

**Multiple Sclerosis: When communication and swallowing
are compromised by cognitive disorders...**

...How to cope with them in daily life?

... How can Speech and Language Therapists help you?

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This booklet has been compiled by the Special Interest Group (SIG) on Communication and Swallowing of Rehabilitation in Multiple Sclerosis (RIMS) and is **relevant to people** affected by MS, as well as their family and caregivers. This is to facilitate understanding of the **significant** relationship between cognitive functions, communication and swallowing. In particular it focuses on the **consequences** of cognitive disorders that are **experienced** in daily life and **offers strategies to cope** with them.

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1. Introduction: Why this booklet?

The announcement of a MS disease is never easy: for the person who is receiving the diagnosis and those who are near and dear it can be traumatic. However, family has a major role to play. Because of the disease, your loved one will have a variety of disabling and difficult symptoms and problems. The most visible are the physical symptoms. However, beyond these problems, more hidden, subtle and complex problems can have an equal impact on daily life. These problems can for example be memory, concentration, or understanding disorders. They are known as cognitive impairments.

This brochure is specifically addressed to patients affected by MS, as well as their family and caregivers, in order to underline the strong relationship between cognitive functioning, communication and swallowing. In particular it focuses on the consequences of cognitive disorders that are experienced in daily life and offers strategies to cope with them.

Many recent studies have focused on **Cognitive deficits (CD)** in Multiple Sclerosis (MS). Despite the great variability in the assessment methodology, it has been found a **prevalence rate up to 70%**. Cognitive impairments have been shown at all stages and in all subtypes of the illness. This means that patients may experience cognitive dysfunctions even in the early stages of the disease course, when there is little, or no physical, disability. The clinical presentation of CD may vary among patients, from mild to rare severe impairments resembling dementia. CD can be very **heterogeneous** from a patient to another. Regardless of the degree of physical disability, illness duration, disease course and demographic variables, CD may have a significant impact on Quality of Life (QoL), leading to a **reduction in daily life activities**.

Fatigue is a common symptom of MS that can be a result of MS itself or it can occur as an adverse effect of treatments. Fatigue may be strongly related to the variability and the severity of cognitive disorders.

Depression and other psychological dysfunctions also have a high prevalence in MS and can interact with CD in a complex way. In particular, CD may interfere with the patients ability to develop effective coping strategies.

To effectively cope with a diagnosis of MS, an individual needs those who are close to be a part of the process. It is natural for you to feel overwhelmed or troubled by all the changes you have to manage. As soon as you feel this way it is very important to talk with therapists to find the most appropriate means to address your concerns.

During speech and language therapy, we also take into account these cognitive deficits. Indeed, as a part of our work, we help the PwMS to cope with breathing, articulation, voice, intonation, language or swallowing disorders. However, our interventions require some adjustments if the PwMS is suffering from cognitive problems. For example, if the patient demonstrates understanding problems, we cannot present our exercises with complex and lengthy instructions.

This brochure's content is intended to explain the problems that are likely to develop in PwMs and give you practical ways to manage them. We will define each disorder and its consequences and explain how we adapt to these challenges during our intervention. We will provide practical advice that can be implemented in daily life.

1.1 Communication

Communication is the complex activity of conveying information through the exchange of thoughts or messages by speech, visual signs, writing or behaviour. Communication is a complex phenomenon in which many domains are involved, such as the ability of understanding what other people are saying or wishing to express, or the ability to convey the intentions and the goals of what we are saying, the content of the message and its utterance or motor execution. It implies the presence of a sender, of a receiver and a communication channel. It involves the ability not only to understand and express messages, but mostly to filter and adapt the content of messages, according to the speakers and the environment.

1.1.1 Speech

Speech is the verbal mean of communicating. It consists of articulation, voice and fluency. **Articulation** refers to how speech sounds are made. **Voice** is the use of the vocal folds and breathing to produce sound. **Fluency** is the rhythm of speech.

1.1.2 Language

Language is the human capacity for acquiring and **using complex systems of communication** both orally and written, **expressive and comprehensive**.

1.1.3 High level language Functions and pragmatics

High Level Language skills refer to those skills that go beyond basic vocabulary, word form, and grammar skills, and **allow adjusting utterances to the required social, work or relationships demands**. In addition to other areas, high-level language skills include development of an advanced vocabulary, understanding word relationships, paraphrasing, reasoning, and developing the ability to look at things from another individual's perspective. **Pragmatic abilities** go further the language itself and **refer more to context factors that are very relevant to give to the message the exact intended meaning**. These abilities include appropriate selection of words, prosody, volume of voice, distance to the other person and of the place and time to say one thing. A correct dealing with these aspects allows to understand another speaker's intended meaning and to convey our intended meaning.

1.2 Swallowing

Swallowing is the function of clearing the food and drink through the oral cavity, pharynx and esophagus into the stomach at an appropriate rate and speed. Commonly, there are three stages in which the swallowing process is divided. The **oral phase** consists in sucking,

chewing, and moving food or liquid into the throat; during the **pharyngeal phase** the swallowing reflex starts, the food is squeezed down the throat, and the airways close to prevent food or liquid aspiration and the choking of the upper esophageal sphincter. In the **esophageal phase** the bolus is transported down the esophagus into the stomach with the peristaltic wave of contraction that propagates down the esophagus.

2. What are the most frequent cognitive disorders observed in PwMS?

Cognitive impairments in MS are highly variable in their severity and in the type of function affected. Studies have shown that MS patients may exhibit deterioration in **executive functions, attention, memory, visuospatial skills**. A significant deterioration in the **speed of information processing** is also common in MS.

2.1 Executive Functions

It is generally accepted that executive functions are responsible for **planning and problem solving, inhibition, organization, flexibility, reasoning and abstraction**. These functions allow someone to adapt to new situations in the environment.

2.1.1 Planning

Planning is involved in problem-solving situations. It is based on the ability to develop a coherent sequence of actions to achieve a given objective. It is therefore necessary to have a fair representation of the situation, develop a set of appropriate strategies and monitor the effectiveness of its actions. Disorders at this level may, for example, result in an **inability to organize and plan movements**.

2.1.2 Problem Solving

Problem solving disorders may lead to difficulties in the process of identifying and implementing a solution to a problem. It may be rather difficult for patients to develop strategies. These **disorders of reasoning, planning and judgment** appear in **abstract and complex activity** requiring a number of operations to reach a final synthesis, such as arithmetic problems or explaining proverbs.

2.1.3 Flexibility

Flexibility difficulties are frequent and show an **inability to control the allocation of attentional resources** to move, or switch, from a sequence of behavior to another. The difficulty may lie in moving the attentional focus, or in the flexibility with which the patient exercises that control.

2.1.4 *Abstract reasoning*

Abstract reasoning disorders may be manifested in a **difficulty in analysing information and solving problems**. Patients may encounter **problems** in different skills such as **forming theories** about the nature of objects, ideas, processes. Moreover it may be **difficult to apply knowledge** in problem-solving using theory.

2.1.5 *Inhibition*

Inhibition is the **ability to resist to non-pertinent information**. This ability enables people to act or talk without being disturbed by non-pertinent information, thoughts or behaviours. It helps us getting rid of previous information that is no longer relevant for the situation. **Inhibition disorders may lead to impulsive behaviours and responses**. It can also influence other cognitive domains.

2.2 *Attention*

Attentional functions are cognitive components **frequently altered in MS**. However, it is still difficult to say with certainty whether the alteration is specific to attentional functions or if it results from a multitude of other factors such as fatigue or a deficit in the working memory . These attention disorders are caused by **difficulty to concentrate for long periods** of time, quick cognitive **fatigability** in tasks requiring significant attentional mobilization and / or require the involvement of other cognitive functions consuming attentional resources. Moreover patients become **easily distracted**, and may **not be able to carry out two or more activities** at the same time.

2.3 *Memory*

The different domains of memory, above all **long-term memory** and the **working memory**, tend to be **systematically affected** in MS. This means that patients may encounter **difficulties in retrieving and storing information and facts of the past**; as a result some elements might be forgotten or even mixed up. Moreover patients may find it **difficult to remember new information**, or **learn instructions** and procedures.

2.4 *Speed of information processing and Working memory*

Slow speed of information processing is very common in PwMS. This cognitive impairment in MS is central and it can either cause, or amplify, other cognitive disturbances. Moreover, even when the cognitive cost required is minimal, patient's responses are slower and less accurate compared to normal population. The slowdown in the speed of information processing can affect working memory. When information is **presented too quickly**, these disorders are increased. Indeed, working memory has no time enough to properly store the information before handling it. As a consequence, **working memory** becomes **rapidly overloaded**. On the other hand when the speed is adapted, the performance gets better. This because additional time would enhance encoding information in memory.

2.5 Spatio-temporal Orientation

Difficulties in spatio-temporal orientation can be observed. They concern the **representation of the body schema** in relation to the environment or the use of spatio-temporal abstract words. For example; **confusion between left and right, weaknesses in reading maps**, diagrams. There can also be **troubles in determining one's own location** in an environment whether it is familiar or not.

2.6 Visuo-spatial perception

Visuo-spatial perception refers to the mental function involved in distinguishing by sight the relative position of objects in the environment or in relation to oneself. Visuo-spatial skills include mental imagery and navigation, distance and depth perception, and visuo-spatial construction. It has been found as one of the most **frequently affected cognitive domain** in MS. Many areas have been described to be impaired, including **visual object recognition, visual perception and discrimination**. However there is a lack of information about visuo-spatial perception, due to the difficulty to adequately assess it, given the frequency of visual sensory losses in MS patients.

2.7 Awareness

Awareness is the state or ability to perceive, to feel, to have the knowledge of, or to be conscious of events, objects, or sensory patterns. In this level of consciousness, sense data can be confirmed by an observer without necessarily implying understanding. Awareness refers to a consciousness of internal or external events or experiences, that is thought by some to separate human and non-human animals. **Patients may underestimate** the importance of the **trouble**. This can lead to a **dichotomy between the patient's self-evaluation** of the trouble and the **objective assessment** of the therapist or the observations of the family.

3. Which troubles can be related to cognitive disorders?

3.1 Communication

A wide range of communication disorders have been described to affect MS and they may be experienced also in the early stages of the disease course. However communication impairments may not necessary result from cognitive disorders. Communication disorders may include changes in the **speech, language, pragmatics and high level language**.

Even a mild impairment of communication abilities may have a **great impact on relevant aspects of patients life**, such as employment and social life. Besides, communication disorders get worse if combined with pain, fatigue or depression, as well as with personal or environment conditions Thus, communication disabilities has shown to reduce participation as defined by the *World Health Organization's (W.H.O.) International Classification of Functioning Disability and Health (I.C.F., 2011)* and may lead to **isolation, depression and loss of independence**. Moreover communicative disorders may reduce the patients compliance to treatments and hence the validity of the rehabilitation itself.

3.1.1 Speech

Speech is produced by the cooperation of different organs: the lungs, the glottis (with the vocal folds) and the articulation tract (mouth and nose cavities). It involves different mechanisms: breathing, voice production, resonance and articulation. The voice is produced when the airflow coming from the lungs crosses the larynx and makes the vocal folds vibrate. This sound is then amplified and modified thanks to the resonators (throat, oral and nasal cavities) and the positions of the various articulators (jaws, tongue, soft palate and lips). This complex ability requires effective, precise and coordinated neurological control. Therefore, neurological lesions can alter one or several mechanisms involved, leading to speech disorders.

People suffering from speech disturbances may have several symptoms such as slow or imprecise articulation, voice difficulties, or production of shorter sentences, for examples.

In MS, the damage to the central nervous system caused by the demyelinated lesions can cause **disturbances of muscular control over the speech mechanism**, producing problems in oral communication due to paralysis, weakness or incoordination of the speech musculature. The reported **prevalence** of dysarthria in MS varies between **40 and 55 %**. The variation in the incidence depends on the severity, duration, and stage of the disease progression.

Dysarthria can occur at various stages of the disease but in general speech disturbance is **uncommon in the initial stage** and tends to occur as later manifestation.

Initially the speech disorder is mild and the severity increases progressively with greater degree of neurological involvement; it is more pronounced in individuals in whom the disease process involves a greater number of neurological systems.

Dysarthria can cause a **decrease of the intelligibility of the person's speech**. In some cases it occurs only in complex situations (surrounding noise, group conversations). In extreme cases it can prevent oral communication and can prevent from having even easy conversation (anarthria, aphonia).

However, although some MS patients do not have noticeable speech difficulties, they may exhibit early deficits in some of the components of speech, such as tongue movement capacity or respiratory and phonatory function.

Since speech and swallowing share some anatomical structures and some physiological mechanisms speech disorders can be associated with swallowing disorders.

It has been shown a strong correlation between the degree of dysarthria in MS and the cognitive-linguistic deficit.

CD may prevent PwMS from adopting effective strategies and behaviors to deal with dysarthria.

The main symptoms of speech disturbances in MS are :

Imprecise articulation (dysarthria) : speech can be slow and slurred, with imprecise vowels and consonants, sudden breakdowns or excessive length of sounds. These difficulties are caused by slowness and weakness of tongue movements, and also to a lesser extent, by difficulties related with movement of lips and jaws.

Voice abnormalities (dysphonia) : there are different types of voice disturbances : harshness, breathiness, hoarseness and strained-strangled voice. The voice intensity may be low and decrease with fatigue. In some cases the person can produce only short utterances. These disturbances are caused by abnormalities of breathing and of the laryngeal system.

Deficits in breathing may consist of poor breath support and lack of breath control for speech. Deficits in the laryngeal system may be caused by hyper- or hypofunction. Sometimes, the voice has an excessive nasal resonance.

Abnormal speech melody (dysprosody) : PwMS may show prosodic disturbances, such as slowness or excessive velocity ; poor or excessive pitch variation ; and excessive variation of loudness. These disturbances are caused by reduced breathing control, by laryngeal and articulatory dysfunction or by poor co-ordination between these components.

3.1.2 Language

3.1.2.1 *Word-finding disturbances:*

Among brain language systems, lexical access is the process that selects and retrieves the right words among those inside our mental lexicon. Patients know the concept of the item, but they **aren't able to retrieve and pronounce the right word**. It may happen that it seems they forget words that they once knew, or that they **substitute a word for another**. In spontaneous speech this disease may be reflected in **inappropriate pauses or hesitations** and no relevant words. These disorders may be the indirect causes of a decrease of speech rate or lack of motivation in conversations.

3.1.2.2 *Aphasia*

Many aspects of language have been described to be impaired in MS. Beyond those, different kind of aphasia syndromes were found in MS. The word aphasia refers to an **acquired impairment of language, both in oral or written language**. However acute **aphasia** seems to be a **rare clinical feature** in MS. Aphasia may also appear in the context of a severe cognitive impairment.

3.1.3 High-level language and pragmatics

Many aspects of the global process of communication may be impaired in MS. However it is common to observe that there is a **wide range of communication disturbances that go beyond language** and refer to an **abnormal use of language** according to the situation, involving then the so called high-level language and pragmatic abilities.

3.1.3.1 *Verbal initiative*

It can happen that some patients may have **difficulties on starting a conversation**, even with a well-known speaker. It may also occur that some patients **cannot provide prompt answers** when required. Moreover they may be not able to express a judgement or an opinion when needed. These disturbances may contribute to **decrease participation in communication**.

3.1.3.2 *Participation in conversations*

Patients may **find it hard to follow conversations**; particularly in complex situations, such as in noisy places, on group conversation, on telephone or while doing something else. This because conversation is a complex activity which requires the ability to pay attention, to

remember and to quickly understand what is being said and meant by the speaker, as well as the capability to keep the main track of conversations and to formulate appropriate messages. Changes in participation were attributed to a variety of factors, including changes in speech, language and cognition, as well as fatigue, depression, social support, visual changes and limited mobility.

3.1.3.3 Turn taking

While having conversations, the listener and the speaker are always switching their role, so that everyone can contribute to the conversation. Facial expressions, eye-contact, feed-back, pauses are unconscious, are cues used to keep talking or allow the other to take over. However some patients may **not be able to respect the alternation between the role of the talker and that of the listener**. This means they may **talk when it is not their turn**, by overlapping to other talkers, **or they may stay quiet** when they are asked to take part to conversation.

3.1.3.4 Comprehension disturbances

Although massive disturbances of comprehension are not common in MS, some **difficulties** appear in the **understanding of long and complex messages**. Moreover, it may be **difficult to understand the implicit meanings** of sentences and to **make inferences**. Patients may get the wrong interpretation of subtle details of language, such as on absurd or ambiguous sentences and metaphors.

3.1.3.5 Message accuracy

Patients may **give information that is not correct or that is not completely accurate**. In this way, they may allow listeners to misunderstand and misinterpret their messages or they assume the wrong impression about what the others are saying.

3.1.3.6 Pertinence

It may occur that some patients may produce inappropriate **answers that are not related** to what was asked. Furthermore patients may show a **poor topic maintenance**, leading to tangentiality and to a **lack of internal coherence**. Moreover they may choose a **content** topic which is **not adequate** or suitable for the situation, so that their messages may be even interpreted as being rude or embarrassing.

3.1.3.7 Completeness of information

Patients may **not be able to make their contribution to conversation as informative as necessary**. They may indeed give **insufficient information**, by leaving out important details. Or they may say too much, by giving **redundant information**. It may happen they go over and over the same ground of conversation or that they carry on talking too long about the same issue.

3.1.3.8 Speech style

Patients may **show difficulties in selecting the appropriate speech style according to the situation** they are in, as well as the listener they are talking to. This means they may not be able to choose the right lexical register or the suitable tone of voice. Their discourses may be **poor of lexical cohesion**. This difficulty may be strongly disabling for patients as far as it can be judged by the listener as inappropriate or even a lack of courtesy.

3.2 Swallowing

Oropharyngeal dysphagia occurs from 33% to 43% of the population in MS and the prevalence increases with rising disability to reach 65% in the most severely disabled subjects. It has also been found that dysphagia could affect the 15% PwMS with mild disability. The most serious complications caused by dysphagia are malnutrition and aspiration pneumonia which has been considered one of the leading cause of death in MS.

The most common MS-related swallowing disorders in the oral and pharyngeal areas are:

Deficit in bolus preparation caused by the hypotonia and incoordination of oro-facial muscles. **The delay in triggering the pharyngeal swallow**, which is the most common problem seen in MS patients, can cause particular difficulties with liquid swallowing, including aspiration. When the pharyngeal swallow is delayed, liquid may splash from the mouth into the pharynx. Because motor control of the pharynx has not been activated by the brainstem, the airway remains open and the upper esophageal sphincter remains closed, causing liquid that enters the pharynx to splash into the open airway and be aspirated.

Reduced laryngeal elevation can contribute to weakened closure of the airway during the swallow and to reduced clearance of material from the pharynx, because the laryngeal elevation is reduced which decreases upper oesophagus opening into the oesophagus thereby causing residue after the swallow and possible aspiration.

Reduction in tongue base activity and/or pharyngeal wall contraction reduces the pressure generated during the swallow, allowing residual food to remain in the pharynx and be aspirated when the patient resumes breathing.

These disorders can be mild, without causing any significant difficulties such as aspiration or inefficient swallow, whereas, they can be more severe and require therapeutic (behavioral) management.

4. How can SLT help patients and caregivers to improve the daily management?

A broad range of cognitive, communicative and swallowing impairments were described above. The daily **management of communication and swallowing** disorders is strongly **influenced** by the presence of **cognitive dysfunctions** and it is indeed **complex**. Therefore it

is obvious that a **multidisciplinary approach is necessary to** pursuit the goal of **increasing the participation** as defined by the *World Health Organization's (W.H.O.) International Classification of Functioning Disability and Health (I.C.F., 2011)*. However this important goal can be achieved only when shared between patients and their caregivers, throughout continuous collaboration and exchange of information. The management of communication and swallowing disorders may be improved by taking into account some simple advices concerning behaviors and strategies to adopt in order to facilitate patient's participation.

Speak clearly!

If the intelligibility of speech is affected, promote conversations that take place in **calm locations**, and avoid sources of distractions.

Encourage to **speak slowly and clearly**, using **shorter and simpler sentences** and **key words**; in this way it is easier to infer true meaning. **Keep eye contact** while talking and **say when you do not understand**, do not let them believe you understood when it is not true. Finally do not **hurry!**

Facilitating word finding

When language is affected, patients may encounter difficulties in retrieving words. Use **facilitation means** in order to avoid stress and frustration. For example; if someone cannot find the word "brush"; you can put your lips as if you produce the sound [b] or produce the first letter or syllable of the word ("B" or "Bru"). You can also create a simple sentence that ends with or contains the searched word. ("for not having hair in a mess, I need a...."). Finally you can **provide a definition** of the requested word.

Involving in conversations

Participation may be reduced, then it would be fundamental to **increase the motivation** to communicate; **involve them in conversations** on topics they are interested in and on which they might have something to talk about; **give them the time** and the **place** to participate; finally show them their contributions are important and that their opinions count.

Respect turn taking

A **mutual cooperation** on conversation is very important, however patients may not be able to respect the existing alternation between the role of talker and listener; **ask PwMs to respect the turn of speech** of each participant as everyone will respect theirs. If the patient cuts the word, **ask him/her to wait until you have finished** your sentence. Encourage the patient to **pay attention to interlocutor's reactions** so as to understand when he/she can talk or not.

Reformulate and rephrase

Sometimes the content of patient's discourses may not be adequate or suitable to the situation. Tell PwMS **if** and **why** his/her responses are not consistent or not clear and complete enough for you to understand. **Ask PwMS to reformulate** the sentences;

otherwise you can **rephrase** what has been said by **synthesizing** and asking the patient if it corresponds to what he/she meant.

All you need is.... Time

Always take into account the slowdown in processing speed: **do not impose time constraints, give time to patients to understand, to think, to do, to speak. Give time** for the patients to integrate information.

The sound of Silence

Additional **time** would therefore **enhance encoding information** in memory. It is then necessary to **insert silence time** to ensure that the instruction has been completely understood and as well to give the patient the opportunity to provide the right answers and to execute the given instructions.

Keep it simple

Abstract reasoning difficulties can be minimized **short and syntactically simple sentences**. Use **clear and concise language** with **concrete terms**. It is also better to **avoid** using unnecessary **metaphors** and requesting **inferential abilities**. **Repeat the instructions** if necessary. An important idea is that activities should be focused on **avoiding to unnecessarily complicate the situation, avoiding additional stress to patients**.

Avoid fatigue

Fatigue is one of the most disabling symptoms of MS. Be aware that fatigue influences all the abilities and may worsen performances. Remember that **patients need to rest regularly. They need to have breaks not only between different activities, but also within an activity itself. Moreover tasks should not last too long.**

Attention, please!

PwMS may encounter difficulties in properly allocating attentional resources between tasks, mostly when occurring simultaneously. However they may struggle even to keep the concentration on the same task. These difficulties are directly related to episodes of extreme fatigue experienced by patients.

Remember that less is better: minimize the amount of information to prevent excessive mental workload. It may be helpful to pace one simple activity at a time, enabling concentration of attention to a single task. Finally, avoid many people trying to communicate all at the same time.

Memory

Memory impairments may interfere with the successful realization of different activities. These disturbances may lead patients not to remember instructions and not to think of doing their daily activities. They may have difficulties in understanding instructions if they are presented at a rapid rate: some information may be partially encoded, or even completely lost. It is therefore necessary to facilitate memory processes by **teaching** the patient **effective encoding and retrieval strategies**. It can be useful to use **semantic cues** (you may have to explain this) to facilitate the easy use of memory. Finally take into account that reduced learning capacity will hinder the use of an alternative communication device.

To be or not to be

A **lack of awareness** is certainly one of the biggest challenges to deal with. Patients may be not aware or may **underestimate their difficulties**, by exposing themselves to possible risks. Moreover they may be non-compliant with the interventions, because they cannot understand and share the objectives of therapy. A **lack of motivation** can be prejudicial for daily trainings and effective rehabilitation. For these reasons it is more effective to share discussions that identify problems and mistakes and the possible way to solve them.

Flexibility and planning

Flexibility and planning disorders can also interfere with daily living. Indeed, it may be difficult for patients to execute instructions, by showing **perseverative behaviors**. It can also be **difficult to switch** from one exercise to the other and to **deal with multiple instructions**. It may be important to **allow the implementation of different strategies of facilitation**.

Eating

Swallowing is realized by both voluntary and automatic actions set sequentially in time and PwMS may experience problems at any point in this process. For example, it may be not easy to chew their food before swallowing. A lack of chewing will lead to obtaining a problematic non-homogeneous bolus that will disseminate throughout the oral cavity and transported to pharynx with risks. Moreover, MS may lead to alterations in sensitivity, as well as motor disorders that may disrupt, delay or cessate the swallowing reflex. Finally a dysfunction in the upper esophageal sphincter opening of the esophagus can prevent the passage of the bolus down into the esophagus.

Firstly, it may be necessary to use **compensation strategies of adjustment of posture and food textures**. Postures and food textures are modified together with the SLT, in relation to patient deficits and abilities. However the implementation of these strategies can be hindered by the presence of cognitive disorders. **Repetition of key instructions and advice is important**, for example to **encourage** adequate chewing.

Make sure that the patient is in a **quiet location** in order to concentrate on intake and **time should not be a constraint** for the meal.

It is important to ensure that the patient is in a optimum and comfortable **sitting position**. Finally, avoid **talking too much to the patients** throughout their meal. This will limit distraction and avoid them trying to engage in conversation whilst trying to eat

5. Conclusion

The aim of this brochure's content is to set out and explain the strong relationship between cognitive functions and communication and swallowing.

It has been written specifically to address the information needs of patients affected by MS, their family and caregivers, and to outline the consequences of cognitive disorders on daily life. It sets out ways of coping with the problems and offers practical advice that can be used in daily life

It defines each disorder, its consequences and challenges, and explains how speech and language therapists adapt their interventions to meet these challenges..

It is importantt to remember the points discussed , and guidelines proposed ,are not comprehensive and any problems must be regarded with caution and discussed with the appropriate health expert. Keep in mind that the symptoms of patients will vary depending on their age, sex, MS course, duration of disease, location of associated lesions, etc..

Ultimately, therapists may help you to find the most appropriate means to address your concerns in order to **improve the quality of life** of PwMS and pursuit the goal of **increasing the participation** as defined by the *World Health Organization's (W.H.O.) International Classification of Functioning Disability and Health (I.C.F., 2011)*.

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