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GLAS I GOVOR KOD PARKINSONOVE BOLESTI: KLINIČKE ODLIKE HIPOKINETIČKE DISFONIJE

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SAŽETAK
Parkinsonova bolest je hronično, progresivno neurodegenerativno oboljenje koje se primarno manifestuje poremećajima motorike, ali značajno utiče i na glas i govor. Jedna od čestih i klinički značajnih manifestacija bolesti jeste hipokinetička disfonija, koja nastaje kao posledica centralnog dopaminergičkog deficita i hipokinezije mišića uključenih u respiraciju, fonaciju i artikulaciju. Cilj ovog preglednog rada jeste prikaz osnovnih neuroloških i kliničkih karakteristika Parkinsonove bolesti, mehanizama nastanka hipokinetičke disfonije, kao i glasovnih, govornih i paralingvističkih osobina pacijenata sa ovim oboljenjem, uz sagledavanje implikacija za kliničku i logopedsku praksu. Pretraga relevantnih izvora podataka izvršena je putem pretraživača Google Scholar Advanced Search i Konzorcijuma biblioteka Srbije za objedinjenu nabavku (KoBSON), pri čemu su analizirani savremeni izvori iz oblasti neurologije, fonijatrije i logopedije. Rezultati pregleda ukazuju da poremećaji glasa i govora, uključujući hipofoniju, monotoniju, smanjenu varijaciju intonacije i dezorganizovanu prozodiju, značajno narušavaju komunikaciju i kvalitet života obolelih. Posebno su izraženi deficiti paralingvističke komunikacije, koji doprinose socijalnoj izolaciji pacijenata. Može se zaključiti da su pravovremeno prepoznavanje hipokinetičke disfonije i interdisciplinarni pristup, uz aktivno uključivanje u logopedski tretman, od ključnog značaja za očuvanje komunikacijskih sposobnosti i unapređenje ukupnog funkcionisanja osoba sa Parkinsonovom bolešću.

Ključne reči: Parkinsonova bolest, hipokinetička disfonija, poremećaji glasa i govora, paralingvistička komunikacija

Uvod

Parkinsonova bolest (PB) je hronično, progresivno neurodegenerativno oboljenje i klasičan primer hipokinezije, koja nastaje kao posledica degeneracije dopaminergičkih neurona u *substantia nigra pars compacta* i drugim strukturama moždanog stabla. Ovaj neurodegenerativni proces dovodi do smanjenog lučenja dopamina u nigrostrijatnom sistemu i narušavanja ravnoteže između dopamina i acetilholina u bazalnim ganglijama. U fiziološkim uslovima, dopamin ima inhibitorni i modulatorni efekat na oslobađanje acetilholina, koji posreduje u mišićnoj aktivnosti putem sinaptičkih veza. Njegov deficit rezultira poremećajem osnovnog održavanja mišićnog tonusa i kontrole pokreta (1,2).

Klinička slika Parkinsonove bolesti uključuje bradikineziju, rigiditet, tremor u miru i posturalnu nestabilnost. Pokreti postaju spori, ukočeni i ograničenog obima, uz gubitak automatske i harmonične koordinacije, što ostavlja utisak da mišići stalno „koče". Rigiditet se često manifestuje u obliku tzv. fenomena „zupčastog točka", dok je tremor u miru, frekvencije od 4 do 7 Hz, jedan od najprepoznatljivijih simptoma bolesti. Ovi motorni poremećaji pogađaju ne samo ekstremitete i trup, već i mišiće respiratornog, fonatornog i artikulacionog sistema (3).

Zahvaćenost mišića uključenih u disanje, fonaciju i artikulaciju dovodi do poremećaja glasa i govora, koji se u Parkinsonovoj bolesti najčešće manifestuju kao hipokinetička dizartrija, čiji je integralni deo hipokinetička disfonija. Hipokinetička disfonija nastaje kao rezultat smanjenog obima i brzine pokreta laringealnih mišića, narušene respiratorne podrške i nedovoljne kontrole fonacije, što je direktno povezano sa hipokinezom mišića larinksa i dopaminergičkim deficitom (4,5).

Glas pacijenata sa Parkinsonovom bolešću karakteriše smanjena glasnoća (hipofonija), monotonija, smanjena varijacija visine tona, dahnuti kvalitet glasa i grublji ton. Ove vokalne promene su rezultat nepotpunog zatvaranja glotisa, produžene otvorene

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VOICE AND SPEECH IN PARKINSON'S DISEASE: CLINICAL CHARACTERISTICS OF HYPOKINETIC DYSPHONIA

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SUMMARY
Parkinson's disease is a chronic, progressive neurodegenerative disease that is primarily manifested by motor disorders, but significantly affects voice and speech. One of the frequent and clinically significant manifestations of the disease is hypokinetic dysphonia, which occurs as a result of central dopaminergic deficit and hypokinesia of muscles involved in respiration, phonation and articulation. The aim of this review is to present the basic neurological and clinical characteristics of Parkinson's disease, the mechanisms of hypokinetic dysphonia, as well as the voice, speech and paralinguistic characteristics of patients with this disease, while considering the implications for clinical and speech therapy practice. The search for relevant sources was carried out using Google Scholar Advanced Search and the Consortium of Libraries of Serbia for Unified Procurement (KoBSON), where modern sources from the fields of neurology, phoniatrics and speech therapy were analyzed. The results of the review indicate that voice and speech disorders, including hypophonia, monotony, reduced intonation variation and disorganized prosody, significantly impair communication and the quality of life of sufferers. Paralinguistic communication deficits, which contribute to the social isolation of patients, are especially pronounced. It is concluded that timely recognition of hypokinetic dysphonia and an interdisciplinary approach, along with active involvement in speech therapy treatment, is of key importance for preserving communication skills and improving the overall functioning of people with Parkinson's disease.
Key words: Parkinson's disease, hypokinetic dysphonia, voice and speech disorders, paralinguistic communication

Introduction

Parkinson's disease (PD) is a chronic, progressive neurodegenerative disease and a classic example of hypokinesia, which occurs as a result of the degeneration of dopaminergic neurons in the substantia nigra pars compacta and other structures of the brain stem. This neurodegenerative process leads to reduced dopamine secretion in the nigrostriatal system and disruption of the balance between dopamine and acetylcholine in the basal ganglia. Under physiological conditions, dopamine has an inhibitory and modulatory effect on the release of acetylcholine, which mediates muscle activity via synaptic connections. Its deficiency results in a disruption of the basic maintenance of muscle tone and movement control (1,2).

The clinical picture of Parkinson's disease includes bradykinesia, rigidity, resting tremor and postural instability. Movements become slow, stiff and limited in range, with a loss of automatic and harmonious coordination, which gives the impression that the muscles are constantly "braking". Rigidity is often manifested in the form of so-called cogwheel rigidity, while tremor at rest, with a frequency of 4 to 7 Hz, is one of the most recognizable symptoms of the disease. These motor disorders affect not only the limbs and the trunk, but also the muscles of the respiratory, phonatory and articulatory systems (3).

The involvement of the muscles involved in breathing, phonation and articulation leads to voice and speech disorders, which in Parkinson's disease are most often manifested as hypokinetic dysarthria, an integral part of which is hypokinetic dysphonia. Hypokinetic dysphonia occurs as a result of reduced range and speed of movement of laryngeal muscles, impaired respiratory support, and insufficient control of phonation, which is directly related to laryngeal muscle hypokinesis and dopaminergic deficit (4,5).

The voice of patients with Parkinson's disease is characterized by reduced loudness (hypophonia), monotony, reduced pitch variation, breathy vocal

faze fonacije i smanjene koordinacije respiratorno-fonatornog sistema (6,7). Procene ukazuju na to da čak 70–90% osoba sa Parkinsonovom bolešću razvije neki oblik poremećaja glasa i govora tokom progresije bolesti, pri čemu je hipokinetička disfonija jedna od najranijih i funkcionalno najznačajnijih manifestacija (8).

Iako su poremećaji glasa i govora česti i imaju značajan uticaj na komunikaciju, socijalno funkcionisanje i kvalitet života obolelih, u kliničkoj praksi često se nedovoljno prepoznaju i leče. Razumevanje patofizioloških mehanizama koji povezuju Parkinsonovu bolest i hipokinetičku disfoniju od ključnog je značaja za pravovremenu dijagnostiku i planiranje adekvatne terapijske intervencije.

Cilj ovog rada je da prikaže osnovne neurološke i kliničke karakteristike Parkinsonove bolesti, mehanizme nastanka hipokinetičke disfonije, kao i vokalne, govorne i paralingvističke karakteristike pacijenata sa ovom bolešću, uz razmatranje implikacija za kliničku i logopedsku praksu.

Metode

Pretraga relevantnih izvora izvršena je korišćenjem napredne pretrage Google Scholar-a i Konzorcijuma biblioteka Srbije za objedinjenu nabavku (KoBSON). U pretrazi su korišćene ključne reči i fraze na srpskom i engleskom jeziku, uključujući: Parkinsonova bolest (eng. *Parkinson's disease*), hipokinetička disfonija (eng. *hypokinetic dysphonia*), poremećaji glasa i govora (eng. *voice and speech disorders*), motorni poremećaji govora (eng. *motor speech disorders*) i paralingvistička komunikacija (eng. *paralinguistic communication)*. Uključeni su radovi na engleskom jeziku objavljeni u vremenskom periodu od 2003. do 2020. godine. Analiza je obuhvatila referentnu i savremenu literaturu iz oblasti neurologije, fonijatrije i logopedije koja se bavi patofiziologijom Parkinsonove bolesti, njenom kliničkom slikom, farmakološkim tretmanom, kao i govorom, glasom i paralingvističkom komunikacijom pacijenata. Podaci iz literature su sistematizovani prema sledećim tematskim celinama: neurološke i kliničke karakteristike Parkinsonove bolesti, mehanizmi hipokinetičke disfonije, vokalne i govorne karakteristike pacijenata, poremećaji paralingvističke komunikacije i preporuke za interdisciplinarni tretman. Ovakav pristup omogućio je objedinjavanje savremenih i klasičnih saznanja i pružio osnovu za kritičku diskusiju i zaključke rada.

Kliničke karakteristike i terapija Parkinsonove bolesti

Parkinsonova bolest se klinički manifestuje prvenstveno kardinalnim motornim poremećajima, koji uključuju bradikineziju, rigiditet, tremor u miru i posturalnu nestabilnost. Pokreti su spori, kruti i ograničenog obima, uz izražen gubitak automatske koordinacije, što ostavlja subjektivni i objektivni utisak da su mišići „inhibirani". Rigiditet se često manifestuje u obliku tzv. fenomena zupčanika (eng. *cogwheel phenomenon*), dok je tremor u miru, frekvencije od 4 do 7 Hz, jedan od najprepoznatljivijih simptoma bolesti (1,3). Pored motornih simptoma, kod značajnog broja pacijenata prisutni su i nemotorni poremećaji, uključujući kognitivni pad, poremećaje pažnje, depresiju i, u uznapredovalim fazama, demenciju, što dodatno usložnjava kliničku sliku i proces multidisciplinarne rehabilitacije (9).

Farmakološki tretman Parkinsonove bolesti primarno je usmeren na nadoknadu dopamina, najčešće primenom levodope, koja je i dalje zlatni standard u terapiji. Iako levodopa značajno poboljšava motorne simptome i funkcionalnu mobilnost kod većine pacijenata, njena efikasnost se vremenom smanjuje, a dugotrajna upotreba može dovesti do motornih fluktuacija i diskinezija (nevoljnih pokreta) (1). Savremena istraživanja ukazuju na to da efekti dopaminergičke terapije na govor i glas nisu jednoznačni; dok kod nekih pacijenata dolazi do blagog poboljšanja prozodije i artikulacije, hipokinetička disfonija često perzistira ili pokazuje minimalan odgovor na farmakološki tretman, što ukazuje na složene i nedovoljno razjašnjene neuralne mehanizme kontrole govora (7,10).

Poremećaji glasa i govora kod Parkinsonove bolesti

Poremećaji glasa i govora su česta i klinički značajna komponenta Parkinsonove bolesti. Savremeni podaci ukazuju na to da čak 70–90% obolelih razvije neki oblik poremećaja govora tokom bolesti, iako su simptomi u ranim fazama često blagi i nedovoljno prepoznati (4,8). Vokalne karakteristike kod pacijenata sa Parkinsonovom bolešću često uključuju hipofoniju, monotoniju, smanjenu varijaciju visine tona, grublji i dahnuti kvalitet glasa, kao i skraćeno maksimalno vreme fonacije. Ove promene su u skladu sa konceptom hipokinetičke disfonije i povezane su sa smanjenim obimom i brzinom pokreta glasnica, nepotpunim zatvaranjem glotisa (insuficijencija glotisa) i narušenom koordinacijom respira-

quality, and a rougher tone. These vocal changes are the result of incomplete glottis closure, prolonged open phase of phonation, and decreased respiratory-phonatory coordination (6,7). Estimates indicate that as many as 70–90% of individuals with Parkinson's disease develop some form of voice and speech disorder during the progression of the disease, with hypokinetic dysphonia being one of the earliest and most functionally significant manifestations (8).

Although voice and speech disorders are common and have a significant impact on communication, social functioning and quality of life of sufferers, they are often insufficiently recognized and treated in clinical practice. Understanding the pathophysiological mechanisms that connect Parkinson's disease and hypokinetic dysphonia is of key importance for timely diagnosis and planning of adequate therapeutic intervention.

The aim of this paper is to present the basic neurological and clinical characteristics of Parkinson's disease, the mechanisms of hypokinetic dysphonia, as well as the voice, speech and paralinguistic characteristics of patients with this disease, while considering the implications for clinical and speech therapy practice.

Method

The search for relevant sources was carried out using Google Scholar Advanced Search and the Consortium of Libraries of Serbia for Unified Procurement (KoBSON). Keywords and phrases in Serbian and English were used in the search, including: Parkinson's disease, hypokinetic dysphonia, voice and speech disorders, motor speech disorders and paralinguistic communication in Parkinson's disease. Works in English published between 2003 and 2020 were included. The analysis included classical and contemporary works from the fields of neurology, phoniatrics and speech therapy dealing with the pathophysiology of Parkinson's disease, its clinical picture, pharmacological treatment, as well as speech, voice and paralinguistic communication of patients. Data from the literature were systematized according to the following thematic areas: neurological and clinical characteristics of Parkinson's disease, mechanisms of hypokinetic dysphonia, voice and speech characteristics of patients, disorders of paralinguistic communication and recommendations for interdisciplinary treatment. Such an approach enabled the unification of modern and classical knowledge and provided a basis for critical discussion and conclusions of the work.

Clinical features and therapy of Parkinson's disease

Parkinson's disease is clinically manifested primarily by cardinal motor disorders, which include bradykinesia, rigidity, resting tremor, and postural instability. Movements are slow, rigid and of limited range, with a pronounced loss of automatic coordination, which gives the subjective and objective impression that the muscles are "inhibited". Rigidity is often manifested in the form of so-called cogwheel phenomenon, while tremor at rest, with a frequency of 4 to 7 Hz, is one of the most recognizable symptoms of the disease (1,3). In addition to motor symptoms, a significant number of patients also have non-motor disorders, including cognitive decline, attention disorders, depression and, in advanced stages, dementia, which further complicates the clinical picture and the process of multidisciplinary rehabilitation (9).

Pharmacological treatment of Parkinson's disease is primarily aimed at replenishing dopamine, most often using levodopa, which is still the gold standard in therapy. Although levodopa significantly improves motor symptoms and functional mobility in most patients, its effectiveness decreases over time, and long-term use can lead to motor fluctuations and dyskinesias (involuntary movements) (1). Modern research indicates that the effects of dopaminergic therapy on speech and voice are not unambiguous; while in some patients there is a slight improvement in prosody and articulation, hypokinetic dysphonia often persists or shows a minimal response to pharmacological treatment, which indicates complex and insufficiently elucidated neural mechanisms of speech control [7,10].

Voice and speech disorders in Parkinson's disease

Voice and speech disorders are a frequent and clinically significant component of Parkinson's disease. Contemporary data indicate that as many as 70-90% of sufferers develop some form of speech disorder during the course of the disease, although the symptoms in the early stages are often mild and insufficiently recognized [4,8]. Vocal features in patients with Parkinson's disease often include hypophonia, monotony, reduced pitch variation, rougher and breathier vocal quality, and shortened maximum phonation time. These changes are consistent with the concept of hypokinetic dysphonia and are associated with reduced volume and speed of vocal

torno-fonatornog sistema (6,10).

Produkcija govora je dodatno kompromitovana bradilalijom, skraćenim i sintaksički jednostavnijim rečenicama, ponavljanjem slogova ili reči i ubrzavanjem govora u kontinuiranom diskursu. Artikulacija je često neprecizna, sa smanjenim pokretima artikulatora, dok je respiratorna podrška nedovoljna, što dovodi do čestih pauza i prekida u govoru. Prozodijske karakteristike, uključujući ritam, naglasak i intonaciju, postaju dezorganizovane, što značajno smanjuje razumljivost govora. U uznapredovalim stadijumima bolesti mogu se javiti i epizode akinetičkog mutizma, kada je inicijacija govora izuzetno otežana ili nemoguća (4).

Paralingvistička komunikacija i socijalne implikacije

Posebno značajan aspekt komunikacionih poremećaja u Parkinsonovoj bolesti odnosi se na paralingvističku komunikaciju. Hipofonija, monotona intonacija i smanjena ekspresija lica dovode do osiromašenog prenosa emocionalnih i pragmatičkih informacija. Fenomen tzv. „maskiranog lica“ (hipomimija/amimija) i odsustvo spontane gestikulacije često rezultiraju pogrešnom interpretacijom emocionalnog stanja pacijenta, koji može biti doživljen kao nezainteresovan, depresivan ili neprijateljski nastrojen, iako su emocije subjektivno očuvane (8,11). Ovi paralingvistički deficiti imaju izražen negativan uticaj na socijalnu interakciju, vode ka povlačenju i socijalnoj izolaciji, te značajno narušavaju kvalitet života.

Savremeni pristupi naglašavaju potrebu za ranim prepoznavanjem poremećaja glasa i govora, kao i uključivanje logopedskog tretmana kao standardnog dela multidisciplinarnog lečenja Parkinsonove bolesti. Posebno se ističe efikasnost intenzivnih terapijskih programa usmerenih na povećanje glasnoće i poboljšanje samopercepcije glasa, kao što je *Lee Silverman Voice Treatment* (LSVT LOUD) program, koji pokazuje dugoročne pozitivne efekte na glas, razumljivost govora i komunikaciono učešće pacijenata (12). Ovo potvrđuje važnost integrativnog pristupa koji uključuje neurološke, fonijatrijske i logopedske aspekte u tretmanu hipokinetičke disfonije kod Parkinsonove bolesti.

Specifične karakteristične disfonije kod Parkinsonove bolesti prikazane su u tabeli.

Tabela 1 - Profil disfonije kod Parkinsonove bolesti

Kategorija	Opis
Patologija	Jedan aspekt Parkinsonove bolesti i srodnih stanja.
Etiologija	Degeneracija *substantia nigra*, deficit dopamina; različiti oblici: idiopatski, arteriosklerotski, postencefalitični.
Znaci i simptomi	Spori, rigidni pokreti ograničenog obima; rigiditet tipa zupčanika; tremor; smanjena ili odsutna ekspresija lica; kognitivni pad.
Laringoskopski nalaz	Normalna anatomska struktura; nepotpuna adukcija i abdukcija glasnica; smanjena pokretljivost glasnica; prisustvo presbilarinksa; produžena otvorena faza ili odsustvo zatvorene faze.
Očekivani vokalni profil	Slab, dahnut glas; povišena visina tona; skraćeno maksimalno vreme fonacije; grublji kvalitet glasa; smanjena glasnoća; monoton glas; odloženi onset glasa; dizprozodija.
Profil akustičke analize	Povećani subharmonici; smanjen odnos harmonika i šuma; povećan tremor i *jitter.*
Volumen i protok vazduha	Povećan transglotalni protok vazduha; smanjen volumen vazduha i subglotalni pritisak.
Medicinsko-hirurški tretman	Intenzivni tretman glasa usklađen sa medicinskim lečenjem pacijenta.

Zaključak

Hipokinetička disfonija je česta, ali često nedovoljno prepoznata i lečena manifestacija Parkinsonove bolesti. Nastaje kao direktna posledica centralnog dopaminergičkog deficita i hipokinezije mišića uključenih u respiraciju, fonaciju i artikulaciju, što dovodi do karakterističnih promena u glasu i govoru. Ove promene uključuju smanjenu glasnoću, monotoniju, dahnuti kvalitet glasa, poremećaje prozodije i smanjenu razumljivost govora, kao i značajne poteškoće u paralingvističkoj komunikaciji. Poremećaji glasa i govora u Parkinsonovoj bolesti imaju izražen nega-

cord movement, incomplete closure of the glottis (glottis insufficiency) and impaired coordination of the respiratory-phonatory system (6,10).

Speech production is additionally compromised by bradylalia, shortened and syntactically simpler sentences, repetition of syllables or words, and speeding up speech in continuous discourse. Articulation is often imprecise, with reduced articulator movements, while respiratory support is insufficient, leading to frequent pauses and interruptions in speech. Prosodic features, including rhythm, stress, and intonation, become disorganized, which significantly reduces speech intelligibility. In advanced stages of the disease, episodes of akinetic mutism may also occur, when the initiation of speech is extremely difficult or impossible [4].

Paralinguistic communication and social implications

A particularly significant aspect of communication disorders in Parkinson's disease refers to paralinguistic communication. Hypophony, monotonous intonation and reduced facial expression lead to impoverished transmission of emotional and pragmatic information. The so-called phenomenon "masked face" (hypomimia/amimia) and the absence of spontaneous gesticulation often result in a misinterpretation of the patient's emotional state, which can be experienced as disinterested, depressed or hostile, although emotions are subjectively preserved (8,11). These paralinguistic deficits have a pronounced negative impact on social interaction, lead to withdrawal and social isolation, and significantly impair the quality of life.

The implications for clinical and speech therapy practice are manifold. Modern approaches emphasize the need for early recognition of voice and speech disorders, as well as the inclusion of speech therapy as a standard part of the multidisciplinary treatment of Parkinson's disease. The effectiveness of intensive therapeutic programs aimed at increasing loudness and improving self-perception of the voice, such as the *Lee Silverman Voice Treatment* - LSVT LOUD program, which show long-term positive effects on the voice, speech intelligibility and communicative participation of patients, is particularly emphasized [12]. This confirms the importance of an integrative approach that includes neurological, phoniatric and speech therapy aspects in the treatment of hypokinetic dysphonia in Parkinson's disease.

Specific characteristic dysphonias in Parkinson's disease are shown in the table.

Table 1 - Dysphonia profile in Parkinson's disease

Category	Description
Pathology	One aspect of Parkinson's disease and related conditions
Etiology	Degeneration of the substantia nigra dopamine deficiency; various forms: idiopathic, arteriosclerotic, post-encephalitic
Signs and symptoms	Slow, rigid movements of limited range; cogwheel rigidity tremor; reduced or absent facial expression; cognitive decline
Laryngoscopic findings	Normal anatomical structure; incomplete adduction and abduction of the vocal folds; reduced vocal fold mobility; presence of presbylaryngis; prolonged open phase or absence of the closed phase
Expected vocal profile	Weak, breathy voice; increased pitch; reduced maximum phonation time; harsher vocal quality; decreased loudness; monotone voice; delayed voice onset; dysprosody
Acoustic analysis profile	Increased subharmonics; reduced harmonics-to-noise ratio; increased tremor and jitter
Airflow volume and rate	Increased transglottal airflow; reduced air volume and subglottal pressure
Medical-surgical management	Intensive voice treatment consistent with the patient's medical management
Medicinsko-hirurški tretman	Intenzivni tretman glasa usklađen sa medicinskim lečenjem pacijenta.

Conclusion

Hypokinetic dysphonia is a frequent, but often insufficiently recognized and treated manifestation of Parkinson's disease. It arises as a direct consequence of central dopaminergic deficit and hypokinesia of muscles involved in respiration, phonation and articulation, which leads to characteristic changes in voice and speech. These changes include reduced

tivan uticaj na svakodnevnu komunikaciju, socijalne interakcije i emocionalno funkcionisanje obolelih. Smanjena ekspresija lica, hipofonija i ograničena upotreba gestova često dovode do pogrešnog tumačenja pacijentovog emocionalnog stanja od strane okoline, što može rezultirati socijalnim povlačenjem, izolacijom i smanjenim kvalitetom života. Ovi komunikacioni deficiti dodatno opterećuju pacijente i njihove porodice, naglašavajući potrebu za sistematičnim i pravovremenim pristupom njihovom prepoznavanju i lečenju. Pravovremena identifikacija hipokinetičke disfonije, uz detaljnu procenu vokalnih, govornih i paralingvističkih karakteristika, neophodna je za planiranje adekvatnih terapijskih intervencija. Multidisciplinarni pristup, koji podrazumeva saradnju neurologa, fonijatara i logopeda, osnova je savremene nege pacijenata sa Parkinsonovom bolešću. Od posebnog značaja je uključivanje logopedskog tretmana, naročito intenzivnih programa zasnovanih na dokazima, usmerenih na povećanje glasnoće, poboljšanje kontrole glasa i unapređenje komunikacionog učešća. Rezultati savremenih istraživanja ukazuju na potrebu za daljim proučavanjem mehanizama hipokinetičke disfonije, kao i za razvojem i unapređenjem terapijskih pristupa koji će biti prilagođeni individualnim potrebama pacijenata. Rano uključivanje u vokalnu i govornu rehabilitaciju može značajno doprineti očuvanju funkcionalne komunikacije, samostalnosti i opšteg kvaliteta života osoba sa Parkinsonovom bolešću.

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loudness, monotony, breathy vocal quality, prosody disorders and reduced speech intelligibility, as well as significant difficulties in paralinguistic communication. Voice and speech disorders in Parkinson's disease have a pronounced negative impact on daily communication, social interactions and emotional functioning of sufferers. Reduced facial expression, hypophonia, and limited use of gestures often lead to misinterpretation of the patient's emotional state by the environment, which can result in social withdrawal, isolation, and reduced quality of life. These communication deficits further burden patients and their families, emphasizing the need for a systematic and timely approach to their recognition and treatment. Timely identification of hypokinetic dysphonia, along with a detailed assessment of voice, speech and paralinguistic characteristics, is essential for planning adequate therapeutic interventions. A multidisciplinary approach, which involves the cooperation of neurologists, phoniatrists and speech therapists, is the basis of modern care for patients with Parkinson's disease. Of particular importance is the inclusion of speech therapy, especially intensive, evidence-based programs aimed at increasing loudness, improving voice control, and improving communicative participation. The results of modern research indicate the need for further study of the mechanisms of hypokinetic dysphonia, as well as for the development and improvement of therapeutic approaches that will be adapted to the individual needs of patients. Early inclusion of voice and speech rehabilitation can significantly contribute to preserving functional communication, independence and the general quality of life of people with Parkinson's disease.

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