# Diagnosis of primary progressive aphasia in frontotemporal dementia

**Boussaid yasmina**
Yahia Fares university-medea,
Email:boussaid.yasmina@univ-medea.dz

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**Abstract:**

This study aims to describe the cognitive and linguistic symptoms of degenerative diseases in general and in patients with primary progressive aphasia in frontotemporal dementia in particular, We discuss the neural structures involved in degenerative brain damage and tried to clarify the ambiguity in diagnosing this disease and the criteria for differential diagnosis with other degenerative diseases. We also reviewed the neuropsychological tests that assess cognitive disorders in the frontal and temporal lobes and assess language by speech therapists or neuropsychologists in a clinical setting.

**Keywords:** frontotemporal dementia; primary progressive aphasia ; diagnosis; neurodegenerative diseases; cognitive disorders.

## 1. Introduction:

Dementia is considered to be the result of a group of progressive neurological disorders that cause gradual deterioration and damages to the brain, affecting its functions and leading to a gradual decline or loss of cognitive performance, such as language abilities, memory, planning, executive functions, or social behaviors, which significantly affects the individual's ability to perform their daily activities in a normal manner and limits their independence. Dementia is one of the most common neurological diseases among the elderly, but its causes and types vary from

case to case. For example, Alzheimer's disease, which is considered the most prevalent in clinical settings has received considerable attention recently, in contrasts with other types such as Lewy body dementia, vascular dementia and frontotemporal dementia, which remain poorly known diseases, as few studies have examinated them due to their rare and complex nature, especially in the field of neuropsychology or speech therapy .

Therefore, in this article, we have attempted to highlight one type of neurological disease, namely frontotemporal dementia. We began by providing an overview of its symptoms, types, the underlying structural abnormalities, and the factors that contribute to its onset. And then we discussed a type of frontotemporal dementia, which is primary progressive aphasia, and the methods used to detect its linguistic symptoms and disorders.

Through this paper, we wanted to point out several types of language disorders that we find in primary progressive aphasia of the frontotemporal dementia type, which are difficult to diagnose and evaluate.

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), dementia, or major cognitive disorders, are defined as a significant and prominent loss of one or more cognitive domains such as memory, attention, language, social skills or executive functions such as planning, organization, or imagination. This loss has a chronic and significant impact on the individual's independence and differs from mild cognitive impairment (MCI), which is a transitional state between normal aging and dementia and is characterized by a decline in cognitive processes without impact on individual independence and daily activities. However, this group is at risk of developing dementia at a rate of 10 to 15% compared to people of the same age. (Belarbi & MEKI MOKRANE, 2022)

**Frontotemporal dementia with primary progressive aphasia, non-fluent type:** Characterized by progressive development of language disorders that manifest as difficulties in verbal language production and .preservation of comprehension in general in the early stages of the disease

**Frontotemporal dementia with primary progressive aphasia in the semantic type (fluent type ) :**

characterized by a gradual loss of understanding, recognition, and comprehension of words, while language production takes the form of .stereotypical patterns

Distinguishing between these types is difficult and challenging due to their similarity to psychological behavioral disorders, which makes misdiagnosis and delayed diagnosis common even in specialized centers such as memory .examinations services

Due to this exceptional clinical diversity and the complex overlap between different types of frontotemporal dementia, clinicians need to accurately distinguish between different patterns and make an early, accurate, and comprehensive diagnosis that takes in considerations the clinical and pathological complexity of this group of disorders. This is one of the greatest and most complex challenges in neuropsychology practice, especially since the symptoms overlap with many diseases such as mental disorders such as psychosis or severe depression, particularly because the symptoms often appear at a relatively young age (45 years), leading to delayed diagnosis or, worse, misdiagnosis in the early stages.

Frontotemporal dementia also overlaps with other neurodegenerative diseases such as Lewy body disease, vascular dementia, or Alzheimer's disease. Adding to all these complications is the lack of specialized diagnostic resources that we have in hospital's departments that make sure clinical tests go properly. (ChormalleZhang & Ballone, 2024) (2025 ,)

Despite advances in neuroi-maging techniques and the use of biological analyses and specific biomarkers to detect neurodegenerative diseases, diagnostic criteria remain an obstacle to early and accurate diagnosis, hence the urgent need for a precise, multidisciplinary diagnostic approach that combines neuropsychological, linguistic, and behavioral assessments with advanced medical imaging to reduce the problem of delayed or incorrect diagnosis, which not only affects the chances of early intervention and improving the patient's quality of life, but also complicates treatment

planning and the family support necessary to care for the patient. (D'Alton Lewis &,2024)

Among these cognitive disorders, language disorders are one of the most prominent clinical manifestations of frontotemporal degeneration, appearing as a gradual deterioration in the ability to produce or understand language. They are often the first or most obvious sign in many people with .progressive primary in frontotemporal dementia

However, these disorders vary greatly in their patterns and severity, ranging from difficulties in pronunciation to sentence construction (non-fluent aphasia), gradual loss of the meanings of words and general or specific concepts (semantic aphasia), and difficulties in word retrieval and repetition .(logopedic aphasia)

This diversity reflects the anatomical distribution of various degenerative lesions in the frontal and temporal lobes, complicating the task of accurate diagnosis and differentiation between subtypes of the disease. (Mollah et ,.al2024)

Language disorders are often considered the first step in diagnosis in more than half of cases. These disorders appear in the shape of primary progressive aphasia (PPA), which includes a syndrome characterized by a gradual loss of these language abilities with relative preservation of other ,.cognitive functions in the early stages of the disease. (Montembeault et al 2018)

what are the cognitive disorders that we generally find in frontotemporal dementia, and what are the specific linguistic symptoms that characterize ? the primary progressive aphasia form

## 2. Definition of frontotemporal dementia:

Frontotemporal dementia (FTD) is a degenerative neurological disease that occurs between the ages of 45 and 65. The disease refers to a wide and variable range of disorders that are characterized by numerous patterns and types and are caused by cortical atrophy or subcortical degeneration in the frontal and temporal lobes of the brain.

Frontotemporal dementia is found in 5 to 15% of dementia cases and is the third most common type of degenerative dementia in clinical settings. It occurs with equal frequency in both sexes, with cases of frontotemporal dementia being equally distributed between males and females. The age of onset is usually between 45 and 65 years, but it can also range from 35 to 81 years.

The patient's condition usually deteriorates to the final stage within 6 to 8 years, which is less compared to Alzheimer's disease. There are strong genetic components to this disorder, as we observe in family history that the rate of inheritance ranges is between 40-50% of cases.

Behavioral and personality changes are among the most common early symptoms of frontotemporal dementia, occurring in approximately 62% of cases. while language disorders are more prevalent in types such as progressive non-fluent aphasia (100% of cases) or semantic dementia (58% of cases).

These behavioral and personality changes are prevalent in frontotemporal dementia at the onset and throughout the course of the disease. Its clinical presentation is so distinctive that frontotemporal dementia can be diagnosed based on interviews with family members who complain of radical changes in the behavior and treatment of their relative. For this reason, they usually refer to a psychiatrist because the symptoms are similar to those of mental illness, especially since the symptoms appear at an early age and they do not think of neurological diseases because there are no symptoms or disorders in other cognitive processes such as memory.

Among the symptoms that the patient may suffer from early on are:

**2.1 Disinhibition:**

Numerous studies have confirmed that disinhibition is one of the specific symptoms of frontotemporal dementia and is not found in other types of dementia such as Alzheimer's or vascular dementia. These behaviors are usually contrary to social or moral values and may manifest as irresponsible and inappropriate behavior.

**2.2 Apathy or inertia:**

This also appears at the onset of the disease and is severe, manifesting as a profound and severe lack of desire and motivation or loss of interest, a lack of spontaneity, and a loss of enthusiasm for activities that were previously enjoyed.

**2.3 Early loss of empathy:**

Loss of the ability to recognize or understand facial expressions and no reaction to the suffering of their family members or, conversely, inappropriate or unsuitable reactions to situations, such as laughing or mocking.

**2.4 Repetitive and stereotypical behaviors:**

Performing repetitive body or hand movements for no reason, or repeating phrases or sentences that are directed to them.

**2.5 Changes in eating habits:**

We observe changes in tastes and preferences for sugary foods or some specific foods. Patients usually eat voraciously and uncontrollably, leading to weight gain. In some cases, the opposite occurs, with patients unable to eat or even put food in their mouths and not even attempting to swallow.

**2.6 Social behavior disorders:**

Disorders in social interactions and relationships, such as the relationship between the patient and their children, and an inability to process or interpret social messages directed at them. (Daoudi & Mazouz, 2023)

**2.7 Cognitive disorders:**

At the onset of the disorder, we do not observe cognitive disorders according to the MMSE test or the Mattis DRS test (which are designed for patients with frontotemporal dementia). They do not generally suffer from memory disorders, but we notice a mild onset of attention disorders, especially in executive functions such as planning and mental flexibility, as indicated by the results of performance tests such as the Stroop test, the TMT test, and the Wisconsin test.

Patients with frontotemporal dementia also suffer from disorders in recognizing and perceiving facial expressions such as sadness, anger, fear

or joy, which increases the severity of difficulties and disorders in behavior and social interaction. (Les Démences, 2015)

## 3. Neuroanatomy of frontotemporal dementia:

The neuroanatomy of frontotemporal dementia (FTD) is a complex field that combines structural and functional changes in multiple brain regions. This disorder is characterized by specific patterns of structural atrophy and disrupted neural connectivity affecting specific and interconnected brain regions, resulting in clinical features and symptoms that are distinctive for each sub-type.

According to previous studies, the primary cortical structures affected in frontotemporal dementia are:

### 3.1. Frontal lobe cortex:

The frontal cortex is the primary area of damage in frontotemporal dementia, with studies showing widespread atrophy affecting both gray and white matter. The orbitofrontal cortex is one of the most affected areas and is directly linked to the behavioral and social disturbances characteristic of the disease.

Studies also show that damage to the ventrolateral cortex leads to disturbances in social control and appropriate behavior, while the dorsolateral cortex, which shows marked atrophy, is associated with reduced executive function.

### 3.2. Anterior cingulate cortex:

The anterior cingulate cortex is considered a pivotal area in distinguishing frontotemporal dementia from other disorders, as studies show that this area demonstrates clear abnormalities in patients with frontotemporal dementia. compared to other diseases and mental illnesses. Atrophy in this region is associated with impaired social cognition. (Chiong et al., 2013)

### 3.3 Insular cortex:

The insular cortex shows prominent damage in frontotemporal dementia and is associated with changes in emotional processing and awareness of internal physical sensations. Studies indicate that atrophy in the anterior

insula is associated with a loss of empathy and self-awareness.(Les Démences,2015)

### 3.4 Subcortical structures:

#### 3.4.1 Central gray nucleus:

The central gray nucleus plays an important role in frontotemporal dementia, with studies showing damage to the caudate nucleus, putamen, and globus pallidus (caudate nucleus, putamen, corpus striatum) are among the most affected areas, and their damage is associated with motor and behavioral disorders as well as motivation.

Neuroimaging studies show distinct patterns of atrophy in these subcortical structures in frontotemporal dementia compared to Alzheimer's disease and Huntington's disease. (Looi et al., 2012)

#### 3.4.2 Hypothalamus and subthalamic nucleus:

The hypothalamus shows subtle atrophy, although less obvious than cortical changes. However, studies indicate that the hypothalamus is particularly affected in relation to executive functions and working memory. The subthalamic nucleus shows changes associated with eating disorders and sleep disturbances common in frontotemporal dementia.

#### 3.4.3 Brainstem and Cerebellum:

Cerebellar involvement in frontotemporal dementia was not considered in early studies, but recent research has suggested a possible role for this structure. A large-scale study was conducted to measure the size of the cerebellum and its subregions in a group of 44 patients with hereditary frontotemporal dementia, 20 of whom carried a genetic mutation, compared to 18 healthy controls. The results showed regional cerebellar atrophy in all genetic groups compared to the controls. (Bocchetta et al., 2016)

#### 3.4.4 Corpus callosum:

The corpus callosum shows marked damage, especially in the anterior (frontal) regions. Studies suggest that damage to the corpus callosum is associated with disturbances in communication between the two hemispheres of the brain and inhibitory control. We observe this atrophy in the non-fluent pattern of primary progressive aphasia.

The neuropathology of frontotemporal dementia shows a complex picture of structural and functional changes involving cortical and subcortical areas and neural networks.

The widespread distribution of damage across multiple networks, from the affected structure to compensatory changes in other networks, explains the complex clinical diversity of this disease. The early involvement of the basal ganglia, particularly the caudate nucleus, along with pathway dysfunction, contributes to the emergence of characteristic behavioral and cognitive symptoms.

These symptoms give rise to distinct patterns of the disease and provide a basis for understanding the pathological mechanisms and developing specific early diagnostic strategies and future targeted therapeutic interventions. They also pave the way for the development of more accurate predictive models of disease progression that take into consideration the anatomical and functional diversity of this complex spectrum of disorders.

## 4. Clinical characteristics of frontotemporal dementia and its types:

### 4.1 Frontotemporal dementia is classified into three main clinical types:

**Behavioral variant of FTD:**

Characterized by early and prominent changes in personality and social behavior, with loss of empathy, social isolation, apathy, impulsive behaviors, verbal hyperactivity, and executive dysfunction with preserved memory. This variant is considered the most common and shows fundamental atrophy in the frontal regions. (Santoro Bahia et al., 2013)

### 4.2 Semantic variant of frontotemporal dementia (Primary progressive aphasia):

It is described as fluent aphasia because the patient retains a kind of language but devoid of meaning. The patient cannot find the right words, there is a deficiency in words, and we find semantic paraphasia, which is characterized by a gradual loss of the meanings and connotations of words with a loss of concepts and preservation of grammatical fluency. The

progression of disorders in this type leads to difficulties in recognizing faces or objects, followed by a gradual decline in conversation. Patients show progressively increasing difficulties in understanding and producing language at the semantic level.

**4.3 The non-fluent variant of primary progressive aphasia in frontotemporal dementia (Primary progressive aphasia- non fluent variant/ Agrammatical):** This aphasia is characterized by difficult conversation and speech with numerous phonetic paraphasias as well as grammatical errors with the omission of some words during language production. We observe difficulty in producing sounds motorically, known as oral apraxia. Patients' comprehension is generally preserved except in sentences with complex structures. The disease progresses to a stage of severe impairment or total inability to produce words and speech, but communication may continue through written language. However, grammatical disorders prevent the writing of long sentences. In addition to these disorders, there are disorders of executive function and attention. (Les Démences,2015)

## 5. Overlap and comparison with other mental and neurological disorders:

One of the biggest challenges in diagnosing frontotemporal dementia is the overlap with mental disorders and other neuropsychiatric disorders such as Alzheimer's disease, Lewy body dementia, or vascular dementia. Studies suggest that approximately 33% of patients with behavioral variant frontotemporal dementia are misdiagnosed with mental illness or severe depression. This is the most common misdiagnosis, especially in younger patients. Despite advances in understanding the disease, there are no clear indicators or strategies for accurately identifying the disease pattern. This lack of clarity complicates the diagnostic process and affects the choice of appropriate treatments, especially since some of these treatments may exacerbate the speed of disease progression or the severity of symptoms. (Ibrahim Eldjaafary & Romero Ortuño,2023)

Therefore, we attempted to summarize these symptoms in a differential diagnosis column:

| Specificity | Frontotemporal dementia | Alzheimer's disease | Lewy body disease | Vascular dementia | Mental illnesses |
|---|---|---|---|---|---|
| Age of onset | years 65-45 | Över 60 y ears | Over 60 years | Various | Random |
| Initial symptoms | Behavioral/language disorders | Memory disorders | Attention disorders and visual hallucinations | Executive function and attention disorders | Significant mood changes or psychosis |
| Memory | Preserved at onset | Memory deteriorati on | Relatively intact | Unstable | intact |
| Response to antipsychotic drugs | Drug intolerance and worsening symptoms | Relatively acceptable | Excessive response to drugs | Acceptable | Clear recovery |
| Medical imaging results | Frontotemporal cortical degeneration | Hippocampal and parietal atrophy | Diffuse lesions in the occipital and temporal lobes | Possible vascular lesion | Normal |

**6. Genetic and hereditary factors:**

Frontotemporal dementia shows a strong genetic component, with familial forms representing 30 to 40% of cases.

The main genetic mutations studied in frontotemporal dementia include the following genes:

C9orf72: Located on chromosome 9, responsible for clearing toxic protein debris from nerve endings, it is the most common and is associated with TDP-43 protein accumulations. This genetic disorder is also found in Charcot disease (SLA).

GRN: Located on chromosome 1, it is responsible for producing the protein progranulin, which protects nerves from damage and aids in cell regeneration. Any defect in this chromosome leads to nerve cell damage and loss of function.

MAPT: Located on chromosome 17, it is responsible for the production of the tau protein. When a genetic defect occurs, it causes this protein to accumulate in the nerves, as in some types of Alzheimer's disease. (Bang et al.,2015)

## 7. Prevalence rates worldwide:

Frontotemporal dementia accounts for 5-15% of all dementia cases. In an Icelandic study, prevalence rates reached 45.3 per 100,000 population, while in northern Finland, incidence rates in the 45-65 age group reached approximately 5.54 per 100,000 people per year.

Prevalence rates in Arab countries:

A global study on dementia prevalence in the Arab world shows that Algeria ranks third among Arab countries in terms of dementia prevalence rates. The prevalence rate of dementia in Algeria is 4.19% among people over the age of 60, placing it just behind Lebanon (4.88%) and Tunisia (4.43%). (Qassem et al., 2023)

The study, conducted in the Sidi M'hamed district of Algiers between July 2012 and August 2014, is the only available source of epidemiological data on dementia in Algeria. This study included 3,896 people aged 60 and over, with a total of 192 cases of dementia diagnosed. The distribution by type of dementia among the 192 diagnosed cases was as follows:

- 138 cases of Alzheimer's disease (71.87% of total dementia cases).
- 27 cases of mixed dementia (14.06%).
- 10 cases of vascular dementia (5.21%).
- 4 cases of frontotemporal dementia (2.08% of total dementia cases).

●4 cases of Parkinson's dementia (2.08%) (Belarbi et al.,2021)

## 8. Steps in diagnosing frontotemporal dementia:

An accurate diagnosis of frontotemporal dementia requires combining observations from a thorough clinical and behavioral examination and interviews with the patient's family combined with the results of imaging, biological, and genetic tests, if possible.

The key to differential diagnosis is early recognition of the type of atrophy and affected neural structures and exclusion of other degenerative diseases such as Alzheimer's disease or Lewy bodies through medical imaging and biomarkers. Neuropsychological tests are then used to assess cognitive and behavioral processes in general and social processes in particular to improve the accuracy of the evaluation and diagnosis and the ability to guide the patient toward an appropriate treatment plan, follow-up, and the initiation of neuropsychological and psychosocial support specific to each case.

Therefore, the use of neuropsychological tests to assess cognitive processes and behavior is considered an essential step in highlighting the differences between the various and interrelated symptoms of many degenerative diseases and dementia. (Yallaoui 2018,)

Psychoneurological diagnostic tools used to assess and diagnose dementia:

Psychoneurological assessment focuses on several aspects to evaluate cognitive processes, and the first step is a general evaluation of disorders.

### 7.1 Mini Mental State Examination:

The Mini Mental State Examination measures several fields of cognitive function, such as orientation, memory, calculation, naming, execution, repetition, writing, and copying. It consists of 11 items distributed across the fields of cognitive processes. The test score ranges from 0 to 30 points, with one point given for each correct answer and zero for an incorrect answer.

The test results are interpreted as follows:

- Zero to 17 points is considered severe cognitive impairment.

- Between 18 and 23 points is considered mild cognitive impairment.
- Between 24 and 30 points means there is no impairment.

**7.2 Mattis Dementia Rating Scale:**

This psychoneurological scale was developed to assess cognitive processes in patients with neurological disorders such as degenerative diseases and dementia. It is based on five sections that assess broad areas of cognitive processes and is divided as follows:

- A section dedicated to assessing attention, consisting of eight items such as digital notepad, dual command, and imitation.
- A section dedicated to assessing initiative, consisting of 11 items such as spontaneous and prompted verbal initiative and repetition of syllables or consonants.
- A section dedicated to assessing construction of plans, divided into 6 items ranging from simple to complex plans and writing.
- A section dedicated to assessing concepts such as spatial or linguistic concepts, divided into 6 items such as similarities and differences in drawings and pictures, and the semantic field of words.
- The section dedicated to assessing memory consists of five items, such as recalling a sentence that has been read before or constructing sentences using specific words, and arithmetic.

Completing this scale takes about 20 to 45 minutes. The total score is 144 points, and the level of impairment is determined to be 122, taking into account the results obtained in each part of the scale.

After a general assessment of cognitive processes and the identification of frontal lobe disorders or symptoms, the second stage is a specific assessment of disorders observed in frontotemporal dementia. the tests used are Tests for diagnosing frontal lobe symptoms of dementia.

**7.3 Tests for the diagnosis of frontal lobe dementia:**

Frontal lobe dysfunction assessment scale (échelle de dysfonctionnement frontal);

The Frontal Dysfunction Scale was designed to diagnose frontal temporal dementia, especially in its early stages. It assesses behavioral disorders by comparing current behavior with behavior prior to the onset of the disease.

Relatives are asked to complete the scale and make a differential diagnosis with other degenerative disorders.

A score of 1 is given for “yes” answers and 0 for “no” answers. A score of 3 or above indicates a diagnosis of frontotemporal dementia, but this scale must be combined with other neuropsychological tests to provide a comprehensive assessment of frontal lobe disorders for diagnostic purposes.

| Date: | Yes | No | Note |
|---|---|---|---|
| Self-control disorders | | | |
| Eating disorders | | | |
| Uninhibited speech | | | |
| Emotionality and anger | | | |
| Stereotypical movements | | | |
| Stereotypical movements | | | |
| impulse control | | | |
| Physical neglect | | | |
| Washing and personal hygiene | | | |

| | | | |
|---|---|---|---|
| Clean clothes and appearance | | | |
| Temperament disorders | | | |
| Overt and persistent sadness | | | |
| Indifference | | | |
| Hypersensitivity | | | |
| Amazement at trivial matters | | | |
| Decrease in daily interests | | | |
| sleepiness and sleeping during the day | | | |
| indifference to social and family relationships | | | |
| Indifference to daily activities | | | |

| | | | |
|---|---|---|---|
| Persistent thoughts | | | |

Among the tests that complement the assessment of frontal cognitive processes are the following:

**7.4 Rapid Frontal Efficiency Battery (la batterie rapide d'efficience frontale):**

This is a neuropsychological test used to assess executive functions. The test consists of six short items that assess cognitive abilities. The test lasts about 10 minutes, and each part is scored to reach a total of 18 points. The test is easy to administer in a clinical setting and provides a quick and sensitive assessment of frontal lobe cognitive functions:

Item 1: Similarities test : The patient is asked to find a common or similar point between two words or sounds. This item measures the ability to classify concepts.

Item 2: Verbal fluency: The patient is asked to name as many words as possible that begin with a specific sound within one minute. This item measures mental flexibility.

Item 3: GO/No GO test: Control and inhibition: This item assesses the patient's ability to inhibit automatic responses and control behavior.

Item 4: Motor Sequence Test: The patient is asked to perform a series of movements and gestures in the correct order. This item assesses planning.

Item 5: Interference: This item relates to attention control and the ability to resist other stimuli.

Item 6: Working memory test: Assessment of working memory, such as reverse numbering. The patient must repeat a series of numbers in reverse order. This item measures working memory.

Each item is scored from zero to three points, with the points added together to assess overall performance (total score of 18 )

**7.5 Trail Making Tes**t:

This test measures processing speed, neural flexibility, and executive functions. It is conducted in two stages:

The first stage is the training stage, in which the examinee must connect numbers in ascending order, starting with the smallest number and ending with the biggest, in a sequential manner. This is followed by the second stage, which is the testing stage, in which the examinee must connect numbers and letters while respecting the ascending sequence and the alphabetical sequence of letters.

Tests for diagnosing language disorders in frontotemporal dementia and primary progressive aphasia:

### 7.6 Mini Linguistic State Examination (MLSE)

This test was developed specifically to assess and classify primary progressive aphasia in 20 minutes. It consists of 11 items and addresses the most important language disorders in primary progressive aphasia, such as naming, motor speech production, semantics, phonology, syntax, and working memory. The test aims to count the number of errors in each item and classify them in a five-dimensional table or file as follows:

| Dimension | concept |
|---|---|
| Motor production of speech | Any speech production that is difficult from a phonetic or motor perspective (difficulty initiating a (sound or word, or interruptions in production |
| Phonology | Phonetic disturbances or sound segments in words |
| Semantics | Difficulty using, recalling, or even understanding words with the right meaning or sense |
| Syntax and morphology | Grammatical or syntactical errors in producing or understanding sentences |
| Working memory | ;The patient's difficulty in repeating sentences more the difficulty to repeat the shortest sentence , .the weaker is the result |

The items are divided into 11 parts: naming pictures, repeating word or sound segments, repeating and pointing to words, repeating meaningless word segments, grammatical linking, understanding sentences,

understanding sentences with pictures, reading meaningful and meaningless words, repeating sentences, describing pictures in writing, and describing pictures orally.

**7.7 Progressive Aphasia Language Scale (PALS):**

This test was developed specifically to diagnose early progressive aphasia. It is based on spontaneous speech and focuses on the correct production and comprehension of language. All disorders are recorded as follows:

- Motor speech disorders such as articulation disorders, intonation disorders, difficulty initiating speech, or stuttering.
- Syntactic disorders such as omission of connecting words in sentences or telegraphic speech.
- Naming disorders such as word deficiency or the use of gestures in naming or paraphasia.
- Disorders in repeating and rephrasing isolated words, such as inventing meaningless words or reversing, omitting, or adding syllables.
- Disorders in understanding isolated words.
- Disorders in repeating sentences.
- Disorders in understanding sentences

**7.8 Boston Diagnostic Aphasia Examination (BDAE):**

The test lasts about 20 to 45 minutes in its abbreviated form. Its purpose is to assess the cognitive and language processes of the patient. The test is divided into two parts that can be administered to the patient separately

The first part is dedicated to language assessment and has five items related to: productive language, spontaneous language, linguistic and auditory comprehension, linguistic expression, reading, and writing.

The second part is dedicated to apraxia and assesses oral-facial apraxia, manual apraxia, and general apraxia.

**7.9 Verbal Naming Test DO 80:**

The verbal naming test consists of 80 images in black and white . It measures verbal naming and word retrieval in patients with aphasia or cognitive disorders. One point is awarded for each correct answer or for each answer that contains part of the meaning of the image referred to, and

0 points are awarded for each incorrect answer. The total points give the final result and level of of the disorder is determined according to the patient's cultural and educational level, as well as their age.

### 7.10 Grémots Language Assessment Battery

The battery is specifically designed to assess language in patients with degenerative diseases such as Alzheimer's, frontotemporal dementia, and primary progressive aphasia in the early stages of the disease. It helps assess the language disorders found in these degenerative diseases and is divided into several areas, including:

-Spontaneous conversational language

-Lexical and semantic processing: assessment of verbal fluency, naming, written and oral lexical comprehension.

-Syntactic processing: sentence construction, sentence comprehension, comprehension of requests with increasing difficulty.

-Repetition of words with or without meaning and spelling.

-Spontaneous writing.

-Assessment of language levels: phonological, syntactic, structural, and pragmatic.

-Assessment of working memory and semantic memory.

-Assessment of executive functions.

A computer program has been developed for this test to facilitate the reading and interpretation of results by comparing the results obtained and providing an accurate report for each item.

## 8.diagnostic challenges:

The overlap of symptoms between neurodegenerative diseases poses a diagnostic challenge, particularly in frontotemporal dementia and primary progressive aphasia. as it can be difficult to differentiate between the different patterns of this presentation. Therefore, neuropsychological assessment, medical imaging, bioanalysis, and neuropsychological evaluation are considered the cornerstones of diagnosis in these cases. From a neuropsychological and aphasiological perspective, neuropsychological

tests are the basis for assessing cognitive disorders and symptoms. However, the lack of batteries and tests specific to the Algerian environment is an obstacle to accurate diagnosis. Aphasiologists and neuroscientists usually resort to tests or items from them to assess these cognitive processes in general and language in particular, because most studies have focused on foreign environments where English or French is spoken, making them difficult to use in the Algerian clinical setting. We also noted a significant lack of Algerian field studies on this disease, so we attempted to conduct a survey to determine the extent of Algerian specialists' knowledge of this condition and the reality of its diagnosis by asking about the tests used in hospitals and specialized clinics.

**9 . Conclusion:**

The diagnosis of frontotemporal dementia poses a highly complex challenge in clinical practice due to the overlap of its symptoms with psychiatric disorders and other types of dementia. Diagnosis relies on a multidimensional approach that includes clinical assessment to monitor early behavioral changes, audiological assessment of characteristic language disorders, and neuropsychological testing and neurological examination to identify executive dysfunction with relative preservation of memory in the early stages, and neuroimaging to reveal frontal and temporal lobe atrophy or hypofunction, which is the basis for early detection. Differential diagnosis is necessary to distinguish this disorder from other diseases such as Alzheimer's disease and psychiatric disorders such as major depression and bipolar disorder, in order to avoid delayed diagnosis. Three main clinical patterns emerge: behavioral variant, semantic variant, and primary progressive aphasia, which further complicates the diagnostic process.

Despite scientific advances, the limited availability of biomarkers, the rarity of cases, and the difficulty of early symptom recognition remain major challenges. Early and accurate diagnosis remains essential for improving treatment and quality of life for patients, with promising

prospects for the development of more sensitive and objective diagnostic tools.

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