Stop after 5 answers.<br>Alternatively spell "world" backward.  |
| 3 | ( ) | <b>Recall</b><br>Ask for the 3 objects repeated above. Give 1 point for each correct answer.   |
| 2 | ( ) | <b>Language</b><br>Name a pencil and watch.  |
| 1 | ( ) | Repeat the following "No ifs, ands, or buts"   |
| 3 | ( ) | Follow a 3-stage command:<br>"Take a paper in your hand, fold it in half, and put it on the floor."  |
| 1 | ( ) | Read and obey the following: CLOSE YOUR EYES   |
| 1 | ( ) | Write a sentence.  |
| 1 | ( ) | Copy the design shown.   |



\_\_\_\_\_ Total Score  
ASSESS level of consciousness along a continuum \_\_\_\_\_  
Alert Drowsy Stupor Coma





Cognitive assessment- Formal testing

# CLOCK DRAWING TEST

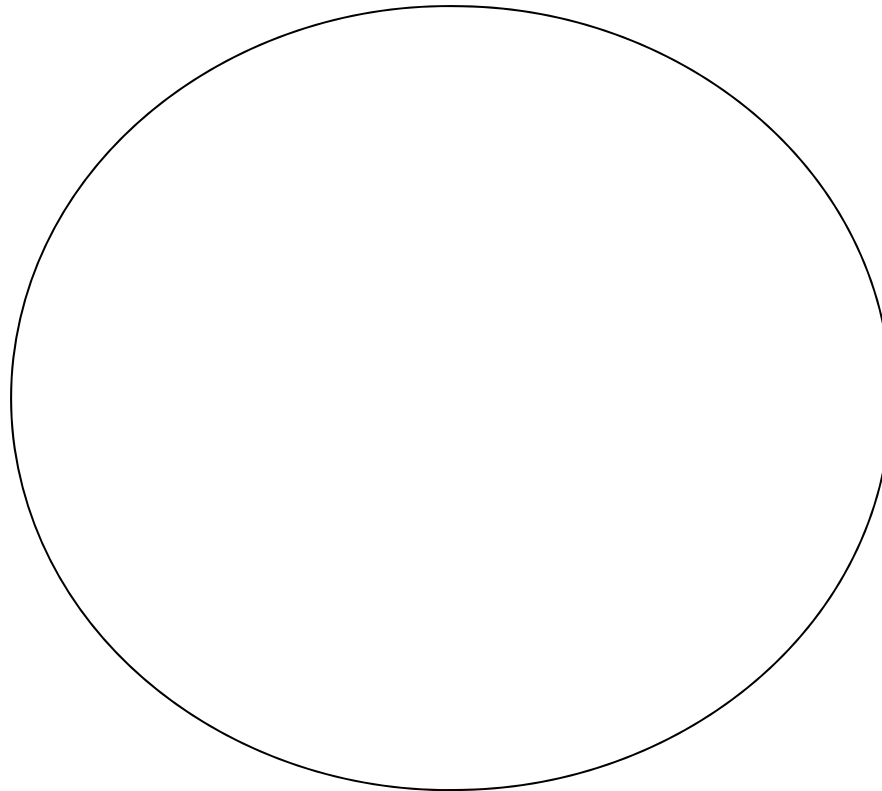
Patient name \_\_\_\_\_

Patient ID # \_\_\_\_\_

Date \_\_/\_\_/\_\_

Instructions

- 1) Inside the circle, please draw the hours of a clock as they normally appear
- 2) Place the hands of the clock to represent the time: “ten minutes after eleven o’clock”



# Cognitive assessment- Formal testing

## Mini-Cog Test

**Mini-Cog™**

### Instructions for Administration & Scoring

ID: \_\_\_\_\_ Date: \_\_\_\_\_

#### Step 1: Three Word Registration

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Look directly at person and say, "Please listen carefully. I am going to say three words that I want you to repeat back to me now and try to remember. The words are [select a list of words from the versions below]. Please say them for me now." If the person is unable to repeat the words after three attempts, move on to Step 2 (clock drawing).

The following and other word lists have been used in one or more clinical studies.<sup>1-3</sup> For repeated administrations, use of an alternative word list is recommended.

<b>Version 1</b>	<b>Version 2</b>	<b>Version 3</b>	<b>Version 4</b>	<b>Version 5</b>	<b>Version 6</b>
Banana	Leader	Village	River	Captain	Daughter
Sunrise	Season	Kitchen	Nation	Garden	Heaven
Chair	Table	Baby	Finger	Picture	Mountain

#### Step 2: Clock Drawing

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Say: "Next, I want you to draw a clock for me. First, put in all of the numbers where they go." When that is completed, say: "Now, set the hands to 10 past 11."

Use preprinted circle (see next page) for this exercise. Repeat instructions as needed as this is not a memory test. Move to Step 3 if the clock is not complete within three minutes.

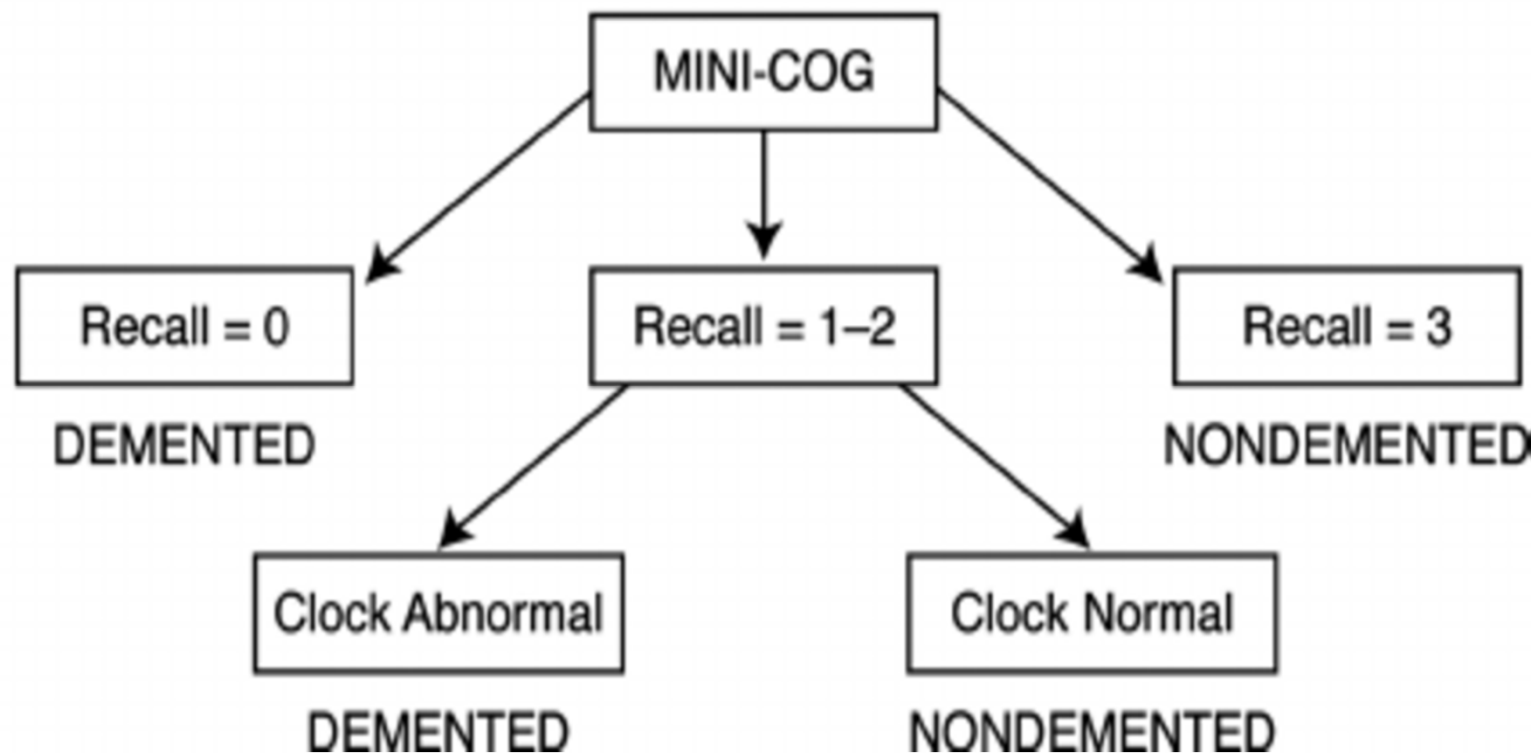
#### Step 3: Three Word Recall

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Ask the person to recall the three words you stated in Step 1. Say: "What were the three words I asked you to remember?" Record the word list version number and the person's answers below.

Word List Version: \_\_\_\_\_ Person's Answers: \_\_\_\_\_

The Mini-Cog scoring algorithm. The Mini-Cog uses a three-item recall test for memory and the intuitive clock-drawing test. The latter serves as an "informative distractor," helping to clarify scores when the memory recall score is intermediate.



# Domains measured by cognitive screening tools

Test	Personal Information	Orientation	Short-Term Memory	Remote Memory	Attention	Naming	Visuospatial Visuo-construction	Other
MMSE		*	*		*	*	*	*
3MS	*	*	*		*	*	*	*
AMTS	*	*	*	*	*	*		
SPMSQ	*	*		*	*			
GPCOG		*	*				*	
RUDAS			*				*	*
MOCA		*	*	*	*	*	*	
NUCOG		*	*	*	*	*	*	*

MMSE = Mini Mental State Examination; 3MS = Modified MMSE; AMTS = Abbreviated Mental Test Score; SPMSQ = Short Portable Mental Status Questionnaire; GPCOG = General Practitioner Assessment of Cognition; RUDAS = Rowland Universal Dementia Assessment Scale; MOCA = Montreal Cognitive Assessment; NUCOG = Neuropsychiatry Unit Cognitive Assessment Tool.



# Cognitive assessment-**Informal testing**

- responses to simple questions in terms of conversational fluency,
- informational content (vague: detailed responses)
- general fund of knowledge (pertinent recent events)
- personally important information regarding hobbies, occupational history and family)

# Neuropsychiatric assessment

- Important role in differential diagnosis between dementia and primary psychiatric disorder such as depression
- provides insight into social behavior (passivity, impulsiveness, disinhibition)
- Mood state ( depressed, euphoric)
- Vegetative state ( eating , sleeping)
- Changes in personality ( apathetic ,disinhibited)
- Alteration in perception (hallucination) or thoughts (delusion)
- Structured interview for neuropsychiatric assessment - neuropsychiatric inventory questionnaire (NPIQ)

# Diagnosis of Dementia - Laboratory Evaluation

## Blood Tests

- Complete blood cell count
  - Glucose
  - Serum B12 levels
  - Liver function test
  - Screening for syphilis (if high risk, living in a high-incidence region)
  - Serum electrolytes
  - BUN/creatinine
  - Thyroid function tests
- Depression screening
  - **Electroencephalogram (EEG)** is not recommended routinely, but it can be considered in atypical presentations
  - CSF tau protein and amyloid A $\beta$  42 shows different patterns with various dementia but Cerebrospinal fluid analysis is not recommended routinely except in atypical presentations
  - Routine genetic test for apoE is not recommended

# Diagnosis of Dementia- Neuroimaging

- **CT/MRI**
  - to exclude treatable disease
  - to identify comorbid disease - stroke, ischaemic changes
- **Functional imaging (SPECT/PET)**
  - Indication- early diagnosis and differential diagnosis
  - used as biomarkers of pathological process in diagnosis of dementia
  - Positive PET amyloid imaging is a biomarker of brain amyloid – $\beta$  deposition
  - hypometabolism in the temporal and parietal cortices in FDG-PET is a biomarker of neuronal degeneration

# PET

## **Can identify disease specific pattern**

- temporal-parietal abnormalities in AD
- frontal - anterior temporal abnormalities in FTD
- temporal-parietal-occipital abnormalities in DLB

# Alzheimer's Dementia

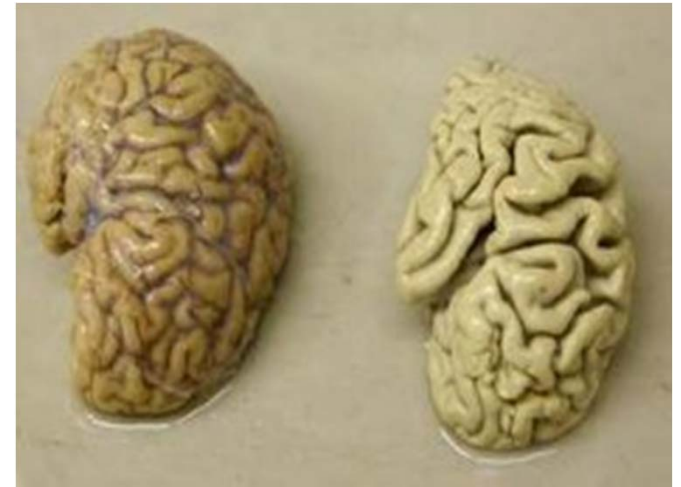
Type of Dementia	History	Signs and symptoms	Pathology/Imaging
Alzheimer's Disease	Gradual, progressive onset	<ul style="list-style-type: none"><li>-Memory loss especially for names and recent events</li><li>-Language deficits</li><li>-Rapid forgetting</li><li>-Impaired visuospatial skills</li><li>-Normal gait and neuro exam early</li><li>-Later affective disturbances,</li><li>-behavioral symptoms such as aggression</li></ul>	<p>Generalized atrophy (esply median temporal)</p> <p>Beta amyloid plaques</p> <p>Neurofibrillary Tangles</p>

# Alzheimer's Dementia

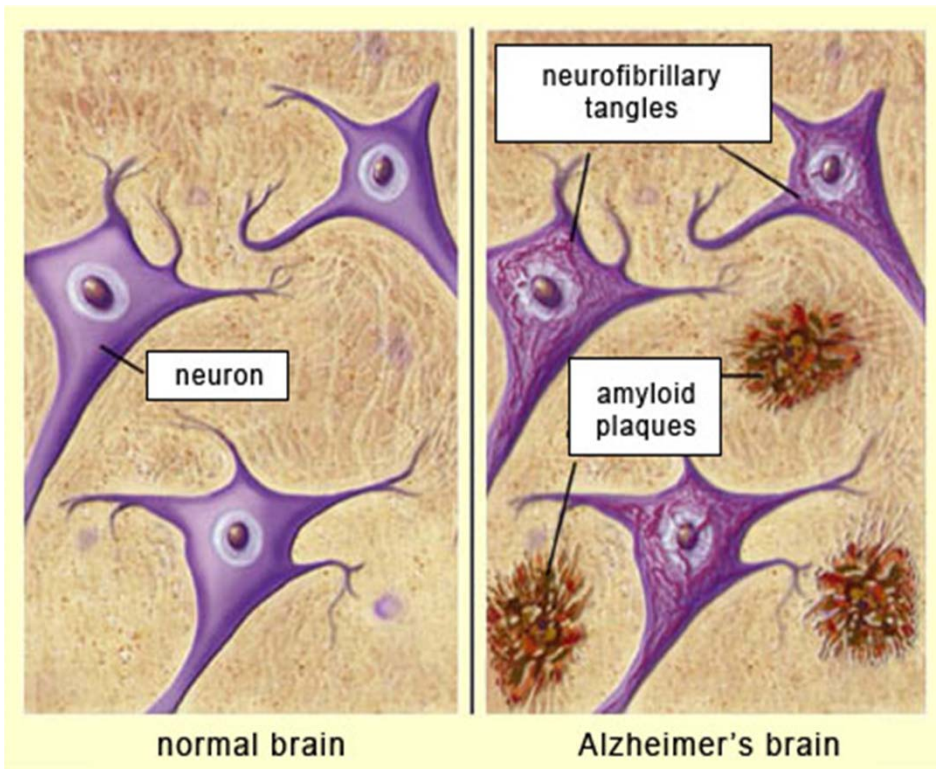


Alois Alzheimer

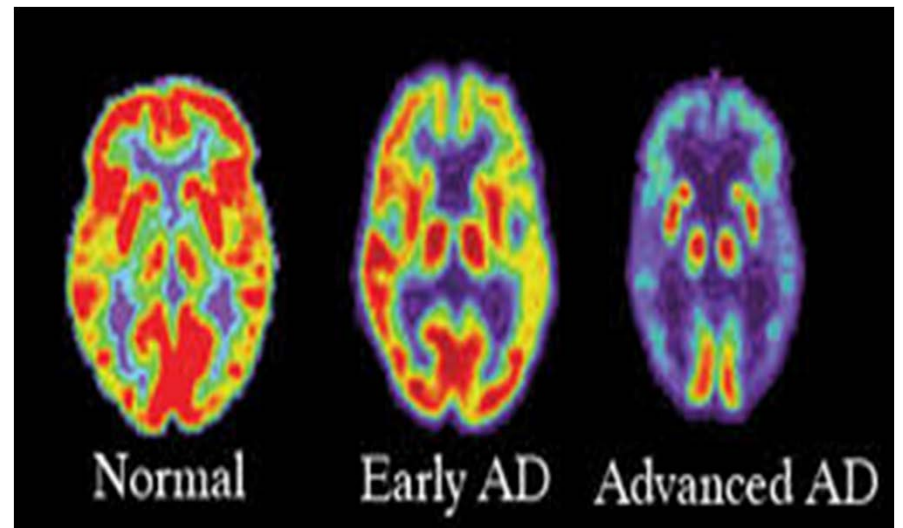
## Anatomy



## Pathology



## Imaging - PET



# Lewy Body dementia

Type of Dementia	History	Signs and symptoms	Pathology/ Imaging
Lewy Body	Insidious onset, Progressive with fluctuations	<ul style="list-style-type: none"><li>•Fluctuating cognition</li><li>•Visual hallucinations</li><li>•Neuroleptic sensitivity</li><li>•Shuffling gait</li><li>•Increased tone</li><li>•Tremors</li><li>•Falls</li></ul>	Generalized atrophy  Lewy bodies in cortex and midbrain





What differentiates Lewy  
body dementia from  
Alzheimer's in early stage  
dementia?

**visual  
hallucinations  
during early  
course of  
disease!!!**

# Lewy Body Dementia



Frederic Heinrich Lewy

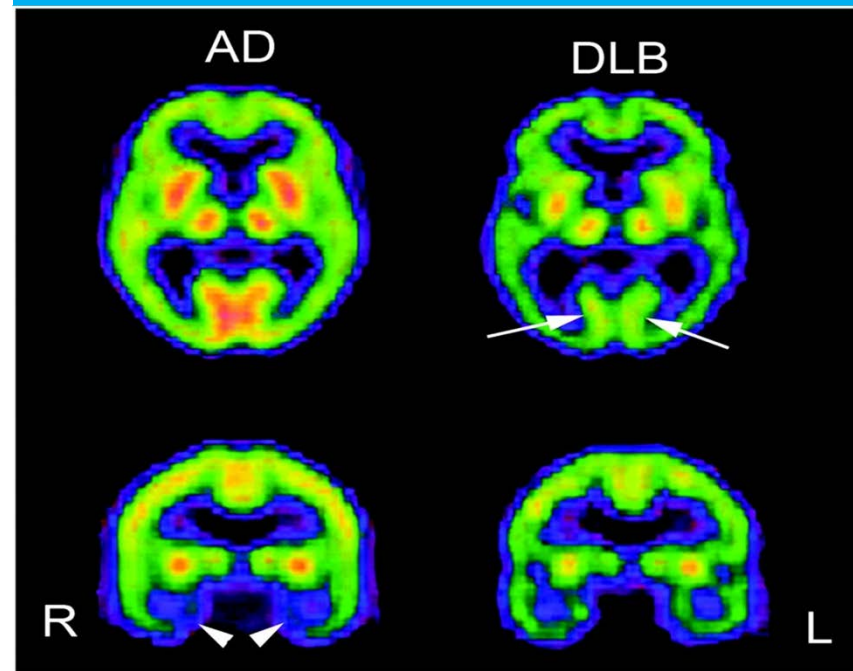
## Anatomy

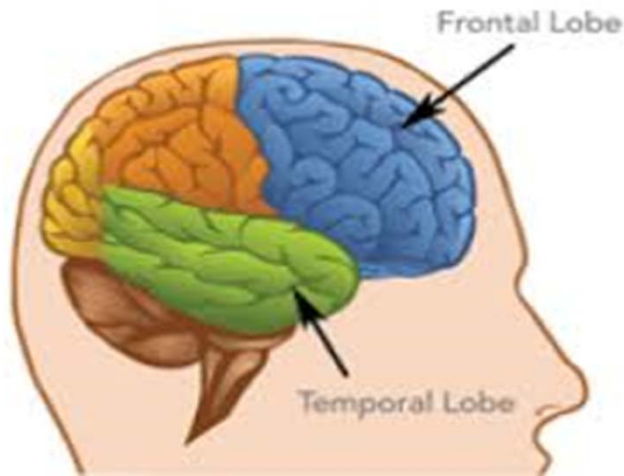


## Pathology – lewy body



## Imaging- PET





# Frontotemporal Dementia(FTD)

Type of Dementia	History	Signs and symptoms	Pathology/Imaging
Fronto temporal	<p>Insidious onset</p> <p>Typically in 50-60 yrs</p> <p>Rapid progression</p>	<ul style="list-style-type: none"> <li>• Disinhibition</li> <li>• Socially inappropriate behavior</li> <li>• Poor judgment</li> <li>• Apathy</li> <li>• Decreased motivation</li> <li>• Poor executive function</li> </ul>	<p>Frontal and temporal atrophy</p> <p>Pick cells and pick bodies in cortex</p>



# Discovery



First description: Auguste H.

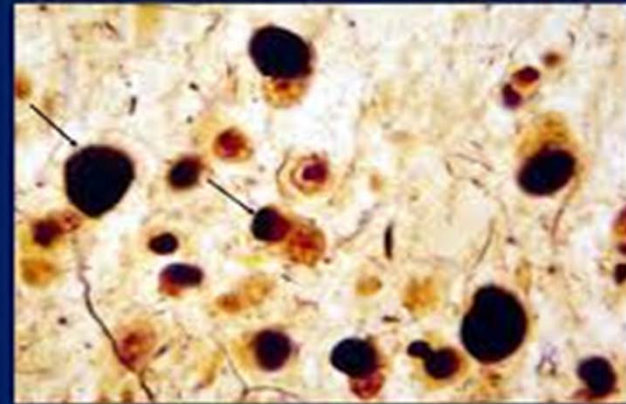
Arnold Pick, 1892.

# Anatomy

# Pathology

## Pick Bodies

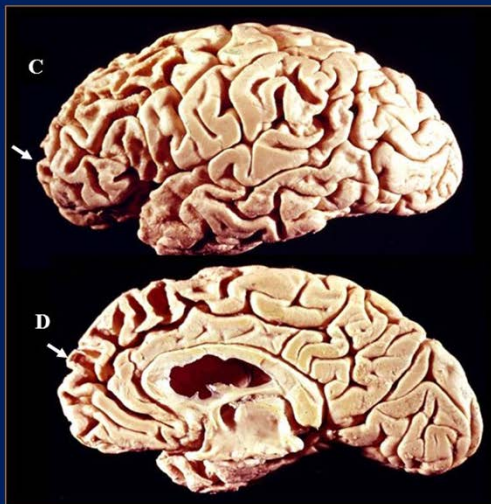
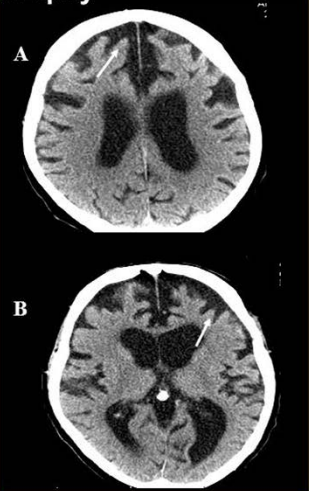
Numerous neurons with round intracytoplasmic Pick bodies



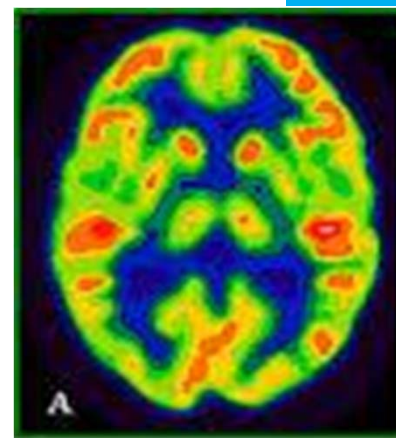
Heavy metal stain

## FTD: Imaging

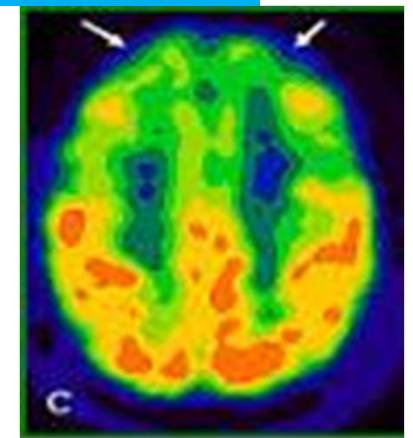
Gross pathologic hallmark : Frontal and temporal cortical atrophy



## PET imaging



NORMAL



FTD

# Management of Dementias

- Non-pharmacological
- Pharmacological
- Evaluation and management of typical BPSD (behavioral and psychological symptoms)
- Caregiver support
- Decision-making and advanced care planning
- Palliative care

# Non-pharmacology Management

- Incorporate values, cultures and specific needs in care plans and interventions



Exercise and recreational activities are encouraged

Encourage participation in programs aimed at cognitive stimulation



# Non-pharmacology Management

- Involve patient and family in pharmacotherapy decision, including discussion of medication risks, benefits and side-effects

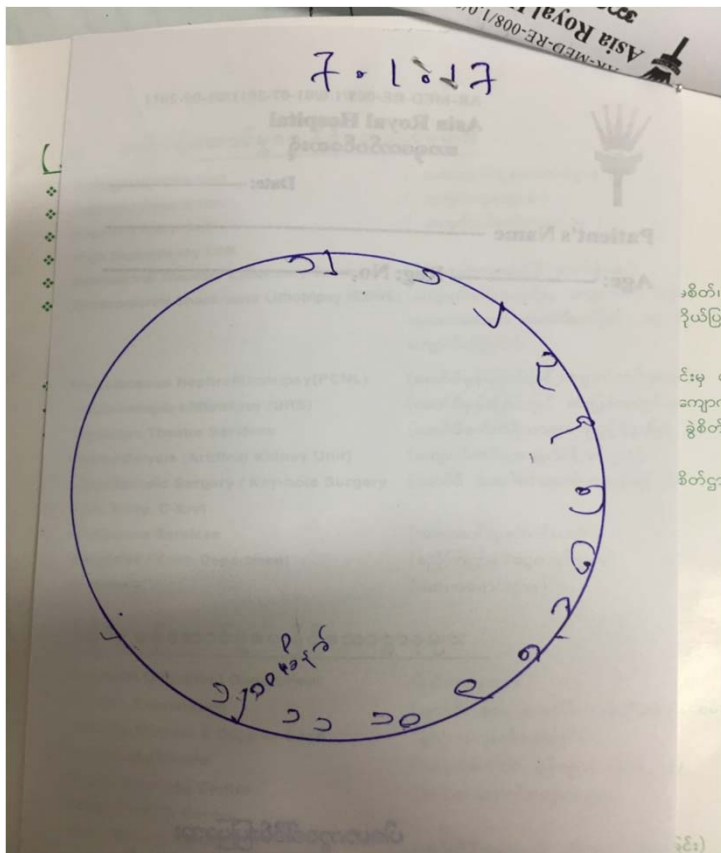


- Assess and monitor changes in medications, the effects and adherence at every visit

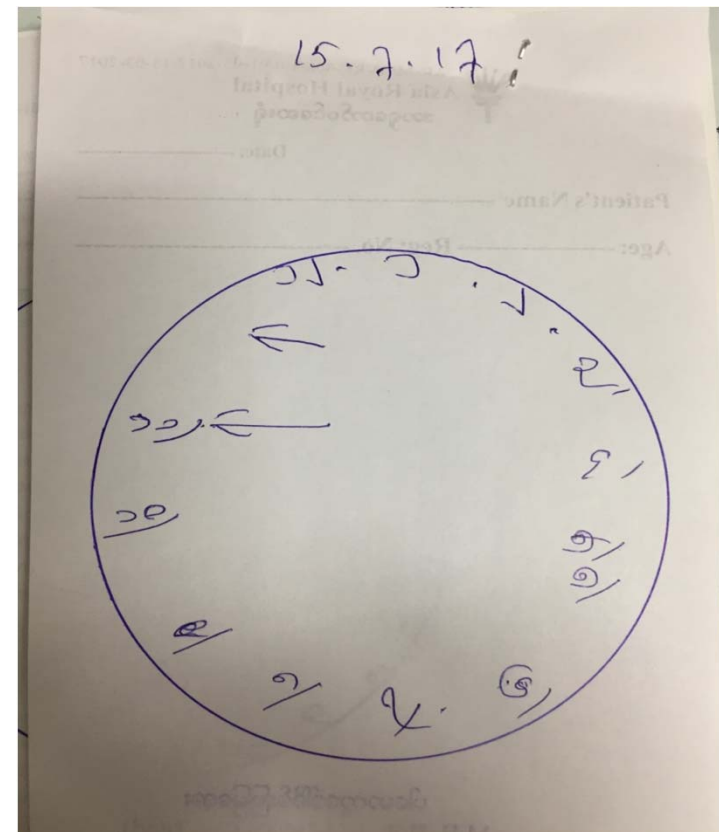


Regularly re-evaluate disease progression in a comprehensive manner, including the option of using scales such as the MMSE, CDT

**At the time of diagnosis**



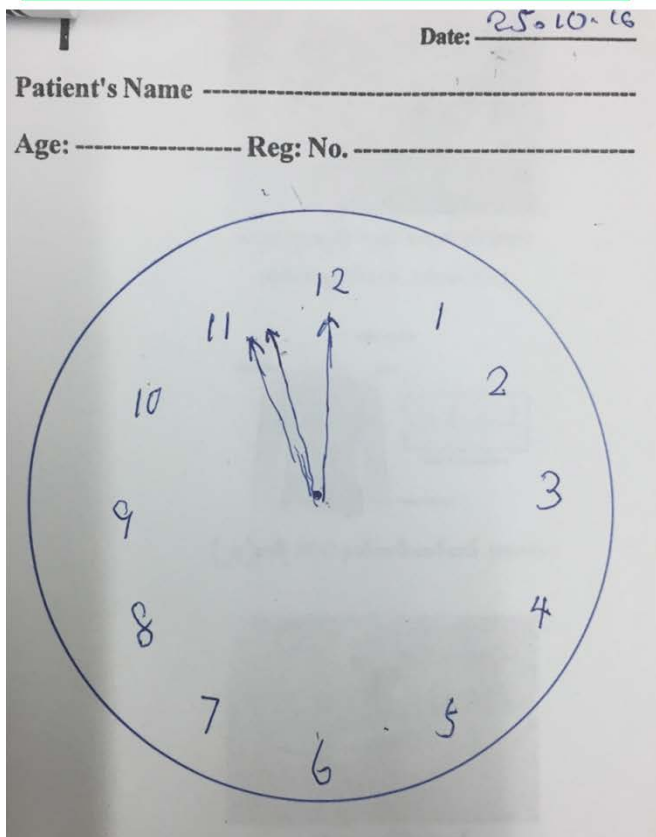
**After 6 months of treatment**



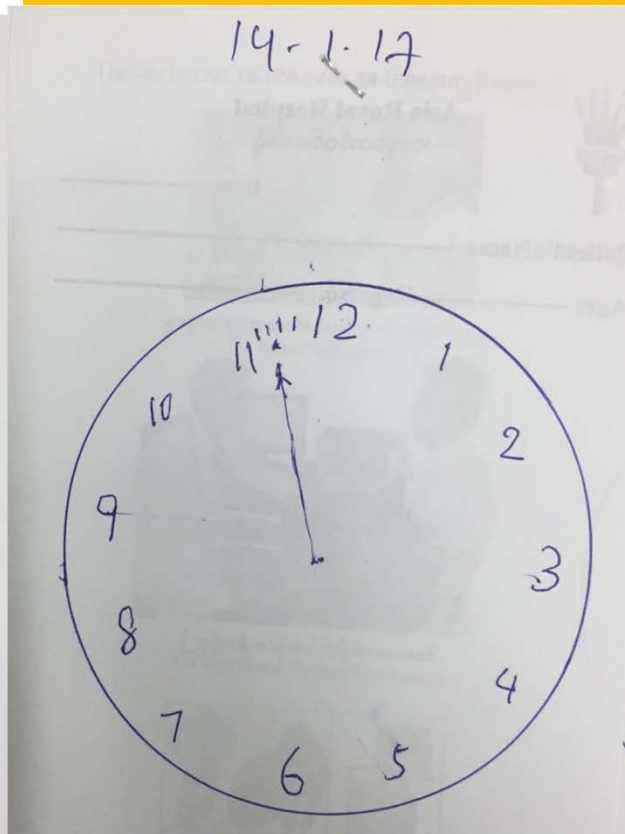


# Serial CDT ,no good response to treatment

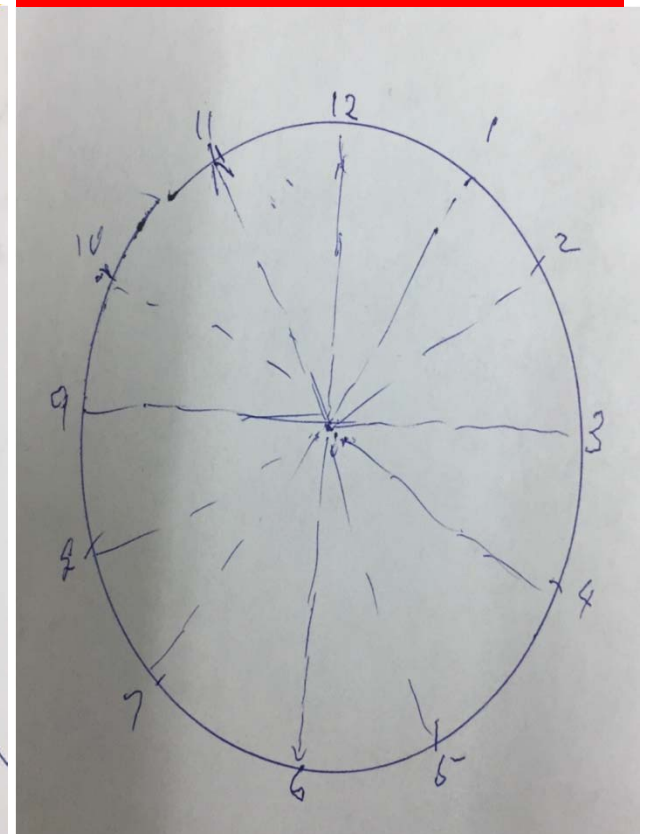
At the time of diagnosis



After 3 months



After 1 year



# Pharmacological management

1. Centrally acting ChEIs ( Choline Estrase inhibitors) prevent the breakdown of acetylcholine.  
(Donepezil , Rivastigmine ,Galantamine)
2. NMDA receptor antagonist - memantine
  - modest benefit on measures of cognitive function and activities of daily living
  - also alleviate the non-cognitive manifestations of AD, such as agitation, wandering, and socially inappropriate behavior.

# Pharmacological management

- AD - ChEIs in mild to moderate dementia
  - Memantine in moderate to severe dementia
- DLB - as above
- FTD - both are not recommended

# Pharmacological management

- Supplements, herbal products
- Gingko biloba,
- Folic acid,
- Vitamin B12,
- Vitamin E,
- Steroidal and non-steroidal anti-inflammatory drugs, hormonal therapy
- Statin therapy

**are not recommended** routinely for dementia management

## Combination therapy in AD

- Several studies have demonstrated that memantine can be safely used in combination with ChEIs.
- The combination of memantine with a ChEI has been shown to significantly delay institutionalization in AD patients.

# Carer Support



DEMENTIA CARERS CAN BECOME ISOLATED  
**THEY NEED THE SUPPORT**



OF THEIR FAMILY AND FRIENDS

# Take home message

- Forgetfulness does not always denote dementia.
- It is essential to look for the reversible cause of dementia.
- Appropriate use of diagnostic tests is important to be cost effective in the management of dementia.
- Both non-pharmacological management and management of BSPD play a major role and so as carer support.

**THANK YOU**





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**Table 1. Original 1999 Mild Cognitive Impairment Criteria<sup>a</sup>**

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**Criterion**

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Memory complaint, preferably corroborated by an informant

Memory impairment documented according to appropriate  
reference values

Essentially normal performance in nonmemory cognitive domains

Generally preserved activities of daily living

Not demented

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<sup>a</sup>Based on information from Petersen et al.<sup>3</sup>

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