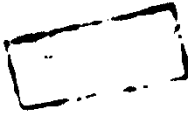


1400014

**ESSAY ON:
SPEECH DISORDERS DURING
INFANCY AND CHILDHOOD**

**SUBMITTED FOR FULFILLMENT
OF THE MASTER DEGREE IN
(PEDIATRICS)**



14000052
A B

BY

**Dr. Azmy Beshra Younan
M.B., B.Ch.**

UNDER SUPERVISION OF

**Prof. Dr. Saadia Abd El Fattah
Prof. of Pediatrics**

**Dr. Shereen Abd El Fattah
Lec. of Pediatrics**

**FACULTY OF MEDICINE
AIN SHAMS UNIVERSITY**

1987

Acknowledgement

Firstly and foremost, I feel always indebted to God, the kindful and merciful.

It is of my pleasure to express my gratitude and sincere appreciation to professor Dr; Saadia Abd El Fattah professor of pediatrics for her great kindness, guidance and helpful remarks and suggestions.

Particular thanks to Dr; Shereen Abd El Fattah; lecturer of pediatrics, for her faithful care, time she spent in making this essay come to light and her kindness.



Index

Subject	Page.
Figures and tables.....	1
Introduction	2
Aim of the essay	4
Anatomical pathways concerned with speech production ..	5
Neurophysiological processes involved in speech production	11
1. Speech receptor system	12
2. Speech integrator system	15
3. Speech transmitter system	21
4. Speech effector system	24
5. Speech sensory system	24
Speech and language development	29
1. Prenatal development	29
2. Postnatal development of voice	29
3. Postnatal development of speech & language	34
4. Postnatal development of articulation	47
Classification of speech disorders	50
I. Voice disorders (Dysphonia)	55
A. Non neurological causes of dysphonia	55
B. Neurological causes of dysphonia	60
C. Preventing voice disorders	62
II. Articulatory disorders	
1. Dysrhythmia (stuttering)	64
≡ Etiology	68
≡ Preventing fluency disorders	77
≡ Treatment of stuttering	79

	Page.
2. Dysarthrias	81
a Classification	83
A. Flaccid dysarthria	91
B. Spastic dysarthria	96
C. Dyskinetic dysarthria	98
D. Ataxic dysarthria	100
E. Mixed dysarthria	101
. Treatment of dysarthria	
3. Nasality problems	105
a Hyponasality	105
a Hypernasality	106
4. Dyslalia	110
a Preventing articulatory disorders	114
III. Symbolization problems (language).....	116
1. Sensory deprivation	118
A. Blindness	118
B. Deafness	119
2. Brain dysfunction	126
A-1- Cerebral palsy	127
ii- Dysphasia	129
B- Mental retardation	145
C- Minimal brain damage	149
3. Psychiatric diseases	151
A. Psychosis of early onset	152
1. Autism	152
2. Symbiotic psychosis	154
B. Psychosis of late onset	155

	Page.
4. Environmental factors	156
Clinical assessment of speech and language disorders..	158
A. Interview	166
B. Observation	173
C. Examination	173
D. Investigation	180
E. Diagnosis and differential diagnosis	185
Treatment consideration	189
Paediatric role	191
Summary	192
References	197
Arabic Summary	219

Fig. (1) A schematic diagram of the cerebral cortex illustrating the areas of the surface of the left cerebral hemisphere involved in speech	11
Fig. (2) A schematic diagram illustrating the components of the speech system	12
Fig. (3) A schematic diagram illustrating the components of the speech system	13
Fig. (4) Analytic schema of the speech system	14
Fig. (5) Communicative system	14
Fig. (6) The functional areas of the cerebral hemisphere	14
Fig. (7) Functional areas of the cerebral hemisphere	14
Fig. (8) A schematic diagram illustrating the components of the speech system	19
Fig. (9) A schematic diagram illustrating the components of the speech system	22
Fig. (10) A schematic diagram illustrating the components of the speech system	23
Fig. (11) A schematic diagram illustrating the components of the speech system	27
Fig. (12) A schematic diagram illustrating the components of the speech system	31
Table (A) Level of speech and language	41
Table (B) Development of intelligibility	44
Table (C) Classification of speech disorders by etiology	51
Table (D) Ingram's classification of speech disorders during childhood	52
Fig. (17) The relative incidence of the different types of communicative problems seen in Ain-Shams phoniatric unit over the year 1995	53
Table (P) The Hg. and V distribution of the communicative problems over the year 1995 in phoniatric unit of Ain-Shams university	54
Fig. (13) Cerebral dominance for dichotically presented verbal and non verbal auditory stimuli	74
Fig. (14) Components and levels and events involved in different neuropathologies of speech and language	82
Table (G) Psychologic perceptual classification of dysarthrias	85
Table (H) Summary of Mayo Clinic Research on Motor Speech Disorders	88
Table (I) Communicative disorders in L,M,W,L of V,VII,I and XII cranial nerves	95
Fig. (15) Reflex - inhibiting patterns for cerebral palsy	104
Table (J) Classification of VPI	108
Table (K) Effects of hearing loss	125
Fig. (16) Anatomical areas involved in main forms of aphasia	130
Table (L) Distinguishing features of main forms of aphasia	130
Table (M) Causes associated with different neurogenic speech and language disorders	135
Table (N) Prognostic variables in aphasia	138
Table (O) Classification of the developmental speech disorder syndrome	143
Table (F) Cry scores (%) in the cries of group 1-3 and group 5 infants	162
Table (Q) Mean cry scores and occurrence of scores (%) in the cries of infants admitted to the neonatal ward	162
Table (R) Primitive oral reflexes and normal period of elicitation	164
Table (S) Indications of pathology, normal to age specified	164
Fig. (17) The speech and language processing model	167
Fig. (18) Oral speech mechanism screening examination	179
Fig. (19) Movement pattern of the tongue, velum and jaw	183
Fig. (20) Movement pattern of the lower lip in a normal subject	183
Fig. (21) Computer processed EMG curves of the anterior digastric and the mentalis muscles	184
Table (T) Differential diagnosis of delayed speech development	187
Table (U) Chief signs associated with mental retardation, dysarthria, aphasia and apraxia of speech	187

I N T R O D U C T I O N

10

"Introduction"

Speech is an extremely important and unique human activity which sets us apart from other animals and is closely related to our ability to reason. (Hirose, 1986)

Darley et al., (1975), precisely defined speech as the concurrent motor functions of respiration, phonation, resonance, articulation and prosody.

Speech is not necessarily language and language is not always speech, although there is a close relationship between them. It is possible to speak or to utter sounds in certain sequences and yet not have language. It is also possible to have language without the ability to speak. Speech refers to verbal symbols, but language includes, not only speech, but, the non-verbal aspects of communication, for example gesticulation, gesture and pantomime. (Woolfolk and Lynch, 1982).

Fuller et al., (1983), stated that there is a wide variety of disorders of speech sound production ranging from minor developmental conditions, in which speech may be delayed and phonologically imperfect, to an organically determined failure to produce speech sounds.

Over the past fifty years innumerable surveys have been conducted to determine the extent and variation of speech disorders. (Jones et al., 1979) .

Espir and Rose, (1983) stated that about 10% of children have a speech defect, but the incidence becomes less in later age groups. From the age of 6 - 10 , 15% are affected but from 10 - 14, this decreases to 5%.

In Egypt, Massoud and Kotby, (1979) found that, out of 600 school children examined - ranging in age from 6-12 years - 92 pupils (15.3%) were found to have communicative disorders of different etiological factors.

Fuller, (1984) Justified that communication disorders in children are developmental handicaps, as real as, and sometimes more disabling than, organic disease. They deserve the same sympathetic attention as their physical counterparts.

This explains the great need for studying speech disorders during infancy and childhood, since early detection and early intervention may prevent or reduce many of them.

AIM OF THE ESSAY

1A

"Aim of the essay"

The aim of this essay is to explain the different types of speech disorders occurring in infancy and childhood. It is a trial to reach to an easy diagnostic approach of these problems, that can help the pediatricians in diagnosis and early detection of these disorders.

**Anatomical pathways concerned
with speech production**

The anatomy of speech production segment is made up of the bilateral structures of the verbal modality from the primary motor cortex to the muscles and structures of the speech mechanism. (Nation & Aram, 1977) . A specific model of the anatomic basis of speech is presented by Whitaker, (1970) in Fig (1).

Anatomically speaking, language is employed in the dominant hemisphere, usually the left. The language areas are located mainly in a posterior zone and an anterior zone. The posterior zone of the left hemisphere comprises

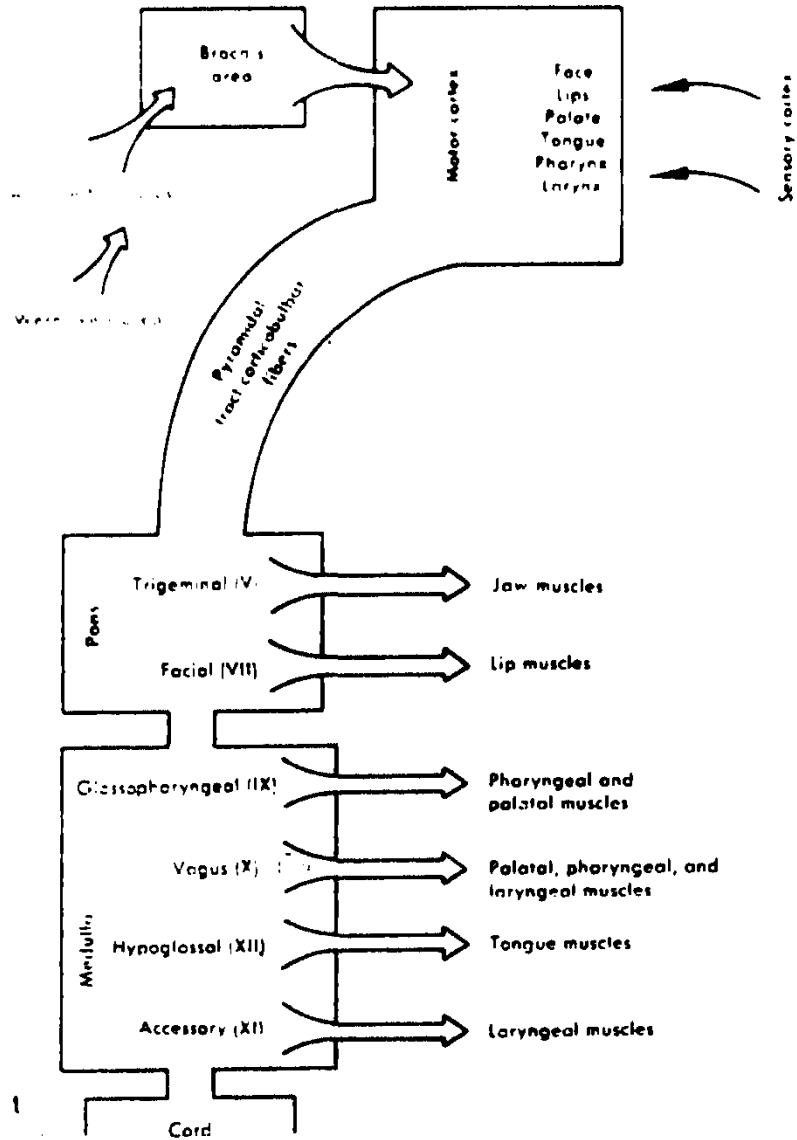
- a. The mid and posterior temporal lobe,
- b. The adjacent inferior parietal lobe, and
- c. The adjacent anterior occipital lobe.

The posterior zone is thus loosely equated with, but. Larger than, the wernickes area.

The anterior zone includes:

- a. The foot of the third frontal convolution,
- b. The Broca's convolution. Fig:(2) (3)

The apparent interconnection between the posterior and anterior zone is the arcuate fasciculus.(Benton, 1976):



Fig(1) Anatomic schematic of the verbal modality.(From Whitaker, H.,A model for neurolinguistics. Occasional Papers 10.Language Centre Colchester, England: University of Essex(1970)).

The arcuate fasciculus leaves the temporal lobe by curving backward, upward, and inward to negotiate the deep lateral fissure and the insular lobe. Next, the arcuate fasciculus enters the parietal lobe beneath the cortex and turns forward to join another bundle of association fibers from the parietal and occipital lobes. Together, these fused bundles form the superior longitudinal fasciculus. This new, enlarged bundle courses anteriorly just below the cerebral cortex to reach the frontal motor association areas anterior to the motor cortex. (Benson, 1973).

The posterior and anterior language areas of the dominant hemisphere are connected with their corresponding areas in the nondominant hemisphere by fiber bundles of the corpus callosum which provide extensive communication between the two halves of the brain. (Bateman and Mason, 1984)

Articulation involves movements of the jaw, lips, tongue, palate, pharynx; and phonation involves the respiratory muscles, which are all represented in the lowest part of the precentral gyrus. From the lower part of the precentral gyri, the motor fibers concerned in phonation and articulation pass downwards in the corticospinal tracts and after decussation end in the trigeminal and facial nuclei, the nuclei ambigu, and the hypoglossal nuclei in the pons and