MEDICINE

NEUROLOGICALLY BASED COMMUNICATION PROBLEMS AND LANGUAGE AND SPEECH THERAPY IN OLD AGE

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Abstract: *Health is a phenomenon that should be protected and looked after in order to benefit from all its benefits in the later years of our lives. Being healthy, maintains the quality of life of the elderly and their contribution to the society. The aging process is affected by environmental influences, lifestyle and diseases. Accordingly, aging can be defined as dysfunction that develops due to the inability to withstand the risks of progressive and age-related diseases. Especially in developing countries, access to appropriate health rehabilitation in the event of a chronic illness or disability is very important for the elderly. Speech and Language therapy is also one of the most important health services that should be provided to the elderly population. The ability to communicate is a very important characteristic peculiar to humans for all ages and in case of injury, the entire life of the individual may be affected. In this article, the types of language and speech problems caused by right and left brain injuries, Alzheimer's dementia and Parkinson's Diseases in adults and the elderly will be discussed, and the role of the speech and language therapist will be discussed.*
Keywords: *Communication problems, Aphasia, Alzheimer's dementia, Parkinson's, language and speech therapy.*

1. Introduction. Old age is a period that describes the changes in the late period of human life. Aging, known as a relative concept, differs in terms of social and cultural factors; Therefore, the concepts of old age and elderly find their place with the value they take in society. When considered as an individual change, aging is a biological event that can be defined as the physical and mental regression of the person [1].

Studies that describe the definition of “old” chronologically accept the age of 65 as the beginning of old age. In most countries, age 65 is also set as the retirement age. In the reports published by the United Nations on aging, aging starts at the age of 60 chronologically. The World Health Organization (WHO) chronologically divides aging in middle-aged (45-59 years old), elderly (60-74 years old) and old (75+ years old) groups. In Turkey, as of 2000, the age of 65 and over is represented by 5.5% [2], by 2025 this amount is expected to rise to 9%.

In medical terms, old age is a period in which losses and collapse are common in the life process. The population group defined as “old” is a special group with its own problems and with a much higher health risk than other segments [3]. The salient features of this population group can be summarized as follows:

a) the majority of persons in this group have at least one illness or health problem;

b) the most common health problems in this group are diseases that require long-term monitoring and care, such as hypertension, diabetes mellitus, chronic lung disease, Parkinson's, dementia, Alzheimer's, and osteoporosis;

c) health problems increase as individuals age;

d) A significant number of individuals in this age group need information or guidance to access health care.

In our country, the fact that the elderly are not aware of their problems, lack of information, and cannot benefit from hospitals and health institutions adequately reveal the necessity of the service to be provided to this group [2]. The increase in the elderly population and the prolongation of human life in direct proportion to the development of medicine cause the focus on studies on the "elderly" population [4].

1.1. Communication Problems in the Elderly

Communication in the elderly may decrease due to biological insufficiency. For example, hearing loss frequently observed in the elderly has been almost an expected and not taken too seriously. Although hearing loss is not very serious, it can be more troublesome than expected in terms of affecting the individual's ability to communicate.

According to the reports they cite from their own experiences, one of the most upsetting problems for the elderly is that they cannot remember even the "most known" words [5]. Word finding difficulties that can be observed at all ages are the most affected cognitive problems with age. Such inadequacies prepare a result that reduces the communication of the elderly and their language competence is evaluated as 'weak' by others. Up to the age of 80, 20-30% of the elderly can get dementia that affects their daily functions. Some studies state that 20% of individuals between the ages of 50-59 and those between the ages of 80-89 complain of cognitive impairment [6].

Language and speech problems that may occur with old age can be observed due to some developmental or acquired damage. Dysarthria known as 'dysarthria' or acquired language and speech loss caused by lower and upper motor neuron damage by disrupting the flow of motor impulses in the cranial and spinal nerves that energize the muscles involved in speech production, such as Parkinson's disease or cerebrovascular diseases. It can occur mostly due to problems that may be encountered in older ages. Naturally, such problems occur more often in older people. A study evaluating the "language (language) dysfunctions" of 20 patients with Parkinson's disease with an average age of 61 and twenty Azheimer-type dementia patients with a mean age of 69, showed that the fluency of speech, reading and repetition abilities in Parkinson's patients, except for paying attention to auditory and visual stimuli in patients with Alzheimer's disease. Found that all cognitive functions decreased [7].

1.2. Role of Speech and Language Therapist in Neurological Communication Problems

The most important resource that can help people with language and speech problems and do their therapy is a speech and language therapist. The goal of a speech and language therapist is to make a speech as intelligible as possible. With this goal, the therapist takes a detailed assessment of the patient and plans the sessions by deciding on the appropriate therapy. Evaluation is also very important as it provides the basis for improvement criteria seen in therapy. Most importantly, evaluations help the therapist identify the patient's strengths and weaknesses and plan appropriate therapies.

Speech and language therapists can assist neurologists in patient diagnosis, as some speech styles are the best symptoms of problems. It is very important to listen to the patient's speech during the evaluation process. The therapist's trained ear can understand the level of speech intelligibility while listening to the patient. It is also evaluated how the organs that produce speech are affected. The level of comprehensibility is an indicator of the patient's incompetence to the therapist; This reveals the impact of speech disorders such as dysarthria or dyspraxia on the patient's quality of life.

As with most neurological problems not addressed in this study, language and speech disorders related to syndromes such as aphasia may not be reversible. Therefore, the goal of speech and language therapy is rarely to return to normal language. The goal is to try to minimize the effects of language problems, dysarthria, or apraxia. In the beginning of therapy, the type and severity of the neurological problem are very important. Equally important is the patient's motivation for recovery and therapy, and the support he receives from his family and environment.

1.3. Goal

Age-related neurological problems threaten our adults and elderly people today. These problems are generally known by their "names", but their features that will affect our lives and communication are unknown. The findings of a survey study revealed that our people are not aware of neurological problems and the language and speech problems that they cause, they expect more information from doctors, and that they cannot easily access informative articles from universities or speech and language therapists [8]. According to the findings of the study, the neurological disorder that the participants heard the least was MS (multiple sclerosis), and the most heard of it was epilepsy and dementia. When asked which one they know the most according to their characteristics, the order did not change, but their recognition decreased according to the characteristics of all the neurological diseases presented.

In this informative article, the language and speech problems that may occur with stroke, Alzheimer's dementia and Parkinson's disease will be described, and the service and necessity of the speech and language therapist will be emphasized to the elderly people and their caregivers in these problems.

2. Brain damage and language-speech problems

2.1. Stroke and Aphasia: A Wording Problem

Brain damage to an adult person brings along many language and communication problems. Such damage that occurs after the acquisition of language is often described as receptive and expressive language impairment [9]. After a stroke, especially if the left half of the brain is affected by damage, aphasia may occur; or cognitive and language disorders related to the affection of the right brain are observed.

Aphasia is a neurocognitive impairment caused by focal damage to the cortical or subcortical areas of the brain [10]. It is important to distinguish language disorders, especially in aphasia, from dementia, motor dysfunction or language impairment resulting from sensory loss.

It would not be correct to associate the occurrence of language disorders in aphasia with a certain age because aphasia is not a disease but one of the observed symptoms of brain damage. Aphasia often occurs as a result of cerebrovascular (CVO) diseases. Most commonly, middle cerebral artery lesions, thromboembolism, intracerebral or subarachnoid hemorrhage, brain tumors, head trauma, infectious diseases or abscesses, progressive and damaging brain diseases, intermittent intermittent diseases such as fever and seizures are seen as aphasia. Although it is mostly seen in adults and the elderly [11], it can also occur in adolescents and children. Therefore, aphasia is not only referred to as a language disorder that affects the older age group, but it is known that age is an important factor in the recovery process. Especially in pre-adolescent children and adolescents, the possibility of improvement of even the most serious aphasia symptoms is high [12]. While the recovery of the middle age group may be relative, it is very rare for older people recovering completely. Predicting which type of aphasic patient will be able to recover is another difficulty. In its early stages, some types of aphasia may improve more than others. It is possible that individual variables such as motivation of the individual and interest of caregivers also affect recovery [13]. Therefore, it should not be forgotten that while the most important reasons affecting recovery positively or negatively may be age and the type of aphasia, other interactions such as the location of damage (localized) and the time elapsed after the formation can also be an important factor for future improvement (prognosis).

2.1.1. Aphasia Assessment and Therapy

Aphasic phenomena are generally covered in four broad categories. The impulsive (expressive) type of aphasia includes individuals who have difficulty communicating their thoughts by speaking or writing. The aphasic adult knows what to say, but has difficulty finding and recalling the words they need from memory or pronouncing the recalled word. Fluent type of aphasia includes individuals who have difficulty understanding spoken and written language. The individual hears the sound, sees the text, but cannot understand the words he / she hears or reads because of the problem of decoding and perception. Although 'anomic or amnesic type' cases do not show very serious aphasia symptoms, they have serious difficulties in making the correct naming of objects, people, places and events. "Global aphasia", on the other hand, occurs as a result of severe and intense damage to all language areas of the brain and causes the person to lose all language functions, including both expression and understanding.

Defining all aspects of language impairment syndromes that occur in aphasia evaluations is a necessary element both for an accurate and complete clinical diagnosis and for predicting the prognosis of the patient [14]. Brief patient assessment at the bedside does not make it possible to demonstrate preserved language characteristics. Therefore, Aphasia Diagnostic Tests are essential for understanding the current situation and predicting prognosis, as well as indispensable assessment tools for rehabilitation and therapy interventions.

The periods in which aphasia studies were frequently conducted were determined by the predominance of neurological and neuropsychological approaches, and linguistic and rehabilitation approaches. With these two dominance that emerged over time, aphasia has now begun to be handled with multidisciplinary approaches in our country. GAT (Gulhane Aphasia Test), which is the first Turkish aphasia test with a history of 20 years, has gained a special feature about the different clinical pictures and prognosis of aphasia with the sections it contains [15]. In addition, linguistics and rehabilitation approaches made it necessary to examine in detail the language characteristics of aphasic patients; For this purpose, different aphasia tests, whose standardization studies are still ongoing, have been developed in accordance with the Turkish language characteristics.

With aphasic cases, every evaluation is a therapy, every therapy is an evaluation [16]. After the evaluation to determine the language deficiency to be addressed in therapy, the goal is to reconstruct the damaged language or communication. Teaching compensatory methods to the patient is within the framework of this goal. The aim of recent therapies is to study the communication of the patient in clinical settings and to generalize them in natural environments. Family support and participation is very important in this therapy approach. The approach of applying a patient-specific therapy with a mixture of all written, drawn, visual, linguistic and non-linguistic tools are known as "Total Communication" [17]. Nevertheless, it should be kept in mind that the same type of therapy will not work for every individual with aphasia, and the therapy plan should be made by taking the patient's speech and individual characteristics and life needs into consideration.

2.2. Right Brain Injury

Until very recently, it was thought that only the left brain is dominant in processing language and the right brain has no language-related function; however, researchers have also examined the right hemisphere of the brain in many studies of language and communication function. As a result of these studies, it was observed that the language skills of patients who suffered such damage, such as phonetics, vocabulary, and syntax, were not damaged much, but the pragmatic dimension of the language was affected. [18]. For example, there have been studies showing that humor or the emotional context are particularly affected in such cases. The dimension of use in context, for example, coherence, is severely affected. Cohesion is a feature that shows how a spoken sentence is related to the next sentence in terms of title and content; It is known to be adversely affected in patients with dementia [19].

Studies have also been conducted to understand the context provided indirectly in cases with right brain injury. For example, if we read that in a picture of a man and a child in front of a dirty car, the man said to the child "the car looks very dirty", we can infer the deep meaning that the man is not only commenting on how dirty the car looks, but implying the boy to clean it up. Left brain injured cases can infer the lower meaning appropriately, while right brain injured cases cannot choose the intended meaning. The emotional context of the medium in which communication is established; It is claimed that the prosodic aspect of speech production is also damaged in such patients. For example, the melody of speech (intonation) is flat, almost expressing no emotion [20].

The focus is on evaluating non-verbal skills (such as attention, orientation, perception, visual-spatial perception and awareness, drawing freely and by copying, and marking) of patients with right brain injuries [21]. Studying visual-spatial perception will also enable individuals to improve their reading and writing. Picture description tests are suitable for revealing the communication problems of individuals. Selecting some items on the picture and studying the relationships between these items will enable the evaluation of the problems to which therapy will be directed. There is no Turkish standard test to evaluate the language and cognition of individuals with right brain injuries.

3. Problems of dementia and language-speech

Dementia is a general name given to "clinical pictures created by high cerebral functions and behaviors and multidimensional disorders as a result of the effects that development and progress in the brain over a period of time due to different reasons" [22]. The disease is progressive in nature, affecting the intellectual and social abilities and daily functions of the person.

Dementia is the most devastating brain disease in middle-aged and elderly people. The emergence of this disease, which has many types such as dementia accompanying Alzheimer's and less frequently Parkinson's disease, attracts attention as a serious health problem due to the increasing number of elderly population especially in developing countries.

The incidence of the disease increases with age; Its prevalence is 1. 5-2% in the 65-69 age group, 5.5-6.5% in the 75-79 age group, while it reaches 20-22% in the 85-89 age group. Symptoms of dementia are observed in one of every two elderly people in their 80s with the weakening of close memory and forgetting to do daily work. Nevertheless, whether every forgetfulness is a sign of dementia should be determined by investigating some values such as thyroid function tests, syphilis (a sexually transmitted disease), vitamin B12 level, and low blood sugar (hypoglycemia) [23]. In addition, past epilepsy (epilepsy), head trauma, brain tumors, vascular diseases of the brain, surgical intervention to the brain, carbon monoxide poisoning, infectious diseases involving the brain tissue, some drug use and depression should be taken into consideration for differential diagnosis; When

necessary, neuroimaging methods should be used. The reliable criterion in dementia assessment is the findings of the Mini Mental Status Assessment tool [24] and meeting the DSM-IV requirements [25].

Cognitive losses in dementia can be divided into four groups as amnesia, agnosia, apraxia and aphasia [26]. Amnesia; Difficulty remembering information or experiences. For example, the patient is in a different city, but thinks he is in the city where he lives. Agnosia; inability to recognize objects. It is usually observed in the late stages of dementia. For example, the patient likes tea and enjoys drinking, but does not know where to cook the tea or the teapot is used for tea cooking. Apraxia is the inability to perform simple daily actions such as buttoning a shirt. Frequently, symptoms related to amnesia and problems with apraxia are observed in the later periods. Aphasia is the inability to speak for self-expression. Especially, aphasia often occurs in pathologies involving the speech center in the left half of the brain.

3.1. Alzheimer's Type Dementia and Language-Speech Problems

Aphasia occurs suddenly after a stroke or an unexpected accident. In diseases such as Alzheimer's that start with dementia symptoms, the first symptoms begin insidiously and it is not possible to know when the disease started. Progressive destruction may have lasted for years before symptoms became apparent [23]. This damage is so subtle that it may not be revealed even in brain movies. Studies on autopsied human brains show cell impairments that reflect developmental damage to cognitive abilities, including memory, problem-solving, learning abilities, and / or language abilities.

Dementia is the medical equivalent of dementia, which is a very general concept, and Alzheimer's disease is one of the common causes of dementia. Two-thirds of patients with dementia suffer from Alzheimer's. Many studies on cognitive loss and related diseases are recent. Alzheimer's disease, especially increased in number as the life ages of people got longer. Accordingly, according to the world literature, the occurrence rate of Alzheimer's is very rare (0.6%) before the age of 70, but it is more common (8.4%) above the age of 84. In a recent study conducted in England, it was revealed that the incidence of dementia also increased in the young age population [27]. It is interesting that Alzheimer type dementia (34%) observed in the younger group (30-64 years) increased towards the rate observed in the older group (80%).

The most prominent feature of Alzheimer's is the progressive (progressive) forgetfulness observed from the beginning. Loss of cognitive abilities such as attention, language and speech, and perception of what he sees is a common condition [26]. In the light of this information, it is possible to define Alzheimer's as a type of dementia where forgetfulness is at the forefront. Another important symptom of dementia is impaired visual-spatial processing skills in the early stages of the disease. Evaluation scales such as face recognition and line orientation test can easily detect such problems in the early stages of the disease [28].

After the initial diagnosis of the neurological patient, it is distinguished whether the brain tissues are damaged mainly at the cortical (brain surface) or subcortical (lower surface of the brain) level. For example, subcortical structures are damaged in Parkinson's disease and cortical structures are damaged in Alzheirmer. Therefore, language disorders resembling aphasia resulting from cortical structural damage are observed in Alzheimer's disease. Especially, meaning and usage knowledge, which is predominantly guided by thought and intelligence, are language components that are susceptible to impairment in patients with dementia. In addition, their phonological and syntactic uses are also not very conscious. When the patients' speech or writing is carefully monitored, errors related to the form are particularly noticeable in the reduction of morphemes or the addition of inappropriate forms [16].

Language problems of the patients with an Alzheirmer in the anterior stage are as observed in anomic aphasia; case has difficulty naming objects. The naming problem arises especially in category naming tests. In the middle and late stages, language problems are reminiscent of transcortical sensory aphasia; patients have conversations that are fluent but cannot control its content [29]. There may also be problems understanding what you hear and difficulty repeating sentences of relative length. In the late stages of the disease, most patients may become almost mutilated, with reduced language use. Others cannot speak in public when speaking in places where people are not present. In this phase, the verbal production of the patient is completely in the form of "speaking jargon". In this context, "the loss of the meaning of the word with the sound changes made in the whole word" is defined as jargon [16]. The late stages of Alzheimer's are the same as in global aphasia, ie their ability to understand and produce language are much reduced. However, still don't make eye contact or "how are you today?" Their ability to answer mold questions, such as, may be preserved.

In their early stages, these patients' reading ability is better than their ability to understand spoken language. In its middle stages, word substitution occurs during reading. Early in the middle phase, the ability to read aloud appears to be more conserved than the ability to read comprehension. Until very recently, reading aloud was thought to be preserved until late stages, but it is claimed that reading aloud is also developmentally damaged over time. In its early stages, spelling mistakes that occur with the addition of infrequent deductions or inappropriate inflection in the writing ability draw attention.

In fact, in the early stages of Alzheimer's, it has been determined that some syntactic (syntactic) structures related to suffixes force patients [30]; Related problems were also encountered in semantic tests in which syntactically complex sentences were used. In particular, it is clear that the understandability of idioms whose meaning is not very clear is damaged. Although it has been suggested in studies that patients with Alzheimer's have misperceptions visually in naming tests, in subsequent studies, it has been stated that healthy people of all ages may also fall into this kind of error. In such cases it is already debated whether the damage is attributed to the word itself or to the access path to it.

Patients may fail in naming tests when other changes due to language impairment are not observed. It is controversial whether the naming disorder reflects the disruption of the semantic system in general or is a true aphasic disorder; because there is no possibility of recovery of language disorders in Alzheimer's dementia.

Language abilities of dementia and Alzheimer type dementia patients are evaluated with "language tests". The language characteristics of 20 dementia patients who were found to have mild Alzheimer's dementia by neurologists in a university hospital were demonstrated by a language test prepared for this study to detect language disorders [31]. Prior to the language test, the Mini Mental State Assessment (MMSE) findings of the patient group, whose findings were between 20-23 out of 30, were noted to be affected by the ability to read aloud and through, and their automatic and categorical naming ability.

3.2. Other Dementias, and Language Problems

Primary Progressive Aphasia is a type of dementia that starts with atrophy and language disorders in the left brain hemisphere and adds cognitive loss much later [32]. Focal atrophy in the left region and slowing of the EEG is frequently seen on tomography. It is widely assumed that this clinical syndrome may be Alzheimer's disease, which begins with symptoms of aphasia. The resulting form of aphasia is of the fluid type. In a study, it has been argued that a patient who started with the complaint of slumpiness three years ago and who added writing difficulty in addition to the gradually increasing speech disorder may have Primary Progressive Aphasia [33]. However, contrary to the findings of the literature, the speech of the case is in the form of stiff aphasia. On the other hand, he had good comprehension by hearing and reading, and normal cognitive tests were found to be within normal limits.

Frontotemporal dementias (FTD) is one of the other types of dementia with prominent language impairment, and it covers 2-3% of all dementias. FTD is a multiple etiology dementia syndrome that progresses with progressive deterioration of the front, middle and frontal temporal lobes in the brain. While memory functions are relatively preserved, the amount of speech is often reduced. Speech quality can range from the stereotypical (stereotyped) speech to echolic (repetitive) and mutual speech. Studies have been conducted in psychiatry clinics as a schizophrenia-like finding, due to rare cases in which socially inappropriate behaviors such as garbage and / or material collecting were also identified [34].

3.3. Language Therapy in Dementia

Each of the different types of dementia has a different effect on neurological functions in terms of language and cognition. Different functions are reflected on the individual with different behaviors. As we get older, a common trait can emerge in almost everyone. This feature, expressed by the sentence "on the tip of my tongue, but I can't say", slows down mutual communication and responses. Sensory and environmental factors also reinforce this feature. Many features that develop due to age are primarily attributed to hearing impairment. Hearing loss in individuals with dementia leads the individual to withdraw and live in isolation over time. In case of visual deficiency, lack of focus and a decrease in selecting objects and colors are observed. Therefore, in addition to dementia, hearing and vision loss are sensory factors that primarily inhibit communication. Environmental inadequacy, the absence of anyone around the individual, and the lack of a subject to talk about also affect the individual's communication. The job of a speech and language therapist can begin with performing environmental regulation. In this context, it is important to determine the communication

needs of the person with dementia, to reveal the difficulty level and preserved skills in communication. Pre-dementia language skills and determination of the education level of the individual are also among the pre-evaluation findings.

The American Speech-Language-Hearing Association (ASHA) recommends that a language and speech therapist participate actively in assessing the communication skills of patients with dementia, providing therapy programs to maintain and facilitating functional communication, and helping patient caregivers understand the communication problems posed by dementia. [30]. In the early stages of dementia, a speech and language therapist should have a role in the rehabilitation team. This role may be for the purpose of both environmental regulation and guiding the family of the patient. Under appropriate conditions, individual therapies can also be arranged for the study of naming and reading skills that are damaged first. Language and speech therapy that can be done in the early stages of dementia are summarized in the following item.

1. To ensure that the family, friends or the multidisciplinary team is aware of the patient's maximum competence in language and communication,
2. To develop applications in order to find an effective communication method with the person with dementia,
3. To make use of hint methods and alternative means of communication such as telling by drawing, in order to benefit from the majority of the existing language skills,
4. To organize special language and communication therapies individually or in groups,
5. To inform about competence and emerging difficulties as dementia develops,
6. Assisting individuals with dementia in their specific rights such as making decisions and exercising authority,
7. To reduce the communication, stress on family and friends.

In the meantime, it is the duty of a speech and language therapist to correct the mistakes of the family of the person with dementia in their effort to communicate and to make suggestions. For example, the therapist can make the following recommendations to patient relatives:

- While communicating with the dementia patient, pay attention to your own speech and be sensitive to the speech styles around,
- Do not make a hasty response attempts, according to the conversation you hear, and listen to the patient,
- Listen to the dementia patient in an active state and reflecting your reaction, establish eye contact, nod your head in appropriate places, smile or react with your face in parts of which you cannot understand,
- Feed back what you understand from the individual's speech,
- Tell him that you understand the patient and his feelings.

4. Parkinson's disease and language-speech problems

Parkinson's is a progressive disease that usually begins between the ages of 50-60. Parkinson's disease is found in 1% of the population over the age of 65 [35]. While both speech difficulties and swallowing difficulties are experienced mildly in some cases, they can be very serious in some cases. No single case is like any other in terms of difficulties experienced. Studies draw attention to the fact that 60-90% of Parkinson's patients have difficulty speaking, and 50% have swallowing / swallowing and chewing difficulties.

Speech and swallowing processes take place with the help of muscles and nerves under and above the throat, such as the jaw, lips, tongue, throat and larynx. Muscles and nerves of all these structures can be affected in Parkinson's patients. Therefore, Parkinson's patients reflect the stiffness and slowness seen in movements that are considered automatic, such as walking, to speech and swallowing, another set of automatic actions. Similar to involuntary movements such as shaking in the hands, involuntary movement is also observed in the jaw and tongue. Speech and swallowing problems can occur together, or they affect the patient separately from each other.

Dementia may occur in approximately 8-30% of patients with idiopathic type Parkinson's caused by neuron degeneration of unknown cause. However, in most cases it is difficult to determine whether the dementia is caused by Parkinson's disease or a concomitant Alzheimer's disease [36]. Especially in Parkinson's disease caused by subcortical injuries and accompanying dementia, communication skills of individuals are affected differently. Patients speak very slowly, their speech is

incomprehensible; In fact, after a few words, there are movements of puffiness, which are described as "word drag / rounding in the mouth".

The speech disorder associated with Parkinson's disease is known as dysarthria. Dysarthria is a motor speech disorder that occurs as a result of damage to the muscles that control speech production. In a more neurological definition, dysarthria is "the general name of a group of speech disorders caused by inadequate, slowing or incoordination of neuromuscular control of speech due to central or peripheral nervous system lesions" [37]. The underlying cause of muscle lack of control may be an injury or illness affecting the brain. For example, 'dysarthria' can also be caused by stroke, which causes cells in the brain area that control the muscles of the face and one side of the mouth to die. If such damage affects the regulation of muscle tone and mobility in the face, mouth, and body, dysarthria will worsen over time. The type of dysarthria seen in Parkinson's patients is usually hypokinetic dysarthria that emphasizes a decrease in movement. In other words, dyskinetic condition in the form of decreased range of motion in the muscles of the face, mouth, pharynx (throat) and larynx (laryngeal) reveals hypokinetic dysarthria in patients with Parkinson's.

4.1. Diagnosis and Therapy of Parkinson's Dysarthria

From the above definitions, it is understood that the speech difficulty in the Parkinson's patient is caused by a muscle control. This type of disorder does not lead to a decrease in intelligence or memory. Nevertheless, as people reveal their intelligence and personality mostly through verbal communication, the difficulty in verbal communication suggests that other abilities may also be affected.

Although Parkinson's speech patterns show variability, the common complaint of Parkinson's patients with hypokinetic dysarthria is a decreased speech tone. The tension of the muscles in the rib cage causes shallow and irregular breathing. The tension and stiffness in these muscles, which are very elastic in their normal state and work with a certain speed and power, will naturally lead to a decrease in the volume of sound. The physiological fact behind the decrease in the volume of the voice below an acceptable tone during speech can be explained by the gradual loss of flexibility in the respiratory muscles [36].

People muting their voices, as they do next to a sleeping person, or raising their voices, as in the case of calling out to a hearing-impaired person, takes place through changes in the volume of the sound. From time to time, we may also make changes in voice to emphasize what we have to say. People who have developed dysarthria due to Parkinson's have lost their ability to make such changes. For the listener, the patient's voice is not strong enough to support or reinforce the meaning and context of what they say.

The first noticeable change in sound quality is like 'coarse and breathtaking' by the description of the listeners. The reason is physiologically associated with the slowing and tightening of the movements of the vocal cords in the larynx. The ups and downs of the speech melody; that is, pitch changes reflect the deep meaning of the spoken words / sentences. Ezgi has been just one of the ways in which human personality is perceived [38]. In Parkinson's patients with dysarthria, the ability to rise and fall in the pitch of the voice is lost, and the speech of the patients becomes monotonous. The tension of the vocal cords causes this and other speech parameters to be lost. Therefore, these patients developed into a straight speech style without melody, which becomes increasingly difficult to hear or understand [39].

Another symptom of hypokinetic dysarthria is the loss of control in the rate of speech. In the early stages, the rate of speech is so fast and explosive that the speech seems to escape from the patient. Gradually, symptoms combined with a decrease in voice volume greatly reduce the intelligibility of the Parkinson's patient. The physiological cause is also related to the brain and is known as bradykinesia (slowdown in movements). All these symptoms are accompanied by dysarthria in most dysarthria. In the speech of such patients, the voices are almost voiced together or the voices at the end of the word are not. The listeners think that the patient is 'mumbling'. The vocal impairment is caused by the loss of strength and speed in tongue and lip movements.

Nowadays, tools such as stroboscope, laryngeal EMG and Electroglottography, which are objective evaluation, have started to be used for the diagnosis of dysarthria, rather than some subjective methods in which speech samples taken from patients are evaluated by listening. One of the first studies evaluating the speech styles of Parkinson's patients with electroglottography in Turkey was conducted in 1991 [37]. With this method, which aims to evaluate the vocal cords (vocal cords) functionally without hindering speech behavior, vocal cord irregularity was found in 95% of eighteen patients with Parkinson's. Dysarthric effects in patients; rhythmic arrangement of speech, sound, tone and intensity, sound production and general intelligibility dimensions.

When problems with speech arise, such as a decrease in voice volume, monotonous melody, deterioration in sound quality, rolling without pause, or unwanted pauses, which may be seen in patients with Parkinson's, help from a speech and language therapist may be sought. Therapies that start before the problems become serious and time will be beneficial. Proper breathing practices increase the sound volume. In addition, tongue, lip and jaw exercises (oral-motor movements) and exercises that increase the rate of pronunciation, melody and speech are recommended. In short, phonation, respiration and resonance (voice, breathing and resonance) therapies, which are basic in dysarthria therapy, is suitable for these patients. When swallowing and chewing difficulties begin, the speech therapist can re-engage.

It is not right to expect radical changes with therapy in chronic problems of a patient with severe dysarthria or restricted speech. However, if the patient can say very important initial sounds or show letters, it will be beneficial in both understanding and production. Speech therapist helps patients with moderate and mild dysarthria in subjects such as breathing and pronunciation control, slowing the speech rate, naturalizing speech sounds, and providing environmental support.

In addition to classical speech therapy approaches, it is known that new methods of speech therapy are developed and used in patients with Parkinson's. The Lee Silverman Method (1987) developed by Ramig and Mead is an effective voice therapy. This method targets the comprehensibility of the speech and the increase in the vocal volume at an intensity of 16 sessions in a month [40].

If the vocal cords are too tense or weak, the vocal cords cannot come together and vibrate, causing speech sounds to be weak and breathless. In this case, collagen needle reinforcement applied to the vocal cords is recommended as a treatment / therapy method (Collagen injection method). Collagen is a type of protein administered subcutaneously. This method, which usually takes fifteen minutes, is also recommended for patients with neurological problems such as Parkinson's.

5. Results. In this study, the approach of a speech and language therapist to his patient with neurological problems is discussed. The age and education of the patient, compliance with therapy, willingness to heal, and accessibility to specialist language and speech therapists are very important for achieving successful results. In the therapy process, the multi-rehabilitation team has an important role as well as family support. Therefore, in addition to the medical improvement of the patients, paying attention to their psychosocial and linguistic improvement and the presence of a language and speech therapy in a team approach will enrich the health service provided to the elderly population.

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