



Construction of an Auditory
Bombardment Therapy Program
for the Egyptian Arabic Speaking children
with Functional Speech
Sound Disorders

Thesis

Submitted for the Partial Fulfillment of the
Requirement
of Master Degree in **Phoniatrics**

By

Mona Mosaad Mahmoud Ahmed

M.B., B.Ch.

Resident of Phoniatrics, Faculty of Medicine, Ain Shams University

Supervised by

Prof. Dr. Nahla Abd-ElAziz Rifaie

*Professor of Phoniatrics and Head of Phoniatrics Unit
Faculty of Medicine - Ain Shams University*

Dr. Dina Ahmed Elrefaie

*Lecturer of Phoniatrics
Faculty of Medicine - Ain Shams University*

Faculty of Medicine - Ain Shams University
2020

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

صدق الله العظيم

سورة البقرة الآية: ٣٢

Acknowledgments

*First and foremost, I feel always indebted to **Allah** the Most Beneficent and Merciful.*

I would like to express my deepest appreciation and profound gratitude to Prof. Dr. Nahla Abd-ElAziz Rifaie, Professor of Phoniatics and head of Phoniatics unit, Faculty of Medicine, Ain Shams University, for her support and efforts to this work and whatever has been said is little to express my thanks.

I would also like to thank Dr. Dina Ahmed Elrefaie, Lecturer of Phoniatics, Faculty of Medicine, Ain Shams University, for her valuable advice, her help and support.

*I am also thankful for all **staff members** and all my **colleagues** in the phoniatics unit in Ain Shams University, for their help and support.*

*Endless thanks for my great **family**, my **husband** (the mate of my journey), my lovely **daughter "Talía"** and my **friends** for their love and support.*

*Finally, very special thanks and love to my **parents** who always encourage me the most throughout my life and support me reaching my dreams.*

Thank you all, Mona

List of Contents

Title	Page No.
List of Abbreviations	5
List of Tables	6
List of Figures.....	12
Introduction.....	- 1 -
Aim of the Work.....	17
Review of Literature	
Chapter (1): Speech Sound Production and its Disorders	18
Chapter (2): Assessment of Speech Sound Disorders.....	32
Chapter (3): Phonological Approaches to Correct Errors of Speech Sound Production.....	40
Subjects and Methods	64
Results	70
Discussion	122
Summary.....	127
Conclusion and Recommendations	131
References.....	132
Appendix.....	148
Arabic Summary	

List of Abbreviations

Abb.	Full term
<i>ASHA</i>	<i>American Speech-Language-Hearing Association</i>
<i>MATPP</i>	<i>The Mansoura Arabic test for phonological processes</i>
<i>MLR</i>	<i>Mean length of response</i>
<i>MLU</i>	<i>Mean length of utterance</i>
<i>PACT</i>	<i>Parents and children together</i>
<i>PCC</i>	<i>Percentage of Consonants Correct</i>
<i>S</i>	<i>Strong</i>
<i>SSD</i>	<i>Speech sound disorders</i>
<i>W</i>	<i>Weak</i>

List of Tables

Table No.	Title	Page No.
Table 1:	The demographic data of group (1) and group (2) regarding chronological age, IQ, language age.	71
Table 2:	Comparison between group (1) and group (2) regarding the results of the articulation test before receiving the therapy.....	73
Table 3:	Comparison between group (1) and group (2) regarding the results of the articulation test after receiving therapy.....	75
Table 4:	Comparison between the results of the articulation test of group (1) before and after receiving conventional therapy.....	77
Table 5:	Comparison between the results of the articulation test of group (2) before and after receiving conventional therapy and auditory bombardment.....	78
Table 6:	Comparison between the differences of group (1) and group (2) regarding the articulation test results.....	79
Table 7:	Comparison between group (1) and group (2) in consonant assimilation processes regarding test for identification for phonological processes before receiving the therapy.....	82
Table 8:	Comparison between group (1) and group (2) in consonant assimilation processes regarding test for identification for phonological processes after receiving the therapy.....	84

List of Tables cont...

Table No.	Title	Page No.
Table 9:	Comparison between the results of consonant assimilation processes regarding test for identification for phonological processes of group (1) before and after receiving the conventional therapy.....	86
Table 10:	Comparison between the results of consonant assimilation processes regarding test for identification for phonological processes of group (2) before and after receiving the conventional therapy and auditory bombardment.....	88
Table 11:	Comparison between the differences in consonant assimilation processes regarding test for identification for phonological processes of group (1) and group (2).....	89
Table 12:	Comparison between group (1) and group (2) in voicing changes regarding test for identification for phonological processes before receiving the therapy.....	92
Table 13:	Comparison between group (1) and group (2) in voicing changes regarding test for identification for phonological processes after receiving the therapy.....	93
Table 14:	Comparison between the results of voicing change regarding test for identification for phonological processes of group (1) before and after receiving the conventional therapy.....	94
Table 15:	Comparison between the results of voicing change regarding test for identification for phonological processes of group (2) before and after receiving the conventional therapy and auditory bombardment.....	95

List of Tables cont...

Table No.	Title	Page No.
Table 16:	Comparison between the differences of group (1) and group (2) in voicing change regarding test for identification for phonological processes	96
Table 17:	Comparison between group (1) and group (2) in syllable-structure processes regarding test for identification for phonological processes before receiving the therapy.....	98
Table 18:	Comparison between group (1) and group (2) in syllable-structure processes regarding test for identification for phonological processes after receiving the therapy	99
Table 19:	Comparison between the results of syllable-structure processes regarding test for identification for phonological processes for group (1) before and after receiving the conventional therapy.....	100
Table 20:	Comparison between the results of syllable-structure processes regarding test for identification for phonological processes for group (2) before and after receiving the conventional therapy and auditory bombardment.....	101
Table 21:	Comparison between the differences of group (1) and group (2) in syllable-structure processes regarding Test for identification for phonological processes	102

List of Tables cont...

Table No.	Title	Page No.
Table 22:	Comparison between group (1) and group (2) in substitution processes regarding test for identification for phonological processes before receiving the therapy.....	104
Table 23:	Comparison between group (1) and group (2) in substitution processes regarding test for identification for phonological processes after receiving the therapy.....	105
Table 24:	Comparison between the results of substitution processes regarding test for identification for phonological processes for group (1) before and after receiving the conventional therapy.....	106
Table 25:	Comparison between the results of substitution processes regarding test for identification for phonological processes for group (2) before and after receiving the conventional therapy and auditory bombardment.....	107
Table 26:	Comparison between the differences of group (1) and group (2) in substitution processes regarding test for identification for phonological processes.....	108
Table 27:	Comparison between group (1) and group (2) in unusual processes regarding test for identification for phonological processes before receiving the therapy.....	110

List of Tables cont...

Table No.	Title	Page No.
Table 28:	Comparison between group (1) and group (2) in unusual processes regarding test for identification for phonological processes after receiving the therapy.....	111
Table 29:	Comparison between the results of unusual processes regarding test for identification for phonological processes for group (1) before and after receiving the conventional therapy.....	112
Table 30:	Comparison between the results of unusual processes regarding test for identification for phonological processes for group (2) before and after receiving the conventional therapy and auditory bombardment.....	113
Table 31:	Comparison between the differences of group (1) and group (2) in unusual processes regarding Test for identification for phonological processes.....	114
Table 32:	Comparison between group (1) and group (2) in total scores of phonological processes regarding test for identification for phonological processes before receiving the therapy	116
Table 33:	Comparison between group (1) and group (2) in total scores of phonological processes regarding test for identification for phonological processes after receiving the therapy	117

List of Tables cont...

Table No.	Title	Page No.
Table 34:	Comparison between the results of total scores of phonological processes regarding test for identification for phonological processes for group (1) before and after receiving the conventional therapy.....	118
Table 35:	Comparison between the results of total scores of phonological processes regarding test for identification for phonological processes for group (2) before and after receiving the conventional therapy and auditory bombardment.....	119
Table 36:	Comparison between the differences of group (1) and group (2) in total scores of phonological processes regarding test for identification for phonological processes.....	120

List of Figures

Fig. No.	Title	Page No.
Figure 1:	Causes of speech sound disorders.....	22
Figure 2:	The place of articulation for bilabial, alveolar, and palatal-velar stops and nasals.	25
Figure 3:	The place of articulation for the fricatives: labiodental, linguadental, alveolar and palatal.....	26
Figure 4:	Onset-rhyme syllable tree.....	53
Figure 5:	Mora syllable tree.....	54
Figure 6:	The demographic data of group (1) and group (2) regarding chronological age and language age.	72
Figure 7:	The demographic data of group (1) and group (2) regarding IQ.	72
Figure 8:	Comparison between the differences of group (1) and group (2) regarding the articulation test results.....	80
Figure 9:	Comparison between the total difference of group (1) and group (2) regarding the articulation test results.....	80
Figure 10:	Comparison between the differences of group (1) and group (2) in consonant assimilation processes regarding test for identification for phonological processes.....	90
Figure 11:	Comparison between the total difference of group (1) and group (2) in consonant assimilation processes regarding test for identification for phonological processes.....	90

List of Figures cont...

Fig. No.	Title	Page No.
Figure 12:	Comparison between the differences of group (1) and group (2) in voicing change regarding test for identification for phonological processes.....	96
Figure 13:	Comparison between the total difference of group (1) and group (2) in voicing change regarding test for identification for phonological processes.....	97
Figure 14:	Comparison between the differences of group (1) and group (2) in syllable-structure processes regarding test for identification for phonological processes.....	103
Figure 15:	Comparison between the differences of group (1) and group (2) in substitution processes regarding test for identification for phonological processes.....	109
Figure 16:	Comparison between the differences of group (1) and group (2) in unusual processes regarding test for identification for phonological processes.....	115
Figure 17:	Comparison between the differences of group (1) and group (2) in total scores of phonological processes regarding test for identification for phonological processes.....	121

ABSTRACT

Speech sound disorder is a communication disorder in which children have persistent difficulty saying words or sounds correctly. Speech sound production describes the clear articulation of the phonemes (individual sounds) that make up spoken words. It requires both the phonological knowledge of speech sounds and the ability to coordinate the jaw, tongue, and lips with breathing and vocalizing in order to produce speech sounds. Children with speech sound disorder may have difficulty with the phonological knowledge of speech sounds or the ability to coordinate the movements necessary for speech. These communication difficulties can result in a limited ability to effectively participate in social, academic, or occupational environments.

The aim of this study is to construct an Arabic auditory bombardment therapy program and measure its effectiveness in treatment of functional speech sound disorders.

This study was applied on 60 participants diagnosed with functional speech sound disorder without language disorders or with mild delayed language development who were chosen according to inclusion and exclusion criteria.

Inclusion criteria was that they should range in age from 3-5 years presented with functional speech sound disorder without language disorders or with mild degree of delayed language development, with average IQ and without any organic causes of speech sound disorders (motor/neurological, structural, or sensory/perceptual causes) and exclusion criteria were illiterate or non-cooperative family and care givers with speech sound disorders. The participants were divided into 2 equal groups. Both groups were subjected to the assessment protocol. After assessment, both groups received the conventional therapy for 3 months but only group (2) received the constructed auditory bombardment therapy program.

Keywords: Auditory Bombardment Therapy Program, Egyptian Arabic Speaking children, Functional Speech Sound Disorders

INTRODUCTION

Speech sound disorder is a communication disorder in which children have persistent difficulty saying words or sounds correctly. Speech sound production describes the clear articulation of the phonemes (individual sounds) that make up spoken words. It requires both the phonological knowledge of speech sounds and the ability to coordinate the jaw, tongue, and lips with breathing and vocalizing in order to produce speech sounds. Children with speech sound disorder may have difficulty with the phonological knowledge of speech sounds or the ability to coordinate the movements necessary for speech. These communication difficulties can result in a limited ability to effectively participate in social, academic, or occupational environments (*Martin, 2014*).

Children with speech sound disorders (SSDs) demonstrate delayed acquisition of developmentally appropriate speech sounds, resulting in reduced intelligibility of their speech. Idiopathic SSDs are not caused by known etiological factors, such as cleft palate, hearing loss, craniofacial or dental abnormalities. Instead, SSDs are hypothesized to reflect a central cognitive and neurological deficiency in how phonemes are represented and organized within the language system (*Fey, 1992*).

Speech sound disorders refer to any difficulty or combination of difficulties with perception, motor production,