Treatment Manual in Malayalam for Developmental Apraxia of Speech (TMMDAS)

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Abstract

Developmental Apraxia of speech (DAS) has been and remains a controversial entity in the field of communicative disorders in terms of its diagnostic label, heterogeneity in symptoms and in the remediation techniques proposed. Considering this a treatment manual in Malayalam for DAS is developed incorporating the principles and factors applicable for the treatment of DAS. The underlying principle of the manual is to facilitate the voluntary skills of the child at various levels of linguistic units. The manual is in accordance with the general treatment guidelines suggested for DAS in the literature and also based on the linguistic rules of Malayalam language. The manual is developed for the use of Speech-language therapists and also the Parent/Caretakers. The manual includes five main sections-oromotor exercises, sounds, words, sentences and prosody. Each section contains activities, games and pictures to elicit and generalize the target responses.

Introduction

Developmental apraxia of speech (DAS) is a condition where children have difficulty formulating and executing motor plans for voluntary speech. Caruso & Strand (1999) defined DAS as the inability or difficulty to perform purposeful voluntary movements for speech in the absence of paralysis or weakness of the speech musculature. They also have difficulty positioning and sequencing movements of muscles specifically for speech. DAS is also known as developmental motor aphasia, articulatory apraxia, developmental verbal apraxia etc.

Children with DAS are found to have multiple speech sound errors like omissions, substitutions etc and also have difficulty in sound sequencing like metathetic errors. These errors increase in number with phonetically more complex sounds. They also exhibit movement characteristics like difficulty imitating and maintaining articulatory configurations, groping behaviour. Dysprosody in speech is another hallmark of the condition which may include features such as slow rate, inappropriate or longer pauses, reduced stress variation and errors in syllabic stress. The condition could be associated with language disturbances and oral apraxia.

All the core features of DAS may not be exhibited by all clients with DAS. There is wide variability reported in the symptoms exhibited by DAS. Crary (1993) defined DAS as a motolinguistic disorder of speech-language development in which speech, motor and language deficits parallel each other. So, it is very important to diagnose DAS as early as possible and start the intervention strategies. The problem then arises as to how and when to start therapy, which are the different approaches available and which technique to be chosen.

The different approaches and treatment techniques already available in the literature have their own limitations. They lack sufficient description, lack objectivity and there are

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limited efficacy studies. Most of the efficacy studies are retrospective in nature and actual data regarding ongoing trends in the acquisition of speech skills are not available. Many specialized approaches to developmental verbal dyspraxia emphasize specific aspects of traditional articulation therapy but de-emphasize other aspects. For example, Love & Fitzgerald (1984) recommend that auditory discrimination drills and rule based phonologic approaches to articulation training should be de-emphasized and imitation of articulatory postures, teaching of phonetic placement, auditory visual sound stimulation and motor repetition should be stressed. Thompson (1988) advocated a management program that includes oral-motor and oral-sensory training, developing articulatory postures, training sound sequences and using speech training associated with rhythm, hand and or body movement. Yoss & Darley (1974) suggested a bottom up approach for DAS with nine sequential steps.

There are few treatment manuals for DAS cited in the literature. Pannbacker (1988) reported that the effectiveness of most developmental verbal dyspraxia (DVD) treatment programs is essentially unknown. There are several problems reported in the management of developmental verbal dyspraxia. Many of the approaches so far reported have been based on single cases or on very few children. Few reports are available that document the response of a group of DVD children to a given technique. Moreover, many of the reported approaches have not been well described and cannot be replicated satisfactorily.

Table 1: Status of selective therapy approaches available for DAS (Pannbacker, 1988)

Type of therapy	General effectiveness
Adapted cueing technique (ACT)	Generally untested
Auditory integration	Untested
Hierarchies, movement sequencing, systematic drill	Preliminary results: efficacious
Melodic intonation therapy	Generally untested
Non speech	Generally untested
Prompts for restructuring oral muscular phonetic targets (prompt)	Untested
Signed target phoneme	Generally untested
Total communication	Preliminary results: efficacious
Touch-Cue system	Untested

Based on Pannbackers (1998) review it is seen that several approaches are effective to some degree with a children with DAS and there is yet no technique of choice. Researchers in the recent years have realized the importance of a structured manual for treatment of DAS. There is dearth of treatment manuals in literature and this is especially true with respect to Indian languages except in Hindi (Rupela, 2002). Hence an attempt has been made to develop a treatment manual in Malayalam for DAS based on the principles of treatment for DAS.

Objective

- To develop a treatment manual in Malayalam language for children with DAS.

Scope of the manual: This manual is meant for:
- Student clinicians trained in the field of speech-language pathology
- Practicing speech-language professionals.
- Parents/caregivers of children with DAS.

Recommended conditions and description for use of the manual:

- The manual should be used for only those children who are diagnosed as having DAS by a qualified speech-language pathologist.
- The manual provides a set of oro-motor exercises for strengthening the oral musculature.
- It also provides activities for elicitation of speech at sound level to contextual sentences.
- The manual also contains a section to correct the prosodic aspects of speech.
- The user should read the instructions completely before using the manual.
- The clinician can start from any section depending upon the level of performance of the client.
- More number of activities can be worked upon based on the client's interest.
- The clinician should record the responses obtained from the client.

Method

Treatment Manual in Malayalam for Developmental Apraxia of Speech (TMMDAS) can be used with those Malayalam speaking children who are diagnosed as having Developmental Apraxia of Speech (DAS) by a qualified speech language pathologist. The manual can be administered soon after the identification of apraxic features in them. It can be started from any section depending upon the baseline speech output level of the client. Clear instructions are given for various exercises in the various sections and this manual can be used by speech language therapists and the parents/caregivers of the child.

The manual is developed based on the general principles of treatment for DAS given in the literature and also based on the linguistic rules of the Malayalam language. It follows a sequential pattern through hierarchies of task difficulties as described below:

- strengthening exercises for oro-motor musculature
- visible sounds before the less visible sounds
- vowels before consonants.
- frequently occuring sounds followed by the less frequently occuring sounds.
- early developing sounds before the later developing sounds.
- use of multi modality inputs.
- use of intensive systematic drill.
- gradation of exercises from sound level to words and then to sentences.
- facilitates response accuracy with systematic use of rhythm, intonation, stress and motor movements.

Development of the manual

The manual is divided into five sections: These include: 1) Oro motor exercises; 2) Sounds; 3) Words; 4) Sentences; and 5) Prosody

- **Oro motor exercises:** This section is developed for those subjects who exhibit weakness in their articulators like lips, tongue, jaw, palate etc.

    ❖ **Strengthening exercises:** This section is further divided into

    o Exercises to strengthen the jaw
    o Exercises to strengthen the tongue
    o Exercises to strengthen the lips

- o Exercises to control drooling
- o Exercises to improve sucking.
- o Exercises to reduce tongue thrust.
- ❖ **Exercises to prepare the oral structures for the production of vowels**: This section contains exercises
  - o To control opening of the mouth.
  - o To control spreading of lips.
  - o To control puckering of lips.
- ❖ **Exercises to prepare the oral structures for the production of consonants:** This section describes exercises to strengthen the jaw, tongue and lips.

  All the above mentioned exercises include direct motoric approaches like massaging and facilitatory techniques like sucking, blowing etc.

- • **Sounds:** This section is divided into two parts
  - ❖ Chapter 1 – Vowels
  - ❖ Chapter 2 – Consonants

Note: The script used to represent different vowels and consonants in Malayalam is based on Roman Transliteration (Schiffman 1978).

Chapter 1 Vowels: This section describes production of 11 vowels and 2 diphthongs in Malayalam. The 11 vowels include 6 short vowels and 5 long vowels.

Table 2: Vowels present in standard spoken Malayalam

	high			**mid**		**low**
Long	ii,		uu	ee,	oo	aa
Short	i,	u,	U	e,	o	a

This section describes normal production of each vowel with the help of pictures. It contains activities to help in the correct production of these sounds and facilitatory activities for the production of each vowel. The following part includes practice exercises for vowels and teaching of long vowels through ear training. This also includes inclusion of music and dance for making the practice exercises more interesting. At the end of this section a set of three games are given for eliciting the vowels.

Chapter 2 Consonants: The consonants in Malayalam are described in this section and they are as follows.

Table 3: Stops affricates and nasals present in standard spoken Malayalam

	Voiceless unaspirated	**Voiceless aspirated**	**Voiced unaspirated**	**Voiced aspirated**	**Nasals**
Bilabials	|p|	|ph|	|b|	|bh|	|m|
Dental	|t|	|th|	|d|	|dh|	|n|
Alveolar	|t|	|th|	|d|	|dh|	|n|
	|t|				|n|
Palatal	|c|	|ch|	|j|	|jh|	|n|
Velar	|k|	|kh|	|g|	|gh|	|nn|

Table 4: Fricatives, laterals and other consonants present in standard spoken Malayalam

	Fricatives		Laterals		Flap		Trill		Continuants	
	Vl	Vd	Vl	Vd	Vl	Vd	Vl	Vd	Vl	Vd
Ladiodental	|f|									|v|
Alveolar	|s|			|l|		|r|		|R|		
Retroflex	|s|			|l|						
Palatal	|s|			|l|						|y|
Glottal		|h|								

Vl-Voice Less, Vd-Voiced

This section describes the correct production of all the consonants by combining them with the vowel |a| to form a syllable. This section also contains activities for the elicitation of different syllables. It further contains activities to teach

- voiced sounds.
- nasal sounds.
- aspirated sounds.

Practice work for consonants

This section includes activities where the consonants have to be combined with different vowels to stabilize the production of the various consonants. Activities with music and dance are also included to make practice of activities more interesting.

Games

This section contains few games to motivate the child to produce the sounds and make the activities interesting.

- **Words:** This section is divided into three chapters.
  - ❖ **Exercises to overcome the errors in word production:** This is a preliminary step before starting with the words and this section includes
    - o Exercises to overcome groping and silent posturing of the articulators.
    - o Activities to correct prolongation and omission errors.
    - o Activities to correct distortions and addition errors.
    - o Activities to correct sequencing of sounds.
  - ❖ **Words for vowels:** The word list consists of a set of words starting with each vowel. Different sets of words starting with different vowels are arranged in a sequential order of the vowels. Words starting with the same vowel are arranged in an order VCV, VCVC, depending upon the complexity of words, frequency of occurrence of words and also based on familiarity of these words. Words with vowels occurring in the initial, medial and final positions are also included. The short vowel |o| does not occur in the word final position. The vowel 'U' occurs only in final position and sometimes in the medial position in free variation with |u|. The remaining vowels occur in all the three positions, viz., initial, medial and final positions in words.
  - ❖ **Words for consonants:** This section is subgrouped into words with a particular consonant occurring in its initial, medial and final positions. The subgroups are classified according to the sequential order of the consonants. Among these consonants most of the stops and fricative sounds occur in initial and medial positions and not in the final position. The occurrence of other sounds like the

nasals, laterals and trills, in initial, medial and final position are described in the following table.

Table 5: Occurrence of sounds in initial medial and final positions

Sound	Initial	Medial	Final
|m|	Yes	Yes	Yes
|n|	Yes	Yes	No
|n|	Yes	Yes	No
|n|	No	Yes	Yes
|n|	No	Yes	Yes
|n|	No	Yes	No
|l|	Yes	Yes	Yes
|l|	Yes*	Yes	Yes
|l|	No	Yes	No
|r|	Yes	Yes	No
|R|	Yes	Yes	Yes

Yes – Indicates the occurrence of the sound in the position mentioned

No – Indicates that the sound does not occur in that position

*   – Very few instances of occurrence

The words are arranged in a simple to complex order combining them with different vowels from \|a\| to \|au\|.

The word list for consonants contains another section consisting of words with geminated sounds, words with final consonant endings and words with few clusters. The words for the vowel and consonant lists were selected from the nursery books and other storybooks for kids. The word list for both vowels and consonants were selected based on a familiarity rating scale obtained from normal subjects. Five native Malayalam speakers (1 male and 4 female) in the age range of 17-25 years were selected and were asked to rate the words on a 5 point familiarity rating scale as given below:

5	-	Most familiar
4	-	Familiar
3	-	Familiar to some extent
2	-	Least familiar
1	-	Not at all familiar

The words that were rated as familiar and most familiar were selected for the final list. The frequency of occurrence of the words in the language was also considered while selecting. For few of the words pictures are provided. A minimum of 2 games are given at the end of the section to facilitate drilling of the sounds.

- **Sentences**

This section consists of a set of sentences to drill the words. The content words in the sentences are selected from the word list and are combined to form meaningful sentences of about 2 to 5 or 6 word sentences arranged in a hierarchy of complexity. The sentences are also grouped according to the different vowels and consonants. This section is further divided into two.

❖ **Part I:** Consists of sentences focussing on drilling the vowels and consonants.

❖ **Part II:** consists of sentences with words chosen from Chapter III of the word list i.e. words with geminated sounds, clusters and final consonant endings. A minimum of 2 games are given at the end of the section to facilitate drilling.

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- **Prosody**

This section can be used for those children who speak in phrases and sentences but who do not use intonation, stress, rhythm and timing appropriately. This section is further divided into four as follows:

❖ **Treatment for intonation:** People use different types of intonation patterns to express their feelings and emotions like a falling pattern for a statement and a rising pattern for a question. Ear training to listen to the different intonation contours is suggested. Activities for use of affective intonation to indicate different emotions like happiness, sorrow, anger, surprise etc. are also provided. Exercises are given to facilitate generalization in sentences.

❖ **Treatment for stress:** This is further divided into 3 sets of activities in order to correct

  o **Word stress:** The pattern of stressed & unstressed syllables at the word level.
  o **Phrasal stress:** The most prominent syllable or word in a sentence.
  o **Emphatic stress:** The prominence used to contradict the expectations of the listeners.

❖ **Treatment for Rhythm:** Rhythm is conveyed by prosodic components like tempo, intonation and stress and also the segmental speech sounds. Activities to improve stress sequences and continuity of speech are suggested in this section.

❖ **Treatment for tempo:** Tempo represents the composite factors related to the timing of speech. This section contains activities for the treatment of

  o **Rate:** Activities to achieve appropriate rate are given through modelling.

  o **Phrasing:** Clients are given sentences which have a double meaning and are asked to read them with appropriate phrasing so that the two meanings are evident.

The general pattern of treatment as described in this manual should be followed and more number of activities depending upon the client's abilities and interests and the clinician's imagination and creativity can be included.

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