THE IMPACT OF ARTICULATORY PROBLEMS ON SPEECH PRODUCTION

A THESIS
SUBMITTED TO THE COUNCIL OF THE COLLEGE OF EDUCATION UNIVERSITY OF TIKRIT IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN ENGLISH LANGUAGE AND LINGUISTICS

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MAY 2005

بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

وَعَلَّمَكَ مَا لَمْ تَكُن تَعْلَمُ وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا

صَدَقَ اللَّهُ العَظِيمُ

سورة النساء

TO
the Sources of Love
and Patience
My

Father and Mother

I certify that this thesis was prepared under my supervision at the university of Tikrit as a partial requirement for the degree of Master of Arts in English Language and Linguistics.

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ACKNOWLEDGEMENTS

I wish to express my thankfulness and deepest appreciation to my supervisor assistant professor Esbah Shakir Abdulla (Ph.D.) for his guidance and encouragement throughout this study.

I am greatly indebted to instructor Amra Ibrahim (Ph.D) , head of the English department, for her helpful assistance .I am also greatly indebted to the tutors of the courses, namely, assistant professor Nawfal Sa'aeed (Ph.D), assistant professor Riyadh K. Ibrahim (Ph.D) , assistant professor Falah S. Mustafa (M.A) ,and assistant Safwat Hawar (M.A) for their helpful suggestions and assistance .

My thankfulness and heartful gratitude is extended to assistant professor Omran M. Mahood (Ph.D.) who was a source of help, patience and support whenever I consulted him.My thanks are also due to assistant instructor Aqeel R. Al-Lamy (Ph.D.) at University of Baghdad , and instructor Ibtisam Abdul-Hussien (Ph.D. Student) at University of Baghdad for their helpful assistance and remarks .

I am greatful to my family,especially to my brothers Issam,Qusay and my sister the instructor Shurooq in the English departement for their constant encouragement.

Finally,thanks are due to the staff of the deanery of the college of Education ,staff members of the speech pathology center for surgery of Ear ,Nose and Throat at Medical City in Baghdad, especially to the speech therapist Alham Y. Behnam and the staff members of the library of the Dental Medicine College of Baghdad for their help and generous loan of books.

ABSTRACT

The speech of any language system plays an important role in communication since it is the best medium by which we can express thoughts and feelings.One of the most common communication defects in children is errors in speech sound production which is called 'articulation defect'.Structural defect (abnormality) is regarded as one kind of articulation defect and it is due to abnormal structures of the vocal organs ,i.e, the dysfunction of the vocal organs.This study is concerned particularly with Iraqi articulation handicapped children who have structural defects in the vocal organs and face difficulties in pronouncing the speech sounds of standard Arabic.There is no such study describing these difficulties and the researcher has found out that there is urgent need for a thorough investigation of the major difficulties of the articulation handicapped children in pronouncing the speech sounds and whether these difficulties can be improved with intensive training exercises at least six months of speech therapy.
To carry out the investigation, it is hypothesized that :

1.The articulation handicapped children's improvement in pronouncing the speech sounds is relative ,i.e, they can improve in pronouncing certain Arabic speech sounds .

2.The improvement of articulation handicapped children in pronouncing certain Arabic speech sounds varies according to the kind of defect since this study is concerned with different structural defects (cleft palate defect, tongue defect, and jaw defect).

For the requirements of this study,the researcher has constructed the following programme that includes three stages to verify the hypotheses set up :

1. The first stage is called the preliminary assessment.It involves the 'Templin-Darley' technique which is used to determine the difficulties of the articulation handicapped children in pronouncing Arabic speech sounds.

2. The second stage involves determining the methods of speech therapy that are suitable and necessary to minimize the difficulties of articulation handicapped children in pronouncing the Arabic speech sounds.

3. The third stage involves constructing a test in which the same technique in the preliminary assessment is used to measure the extent of improvement of the articulation handicapped children in pronouncing the difficult Arabic consonant sounds.

The study ,which falls into five chapters ,has arrived at a number of conclusions,the major ones are :

1.The articulation handicapped children have improved in pronouncing some difficult consonant sounds.The handicapped children who have tongue defect improved in pronouncing some stop sounds like [k ,q ,] and most fricative sounds like [ð , , z , s , s , ħ ,] whereas the cleft palate handicapped children improved in pronouncing some stop sounds like [k , b , t , d] and some fricative sounds like the velar sound [x]. Thus, the first hypothesis has been verified.

2.The improvement of tongue handicapped children in pronouncing some difficult consonant sounds is better than the improvement of cleft palate handicapped children, whereas the handicapped children who have jaw defect have no improvement and still have difficulty in pronouncing the consonant sounds.Thus, the second hypothesis has been supported.

3. The most easiest speech sounds in the pronunciation of all the articulation handicapped children are : stops (except [t]) , voiceless consonants , nasals , the lateral , semi-vowels , the glottal fricative [h] ,and the vowels ; whereas the fricatives , voiced consonants , emphatics , the trill, and the affricates are the most difficult and problematic sounds. However, these difficulties are due to one or two of the following reasons :

A.Abnormal structure of the palate , tongue , and jaw.

B.Nasopharyngeal valve incompetency as the cleft handicapped children cannot control the strong air pressure in his (her) oral cavity.

Besides the conclusions,the study has stated some recommendations with suggestions for further study.

LIST OF ABBREVIATIONS

AHChn	Articulation Handicapped Children
CL	Cleft Lip
CLD	Cleft Lip Defect
CLP	Cleft Lip and Palate
CLPD	Cleft Lip and Palate Defect
CLPHChn	Cleft Lip and Palate Handicapped Children
CP	Cleft Palate
CPD	Cleft Palate Defect
CPHCh	Cleft Palate Handicapped Child
CPHChn	Cleft Palate Handicapped Children
EXT	Symbols for Disordered Speech
HCh	Handicapped Child
HChn	Handicapped Children
IPA	International Phonetic Association
JD	Jaw Defect
JHCh	Jaw Handicapped Child
JHChn	Jaw Handicapped Children
NPV	Nasopharyngeal Valve
NPVI	Nasopharyngeal Valve Incompetency
SA	Standard Arabic
SPCSENT	Speech Pathology Center for Surgery of Ear, Nose,and Throat
TD	Tongue Defect
THCh	Tongue Handicapped Child
THChn	Tongue Handicapped Children
[ ]	Phonetic representation
/ /	Phonemic representation
~	Nasalization
~	Nasal air emission
>	Backing
ɹ	Weak articulation
ɵ	Devoicing

→	From target to production
	Interdental replacement
	Dental replacement
	Lateral replacement

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KEY TO ARABIC PHONETIC SYMBOLS

Arabic Consonants

[?]	أ	as in	[?ab]	‘father’
[b]	ب	as in	[balad]	‘country’
[t]	ت	as in	[tamr]	‘dates’
[θ]	ث	as in	[θamiin]	‘valuable’
[d]	ج	as in	[d adiid]	‘new’
[ħ]	ح	as in	[ħarb]	‘war’
[x]	خ	as in	[xubz]	‘bread’
[d]	د	as in	[dubb]	‘bear’
[ð]	ذ	as in	[ðayl]	‘tail’
[r]	ر	as in	[raff]	‘shelf’
[z]	ز	as in	[zuhuur]	‘flowers’
[s]	س	as in	[sayf]	‘sword’
[ ]	ش	as in	[imaal]	‘north’
[s]	ص	as in	[sabr]	‘patience’
[d]	ض	as in	[dayf]	‘guest’
[t]	ط	as in	[taalib]	‘student’
[ð]	ظ	as in	[ðill]	‘shadow’
[ ]	ع	as in	[alam]	‘flag’
[ ]	غ	as in	[uyuum]	‘clouds’
[f]	ف	as in	[fa?s]	‘axe’
[q]	ق	as in	[qamar]	‘moon’
[k]	ك	as in	[kalb]	‘dog’
[l]	ل	as in	[lisaan]	‘tongue’
[m]	م	as in	[miizaan]	‘balance’
[n]	ن	as in	[nawm]	‘sleep’
[h]	ها	as in	[huwa]	‘he’
[w]	و	as in	[waqt]	‘time’
[y]	ي	as in	[yad]	‘hand’

Arabic Vowels

[i]	as in	[min]	‘from’
[ii]	as in	[d amiil]	‘beautiful
[a]	as in	[fann]	‘art’
[aa]	as in	[baab]	‘door’
[u]	as in	[kutub]	‘books’
[uu]	as in	[d unuud]	‘soliders’

Arabic Diphthongs

[aw]	as in	[mawt]	‘death’
[ay]	as in	[layθ]	‘lion’

CONTENTS

CHAPTER ONE

1. Introduction

1.1 The Problem

The speech of any language system is certainley crucial and necessary in communication.The speech skill needs normal articulators (vocal organs) that enable the person to communicate with others.So, any impairment in the vocal organs will prevent the use of normal articulation.Articulation defect is very recognizable in children , which limits their abilities in producing the speech.The AHChn especially those who have structural defects ,i.e, dysfunction of the vocal organs, face difficulties in pronouncing the speech sounds.These difficulties lead to errors in speech production like substitutions , omissions, transpositions, and distortions.

Since this topic,to the best of the researcher's knowledge, has not been tackled in Iraq ,the present study is felt to be justifiable in that it fills the gap in the literature.

1.2 Aims of the Study

This study aims at:

1.Specifying and classifying the difficulties faced by AHChn with structural defects in pronouncing the speech sounds of SA.

2.Determining the methods of speech therapy that are suitable and necessary to minimize the difficulties of the HChn in pronouncing the speech sounds of SA.

3.Identifying the extent of improvement of AHChn with structural defects in pronouncing the difficult speech sounds of SA.

3. Giving some recommendations for pedagogical implications.

4. Presenting some suggestions for further studies.

1.3 Hypotheses

1.It is hypothesized that the improvement of AHChn in pronouncing the speech sounds is relative,i.e, they can improve in pronouncing some Arabic speech sounds.

2.It is assumed that the improvement of AHChn in pronouncing some Arabic speech sounds varies according to the kind of the defect since this study is concerned with different structural defects.

1.4 Limits of the Study

1.This study is concerned with Iraqi AHChn who have structural defects and whose ages ranged between (6-10) years.

2.The speech therapy,involved in practical study,is restricted to six months of treatment.The sample is taken from the "SPCSENT"at Medical City of Baghdad.

3.The study is limited to pronounce the isolated speech sounds,the sounds in words initially,medially,and finally of SA.

1.5 Procedures of the Study

The procedures to be adopted here can be summed up as follows:

1.Presenting a survey of the literature available concerning articulation defect in particular and speech therapy in general.

2.Describing the role of articulatory phonetics in speech production.

3.Constructing a programme which is designed to carry out the practical procedure of the study.

1.6 Value of the Study

Theoretically,the study will provide insight into the salient features of the articulatory defects and factors behind them.It is hoped that this study will increase the attention of Arab scholars and phoneticians to the study of phonetics in general and articulation defect in particular.

Practically,it is of significance in pointing out the major characteristics and difficulties of AHChn in pronouncing the speech sounds.It also shows the importance of such field in providing methods of speech therapy to minimize or overcome the difficulties in pronouncing the speech sounds.

CHAPTER TWO

Articulation Defect and Its Effect on Speech

2.1 Preliminaries

One of the most common communication defects in childhood is errors in speech sound production that are called articulation defects.This chapter is an attempt to shed light on the articulation defect and the factors behind the abnormalities of the vocal organs.It also involves speech therapy and its significant role in improving the defective articulation.

2.2 Theoretical Background

This section presents a clear image of the articulation defect and its difference points from other defects.Using different terms of articulation defect lead to people's misunderstanding of these terms.

2.2.1 Articulation and Articulation Defect

Communication is the essence of life by which all human beings can interact and express their ideas and thoughts.The process of communication needs a correct speech system in which the sounds can be produced accurately.

However,in the process of communication ,the brain of the speaker has to form a message then send it to the speech muscles which in turn affects speech organs like lips,tongue,etc.Once these organs are formed appropriately at a desired rate and time,the speech sound is produced correctly.Thus,the articulation of speech sounds requires precise coordination of many muscles including those of breathing , the vocal cords, tongue, the velum (soft palate), hard

palate,lips,the size and shape of the teeth, and the mandible (lower jaw) (Maurer,2002:1).In this respect, Hartmann and stork (1972:19) define articulation as "the production of speech sounds by the movement of the organs of speech". The articulation can also be defined as "the physiological movements involved in modifying the airflow in the vocal tract above the larynx to produce the various speech sounds" (http://www.members.tripod.com/caroline-bowen phonol- and-artic.htm.,1998:1-11).

Intelligibility of the person's speech who has articulation defect can be hard to understand because he (she) utters sounds incorrectly.He (she) may substitute one sound for another,omit the sound,or distort the sound so it seems funny but is still recognizable as the same sound (http://www. home. ica.net/~ fred/anch.htm.,2004:1-2).The speech is said to be abnormal in such a way that makes other people pay attention to it and causes the speaker or his listener to be distressed (Fagan and Jenkins, 1989:140). In addition, Morley (1972:4) indicates that speech sounds can be developed gradually over time.The child's speech is usually hard to understand at the age of three and he(she) frequently substitutes ,omits and even his(her) speech is difficult to be understood at this age.So, most of the sounds must be produced correctly by the age of three and all the sounds must be produced correctly by six.Usually children first acquire the vowels then the consonants emerge,and the last consonants appear are [r] and [s].

Several attempts have been made to define the articulation defect.Thal(1969:66) defines articulation defect as "substitution, omission, transposition, confusion, and distortion of the speech sounds". Articulation defects are also defined as "difficulties with the way sounds are formed and strung together,usually characterized by substitutions,omissions,or distortions of the speech sounds" (http://www.psychnet-uk.com/ dsm-iv/speech-articulation-disorder.htm.,2004:1).The abnormal structures of the articulators , faulty learning, hearing loss and neurological

damage are the main causes of the articulation defect.Such defects result in poor production, transmission, and perception of speech sounds.Likewise, Ollendorff and Kaplan (1974:162) define articulation defect as "the difficulty with the physical production of individual speech sound".There may be incorrect placement of the lips,teeth , tongue and even the soft palate during speech, resulting in inaccurate producion of certain sounds.At last, articulation defect is described as,

> Using this label meant that all the problems with speech sounds were treated as if they only required focus on perception and production.The HChn require ear training before production training.There is no need actually to test speech perception. (http://www.chw.edu.au,2003:1-3)

Practically,all the articulation errors are substitutions, omissions, distortions, additions, and transpositions.Broadly speaking,the kinds of articulation defect can be classified as follows:

1.Substitution :This kind of error refers to the incorrect sound (usually easier) that is consistently replaced for the correct one,e.g:

[s] → [θ] as in [s n] 'sun' → [θ n]
[r] → [w] as in [ræbit] 'rabbit' → [wæbit]

although the substitution errors make a nonesense word like [t ut] for [k ut] 'coat'.It is easier for the adult to imagine what the HCh may intend .Occasionally,the HCh substitutes the sound by more than one sound.The substituted sound is commonly either in the same class phonetically like one fricative sound used for another ,or in a different class,phonetically like one affricate sound used for another fricative sound (Thal,1969:66).

2.Omission: This kind of error occurs when one or two consonant sounds are completely omitted in a word because the HCh cannot manipulate the quick movement from one sound to another.Most HChn omit the sounds that cannot be articulated correctly.The consonant sounds are commonly affected more than vowels,e.g:

[b s] 'bus' → [b]
[plei] 'play' → [pei]

(Renfrew,1972:26)

3. Distortion: This kind of articulation errors appears when the HCh tries to produce the correct sound but it results in poor production.When the HCh starts imitating words,he(she) produces some noises which donot appear in his (her) language because it is the best the HCh can produce.The distortion in the sounds is commonly found in the speech of HChn who have complete CPD, for example,the distorted [s] sound may whistle, the air may come out the sides of the mouth causing 'slushy' sound or lateral lisp, or the tongue may be thrusting between the teeth causing a frontal lisp (ibid.).

4.Assimilation: This kind sometimes occurs differing from those usually in the language being spoken.It is is more linguistic than purely articulatory,a misapprehension of the word pattern rather than an ability to say certain sounds (Widesmiles website-www.widesmiles.org ,2002:1-2)

5.Confusion: This kind of errors is very commonly used and it occurs when the HCh produces voiced sound for voiceless sound or the use of a sound that approximates other sounds,e.g:

[s mθi] 'something' → [s mfi]

(Thal,1969:66)

6.Transposition:This kind of errors is less common than other kinds of articulation errors.It is also called 'metathesis' , e.g: 'otmy' for 'tommy'

(ibid.)

7.Addition:This kind of errors is also less common and it occurs when the HCh adds extra sounds or syllables to the word ,e.g :

[æniml] 'animal'→ [ænimml]

(http://www. psychnet- uk.com / dsm- iv/speech-articulation-disorder.htm.,2004:1-2)

2.2.2 Phonetics and Its Relationship to Articulation Defect

Traditionally, articulation defects were studied solely from phonetic point of view.Today,special attention is given to study the articulation defect since it causes a great serious interference with the intelligibility of the children's speech (Crystal,1987:277).Shriberg and Kent (1982:1) remark that although subdisciplines within phonetics are well established like articulatory phonetics and acoustic phonetics yet its applications to clinical area is limited.The study that connects between phonetics and articulation defect is called clinical phonetics. Clinical phontics is the study of phonetics as applied to communication defects (http://members.tripod.com/caroline-bown/ phonetic-phonemic.htm,2002:2-4).In this regard,Shriberg and Kent write,

> In coining the term clinical phonetics we acknowledge that application of phonetics in the clinical area is a legitimate area of study in its own right.Beyond the basic concepts of phoneics,there is need for a discipline that deals with phonetics as it applies to disorder.(1982:1)

According to Maurer (2002:1), phonetics is " the study of speech emphasizing the description and classification of speech sounds according to their production, transmission, and perceptual features".Articulatory phonetics, the subdivision of phonetics,in which categorization of speech sounds is in accordance with specific production parameters.Therefore,errors in phonetics result in articulaton defect.

Consequently,an articulation defect is a speech impairment that affects the phonetic level.The HCh has difficulty in saying a particular consonant and vowel (http://www.chw.edu. au, 2003:1-3).Since phonetic errors deal specifically with speech form, phonological errors then emphesize their function as a meaningful unit within language.The meaningful unit is termed as phoneme which is the basis of phonology.For example, the /s/ sound represents the notation /s/, an impairment in producing such a sound, or phoneme,within the context of a spoken language is defined as a phonological defect (Maurer,2002:2).

2.2.2 Articulation Defect VS. Phonological Defect

Articulation and phonological defects are two terms that make confusion among many people and they cannot distinguish between the phonetic speech sound defect and phonemic speech sound defect (ibid.).Some speech therapists use the term articulation defect very loosely especially when they explain the complex ideas to people who donot have linguistic or speech therapy background.Indeed,speech therapists may refer to a phonological defect as an articulation defect.So, it is importatnt to give a clear difference between these two terms.

It is known that speech is the "spoken medium of language that has a phonetic level and a phonological level".The phonetic level is concerned with the motor act of producing the vowels and consonants, so that we have a repertoire of all the sounds the enable us to speak our language while phonoloical level concerns the brain work that is responsible for organising the

speech sounds into patterns of sound contrasts so that we can make sense when we talk (http://www.members.tripod.com/caroline-bowen/phonetic-phonemic. htm,2002:2-4).

In essence,the articulation defect is a speech defect that affects the phonetic level ,i.e, the HCh faces difficulty in producing particular consonants and vowels,while phonological defect is a language defect that affects the phonological level, i.e, the HCh faces difficulty in organising his (her) speech sounds into a system of sound contrasts (phonemic contrasts) (ibid.).Thus,the articulation defect is the HCh's difficulty in phonetic level, i.e, the individual speech sound.The HCh has the main difficulty in the motor (muscle or nerve) level,whereas the phonological defect is the HCh's difficulty in the phonemic level (in the mind, not in the muscles).This phonemic level is sometimes referred to as "the linguistic or a cognitive level".So,to offer a comprehensible distinction between the two terms, Maurer (2002:2) summerizes the main different characteristics in Table (1).

Table(1)

The Difference between the Articulation Defect and Phonological Defect

Articulation Defect	Phonological Defect
1.Phonetic errors.	1.Phonemic errors.
2.Problems in speech sound.	2.Problems in language specific production function of phoneme.
3.Difficulties with speech sound form	3.Difficulties with phoneme function.
4.Disturbance in relatively peripheral motor process in nature that result in speech.	4.Disturbances are more central, concerning the phonological level of the organization of the language system.
5.Speech sound production difficulties donot typically impact other areas of language development such as syntax (grammar) or sometimes (word meaning).	5.Phoneme difficulties may impact other language areas such as syntax (grammar) or sometimes(word meaning).

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The qualified speech therapists are able to distinguish between the many speech and language problems they have to assess in the course of their work because they have the required experience and knoweldge.

2.3 Speech Understanding as the Basis of Speech Production

The nervous system is the most involved part of the brain in the speech production process.Bloom and Lahey (1978: 237) state that commands from the brain control the human articulation when mental signals are carried by the nervous system to certain articulators in the vocal tract.Therefore,articulation is considered as a very complicated process that starts in the brain to extend beyond it.There is a relationship between understanding and speaking in the study of child's language.Children's early speech has been given more attention than the children's early understanding and this due largely to the difficulties included in measuring comprehension, whereas the child's speech can be written down, recorded, reported or described.

In learning language, we understand speech before we produce it ,i.e, the children's ability to utter the words and sentences in meaningful situations are accomplished after they can hear and understand the words and sentences which others speak.This leads to a quite simple fact that comprehension must necessarily precede production.Strictly speaking,the ability to uttre speech sounds in appropriate situations is a good indicator of language knowledge,but the absence of their ability to produce speech may not indicate a lack of language knowledge.For example,a girl who has hearing loss can understand what was said to her except for her ability to produce speech (Steinberg,1991:142).

It is very clear that language learning may happen without speech production but not without speech understanding.Speech understanding forms the basis for speech production.For this reason,speech understanding plays an important role in language acquisition since speech comprehension develops in advance of speech production.Parents have recognized that children are able

to respond appropriately to speech more complex than what the children are able to say.It is noted that children choosed the objects which were named and were able to respond appropriately to commands even though they didnot use these words in their own speech (ibid.:143).Chomsky is one of the most prominent linguists who asserts that children can learn language because of the children's innate capacity that enables them to acquire the language normally (Akmajian et al.,1995: 113)

Since the brain is responsible for controlling the information about the linguistic system of the language (semantic,syntactic, phonological and phonetic information) including the significant differences in speech sounds, intonation,and in rhythmic pattern .Then when someone is speaking, his (her) brain sends an amount of signals to many different sorts of muscles involved directly or indirectly in making the required skilled movement of articulation (ibid.).So,the primacy of understanding is very necessary in the speech production of AHChn in which they must comprehened the object before they ask to name it.

2.4 Discussion of the Term 'Articulation Defect'

It has been estimated that articulation defect represents about 80% of all speech defects in children.A large number of these articulation defects have no noticeable organic or physical cause and the difficulties may have consequences during the lifespan of these children (http://www.healthsystem .virginia.eu, 1998:1-5).

There are various kinds of articulation defect but most of them are classified ino four divisions:specific developmental delay, neurological dysarthria,hearing loss,and structural defects (abnormalities).Thatcher et al.(1972:22) state that specific developmental delay is the most prominent cause of articulation

defect.This kind is usually called ‘Dyslalia’in the sense that the HCh is slow to acquire speech sounds and may omit or substitute some sounds.Further,the function of the lips, tongue, palate and related organs are also affected by neurological defects.These defects are regarded the most difficult ones because they cannot be treated and the difficulties in producing speech sounds continue in adult life.

Moreover, Morley (1972:206) ponits out that articulation defect may result from hearing impairment.The HCh cannot hear the fine differences between the sounds,so the HCh imitates them as he perceives them.However,the most common kind of the articulation defects is the structural defect that leads to the dysfunction in the vocal organs.Structural defects or abnormalities refer to the abnormal development or damaging of the lips, tongue, palate, jaw, the NPV, and the teeth.These conditions result from injury or disease,for example,CPD is a congenital structural abnormality while obstruction of the nasal airway is strucural abnormality caused by disease of the adenoids . Also,these defects are caused commonly by accidents as the child tears his (her) soft palate by holding a sharp object stick or pencil in his(her) mouth(ibid.).

For the requirement of this study,it will focus only on the articulation defect that is due to structural abnormalities since it is concerned particularly with AHChn who have structural defects.

2.4.1 Classification of the Structural Defects (Abnormalities)

It was recognized that in some of the HChn,who have articulation defect,the failure to develop normal articulation was probably the result of an organic condition.In HChn,many of the pronunciation problems that cause anxiety for the parents are due to a delay in the ability to control movements of the vocal organs. Others have more serious problems of incoordination

such as being unable to control the speed and direction of tongue movements,or to maintain consistent pressure between articulators (Crystal,1987:277).Purely articulatory defects occur when there are structural malformations of the organs of speech as short tongue frenum (tongue-tie) and dental irregularities (Thal,1969:66).

2.4.1.1 Lips Abnormalities

The most common abnormality in lips is CL(hare lip).CL is "the associated condition in which the upper lip is split or the division may be complete and include the upper teeth ridge behind".The split may be in the middle,on one side,or on both sides.It is found that CLD alone does not usually affect speech (Renfrew,1972:26).

2.4.1.2 Teeth Abnormalities

Articulation defect is usually associated with faults of dentition.Rihani (1980:125) claims that sometimes there is normal size of the jaw with large dentition or normal dentition with small size of jaw and this will result in crowding and overlaping in the mouth.Maldentition can be corrected surgically but this takes time. Some people have a difficulty in adjusting speech when they start wearing dentures.Renfrew(1972:26) remarks that "missing front teeth can allow the tongue tip to slip a little further forward than usual and protrude the gums when speaking" .Teeth which grow behind the usual 'U-shaped' line can crowd into the tongue and impede its quick and precise movement ; speech is improved by reducing its rate in order to give the tongue more time to make precise movements.

2.4.1.3 Jaw Abnormalities

Developmental abnormalities of the jaws are "those abnormalities that make malocclusion of the teeth,malrelation of the jaws and associated facial disfigurement".They are often considered as congenital in their origin but they may result from other causes (Hayward,1984:481).In this regard,Thal (1969:66) states that the jaw which is either too large or too small especially the mandible(the lower jaw),or that ill matched in size and shape,can affect the speech.According to Mcelroy and Malone,

> The malrelation consisted either in a disproportionate growth in the length of the body of the lower jaw, in the lack of development of the upper jaw,in the lack of development of the lower jaw,or in a bending downward of the lower jaw at or in front of the angle.(1969:70)

2.4.1.4 Tongue Abnormalities

The most common defect of the tongue is the weakness in the muscles of the tongue.The tongue is very important because clear speech depends mainly on the accuracy and speed of the complicated movements of the tongue (Renfrew, 1972: 28).The abnormalities of the tongue are numerous like macroglossia (large tongue), aglossia (short tongue), ankyloglossia (tongue-tie), bi-furcation, glossectomy.

It is rare to find a case with a large tongue.The HChn who have large tongue can interfere with articulation because it cannot be contained easily in the mouth and there is insufficient space for the rapid movements and adjustments required for speech.Because of its position,this will lead to malocclusion of the upper and lower incisors with a severe degree of open bite. Here the speech is chararcterized as intelligible but not normal. Stones et al.(1962:11) assert that aglossia is also a very rare

condition and even the speech is intelligible but there is clear impairment.

It is found that some cases have short lingual frenum (tongue-tie) extending from the tip of the tongue to the floor of the mouth and into the lingual gingival tissue.Tongue-tie limits the movements of the tongue and causes speech difficulties.The two latter abnormalities of the tongue are also very rare conditions.The failure of coalescence of the mandibular arch elevations during the development of the tip of the tongue is called bi-furcation.Glossectomy occurs when from one third to two third of the tongue is removed and the abnormal speech can be noticd clearly (Mcdonald,1963:25).Thal (1969:68) indicates that the articulation must become normal if the impairment is removed. If the treatment has left fresh anomalies,the HCh has to seek speech therapy to avoid his (her)difficulty in articulation.

2.4.1.5 Palate Abnormalities

It is known that the palate consists of two parts:the hard palate and the soft palate(velum).The palate abnormalities have an active role in developing speech defect.In this respect, Renfrew states,

> The highly arched palate makes speech difficult while narrow hard palate when coupled with a broad lower jaw will necessitate the tongue is being crowded when articulating the speech sounds.(1972:30)

Gradually,the soft palate is also essential to ensure that speech sounds are made through the mouth or nose.The soft palate is ‘trap-door’ raising against the pharyngeal wall to prevent the air passes through the nose and falling to allow the air passes into the nose.If this ‘trap-door’ is short compared with the nasopharyngeal opening or if it is cleft,the air will pass into the nose during speech.The speech is then characterized as weak articulation and the voice will be nasal (ibid.)

One of the most common birth defect is CLP. CPHChn are usually suffering from palate abnormalities.CLD alone doesnot have any affect on speech because it is usually successful repaired surgically after birth.The speech of HChn who have both CLPD remains abnormal even with closing of CP surgically because of the badly surgical operation (Takagi et al., 1965:29).Crystal defines CLPD as,

> A birth defect in which the upper lip is split while the CP is congenital fissure along the midline of the palate and it may extend throughout the whole palate or affect only part of it.(1987:277)

Likewise,Fathi (1997:30) defines CLPD as "a vertical cleft in the upper lip,alveolus nasal floor and/or palate and its severity varies from a split uvula to complete CP".Walsh and Hercus write,

> CL is incomplete fusion of the maxillary processes with the median nasal process while CP is the failure of fusion of the palatal folds,the median nasal process which forms the premaxilla and maxillary process.(1957:30)

It is seldom to find HCh with unoperated and palate fissures and it occurs in one of every 500 to 1000 babies.Speech can be developed with the understanding of the soft palate actions and development of surgical techniques to treat the function of the velum.CLP has very serious consequences because the condition affects not only the development of speech,but there are other problems that are associated like feeding problems , psycological and social problems, facial deformities, dental and occlusal problems , and respiratory problems (Takagi et al.,1965: 71).Further, Morley (1972:385) states that the CPHCh is unable to control the expiratory air stream and its direction varies whether through the mouth or the nose.Broadly speaking,CLPD can be classified as follows:

1. Cleft lip(CL).
2. Cleft palate(CP).
3. Cleft lip and palate(CLP). (Ingram,1976:35)

Surgeon,orthodontist and speech therapist face a great problem in the complete CP because it must be dealt with both the gap at the back and the twist at the front.The complete cleft is considered dangerous since it extends through lip,alveolus (upper gum) , hard and soft palate.The bifid uvula also represents a minimal cleft of the soft palate and may not interfere with normal nasopharyngeal closure unless associated with incomplete development of the palate(Johnson,1997:1192).

It is worth mentioning that the most important objective in the treatment of CP is to construct a functional soft palate so that the speech may be as normal as possible.The most suitable time of operation for the CPHChn is between one and two years of age so that the HChn can learn to speak with a functional soft palate (Stones et al.,1962:11) .

2.5 Structural Defects (Abnormalities) and Their Effect on Speech

A great deal of speech development depends on the severity of the defect and the extent of the vocal organs ability to grow in a normal way after surgical operation.Nevertheless, speech therapy is regarded as a crucial factor in obtaining the normal articulation of speech sounds (Linder-Aronson and Woodside, 1967:10).Structural abnormalities in the pharynx or oral and nasal airways may interfere with the movements and adjustments of the tongue or lips,or prevent adequate control of the essential intra-oral air pressure for the articulation of the plosive and fricative sounds of speech.It is interesting to note that the airstream used for speech is normally controlled by three valves in three positions:

1.In the larynx,at the level of the vocal cords,or venticular bands.
2.In the nasopharynx,by the NPV.
3.At the lips,by the arbicularis oris and other facial muscles (Morley,1972:400).

Thus,normal speech requires primarily the coordination of the muscles related in the action of these three valves.First,the airstream is modified and directed into vibration of the vocal cords for phonation that is essential in forming vowel and voiced sounds.The vibration is also amplified as aresult of resonance in the various resonating cavities in the chest,larynx, pharynx,mouth and nasal airways (ibid.).

In addition,Renfrew (1972:56) indicates that the air is allowed to pass into the nose for only nasal consonants [m,n,]. All other sounds are articulated from the mouth by completely closing the nose.Nasality occurs when some of the air passes into the nose during the speech.Sometimes if the leak is a small one this is just an air friction like a slight snoring and when the HCh talks against this leak he (she) often finds clear difficulty in his(her) speech. But if the leak is large,the HCh tries to produce the sound through the mouth and makes unusual substitutions like glottal stop.Ollendorff and Kaplan (1974:155) remark that nasality and compensatory errors are always associated with the speech of CLPHChn.It is recognized that the tongue is responsible for so much compensatory articulation than dental irregularities since the tongue is essential in producing most of the speech sounds.It is important to mention that the speech of CPHChn is affected by two factors :

1. Difficulties of voice due to the gap at the back.
2. Difficulties of articulation due to the twist at the front.

Velopharyngeal or NPVI is the most important cause of speech defect and it occurs particularly in the speech of CPHChn.It

causes inability to control the outlet of air through the nasopharynx and nasal airways (Renfrew,1972:56).

2.5.1 Nasopharyngeal (Velopharyngeal) Valve Incompetency

The NPV may be incompetent for various reasons like when it is incompetent in CP,or when function is inadequate for normal articulation like in paralysis of the soft palate.Conditions which may be associated with incompetent NPV are:CP,sub-mucous cleft,short soft palate,large nasopharynx, defect in the palate, and incoordination in the use of the NPV in the absence of any anatomical insufficiency or paralysis (Morley,1972:384).

Furthermore, the norml articulation of most consonant sounds requires a degree of air pressure in the mouth which cannot be achieved if air escapes through the nasopharynx and nostrils.When the NPV is defective ,the speech can be characterized by nasal air emission during the production of pressure-sensitive consonants.In addition,inadequate intra-oral breath pressure ,due to a faulty NPV can result in weak articulation and the development of compensatory articulation productions (substitutions) (Kummer,2002:1).

Consequently, NPV competency is highly required for the adequate articulation of the speech sounds.In the production of the plosive consonants ,the air must be held under pressure in the mouth momentarily and then released.This pressure can only be obtained adequately when there is simultaneous closure of the nasal and oral outlet.The fricative consonants are also required air pressure in which the air must pass through a small airway between the parts of the mouth used for their articulation. The most two common kinds of articulation errors that are observed in the speech of CLPHChn are substitutions and distortions (Morley,1972:384).It is difficult to articulate either nasalized vowels or nasal consonant when there is enlargement of the organs that cause the enclosing of the

nasopharynx.On the other hand,the failure in making a complete closure by raising soft palate may due to abnormal opening in the roof of the mouth or defective soft palate.This will result in nasalization of vowels and the defective oral consonant stops such as [b,d,g] (Gimson, 1989:12). However, the kinds of articulation defect and their characteristics for the CLPHChn with NPVI can be stated as follows:

1.Substitution: This kind occurs when there is a sufficient lack of intra-oral air pressure that results in weakness of consonants articulation with nasal escape of air or in the substitution of fricative sounds.Consonant sounds such as the glottal stop and pharyngeal fricative are substituted for fricative sounds especially back fricatives.The consonant [s] in particular requires the maintenance of good air pressure as far forward in the mouth as the alveolar ridge and incisor teeth.Because of the high pressure required for this sound,the air tends to escape through the nasopharynx when closure is incompetent (ibid.). Luchsinger (1968: 506) states that many experimental studies indicate that the problem of nasality is ralated to defect in the alveolar ridge .As the NPVI increases,other sibilants and fricatives like [f,θ, ,z,s,] become involved.The most consistently misarticulated sounds by CPHChn are [s,z,d,t ,b] (Johnson,1997:1191)).Nasal consonant is another characteristic of the CPHCh's speech who substitutes a nasal consonant like[m] for a consonant that requires intra-oral pressure like [b].The tongue may occupy too high position in the mouth in some CPHChn.In this sense the tongue can direct the air into the nasopharynx instead of the mouth(Morley,1972:412).

2.Distortion by nasal emission:CPHChn produce distorted nasal consonant.There are nasal and non-nasal distortions of speech (Sherman,1970:626).Renfrew (1972:38) adds that some

CPHChn make sounds in the throat, where the air pressure is still strong,to substitute for the weak sounds they make in the mouth.These throat noises make speech particularly difficult to be understood.Also,CPD can affect the HCh's teeth in a way that cannot be grown normally or may cause missing some of the teeth. Then,some of the sounds that are produced with tongue tip and teeth are affected like [s,θ,] (Mcelroy and Malone,1969:41).

3.Omission: It is usually that CPHChn omit the consonants especially the final consonant as a means of avoiding nasal emission (Ollendorff and Kaplan,1974:141).

It is noted that the most easy sounds which CLPHChn can produce are [m,n, ,h,y] ,while the difficult sounds are the fricatives and affricates,with the exception of [f,v].The CPHChn had difficulty in producing the clusters and showed inconsistency in their errors.These errors do not decrease with the chronological age of CPHChn (Ingram,1976:128).

2.6 Factors Behind Structural Defects (Abnormalities)

There is no single factor that could cause structural abnormalities.It is believed that even for the individul case the aetiology includes multiple factors.

2.6.1 Genetic Factors

Genetic factors have been found to play an important role in the aetiology of CLPD,TD,and JD.It is observed that some families have a history of clefting.Nevertheleses,many HChn are

born with CPD who have no family history of clefting and only 1 out of every 5 cleft is inherited (Walker,1967:53).In this respect,Fathi writes,

> Genetic factor may be due to mutant gene example lip-pit syndrom which is single gene mutation and dominantly inherited or the genetic causes may be due to chromosomal aberration like Trisomy B.(1997:22)

Walther(1967:15) states that the ultimate size and shape of the human skeleton including the jaws and teeth are very largely inherited and genetically determined.

2.6.2 Environmental Factors

Most CLPD seem to be caused by environmental factors.These factors include drugs, nutrition, stress. Drugs have an important role in causing many infants born with a congenital malformation like the CL and /or CP.The drugs are reported to have great influence when taken during pregnancy (Sperber,1981:12).

Moreover,Kaplan (1996:220) points out that there are many nutritional deficiencies which cause structural abnormalities especially tongue, jaw, teeth, and palate.Vitamin 'A' is one of the most important vitamin deficiency that mainly causes CP.In this regard, Moyers writes,

> Vitamin 'A' provides the developing palatal processes with plasticity and mobility,which helps them to acquire a horizontal position prior to their fusion with each other. (1988:50)

An adequate diet is needed for the mother so that the child is born with normal bone and tooth development (Walther,1967 : 15).Moreover,psychological and emotional stress were found to be more common among mothers of children with oral clefts.

Other causes of congenital malformation involve climate and the mother social habits like alcohol drinking and smoking (Fathi,1997:26).

2.6.3 Multifactorial Factors

This factor is very known and most congenital malformation results from multifactorial inheritance factors .According to Sperber,

> The final shape of most of the oral and facial structures in common with other morphologic structures in the body is regulated by multiple genes rather than by single gene. (1981:11).

It is found that about 80% of human malformation are caused by the interaction of several genetic and environmental factors (Fathi,1997:26).

2.7 Articulation Defect and Speech Therapy

Speech therapy is now widely required because of the large number of conditions that need treatment to obtain normal articulation.At present,speech therapy is very little known and understood by other professions particularly and the public generally.Speech therapy has begun with a small member of professions and till now in spite of its development and the great demands on therapy,it did not become widespread in the world (Thatcher et al.,1972:22).

Speech therapy has been developed as "a separate profession specializing in the treatment of speech defect and language".Then , speech therapy with its techniques have improved and led to the foundation of the 'International Association of Logopedics and Phoniatrics' in 1924 (ibid.).

It is important that the therapy must be planned to meet the condition and need of each HCh.The speech therapy is required at the time when the parents become aware of their child's defect in using speech.This is very important to avoid the stabilisation of faulty speech patterns that make the development of normal speech much difficult (Morley,1972:205).

While the speech therapy profession is independent,there are good reasons why it does not stand alone:located as it is between education and medicine.In this ragard, Thatcher et al. state,

> Continued independence is essential for vigorous development:speech therapy needs to maintain its integrity as a profession while retaining and indeed strengthening link with other profession and services.(1972:2)

It is important that the speech therapist must work with a team of professionals that consist of:surgeons, neurologists, orthodontists, prosthodontists, audiologists, and others who may help in treating the HChn's speech defect.Treatment for an articulation defect depends upon the cause of the defect.The most common articulation errors are compensatory errors that the therapy must focus on the specific sound error.Therapy begins by finding the best way to help the HCh produce the correct sound (Lewis, 1987:50).

However, the role of the professionals team in clinical management is very necessary in diagnosing any HCh ,because other variables can arise affecting the HCh's speech production skills such as middle-ear infections and other associated hearing loss.Speech therapist is "the person who is responsible to conduct evaluation and make a diagnosis or prognosis as a professional looking out for the best interests of the HCh".Accurate evaluation and appropriate diagnosis result from the cooperation between a multidisciplinary team of people

involved with the HCh such as physician, psychologist, teacher, and most important the parents of the child (Maurer,2002:2).

Speech therapy is regarded as second stage after the surgical operations. Previous studies have shown that the vast majority of CPHChn will require additional surgical operation even with intensive speech therapy.This is very important in facilitating training the muscles of the vocal organs to work properly after surgery.Hence,the length of therapy can be from months to several years depending on the cause,severity of the problem,the HCh's motivation and parent support (Sherman, 1970:626).The HCh needs speech therapy when he(she) encounters special difficulties and failed to develop normal articulation by four or five years of age.The work of the speech therapist has become that of assessment rather than treatment in cases of CP. Speech therapist is a specialist in the assessment, treatment and prevention of communication defects.Speech therapy is becoming less important in the treatment of many HChn and involves only those who have failed to develop at the same time the normal coordination for articulation (Morley,1972:407).

At last,Lewis (1987:407) points out that the parents must be given a realistic description of their HChn's defect so that they have a complete understanding of the problem.The mother, who is the most important person,must attend the therapy sessions of her child so that she can complete the therapy sessions at home successfully.

CHAPTER THREE

The Role of Articulatory Phonetics in Speech Production

3.1 Introduction

This chapter is an attempt to explain comprehesively the role played by the articulatory phonetics in speech production. Many important issues will be discussed such as the speech mechanism, anatomical and physiological considerations of the vocal organs since this study is concerned particularly with AHChn who have structural defects in the vocal organs.Besides, the speech sounds are classified according to their place and manner of articulation so that the data of AHChn (in chapter 4) can be analysed according to the phonetic features of these sounds.

3.2 The Speech Mechanism

Speech is produced by the controlled action of almost 100 muscles in the chest, abdomen, neck and head (Shriberg and Kent,1982:22).There are three major functional systems: respiratory, laryngeal, and supralaryngeal (or pharyngeal-oral-nasal). These three systems can be represented as in Figure (1) (ibid.).

Figure(1) The three systems of speech production: respiratory, laryngeal, and supralaryngeal.

3.2.1 The Respiratory System

The respiratory system consists primarily of the lungs , rib cage, abdomen and associated muscles.It works like a pump to provide the movement of air required for speech production (ibid.).Lung air is necessary for the production of all the essential sounds.In this respect , Ladefoged (1982:119) states

that the air which comes out of the lungs is the source of energy in almost all speech sounds.This movement of the air is called pulmonic airstream mechanism.The lungs are “spongelike tissue within a cavity made by the rib cage and the diaphragm”.The air can be pushed out of the lungs either by a downward movement of the rib cage and /or an upward movement of the diaphragm.

However, all speech sounds are produced normally either by egressive or inegressive flow of air.Egressive sounds are those produced with a flow of air that moves outward from the lungs.Inegressive sounds are those sounds produced with an inward flow of air.The egressive and inegressive processes can be presented as in Figure (2) (Simpson,1979:48).

Figure(2) Egressive and Inegressive Airstream

The role of respiratory system in speech production can be summarized as follows:
1. Air is drawn into the lungs during inspiration as a result of muscle contraction which increases the volume of chest cavity.

2. The muscles of the respiratory system release air into the larynx and supralaryngeal system for the purpose of producing the sound (Shriberg and Kent,1982:22).

3.2.2 The Laryngeal System

The voice is produced when the air from the lungs goes up through the laryngeal system ,i.e, through the air-pipe that connects the lungs with the larynx which is made up of cartilage and muscles and it lies on the top of the trachea.Inside the larynx are the vocal cords (ibid.).During breathing,the vocal cords are kept apart so that air can move freely into and out of the lungs.The voice is produced when the vocal cords are brought together so that the air passes and causes the vibration of the vocal cords (Denes and Pinson,1963:52).

3.2.3 The Supralaryngeal System

The internal and external muscles of the chest produce the flow of air required for almost all speech sounds.Then,many different modifications are produced by the muscles of the larynx in the flow of air from the chest to the mouth.

Gradually,the part of speech mechanism that lies above the larynx is called the supralaryngeal.This system may also be called the pharyngeal-oral-nasal system because it consists of three major air cavities:the pharyngeal, oral, and nasal (Shriberg and Kent,1982:26) (see Figure 1).Most of the Arabic speech sounds are formed by modifying pharyngeal, oral, and nasal cavities.These modifications are achieved by the activation of

the muscles of the head, and neck which will work to move the velum, jaw, tongue, lips, and pharyngeal walls.

3.3 Anatomical and Physiological Considerations

Speech is a series of movements made audible.Thus,the process of articulation is one of movement and the moving structures are called articulators (Shriberg and Kent,1982:2).In this regard, the most essential articulators in speech production are as follows (see Figure 3):

3.3.1 The Larynx

It is a fact that most of the sounds energy used in speech is created by the larynx (Malmberg,1963:21).For this reason, the larynx is called by phoneticians as the voice box (Crystal,1991: 195).It is always described as a sort of cartilaginous box situated at the upper end of the trachea (ibid.).In addition, Hardcastle (1976:63) points out that larynx generally consists of nine cartilages:three unpaired (the thyroid, cricoid,and epiglottis) and three paired (the arytenoid, corniculate,and cuneiform cartilages). Then he adds,

> These cartilages are connected to each other by complex joints and move about these joints by means of various muscular and ligamentous forces.The motions of the various cartilages about these joints permit the wide variety of configurations that the larynx can assume during speech production.(ibid.)

The larynx acts as a valve between the lungs and the mouth.The larynx has an important part in speech production, eating and breathing because it can completely control the flow of air from the lungs (Denes and Pinson,1963:55).

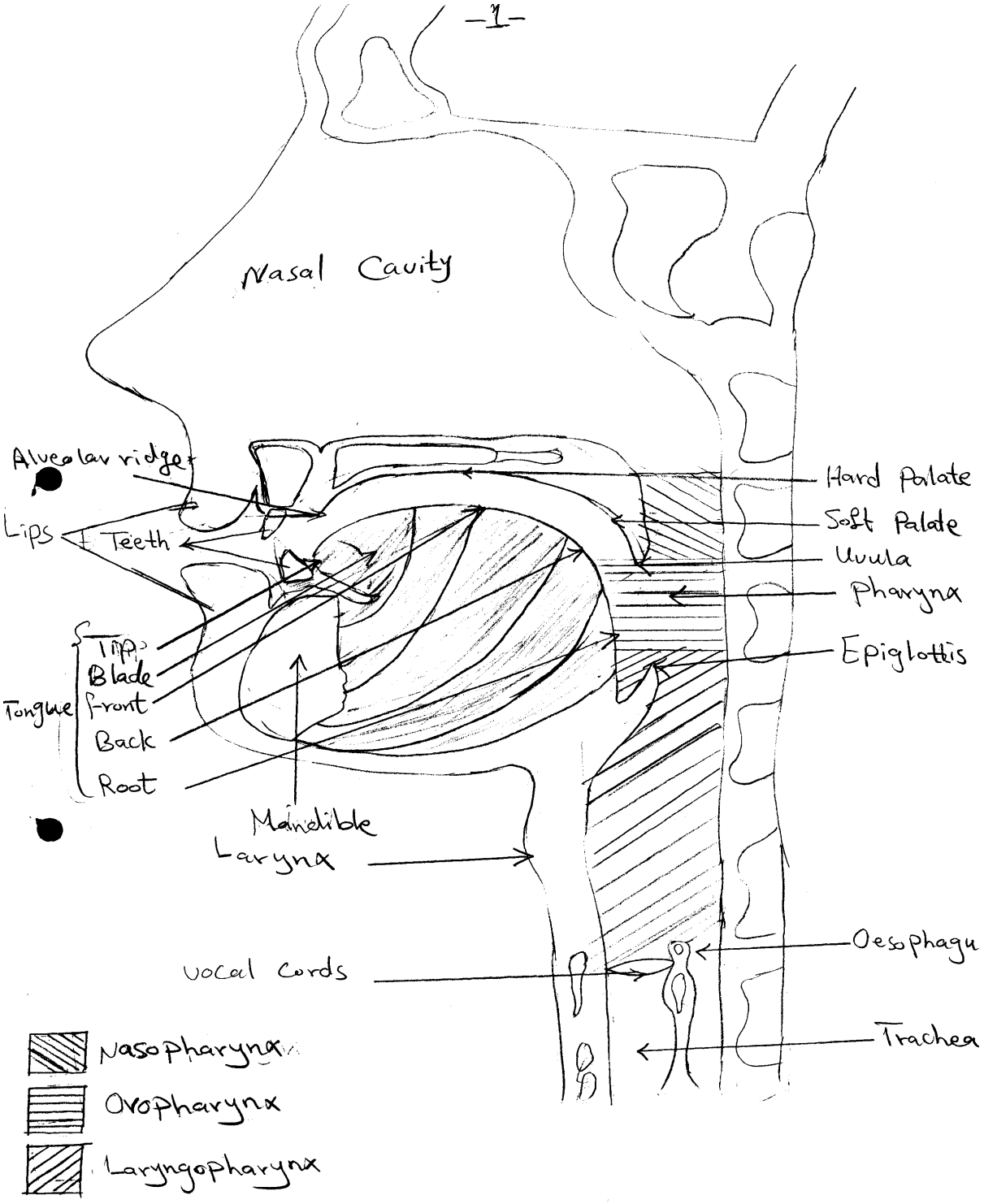

fig. 1 Organs of Speech

3.3.2 The Vocal Cords

The vocal cords are very important in speech production. They form a part of the larynx.Crystal describes the vocal cords anatomically as,

> Two muscular folds running from a single point inside the front of the thyroid cartilage(Adam's apple) backwards to the front ends of the arytenoid cartilage.They are very flexible,being shaped by the combined activities of the associated cartilages and muscles.The space between them is known as the glottis.(1991:373)

The vocal cords are about three-quarters of an inch long in an adult male and their length is shorter in women and in children (Shriberg and Kent,1982:22).They are situated at the top of the wind-pipe in a way lying opposite to each other across the air passage.They are "fixed adjacent to each other at the front end but horizontally movable at the back,where they are attached to the arytenoid cartilages" (O'connor,1973:25) (see Figure(3)).

One may think that the continuous action of the vocal cords in the process of speech production is very simple but it is actually quite complicated.The vocal cords are necessary in the production of voiced and voiceless speech sounds.The former are those sounds produced with vibration of the vocal cords whereas the latter are those sounds produced with no vibration of the vocal cords (Wise,1957:42).Arabic consonants like [b,z,d] are voiced stop consonants and [t,t,k,q,?] are described as voiceless stop consonants.Simpson (1979:48) states that in producing the glottal stop,the vocal cords are brought together so that the pulmonic airstream is interrupted,such an interruption is a glottal stop[?].

3.3.3 The Pharynx

The pharynx is a tube-shaped channel which lies above the larynx and stretched upward to the mouth and above this to the posterior opening of the nasal cavities (Singh and Singh, 1976:2; Roach ,1991:9) .O'conner (1973:30) indicates that the pharynx is divided into two cavities:the nasal and the oral cavity.The pharynx extends from the top of the larynx up to the back of nasal cavity.Roach (2002:56) classifies the pharynx as an articulator and the best known language that has consonants with pharyngeal place of articulation is Arabic.

Moreover,Gimson (1989:9) asserts that there are three sections inside the pharynx:nasopharynx, oropharynx, and laryngopharynx (see Figure (3)).The nasopharynx is situated directly posterior to the nasal cavity and extends from the base of the skull above to the level of the velum below.The oropharynx is a part lying directly posterior to the oral cavity and extends from the level of the velum above to the level of the tongue root below.The laryngopharynx is also known as the hypopharynx.This part lies directly behind the laryngeal structure and extends from the level of the tongue root above to the beginning of the esophagus below (Singh and Singh,1976:2).

Although the NPV has many functions like respiration, sucking, swallowing and blowing but the most important function is the speech.The NPV opens when the respiration takes place through the nose but the NPV closes when the respiration takes place through the mouth with the raising of the soft palate.As previously mentioned in chapter one,the normal articulation of the speech sound is achieved when there is a balance between oral and nasal resonance and this cannot be achieved if the NPV is incompetent.Plosive consonants like [p,b,t,d,k,g,?] are produced by an air pressure that is built behind the closure rushes out with explosive sound.The occurring of accurate pressure needs a simultaneous closure of the oral and nasal outlets (Morley,1972:385).

3.3.4 The palate

The palate, as shown in Figure (3), is "arched bony structure which forms the roof of the mouth" (Crystal,1991: 247). Physiologically speaking, the division of the palate into parts, particularly for purpose of speech production,has been underlying many disagreements among phoneticians.Different classifications of the palate have been used in describing the types of pathological conditions known as CLP(ibid.). Jones (1972:14) and Gimson(1989:12) classify the palate into three parts:the alveolar ridge,the hard palate,and the soft palate; whereas Simpson (1979:50) classifies the palate into four parts:the alveolar ridge,the hard palate,the soft palate,and the uvula. While Behnam and Al-Hamash (1972:16) classify the palate as follows:

1.The dental region is the inner surface of the upper incisors.
2.The gingival region is the narrow area of the gums.
3.The alveolar ridge.
4.The hard palate.
5.The soft palate.

Generally speaking,the palate can be classified as follows:

1.The alveolar ridge : It is also called the teeth ridge because it lies just behind the upper front teeth which is the convex of the tongue (Simpson,1979:50).Similarly,Behnam and Al-Hamash (1972:16) define the alveolar ridge as "the region that corresponds to the insertions of the teeth into the upper jaw".In addition,Jones writes,

> This part extends from the back of the upper front teeth to the piont where the roof of the mouth ceases to be convex to the tongue and begins to be concave.(1956:6)

2.The hard palate : The hard palate is characterized as "immobile bony area that lies immediately behind the alveolar ridge".For this reason,it is considered by most phoneticIans to be a passive vocal operator (Crystal,1991:247).Ward (1972:48) defines the hard palate as "the concave part of the roof of the mouth". Furthermore,Behnam and Al-Hamash (1972:17) define the hard palate as "arched vault of bones of the hard palate covered with a complex structure and protected by mucous tissue".The hard palate can be subdivided into three parts:the prepalatal region, the mediopalatal region and the postpalatal region (Brosnahan and Malmberg,1970:41).

3.The soft palate (velum): The soft palate plays a very essential role in the production of speech sounds because it separates the nasal from the oral cavities and it ends in the uvula.The soft palate is considered as an active articulator because it is mobile and fleshy.In this regard, Hardcastle (1976:112) defines the velum as "a flexible extension of the hard palate".Likewise, Crystal (1991:247) defines the velum as "the mobile fleshy continuation of the hard palate,culminating in the uvula". Brosnahan and Malmberg (1970:41) subdivide the velum into three types:the prevelar, postvelar, and the uvula .The uvula is a small muscular flap that is attached to the posterior edge of the velum.Normally, the uvula is biologically useless but phonetically it is helpful in the production of the trilled sounds.

However,phoneticians do not consider the speech sounds that are produced in the area of the soft palate as palatal. They regard them as velar-uvula.This means that the palatal speech sounds are just those which are normally produced in the area of the hard palate (Hardcastle,1976:110). The movements of the velum and the velum only can determine whether a speech sound is produced with or without nasal resonance.Phoneticians believe that there are two main activities for the velum at the muscular level.These are lowering and raising movements.They

assert that any constraint in the velum may take place during the production of the speech sound will constrain the articulatory mechanisms and differences in the timing with which the two movements are applied (Moll and Shriner, 1967:68).The velum has three main attachments and as described by Hardcastle,

> Anteriorly,it is attached to the hard palate. Superiorly, it is fixed to the skull by two sets of muscles whose fibers run down the sides of the nasal cavity into the lateral margins of the velum.Inferiorly,it is attached to the tongue and the pharynx.Muscle fibers inserting into the velum from these three attachments permit the main raising and lowering movements.(1967:112)

It is worth mentioning that the velum works as a valve to open or close the entrance to the nasal cavity.Thus,the soft palate will determine whether a sound will be nasal ,i.e, air passing through the nose, or oral ,i.e, air passing only through the mouth (Shriberg and Kent,1982:26).Gimson (1989:9) indicates that the three sections inside the pharynx (nasopharynx, oropharynx, laryngopharynx) are determined by the muscles' action which closes the pharynx, the movement of the tongue back, the position of the soft palate and the raising of the larynx itself. Therefore, the air escapes from the pharynx may be effect in one of the following three ways :

1.When the soft palate is lowered and the mouth is closed, the air can pass through the nose.This occurs in the production of nasal consonant sounds like [m,n,] (ibid.).The contribution of nasal cavity to speech is a matter of resonance ,if the soft palate is lowered with vibration of the vocal cords, the pharynx, nasal cavity and oral cavity are interacted and the air in the interactive cavities vibrates and has a nasal feature (O'conner,1973:32).

2.The soft palate may be lowered with the mouth opened, as for [æh].Then the vibrating air passes through both the mouth and nostrils.Here [æh] is a purely oral but has nasal feature and this is called nasalization like in French language ,the main difference between bon ‘good’ and beau ‘beautiful’ is clearly noticed between the nasalized and an oral vowel.It is noted that the lowering of the soft palate does not itself prevent the air passes through the mouth (ibid.).

3.When the soft palate is raised ,this will minimize the action of the nasopharynx and forces the air passes through the mouth.All the sounds,with the exception of the nasal consonant sounds, are produced by the oral escape ,e.g, [b,d,f,s],etc. (ibid.).

It is interesting to note that the HChn who have an abnormality of the velum,such as CP or short palate are used the NPV as Shriberg and Kent (1982:27) state “Bulging of the back wall of the pharynx, so that the back wall appears to move forward to meet with the elevating velum.

3.3.5 The Tongue

There is no doubt that the tongue is the most vocal operator involved in the production of speech sounds.The majority of the consonants in the languages of the world are produced by this articulation.

The main role of the tongue comes as a result of being the most movable and flexible vocal operator in the whole speech production system.The movement of the tongue ,as shown in Figure (4), is supported by the action of the muscles that connect the tongue to the lower jaw, the base of the skull, and the hyoid bone which lies between the mandible and the larynx (ibid.:28).

Figure (4) Skeletal or bony structures of the articulatory system shown by broken lines.Tongue and lips are also shown.

However,phoneticians classify the tongue into five functional parts (see Figure 3):

1.The tip (apex):It is the part that lies opposite the teeth ridge.
2.The blade(front):It is the part that lies opposite the hard palate.
3.The centre (top):It is the part that lies partially beneath the hard palate and the soft palate.
4.The back(dorsum):It is the part that lies beneath the soft palate.
5.The root:It is the part that lies opposite the back wall of the pharynx.The epiglottis is attached to the lower part of the root of the tongue.

In terms of mobility,the tip and blade of the tongue are the most mobile areas in this essential vocal operator.They could touch the whole cavity.In addition to that, "its tip, its edges, and its centre can be moved independently" (Denes and Pinson,1963: 65).Because of its great complexity of muscle structure, the tongue is capable of making a wide variety of shapes, moves quickly and consequently identifying airstream in numerous ways (Ward,1972:59).

It is important to mention that most speech sounds are formed by the contact of the tongue with other articulators like the teeth, palate, etc as in [t,l,n,s,d,k],etc.The horizontal backward movement of the tongue is necessary in producing pharyngeal consonant sounds like the Arabic consonant sound [ħ].The backward movement is also important because it is combined with an upward movement in the production of velar and uvular sounds such as [x] and [q] (Hardcastle,1976:93).

3.3.6 The Lips

The lips are defined as "complex structures of muscles that are joined together in a band which surrounds the opening of the mouth (Behnam and Al-Hamash,1972:16). Similarly, Hardcastle (1976:106) defines the lips as "a pair of fleshy folds that encircle the mouth composed largely of tissue, blood vessels, glands, nerves and muscle" . Moyers states,

> The upper lip is formed by the two medial nasal processes and the two maxillary processes.Labial component forms the philtrum of the upper lip and upper jaw component carries the four incisor teeth.(1988:30)

The upper and lower lip have separate muscles that both of them can move independently.The lower lip is supported by the muscles of the jaw so that it is usually more mobile than the upper lip and it moves with the jaw (Hardcastle,1976 :112). However , the lips play an important role performing the

accurate production of the vowel and consonant sounds.The muscles of the lips supply its mobility and facilitate the formation of various lip shapes for the production of the vowels like [a,o, æ] and consonants such as [p,b,m,f,r],etc. (Singh and Singh, 1976:29).

3.3.7 The Jaw

The jaw consists of the upper and lower jaw and the latter which is called the mandible is the most important part, for it can control the gap between the upper and lower and the disposition of the lips (Gimson,1989:12).Hardcastle (1976:106) indicates that the mandible is connected to both the hyoid bone and the tongue by means of muscles so that any movements will determine both the position and the shape of the tongue.Likewise, Singh and Singh (1976:29) indicate that the mandible is important in moving the lower teeth close or away from the upper teeth.Its movement helps to minimize or enlarge the size of the oral cavity.Shriberg and Kent write,

> The jaw has a hingelike motion made possible by a joint located close to the ear on either side of the head.The hing is formed at a place called the temporomandibular joint where the mandible inserts into the temporal bone of the skull.(1982:27)

However,the joint is structured in such away that enables the jaw move slightly forward and backward.Therefore,both the tongue and lower lip,as shown in Figures (5) and (6), are supported by the lower jaw (mandible).As the jaw moves,the tongue and lower lip also move with the jaw for the production of the speech sounds ,e.g, [s] in [so:] ‘saw’.In the following figures, the jaw presents a close (or elevated) position, whereas for the following vowel,it assumes open (or lowered) position (ibid.).

Figure 5
Shape of jaw,seen in Lateral view.

Figure 6
Jaw motion during speech.The closed position is for [s] in 'saw' and the open position is for the vowel.

3.3.8 The Nasal Cavity

The nasal cavity , as shown in Figure(3), extends from the pharynx to the nostrils which is about four inches long (Denes and Pinson ,1963:63). Singh and Singh (1967:29) state that the

nasal cavity and nasal sinuses lie anterior to the nasopharynx.In describing the nasal cavity ,Denes and Pinson write,

> It is divided into two sections by the septum, a central partition that runs a long the entire length of the cavity. Ridges and folds in the cavity's walls break up some segments of the nasal air passages into intricately shaped channels. At the back of the nose and also lower down in the pharynx are the tonsils.(1963:63)

Sometimes, the tonsils influence the air flow from the lung when they become large and the speech acquires the adenoidal quality.When the soft palate is raised,the nasal cavity can be isolated from the pharynx and the back of the mouth (ibid.).

3.4 The Phonetic Description of the Standard Arabic Speech Sounds

For the sake of simplification,the speech sounds of SA are described phonetically in Tables (2) and (3) according to Al-Ani's classification (1970:29).The SA consists of 36 speech sounds.The consonant sounds will be only described phonetically since the data of AHChn include only difficulties in pronouncing the consonant sounds ,i.e, the HChn do not have difficulties in pronouncing the vowels.

Table (2)
The Arabic Consonants

		Bilabial	Labio-dental	Inter-dental	Dental	Palatal	Velar	Uvular	Pharyngeal	Glottal
Stops	vl.				t		k	q		?
	vd.	b			d					
Fricatives	vl.		f	θ	s		x		ħ	h
	vd.			ð	z					
Affricates	vd.					d				
Nasals		m			n					
Trill					r					
Lateral					l					
Semi-vowels		w				y				
Pharyngealized	Vl. Stop Vd.				t					
	vl. Fricatives vd.				s					
				ð						

Table (3)

The Arabic Vowels

		Front	Central	Back
Short	High	i		u
	Mid		a	
	Low			
Long	High	ii		uu
	Mid			
	Low		aa	

The diphthongs are :[aw] and [ay]

3.4.1 The Consonants

There are 28 consonant sounds in SA.They are classified into groups according to their place and manner of articulation as listed in Table (2).

3.4.1.1 Stop Consonants

It is a fact that stops are produced by a complete closure in the vocal tract. Al-Ani (1970:31) defines the stop consonants

physiologically according to two terms: " the first is the formation of a closure within the vocal activity by one or more articulators where the diving perssure is blocked and the second by the sudden release of that pressure".As described by Al-Ani (ibid.:30) , the main points of articulation are as follows:

1.[b] :This consonant sound is a voiced bilabial stop.The two lips come together with a complete closure then the breath stream is released ,e.g :

[bint] 'girl' [d abaan] 'coward'
[markab] 'boat'

2.[t] :It is a voiceless dental stop.In describing this consonant sound, Bishr indicates,

> The tip of the tongue touches the upper gum at the point where the teeth emerge,also touching the rear surface of the teeth.(1975:101)

For example,

[tuut] 'blackberries' [itaa?] 'winter'
[?ixtaara] 'chose'

3.[d] :It is a voiced dental stop.The voiced counterpart of [t] (ibid.) ,e.g :

[dubb] 'bear' [?asdiqaa?] 'friends'
[ħafiid] 'grandson'

4.[k] :It is a voiceless velar stop.This consonant sound is produced when the back part of the tongue touches the soft palate (Abdul Jalil,1998:178) ,e.g :

[kabiir] 'big' [ðakiy] 'intelligent'
[fakk] 'jaw'

5.[q] :It is a voiceless uvular stop.The production of this consonant sound lies in the area of the uvula, when the back part of the tongue touches the soft palate (ibid.: 179) ,e.g :

[qaala] 'he said' [taqra?] 'she reads'
[suuq] 'market'

In addition,Catford writes,

> This consonant sound is formed by holding the dorso-velar articulation, then sliding the tongue backwards (while simultaneously slightly opening the mouth) as far as it can go and still be in contact with the roof of the mouth.(1977:163)

Nori (1991:90) states that [q] is the 'mufakhamm' counterpart of [k] ,e.g :

[kalb] 'dog' and [qalb] 'heart'

6.[ ]:This consonant sound has been described in all previous works on Arabic,classical as well as dialectical as a voiced pharyngeal, but according to Al-Ani's acoustical analysis, it is a voiceless stop.However,this consonant sound needs further intensive physiological investigation and careful acoustic analysis (1970:32) ,e.g :

[ali] 'name of a boy' [ta aam] 'food'
[yabii] 'he sells'

7.[?] :It is a voiceless glottal stop (Nasr,1967:24).This consonant sound is produced when the vocal cords are completely close together and then they are released (Nori,1991:86) ,e.g :

[?asmaa?] 'name of a girl' [?imra?a] 'women'
[samaa?] 'sky'

Further,Catford (1977:162) describes this sound as "the deeper sound in the throat , in the place where the air involved in vomiting is located".

3.4.1.2 Fricative Consonants

Fricatives are produced when two organs come together that the air moving between them produces audible friction (Crystal,1991:143).

1.[f] :It is a voiceless labio-dental fricative.This consonant sound is produced by touching the lower lip with upper teeth; the airstream passes with some friction (Erwin,1963:7) ,e.g :

[faqiir] 'poor' [xaafa] 'afraid'
[xariif] 'autumn'

2.[θ] :It is a voiceless interdental fricative.This consonant sound is produced when the tip of the tongue is between the upper and lower teeth and the air passes through a narrow obstruction (Bishr,1975: 118) ,e.g :

[θald] 'ice' [maθal] 'proverb'
[ħaariθ] 'name of a boy '

3. [ð] : It is a voiced interdental fricative.This consonant sound is the voiced counterpart of [θ] (ibid.) ,e.g :

[ðanb] 'guilt' [laðiið] 'delicious'
[xuð] 'take'(imp.)

4.[s] :It is a voiceless dental fricative (Beeston,1970: 17).This consonant sound is produced when the tip and blade of the tongue touch the gum,so that the air passes through a narrow gap that produces audible friction (Abdul Jalil,1998:164) , e.g :

[sa?ala] 'he asked' [yasma] ' he hears'
[ams] 'sun'

5.[z] :It is a voiced dental fricative .This consonant sound is the voiced counterpart of [s] (Al-Ani,1970: 34) , e.g :

[zayt] 'oil' [mazra a] 'farm'
[mawz] 'bananas'

6.[ ] :It is a voiceless palatal fricative (Beeston,1970: 18). Mahdi describes the production of this consonant sound as,

> The upper surfacs of the front part of the tongue approaches the roof of the mouth in the area just behind the gum-ridge,and the air passes with friction. (1985:34)

For example:

[ud aa] 'brave' [a ra] 'ten'
[ar] 'throne'

7.[x] :It is a voiceless velar fricative.This consonant sound is produced when the back part of the tongue approaches the roof of the mouth in the area of the soft palate and the airstream passes through a narrow passage with friction (ibid.) ,e.g :

[xaali] 'empty' [?axras] 'dumb'
[?ax] 'brother'

8.[ ] :It is a voiced velar fricative.This consonant sound is the voiced counterpart of [x] (Bishr, 1975: 121) ,e.g :

[aali] 'expensive' [lu a] 'language'
[balii] 'eloquent'

9.[ħ] :It is a voiceless pharyngeal fricative.This consonant sound is produced by narrowing the gap of the airstream in the pharynx and then the air passes causing friction (Abdul Jalil,1998:182). Similarly, Mahdi (1985:10) states that this sound is produced when "the root of the tongue retracted towards the back wall of the pharynx, passing the airstream through narrow passage with friction. For example :

[ħatab] 'firewood' [laħm] 'meat'
[sabaaħ] 'morning'

10.[h] :It is a voiceless glottal fricative.This consonant sound is produced when the air stream passes through the glottis with a slight friction (ibid.) , e.g :

[haa a] 'this' [maahir] 'skilful'
[wad h] 'face'

3.4.1.3 Affricate Consonants

[d] :It is a voiced palatal affricate.This consonant sound is produced when the tip and blade of the tongue touch the roof of the mouth mainly in the area just behind the upper teeth and then the tongue releases its contact slowly causing audible friction (Bishr,1975:122) ,e.g :

[d anna] 'heaven' [ad ara] 'tree'
[zawaad] 'marriage'

3.4.1.4 Nasal Consonant

1.[m] :It is a voiced bilabial nasal.This consonant sound is produced when the lips completely close and the airstream passes through the nose ,e.g :

[mataar] 'airport' [samak] 'fish'
[summ] 'poison'

2.[n] :It is a voiced dental nasal.It is produced when the front part of the tongue touches the upper gum where the teeth emerge ,closing the oral passage, and the airstream passes through the nose ,e.g :

[nahr] 'river' [banaat] 'girls'
[ʔibn] 'son'

(Nasr,1967:62;Bishr,1975:130)

3.4.1.5 Trill

[r] :It is a voiced dental trill.This consonant sound is produced by touching the tip of the tongue the gum behind the upper teeth .The tongue tip makes a series of taps against the gum ridge, while the air stream passes over the central part of the tongue that causes it to vibrate (Mahdi,1985:12) ,e.g :

[raʔs] 'head' [ʔazraq] 'blue'
[barr] 'land'

3.4.1.6 Lateral

[l] :It is a voiced dental lateral (ibid.). In the production of this consonant sound , Bishr writes,

> The tip of the tongue touches the upper gum where the teeth emerge just a little further back than [n] and the airstream passes out of the sides of the tongue. (1975:12)

For example:

[layl] ‘night’ [ʔalam] ‘pain’
[baxiil] ‘stingy’

3.4.1.7 Semi-vowels

Semi-vowels are also called sonorants and some phoneticians call them approximants.Semi-vowels are those sounds that are phonetically similar to vowels but phonologically they function as consonants.There are two semi-vowels :

A.[w] :It is a bilabial semi-vowel.This consonant sound is formed when the lips are rounded and the back part of the tongue is high (Mahdi,1985:12) , e.g :

[walad] ‘boy’ [lu awiy] ‘linguist’
[law] ‘if’

B.[y] :It is a palatal semi-vowel.In the production of this consonant sound, the front part of the tongue is high and it touches the area just behind the gum,and the lips are rounded (Bishr,1975:133) ,e.g :

[yaasamiin] ‘yasmine’ [miyaah] ‘waters’
[arabiy] ‘Arabic’

3.4.1.8 Pharyngealized Consonants

Different terms have been used to refer to 'pharyngealized consonants'.Arab grammarians have used the phenomenon 'tafkhim' or 'emphasis' while the European and American scholars have used the phenomenon 'emphatic velarized' to refer to pharyngealized consonants. Phonetically speaking, most of the Arabic consonants have their 'mufakhama'counterparts,e.g [t,t] and [d,d] respectively .Al-Ani (1970:44) classifies the consonant sounds [t,s,d,ð] as pharyngealized rather than velarized according to his acoustic and physiological analysis. It is clear that the feature 'mufakhama' is connected with stop consonants [t,d,q] and the feature 'non-mufakhama' is connected with stop consonants [t,d,k] (Nori,1991:90) .The difference between the emphatic and non-emphatic sound as stated by O'connor is,

> [s,ð,t,d] are matched by a so-called 'emphatic' set [s,ð,t,d] which differ in that they are velarized ,that is they have the same primary place of articulation as the corresponding non-emphatic set but with added raising of the back tongue.(1973:42)

Moreover,Erwin (1963:12) states the features that characterize the pharyngealized consonants and distinguish them from their plain counterparts.These features can be illustrated as follows:

1.The back part of the tongue is raised and it is slightly depressed,so that the upper surface of the tongue is concave.
2.The tongue as a whole is tense and almost retracted.
3.The pharynx walls include some constriction in it.

However,in producing the pharyngealized consonants, Mahdi writes that " the palatine dorsum moved inferiorly and the

pharyngeal dorsum moved toward the posterior pharyngeal wall" (1985:14).

1.[t] :It is a voiceless dental stop, pharyngealized, the counterpart of [t].This consonant sound is produced when the front part of the tongue contacts with the gum behind the upper teeth, the central part of the tongue is depressed and the back part is raised (Bishr, 1975: 102),e.g:

[tawiil] 'long' [mat am] 'restaurant'
[wasat] 'medium'

2.[ð] :It is a voiced interdental fricative, pharyngealized , the pharyngealized counterpart of [ð].This consonant sound is produced as,

> The air passes the partial obstruction when the tongue tip is between the teeth.The central part of the tongue is depressed and the back part is raised.(ibid.)

For example :

[ðahr] 'back' [aðiim] 'great'
[ħaðð] 'luck'

3.[s] :It is a voiceless dental fricative ,pharyngealized, the pharyngealized counterpart of [s].This consonant sound is produced as,

> The front part of the tongue touches the upper gum ridge but farther back than for [s].The central part of the tongue is depressed and the back part is raised .
> (Abdul Jalil,1998: 164)

For example :

[sayf] 'summer' [basma] 'finger print'
[xaass] 'private'

4.[d] :It is a voiced dental stop, pharyngealized, the pharyngealized counterpart of [t][1].This consonant sound is produced when the front part of the tongue touches the gum behind the upper teeth just a little farther back than for [,d].The air passes out the sides of the tongue in which the central part of the tongue is depressed and the back is ralatively raised (Bishr,1975:104) , e.g :

[dabaab] 'fog' [ba? duhum] 'some of them'
[ba? d] 'some'

Notes to Chapter Three

[1] The classical pronunciation of [d] as a pharyngealized stop has disappeared in SA except the Arabic Egyption language and this sound has pronounced as [ð] (classical [ظ]) in all cases (Bishr, 1975:104).

CHAPTER FOUR

The Practical Procedures

4.1 Introduction

Children with articulation defect are characterized by a difficulty with the physical production of individual speech sounds.As is explained in chapter two (sec.2.2.1), the articulation defect occurs when there are structural malformation in the organs of speech.The correct production of the organs is very important and as Renfrew (1972:24) asserts that the articulation of the sounds of any language depends on the ability to manipulate the organs of speech in different movements and shapes in which we can produce the sounds correctly.

Because of the difficulties resulting from these abnormalities, the study of AHChn needs patience and ability to endure the hard task to carry out the experiment procedure. It also requires to be in close connection to the HChn in order to know how to deal with them in such a way that the researcher can get an accurate and thorough investigation of their defects in the production of the speech sounds.It is important that diagnosing any HCh needs a specific team to provide accurate information about each individual of them.The team of speech therapy as described by Thatcher et al. is "a flexible instrument for continuous assessment , coordination of treatment, and discussion of progress"(1972:40).

However, the researcher used a training programme which is adopted by the "SPCSENT" at Medical city in Baghdad.The training programme was applied to the AHChn with structural defects.It provided the researcher with the necessary knowledge and gave her insight on procedural evaluations that lead to an appropriate diagnosis of a particular articulation defect. Gradually , it is also used in assessing and treating the

difficulties of each HCh in producing the speech sounds.To conduct this study, the researcher will follow an outline involving three-stage training programme which is shown below:

4.2 The Preliminary Assessment

This is the first stage.It includes the samples (speakers), data, and data analysis.The preliminary assessment serves as a guide to determine the difficulties in pronouncing the speech sounds and to follow the suitable methods of speech therapy in which the improvement in pronouncing the difficult speech sounds will be determined.

4.2.1 The Sample

The AHChn who produce the data are fifteen mono-lingual Iraqi Arabic HChn : four females CPHChn (one has a mild and three have severe CPD), seven THChn (five males and two females), and four JHChn (one male has a mild and three females have severe JD).The AHChns' ages ranged between (6-10) years.They are chosen in such a way to ensure the rapid equisition of speech sounds in this period and to minimize or overcome the effect of the defect.The AHChn are not homogenous with respect to their type of the defect.As far as this study is concerned ,the researcher is concerned with the AHChn who have abnormal structures of the vocal organs.The HChn are obtained from 'SPCSENT' at Medical city in Baghdad (For more details see Appendix 1).Hearing and intelligence are within normal limits (according to conversational statement by the HChn's speech therapist) and that there are no additional difficulties that may change during the period of the study.

4.2.2 The Criteria Used for Selecting the Data

The data of the present study are guided by a number of considerations :

1.The AHChn are given 34 isolated speech sounds (28 consonants,4 vowels and 2 diphthongs) and the sounds in words are found initially,medially,and finally.The stop sound [d] is treated as the fricative sound [ð] since the Iraqis usually pronounce the sound [d] in the same way that the fricative sound [ð] is pronounced .

2. The SA chosen is that used and understood by the different dialects of the Iraqi Arabic.

3.The chosen words are not balanced but the familiar and easy words are chosen for the following purposes :

A.The chosen words used are those words that have been taught to children at school because they know them and are used to hear them.
B.The simple words that include few syllables are chosen since the compound words seem to be more difficult than simple words.
C.The chosen words are standard words in which there is no great differences in the pronunciation of both the standard and colloquial form .(see Appendix 2).

It is worth mentioning that the chosen data,i.e, isolated speech sounds and words are produced to AHChn like picture form during therapy sessions in the SPCSENT at Medical city (For more details see 4.4.8).The test pictures help the HChn to identify the word correctly so that the researcher can determine the real ability of their pronouncing the speech sounds.The

resrarcher has encountered difficulty especially with HChn whose ages are six and for this aid means have been used to represent some words like [ʔu niya] ‘song’ and names of the persons (see 4.4.8). The researcher had to use the repetition process for some words like [ħaðð] ‘luck’,[ʔaw] ‘or’ , [nahaar] ‘day’.Thal (1969:68) asserts this procerure if the child is unable to name an object or an older patient cannot pronounce a word on the list.

However,the picture test is very active in showing the difficulties of the HChn in pronouncing the speech sounds and words.The sessions of speech therapy for each HCh are taperecorded and the data are transcribed by the researcher and later checked and rechecked with the recordings.

4.2.3 The Analysis of the Data

As for the present study, the AHChn with structural defects show no difficulty in pronouncing the vowels ,i.e, they have produced all the vowels without any impairment.On the other hand, AHChn encounter difficulty in pronouncing the consonant sounds.However, the production patterns of the difficult consonant sounds for all the AHChn are summarized in Tables (4), (5) , and (6).Table (4) sums up the production patterns of the CPHChn,Table (5) sums up the production patterns of the THChn and Table (6) sums up the production patterns of the JHChn.Transcription is used the symbols of IPA (revised to 1993) and EXT (revised to 1997) (http://www2.arts.gla. ac.uk/IPA/ fulchart.htm1. ,2004:1-3).

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Table (4)
Production Patterns of the CPHChn
(Rawan=R ,Dua'a=D ,Eman=E ,Aseel= A)

A.Substitutions	Characteristics Illustrated
i. [b] →[m], [d] → [n] (RED) [t,k,θ, ð,z, ,s,d,t,ð] → [n] (D) [f] → [m] (D)	Nasal air emission
ii. [?,ħ,x, ð ,r,z,s, , s ,d,ð, , , f, l, w,y] → [?,ħ,x,ð,r,z,s, ,s,d, ð, , ,f,l,w,y] (R)	Nasalization
iii. [θ] → [θ], [q] → [q] (E) [r] → [r], [s] → [s] (A)	Weak articulation
iv. [t] → [θ] (R)	Interdental replacement
v. [d,t, ð] → [t] (E)	Dental replacement
vi. [d] → [t] (R)	Voiceless replacement
vii.[θ , ð,z] → [y] (A)	Backing replacement
viii. [t,q] → [?] (RA) [k] → [?] (R) [x,d,] → [?] (A) [,x,d ,q] → [?] (D)	Glottal replacement
ix. [z] → [z] (E) [, ð ,d] → [, ð ,d] (A)	Devoicing

B. Sometimes distortions : [s] (A)

Table (5)
Production Patterns of the THChn

(Mahdi =M ,Omer=O ,Abdulla=C ,Ahmed=H , Rasool=S , Abdulmuttalib=U , Haneen=N)

A.Substitutions	Characteristics Illustrated
i. [r] → [l] (MHOC)	Lateral replacement
ii. [ ] → [q] (O)	Stopping replacement
iii.[s] → [s] (O) [r] → [r] (U)	Weak articulation
iv.[θ] → [f] (M)	Labiodental replacement
v.[ð] → [d] (MOCSN) [d] → [d] (M) [t,d, ð] → [d] (O) [d,t, ð] → [t] (MCHSN) [k] → [t] (M) [ ] → [s] (OM) [s] → [s] (NO) [z,s, ,s] → [t] (S)	Dental replacement
vi. [ ] → [ħ] (M)	Pharyngeal replacement
vii. [x] → [h] (MCS) [h,] → [h] (C) [q] → [?] (MNH) [ ] → [?] (MC) [k] → [?] (CO)	Glottal replacement

Table (5)-Continued

A.Substitutions	Characteristics Illustrated
viii.[z] → [z] (O)	Devoicing replacement
ix. [ħ] → [x] (S) [ ] → [x] (H)	Velar replacement
x. [ð] → [θ] (H)	Interdental replacement
xi. [d] → [t] (HSNO) [z] → [s] (MHN)	Voiceless replacement

B. Sometimes distortions : [s] (O), [z,] (C) , word (M)
C. Sometimes transposition :word (M)

Table (6)

Production Patterns of the JHChn

(Aaya=Y ,Ali=L ,Zeena= Z ,Fatma=F)

A. Substitutions	Characteristics Illustrated
i.[d ,ð ,s] → [d] (YL) [b,t,l] → [d] (Y) [t, θ ,x,r,s, ð,d,k] →[d] (YZF) [k, θ] → [t] (YZF) [z] → [s] (L)	Dental replacement
ii. [f] → [w], [θ,d] → [b] (L)	Bilabial replacement
iii. [ð] → [q] (Y)	Backing replacement
iv.[?,q,k] → [ħ] (YZF)	Pharyngeal replacement
v. [k] → [?] (YZF) [q] → [?] (L) [ħ] → [h] (L)	Glottal replacement
vi.[ ] → [m] (L)	Nasal replacement

B. Sometimes distortions :[z], syllable (Y)
C. Sometimes omissions: [f] (YZ)
D. Sometimes instability in the substitutions :
[b] → [θ,d] , [ð] → [q,d] (y)
[k] → [t ,d, ħ,?] ,[θ] → [t,d] (YZF)
[d] → [d,b] (L)
E. Sometimes transopitions: word (YZ)

Consequently,the major characteristics of all the AHChn are illustrated as follows:

1.The major characteristics of CPHChn are:

A.Nasal air emission is substituted for the consonant sounds [b , d , t , θ , k , ð , z , , s , d , t , ð , f] and glottal feature is substituted for the consonant sounds [t , q , k , x , d , , ,d]. These features occur in the speech of three HChn. Examples are given respectively:

[baab]	→	[maab]	‘door’
[θuum]	→	[nuum]	‘garlic’
[am a]	→	[nam a]	‘candle’
[batt]	→	[ban]	‘duck’
[?awraaq]	→	[?awraa?]	‘papers’
[kitaab]	→	[?itaab]	‘book’
[tiin]	→	[?iin]	‘mud’

B.Nasalization is substituted for the consonant sounds [?, ħ , x ,ð , z , r, s , , s , d , , , f ,l , w, y, ð], interdental feature is substituted for the stop sound [t], voiceless feature is substituted for the affricate sound [d], dental feature is substituted for the emphatic sounds [d , t , ð], and backing is substituted for the consonant sounds [θ , ð , z]. These features occurr in the speech of one HCh.Examples are given respectively:

[?awwal]	→	[?awwal]	‘first’
[xass]	→	[xass]	‘lettuce’
[tiin]	→	[iin]	‘figs’
[farad]	→	[farat]	‘name’
[taalib]	→	[taalib]	‘student’
[ħiðaa?]	→	[ħiyaa?]	‘shoe’

C. The consonant sounds [θ, q , r , s] are weakened and the consonant sounds [z, , ð ,d] are devoiced. The weak articulation and devoicing features occur in the speech of two HChn , examples are given respectively:

[rummaan]	→	[rummaan]	‘pomegranate’
[sinn]	→	[sinn]	‘teeth’
[xabbaaz]	→	[xabbaaz]	‘baker’
[?abyad]	→	[?abyad]	‘white’

For the investigation of the aforementioned characteristics of the CPHChn,it is worth mentioning that CP speech patterns have been considered universal ,i.e, occurring for CPHChn regardless of language .As reported in previous studies, the major characteristics of CPHChn are : hypernasality , nasal emission , weak pressure consonants , glottal replacement , weak or strong expiratory air , and backing . Shahin’s study of Arabic CPHChn (2000:6) states that “weak pressure consonants occur because the pressure leak at the nasopharyngeal valve compromises intra-oral pressure”.While glottal replacement involves “valving at the glottis to give oral obstruent percept for targets with place of articulation too forward in the vocal tract”.

In addition to that, Landis and Cuc (1975:236) affirms that distortions consist of lateralization , interdentalization , glottalization and pharyngealization.The distortions can extend to include the nasal consonants to the most CPHChn.In this respect, Johnson asserts that ,

> The air pressure is emitted through the nostrils during the production of the pressure consonants.If the escape is sufficient in quantity,the nasal emission of air pressure is audible and distorts the acoustic signal of the speech sound.
>
> (1997:1190)

In some backing compensatory articulations (substitutions), Shahin(2000:2) remarks that "the back or blade of the tongue is raised for lingual assist in velum raising,or blockage of palatal fistula".

It is interesting to note that Shahin's study of Arabic CPHChn (ibid.) indicates that glottal replacement was observed only for stops ,not for fricatives or affricates ,and backing was observed for stops and the fricative sound [s] ,not for other fricatives or affricates, as reported by Trot-Gardamane. Likewise,for the present study,the production patterns of CPHChn show that glottal replacement is observed for some stop , fricative sounds ,and the affricate sound and backing is observed for some fricative sounds.The most common features are nasal air emission and glottalization.Nasal consonants are substituted for some stop and fricative sounds.Further,other minor characteristics are found such as nasalization, weak articulation, interdental replacement, dental replacement, voiceless replacement, backing and devoicing. Nasalization is substituted for some stop , most fricative sounds , the lateral , and semi- vowel sounds , weak articulation is substituted for some fricative sounds , the trill sound [r] and the stop sound [q] , interdental replacement is observed for the stop sound [t], dental replacement is observed for emphatic sounds except [s], voiceless replacement is observed for the affricate sound [d] and devoicing replacement is observed for some fricative sounds.

2.The major characteristics of the THChn are:

A.Lateral feature is substituted for the trill sound [r].This feature occurs in the speech of four HChn , e.g:

[sariir] → [saliil] 'bed'

B.Stopping and pharyngeal features are substituted for the fricative sound [ ], labiodental feature is substituted for the sound [θ] , interdental feature is substituted for the consonant sound [ð], and the consonant sound [z] is devoiced. These features occur in the speech of one HCh .Examples are given respectively:

[azaal]	→	[qazaal]	‘deer’
[aaz]	→	[ħaaz]	‘gas’
[muθallaθ]	→	[mufallaf]	‘triangle’
[tilmiið]	→	[tilmiiθ]	‘pupil’
[zaraafa]	→	[zaraafa]	‘giraffe’

C. The consonant sounds [s, r] are weakened and velar feature is substituted for the consonant sounds [ħ,].The weak articulation and velar features occurr in the speech of two HChn.Examples are given respectively:

[d isr]	→	[d isr]	‘bridge’
[?arnab]	→	[?arnab]	‘rabbit’
[?aħmar]	→	[?axmar]	‘red’
[faari]	→	[faarix]	‘empty’

D.Dental feature is substituted for the consonant sounds [ð ,d , t , d , ð , k , , z , s , s].This feature occurrs in the speech of six HChn ,e.g :

[ðahab]	→	[dahab]	‘gold’
[?asfar]	→	[?asfar]	‘yellow’
[d amal]	→	[damal]	‘camel’

E.Glottal feature is substituted for the consonant sounds [x , ħ , , q , , k] and voiceless feature is substituted for the consonant sounds [d , z] .These features occur in the speech of five HChn .Examples are given respectively:

[ħaliib]	→	[ʔaliib]	‘milk’
[alam]	→	[ʔalam]	‘flag’
[nad d aar]	→	[nat t aar]	‘carpenter’

Thus, we find that the most common characteristics of THChn are : lateral , dental , glottal, and voiceless replacement. Lateral replacement is observed for the trill sound [r], dental replacement is observed for some stop , some fricative sounds, and the affricate sound , glottalization is observed for some stop and fricative sounds, and voiceless replacement for the affricate sound [d] and the fricative sound [z]. Other minor characteristics are: stopping , weak articulation , labiodental replacement, pharyngeal replacement, devoicing , velar replacement and interdental replacement. Respectively, stopping is substituted for the fricative sound [ ] , weak articulation is substituted for the trill sound [r] and the fricative sound [s], labiodental replacement is observed for the fricative sound [θ], pharyngeal replacement is observed for the fricative sound [ ], devoicing is observed for the fricative sound [z] , velar replacement is observed for the fricative sounds [ħ,] and interdental replacement is observed for the fricative sound [ð].

Since this study is concerned with HChn who have structural defects , we can notice that the production patterns of all the AHChn indicate organic errors ,i.e, substitution in the place of articulation.But it is found , through the investigation of the major characteristics of AHChn, that their production patterns reveal errors in the manner of articultion as well as place of articulation such as the substitution of stops for the fricative sounds.Sometimes, THChn tend to make distortions and transpositions in words that consist of one syllable , e.g :

[saff]	→	[fass]	‘class’

3. The major characteristics of the JHChn are:

A.Dental feature is substituted for the consonant sounds [s , s , z , t , d , t , ð , θ , ð , d , b, x , k , r , l] , glottal feature is substituted for the consonant sounds [k , q , ħ], and pharyngeal feature is substituted for the consonant sound [? ,q ,k]. These features occur in the speech of all the HChn.Examples are given respectively :

[miftaaħ]	→	[mifdaaħ]	'key'
[d amal]	→	[damal]	'camel'
[qafas]	→	[?afas]	'cage'
[maktaba]	→	[ma?taba]	'library'
[baqara]	→	[ba?ara]	'cow'

B.Bilabial feature is substituted for the consonant sounds [f,θ,d] and the consonant sound [ ] is nasalized. These features occur in the speech of one HCh , Examples are given respectively :

[saff]	→	[sabb]	'class'
[rii]	→	[riim]	'feather'

C.Backing is substituted for the consonant sound [ð]. This feature occurs in the speech of one HCh , e.g :

[ħiðaa?]	→	[ħiqaa?]	'shoe'

The production patterns of the JHChn reveal that the most common characteristics are : dental , glottal , and pharyngeal replacement.Dental replacement is observed for some stop , some fricative sounds , the affricate ,the lateral ,and the trill sound ; glottal replacement is observed for some stop sounds and the fricative sound [ħ] ; and pharyngeal replacement is observed for some stop sounds . Other

minor characteristics are: bilabial , nasal , and backing replacement. Bilabial replacement is observed for some fricatives and the affricate sound [d], nasal replacement is observed for the fricative sound [ ], and backing replacement is observed for the fricative sound [ð] .

However,the speech of JHChn is characterized by instability in their substitution.One HCh substitutes [θ] in the word [θuum] 'garlic' either [t] or [d] , e.g :

[θuum] ⇀ [tuum] 'garlic'
↘ [duum]

Distortions , transpositions of the consonant sounds and omissions of final consonant sounds [f,h] can be seen in their productions , e.g :

[da iif] → [da ii] 'weak'

In short,the most common characteristics of all the AHChn with structural defects are: glottalization and dental replacement. These characteristics are observed for some stop and fricative sounds.Besides , THChn make dental replacement for the affricate sound whereas JHChn make dental replacement for the affricate , the lateral , and the trill sound . Other minor characteristics are: pharyngealization , nasal air emission, nasalization, velarization, weak articulation, interdental replacement, devoicing , backing, labiodental replacement , bilabial replacement, stopping, lateralization and voiceless replacement.

It is recognized that only the CPHChn who produce nasal stop and fricative consonants and nasalize some stop , most fricative , the semi- vowel sounds ,and the lateral sound . Although nasal consonants are found in the speech of one JHCh, this is to avoid pronouncing a specific sound that can not be

produced with such defect.On the one hand, the characteristics of weak articulation , interdental replacement, devoicing , and voiceless replacement are the most common features in the speech of both the CPHChn and THChn.The weak articulation and interdental replacement features are observed for some voiceless stop and some fricative sounds except that the trill sound is weakened whereas the devoicing and voiceless features are observed for some voiced fricative sounds except that the voiceless feature is substituted for the affricate sound .On the other hand ,both CPHChn and JHChn produce backing for some fricative sounds and nasal air emission for some stop and fricative sounds except the latter produce this feature for the fricative sound [ ] only.Furthermore ,both THChn and JHChn make pharyngeal replacement in which the former produce it for the fricative sound [ ] only whereas the latter produce it for some stop sounds. The minor characteristics like velar , labiodental , stopping , and lateral replacement are found only in the speech of THChn and they are observed for some fricatives except the lateral replacement is observed for the trill sound [r].Bilabial replacement occurrs only in the speech of JHChn and it is observed for some fricative sounds and the affricate sound . (see Table 7)

In addition to that, all the AHChn tend to make distortions in the consonant sounds especially CPHChn and JHChn. Trasposition in words of one syllable is occurred in the speech of THChn and JHChn whereas JHChn tend to make omissions in final consonants.Their speech is characterized by inconsistency in the substitutions and this results from their defect that avoid them from producing the correct movement of articulation.

Table (7)
The Speech Characteristics of the AHChn (before therapy)

The Characteristics	CPHhn	THChn	JHChn
1.Glottal replacement	Some stops , fricatives , and the affricate	Some stops and fricatives	
2.Dental replacement	Emphatic sounds except the sound [s]	Some stops, fricatives, and the affricate	Some stops, fricatives, the affricate ,the lateral ,and the trill
3.Pharyngeal replacement		The fricative sound [ ]	Some stop sounds
4.Nasal air emission	Some stops and fricatives		The fricative sound [ ]
5.Nasalization	Some stops,most fricatives, the lateral , and the semi - vowels		
6.Velar replacement		Some fricatives	
7.Weak articulation	The stop sound [q], some fricatives, and the trill	The fricative sound [s] ,and the trill	

Table (7)-Continued

The characteristics	CPHChn	THChn	JHChn
8.Interdental replacement	The stop sound [t]	The fricative sound[ð]	
9.Devoicing	Some fricative sounds		
10. Backing	Some fricatives		The fricative sound [ð]
11.Labiodental replacement		The fricative sound [θ]	
12.Bilabial replacement			Some fricatives and the affricate
13.Stopping		The fricative sound [ ]	
14.Lateral replacement		The trill sound [r]	
15.Voiceless	The affricate sound [d]	The affricate sound [d] and the fricative sound [z]	

In the investigation of the compensatory production (substitutions) patterns for all the AHChn, we conclude the following :

1.The HChn substitute one consonant sound for another by the influence of the following factors:

A.The effect of some articulators like the movement of the lips and the tongue: This factor occurs particularly in the speech of CPHChn.For example,it is recognized that the nasal consonant [m] is substituted for the consonant sounds [b,f].As the lips contribute in producing the nasal consonant [m],the HChn tend to substitute it for the sounds that are produced by the lips like [f,b].The nasal sound [n] is produced by touching the tongue tip with the gum behind the upper teeth, so that the HChn tend to substitute it for the consonant sounds that are produced by the tongue like [θ , t , d , ð, z , , s , d , ð,t , k].

B.The effect of the place of articulation parameter: This factor occurs in the speech of all the HChn .The HChn usually substitute one sound for another that is very close in place of articulation to that sound ,i.e, two sounds have the same manner of articulation parameter but they are different only in place of articulation parameter.It is known that HChn tend to utter the effortless and the easy consonant sounds because of their defects.The following examples are given to illustrate this factor :

i. [t]→ [t] :Both of the consonants [t] and [t] are voiceless stops but they are different in that the former is emphatic and the latter is non-emphatic. The emphatic sound is more difficult than non- emphatic since it needs not only the tongue touches the gum behind the upper teeth but also the raising of its back part in which the tongue as a whole is retracted . Many consonant sounds like [d, ð ,k] are ssbstituted by the consonant sound [t]. In the case of the consonant sound [k], the HCh finds

a difficulty in raising the back part of the tongue than raising the tongue tip .

ii. [q]→ [ʔ] : Both of them are voiceless stops but they are different in that the former is uvular and the latter is glottal.The HCh has a clear defect since he (she) can not make a backward movement of the tongue in which the tongue touches the soft palate in the area of uvular, the HCh produces this sound in the area of glottis and the result is the consonant sound[ʔ].Many consonant sounds like [t, d ,k] are substituted by the consonant sound [ʔ] .All these can be explained in the same manner.

iii. [x]→ [ħ] :Both of them are voiceless fricatives but they are different in that the former is velar and the latter is pharyngeal.In the production of the sound [x], the HCh raises the back part of his (her) tongue towards the back wall of the pharynx instead of the soft palate and the result is the consonant sound [ħ].

iv. [θ]→ [f] :Both of them are voiceless fricatives but they are different in that the former is interdental and the latter is labiodental.The HCh touches the lower lip with the upper teeth to minimize the tongue's effort in producing the consonant sound [θ].

v. [r]→ [l] :Both of them are dental but they are different in that the former is trill and the latter is lateral.It is found that the consonant sound [r] is the most difficult sound that the HChn face in their production.This substitution occurs only in the speech of THChn since this sound requires to make quickly a series of a firm taps with the tongue tip against the gum behind the upper

teeth.The most closest sound to the sound [r] in its place of articulation is the sound [l].

vi. [ ]→ [s] :Both of them are voiceless fricatives but they are different in that the former is palatal and the latter is dental.In the production of [s],the air passes through a narrow gap to give audible friction but in the production of the sound [ ],the air passes through a narrow gap which is larger than the gap in producing the sound [s] and the tongue is a little backward so that the HCh must make a great effort and this is why he substitutes [s] for [ ]. This substitution occurrs in one THCh who has a mild weakness in the tongue and has improved his speech sounds except the trill sound [r].

C. The effect of the manner of articulation parameter: It is found that the HChn tend to make substitutions in fricatives and affricates more than stops and semi-vowels since the tongue must be kept very closely from the other articulator in the production of the fricatives until the air can pass between them to produce audible friction. Further, in the production of the affricates , the air must be controlled behind a complete closure in the vocal tract until gradually is released , e.g :

[ ] → [t], [ ] → [?], [d] → [d], [d] → [?],
[ ] → [ħ], [x] → [?], [θ] → [y], [d] → [b]

D. The HChn tend to substittute the voiceless sounds for the voiced sounds:Usually, the HChn use the voiced counterpart sounds for the the voiceless sounds because they are easy and donot require great effort in their production.This factor emphasizes the effect of the place of articulation parameter in producing these substitutions , e.g:

[ð] → [θ] , [z] → [s] , [d] → [t], [ ] → [x]

4.3 Speech Therapy for Pronunciation of AHChn with Structural Defects

This is the second stage.It involves the training exercises of speech therapy to minimize or overcome the difficulties of the AHChn in pronouncing the consonant sounds.The aim of the speech therapy is to help each HCh to obtain normal speech which is useful for the purpose of communication , appropriate for his (her) age, development and environment.It aims mainly to teach the correct production of the speech sounds. Morley (1972:305) asserts that it is essential that HChn must speak without conscious effort whilst producing the sound patterns characteristics of the language of the community. Nevertheless, the therapist must consider the HCh as a whole , and in relation to his (her) environment and not merely his (her) use or mal-use of articulate speech.The aim of the speech therapy must always be the development of articulation of the speech sounds that is intelligible to others even if there is severity of speech defect. The friendly relationship between therapist and the HCh is necessary and helpful in the development of the speech therapy.

It is important to mention that speech therapy becomes very effective in eliminating compensatory articulation productions (substitutions).The characteristics of AHChn ,which are mentioned in (sec. 4.2.3) , can be corrected or improved only under specific conditions.Such a therapy is suitable for HChn with these characteristics only if they have structural defects (dysfunction of the vocal organs) ,i.e, the therapy is not suitable for those who have dysarthria or apraxia defects (Kummer,2002:1).

It is a fact that physical management, through surgical correction,is still the most effective means to correct vocal organs dysfunction.Since there is a bad surgical correction especially in repaired CPHChn as well as there are some defects that can not be corrected surgically (like the weakness of the tongue muscles), the speech therapy is very necessary and

tongue muscles), the speech therapy is very necessary and required for HChn to improve their pronunciation of the speech sounds.

Moreover,Thal (1969:89) indicates that clear speech depends mainly on the accuracy and speed of the complicated movements of the tongue.In this regard,it is important to find methods of minimizing the effect of the limited mobility of the tongue. If the impairment in the vocal organs is removed, the articulation must become normal otherwise the HCh has to seek speech therapy to overcome his (her) difficulty with articulation.

Broadly speaking, the general aims of speech therapy can be stated as follows:

1.To achieve a normal relationship between the HCh's phonological system for normal speech reception and his (her) defective system for production.

2.To establish the normal movements for articulation of the phonetic sounds which are defective in HCh's phonological system.Various processes are involved :

a Inhibition of faulty movements.
b.Facilitation of correct movements.
c.Association of these movements into phonemic units and sequences and sonsorimotor associations.
d.Stabilisation of these new patterns of movement through adequate experience and practice active is essential for the achievement of normal sensorimotor coordination.

3.To give the HCh enough sensorimotor experience until the phonemic patterns are acceptable to the HCh and can be used for normal articulation (Morley,1972:318).

However,the researcher has used techniques of speech therapy that are designed by 'Nuffield Hearing and Speech Centre : Royal National Throat. Nose and Ear Hospital in

London'.These techniques are used by the speech therapist in training AHCHhn with structural defects in 'SPCSENT' at Medical city in Baghdad. In this respect ,Thatcher et al. (1972: 30) point out that the techniques used in speech therapy vary according to the nature of the HCh's defect,his (her) age and sometimes his(her) level of intelligence.It is noticed that HCh needs therapy since changing the structure does not necessarily change the function of the organs. Morley (1972: 413) asserts that with appearance of new surgical techniques , speech therapy is becoming less important in the treatment of the HChn; but nevertheless speech therapy is considered essential for normal coordination of the articulators in spite of all what surgery can do.

For the requirement of this study, it is important that the researcher has a knowledge in the way the exercises can be practised correctly.Thus, the researcher has watched for a period of time the way that the speech therapist has used in training the HChn so that the researcher can train them in the same manner that the therapist did.For this reason, the researcher can determine the improvement of the HChn in pronouncing the speech sounds.The HChn have to practise the exercises tasks one time daily at home and twice in a week for at least two months in 'SPCSENT'.The techniques of muscls training exercises are structured in such a way to achieve sequential training for each kind of defect.

It is usual that the HChn are trained on the same exercises by their families at home daily especially the mother who already has a knowledge in practicing these exercises .The success of therapy certainly depends upon the understanding and the cooperation between the mother and the HCh.The exercises of muscles training are very effective to establish correct oral consonant production and eliminate compensatory errors.These exercises involve non-speech exercises and speech exercises.The non-speech exercises must be given first to the

HChn to strengthen the movements of the vocal organs before training for pronouncing the speech sounds.The researcher has ensured that the HChn are practised the training exercises accurately and correctly.The researcher has practised the training exercises in front of the HChn and they imitated in the same manner .The sequential training of the activities is very important to obtain progress in the HChn's production of the speech sounds.However, the researcher took the following factors into consideration in training the HChn during the training sessions of the speech therapy :

1.Repetition is the mother of learning and practice makes it perfect.Both repetition and imitation are the most active and useful ways in improving the HChn's pronunciation of the speech sounds (Thal,1969:68) .

2.Mirror is an active means of training that encourages the HCh to imitate the correct production of the sound.The researcher has used the mirror particularly with JHChn to show the correct placement of the lips.Also, recordings are very necessary in encouraging the HCh to imitate the correct pronunciation of the sound.

3.The familiar and easy objects, words are more preferable in training the HChn for producing the sounds because they are easy asked the HCh to name.The researcher has used what is found in the room like '[haa a] ……'for encouraging the HCh to pronounce the specific sound ,counting from ten to twenty, thirty, etc. or using yes /no questions.Also, using simulating means like stories , games, pictures, etc. are more effective in making the HCh learn by rote certain sounds and words (Stinchfield,1933: 14).It is better to start with one or two situations during a day.When the HCh wants a biscuit or

a particular toy , the therapist must not give him (her) what he (she) wants until producing the correct sound (Hayes,1975:4).

4.Short breaks between exercises are needed if the HCh is restless,a change to an activity is necessary so that the HCh will tolerate the sessions of the speech therapy. Encouragement is very important and any defeat must not be noticed by the HCh (Thal,1969: 4). In addition, rewarding the HCh immediately is needed if he (she) is producing the correct sound and the therapist must show his (her) plaesure to encourage the HCh for more repetition of the speech sounds (ibid.).

It is interesting to note , new special techniques are successfully used,in addition to the techniques of muscle training exercises to serve many purposes including speech therapy and the HChn.The major goal of these techniques is to eliminate the characteristics of the HChn's speech like nasality. By using these techniques ,the HChn will be aware of their defects and this is very important in the course of treatment. These techniques will be explained within the training exercises. The muscle training exercises are classified into three kinds according to each kind of the defect.

4.3.1 Exercises for the Soft palate

These exercises are given especially to the CPHChn who have nasal tone.The aim of the soft palate exercises is to prevent the air stream pass through the nose and make it mainly pass through the mouth . Kummer (2002:3) gives a description of specific therapy techniques that can be used with nasal articulation characteristics (see Appendix 3).Once the CPHChn have achieved the specific techniques of nasality, they are given the exercises of the soft palate.These exercises involve non-speech and speech exercises.(see Appendix 4)

4.3.1.1 Non-speech Exercises

The CPHChn are trained for non-speech exercises which strengthen the muscles of the soft palate.These exercises include two activities:

1.Blowing :The aim of the blowing activity is to make the airstream pass through the mouth.The blowing games and exercises are useful in improving the breath direction and tongue position (Morley,1972:414). In this regard , Massengill et al. indicate two objectives of using blowing ,

> To effect a closure of the NPV in order to increase the intra-oral pressure needed for consonants and to obtain resonance control for the production of vowels and semi-vowels.(1968:44)

The CPHChn are asked to do the blowing exercises like blow out candles ,bubbles ,etc.

2.Sucking : The CPHChn are asked then to make the sucking activities like suck up waters , pepsi, pieces of papers at the end of the straw ,etc.These activities are very important for the CPHChn who have abnormal position of the tongue (Morley, 1972:414) .Later on , they are asked to practise both the blowing and sucking activities like blow bubbles through a straw in water and then suck some of it through the straw.Another way is to blow out cheeks and explode air through the lips ,etc.The best way to make this activity fun for the HChn is using a simple 'diving-board'.The 'diving-board' activity is very similar to the visual feedback technique (see Appendix 3).Further , this activity is a common way that can be used to test the HChn who have nasal tone (see Appendix 4:no.1.c). Powers and Starr (1974:28-32) remark that the

blowing and sucking activities show decrease NPVI and nasality during the course of treatment.

4.3.1.2 Exercises Involving Speech Sounds

The CPHChn are then given the exercises of the soft palate that include speech sounds.The HChn are asked to make a yawn movement ,i.e, raising the soft palate and lowering tha back of the tongue and produce a voiced vowel [æh].Repeating these activities by using a mirror to watch the movement of the palate. Later on, the HChn are given exercises that include meaningless syllables that consist of vowels and nasal consonant ,e.g :

[aah] [m] , [aa] [n] , [ii] [m]
[aah] [n] , [aa] [m] , [ii] [n]
[maah] , [naah] , [baah]

Later on ,the HChn are asked to make alternation of nasal consonant and its corresponding plosive consonants. Usually, this activity is practised at first slowly , e.g , [m…..baa, m…….bii ……,m……..buu] , etc.This activity is important in improving the ability to open and close the NPV.The nasal consonant is sustained, then nasopharyngeal closure occurs with the interruption of the hum. Air pressure is then built up with the mouth and sustained until the moment when the air is released through the lips for the plosive consonants.When normal coordination between the NPV and that of the oral outlets at the lips have been established , the exercises are practised with repetition of the meaningless syllables at speed and with achievement of normal pressure or the plosive consonant, using [m] with [b] and [n] with [t] and [d]. It is necessary that the HChn are asked to make a mixture of all the oral and nasal consonants with repetition of these sounds several times until obtaining the accurate production of

the sounds.The practicing of humming activities during the training exercises are very effective in facilitating the pronunciation of some consonant sounds like [b].

4.3.2 Exercises for the Tongue

It is common that the HChn who have weakness in the muscles of the tongue are given the exercises of the tongue to improve the movement of the tongue (see Appendix 5).Besides, these exercises are also important for JHChn to improve the mobility of the mandible accurately and correctly.The licking exercise is the major tongue activity. The HChn are asked to make this exercise in different ways :

1.Licking off the plate :The aim of this exercise is to improve the protrusion of the tongue, tongue pointing ,and tongue movement.The HChn are asked to protrude their tongue and lick sweet things from the plate.The researcher has ensured that the plate stays flat on the table unless the HCh faces a difficulty to control head movement and tongue protrusion, the researcher can raise the plate to the child's mouth and then gradually low the plate to the table level.

2.Licking exercises using a spatula or clean stick : Different activities can be made by using a spatula :

A.Licking outside the mouth with direct tongue Protrusion. This exercise is necessary to encourage tongue protrusion, tongue tip pointing , tongue elevation and a direct movement without deviation.The HCh is asked to open his (her) mouth wide and the researcher holds the stick vertically in front of the HCh's mouth and encourages him (her) to lick the spatula.The HCh licks the spatula by protruding his(her) tongue (not the lips) and without any movement of his (her) head .The HCh continues to do

this exercise until he (she) performs it correctly. Once the exercise of the tongue's protrusion is achieved , the researcher starts to train the HCh for the exercise that improves the tongue's elevation. First, the researcher lifts his (her) tongue up in front of the mirror and the HCh is asked to practise the same activity. Many HChn find this activity difficult at first ,so the researcher has to raise the HCh's tongue tip by (her) finger until the HCh can elevate his (her) tongue by himself or herself.

B. Licking off food from various positions around the Lips. This exercise is particularly useful to improve the range of movements and accuracy of positioning the tongue. The HCh is asked to lick the sweet things from the lips.It is important to be sure that the HCh makes the licking activity by using his (her) tongue (not the teeth or lips) .The researcher can help the HCh by holding a stick on the HCh's lip and encourage him (her) to touch it with his (her) tongue when he (she) achieves this exercise correctly , the researcher then can give him the licking activity.

C. licking outside the mouth using the spatula. The HCh is asked to lick the wet stick from various positions around the mouth and this exercise is very important for sideways licking.The researcher can encourage the tongue's mobility by asking the HCh to practise the licking activities like : putting a chocolet or a jam around the HCh's lips, imitating the tongue movement in front of the mirror ,e.g, side to side, up to down , etc.

D.Using the spatula inside the mouth. It is necessary that the HChn have achieved all the previous activities in order they can do this activity correctly. This activity encourages the HCh's tongue elevation and tongue tip pointing inside the mouth. The HCh is

asked to open his (her) mouth wide and put the end of the spatula against the upper teeth.Then, the HCh is asked to lick the spatula by using his (her) tongue (not the lips).The researcher must ensure the accurate practicing of the activities so that the improvement in pronouncing the speech sounds can be achieved.The HCh is also asked to lick a jam that is placed on the ridge behind his (her) top teeth and this will give him (her) an awareness of the correct placement.

4.3.3 Exercises for the Lips

All the HChn with structural defects ,i.e, CPHChn, THChn, and JHChn , are given the lip exercises because the lips have essential role in producing many speech sounds.The exercises of lip rounding that involve blowing activities are given to the CPHhn and JHChn (see Appendix 6).It is known that accurate production of the speech sounds needs lips move rapidly since the lips are important for the activities such as control of dribbling , swallowing and blowing activities.The lips exercises help the HCh to open, close his (her) lips and move them forwards and into a spread position .It must be sure that the HCh has to use his (her) lips not tongue in doing these activities.The lip exercises are illustrated as follows:

1.Lip rounding exercises: These exercises include various activities:

A.Blowing using candles.The aim of this activity is to improve lip-rounding , lip-protrusion and control the flow of air out of the mouth .This will also strengthen the muscles of the soft palate.The HCh is asked to imitate the pushing of the lips forwards as for kissing. It is very useful to use the mirror as a means to copy the same exercise.The researcher can paint the HCh’s lip and make round lip-stick

prints on paper.This way is very active and fun particularly for the JHChn to adjust their lips as possible as they can.Once the exercise of lips-rounding is achieved, the HCh is asked to blow candles, carnival blowers, etc.

B.Blowing through straw.The HCh is then asked to blow the candles through the tube and the researcher has ensured the holding of the tube between the HCh's lips not his(her) teeth.The HCh can use a large tube if he (she) finds a difficulty in blowing thin tube until he (she) can gradually use the thin tube.

C.Blowing bubbles,ping pong balls,pieces of paper.The HCh is asked to blow straight through the plastic wand.This activity encourages lip-rounding and controls the airstream.The HCh is then asked to blow ping-pong balls and pieces of paper through the straw.These activities can be fun if they are practised between two HChn.

2.Lip movement exercises.These exercises are very useful to strengthen the lip movement.They involve the following activity:

A.Lip smacking. The HCh is asked to lick sweets on his upper lip by using his (her) lower lip.Later on, the HCh tries to pick up large sweets with lips and then gradually pick up smaller sweets ,e.g, jelly tots , dolly mixtures , etc.

3.Changing lip shapes.The HCh is asked to practise changing from a round to a spread lip shape.The HCh is then asked to make alternate kissing (with lips rounded) and smiling (with lips spread).The rounded and spread lips are made by using various ways :lip-stick and paper (making round shape then a spread shape) by saying [oo] then [ii].

Consequently, the HChn will be ready to practise the specific techniques of producing the speech sounds when they have completed the training exercises of the vocal organs.It is supposed that the HChn have improved their ability in producing the speech sounds.The AHChn need at least sixteen sessions for two months - the time of each session is 30 minutes - to achieve all the techniques of muscle training exercises.It is worth mentioning that the principles of the therapy that will be described are based on and follows the normal development of phonemic patterns.These principles emphasize the normal linguistic development in that it requires first, the development of the use of the simplest phonological element the phonetic sound ; secondly , the association of the consonant sound with other sounds in phonemic sequences ; and thirdly its gradual introduction into linguistic sequence of increasing length (Kaplan,1969:229).

In order to obtain accurate treatment for the difficulties in pronouncing the speech sounds, the researcher uses principles of therapy which one must be based on them when it begins in training the HChn for pronouncing the speech sounds.The researcher has arranged the principles of therapy into five stages as follows :

1. Deciding what to teach first depends on the degree of difficulty for each HCh.The training for pronouncing a specific sound must begin with the sound that is easily pronounced by HCh.For this reason , one HCh has trained for pronouncing the consonant sound[t] ,while other CPHCh have trained for pronouncing the consonant sound [ ].Further, the researcher has used two ways for improving the required movement of articulating the speech sounds :

A. The order of development of consonant sounds:The HCh must be practised, in the first place, the speech sounds that he (she) could say them easily. Practising some

consonant sounds may facilitate the pronunciation of others ,e.g, the practice of [t] if normal, may help the control of tongue tip render it less difficult to obtain [s].

B. Associated positions for articulation:If a consonant sound is made too far back in the mouth,a sound more forward than the one required must first be practised. For example,when [s] is substituted by the velar plosive (stop) sound [k] or pharyngeal [ ] or [ħ] ,the practice of [f] or [θ] is useful to give the sensation of a fricative sound and to differntiate it from the stop sound (Morley, 1972:322).

2.Then ,the HCh must fully experience both the motor and sensory aspects of the sound he is producing.The direct imitation of the training exercises is continued until automatically achieving the normal production of the sound without hesitation and with direct stimulation of the therapist.Through the imitation , the HCh will develop the correct association between what he hears from the therapist and the sound he makes himself.The best way to avoid the substitutions is the training the HCh for pronouncing the sound that is substituted by another (ibid.).The HChn have trained for pronouncing the difficult consonant sounds by using simple activities or exercises of articulation these sounds.As described by Thal (1969:80) ,the simple activities are illustrated in (Appendix 7).

3.This stage involves the building up of associations between one consonant and another in sequences that require the introduction of the sound into the simplest phonetic sequences which form syllable consisting of one consonant and vowel (CV) .Degree of correctness is very important in producing the speech sounds . The HChn must be trained for the sounds in

isolation and then in meaningless syllables of a (CV) structure , e.g : [taa,tuu, tii]. (ibid.)

In this respect ,Morley (1972:319) points out that physiologically ,the syllable is the morphological unit of speech and articulatory movements are auxiliary movement in the syllable.Therefore, if the HCh can use the articulatory movement automatically in syllables, he (she) will be able to combine these syllables in words, phrases, and sentences.Nonsense or meaningless syllables are the best way for the phonetic stabilisation and strengthening the correct sound.Linguistically , the structure of the sounds is organized into syllables.One or more consonant sounds are associated with a vowel (V) either before the vowel (CV) or following the vowel (VC).Words then consist of one or more syllables while vocabularly changes with time but the basic structure of the sound patterns remains constant.The syllable is next incoporated into the simplest form of phrase without meaning ,i.e, the repetition of one consonant and vowel syllable in sequence as (CV CV CV) or [baa baa baa].In this way, through practice the new sequential associations are stabilized until they are all produced correctly. The researcher finds that it is helpful when the chosen patterns of the meaningless syllables contain the nucleus of an exisiting word ,e.g, [saa,suu,sii] provide the begining of the following words:

[saaruux] ‘missile’
[suura] ‘picture’
[siin] ‘China’

4.In this stage, the building up of such normal associations and coordination begins when the required movement and the production of the correct sound have been achieved (ibid.: 324). Each syllable is first repeated after the researcher. If there is a difficulty in joining the consonant and vowel ,

a slight break beween the consonant and vowel may help at first.Gradually, the best way in pronouncing the consonant sounds in words is by breaking up the words into single syllables , e.g :

[kitaab] → [ki] +[taab] ‘book’

5.Once the HCh has been trained for pronouncing the words, the next stage is that the HChn will be practised on contrasting between the two consonant sounds like [s] and [z].The role of discrimination training is very necessary to prevent the confusion between the two consonant sounds that arealike.Stinchfield (1933:53) and Ingram (1976:139) indicate that this way is usually used with HChn who do not have auditory problems .At first, the HCh learns to discriminate between the two sounds and he (she) will be trained to pronounce them.For example, the HChn have trained to hear the two consonants [t] and [t] in words [tiin] ‘figs’ and [tiin] ‘mud’ , then the HCh is asked to discriminate between [t] and [t]. It is recognized during the sessions of speech therapy that some HChn may have temporary difficulty in retaining a consonant sound already in use ,e.g, if [t] has been substituted for [t] and the HCh has improved the pronunciation of [t], he (she) may lose the sound [t] and substitutes [t] for [t]. If then the HCh practises the two sounds alternately contrasting them in such exercises [taa , taa , taa , taa], he (she) will notice the difference between them and retain both consonant sounds.

However, the researcher uses the discrimination training as follows:

A. As explained previously,the researcher uses the two words [tiin] ‘figs’ and [tiin] ‘mud’ to discriminate between the two consonant sounds [t] and [t]. Usually,the HCh has a difficulty in pronouncing the consonant sound [t].

B. The researcher says the two words and then tests the HCh if he (she) can point the correct word.Usually, the HCh will not confuse between the two words because he (she) does not have language defect but the problem is in the articulation defect.

C.The HCh is then asked to pronounce the two words.If the HCh says the word [tiin] as [tiin],the researcher points [sah] 'true' but if the HCh says the [tiin] as [tiin], the researcher point [xata?] 'false'.In this way, the HCh must notice the mistake and say that this word is [tiin].This way is very active to encourge the HCh to focus on pronouncing a specific sound.

However,compensatory articulation productions (substitutions) are usually developed by the HChn who encounter difficulty in the normal productions.The compensatory production (substitutions) are easier to produce and result in better use of airflow.Therefore, changing placement of the vocal organs to eliminate compensatory production is not easy in the presence of the vocal organs dysfunction .If the surgical operation succeeded in adjusting the articulation defect, it is often better to wait until after the surgery before beginning therapy.On the other hand,if the therapist finds that the HCh needs a change in the placement of certain defect, especially those who have CPD and JD and this results in an elimination in the degree of the defect.So, the therapy must be given priority in considering the surgical correction.Morley (1972:320) states that in the substitution of one consonant for a defective one, the HCh needs to inhibit the old faulty sensori-motor patterns and substitute another.

Further, cases of omission of the consonant sound are also found in the production patterns of JHChn.The omission of a single final consonant sound is quite common in

their speech.For its correction, the researcher has focused on the final consonant of the word in questions in order to draw attention to it (Thal,1969:89) .The researcher has broken up the word into its component parts and has treated the omitted sound like the initial consonant of the syllable.Then, the pause gradually reduced until it disappeard.In this regard,Morley (1972:326) indicates that the syllables which include omitted sounds must not be practised rapidly.The faulty word may be repeated in isolation two or three times, but if a correct response is not obtained, the faulty articulation must be accepted and further practice must be given on the incorrect phonological element.Once the HCh has achieved adequate control of the normal phonetic sounds during therapy,the HChn then will use them into their own speech that will be gradually intelligible to others.Table (8) shows the distribution of the training sessions during six months of speech therapy.

Table(8)

The Distribution of the Training Sessions During Six Months of Speech Therapy

The Sample	The kinds of techniques	The kinds of exercises	The long of session	Number of sessions	The period of Time
CPHhn	Muscle training exercises	Special techniques and exercises for the soft palate	30 minutes (twice at week)	16 sessions	two months
THChn	=	Exercises for the tongue and lips	=	=	=
JHChn	=	=	=	=	=
AHChn	Specific techniques involving Speech sounds	Training exercises for pronunciation Of the consonant sounds	30 minutes (twice at week)	32 sessions	4 months

4.4 Testing the Improvement of AHChn in Pronouncing the Consonant Sounds

This is the third stage.It includes the test and its component parts.Besides, the technique that is used to test the improvement of the AHChn in pronouncing the difficult consonant sounds will also be included .

4.4.1 The Test

The test is constructed by the researcher to fulfil the third aim of the present study which aims at determining the degree of improvement of AHChn in pronouncing the difficult consonant sounds of SA.The test involves the same words that are chosen in the preliminary stage ,i.e, in determining the difficulties of the speech sounds (see Appendix 2) in order to get the improvement in the same difficult isolated consonant sounds and consonants in words initially, medially, and finally.Below is a brief description of the test items :

1.Question no.1 is designed to test the HChn's improvement in pronouncing the isolated consonant sounds.It consists of (25) difficult consonant sounds[1].

2.Question no.2 is designed to test the AHChn's improvement in pronouncing the consonant sounds in words initially, medially, and finally (see Appendix 8).

4.4.2 The Sample

The sample of this study is AHChn with structural defects who have completed six months of speech therapy in 'SPCSENT' at Medical city in Baghdad.The test sample is (15) HCh (see Table 9).

Table (9)

The Test Sample

The sample	No. of HChn
CPHhn	4
THChn	7
JHChn	4
Total	15

4.4.3 The Objectives of the Test

1. General objectives :

The general objectives are to verify the hypotheses which go as follows:

A.The improvement of AHChn in pronouncing the speech sounds is relative ,i.e, they can improve in pronouncing certain Arabic speech sounds.

B.The improvement of AHChn in pronouncing certain Arabic speech sounds varies according to the kind of the defect since this study is concerned with different structural defects.

2. Specific Objective :

The specific objective is decided in terms of the table of specification and content. (see Table 10)

Table (10)

Table of Specification

Content Area	No. of items	Weight	Production
1. Isolated consonant sounds	25	25	25
2. The consonant sounds			
a.Initially	25	25	25
b.Medially	25	25	25
c.Finally	25	25	25
Total	100	100	100

4.4.4 Validity

Validity of a test is one of the most complex concepts in test constuction. It refers to the degree of success with which a technique or any other instrument is measuring what it claims to measure (Verma and Beard,1981:87).There are different types of validity and the most prominent are face validity and content validity (Harrison,1983:11).

4.4.4.1 Face Validity

Face validity refers to what it appears superficially to mesure.Face validity refers to whether the test looks valid to the examinees who take it, the administrative personnel who decide on its use, and other untrained observers (Anastasi,1976:139 ; Harries,1969:21).

Chi-sequare has been used to explain agreement and disagreement of the jury members concerning the test items.The proportion of the jury members's agreement is found to be (0.80) which is estimated high.The calculated chi-sequre at (1) degree of freedom at (0.05) level of significance is (3.06) which is lower than the tabulated chi-sequare (3.84).The following formula is used to calculate chi-sequare :

$$X^2 = \sum \frac{(O-E)^2}{E}$$

Where O=Observation frequency
E=Expected frequency

(Ferguson,1976:189)

4.4.4.2 Content Validity

The most important aspect of validity is content validity.Content validity is the extent to which the test adequately covers the syllables area to be tested, a test must reflect both the content and the balance of the teaching which leads up to it (Deale,1975:30).Furthermore,Gronlund(1976:59) states that the content validity is "the process of determining the extent to which a set of test tasks provides a relevant and representative sample of the domain of tasks under consideration".

To ensure content and face validity,the researcher has consulted (10) experts and they asserted the features of the test.However,certain suggestions and modifications are made by the jury members on the test and they were taken into consideration.

Note : The jury members are as follows :

1. Assistant Instructor Abbas Luttfi	Ph.D.student / College of Education/ Ibn-Rushd/ Baghdad University.
2.Assistant Professor Abdul-Karim Fadhil Jamil	Ph.D./College of Education/ Ibn-Rushd /Baghdad University.

3.Assistant Professor Abdulla Salman Abbas	Ph.D. /College of Education/ Diyala University.
4.Assistant Professor Bushra Mustafa	Ph.D./ College of Arts / Al-Mustansiriya University.
5.Assistant Professor Falah Salahaddin Mustafa	M.A./ College of Education/ Kirkuk University.
6.Assistant Instructor Khalf Ali Ahmed	M.A./ College of Education for Women / Tikrit University.
7.Assistant Professor Nawfal Sa'aeed	Ph.D./College of Education/ Tikrit University.
8.Assistant Professor Omran Moosa Mahood	Ph.D./ College of Education/ Ibn-Rushed /Baghdad University.
9.Assistant Professor Riyadh Khalil Ibrahim	Ph.D./ College of Education for Women / Tikrit University.
10.Instructor Safwat Hawar	M.A./College of Education/ Kirkuk University.

4.4.5 Reliability

Reliability refers to the consistency of its results (Valette, 1967:44).In Lewis's (1967:187) words , it is "essentialy consistency of measurement,the extent to which the test scores are free from chance errors".There are different ways for estimating reliability .The Cronbach method seems to be the most preferable method to get the reliability of the test in this study.This method depends on counting the internal relatings between marks of reliability group for each item and marks of any other item,on one hand ,and with marks of the whole test on the other hand,the following formula is used to count the reliability of the test:

$$\mathbf{r\ x\ y} = \frac{n \times \acute{r}f}{1+(n-1)\acute{r}f}$$

Where rf =The mean of coefficient of internal relating between the items.

n=the number of items(the sample).

(Cronbach,1970:297)

Furthermore,the reliability of the test was found to be (0.95) which estimated high.

4.4.6 The Scoring Scheme

Scoring of each student's production is done individually. Each item is marked as either correct or incorrect. The accurate pronunciation of the consonant sound is considered correct and the item is given one score.Any other pronunciation (when the HChn fail to produce the accurate consonant sound) is counted incorrect and is given zero score. The words which are mispronounced or not clear are counted as incorrect.As the test consists of (100)items,the highest mark is (100) whereas the lowest is zero.

4.4.7 Final Administration of the Test

Making sure that the test is valid and reliable,the test was given to (15) AHChn who represent the whole sample of the study.All the HChn were tested the isolated consonant sounds,and consonant sounds in words initially, medially, and finally.Each HCh needed (30) minutes to complete the whole test.The researcher often tried to apply the test to all AHChn when they were under the same conditions and environmental factors.The researcher would like to take more than this number but she could not find many cases concerning the articulatory defects.

4.4.8 The Technique

Templin-Darley is a simple technique which has been used to determine the difficulties of AHChn in pronouncing the speech sounds as well as their improvement in pronouncing them.This technique is regarded as one of the most common used articulation test in America in 1969 because of its simplicity and its application to different ages of AHChn.However, this test involves three steps :

1.Picture test: The HCh is asked to name a picture[2].
2.Aural test A :The HCh is asked to imitate a word with the picture of the object named before him (her).
3.Aural test B: The HCh is asked to imitate the word without the aid of picture.

(Ingram,1976:81)

Hence,if the HCh has a difficulty in one of the consonant sounds like [b], the researcher uses the three steps to test his (her) difficulty in pronouncing the consonant [b] as follows:

A.The researcher asks the HCh to name the consonant sound [b].Then, the HCh is asked to name the picture that represents the consonant sound [b] ,e.g :

[baab] ‘door’

B.The HCh is asked to pronounce the word [baab] ‘door’ with the picture of the word [baab] named before him.

C.The HCh is then asked to name the word [baab] without aid the picture of the word [baab].

After the HCh is given the training exercises of speech therapy to improve his (her) difficulty in pronouncing this sound,the same three steps can be used to test his (her) improvement in pronouncing this consonant sound.Sometimes , some words can not be represented in pictures like [?u niya] ‘song’, so that the researcher has used the recorder as a means to hear the song to encourage the HCh to pronounce the word.Also the names of persons are difficult to be represented but the researcher has tried to choose the names of HChn’s that are similar to the names of HChn’s families to encourage the HCh to pronounce them.

Notes to Chapter Four

[1] It is worth mentioning that the consonant sounds [m,n,h] have not been involved since the production patterns of all the HChn have not shown any difficulty in pronouncing them.

[2] It is assumed that there is a coloured picture card which contains the isolated sound presented in the initial,medial,and final position.

Chapter Five

Discussion,Conclusions,and Recommendations

5.1 Introduction

This chapter aims at discussing the results obtained from the main test.Testing has been undertaken to achieve the objectives of this study and to verify or refute the hypotheses already set up.It is important after discussing the results to find out some conclusions of this study.

5.2 Discussion

It was stated in the scoring scheme (see 4.4.6) that the samples' productions would be classified into correct and incorrect.Table (11) mentioned below indicates the correct and incorrect productions for CPHhn ,THChn ,and JHChn with their percentage after testing the HCh'n improvement in pronouncing the difficult consonant sounds.Table (12) provides on overall picture of the total number of the AHChns' correct and incorrect productions with their percentage.

Table (11)
Percentage of Correct and Incorrect Productions of Articulation Handicapped Children

Samples	No.of items	No. of samples	Correct production	Percent-age %	Incorrect production	Percent-age %
CPHChn	Q1 Q2	4	1	25	3	75
THChn	Q1 Q2	7	5	71.43	2	28.57
JHChn	Q1 Q2	4	0	0	4	100

Table (12)
General Results of all the Articulation Handicapped Children

Subjects	No. of items	No.of subjects	Correct Productions	Percent-age %	Incorrect Production	Percent-age %
AHChn	Q1 Q2	15	6	40	9	60

We can recognize in Table (11) that percentage of the correct productions of CPHhn form 25 % and the incorrect productions form 75 %.The percentage of correct productions of the THChn form 71.43 % and the incorrect productions form 28.57 % whereas the correct productions of the JHChn form zero % and the incorrect productions form 100 %.This indicates that HChn have improved in pronouncing some difficult speech sounds.The THChn have improved in pronouncing some stop sounds like [k,q,] and some fricative sounds like [, ħ ,] and the dental sounds [ð , z , s , s] . Besides, the CPHChn have improved in pronouncing some stop sounds like [k , b , t , d] and some fricative sounds like the velar sound [x]. Thus, the first hypothesis that stipulates the HChn can improve in pronouncing some certain Arabic speech sounds is verified . (see Table 13).

In addition,Table (12) shows that the percentage of the correct productions for all the AHChn forms 40 % and the incorrect productions forms 60 % since the percentage of the correct productions of both the CPHChn and JHChn forms 25 % and the percentage of the correct productions of THChn forms 71.43 % (see Table 11) .This suggests that THChn have a recognizable improvement which is more than CPHChn who have a little improvement in pronouncing the difficult consonant sounds whereas JHChn have no improvement ,i.e, they still have difficulty in pronouncing the consonant sounds.This verifies the second hypothesis that HChn's improvement varies according to the kind of defect since this study is concerned with different structural defects.(see Table 13)

Table (13)

The Improvement of the AHChn in Pronouncing the Difficult Consonant Sounds

The samples	Difficulties before speech therapy→Difficulties after speech therapy	Improvement
1.Rawan	[?,b,t,d ,ħ,x,d, ð,r,z,s, ,s,d,t,ð , , , f,q,k,l,w,y]→ [ð ,r,z,s,d, ð, ,]	[?,b,t,d ,ħ,x,d,s, , t,f,q,k,l,w,y]
2.Dua'a	[b,t,θ,d ,x,d, ð ,z, ,s,d, ð ,t, ,f, q, k]→[ð,z,d,t, ð , ,q,x,d , ,s,f,θ]	[b,t,d,k]
3. Eman	[b,θ,d,z,t,d, ,q]→ [b,z,t,d, ð,q,θ]	[d]
4. Aseel	[θ,x,d, ð ,r,z,s, ,t,d, ð , ,q]→ [ð,r,z,t,d, ð , ,q,θ,s,]	[x,d]
5.Mahdi	[θ,d ,x, ð ,r,z, ,t,d, ð , , ,q,k]→ [r,d ,d, ð] ,[θ,x,t] (initially,madially),[q,z,] (finally)	[, , ,k], [θ,x,t] (finally),[q,z,] (initially,madially)
6. Omer	[d , ð ,r,z,s, ,s,d, ð ,t, ,k]→ [r, ð ,t ,d]	[d , ð ,z,s, ,s, ,k]
7.Abdulla	[ħ,x, ð ,r,d, ð ,t, , ,k]→ [r,ð ,d,t], [x] (initially,medially),[ ] (either weakened finally or omitted medially)	[ħ, , ,k], [x] (finally),[ ] (initially)
8.Ahmed	[d , ð ,r,z,d,t,ð , ,q]→ [d ,d,r,t,] [q, , ,z] (finally),[b] (omitted medially)	[q, , ð,z] (initially, medially),

Table (13)-Continued

The Samples	Difficulties before speech therapy→Difficulties after speech therapy	Improvement
9.Rasool	[d , ħ,x, ð ,z,s, ,s,d, ð ,t]→ [d ,d, ð, t], [x] (initially,medially), [f] (medially),[ ](omitted medially)	[ħ, ð ,z,s,s] , [x](finally) ,[ ] (initially,finally)
10.Abdul-muttalb	[r]→ [r]	
11.Haneen	[d , ð ,z,s,d, ð ,t,q]→ [d ,d, ,t]	[ð ,z,s,q]
12.Aaya	[?,b,t,θ,d ,x, ð ,r,s,s,d,t, ð ,q,k,l]→ [?,b,t,θ,d ,x, ð ,r,s,s,d,t, ð,q,k,l] (transposition :word)	
13. Ali	[θ, d , ħ, ð ,z, ,s,f, w,q]→ [θ, d , ħ, ð,z, , s, f,w,q]	
14.Zeena	[?,t,θ,x,r,s,d, ð,q,k]→ [?,t,θ,x,r,s,d, ð,q,k] (transposition:word)	
15. Fattma	[?,t,θ,x,r,s,d, ð,q,k]→ [?,t,θ,x,r,s,d, ð ,q,k] (transposition:word)	

On the one hand,the most difficult consonant sounds for all the AHChn are some stops like the emphatic sounds , the trill sound [r],and the affricates.The fricative sounds are also difficult and this is very clearly noted through the training sessions of speech therapy in which the THChn need intensive training exercises until they can pronounce the fricatives whereas the CPHChn cannot pronounce these sounds unless the closing of NPV.

On the other hand ,the most easiest consonant sounds are some stops and fricatives especially the voiceless like [x,k, , ħ], the lateral, and semi-vowels.As for JHChn, it is very hard to state their difficulties since their speech are characterized by erratic substitutions and even during the speech therapy period, the researcher finds a difficulty in dealing with such defect.

Thus,the THChn can prevent the defective articulation with a successive intensive speech therapy.The CPHChn have not improved their speech too much as well as JHChn and this is due to the fact that the successful surgical operations and intensive speech therapy will lead to the improvement in pronouncing the speech sounds ;otherwise the defective articulation will be the result..So, CPHChn are suffering from a badly operated CP (except one CPHCh who has a twist in the roof of the mouth and this is why she improves the pronunciation of most speech sounds), in addition to many problems like the mal-development of the palate, the mal-occlusion of the teeth and the most important is NPVI.

It is worth mentioning that the substitution is the most common kind of speech errors that is recognized in the speech of AHChn.Besides, cases of omission are found in the speech of both the THChn and JHChn while cases of transpositions are found only in the speech of JHChn.Most of the HChn tend to make substitutions as the influence of many reasons: the place of articulation, the manner of articulation , some articulators , the other speech sounds, and the bad speech habits.Many of the substitutions occur because of the influence of the place

of articulation ,i.e, the sound is substituted for the other sound that is very close in articulating that sound like [r] → [l] , [t] → [t] , [d,] → [d] ,etc.It is noticed that HChn tend to make substitutions in fricatives and affricates more than in the stops and semi-vowels because of the difficult production of both the fricatives and affricates ,as mentioned previously, like [d] → [d], [ ] → [?] , etc. Most of the nasal substitutions of the CPHChn occur as the influence of some articulators like lips and tongue such as [d] → [n] , [f]→[m] ,etc.Although some of the HChn especially the THChn improve their pronunciation of the isolated consonant sounds in final words like [t, ,x], they still have a difficulty in pronouncing the same consonant sounds in initial and medial words.This is due to the fact that initial and medial consonants are difficult since they are followed by other speech sounds.These sounds are difficult especially when they are preceded or followed by the consonant sounds that the HCh has a difficulty in pronouncing them.For this reason, the HCh substitutes the sound [t] for the sound [t] as the word [tiin] becomes [tiin] although the HCh can pronounce the sound [t] in word finally .Here the difficulty can be explained that the sound [t] is an emphatic one and it needs to raise the back of the tongue and then descend it for producing the vowel sound [ii] .For this reason ,the sound [t] has been substituted by the consonant sound [t] .Also, THCh finds a difficulty in pronouncing the sound [ ] at final word like [faari] and has substituted the sound [q] for the sound [ ].This substitution illustrates that the sound [ ] is preceded by the consonant sound [r] which the HCh still has a difficulty in pronouncing this sound and as a result this sound has been influenced by pronouncing the sound [ ] and makes the substitution.Another effect of the sound on other sound can be found in the word [xass] which is pronounced by the HCh as [hass].The word [xass] includes a combination of two fricatives that are [x] and the geminated sound [ss]which makes this word is more difficult than the word [hass] since the sound [h] is

regarded as the most easyiest consonant sound in which the HChn have not faced any difficulty in pronouncing it.The sound [f] is also substituted for the sound [θ] like [mufallas] for [muθallaθ] and [mumaffil] for [mumaθθil] . The labiodental sound [f] is influenced by the production of the bilabial sound [m] since the lip contributes in producing both the consonant sounds.This substitution occurs particularly in words that contain two similar sounds and in speech of THChn.Some of the THChn make substitutions as a result of the bad speech habits.This is very clearly seen when the HCh is substituted [x] for the sound [ħ]and in another time the sound [h] is substituted for the [x] , i.e, [ħ] → [x] → [h]. Another example as the THCh substitutes the sounds [ ] for the sound [?].The training sessions of speech therapy have proved that this substitution is the result of the bad habit since the TD has no effect on pronouncing the pharyngeal [ ] and it has improved after the speech therapy.

Cases of omission are seen in the speech of THChn and JHChn whereas the cases of transposition are seen only in the speech of JHChn . Cases of omission are used especially in words that consist of more than one syllable and include two similar consonant sounds .They occurred either to prevent the pronunciation of the difficult consonant sound ,i.e, the HCh still has a difficulty in pronouncing this sound , like [babaaa?] is substituted for [baba aa?] ‘ parrot’ or to reduce the number of syllables so that the HCh can pronounce the word in more easy way than previously such as [mimi] is substituted for [mi mi] ‘apricot’. In addition to that , cases of transposition occur in words that consist of one syllable and this leads to a complete change in the structure of the word like [fass] is used for [saff]. Here the sound [s] is geminated in the former whereas the sound [f] is geminated in the latter.

5.3 Conclusions

In the light of the previous study,the researcher has come up with the following considerations :

1.It has been found out that the AHChn with strucrural defects have improved in pronouncing certain difficult speech sounds but with intensive training exercises of speech therapy for at least six months.The THChn have improved in pronouncing some stop sounds like [k, q ,] and most fricative sounds like [ð , , z , s , s , ħ,] whereas the CPHChn have improved in pronouncing some stop sounds like [k , b , t , d] and some fricative sounds like the velar sound [x].

2.The improvement of THChn in pronouncing some difficult consonant sounds is more than the improvement of CPHChn whereas the JHChn have no improvement in pronouncing the consonant sounds and it is difficult to deal with such defect.Both of the CPHChn and JHChn need more than six months of speech therapy to prevent the defective articulation but in a condition that their defects must be surgically repaired successfully especially the CPHChn who have NPVI.

3. It is noted that stops (except [t]), voiceless consonants , nasals, the lateral, semi-vowels, the glottal fricative [h] , and the vowels are the most easiest speech sounds in the pronunciation of all the AHCHhn whereas the fricatives , voiced consonants , emphatics , the trill , and the affricates are the most difficult and problematic sounds. Although the THChn have improved in pronouncing the fricative sounds , they required successive training exercises more than training for pronouncing the stop sounds. However, this difficulty is due to one or two of the following reasons:

A. Abnormal structure of the palate , tongue , and jaw.

B. NPVI, when the CPHCh cannot control the strong air pressure in his (her) oral cavity.

4.The most common kind of error is the substitutions of the consonant sounds which are constant particularly in the speech of CPHChn and THChn whereas there is an erratic use of substitutions in the speech of the JHChn.These substitutions occur as a result of one of the following reasons :

A.The influence of the place of articulation.
B.The influence of the manner of articulation.
C.The influence of some articulators like the tongue and the lips.
D.The influence of some neighbouring difficult speech sounds that come either before or after the substituted sounds.
E.The influence of the bad speech hapits.

5. Cases of omission in the consonant sounds occur in the speech of both THChn and JHChn in words that consist of more than one syllable, especially the words that include two similar consonant sounds.They occurred either to prevent the pronunciation of the difficult consonant sounds or to reduce the number of the syllables so that the HCh can pronounce the word easily.

5.Cases of transposition in the consonant sounds occur in the speech of JHChn in words consisting of one syllable which result in changing the structure of the word completely like [fass] for [saff].

5.4 Recommendations

In the light of the conclusions arrived at in this study, the following recommendations can be made:

1.Constructing standard articulation test in Iraq which caters for the needs of AHChn who have structural defects accurately.

2. Designing and refreshing training sessions of speech therapy for the therapists to help them to be in continuous contact with the most suitable modern trends and techniques for training the AHChn.

3. Encouraging AHChns' families to follow up always their children and not to neglect them.They must be good language models for their children.

4. Setting up courses for training the phoneticians to make them especialized in speech therapy to overcome the difficulties of the English foreign learner in pronouncing the speech sounds that result from articulation defect.

5.5 Suggestions for Further Studies

1. The same study can be achieved to investigate the impact of other articulatory defects like dental abnormalities on pronouncing the speech sounds.

2. Making an experiment to investigate the impact of the articulatory defects on pronouncing the words within the context.

3. Carrying out an experiment to investigate the difficulties between the handicapped children and the handicapped adults in pronouncing the speech sounds.

Glossary

The following medical terms have been defined according to Nicolsi et al.(1978).

Adenoidal **:** Lymphoid tissue located in the posterior wall of the nasopharynx, when inflamed, it is referred to adenoids

Apraxia : It is a disruption in the ability to transmit or express a motor response along a specific modality;involves disruption of muscular movements while involuntary movements remain intact , characterized by difficulty in articulation of speech, formation of letters in writing,or in movements of gestures and pantomime.

Dysarthria : It is a term for collection of motor speech disorders due to impairment originating in the central or peripheral nervous system.Respiration, articulation, phonation, resonation, and /or prosody may be affected.

Language defect : It is any difficulty with the production and /or reception of linguistic units, regardless of environment, which may range from total absence of speech to minor variance with syntax.

Lisp : It is a defective production of one or more of the six sibilant consonants [s,z, , ,t ,d].Frontal lisp is the substitution of the [θ] or [ ] for the sibilant consonants due to obstruction of the narrow channel of air by placing the tongue tip too far forward either against the teeth or between the teeth.Lateral lisp is a defective production of the sibilant sounds due to excessive escape of air over around the sides of the tongue ,producing a sound similar to [ ], as the result of dental malocclusion, e.g ,

‘shun’ for ‘sun

Logopedics and phoniatrics :logopedics refer to the speech and language pathology.Phonatrics is a science concerned with pathological phenomena of pronunciation,whether they are articulatory in nature or are caused by disorders of the central nervous system.

Nostril (naris) : Anterior opening of either side of the nasal cavity.

Open bite : It is a condition in which the anterior upper teeth appear to be too short to reach the midline;the posterior teeth may have grown past the midline point,and thumb sucking may also be a contributing factor.

Orthodontics : That speciality of dentistry concerned with the correction and prevention of irregularities and malocclusion of the teeth and jaws.

Prosthodontists : Dentists who specialize in providing prosthetic appliances for oral structures,such as a palatal lift or obturator.

Tonsil : Mass composed of lymphoid tissue and covered with a mucous membrane;abnormal swelling results in an alternation of resonance.

Venticular bands : They are called venticular folds which are thick paired folds of mucous membrane lie superior to the true vocal folds and enclose a narrow band fibrous tissue and a few fibers of vocalis muscle.

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Appendix (1)

The Samples of AHChn with Structural Defects

1.Samples of CPHChn :

A.Rawan Mawfaq (R) : She is nine years old.She is in the primary stage and speaks mainly the Baghdadi dialect . Her speech is characterized by nasality in the consonant sounds because she has a twist at the palate ,i.e, disfugured palate.She is so cooperative in that she improves in pronouncing most difficult consonant sounds more than other HChn.The most important feature of this sample is that she could pronounce the oral sounds by closing her nose.

B.Dua'a Anwar (D) : She is ten years old.she is in the primary stage and speaks mainly the Baghdadi dialect .Her speech is characterized by nasality and glottalization of the speech sounds since she has a severe CP.She suffers from a badly-operated CP and the result was a deformed palate.She has a little improvement in pronouncing the consonant sounds even with intensive training exercises of speech therapy .

C.Eman Aala'a (E) : She is six years old.She is in the primary stage and speaks the dialect of Ramady .She makes two surgical operations in the CL and CP.She suffers from badly-operated CP and dental abnormalities.Because of these abnormalities she makes a very little improvement in pronouncing the consonant sounds.

D.Aseel Ra'ad (A): She is ten years old.She is in the primary stage and speaks the dialect of Basrah .She suffers from a badly-operated CP and the result was a deformed Palate. The characteristic of weak articulation is recognizable in her pronouncing the consonant sounds that has not been improved

after the speech therapy.Also, this case suffers from weakness in the tongue because of the palatal deformities.

2.Samples of THChn :

A.Mahdi Senan (M) : He is six years old.He is in the primary stage and speaks the Baghdadi dialect.He has a weakness in his tongue and cannot move it rapidly.His speech is characterized by transpositions and distortions in consonant sounds and words.Besides,he has a little improvement in pronouncing the consonant sounds.

B.Omer Sabah (O) : He is ten years old.He is in the primary stage and speaks the dialect of Ramady.He is very active and has a mild TD.He is so cooperative and his speech has been improved in most of the consonant sounds except the trill sound [r].

C.Abdulla Dhiya'a (C) : He is six years old.He is in the primary stage and speaks the dialect of Diyala.He has a mild TD and his speech is characterized by a difficulty in pronouncing some emphatic sounds.His speech indicates improvement in pronouncing the consonant sounds except some emphatic sounds.

D.Ahmed Isma'aeel (H) : He is six years old.He is in the primary stage and speaks the Baghdadi dialect .He has a mild weakness in his tongue.The most overt characteristics of his speech after the sessions of speech therapy is making omissions and substitutions of the consonant sounds in final words.

E.Rasool Farooq (S): He is seven years old.He is in the primary stage and speaks the Baghdadi dialect . After the training

sessions of speech therapy , his speech is characterized by a difficulty in pronouncing some consonant sounds especially the emphatics.

F.Abdulmuttalib Yousif(U) : He is ten years old.He is in the primary stage and speaks the dialect of Mosul.He has a short tongue which is called aglossia.He can pronounce all the consonant sounds correctly and accurately except the trill sound [r] .In spite of the intensive speech therapy ,he still has a weak articulation in this consonant sound .

G.Haneen Moosa (N) : She is nine years old.She is in the primary stage and speaks the Baghdadi dialect.She has a mild weakness in her tongue.She is very cooperative and her pronouncing of the most consonant sounds has improved more than other THChn.She makes a recognizable improvement in pronouncing the consonant sounds except the emphatic sounds.

3.Samples of JHChn

A.Aaya Ahmed (y) : She is seven years old.She is in the primary stage and speaks the Baghdadi dialect .She has a severe jaw abnormality.She is very shy and there is no cooperation from her family.Despite many training exercises of speech therapy ,there is no improvement in her pronouncing the consonant sounds.

B.Ali Kadhem (L): He is seven years old.He is in the primary stage and speaks the Baghdadi dialect.He has a mild jaw abnormality and he is so cooperative during the training sessions of speech therapy , nevertheless he still has a difficulty in pronouncing the consonant sounds.

C.Zeena Abbas (Z): She is seven years old.She is in the primary stage and speaks the dialect of Basrah.She has a mild jaw abnormality and her difficulty in pronouncing the difficult consonants sounds has not been improved even with intensive speech therapy.

D.Fattma Ali (F) : She is eight years old.She is in the primary stage and speaks the dialect of Baghdad.She has a mild jaw abnormality and her pronouncing the difficult consonant sounds has not been improved during the training sessions of speech therapy.

Appendix (2)

The Arabic Speech Sounds and Words

The Sound	The Sound in the Word Initially	The Sound in the Word Medially	The Sound in the Word Finally
1.أ [?]	أوَّل [?awwal] ‘ first‘	دَائِرَة [daa?ira] ‘circl’	بَبَغاء [baba aa?] ‘parrot’
2.ب [b]	بَا ب [baab] ‘door'	مَطْبَخ [matbax]	أب [?ab] ‘father’
3.ت [t]	تِيْن [tiin] ‘figs’	‘kichen’ مِفْتَاح [miftaaħ]	حُوتْ [ħuut] ‘whale’
4. ث [θ]	ثُوْم [θuum] ‘garlic’	‘key’ مُمَثِّل [mumaθθil]	مُثَلّث [muθalliθ]‘triangle’
5. ج [d]	جَمَل [d amal]‘camel’	‘actor’ نَجّار [nad d aar]	فَرَج [farad] ‘name’
6. ح [ħ]	حَلِيْب [ħ aliib] ‘milk’	‘carpenter’ أَحمَر	تُفّاح [tuffaaħ] ‘apple’
7. خ [x]	خَسّ [xass] ‘lettuce’	[?aħmar] ‘red’	بَطّيْخ [battiix] ‘melon’
8. د [d]	دُبّ [dubb] ‘bear’	صَخْرَة [saxra] ‘stone’	أَسَد [?asad] ‘lion’
9. ذ [ð]	ذَهَبْ [ðahab] ‘gold’	مَدرَسَة [madrasa] ‘school’	تِلْمِيْذ [tilmiið] ‘pupil’
10.ر [r]	رُمّا ن [rumman] ‘pomegranate’	حِذَاء [ħiðaa?] ‘shoe’	سَرِيْر [sariir] ‘bed’
11. ز [z]	زَرَافَة [zaraafa]‘giraffe’	أَرْنَبْ [?arnab] ‘rabbit’	خَبّاز [xabbaaz] ‘baker’
12.س [s]	سِنّ [sinn] ‘teeth’		طَاوُوْس [taawuus]‘peacock’
13. ش [ ]	شَمْعَة [am a] ‘candle’	غَزَال [azaal] ‘deer’	رِيْش [rii] ‘feather’
14.ص [s]	صُوْرَة [suura]‘picture’	جِسْر [d isr] ‘bridge’	قَمِيْص [qamiis] ‘shirt’
15. ط [t]	طَالِب [taalib] ‘student’	مِشْمِش [mi mi] ‘apricot’	بَطّ [batt] ‘duck’
16. ض [d]	ضَعِيْف [da iif] ‘weak’	قِصّة [qissa] ‘story’	أبيَض [?abyad] ‘white’
17.ظ [ð]	ظَلَام[ðalaam] ‘darkness’	قِطَار [qitaar] ‘train’	حَظّ [ħaðð] ‘luck’
18. ع [ ]	عَلَم [alam] ‘flag’	أَخْضَر [?axdar] ‘green’	شَا رِع [aari] ‘street’
19. غ [ ]	غَازْ [aaz] ‘gas’	عِظَا م [iðaam] ‘bones’	فَارِغ [faari] ‘empty’
20. ف [f]	فِيْل [fiil] ‘elaphant’	سا عَة [saa a] ‘clock’	صَفّ [saff] ‘class’
21. ق [q]	قَفَص [qafas] ‘cage’	أُغْنِيَة [?u niya] ‘song’	أوْرَاق [?awraaq] ‘papers’
22. ك [k]	كِتاب [kitaab] ‘book’	أصْفَر [?asfar] ‘yellow’	
23. ل [l]	لِسَان [lisaan] ‘tongue’	بَقَرة [baqara] ‘cow’	مَلك [malik] ‘king’
24. م [m]	مَطار [mataar] ‘airport’	مَكْتَبَة [maktaba] ‘library’	عَسَل [asal] ‘honey’
25. ن [n]	نَار [naar] ‘fire’	قَلَم [qalam] ‘pencil’	قا سِم [qaasim] ‘name’
26.ها [h]	هُدهُد [hudhud] ‘hoopoe’	أمَل [?amal] ‘name’	طِيْن [tiin] ‘mud’
27. و [w]	وَلَد [walad] ‘boy’	سَناء [sanaa?] ‘name’	أله [?allaah] ‘God’
28. ي [y]	يَا سِر [yaasir] ‘name’	نَهار [nahaar] ‘day’	أو [?aw] ‘or’
		أسوَد [?aswad] ‘black’	كُرسِي [kursiy] ‘chair’
		رِياضَة [riyaada] ‘sport’	

Appendix(2)-Continued

The Vowels and Diphthongs	The Vowels and Diphthongs in the Word		
1. [ii]	خَريف	[xariif]	‘autumn’
2. [i]	هِند	[hind]	‘name’
3. [aa]	دار	[daar]	‘house
4. [a]	نِسر	[nisr]	‘eagle’
5. [uu]	صاروخ	[saaruux]	‘missile’
6. [u]	مُر	[mur]	‘bitter’
7. [aw]	رَوضة	[rawda]	‘kindegarten’
8. [ay]	سَيا رَة	[sayyaara]	‘car’

Appendix (3)

Therapy Techniques of Nasality

1. Auditory feedback : Make the HCh aware of the nasal air emission.This can be done by simulating this characteristic,or by having the HCh listen to and identify his (her) own nasal air emission on a tape recorder.The use of a "listening tube" or a straw is the best method for auditory feedback because when nasal air emission occurs ,it is heard clearly and even loudly through the tube.With this technique ,the HCh puts one end of the tube at the entrance to a nostril and the other end near his (her) ear.When nasal air emission occurs,it is very audible and even loud.The HCh is then asked to try to make adjustments in articulation to reduce or eliminate the sound in his(her) ear.

2. Tactile feedback : Have the HCh feel the sides of his (her) nose for vibration during the repetitive production of pressure-sensitive sounds (oral sounds).Ask the HCh to produce carefully these sounds without the vibration.

3. Visual feedback :Place an air paddle(It is a shape that is cut from a piece of paper) under the nares during the production of pressure-sensitive sounds to help the HCh to see the nasal air emission.Ask the HCh to produce the same sounds without moving the air paddle.

4. Cul De Sac Technique : Have the HCh hold the air under pressure in the mouth and pharynx with the oro-pharyngeal isthmus and the tongue low in the mouth.Keeping the mouth closed,the HCh is asked to release the air through the NPV ,and then reverse the procedure and maintaining closure in the nasopharynx release the air through the mouth.Then, make the

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HCh to hum in which the vibration of the air is now passing through the naso-pharynx and down the nose.The HCh tries to interrupt the humming sound by closure of the NPV ,his(her) lips allowing the air to be directed into the mouth and causing increased intra-oral pressure with distention of the cheeks.This way is very active for competency of NPV.

5. <u>Light,quite contacts</u> : Ask the HCh to produce light,quick contacts during the production of pressure-sensitive sounds.This helps to eliminate the back-up of air pressure in the nasopharynx and reduces the occurrence of nasal air emission.

Appendix (4)

Exercises for the Soft Palate

1. Not involving speech sounds

A. Blowing : This activity involves blowing many things like : candles and saying [b] gently,bubbles through the plastic wand,carnival blowers,musical instruments,ping-pong balls,small pieces of tissue paper,etc.Using a straw to blow the above things like blow bubbles in water,orange,etc.

B. Sucking : Using a straw try the following :

i. Sucking up a straw to a certain mark.Thick 'McDonald' type straw or plastic curly ones are fun for this activity.
ii. Sucking and holding paper fish on the end of the straw.
iii. Sucking up peas.

C. Other activities :

i.Try alternating blowing and sucking activities ,e.g, blow bubbles through a straw in water,then suck some of it through the straw.Repeat several times.

ii. Try holding the air under pressure in the mouth , e.g, blow out cheeks and explode air through the lips,or hold nose with fingers and blow whilst blowing ,try to remove fingers and maintain the airstream through the mouth.

iii. Alternate blowing out through the nose and the mouth.Hold nose with fingers when blowing through the mouth to make sure the airstream passes through the mouth.To make this activity fun, try making a simple 'diving-board'.This can be done by

using straws,pieces of card and tissue paper.See the following diagram:

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This can be used in the following way:

One piece of card should be positioned under the nose and the other piece just below the mouth. Place a piece of tissue paper on the 'top diving-board' and blow it off,by blowing through the nose.Then place a piece of tissue paper on the 'lower diving-board' and blow it off by blowing through the mouth.

iv. Try whistling.

v. Try humming.

2. <u>Involving speech sounds</u>

i. Breathe in a yawn movement and breathe out on a voiced vowel [æh].
ii. Think of a yawn movement,raising the soft palate and lowering the back of the tongue,and voice a vowel [æh].

iii. Watch movements of the palate in a mirror whilst repeating [æh, æh, æh] with mouth wide open.

iv. Alternate a vowel and a nasal consonant ,e.g ,

[aah] [m]
[uu] [n]
[ii] [m]

Try a mixture of all these sounds , e.g ,

[aah],[n],[uu],[m],etc.

a.Alternate an oral and nasal consonant made in the same place in the mouth ,e.g ,

[m] [b]
[n] [d]
[maah] [baah]
[naah] [daah]

vi.Use humming as follows:

hum - blow out cheeks-hum
hum-blow out cheeks-say[b]
[m] [baah] [m] [bay] [m] [bee]

For [b] bause slightly before [b] to try and build up air in the cheeks.

vii. Try alternating of a nasal and its corresponding plosive consonant , e.g ,

[m] [baa]

[m] [bii]
[n] [buu]

Appendix (5)

Exercises for the Tongue

1. Licking off a plate

Method

Place some of one of the foods: sweet things, sugar, honey, chocolate spread, jam, ice-cream,etc. Demonstrate licking the food off the plate and encourage the HCh to lick.Make sure that:

a.The plate stays flat on the table
b.The HCh protrude his(her) tongue and makes a licking movement.
c.Discourage picking the food up using the lips only.

2. Licking exercises using a spatula.There are several exercises that can be done by using a spatula or a large lolly stick:

A. Licking outside the mouth with direct tongue protrusion

Method

Wet the end of the stick by licking it with sweet things,hold the stick vertically in front of the HCh's mouth and encourage him (her) to lick the stick clean.As he (she) improves ,gradually move the stick away from the mouth in small stages so that the tongue has to stretch a little further out.Make sure that HCh does not do any of the following:

i. Nod his (her) head,with the tongue remaining protruded but immobile,instead of making his (her) tongue do the work.You

may find that gently holding his (her) head still,will prevent him(her) from doing this.

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ii. Using his (her) lips ,instead of protruding the tongue.To avoid this,make sure that he (she) starts the exercise with his (her) tongue protruded.

iii. If he (she) is doing the exercise by himself(herself),watch that he (she) does not make the mistake of moving the stick downward,instead of keeping the stick still and making his(her) tongue move.To help prevent this ,suggest that he(she) rests his(her) elbow on the table.

Note:if the HCh is unable to do this exercise,this may be because he(she) cannot protrude the tongue and achieve elevation to lick.

For protrusion

To help protrusion of the tongue beyond the lips,try the following:
a. Try more practice of licking from the plate.
b.Looking in a mirror and encouraging the HCh to copy you sticking out your tongue.
c.At first just use the stick as something to reach for his(her) tongue,placing it right in front of his(her) lips.Do not worry about getting him(her) to lick.
d.Try gently pulling the tongue forward by applying slight pressure to the tip of the tongue with the spatula.
e.Try every day activities,such as licking loollies,icecream, ,etc.

For elevation

a.Assist the tongue by gentle pushing the tongue tip up with your fingers or the spatula.

b.Work in front of a mirror,encouraging the HCh to copy lifting his(her) tongue up.you could say 'try and touch your nose'.

c.Try putting one of the sweet things on the top lip and encourage him (her) to lick it off.

d.Hold a spatula with sweet things on it horizontally above the top lip and get him (her) to try and lick them off.

B. Licking off food from various positions around the lips

Method
Using the stick,or your finger,dab one of the foods into a position on the lips and encourage the HCh to lick it off.Aim to get upward, downward and sideways movements.

Note: HCh often will use his (her) lower lip or teeth to take something from his(her) upper lip and vice versa.To help avoid this ,you can keep reminding the HCh to use his (her) tongue.You could gently restrict the movement of the lip by holding it.

C. Licking outside the mouth using the spatula .This is exactly as for exercise no.B but using the spatula.

Method
Dab the stick with sweet things and place the stick in various positions around the mouth and encourage the HCh to lick the stick clean.Use this exercise particularly for sideways licking.
Other exercises for encouraging tongue mobility:

1.Spread something like jam , honey, chocolate spread , etc. around the HCh's lips and see if he (she) can lick them clean.Make sure that he (she) uses his (her) tongue and not his (her) lips.
2.Copy tongue movements in front of a mirror ,e.g, side to side, up to down, and licking round the lips.

1. Licking icecream,lollies ,etc.Make sure that he (she) uses his (her) tongue and does not bite with his (her) teeth or suck with his (her) lips.
2.Coat the back of a large tablespoon with something sticky ,e.g, treacle and let him (her) lick it clean.
3.Put something in a small short container ,e.g, small egg cup, and encourage the HCh to lick it clean.

D. Using the spatula inside the mouth

Method

Wet the end of the stick with sweet things and ask the HCh to open his (her) mouth wide ,place the end of the stick against the upper teeth,so that approximately one quarter of an inch protrudes beyond the teeth.Encourage him (her) to lick the stick. Very often there is a tendency to either ,close the jaw or use the lips ,rather than making the tongue do the work.Watch out for this and try to ensure that the tongue is being used fully.To help achieve this you may have to restrict jaw movement by gentle holding the lower teeth down with your fingers.Now try this exercise with the spatula at the side of his mouth.If the HCh has a difficulty with elevating the tongue,try the following:

a.Go back and do some more practise with licking off his(her) top lip.
b.Use a mirror ,and encourage him(her) to copy the correct position

c.Try putting a dab of something which is sticky such as jam on the ridge behind his (her) top teeth and see if he (she) can lick it off.
d.Touch gently the two points of contact ,i.e, the end of the tongue and the ridge behind the teeth may give him (her) an awareness of the correct placement.

Appendix (6)

Exercises for the Lips

Lip rounding exercises

1. Lip exercises using candles :Use the small cake candles, stuk in something steady ,e.g, plasticine, peg-board, etc.

A. Blowing : Light the candles and encourage the HCh to blow them out with a nice gentle blow and rounded lips. Ensure that the lips are rounded. If he(she) cannot achieve lip-rounding then practise lip-rounding without blowing first.Try the following :

i.Use a mirror and encourage him to copy an [oo] shape.At first,you may need to push gentle the lips from a tight stretch position to the round position.
ii. Push lips forward as for kissing. Practise kissing a teddy /dolly.
iii. Push lips forward and make round shapes in a saucer of icing sugar.
iv. Paint lips with lip-stick and make round lip-stick prints on paper.
v. Hold a large piece of plastic tubing in lips ,e.g, beer-making tube from boots.Practice blowing through this.
vi. Hold carnival blowers in lips and blow these.
vii. Try to hold a pencil between upper lip and nose .

B. <u>Blowing through a straw</u> : This exercise should be carried out in the same way as for (a),but this time the candles should be blown out through a straw.Make sure that the straw is held between the lips and not between the teeth.You can check this by looking at the end of the straw to see if it has been bitten.

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Note :Try to blow out the candles one at a time rather than all at once,so that there is plenty of repetition of small puffs and therefore more exercises.

2. <u>Lip exrcises using bubbles, ping-pong balls, tissue paper, carnival blowers :</u>

Bubbles and ping-pong balls can be blown straight through the plastic wand or straw.Using a straw, try blowing a little pieces of paper along a table.Holding the straw with the lips and using lip-rounding are important points to be remembered.Then,use instruments with rounded mouth-pieces to encourage lip rounding.These should be held with the lips and not the teeth.

3. <u>Other lip movement exercises</u>

A. Lip smacking : Put chocolate spread ,etc. on the top lip and encourage the HCh to take it off with the bottom lip.Also try this the other way round ,i.e, place chocolate on bottom lip and take it off with top lip.The tongue should not be used for this exercise.

B. Using lips to pick up sweets : At first try to pick up quite large sweets with lips ,e.g, smarties and gradually work down to smaller sweets ,e.g, jelly tots ,etc.

4. <u>Changing lip shapes</u>

A.Without using any speech sounds, practise changing from a round to a spread lip shape.Perhaps pretend to be a goldish for a round shape and then smile like a clown to produce a spread shape.

B.Alternate kissing (with lips rounded) and smiling at (with lips spread) a teddy/dolly.

C.Using lip-stick and paper , try making a round shape, then a spread shape.

D.Say [oo] (really rounding lips), then [ee] (really stretching lips to a spread shape).Exaggerate the movement and use your fingers to help the movement if they prove difficult.

E.Say [ ] (with lips rounded), then [s] (with lips spread).Try to alternate these fairly rapidly.

Appendix (7)

Therapy Techniques for the Pronunciation of the Consonant Sounds

1. For [s,s,z,] substitution : It is considered that the natural sounds are the best way to produce [s ,s ,z].Hissing over the tongue is used for producing the sound [s] and buzzing over the tongue is used for producing the sound [z].Also, the following three activities are used to improve the HChn's pronunciation of the sound [s]:

A.Blow gently and steadily down the tube held by the tongue. Gradually,withdraw the tube while still blowing , so that [s] or something close to it can be heard.This activity is repeated several times until the sound [s] can be heard.

B.Ask the HCh to close his (her) teeth and push the air outside.

C.The third activity involves sucking a little air audibly as if in pain, and quickly direct it out again.

For producing the sound [ ],ask the HCh to close his (her) teeth and make circular lips with pushing the air outside.

2. For [r] substitution : Ask the HCh to do the following :

A.The backward licking tongue movement with the tip of the tongue is performed while the rims raise and remain in contact with the upper back teeth.

B.The licking is done along narrow spatula or a rod held parallel with the hard palate inserted a distance of not more than two inches into the mouth.

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C.Then,the licking movement has to be done without any object to lick 'as in the air'.

D.Ask the HCh to give air to the neutral vowel while he (she) licks to find out what sound will emerge .The HCh must not be felt that the sound [r] is expected .

E.The tongue exercise includes a series of light firm taps with the tip of the tongue against the upper teeth ridge and the rims raised.

3. <u>For the substitution of front sounds for back sounds</u>:
Ask the HCh to do the following:
A.Hold down the front part of the tongue with a spatula or a clean finger

B.Firm pressure has to be exercised at first to oppose the HCh's struggle to raise the front part of the tongue.

C.Ask the HCh to say the sound [t] while the tongue is held down as a test to discover which sound results.

D.Gradually,pressure is decreased and the spatula subsequently is only moved in the direction of the mouth as a reminder until finding that the aids are not required.

E.Tactile means can be used to demonstrate the difference between the front and back sounds.For front sounds, the HCh is asked to put his (her) fingers against the incisors and for the back sound ,the HCh is asked to put his (her) finger under the floor of the mouth.The same activities can be used to demonstrate the difference between the voiced and voiceless sounds.The HCh puts one finger on the therapist's lips and the other on his (her) own to feel the puff of non-vibrating

air when [s] is spoken in isolation. When the sound is [z],he(she) will feel vibration.Ask the HCh tries to repeat these sounds ,the fingers on his (her) own lips serves to check the accuracy of his (her) own perfomance.

4. For [b] substitution :Ask the HCh to use humming activities by blowing out cheeks and say [b].

5. For [f] substitution : Ask the HCh to blow out candles by putting the lower lip under the upper front teeth and say [f].

6. For [q] substitution : Ask the HCh to open his (her) mouth wide and the spatula is put in front of his(her) tongue.The HCh must be encouraged to vent the uvular stop[q]. The repetition of this activity more than one time will obtain the required sound.

Appendix (8)

A copy of the test given to the jury members

University of Tikrit,
College of Education,
English Department,
Higher Studies.

Dear Mr./Mrs.,

The researcher intends to set up a test for measuring the degree of improvement of the articulation handicapped children with structural defects (dysfunction of the vocal organs) in pronouncing the consonant sounds of standard Arabic.

This test is used to indicate the degree of improvement in pronouncing the isolated consonant sounds,the consonant sounds in words initially, medially,and finally.The test includes only the difficult consonant sounds that the articulation handicapped children face difficulties in pronouncing them.

A table of specification of the test items has been prepared to guide the construction of the test.

Please read the test and point out if the test is a valid measures of the purposes outlined above.Any suggestions or modifications are highly appreciated.

Thank you in advance

The researcher
Zaynab Abbudi Ali
M.A Student
2004

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1.Pronounce the following consonant sounds:

The Arabic Consonants

1. [?]	**أ**
2. [b]	**ب**
3. [t]	**ت**
4. [θ]	**ث**
5. [d]	**ج**
6. [ħ]	**ح**
7. [x]	**خ**
8. [d]	**د**
9. [ð]	**ذ**
10.[r]	**ر**
11.[z]	**ز**
12.[s]	**س**
13.[ ]	**ش**
14.[s]	**ص**
15.[t]	**ط**
16.[d]	**ض**
17.[ð]	**ظ**
18.[ ]	**ع**
19.[ ]	**غ**

20.[f] ف
21.[q] ق
22.[k] ك
23.[1] ل
24.[w] و
25.[j] ي

2.Pronounce the following words:

The sound in the word initially	The sound in The word medially	The sound in The word finally
1. [?awwal] أوّل	[daa?ira] دَائِرَة	[baba aa?] بَبغَاء
2. [baab] بَاب	[matbax] مَطْبَخ	[?ab] أب
3. [tiin] تِيْن	[miftaaħ] مِفْتَاح	[ħuut] حُوْت
4. [θuum] ثُوْم	[mumaθθil] مُمِثّل	[muθalliθ] مُثَلِث ّ
5. [d amal] جَمَل	[nad d aar] نَجّا ر	[farad] فَرَج
6. [ħaliib] حَلِيْب	[?aħmar] أحَمَر	[tuffaaħ] تُفّاح
7. [xass] خَسّ	[saxra] صَخْرَة	[battiix] بَطّ ّيْخ
8. [dubb] دُبّ	[madrasa] مَدرَسَة	[?asad] أَسَد
9. [ðahab] ذهَب	[ħiðaa?] حِذَاء	[tilmiið] تِلْمِ ِيذ
10. [rummaan] رُمّان	[?arnab] أَ ْرْنَبْ	[sariir] سَرِ ِيْر
11.[zaraafa] زَرَافَة	[azaal] غَزأْ ل	[xabbaaz] خَبّاز
12.[sinn] سِ ِنّ	[d isr] جِسْر	[taawuus] طَ َاْوُوْس
13.[am a] شَمْعَة	[mi mi] مِشْمِش	[rii] رِيْش

14.[suura] صُوْرَة	[qissa]	قِصّة	[qamiis]	قَمِيْص
15.[taalib] طَالِب	[qitaar]	قِطَاْر	[batt]	بَطّ
16.[da iif] ضَعِيْف	[?axdar]	أَخْضَر	[?abyad]	أَبِيَض
17.[ðalaam] ظَلَام	[iðaam]	عِظَام	[ħaðð]	حَظّ
18.[alam] عَلَم	[saa a]	سَاعَة	[aari]	شَارِع
19.[aaz] غَاْز	[?u niya]	أُغْنِيَة	[faari]	فَارِغ
20.[fiil] فِيْل	[?asfar]	أصْفَر	[saff]	صَفّ
21.[qafas] قَفَص	[baqara]	بَقَرَة	[?awraaq]	أوْرَاق
22.[kitaab] كِتَاب	[maktaba]	مَكْتَبَة	[malik]	مَلِك
23.[lisaan] لِسَان	[qalam]	قَلَم	[asal]	عَسَل
24.[walad] وَلَد	[?aswad]	أسْوَ د	[?aw]	أو
25.[yaasir] يَاسِر	[riyaada]	رِيَاْضة	[kursiy]	كُرْسِي

Table of Specification

Content Area	No. of items	Weight	Production
1. Isolated consonant sounds	25	25	25

2. The consonant sounds			
a.Initially	**25**	**25**	**25**
b.Medially	**25**	**25**	**25**
c.Finally	**25**	**25**	**25**
Total	**100**	**100**	**100**

الملخص

يلعب الكلام في نظام أية لغة دوراً أساسياً في التفاهم لأنه افضل الوسيلة نتمكن من خلالها التعبير عن أفكارنا ومشاعرنا. و تعدّ الأخطاء النطقية في الأصوات أحدى عوائق التفاهم الشائعة عند الأطفال والتي تسمى العوق النطقي .ويعُدّ العوق التركيبي (التشويهات) أحد أنواع العوق النطقي وأسبابه تعود الى التركيب غير الطبيعي لأعضاء النطق أي الفشل في عمل (وظيفة) أعضاء النطق . وتعنى هذه الد راسة بالأطفال العراقيين الذ ين لد يهم عوائق تركيبية في أعضاء النطق ويواجهون صعوبة في لفظ أصوات اللغة العربية الفصحى. ولا توجد- فيما نعلم- دراسة تقوم على وصف هذه الصعوبات فأدركت الباحثة الحاجة الملحة للبحث الكامل عن الصعوبات الرئيسة لدى الأطفال المعوقين في نطق الأصوات وفيما أذا

أمكن تحسين هذه الصعوبات مع تمارين تدريبية مكثفة ولمدة لا تقل عن ستة أشهر من علاج النطق.

ولإنجاز هذه الدراسة فقد استند الباحث إلى الفرضيات الأتية :

١. إنّ تحسّن الأطفال المعوقين في نطق الأصوات تحسّن نسبي أي أنه يكون في أصوات عربية محد ودة.

٢. إن تحسّن الأطفال المعوقين في نطق أصوات عربية محدودة يتنوع تبعاً لنوع العوق وذلك لأن هذه الدراسة تعنى بالعوائق التركيبية في أعضاء النطق على اختلاف أنواعها (عوق الحنك الصلب ، وعوق اللسان ، وعوق الفك) .

ووفقاً لمتطلبات الدراسة فقد قام الباحث ببناء برنامج متكون من ثلاث مراحل لتحقيق الفرضيات السابقة:

١. تسمى المرحلة الأولى مرحلة التقييم الأبتدائي و تتضمن هذه المرحلة تقنية تسمى " Templin-Darley" والتي أستخدمت في تحديد الصعوبات لدى الأطفال المعوقين عند نطق الأصوات العربية .

٢. تتضمن المرحلة الثانية تحد يد طرق العلآج المناسبة والضرورية لتقليل الصعوبات لدى الأطفال المعوقين عند نطق الأصوات العربية.

٣. تتضمن المرحلة الثالثة بناء اختبار تستخدم فيه التقنية نفسها التي استخدمت في مرحلة التقييم الأبتدائي لقياس مدى تحسّن الأطفال المعوقين عند نطق الأصوات العربية الصعبة.

وتوصلت الدراسة، التي تقع في خمسة فصول ، الى نتائج من أهمها :

١. لقد تحسّن الأطفال المعوقين في لفظ بعض الأصوات الصامتة الصعبة، فتحسَّن الأطفال المعوقون باللسان في لفظ بعض الأصوات الأنفجارية مثل [ك، ق،ع] ومعظم الأصوات الأحتكاكية مثل [ذ، ش، ز، س، ص،ح ، غ] في حين أن الأطفال المعوقين بانشقاق الحنك الصلب تحسنوا في لفظ بعض الأصوات الأنفجارية مثل [ك، ب، ت، د] وبعض الأصوات الأحتكاكية مثل صوت [خ] . وهكذا تكون الفرضية الأولى قد تحققت .

٢. .إن تحسّن الأطفال المعوقين باللسان في لفظ بعض الأصوات الصامتة الصعبة أكبر من تحسن الأطفال المعوقين بانشقاق الحنك الصلب في حين لم يظهر أي تحسّن لدى الأطفال المعوقين بالفك ولا تزال لديهم صعوبة في نطق الأصوات االصامتة. وهكذا تكون الفرضية الثانية قد أسند ت.

٣. إن أسهل الأصوات في لفظ الأطفال المعوقين بالنطق هي : الانفجارية (عدا [ط]) ، و المهموسة ، والأنفية ، والجانبية ، وأنصاف الحركات ، والصوت الاحتكاكي البلعومي [هـا] ، والحركات في حين أن الأصوات الاحتكاكية ، والمجهورة ، و المطبقة ، والمكررة، و المركبة (الانفجارية – الاحتكاكية) من أصعب الأصوات الصامتة وتعود هذه الصعوبات الى أحد السببين الآتيين أو كليهما :

أ. التركيب غير الطبيعي للحنك الصلب أو اللسان أو الفك السفلي .

ب. عدم د قة إغلاق القناة الأنفية- البلعومية إذ إنّ الأطفال المعوقين بانشقاق الحنك الصلب لا يستطيعون التحكم بضغط الهواء القوي في التجويف الفمي .

وفضلاً عن هذه النتائج فقد قدمت الدراسة بعض التوصيات مع مقترحات لدراسات مستقبلية .

أقرار المشرف

أشهد أن أعداد هذه الرسالة الموسومة تأثير المشاكل النطقية على الكلام جرت تحت أشرافي في جامعة تكريت وهي جزء من متطلبات نيل شهادة ماجستير اداب في اللغة الأنكليزية وعلم اللغة .

التوقيع :
الأسم : د. ا صباح شاكر عبدالله
التاريخ : / / ٢٠٠٥

بناء على التوصيات المقدمة من قبل المشرف نرشح هذه الرسالة للمناقشة

التوقيع :
الأسم : د. عمرة أبراهيم
رئيس قسم اللغة الأ نكليزية
التاريخ : / / ٢٠٠٥

قرار لجنة المناقشة

نشهد نحن أعضاء لجنة المنا قشة أننا قد اطلعنا على هذه الرسا لة وناقشنا الطالبة في محتوياتها وفيما له علاقة بها فوجد نا إنها جد يرة بالقبول لنيل شهادة ماجستير أداب في اللغة الأنكليزية وعلم اللغة .

التوقيع :
الأسم :
التاريخ : / / ٢٠٠٥

عضو

التوقيع :
الأسم :
التاريخ : / /٢٠٠٥

عضو

التوقيع :
الأسم :
التاريخ : / / ٢٠٠٥

عضو

التوقيع :
الأسم :
التاريخ : / /٢٠٠٥

رئيس اللجنة

تأثير مشاكل النطق على الكلام

رسالة

مقدمة الى مجلس كلية التربية / جامعة تكريت
وهي جزء من متطلبات شهادة الماجستير في اللغة
الأنكليزية وعلم اللغة

أعداد الطالبة

زينب عبودي علي

بأشراف

الأستاذ المساعد الدكتور

أصباح شاكر عبدالله

2005 م ٢٠٠٥ هـ