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Review

CHARACTERISTICS OF SPEECH AND SWALLOWING IN PERSONS WITH MULTIPLE SCLEROSIS

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SUMMARY – Inflammation, axonal loss and demyelinating plaques in the brain, which are the background of multiple sclerosis, very often cause changes in speech or dysarthria, in a range from mild to so severe that they impair comprehension of speech by the interlocutor. As a consequence of multiple sclerosis, dysphagia can also occur. The aim of this paper is to present the speech and swallowing difficulties that result from multiple sclerosis, and the importance of assessing the speech and swallowing in people with multiple sclerosis. This article is descriptive and provides a comprehensive overview of the literature dealing with this topic. Speech difficulties impede daily functioning and are often the first sign that other people notice. Swallowing difficulties not only complicate daily life but, if not given sufficient attention, are a possible life-threatening consequence of multiple sclerosis. Assessment of speech and swallowing difficulties should be part of the clinical assessment in each person with multiple sclerosis. As multiple sclerosis progresses, so do speech and swallowing difficulties, and it is of utmost importance to provide appropriate treatment that can alleviate these difficulties. Speech-language pathologists should be part of a team making the diagnosis and providing treatment for a person with multiple sclerosis.

Key words: *Multiple sclerosis; Speech; Swallowing*

Introduction

Multiple sclerosis (MS) is one of the most common chronically degenerative diseases of the central nervous system, which has a variable course of the disease[1,2]. Diagnosis is made through a combination of clinical history, neurological examination, magnetic resonance imaging, cerebrospinal fluid examination, with exclusion of other diagnostic options[3]. The cause is unknown, and several factors appear to be involved and arise as a combination of genetic predisposition and non-genetic triggers from the environment[4]. MS usually affects people between the age of 20 and 50[5]. One person out of 400 is at risk of getting MS, making MS the potentially most common cause of neurological disability in young adults[6]. The prevalence of MS varies by geographical area and has increased significantly worldwide[4,7]. About half of the affected people live on the European continent[8]. Such an uneven distribution of MS in the population can be attributed to genetic and environmental differences[9]. The prevalence of MS

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is higher in the female than the male[10,11]. Women of all races are thought to have a three times higher incidence of MS than men[12]. Because inflammation, axonal loss and demyelinating plaques can occur anywhere in the brain, MS symptoms are often unpredictable, varying from patient to patient, and change over time as the disease progresses[4]. It is estimated that over 80% of people with MS have an initial course with relapses and remissions[5]. Typical symptoms of MS include episodes of sensory disorders (numbness, tingling), walking difficulties (weakness, fatigue, balance problems), and vision problems (diplopia, blurring). Bladder dysfunction, sexual dysfunction, and cognitive and emotional disorders are also frequent[13-16]. An important group of symptoms that often match with MS are speaking difficulties (dysarthria) and swallowing difficulties (dysphagia)[17,18]. The aim of this article is to present speech and swallowing problems that result from MS. Also, the goal is to emphasize the importance of speech and swallowing assessment in people with MS.

Speech in Persons with Multiple Sclerosis

Speech difficulties were associated with MS back in 1868 when Charcot described three symptoms that are still considered to be the most reliable indicators of MS, i.e., tremor, nystagmus, and 'scanning' speech[19]. The term 'scanning speech' or 'staccato speech' is used to describe the intermittent way of pronouncing words, which is one of the most prominent characteristics of dysarthria due to MS[20,21]. Dysarthria is a set of motor disorders which are associated with non-coordination, weakness or paralysis of the muscles, and is caused by damage to the central or peripheral nervous system. Errors in articulation are the most common feature of dysarthria and are accompanied by voice disorders (dysphonia), resonance disorders, and fluency disorders[22].

Respiratory dysfunction is common in patients with advanced MS[23]. Areas of respiratory or phonatory dysfunction due to dysarthria are decreased respiratory support, decreased respiratory or phonatory coordination and control, and decreased phonatory function[24]. Respiratory dysfunction is manifested through respiratory control disorders, respiratory muscle weakness, difficulties with breathing during sleep, acute or chronic respiratory failure, or neurogenic pulmonary edema[23]. Respiratory muscle coordination disorders due to MS are poorly recognized and their diagnosis is a challenge for clinicians[25]. Early identification of people with MS at risk of respiratory complications enables timely treatment involvement and therefore prevention of mortality resulting from unrecognized respiratory dysfunction[23].

Spastic and ataxic dysarthria are the two most common forms of dysarthria in people with MS[26]. A mixed type of dysarthria, with associated spastic and ataxic symptoms, is also very common in people with MS[27]. The severity of dysarthria due to MS varies from mild to severe and is most commonly measured by determining the intelligibility of speech in a person with MS[28]. The severity of dysarthria is closely related to the severity and duration of MS[29]. Dysphonia, as one of the components of dysarthria, is caused by irregularities of the vocal cords[30]. Dysphonia is observed in 70% of people with MS[31]. The characteristics of dysphonia due to MS are poor voice control, changes in intensity and quality of voice, and disturbances in resonance[32]. Symptoms of vocal fatigue, voice interruption, and phonatory instability are prevalent among vocal symptoms, and their impact on daily functioning of a person with MS needs to be further investigated[33]. It can be said that there is a tendency of deterioration of voice parameters due to MS, including values of fundamental frequency and values of frequency variations[34]. Changes, or deviations of fundamental frequency are more common and have significantly greater values in women with MS, while values of frequency variation (jitter) have greater values in men with MS[31]. Maximum phonation time is significantly shorter in people with MS compared to people without MS[34].

There also are differences in speech speed between people with MS and people without MS. Oral motor speed in people with MS is slower compared to speakers without MS[35].

Reported speech difficulties in people with MS can lead to decreased communication involvement and impair the quality of life[36]. The importance of assessing speech in people with MS is reflected both in the process of diagnosis and in monitoring the progress of the disease[37]. Speech therapy is recommended in cases where speech or voice difficulties interfere with communication, reduce the quality of life due to social isolation, or produce stress for people with MS and those in their daily environment[26]. Communication support, known as augmentative and alternative communication, is an integral part of the treatment

of people with more complex speech and language pathology due to neurodegenerative diseases such as MS[38].

Swallowing in Persons with Multiple Sclerosis

Dysphagia is one of the symptoms that presents a challenge in clinical practice of MS patient management[39]. The most common type of dysphagia that occurs as a result of MS is oropharyngeal dysphagia[40]. Disorders caused by dysphagia can further complicate MS[41]. Dysphagia begins to appear as early as the initial stage of MS and becomes more common as the disease progresses[42]. It occurs in approximately 30% of MS cases[43]. The prevalence of dysphagia increases along with the severity of MS. In more severe MS, it occurs in as many as 65% of cases[44]. Complications due to dysphagia are the most common cause of morbidity and death in late stages of MS, which emphasizes the importance of assessing swallowing difficulty especially in individuals with longer disease duration and more severe MS[45]. Diagnostic procedures to assess swallowing status include history, screening evaluation by water-swallow test, and also video-fluoroscopic and fiberoptic endoscopic swallowing assessment[46]. A combination of modified barium swallowing and manometry are also used to assess swallowing ability[47]. In people with MS, food lags in the mouth or pharynx or the food is aspirated to the level of vocal cords or even below vocal cords[48]. Among the most common complications of dysphagia in people with MS are dehydration and aspiration pneumonia[49].

A greater number of patients have difficulties in the oral phase, while difficulties in the pharyngeal phase occur in those with severe disabilities. Already in people with mild MS, it is possible to develop permanent dysphagia, however, it is more commonly diagnosed in people with moderate to severe MS[44].

Symptoms to pay extra attention are coughing and suffocation during meals[44]. People with MS sometimes independently report coughing as they eat and feel that food is diverting the wrong way, however, half of those who have difficulties do not report symptoms on their own[50]. Aspiration, pulmonary infections, and respiratory failure generally occur in patients with longer MS duration[23]. There are confirmed aspirations in all persons with MS who complain of persistent swallowing disorders[51].

The high prevalence of dysphagia in people with MS suggests the importance of establishing a standard protocol for radiological assessment and clinical monitoring of swallowing[40]. The potential risk of aspiration and malnutrition and the high efficiency of swallowing rehabilitation suggest that swallowing function should be evaluated in all MS patients, especially those with greater brain damage and higher levels of disability[43]. Timely assessment can ensure timely treatment and delay of pulmonary complications for as long as possible[40]. People with MS associated with dysphagia have diminished results in all areas of the quality of life associated with swallowing. These findings support initiation to speech-language pathologists for the management of dysphagia from the early stages of MS[39]. The treatment of dysphagia in people with MS is mainly based on functional rehabilitation therapy involving methods of restitution, compensation and adjustment[46]. Symptoms of dysphagia can also be treated pharmacologically, with drug therapy[41]. Neuromuscular electrostimulation is another form of dysphagia treatment and is effective in reducing saliva leakage and aspiration[52]. Swallowing maneuvers and postural strategies lead to increased safety when swallowing[53]. Compensatory strategies in a large number of cases are sufficient to eliminate swallowing difficulties[43]. The magnitude of the impact of speech and swallowing difficulties on a person's quality of life suggest the importance of a multidisciplinary approach to assessment, diagnosis and treatment to ensure the physical and communication integrity of a person with MS[54,55].

The Role of Speech and Language Pathologist in Rehabilitation of People with Multiple Sclerosis

After the speech and swallowing evaluation, which is the first step of speech and language diagnosis in people with MS, the speech therapist has the task of finding which techniques will work best for each individual depending on the severity of the symptoms[22,56]. Systematic monitoring and responsible counseling regarding the communication and swallowing changes that are present, but also those that will occur as MS progresses fall under the responsibility of speech and language therapist too[57].

There are a number of techniques that speech and language therapists use to help people with MS and their voice, speech, and swallowing changes. To alleviate the symptoms of dysarthria in people with multiple sclerosis, speech therapists most often use oral exercises and voice training[24]. Oral exercises aim

to strengthen the muscles of the articulators (tongue, lips, and facial muscles, especially the cheeks) and also the endurance of the throat muscles, which helps speak better but also makes swallowing safer. Also, a speech and language therapist will demonstrate and teach a person with MS to speak clearer. Special attention is paid to teaching a person with MS how to slow down the speech act and articulate, sometimes by using overemphasized articulator movements[58].

Those with MS who have dysphonia will have to develop awareness of irregular patterns of speech and breathing and learn to improve breath support using abdominal breathing and control breathing through respiratory training that emphasizes the importance of proper, deeper inhalation and prolonged exhalation with increased force[29,59].

Speech and language therapists also provide support for swallowing difficulties to people with MS through traditional dysphagia treatment which includes body positioning techniques and diet modifications[60]. Diet modification involves changing the consistency and texture of the food and carefully choosing the type of food (for example, food that is too slippy is avoided)[61,62]. Awareness of difficulties and mistakes and the possibility of self-monitoring of speech and swallowing are some of the important goals that the speech and language therapist will assist a person with MS to learn aiming to contribute to restoring a sense of active control[63]. Unfortunately, speech and language therapists are mainly not part of the teams for diagnosis and rehabilitation of persons with MS, although their knowledge would be a valuable addition in working with people with MS[64].

Conclusions

People with MS often have problems with speech and swallowing. The types of speech problems depend on which region of the brain is affected by the inflammatory processes. Speech and swallowing problems increase as MS progresses. Symptoms range from extremely mild to those that already severely impair the quality of life or are potentially life-threatening. In everyday clinical practice, it is important to emphasize prompt diagnosis of speech and swallowing problems, and this assessment should become part of standard clinical procedures. Appropriate treatment can alleviate speech and swallowing problems, as well as prevent or slow down factors that may increase mortality. Speech and language pathologists should be part of a multidisciplinary team that diagnoses and ensures timely and appropriate treatment for a person with MS.

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Sažetak

POTEŠKOĆE U GOVORU I GUTANJU KOD OSOBA S MULTIPLOM SKLEROZOM

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Upala, gubitak aksona i demijelinizacijski plakovi u mozgu su pozadina multiple skleroze koji vrlo često izazivaju promjene u govoru ili dizartriju u rasponu od blage do toliko teške da narušava razumijevanje govora od strane sugovornika. Kao posljedica multiple skleroze može se javiti i disfagija. Cilj ovog rada je predstaviti poteškoće u govoru i gutanju koje su posljedica multiple skleroze te naglasiti važnost procjene govora i gutanja osoba oboljelih od multiple skleroze. Ovaj članak ima opisni karakter i pruža sveobuhvatan pregled literature koja se bavi ovom temom. Govorne poteškoće ometaju svakodnevno funkcioniranje i često su prvi znak koji drugi ljudi zapaze. Poteškoće s gutanjem ne samo da kompliciraju svakodnevni život, nego su, ako im se ne poklanja dovoljno pozornosti, moguća i za život opasna posljedica multiple skleroze. Procjena poteškoća govora i gutanja bi trebala biti dio kliničke procjene svake osobe s multiplom sklerozom. Kako napreduje multipla skleroza tako napreduju i poteškoće u govoru i gutanju te je od najveće važnosti osigurati odgovarajuću pomoć koja može olakšati te poteškoće. Logopedi bi trebali biti dio tima koji dijagnosticira i pruža liječničku skrb osobi s multiplom sklerozom.

Ključne riječi: *Multipla skleroza; Govor; Gutanje*