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REVIEW ARTICLE

A Report of Assessment Tools for Individuals with Dysarthria

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Abstract:

Introduction:

The development of assessment tools for individuals with dysarthria has been reported in many clinical and empirical studies.

Methodology:

A literature review was based on online resources including Google Scholar, EBSCO, Medline, PubMed, and BIOMED Central articles and journals.

Results and Conclusion:

In this paper, we summarized the commonly used formal and informal assessment tools and explained the assessment procedure when managing clients with dysarthria. We aimed to share the current practice of speech-language pathologists together with the allied health service providers in the management of patients with dysarthria.

Keywords: Dysarthria, Assessment tools, Speech-language-pathologist, Measurement , Procedure, Acquired progressive neurological disorders.

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1. INTRODUCTION

Dysarthria is a communication disorder resulting from acquired progressive neurological disorders such as Parkinson's disease, motor neuron disease, multiple sclerosis, and Huntington's disease [1]. Dysarthria could have an impact on the overall communication ability, speech intelligibility, and an individual's ability to participate and interact in daily life situations.

Dysarthria is categorized based on the clinical signs and symptoms displayed by an individual. For instance, flaccid dysarthria is due to the damage to the lower motor neuron. On the other hand, upper motor neuron abnormalities could cause spasticity. Damage to the cerebellum causes ataxic dysarthria, while damage to basal ganglia causes hyperkinetic and hypokinetic types of dysarthria [2]. Other types of dysarthria include mixed dysarthria, when more than one symptom of the different types of dysarthria is present. Individuals with dysarthria have issues with strength, speed, volume, vocal quality, tone, breath control, pitch, range, and steadiness of speech [3]. Treatment techniques are determined by the effects of the impairment and the affected speech motor components to reduce client's difficulties in communication [4]. The aims of therapy are targeted to improve their relationships and interaction with friends and family, as well as their participation at the workplace [5]. Recent studies have identified the inability to produce speech by individuals with dysarthria which is accompanied by a lack of cognitive function [6 - 10], neurological mental state [11], and language [12 - 14]. In conclusion, the treatment process for individuals with dysarthria is focused on improving their speech production, social participation, and cognitive function abilities.

In the following sections, we will describe and summarize the assessment procedures and available assessment tools that speech-language pathologists commonly use when assessing individuals with dysarthria.

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2. THE GOALS OF DYSARTHRIA ASSESSMENT

In general, the assessment focuses on the subsystems of speech, including respiration, phonatory, resonance, prosody, and articulation. At the same, speech-language pathologists also assess individuals with dysarthria's social participation and the need of daily activities as recommended by the World Health Organization (WHO) [4].

3. DYSARTHRIA ASSESSMENT TYPICAL COMPONENTS

3.1. Case History

Case history usually consists of obtaining information about hearing, vision, swallowing, and language problems that patients have, followed by medication history which could include any side effects that they may face with certain medication. Other information includes patient's personal information such as information regarding family, education level, and patients' language proficiency in all language modalities. Patient's communication needs, as well as family's expectation for therapy, will be noted during the case history taking session.

3.2. Oral Motor Examination

The oral motor assessment aims to assess the accuracy, range, strength, and speed of the lips, tongue, and jaw movements. The oral motor assessment consists of observation of the neck and facial muscle tone during non-speech "rest" state [15], by performing the cranial nerve exam to identify oral and facial symmetry. Tongue movement coordination, speed of motion, range of motion, and strength will be assessed by performing sequential motion rates and alternating motion rates [16]. The speech-language pathologist may request the patient to perform sustained vowel prolongation ("aaaa") in order to assess the sufficiency of respiratory support.

3.3. Speech Production Examination

During the assessment, the speech-language pathologist will ask the patient to count (from 1-10), read aloud (word, phrase, sentence), and engage the patient in a brief spontaneous conversation. The aim is to understand the ability of patients to follow simple and complex instructions, whether there are any changes in pitch, tone, and loudness with the conversation, accuracy of speech production, speech rate (*i.e.*, talking too slow or too fast) and speech intelligibility. At this stage, a variety of words used and sentence complexity were used as criteria to exclude the presence of apraxia of speech.

4. ASSESSMENT TOOLS

The accurate diagnosis of the types of dysarthria is important in developing an effective treatment program for patients. At present, assessment tools used by speech-language pathologists could be divided into two types, namely formal and informal assessment tools [17]. In this paper, we summarize the commonly used assessment tools that speech-language therapists used in clinic settings as presented in (Table **1**). The most commonly used formal assessment tool by speech-language pathologists is the Frenchay Dysarthria Assessment (FDA) [18, 19]. According to Duffy [20], the FDA is the only standardized published test for the diagnosis of dysarthria. However, there are other assessment tools used for the diagnosis of dysarthria such as the Dysarthria Profile [21], Dysarthric Speech [22], and Voice Handicap Index [23]. Meanwhile, the informal assessment in terms of the oral motor examination is used alongside the formal assessment [17]. Perceptual assessment continues to be the golden standard practice for speech-language pathologists when assessing patients with dysarthria [24]. These perceptual judgments are subjective as the accuracy of the assessment finding depends on the clinicians' expertise in active listening and analysing the speech [18, 19].

Table 1. Assessment tools commonly used by speech-language pathologists.

Formal assessments	Informal assessments
Frenchay Dysarthria Assessment [20]	Oral motor examination
Dysarthria Profile [27]	Client/significant other ratings of social participation
Therapy Outcome Measures [28]	–
Voice Handicap Index [23]	–
Functional Communication Profile [29]	–
Assessment of Intelligibility of Dysarthric Speech [30]	–
Dysarthria Impact Profile [31]	–
Intelligibility Rating Scale [20]	–
Social -Networks [32]	–

Another assessment protocol used by speech-language pathologists is to assess the effectiveness of communication abilities in social contexts [25]. The idea is to incorporate the patient's communicative impairment, limitation of activities and participation restriction brought about by dysarthria [26] and to improve these limitations through speech rehabilitation. When the speech-language pathologists have a clear understanding of the individuals' condition, the treatment can be carried out guided by the assessment's findings [18].

4.1. Outcomes of the Assessment

Through the formal and informal assessments, the speech-language pathologists could obtain their patient's speech characteristics and severity, the differential diagnosis between the types of dysarthria, and the identification of the presence of associated impairments such as dysphagia. Such information could be used to develop an individualized intervention plan with the patients and their family, or referral to other specialists such as physiotherapist or audiologist.

CONCLUSION AND FUTURE STUDIES DIRECTIONS

In this paper, we described and summarized the current assessment tools for individuals with dysarthria. The procedure of a typical assessment of a patient is explained so that other allied health professionals could gain ideas on how speech-language pathologists assess individuals with dysarthria. It is recommended that individuals with dysarthria is assessed in a holistic manner, which includes formal and informal assessments, and to include their family members into the team of care providers with the incorporation of typical social situations. As allied health service providers, it is also

recommended to implement the International Classification of Functioning, Disability, and Health (ICF) and Clinical Excellence (NICE guide) into speech rehabilitation management. While the ICF framework enhances the understanding and awareness of impairments for patients with dysarthria, the NICE guide aims at developing excellent clinical practices using guiding principle outlines for the efficient delivery of clinical services. It is hoped that these procedures will improve the quality of services and simultaneously enhance the clients' satisfaction and assist in improving their quality of life.

CONSENT FOR PUBLICATION

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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