ARTICULATION DISORDERS

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CHAPTER 1 Clinical Framework BASIC TERMS AND CONCEPTS

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COMMUNICATION, SPEECH, AND LANGUAGE

- **Communication:**refers to any way that we convey information from one person to another.
- **Speech:**communication or expression of thoughts in spoken words, that is, in oral, verbal communication.
- Language:complex and dynamic system of conventional symbols that is used in various modes for thought and communication.

SUBDIVISIONS OF LANGUAGE

- **Phonology:**the study of the sound system of language and includes the rules that govern its spoken form.
- Phonology also examines how these sounds are arranged, their systematic organization, and rule system(street, sp, pf).
- Morphology: studies the structure of words.
- A **morpheme** is the smallest meaningful unit of a language.

Cont.

- Syntax:consists of organizational rules denoting word, phrase, and clause order; sentence organization and the relationship between words.
- Semantics is the study of linguistic meaning and includes the meaning of words, phrases, and sentences.
- Pragmatics: refers to the study of language used to communicate within various situational contexts.

Divisions of Communication



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ARTICULATION

- Used to describe an individual's speech.
- Articulation: refers to the totality of motor processes involved in the planning and execution of sequences that result in speech.
- □ This definition entails that:
- -The learning of articulatory skills is a developmental process (Motor Learning).
- -Errors in articulation result from relatively peripheral disturbances of these articulatory processes.
- -The central language capabilities of the individual remain intact.
- Articulation is a specific, gradually developing motor skill that involves mainly peripheral motor processes.

Speech sounds

- Represent physical sound realities.
- End products of articulatory motor processes.
- Speech sounds then are real, physical sound entities used in speech(*articulatory form*).
- Speech sounds have(*Linguistic function*) which includes:
- -The rules that address how specific sound units can be arranged to produce appropriate words.
- -The phoneme concept.

The Phoneme

- The smallest linguistic unit that is able, when combined with other such units, to establish word meanings and distinguish between them(beet,seat,feet).
- Allophones are variations in phoneme realizations that do not change the meaning of a word when they are produced in differing contexts.
- Is used to refer to the changes which occur in a phoneme when produced by speakers in differing contexts.

Phonology

- The study of how phonemes are organized and function in communication.
- Includes:
- -The inventory of phonemes of the language.
- -How these phonemes are *organized* to convey meaning within a language system.
- **Phonotactics :**refers to the description of the allowed combinations of phonemes in a particular language.

-Some phoneme combinations do not occur. (/ $\int / + /v/$)

-Some consonant clusters occurring are restricted in their use to certain word positions.(sk,ks)

Phoneme versus Speech Sound

Phoneme	Speech Sound
The smallest unit within a language that is able, when combined with other units, to establish word meanings and distinguish between them	Actual realizations of phonemes; referred to as allophonic variations or phonetic variations
Linguistic unit	Concrete, produced, transmitted, and perceived
Used in reference to a particular language system	Can be examined without referring to a specific language system
Basic unit within phonology	Basic unit within phonetics
Notation is within virgules / /, e.g., "the /s/ phoneme"	Notation is within brackets, e.g., "the [f] speech sound"

ARTICULATION DISORDERS

- Refers to difficulties with the motor production aspects of speech, or an inability to produce certain speech sounds.
- Articulation errors are typically classified relative to a child's age, which translates into stages within this developmental process.
- Production of speech sounds characterized by substitutions, omissions, additions, or distortions that may interfere with intelligibility (ASHA, 2008).

Phonological disorder

- Refers to impaired comprehension of the sound system of a language and the rules that govern the sound combinations (ASHA,2008).
- According to this definition, a phonological disorder is seen as a subsystem of a language disorder.
- Phonology is closely related to other constituents of the language system, such as morphology, syntax, semantics, and pragmatics.

Cont.

 Several studies have documented that delayed phonological development occurs concurrently with delayed lexical and grammatical development.

Articulation, Articulation Disorder, Phonology, Phonological Disorder

Term	Definition	Examples
Articulation	The totality of motor processes involved in the planning and execution of speech.	Describes the speech sound production of individuals; e.g., "The <i>articulation</i> of [s] was incorrect." Describes tests that examine the production of speech sounds; e.g., "The clinicial administered an <i>articulation</i> test."
Articulation Disorder	Difficulty with the motor production aspects of speech or an inability to produce certain speech sounds.	A diagnostic category that indicates that an individual's speech sound productions vary widely from the norm; e.g., "Tony was diagnosed as having an <i>articulation</i> disorder."
Phonology	The study of the sound system of a language, examines the sound units of that particular language, how these sounds are arranged, their systematic organization and rule system.	Describing the inventory and arrangement of sound units; e.g., the Spanish <i>phonological system</i> has fewer vowels than American English. The phoneme /s/ is present in Spanish, but not /z/.
Phonological Disorder	Impaired comprehension and/or use of the sound system of a language and the rules that govern the sound combinations.	The inventory of phonemes may be restricted; e.g., "Jonathan used the phoneme /t/ for /d, k, g, s, z, ſ, ʒ, tſ, dʒ/. He was diagnosed as having a
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CHAPTER 2 Phonetics—Articulatory Phonetics

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PHONETICS

- The science of description and classification of speech sounds(the science of speech sounds).
- Sounds may be identified with reference to:
- 1. Their production (or "articulation") within the vocal tract.
- 2. Their acoustic transmission.
- 3. Their auditory perception.
- The most widely used descriptions are articulatory.

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Branches of Phonetics

- **I.** Articulatory phonetics: speech production.
- **II. Acoustic phonetics**: the study of speech transmission, speech sound physics.
- **III. Auditory phonetics***:* which examines speech sound perception.

Articulatory phonetics

- Deals with the production features of speech sounds.
- Categorization and classification according to specific parameters of their production.
- Describes and classifies the specific motor processes responsible for the production of speech sounds.
- Articulatory phonetics is a field of study that attempts to document these processes according to specific parameters, such as the manner or voicing of the speech sound.

Acoustic phonetics

- The transmission properties of speech and speech sounds.
- Frequency, intensity, and duration of speech sounds, for example, are described.

Auditory phonetics

- Focus on how we perceive sounds.
- Our ears are subjective receivers of acoustic data.
- Many factors, including our individual experiences, influence our perception.

Finally

- The production of vowels and consonants depends on articulatory motor processes.
- Articulatory motor processes depend in turn on many anatomical-physiological prerequisites.
- Respiratory, phonatory, or resonatory processes.
- Articulatory motor ability is embedded in many different anatomical-physiological requisites.
- If these processes are impaired, speech sound production will be disordered.

VOWELS VERSUS CONSONANTS

- **Vowels:** are produced with a relatively open vocal tract; *no significant constriction* of the oral (and pharyngeal)cavities exists.
- The airstream from the vocal folds to the lips is relatively unimpeded.
- Therefore, vowels are considered to be *open sounds*.
- Vowels are *sonorants*.

Cont.

- Consonants: have significant constriction in the oral and/or pharyngeal cavities during their production.
- For consonants, the airstream from the vocal folds to the lips and nostrils encounters some type of articulatory obstacle along the way.
- Consonants are considered to be *constricted sounds*.
- For most consonants this constriction occurs along the sagittal midline of the vocal tract.

Features Differentiating Vowels and Consonants

Vowels	Consonants
No significant constriction of the vocal tract	Significant constriction of the vocal tract
Open sounds	Constricted sounds
Sagittal midline of vocal tract remains open	Constriction occurs along sagittal midline of the vocal tract
Voiced	Voiced or unvoiced
Acoustically more intense	Acoustically less intense
Demonstrate more sonority	Demonstrate less sonority
Function as syllable nuclei	Only specific consonants can function as syllable nuclei

Consonants		Vowels			
Symbol	Commonly Realized In	Symbol	Commonly Realized In		
[p]	pay	[i]	eat		
[b]	boy	[1]	in		
[t]	toy	[e ^I]	ape		
[d]	doll	[٤]	egg		
[k]	coat	[æ]	at		
[g]	goat	[a]	f <u>a</u> ther*		
[m]	moon	[u]	moon		
[n]	not	[0]	wood		
[n]	sing	[0 ⁰]	boat		
[0]	think	[>]	father*		
[8]	those	[a]	hop		
[f]	far	[a ^I]	tie		
[1]	vase	[a ⁰]	mouse		
[s]	sun	[ɔ ¹]	boy		
[z]	<u>z</u> 00	[3]	girl*		
10	shop	[3*]	bird		
[3]	beige	[æ]	winner		
[4]	chop	[^]	cut		
[c]	job	[ə]	above		
[i]	yes				
[w]	win				
[]	when*				
[1]	leap				
[r]	red				
[h]	hop				

TABLE 2.1 | IPA Symbols (Wise, 1958)

STUDENTS-HUB May be regional or individual pronunciations. Uploaded By: Sulaf Salaymeh

Vowels and Consonants

- Voice/Voiceless.
- Sonorant/(Non or Less) sonorant.
- Open/Obstruents.
- Syllable nuclei(syllabic)/Non Syllabic(some consonants are Syllabic).
- Consonants are those speech sounds that function linguistically together with vowels.

Vowels

- Vowels are commonly described according to:
- The portion of the tongue that is involved in the articulation. Example: front versus back vowels.
- II. The tongue's position relative to the palate.Example: high versus low vowels.
- III. The degree of lip rounding or unrounding.

Vowel Quadrilateral



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Arabic Vowels

Vowel phonemes of Modern Standard

Arabic & Classical Arabic

	Sh	ort	Long		
	Front	Back	Front	Back	
Close	/i/	/u/	/i:/	<mark>/u</mark> :/	
Open	/a/		la:l		
Diphthongs	/aw/, /aj/				

most common vowel system among

Arabic dialects



Consonants

- Four phonetic categories used to transcribe consonants:
- (1) active articulator (organ of articulation)
- (2) the passive articulator (place of articulation)
- (3) manner of articulation
- (4) voicing features

Arabic Consonants

Modern Standard Arabic consonant phonemes

		Labial Dantal		Denti-alveolar		Delatal	Valar	Unular	Dhammaal	Clattel
		Labiai	ai Dentai	plain	emphatic ^[a]	Falatai	velar	Ovular	rnaryngear	Giottai
Nasal		m		n						
	voiceless	(p) ^[b]		t[c]	t ^c [d]		k	q ^[e]		?
stop	voiced	b		d[c]	dc[d]		(g) ^[f]			
.	voiceless	f	θ[ð]	s	s٢	ſ	X ·	- χ ^[h]	ħ ^[i]	
Fricative	voiced	(V) ^[b]	Q[0]	Z	ð۶		γ·	R[µ]	ç[i]	ĥ
Affricate	voiced					dzm				
Trill				r[k]						
Approxim	nant			I	(†) ^[1]	j	W			Colours

Features Differentiating Vowels and Consonants

Vowels	Consonants
No significant constriction of the vocal tract	Significant constriction of the vocal tract
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Voiced	Voiced or unvoiced
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Demonstrate more sonority	Demonstrate less sonority
Function as syllable nuclei	Only specific consonants can function as syllable nuclei



FIGURE 2.4 | Structures of the Oral Cavity as Active STUDENTS-HUB:modelPassive Articulators Uploaded By: Sulaf Salaymeh



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Active articulators

TABLE 2.3 | Phonetic Description: Active Articulator/Organ of Articulation

Active Articulator	Phonetic Descriptor	Examples			
Lower lip	Labial	[p], [b], [m], [f], [v], [w], [ʌ]			
Tip of tongue	Apical [s], [z], [θ], [ð], [r], ¹ [l]				
Lateral rims of tongue ²	Coronal	[t], [d], [n], [ʃ], [ʒ]			
Surface of tongue anterior portion central portion posterior portion	Dorsum predorsal mediodorsal postdorsal	[s], <mark>[z]</mark> [j], [r] [k], [g], [ŋ]			

Passive Articulators

TABLE 2.4 | Phonetic Description: Passive Articulators/Place of Articulation

Passive Articulators	Phonetic Descriptor Examples				
Upper lip	L <mark>a</mark> bial	[p], [b], [m], [w], [ʌ]			
Upper teeth	Dental	[f], [ν], [θ], [ð]			
Alveolar ridge	Alveolar	[t], [d], [n], [s], [z], [l]			
Surface of hard palate anterior portion central portion posterior portion	Palatal prepalatal mediopalatal postpalatal	[ʃ], [ʒ], ¹ [r] [j], [r] (does not normally occur in General American Engli			
Soft palate	Velar	[k], [g], [ŋ]			

Manner of Articulation

TABLE 2.5 | Phonetic Description: Manner of Articulation

Manner of Articulation	Phonetic Descriptor	Examples		
Complete blockage	Stop-plosive	[p], [b], [t], [d], [k], [g]		
Partial blockage	Fricative	[f], [v], [s], [z], [ʃ], [ʒ], [θ], [ð]		
Nasal emission	Nasal	[m], [n], [ŋ]		
Release of stop portion to a homorganic fricative portion	Affricate	[tʃ], [dʒ]		
Gliding motion from a more closed to a more open position	Glide	[w], [ʌ], [j]		
Lateral airflow	Lateral	[1]		
Retroflex blade or bunched dorsum	Rhotic	[r]		

Voicing

TABLE 2.6 | Phonetic Description: Voicing

Voicing	Phonetic Descriptor	Examples [b], [d], [g], [m], [n], [ŋ], [v], [z], [ʒ], [ð], [w], [j], [l], [r]		
With vocal fold vibration	Voiced			
Without vocal fold vibration	Voiceless	[p], [t], [k], [f], [s], [ʃ], [θ], [ʌ], [h]		

COARTICULATION/ASSIMILATION

- Sounds within a given phonetic context influence one another.
- **Coarticulation** describes the concept that the articulators are continually moving into position for other segments over a stretch of speech (Fletcher, 1992).
- Modifications happened.
- Assimilation(Harmony processes): adaptive articulatory changes by which one speech sound becomes similar, sometimes identical, to a neighboring sound segment.

Types of Assimilatory Processes

- Contact (or contiguous)Assimilations:adjacent sounds.
- Remote (or noncontiguous)Assimilation: separated sounds, in two different syllables.
- Contact
- "jumping" [d3^mpin] \rightarrow [d3^mbin]
- "skunk" [sk^ŋk] → [st^ŋk]
- *Remote* "yellow" $[j\epsilon lou] \rightarrow [l\epsilon lou]$

"telephone" [t ϵ ləfoun] \rightarrow [t ϵ dəfoun]

- Progressive(perseverative)Assimilation:a segment or a sound influences a following sound.
 - **skunk** [sk^ŋk] becomes [st^ŋk] **telephone** [tεləfoun] becomes [tεdəfoun]
- Regressive(anticipatory) Assimilations:a segment or a sound influences a preceding sound.
- "bathtub" $[b \approx \theta t^b] \rightarrow [\theta \approx \theta t^b]$
- "pumpkin" [p^mkin] → [p^ŋkin]
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- Phonemic Assimilation: If an altered segment is perceived to be a different phoneme.
 Ten girls [tεn glz] to [tεŋ glz].
- Phonetic Similitude:occurs when the change in the segment is still perceived by speakers of a language as a variation(allophone).
- [s] in *soup* [sw up] lip rounding during [s] production.

• Total Assimilation:

"window" [windoU] → [winnoU] "Pontiac" [pɑntiæk] → [pɑnniæk]

- Partial Assimilation:
 "handkerchief" [hænkt[if] → [hæ ŋkt[if]
- Coalescence:two neighboring segments/sounds are merged into a new and different segment/sound.
- Sandwich [sænwitʃ] as [sæmitʃ].

SYLLABLE STRUCTURE

- Syllables appear to be easily recognizable units.
- **Peak**:(NUCLEUS)the most prominent, acoustically most intense part of the syllable, can stand alone (vowels, semivowels-syllabic).
- **Onset**(syllable releasing): consists of all the segments prior to the peak.
- Coda(syllable arresting): is made up of all the sound segments of a syllable following its STUDENPER

- **Rhyme**:peak and coda together.
- **Open** or **Unchecked Syllables**:Syllables that do not contain codas.
- **Closed** or **Checked Syllables**:Syllables that do have codas.



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Type of Syllables	Open Syllable toe	Closed Syllable toad
Type of Cynabics	• to tulip	toothache

Degree of Syllable	Stressed Syllable Unstressed Syllable Syllable			
Stress	Target [t]: taco today tomorrow			
0.000	Target [b]: book textbook			

Number of Consonants	Singletons	Consonant Clusters
Grouped Together	• see ski	scream
	• mass mask	masks

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CHAPTER 3 Phonetic Transcription and Diacritics

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PHONETIC TRANSCRIPTION AS A NOTATIONAL SYSTEM

- Accurate transcription forms the basis for the diagnosis of articulatory-phonological impairments.
- In Phonetic transcription we do listen carefully to differentiate accurately between tiny changes in sound production.
- International Phonetic Alphabet as the notational system used to document norm productions of vowels and consonants.
- Present and discuss some of the more common diacritical markers.

- Clinical implications of phonetic transcription, including the use of diacritics.
- What has been said, to How it has been said.
- *How* a specific speech event has been executed than about *What* has been.
- Phonetic Alphabet (IPA) is probably the most widely accepted transcription system.
- The International Phonetic Alphabet offers a one-to-one correspondence between phoneme realizations and sound symbols.

Transcription Types:

- Broad transcription:
- The more general type of transcription.
- Based on the phoneme system of the particular language.
- Referred to as **phonemic transcription**.
- For broad transcription the symbols are placed within slashes / /, which are termed virgules.

- Narrow transcription:
- In this case the sound units are recorded with as much production detail as possible.
- This notation encompasses both the use of the broad classification system noted in the International Phonetic Alphabet as well as extra symbols, which can be added to give a particular phonetic value(specific production features).
- Said to be called **Phonetic transcription**.
- For narrow transcription the symbols are placed within brackets [].
- Phonemes versus Allophones.

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USE OF PHONETIC TRANSCRIPTION

- Accurate phonetic transcription is clinical tool.
- Phonetic transcription provides accurate written record of what was said and what it sounded like.
- Several problems must be considered when using phonetic transcription:
- The age of the client or an unusual vocal quality.
- Intelligibility of the client,

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DIACRITICS

- Marks added to sound transcription symbols in order to give them a particular phonetic value.
- Represents language-specific typical productions.
- Describe deviations/variations from normal tongue placement.

Diacritics Used with Consonants

- **Dentalization**: This refers to an articulatory variation in which the tongue approaches the upper incisors.
- It is marked by [] placed under the IPA symbol [d] dentalized [d].
- Occurs as the result of coarticulation *widow* and *width*.
- [s], [z] production approaches a [θ] or [δ] quality.
- **Palatalization**:can occur with sounds that have a place of articulation anterior or posterior to the hard palate region.
- [sj] palatalized [s]
- [tj] palatalized [t]

- Velarization: This term refers to a more posterior tongue placement (in the direction of the velum) for alveolar , palatal sounds.
- [t^y] is a velarized[t].
- [fu<u>+</u>] velarized [I]-sound
- [IY] velarized [I]-sound

- Lateralization: during any consonant production other than [I] air is released laterally.
- [s] and [z] can and often becomes lateralized.
- $[sip] \rightarrow [4ip]$ a lateralized [s]
- $[zip] \rightarrow [\beta ip]$ a lateralized [z]
- Dentalized, palatalized, and lateralized [s], [z] realizations are frequent distortions noted in children.

Voice Symbols

- Devoicing of Voiced Consonants:
- [ʃu:s] for "shoes"
- [ti:p] for " deep"
- Voicing of Voiceless Consonants:
- *Eighteen* [eitin] \rightarrow [e idin]

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Aspiration and Nonaspiration of Stop-Plosives.

- Stop-plosives are often described according to two parameters: *Fortis* and *Lenis*.
- Fortis: relatively more articulatory effort (voiceless sounds) [t,p,k].
- Lenis: comparatively less articulatory effort (voiced sounds) [d,b,g].
- Aspiration "table" [t^h eibəl].
- Stop-plosives, which are normally aspirated, are not marked unless the aspiration is excessive.

 Voiceless stop-plosives are usually aspirated at the beginning of words; however, they are not aspirated in consonant clusters.

Labialization

- Labialization:unrounded consonant is produced with lip rounding.
- "soup" [s wup] labialized [s]
- Labialization of normally unrounded consonants due to assimilation is noted, but it is not considered a speech sound problem.

Nasality Symbols

- During the production of mostsounds, the velum is tensed to block the escape of the expiratory air through the nasal cavity.
- There is only one exception to this rule: the nasals.
- If a nasal follows a vowel, for example, nasality often seeps into the vowel segment; the preceding vowel becomes nasalized:
- [tæn] → [t ~æ n] "tilde" is placed over the nasalized sound.

0	Voiceless	ņ	ģ		Breathy voiced	þ	a	п	Dental	ţd
~	Voiced	Ş	ţ	2	Creaky voiced	þ	a	ц	Apical	ţ d
h	Aspirated	th	dh	~	Linguolabial	ţ	ğ		Laminal	ţd
,	More rounded	ş	2 2	w	Labialized	tw	dw	2	Nasalized	ẽ
c	Less rounded	Ş		j	Palatalized	tj	dj	n	Nasal release	dn
+	Advanced	ų	20	Y	Velarized	t ^y	dy	1	Lateral release	dl
-	Retracted	ē		ſ	Pharyngealized	ť	ds	٦	No audible releas	_e d⁻
••	Centralized	ë		2	Velarized or pha	ryngea	lized 1	8		
×	Mid-centralized	ě		т	Raised	ę	(\mathbf{I})	= V(oiced alveolar frica	tive)
1	Syllabic	ņ		т	Lowered	ę	ι <u>β</u>	= V(oiced bilabial appro	oximant)
^	Non-syllabic	ĕ		4	Advanced Tongu	ie Root	ę			
∿ DEN	Rhoticity	θ	a₁	F	Retracted Tongu	e Root	ę		Uploaded By	· Sulaf Sala

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Normal Phonological Development

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SOME TERMINOLOGY

- **Prelinguistic behavior** refers to all vocalizations prior to the first actual words.
- Phonological development refers to the acquisition of speech sound form and function within the language system.
- Speech sound development refers primarily to the gradual articulatory mastery of speech sound forms within a given language.

ASPECTS OF STRUCTURAL AND FUNCTIONAL DEVELOPMENT

- In Newborns and infants lungs are proportionally large for their body structure.
- Their subglottal pressure, perfectly able to accumulate enough air pressure against a closed glottis to "phonate" quite impressively.
- Children demonstrate higher subglottal pressure values than do adults.

Respiratory Development

TABLE 5.1 | Milestones in the Development of the Respiratory System of the Child

Age	Typical Patterns
Birth	Rest breathing is approximately 30 to 80 breaths per minute. Frequent paradoxical breathing occurs, exemplified by the rib cage making an expiratory movement as the abdomen performs an inspiratory movement. Only between one third and one half of the number of alveoli are present at birth.
1.5 to 3 years	Rest breathing rate decreases to approximately 20 to 30 breaths per minute at age 3. Respiratory control increasingly supports the production of longer utterances during this time frame. The number of alveoli increases rapidly, beginning to approximate adultlike values at the end of this period. Small conducting airways surrounding the alveoli increase their dimensions in a similar fashion.
7 to 8 years	Rest breathing is approximately 20 breaths per minute. Adultlike breathing patterns are now beginning to be achieved. Number of alveoli reaches adult values at age 8.
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- The tongue in young infants fills out the oral cavity (for more effective sucking action).
- The production of sounds is restricted.



FIGURE 5.1 | Sagittal Section of the Head of the Newborn Infant Demonstrating the Forward and Downward Placement of the Tongue

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Larynx

- In newborns, for example, the arytenoid cartilages and the large posterior portion of the cricoid cartilage are disproportionately large when compared to an adult larynx.
- The vocal processes where the vocal folds attach are also large in relationship to the other structures.
- larynx sits closely under the angle between neck and chin.



FIGURE 5.2 | Posterior and Anterior Views of the Laryngeal Structures of an Adult and of an Infant

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CHANGES

- The thyroid cartilage enlarges more than the cricoid cartilage.
- The epiglottis becomes larger and more firm.
- The arytenoid cartilages, which were relatively large in the early stages of this development, now change little in size; they adapt structurally and functionally to the other laryngeal structures.
- The vocal and ventricular folds—that is, the "true" and "false" vocal folds—lengthen. This has the effect that more of the vocal folds' muscular portion is now freed for normal vocal cord vibration.

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- Enlargement of the skull and laryngeal areas This allows the velum more room and thus more mobility.
- Tongue no longer completely fills the mouth.
- The tongue and Lips become elongated and acquire further mobility.
- The fine-tuning and coordination for regular voice and speech production are now increasingly acquired.
- Evolve from a mechanism able to serve only respiratory and feeding to speech sounds production.

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ASPECTS OF PERCEPTUAL DEVELOPMENT

- Infants are able to discriminate minimal differences in speech sounds.
- Researchers detect fetal eye blink responses to aloud noise between 24 and 28 weeks after conception and Changes in fetal heart rate.
- Also, within the first days after birth, infants demonstrate a preference for their own mothers' voice and will actively change their sucking rate to hear her voice more often than others.

Perceptual Skills.

- **Categorical Perception**:refers to the tendency of listeners to perceive speech sounds (which are varied acoustically) according to the phonemic categories of their native language.
- Discrimination of nonnative sounds in infants:
- The discrimination skills of young infants were tested with unknown phonemes of nonnative languages.
- Infants up to approximately 6 to 8 months of age, could discriminate between two nonnative sounds that were very similar in their production characteristics.
- By 10 to 12 months, this discrimination ability had disappeared.

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- **Perceptual constancy**: The ability to identify the same sound across different speakers, pitches, and other changing environmental conditions.
- Noted in children from 5½ to10 months of age
- Perception of phonemic contrasts:minimally paired (10 to 22 months)in all children there was a developmental progression in the ability to differentiate between phonemes that signal word meaning differences.

- Early perceptual abilities related to language development and disorders:
- Significant correlations between speech perception at 6 months of age and later language (word understanding, word production, and phrase understanding).
- The infant's early perceptual abilities may also impact later language development, while lack of specific skills may be a portion of the symptom complex of disordered language learning.

PRELINGUISTIC STAGES: BEFORE THE FIRST WORDS

- Jakobson's Discontinuity Hypothesis: emphasized a sharp separation between Prelinguistic Behavior and Linguistic Development.
- Babbling is a random series of vocalizations in which many different sounds are produced with no apparent order or consistency.
- Such behavior is seen as clearly separated from the following systematic sound productions evidenced by the first word.
- Child undergo a period of silence between the end of the babbling period and the first real words.

- Researches later on documented that:
- (1) Babbling behavior is not random but rather that the child's productions develop in a systematic manner.
- (2) The consonant-like sounds that are babbled are restricted to a small set of segments.
- (3) The transition between babbling and first words is not abrupt but continuous; late babbling behavior and the first words are very similar(the sounds used and the way they are combined).
- The child'sperceptual abilities are quite developed before the first meaningful utterances.

Prelinguistic Stages

STARK(1986)

Stage 1: Reflexive crying and vegetative sounds(birth to 2 months):

- Reflexive vocalizations: include cries, coughs, grunts, and burps that seem to be automatic responses reflecting the physical state of the infant.
- Vegetative sounds: may be divided into grunts and sighs associated with activity and clicks and other noises, which are associated with feeding.

Stage 2: Cooing (Gooing) and laughter (2 to 4 month):

- Cooing or Gooing sounds are produced during comfortable states.
- Consonantal elements that are produced at the back of the mouth.
- From 12 weeks onward, a decrease in the frequency of crying is noted.
- Most infants' primitive vegetative sounds start to disappear.
- At 16 weeks, sustained laughter emerges.

Stage 3: Vocal play (4 to 6 months):

- Production of prolonged vowel- or consonant-like steady states.
- Infant often produces variations in loudness and pitch.
- Vowels demonstrate more variation in tongue height and position.

Stage 4: Canonical babbling (6 months and older):

- **Reduplicated babbling** is marked by similar strings of consonant–vowel productions.
- Nonreduplicated or variegated babbling demonstrates variation of *both* consonants and vowels from syllable to syllable.
- One major characteristic of this babbling stage is smooth transitions between vowel and consonant productions.
- Used as selfstimulatory manner; it is not used to communicate to adults.
- Toward the end of this stage, babbling may be used in ritual imitation games with adults. STUDENTS-HUB.com

Stage 5: Jargon stage (10 months and older):

- The **jargon stage** is characterized by strings of babbled utterances that are modulated primarily by intonation, rhythm, and pausing.
- It sounds as if the child is actually attempting sentences but without actual words.
- Eye contact, gestures, and intonation patterns that resemble statements or questions, parents are convinced that the child is indeed trying to communicate something to which they often feel compelled to respond.

Vocoids,Contoids&Syllable Shapes

- The productions cannot yet be said to be true vowels and consonants of a particular language system, they are referred to as vocoids and contoids.
- Front and central vocoids were found to be favoured [ε], [i], and [^].
- The most frequent contoids were [h], [d], [b],
 [m], [t], [g], and [w].
- Open syllables are still the most frequent type of syllables (V,CV, VCV, and CVCV).

More Frequent Consonants				Less Frequent Consonants				
Sound	A ²	В	С	Sound	A ²	В	С	
h	31.77	21.0	18.3	v	1.03	1.0	0	
d	20.58	30.0	13.5	I	.96	1.0	1.6	
b	9.79	5.0	10.0	θ	.85	0	0.4	
m	6.69	1.0	7.2	Z	.56	0	0	
t	4.34	0	3.6	f	.37	0	0.4	
g	4.15	12.0	8.4	ſ	.37	0	0	
s	3.45	0	0.4	ð	.34	0	0.8	
w	3.39	17.0	8.4	ŋ	.33	1.0	3.2	
n	2.65	1.0	4.4	3	.10	0	0	
k	2.12	1.0	6.3	r	.10	0	0	
j	1.77	9.0	11.6	ť	0	0	0	
р	1.63	0	1.6	dз	0	0	0	
Totals	92.33	97.0	93.7		5.01	3.0	6.4	

TABLE 5.2 | Relative Frequency of English Consonant-like Sounds in the Babbling of 11- to 12-Month-Old American Infants¹

1. The three investigations represented are A: Irwin (1947a); B: Fisichelli (1950); C: Pierce and Hanna (1974).

2. The A columns total less than 100% because the difference (2.66%) represents several sounds in Irwin's original tabulations that have no phonemic equivalent in American English phonology (e.g., [? $\varsigma \chi$]).

Source: From Phonological Acquisition and Change (p. 4), by J. L. Locke, 1983, Orlando, FL: Academic Press. Copyright 1983 by Academic Press. Reprinted with permission. STUDENTS-HUB.com Uploaded By: Sulaf Salaymeh

Babbling and Its Relationship to Later Language Development

- Jakobson's discontinuity hypothesis denounced any link between babbling and later language development.
- Several researchers have suggested that both the **Quantity** and the **Diversity** of vocalizations do indeed play a role in later language development.
- Quantity was defined as the number of vocalizations during a specific time.
- Results showed that the amount of prelinguistic vocalizations was positively related to later language development.

- **Diversity** of vocalizations was measured by:
- (1) The number of different consonant-like sounds heard in the babbling of infants.
- (2) The number of structured CV syllables.
- (3) The proportion of vocalizations containing a true consonant.
- (4) The ratio of consonant-like sounds to vowel-like sounds.

- Summarized results:
- 1. less language growth is seen in children with more vocoid-babble compared to those with more contoid-babble.
- 2. greater language growth is related to greater babble complexity.
- **3.** greater language growth is related to the increased diversity of contoid productions.

TRANSITION FROM BABBLING TO FIRST WORDS

- Several studies suggest that babbling and early words have much in common.
- Transition from babbling to first words include:
- 1. Primarily monosyllabic utterances
- 2. Frequent use of stop consonants, followed by nasals and fricatives
- 3. Bilabial and apical productions
- 4. Rare use of consonant clusters
- 5. Frequent use of central, mid-front, and low-front vowels ([[^], ε, a])

Distinctions between Babbling and First words:

- **1.** A large diversity existed between the children's productions(Vihman et al., 1986).
- 2. Frequent use of [I] in one child's speech (Davis & MacNeilage, 1990).
- **3.** The majority of the children used voiced stops in babbling but not in words; [g] was the most prominent example of this(Vihman et al., 1986).
- **4.** Vowels produced during babbling were used as substitutes for other vowel,[i]is an example.
- 5. Productions were context dependent.For example, high-front vowels occurred more frequently following alveolars [di:], [ti:] high-back vowels following velars [ku:],[gu:],

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THE FIRST FIFTY WORDS

- Linguistic Phase: starts the moment the first meaningful word is produced.
- First Word: an entity of:-
- □ relatively stable phonetic form.
- □ Produced consistently in a particular context.
- □ approximates the adult form.
- proto-words, phonetically consistent forms, vocables, quasi-words: "invented words" without a recognizable adult model

- First-50-Word Stage: 1 year of age up to 18 to 24 months.
- The child produces approximately 50 meaningful words before the next generally recognized stage of development, the *two-word stage*, begins.
- Large difference between productional versus perceptual capabilities of the child.
- The child's perceptual, motor, and cognitive growth, as well as the influence of the environment play roles in this stage of language acquisition.

- Phonological development during this period, is influenced by the individual words the child is acquiring.
- Children learn word units that happen to contain particular sets of sounds. Ingram (2006) called this a *presystematic stage* in which contrastive words rather than contrastive phonemes are acquired.
- *Item Learning* and *System Learning* stages of early phonological development.

- Item learning: the child first acquires word forms as unanalyzed units, as productional wholes.
- The early portion of the item learning stage is known as the **holophrastic period** as the child uses one word to indicate a complete idea.
- **System Learning:** the child acquires the phonemic principles of the phonological system in question.
- Took place after the first-50-word stage.

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Segmental Form Development

- **Phonetic variability:** refers to the unstable pronunciations of the child's first 50 words.
- Limitation of syllable structures: and segmental productions used.
- Certain syllable types clearly predominate, these are CV, VC.
- CVC syllables appear only later.

- CVC syllables Do not constitute any major part of the child's phonology until after the first-50-word stage.

- Speech Sound Segments:
- First consonants are labials, most commonly [p] or [m].
- Followed by [t] and later [k].
- Fricatives produced only after the respective homorganic stops have been acquired.
- First vowel is [a] or [a], followed by [u] and/or [i].

TABLE 5.3 I Initial Consonant Productions within the First-Fifty-Word Vocabularies of Seven Stanford Subjects and Nineteen Other English-Speaking Children

	Stanford	Others	62.	Stanford	Others ¹
р	×	+	ſ	+	+
Ь	×	×	3	0	0
t	×	+	ť		1000
d	×	+	dz		<u></u> 53
k	×	+	m	×	×
g	+	+	n	×	+
f	+	-	ŋ		100
v		0	1		
θ	+	10000	r	+	715 83
ð	+		w	+	+
S		_	j	+	
z	10000	—	h	+	+

Note: x = all children in study; + = over half but not all children in study; - = more than one but less than half STUDENTSHILBROW in study; 0 = none of the children. Uploaded By: Sulaf Salaymeh

Longitudinal Study Findings

- Stoel-Gammon (1985)
- Thirty-four children between 15 and 24 months,10 identifiable words used.
- Group A children, who had 10 words at 15 months; Group B, who had 10 words at 18 months; and Group C, who had 10 words at 21 months.

Resulting Data about Early Consonant Development

- **1.** A larger inventory of sounds was found in the word-initial than in the word-final position.
- 2. Word-initial inventories contained voiced stops prior to voiceless ones; the reverse was true for word-final productions.
- **3.** The following phones appeared in at least 50% of all the subjects by 24 months of age: [h, w, b, t, d, m, n, k,g, f, and s] word-initially
 [p, t, k, n, r, and s] word-finally

- **4.** The "r" nearly always appeared first in a word-final position.
- 5. If the mean percentage of norm consonant productions was calculated (Shriberg & Kwiatkowski, 1982b), 70% accuracy was achieved.
- The order of appearance of initial and final phones was relatively constant across the three groups of children tested , except for fricatives, affricates and liquids.

Individual Acquisition Patterns

- Salience factor is defined as a child's active selection in early word productions containing sounds that are important or remarkable (salient) to the child.
- Avoidance factor is defined as the avoidance of words that do not contain sounds within a child's inventory.
- Individual phonetic preference.

THE PRESCHOOL CHILD

- From approximately18/24 months to the beginning of the sixth year.
- 18/24–30 months, the child's expressive vocabulary increased to 150–300 words.
- Receptive vocabulary grown to 1,200 words.
- The transition from one-word utterances to two-word sentences.
- Semantic and Syntactical development.

- At age 5:
- Almost complete phonological system has emerged.
- ✓ 2,200 words in the expressive vocabulary.
- ✓ 9,600 words in the receptive vocabulary.
- Almost all of the basic grammatical forms of the language are present.
- The child knows now how to use language to communicate in an effective manner.

Segmental Form Development: Vowels

- Children have acquired all vowels by the age of 3 years.
- Individual variation plays a large role in this acquisition process still noticed.
- Different percentage of mastery at different ages is noticed.

Segmental Form Development: Consonants

- Cross-Sectional Results:Large sample studies were initiated.
- Most of the speech sounds within a given native language are evaluated.
- Articulation tests are used to collect data.
- These cross-sectional studies are indicative of the inventory of speech sounds that children typically possess at certain ages.

	Wellman (1931)	Poole (1934)	Templin (1957)	Prather (1975)	Arlt (1976)	Smit (1993b)
m	3	31/2	3	2	3	2
n	3	41/2	3	2	3	2
ŋ		41/2	3	2	3	4
p	4	31/2	3	2	3	2
b	3	31/2	4	2;8	3	2
t	5	41/2	6	2;8	3	2
d	5	41/2	4	2;4	3	3
k	4	41/2	4	2;4	3	2
g	4	41/2	4	2;4	3	2
w	3	31/2	3	2;8	3	2
j	4	41/2	31/2	2;4	not tested	31/2
1	4	61/2	6	3;4	4	51/2
r	5	71/2	4	3;4	5	7
h	3	31/2	3	2	3	2
f	3	51/2	3	2;4	3	3
v	5	61/2	6	4	31/2	4
S	5	71/2	41/2	3	4	6
Z	5	71/2	7	4	4	6
5	not mastered by age 6	61/2	41/2	3;8	41/2	31/2
3	6	61/2	7	4	4	not tested
θ	not mastered by age 6	71/2	6	4	5	5;6
ð	not mastered by age 6	61/2	7	4	5	41/2
t∫	5		41/2	3;8	4	31/2
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TABLE 5.4 | Age Levels for Speech Sound Development According to Six Studies
Longitudinal Results

- Vihman and Greenlee (1987) used a longitudinal methodology to examine the phonological development of ten 3-year-old children with the following results:
- 1. Stops and other fricatives were substituted for [ð] and [θ] by all children.
- Over half of the children also substituted sounds for [r] and [l] (gliding) and employed palatal fronting, in which a palatal sound is replaced by an alveolar ([∫] becomes [s]).

- **3.** Two of the 10 children demonstrated their own particular "style" of phonological acquisition.
- **4.** On the average, 73% of the children's utterances were judged intelligible by three raters unfamiliar with the children.
- Phonological idioms or Regression:refer to accurate sound productions that are later replaced by inaccurate ones, When trying to deal with more complex morphosyntactic or semantic structures.

Phonological Processes

- A kind of strategy used to make it easier for the child to produce, and are substituted for sounds, sound classes, or sound sequences when the child's motor capacities do not yet allow their norm realization.
- Syllable Structure Processes.
- Substitution Processes.
- Assimilation Processes:up to 3 years of age.

Syllable Structure Processes

- Address the general tendency of young children to reduce words to basic CV structures.
- **Reduplication**: The child repeats the first syllable twice, a common process during the child's first-50-word stage(18-21months)
- طابة for طاطا •
- Final consonant deletion: (26-30months) to be dropped by age 3.
- باب for [bʊ] for [bʊk]

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- Unstressed syllable deletion(weak syllable deletion): lasts to approximately 4 years of age
- مفتاح for تاح •
- **Cluster reduction**: lasts to approximately 5 years of age.
- (لام) for (زلام) (back) for (black)
- **Epenthesis** :refers to the insertion of a sound segment into a word(vowel), thereby changing its syllable structure, to simplify consonant cluster production.
- (balack) for (black).

- Metathesis : changing sound arrangement in the word.
- مروحة for /طاولة مرحوة for طالوة •

Substitution Processes

- **Stopping**: replacement of stops for fricatives and affricates.
- سامي for تامي •
- Up to 4 years of age.
- Fronting: replace palatals and velars with alveolars.
- $[\int] \rightarrow [s], [k] \rightarrow [t], [t] \rightarrow [ts].$
- Up to 3;6 years of age.
- Gliding : [r] and [l]are replaced by [w] and [j]
- ملعب for رامي / ميعب, موعب for يامي, وامي •
- Up to 5 years of age.

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THE SCHOOL-AGE CHILD

- Phonological development has progressed considerably.
- Their phonological inventory is nearly complete.
- Some phonological features are obviously not mastered at all at this time.
- Certain sounds are still misarticulated.
- Phonological acquisition and mastery is that much important for learning to speak and learning to read.

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Segmental Form Development

- Perceptually:
- Gradual establishment of phonemic categorization skills, continues well beyond 5 years of age, until 14 years of age.
- Recognition of isolated words under quiet and noisy environmental conditions demonstrates improvement until at least age 10.
- The ability to understand specifically structured sentences under difficult listening conditions continues to develop until the age of 15

- Productionally:
- Most of the information on production abilities is based on the results of articulation tests, that is, based on responses to picture naming.
- Acceptable pronunciation of certain sounds is not achieved until between age 4;6 and 6;0.
- The most common later sounds are [θ, d, ʒ, r,s, z, v].
- Based on single-item pronunciation, most investigators agree that children complete their phonemic inventory by the age of 6;0 or, at the latest, 7;0.

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TABLE 5.7 | Later-Developing Sounds with Approximate Ages of Mastery

Sound	Age of Mastery	Source
[s]	71/2, 9	Poole (1934), Smit (1993b) ¹
[z]	71/2, 9	Poole (1934), Smit (1993b)
[r]	71/2, 8	Poole (1934), Smit (1993b)
[v]	61/2, 6, 51/2	Poole (1934), Templin (1957), Smit (1993b)
01	61/2, 51/2	Poole (1934), Smit (1993b)
[3]	6, 61/2, 7	Wellman et al. (1931), Poole (1934), Templin (1957)
[0]	71/2, 6, 6	Poole (1934), Templin (1957), Smit (1993b)
[ð]	61/2, 7, 7	Poole (1934), Templin (1957), Smit (1993b)
[4]	5, 51/2	Wellman et al. (1931), Smit (1993b)
[cz]	7, 51/2	Templin (1957), Smit (1993b)
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- Consonant Clusters:
- □ Prove difficult for the school-age child.
- □ The acquisition takes place from age 3;6to5;6.
- Child may demonstrate consonant cluster reduction, epenthesis.
- A study was made on 1,049 children between the ages of 2;0 and 9;0,targeting 27 different initial clusters, results showed :

- 1. On 14 of the 27 initial clusters tested, a small percentage of children in the 8;0- to 9;0-year-old group (N 247, frequency of occurrence approximately 2%) reduced two consonant clusters to a single element. These clusters included [pl], [kl], [gl], [sl], [tw], [kw], [tr], [dr], [fr], [sw], [sm], [sn], [st], [sk].
- 2. The consonant clusters [br] and [θr] demonstrated a higher frequency of consonant cluster reduction (5% to 15%) for children from *ages 5 to 9*. STUDENTS-HUB.com

- Second Structure
 For the 5;6- to 7;0-year-olds, the consonant clusters that fell at 75% or below group accuracy included [sl], [br], [θr], [skw], [spr], [str], and [skr].
- 4. Epenthesis, or schwa insertion in consonant clusters, occurs frequently up to *age 8;0*. The 9-year-olds exhibited schwa insertion rarely.

- Sound sequences occurring in new words require:
- Increased oral-motor control.
- Improved timing skills.
- Internalization of new phonological rules.
 - Morphophonology: the study of the different allomorphs of the morpheme and the rules governing their use(cat<u>s</u>,dog<u>s</u>).
 - Children who are as old as 17 are still acquiring certain morphophonological patterns.

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Phonological Awareness, Emerging Literacy, and Phonological Disorders

- Strong correlation between the phonological development, and later reading achievement has been found.
- Early language development, specifically the perceptual processing of sounds, has been found to be one of the strongest predictors of later reading acquisition.

Metaphonology

- Child's conscious awareness of the sounds within that particular language.
- It includes how these sounds are combined to form words.
- Enables the child's to grasp how many sounds are in a word or which sound constitutes its beginning or end.
- **Phonological Awareness** abilities are one important metaphonological skill.
- Refers to all sizes of sound units, such as words,syllables,phonemes(sound units)&rhymes.
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- Phonemic awareness:refers only to the phoneme level and necessitates an understanding that words are comprised of individual sounds.
- Coding is translating stimuli from one form to another—for example, from auditory to written form or from written to acoustic form.

Phonological processing

- The use of sounds of a language to process verbal information in oral or written form that requires working- and long-term memory.
- Phonological processing includes two broad dimensions: Coding and Phonological Awareness.
- Coding, contains two dimensions, Phonetic and Phonological coding.
- Phonetic coding: takes place in the working memory.
- The child learns that the letter /s/ sound a certain way.
- The child must access the memory where /s/ stored when trying to sound out a new word containing /s/.

Phonological coding

- **Phonological coding**: takes place in the long-term memory(semantic lexical abilities).
- Involves a three-step process:
- First- written symbols are matched to the pronunciation of the written word.
- Second- the pronunciation of the written word is matched with the pronunciation of words & sounds in memory.
- Third- pronunciations of words & sounds in memory are linked with meaning for retrieval and pronunciation.

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Phonological Awareness

- Is a subdivision of phonological processing.
- Is a multilevel skill of breaking down words into smaller units.
- Described in terms of syllable awareness, onset-rime awareness, and phoneme awareness (according to emerge & unit size).
- Stable performance of phonological awareness tasks may not be evident until 4-5 years of age.
- Scores of Phonological awareness tasks are correlated to scores on receptive and expressive language tasks at the 4- and 5-year-old level.

Syllable Awareness

- The child understands that words can be divided into syllables.
- Syllable Awareness include:
- (1) syllable segmentation(How many syllables)
- (2) syllable completion.
- (3) syllable identity(sound the same).
- (4) syllable deletion.

Onset-Rime Awareness

- Recognition of the onset of the syllable and the rime(rhyme).
- To be able to rhyme, the child must be able to separate the onset from the rime of the word.
- Tasks that measure onset-rime awareness include:
- (1) Spoken rhyme recognition(Do these words rhyme).
- (2) Recognition of words that do not rhyme.
- (3) spoken rhyme production (Tell me a word that rhymes with).
- (4) onset-rime blending(("c" "at" is blended to "cat").

Phonemic Awareness

- This skill can be measured in a number of ways:
- (1) Phoneme detection(different first sounds).
- (2) Phoneme matching(begins with same sound as).
- (3) Phoneme isolation (Which sound do you hear at the beginning of.....).
- (4) Phoneme completion.
- (5) Phoneme blending. (6) Phoneme deletion.
- (7) Phoneme segmentation.
- (8) Phoneme reversal. (9) Phoneme manipulation
- (10) Spoonerisms (sound transposition), STUDENTS-HUB.com

Phonological awareness & Reading, Spelling Competencies

- **1.** There is a positive relationship between phonological awareness and reading.
- 2. Performance on phonological awareness tasks in kindergarten and first grade is a strong predictor of later reading achievement.
- 3. Direct training of phonological awareness and sound-letter correspondence with children who are not yet reading improves their reading and spelling skills.
- **4.** Phonological awareness teaching works best when combined with instruction in sound-letter correspondence.

- Children who have a phonological disorder, are potentially at risk for literacy difficulties.
- Specific findings from children with expressive phonological difficulties and their phonological awareness skills :
- 1. As a group, children with phonological difficulties show deficits on a variety of phonological awareness tasks.
- 2. Without intervention, these difficulties with phonological awareness persist over time, difficulties have been especially noted in acquiring phonemic level skills.

- **3.** Children with additional spoken language impairments generally experience poorer long-term outcomes in reading and writing.
- 4. In addition to phonological awareness difficulties, children with expressive phonological problems display weaknesses in other areas that appear to be important for literacy development, including letter-name knowledge and verbal working memory.
- 5. The type of phonological disorder is relevant to predicting reading outcomes.
- 6. The severity of a child's phonological disorder STUDENING INFORMATION Uploaded By: Sulaf Salaymen

Appraisal COLLECTION OF DATA

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- Before diagnosing and treatment of impaired articulation and phonology information have to be collected.
- (1) What information do we actually need?
- (2) How should we gather that information?
- Assessment: the clinical evaluation of a client divided into two phases:
- Appraisal refers to the collection of data.
- **Diagnosis** represents the end result of analysing and interpreting these data.
- Effective assessment is essential for clinical procedures; they lead us through the entire diagnostic and therapeutic process.

Sources of Appraisal Data

- (1) The case history.
- (2) Interviews with client, parents and others.
- (3) Professionals, School, and medical records.
- (4) The evaluation by the clinician in two different ways:
- Screening.
- Comprehensive Evaluation.

Screening

- Consists of activities or tests that identify individuals who are at risk, suspected of having disorders.
- Demonstrates the need for further testing.
- Screening measures can be formal or informal.
- Screenings are typically used to give the clinician an initial impression of a large group of children.
- Screenings are not always reliable in that some individuals may "pass" the procedure but still demonstrate impairments.
- Screenings were not devised to serve as a database for a diagnosis.

Comprehensive Evaluation

- A series of activities and tests that allows a more detailed and complete collection of data.
- A comprehensive phonetic-phonemic evaluation is the core of the appraisal for articulatory/phonological impairments.
- It includes data from the following sources:
- 1) An articulation test and stimulability measures.
- 2) Conversational speech assessment in varying contexts. TUDENTS-HUB.com

- 4) Hearing testing.
- 5) Speech mechanism examination.
- 6) Additional measures such as language testing, cognitive assessment.

INITIAL IMPRESSION

- Clinicians can start collecting data even before the formal appraisal(testing) actually begins.
- Observing the conversation between the caregiver and the child, the teacher and the child in a classroom situation.
- This record of the initial impression is meant to aid in planning and organizing the remainder of the assessment.
- If the initial impression is that the child is partially intelligible, unintelligible, then the next step, the collection of data from an articulation test, could be initiated.

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ARTICULATION TESTS

- Designed to elicit spontaneous naming based on the presentation of pictures.
- Sounds of the language are tested in the initial, medial, and final positions of words.
- □ Advantages of articulation tests:
- Easy to give and score, minimal time consuming.
- Results provide a list of "incorrect" sound productions in different word positions.
- ✓ Provide standardized scores. STUDENTS-HUB.com

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Problems with Articulation Tests

- 1. An articulation test examines sound articulation in selected isolated words.
- **2.** Articulation tests do not give enough information about the client's phonological system.
- **3.** Articulation tests do not test all sounds in all the contexts in which they occur in the language.
- **4.** The sounds actually tested do not occur in comparable phonetic contexts, they are not context controlled.

5. Articulation tests examines only a very small portion of child's articulatory behavior with particular test items, on a certain day, in a unique testing situation.

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Factors to Consider When Selecting a Measure of Articulation

- (1) The test's appropriateness for the age or developmental level of the client.
- (2) The test's ability to supply a standardized score.
- (3) The test's analysis of the sound errors.
- (4) The test's inclusion of an adequate sample of the sound(s) relevant to the individual client at hand.

Appropriateness for the Age or Developmental Level of the Client

- Most tests can be administered to children from approximately 3 years to school age.
- Younger clients, and this may include 2-year-olds or delayed 3- and 4-year-olds, may not respond well to a formal articulation test.
- For adolescent or adult clients:
- Most articulation tests are humiliate for older adolescents and adults and, therefore, is inappropriate.
- Many of the tests are not standardized for children beyond the ages of 12 or 13.

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Ability to Provide a Standardized Score

- Average, norm, criterion.
- Some articulation tests are not standardized; that is, standardized scores are not available.
- Results obtained from a client cannot be compared to the performance of other children of a similar age.

Analysis of the Sound Errors

- Some tests are articulation tests.
- Some tests are Phonology tests.
- Most articulation tests and tests of phonology do not differ in their examination format.
- They differ in their analysis of the results.
- Tests of phonology categorize misarticulations according to phonological processes.
- Articulation tests categorize misarticulations according to (omission,addition,distortion,...)

Includes an Adequate Sample of the Sound/s Relevant for the Individual Client

- Articulation tests typically contain words that sample the sound inventory of the spoken language.
- Most articulation tests do not sample the most frequently misarticulated sounds in a large number of different contexts.
- Any sound is tested in three positions (initially , medially, finally)

Assessment Procedures to Supplement Articulation Tests

- 1. If a word contains any aberrant vowel or consonant productions:
- Transcribe the entire word in isolation, called (*citation form testing*).
- Transcribe the conversational speech sample called (*spontaneous speech sampling-talking*).

- 2. Supplement the articulation test with additional utterances that address the noted problems of the client:
- The target sound(s) should be sampled in various vowel contexts and word positions.
- We can develop a list of words containing the needed sound(s).
- Commercially available tests have the advantage of assessing a sound in a variety of context without any preparation on the part of the clinician.

- **3.** Always sample and record continuous speech:
- Production differences exist in children between single-word tasks (citing) and spontaneous speech (talking).
- **4.** Determine the stimulability of the error sounds.

Organizing Articulation Test Results: Describing the Error

- Most articulation tests include a form that can be used to record the client's responses.
- By completing this form, the clinician obtains the appropriate information.
- Each test gives directions on how to record accurate and inaccurate sound realizations.
- Three different scoring systems to describe sound errors.

Two-Way Scoring

- "Right" (accurate articulation).
- "Wrong" (inaccurate articulation).
- Can be used effectively to give feedback to the client or parents.
- To document therapy progress.
- Can be used in a screening protocol.
- Two-Way scoring system is inappropriate for the scoring of articulation tests.

Five-Way Scoring

- 1) "Correct," or normal productions.
- 2) Deletion or Omission.
- 3) Substitution.
- 4) Distortion.
- 5) Addition.

Phonetic Transcription

- Represent spoken language by written symbols.
- Describe speech behavior.
- Requires the highest degree of clinical skills.
- The goal is not to judge specific misarticulations but to *describe* them as accurately as possible.

Advantages of Phonetic Transcription

- (1) It is far more precise.
- (2) It gives more information about the misarticulation.
- (3) The most universally accepted way to communicate information among professionals.
- (4) Used for analyses of citation articulation tests as well as spontaneous speech sampling.

Stimulability Testing

- Stimulability: the ability of the client to produce a misarticulated sound correctly when "stimulated" by the clinician to do so.
- There is no standardized procedure for stimulability testing.
- Number of models provided by the clinician typically varies from one to five attempts.
- It gives a measure of the consistency of a client's performance on two different tasks: the spontaneous naming of a picture and the imitation of a speech model provided by the clinician.

- Predict which children might benefit more from therapy.
- Sounds that were more stimulable would be easier to work on in therapy , and would be targeted first.
- High stimulability was correlated with more rapid therapeutic success and good prognosis.
- It was also proposed that high stimulability might mean that children were about of acquiring the sounds and would not even need therapeutic intervention.

SPONTANEOUS SPEECH SAMPLE

- The conversational speech sample is not optional, but rather a basic necessity for every professional appraisal.
- Differences exist in children's speech when single-word citing responses are compared to spontaneous speech.
- Speech sample is more representative of a client's production capabilities than a one-word citation-form test.
- An increase or decrease in errors depending on the production task required.

- Conversational speech samples can supply additional information about the language, voice, and prosodic capabilities of the client.
- Based on the data from the spontaneous speech sample, specific semantic, morphosyntactical, and pragmatic analyses could supplement language testing when required.

Organizing the Continuous Speech Sample

- 1) Begin with the Articulation Test.
- 2) Provide Objects or Pictures That May Elicit Targeted Sounds.
- 3) Plan the Length of the Sample.
- 4) Plan Diversity into the Sample.
- 5) Monitor Your Recording and Gloss Any Utterances That Might Later Be Difficult or Impossible to Understand from the Taped Recording.
 - Glossing means repeating with normal pronunciation what the client has just said for easier identification later.

6)Transcribe As Much of the Spontaneous Speech Sample as Possible during the Recording.

EVALUATION OF THE SPEECH MECHANISM

- An evaluation of both the structure and the function of the client's speech mechanism.
- Our evaluation of the speech mechanism is actually just a screening measure requiring more testing and possible referral.
- At the end showed either normal results in both structure and function ,or structural and functional aberration.

Examining the Head and Facial Structures

- Evaluate the size and the shape of the head.
- The relationship between the cranium and the facial skeleton.
- Macrognathia, Micrognathia.
- The symmetry of the facial features(Do the right and left sides of the face appear similar both in proportion and appearance).
- Nostrils , nasal septum, philtrum, columella.
- Adenoid facies is the result of chronic or repeated infections that lead to enlarged adenoids, mouth breathing, a shortening of the upper lip, and an elongated face.

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Examining Breathing

- Examining breathing patterns at rest (silent breathing) and during speech.
- Clavicular breathing versus Abdominal breathing.
- The time ratio between the inspiratory and expiratory phases.
- Irregularities in breathing patterns should be noted(irregular breathing patterns, jerks or spasms, forced inhalations or exhalations).

Examining the Oral and Pharyngeal Cavity Structures

- TheTeeth:
- Occlusion of the teeth(Normal occlusion, overbite, underbite), open bite, and cross bite.
- Teeth are present or missed, and their axial orientation.
- The Tongue:
- Size(macroglossia, microglossia).
- Tongue appearance and color.
- Tongue frenum(ankyloglossia)

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- The Hard and Soft Palates:
- Gloves, penlight, tongue depressor.
- Hard palate's color, size, palatal arch(vault)
- Presence or absence of clefts, fissures, and fistulas.
- Normal pink color, a blue color may suggest a submucous cleft.
- The uvula should be examined.
- Fauces (the passage between the oral and the pharyngeal cavities) and the pharyngeal area itself need to be assessed.

Functionally Assessing the Speech Mechanism

- The movement patterns of the lips, mandible, tongue, and velum are examined.
- Client can move the structures on command, the range, smoothness, and speed of the movements are adequate.
- 1. Can the client adequately perform the task?
- 2. Is the range of movements adequate?
- 3. Are the movements integrated and smooth?
- **4.** Given the age of the client, is the speed of movement within normal limits?

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Diadochokinetic rates

- These rates refer to the maximum repetition rate of the syllables [p^], [t^], and [k^] alone and in various combinations.
- (1) count by time procedure.
- (2) time by count procedure.
- In general, it can be said that diadochokinetic rates increase with age up to 8 years of age, where is the rates remain very similar.

Diadochokinetic Rates

Age	Repetition Rates/Second	Stimulus
6	4.2 per second	[pʌ]
	4.1 per second	[tʌ]
	3.6 per second	[kʌ]
	1 per second	[pʌ]-[tʌ]-[kʌ]
7	4.7 per second	[p^]
	4.1 per second	[tʌ]
	3.8 per second	[kʌ]
	1 per second	[pʌ]-[tʌ]-[kʌ]
8+	5-6 per second	[p^]
	5-6 per second	[tʌ]
	5-6 per second	[kʌ]
	2 per second	[pʌ]-[tʌ]-[kʌ]

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SELECTION OF ADDITIONAL ASSESSMENT MEASURES

- Hearing Screening.
- one third of children enrolled in speech or language intervention had histories of recurrent middle-ear disease.
- Language Testing.
- Approximately 80% of the clinical population with "delayed speech" have associated language problems.

Cnot.

- Specific Auditory Perceptual Testing:
- Speech sound discrimination testing, was a standard procedure for all clients with speech sound difficulties.
- Faulty speech sound perception often caused, or was linked to the production problems.
- Auditory discrimination testing is carried on to judge phonemic contrasts.

Discrimination Testing and the Phonological Performance Analysis (Winitz, 1984)

- 1. The test items should be relevant and client oriented.
- 2. The specific aberrant productions of the client should be targeted.
- 3. The phonetic context in which the incorrect productions occur must be considered.

Cognitive Appraisal

- S-L-Ps are not qualified to perform IQ testing.
- □ Cautions to be taken in consideration:
- First: a large percentage of children with speech disorders also demonstrate language difficulties.
- Second: intelligibility may play a role in the assessment of children with moderate to severe phonemic difficulties.
- Third: cognitive measures do not adequately reflect the abilities of children from culturally and linguistically diverse backgrounds.

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SPECIAL CONSIDERATIONS

- The Child with Emerging Phonology: time span during childhood in which conventional words begin to appear as a means of communication.
- It may also occur in older children with more severe deficits in language learning.
- Special consideration must be given to the child with an emerging phonological system.

Characteristics of Children with Emerging Phonological Systems.

- Reasons for referral:
- Some may have been born with known risk factors.
- Some children have early acquired disorders secondary to diseases or trauma such as encephalitis, closed head injury.
- Children brought by parents who are concerned about their child's development.
- Children referred through various sources because they are "late talkers" their expressive language is slow to emerge.

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- Characterized by:
- 1. Small expressive vocabularies showing a reduced repertoire of consonants and syllable shapes.
- 2. Their words are unintelligible.
- 3. The limited phonological system impacts further semantic and morphosyntactic development.
 - It is important to asses the phonological system within the broader framework of the child's developing language system.

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Procedural Difficulties with These Children.

- 1. Articulation tests and stimulability measures
 - Children are not yet skilled at following directions or at imitating.
 - An alternative method might include the naming of objects.
 - Sample of words the child is using to be taken.
 - A- Have the family tape-record the child production.
 - B- Have the mother bring from home a few objects the child can name.

C- Have the mother keep a log of the words that the child can produce. STUDENTS-HUB.com Uploaded By: Sulaf Salaymeh

2. Spontaneous speech sample:

- Children with emerging phonological systems do not talk a lot.
- Utterances may contain only one or two words and these may be partially unintelligible.
- They should be examined and evaluated within the broader parameters of the child's emerging language as a whole.
- Previous techniques can be used.
- 3. Examination of the oral-facial structures and the speech-motor system:
- Young children are intolerance of the procedures needed to complete an oral examination.
- Limitations in imitating movements on command.
- Several fun situations can be initiated to assist in this process.

- 4. Hearing screening:
- Hearing screening is so important for children with emerging phonological systems.
- High prevalence of otitis media and its impact on hearing and speech.
- May not be possible with children at this age.
- A comprehensive audiological evaluation is recommended.

- 5. Additional tests:
- Assessment instrument must be selected with care Because:-
- Limited attention spans.
- Difficulties in following directions.
- Relatively poor imitation skills.
- Rely partially or totally on the information supplied by the mother about the child's level of functioning.
- The analysis of language in naturalistic contexts can also be used.

Analyzing the Child's Emerging Phonological System

- Relatively limited number of consonants and vowels are typically present in the child's inventory.
- Comparison to the adult norm would not be helpful for later assessment and intervention.
- Which sounds and syllable shapes are present.
- Three kinds of data are collected:-
- □ The inventory of speech sounds.
- □ The syllable shapes the child uses.

 Image: Any constraints noted on sound sequences.

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An Index of Severity

- Based on the number of different consonants and the syllable shapes represented in the child's productions.
- Data from normally developing children were compared to those of children with small expressive vocabularies.

TABLE 6.3 | An Index of Severity of Phonological Delay (Paul and Jennings, 1992)

Total Number of Consonants

Procedure: The gathering of words for the analysis is based on a 10-minute communication's sample.

The total number of different consonants are counted.

Results:	Children	Age	Number of Consonants	
	Norm	18-24 mos.	14	
	Small expr. vocab.	18-24 mos.	6	
	Norm	24-36 mos.	18	
	Small expr. vocab.	24-36 mos.	10	

The child's number of different consonants can be compared to see if they are closer to the number produced by the norm children or to those with small expressive vocabularies.

The Unintelligible Child

- Characteristics of Unintelligible Children:
- Hodson and Paden (1981) evaluated the speech of 60 unintelligible children ranging from 3 to 8 years of age.
- Difficulty with the production of liquids, stridents, and consonant clusters.
- Cluster reduction, stopping, gliding and vocalizations of liquids, and labial and nasal assimilations.
- Least intelligible children were those who omitted entire classes of sounds.
- Small number of the children did not produce sonorant consonants.

Procedural Difficulties with Unintelligible Children

- 1. Choose the topic and attempt to structure the situation as much as possible.
- Routine events and actions, everyday occurrences with predictable elements.
- Scripted events are activities that have been performed previously.

- 2. Gloss the utterances the child says as much as possible.
- Any utterances that may later be difficult to understand from the tape recording should be glossed by the clinician.
- Glossing means repeating the child's utterance according to norm pronunciation.
- The clinician repeats the utterance in a regular manner so that it is recorded together with the sample.

Therapy for Articulation Errors

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- Describes techniques that can be used to treat articulation errors.
- Tasks used to improve auditory discrimination skills
- Articulation errors are motor production problems.
- **Phonetic Approach**(*traditional motor approach*).
- Phonological treatment principles, the linguistic function (exemplified by sound frequency, phonotactics, and examples of minimal pairs) is provided.

WHEN TO USE A PHONETIC APPROACH

- Should a traditional phonetic approach still be used?
- In case of Articulation Errors.
- Each error sound is treated individually, one after the other.
- Multiple-Sound Approach, which attempts to influence several error sounds simultaneously.
- This does not necessarily mean that it is unsuitable for clients with phonological difficulties.

- In some cases if the sound is not in the child's repertoire the phonetic approach could be implemented to establish its norm articulation
- This in turn could facilitate increasing the child's ability to understand and use the phonological rule and contrasts with that particular sound.
- Can be used for clients who demonstrate pattern-based errors, especially if the patterns reflect motor constraints.

THERAPY SEQUENCE

- These sequences have been described by numerous authors (mainly Van Riper)
- Clinicians will find that certain training items will be necessary for some clients, whereas they might prove unnecessary for others.
- The client moves to the next stage when a certain level of accuracy has been achieved.
- 80% to 90% accuracy in structured intervention contexts will be achieved.
- Dismissal or Termination criteria in spontaneous contexts should be set at (50% +)accuracy-the majority of the time.
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General Overview of Therapy Progression

- Sensory-Perceptual or Ear Training: the first step in the treatment process.
- Two factors should be considered:
- \Box The age of the client.
- Specific Auditory Perceptual Skills:refers to clients' abilities to differentiate between their error production and the target sound.
- Although sensory-perceptual training may not be used, it is important to remember that each client must develop specific perceptual abilities in the form of self monitoring skills.

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Sensory-Perceptual Training Progression

Sensory-Perceptual Training/Ear Training

- Client develops ability to discriminate between the target sound and other sounds, including the irregular production used.
- Client is not asked to attempt a production of the target sound but only to judge its distinctness from other sounds.

Identification

- Recognition and discrimination of sound in isolation when contrasted to other similar and dissimilar sounds.
- Contrasts should first address sounds that are productionally very
- different. If the target is [s], then possibly use [m].
- Arrange sounds hierarchically from dissimilar to similar.

Isolation

- Clinician says sound in word-initial, -medial, and -final positions.
- Client is asked to identify sound and state in which position the sound occurred.

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Stimulation

- Client is bombarded with variations of the target sound and must identify the sound.
- Variations include louder, softer, longer, shorter, and different speakers, for example.

Discrimination

- Error productions of the target sound are presented by the clinician. Error productions should mirror those of the client.
- Client is asked to detect the error production and then say why it is wrong.
- Perceptual knowledge of correct and incorrect production features must be taught in previous stages.

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Production of the Sound in Isolation

- Auditory Stimulation/Imitation.
- Phonetic Placement Method.
- Sound Modification Method.
- □ Stabilize the correct or acceptable production.
- □ Facilitating contexts or key words are used.
- □ Nonsense Syllables.
- □ Words:
- ✓ The Length of the Word.
- The Position of the Sound within the Word.
- ✔ The Syllable Structure.
- ✔ The Syllable Stress.
- Coarticulation Factors.
- ✔ Familiarity.

- □ Phrases and Sentences.
- ✓ Starts as highly structured.
- Clinician moves to less structured tasks.
- Carrier phrases used.
- Clinician begin to implement target words with more syllables and consonant clusters.
 - □ Spontaneous Speech.
 - □ Carryover(transfer).

Dismissal and Reevaluation Criteria.

MISARTICULATIONS OF [s] AND [z]

- One of the most common speech sound errors
- Counted among the latest developing speech sounds.
- In addition, the voiceless [s] is a high frequency sound
- (1) [s] and [z] are both fricatives that are physiologically complex.
- (2) The fricatives are also the longest sounds in duration.
- (3) There is a precise balance between the articulatory effort required to create the narrow opening and the expiratory air pressure.
- (4) Aberrant productions can easily cross phonemic boundaries.

Phonetic Description

TABLE 9.1 | Production Differences: Apico-Alveolar versus Predorsal-Alveolar [s] and [z]

	Phonetic Description		
	Apico-alveolar fricative	Predorsal-alveolar fricative	
	[s] voiceless [z] voiced	[s] voiceless [z] voiced	
Notable Differences	Tongue tip up	Tongue tip down behind lower incisors	
Active Articulator	Apex (tip of tongue)	Predorsal (front portion of tongue)	
Passive Articulator	Alveolar ridge	Alveolar ridge	
Productional Notes	Narrow opening between tongue tip and alveolar ridge	Tongue arches toward alveolar ridge, narrow opening between predorsal section of tongue and alveolar ridge	
	Sagittal grooving of tongue Lateral edges of tongue elevated	Sagittal grooving of tongue Lateral edges of tongue elevated	

Linguistic Function

- Frequency of Occurrence:[s] ranks among the top five sounds in frequency of occurrence.
- Phonotactics: Both [s] and [z] can occur initiating and terminating a syllable.
- Morphophonemic Function:
- (1) plurality. (2) third-person singular.
- (3) possessives.
- Minimal Pairs: Minimal pairs are often used to test the perceptual accuracy of the error production versus the norm production.

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Initial Remarks

- First, the disorder may be the result of a hearing loss, specifically a high-frequency hearing loss.
- Second, certain minor structural changes may affect [s] as well.
- Third, such diagnoses as "tongue thrust" or "tongue thrust swallow" (oral muscle pattern disorders).
- Finally, the auditory discrimination abilities of the client need to be carefully evaluated.

Types of Misarticulation

- Distortions are the most common misarticulations.
- Nasalized [s] and [z].
- 1. Organic velopharyngeal competency.
- 2. Functional nasalized productions:
 - If the nasality is restricted to [s] and [z].
 - Air escape through the nose only.
 - Normal tongue placement for [s] and [z].

Therapeutic Suggestions

- Phonetic placement method.
- Sound modification method.
- A mirror might be used as visual feedback.
- Tactile sensation can be used for feedback.

Phonetic Placement

- Apico-Alveolar [s]:
 - • Tongue tip near the alveolar ridge.
 - • Lateral edges of tongue must be elevated.
 - • Grooving of tongue is necessary.
 - • Visual and auditory feedback necessary.
- Predorsal-Alveolar [s]:
 - • Tongue tip behind lower teeth.
 - Front portion of the tongue is directed toward the alveolar ridge.
 - • Lateral edges of tongue must be elevated.
 - • Grooving of tongue is necessary.
 - • Visual and auditory feedback important.

Sound Modification Methods

- Using a similar, appropriately articulated sound to aid in the production of the misarticulated sound.
- **1.** [t]-[s] method.
- **2.** [ʃ]-[s] method.
- **3.** [f]-[s] method.
- **4.** [i]-[s] method.

Nasal [s] and [z] Problems

- **1.** [t]-[s]. If [t] can be produced without hypernasality.
- Visual and auditory feedback should also be implemented to increase the client's awareness of nasal emission versus no nasal emission.
- 2. [f]-[s]. Requisites for this method are an [f] production without hypernasality and the correct tongue placement for [s].
- Coarticulatory Conditions.

Where to Begin: [s] or [z]?

- Most clinicians automatically begin with voiceless [s].
- Beginning with [z] could be advantageous under certain conditions:
- First, voiced consonants normally are produced with less air pressure than the voiceless ones.
- Second the ability of the voicing component to mask minor productional differences of [s].
- Third the coarticulatory consideration If the voiceless[s] is placed in a consonant–vowel (or vowel–consonant) context the client change the voicing halfway through the utterance.

MISARTICULATIONS OF []] AND [3]

[s] and [ʃ] show many similarities in error productions as well as in the diagnostic procedures that would be implemented.

Phonetic Description

- Phonetically, [s] and []] are closely related.
- However, the sagittal groove is considerably wider and flatter for []] than it is for [s].
- Place of articulation is coronal-postalveolar or coronal-prepalatal.
- [**]** has lip rounding.

Linguistic Function

Frequency of Occurrence

- [ʃ] is ranking 20th out of the 24 General American English consonants.
- The voiced [3] is the most infrequent sound in General American English, occurring only in words of foreign origin, such as beige or rouge

Phonotactics

- Both []] and [3] can occur initiating and terminating a syllable.
- Both []] and [3] can occur in consonant clusters.

Morphophonemic Function

 Word-final clusters that end in []] or [3] can be used to signal past tense in regular verbs that end in these sounds, such as *splashed* and *massaged*.

Minimal Pairs

 Frequent sounds that are substituted for []] and [3] include [s] and [z] and [t] and [d].

Initial Remarks

• The same as in [s] and [z].

Therapeutic Suggestions

Phonetic Placement

- most []] and [3] realizations are produced with the tongue tip up, also can be produced with the tongue tip down.
- Edges of the tongue approximate the anterior area of the palate either posterior to the highest point of the alveolar ridge (postalveolar) or the anterior area of the palate (prepalatal).
- • Sagittal grooving of tongue is present, it is wider and flatter than for [s].
- • Lips are rounded.

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Predorsal-Prepalatal Production

- • Tip of tongue is down, touching inside of lower incisors.
- Front portion of tongue arches upward towards the alveolar ridge.
- Narrow opening is created between the predorsal portion of tongue and slightly behind alveolar ridge.
- • Slight medial groove is necessary.
- • Lips are slightly protruded and rounded.

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Sound Modification Methods

- **1.** [s]-[ʃ] method.
- **2.** [t]-[ʃ] method.
- **3.** [tʃ]-[ʃ] method.
- **Coarticulatory Conditions**
 - If the problem is a result of faulty tongue placement, high-front vowels [i] and [I] are used.
 - If the problem is due to a lack of lip rounding, high-back rounded vowels [u] followed by [o].

MISARTICULATIONS OF [k] AND [g]

- Most common deviation is substitution of [t] for [k] and [d] for [g].
- Retain the [t/k] [d/g] substitution by preschool or even school years.
- **D** Phonetic Description
 - [k] and [g] are voiceless or voiced postdorsal-velar stops.
 - The back of the tongue is raised against the anterior portion of the velum.
Linguistic Function

Frequency of Occurrence

- [k] is ranked within the top 10 most frequent consonants.
- [g]ranks approximately 15th.
- Both occur in clusters initially or finally.

Phonotactics

- Most [g] sounds occur initiating words.
- [k] sounds are fairly equally distributed across initial, medial, and final word positions

Morphophonemic Function

• [ks] or [gz] can signal plurality and tense.

O Minimal Pairs

 The most common substitutions for [k] and [g] are [t] and [d].

Initial Remarks

• It is important that the client be evaluated for a phonemic disorder.

Types of Misarticulation

- Substitution of [t] and [d]
- Substitution of postdorsal-velar fricative [x] and [γ]
- Substitution of a postdorsal-uvular stop-plosive [q]

Therapeutic Suggestions

- Phonetic Placement: [k] and [g]
- [t] and [d] Substitutions:
 - Prevent tip of tongue from touching the alveolar ridge
 - • Tip of tongue must remain down behind the lower incisors
 - Using tongue depressor hold down the front half of the tongue (not just the tip of the tongue or a [t], [d] production will still be possible)

- Postdorsal-Velar Fricative Substitution [x] and
 [γ] substitutions:
- Tongue needs to be elevated to achieve contact between the articulators
- Demonstrate with [t] or [d] to emphasize the stop phase and the release aspiration
- Postdorsal-Uvular Stop-Plosive[q]Substitution:
- Place of articulation must be moved more anteriorly
- • Client repeats a rapid sequence of [i]–[k]

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Sound Modification Methods

- **1.** [ŋ]-[g] *method.* These two speech sounds are phonetically very similar:
- A. Prolong [ŋ] sound while holding the nostrils closed.
- B. Release the buildup of air pressure into the oral cavity; [g] should result.

- 2. [u]-[k] method. This method is based on using the high-back vowel [u] to facilitate the tongue positioning for [k].
- A. Prolong [u] and then elevate the back of the tongue.
- B. Suggest that the client try to "stop" the sound by blocking it with the back portion of the tongue.
- C. Release the sound.

Coarticulatory Conditions

- If the goal is to move the positioning of the articulators posteriorly, combining [k]and [g] with the back vowels [u], [o], and [a].
- If the goal is a more anterior tongue position, as in the substitution of a postdorsal-uvular[q] stop for [k] and [g] the opposite vowel [i] is used.
- It seems advisable to let [g] follow [k] in the sequencing of therapy.

MISARTICULATIONS OF [I]

- Problems with [l]-productions are common in the speech of 3- and 4-year-old children.
- By age 4;6 to 5, normally developing children demonstrate a decrease in [I] misarticulations.
- Misarticulations include substitutions of [w] and
 [j] for [l].
- [I] sounds are phonetically described as voiced apico-alveolar laterals.
- The tip of the tongue touches the alveolar ridge.
- The neighboring coronal areas are relaxed, allowing air to escape laterally.

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Linguistic Function

Frequency of Occurrence:

• [I] is ranked eighth in children's speech and fifth in adult's speech.

Phonotactics:

- [I] is realized in all word positions.
- [I] occurs more frequently in medial and final word positions than initial word position.

I Minimal Pairs:

• Minimal pair words must contain [w], and [j].

Initial Remarks:

- Typical substitutions include w/l, j/l.
- Because these substitutions are phonemically relevant, it is important to establish whether they represent phonemic difficulties.

Phonetic Placement

[w] for [l] Substitutions:

- Lip protrusion on [w] needs to be eliminated use
 [i] as a contrast of lip protrusion—no lip protrusion)
- Contact with alveolar ridge needs to be established
- Edges of the tongue are relaxed; instruct the client to use a "flat tongue" and then raise to alveolar ridge.
- Visibility of the articulatory events is often very helpful when establishing the placement of an isolated sound.

[] [j] for [l] Substitutions:

- Tongue tip must be elevated to alveolar ridge; this may be the only adjustment necessary.
- Lateral edges of the tongue will need to be lowered to allow more airflow.
- Visibility of the articulatory events is often very helpful when establishing the placement of an isolated sound.

Sound Modification Methods

- 1. [d]-[l] method.
- 2. [n]-[l] method.
- 3. [i]-[l] method.
- 4. [a]-[l] method.

- Coarticulatory Conditions:
- If the client demonstrates a [w/l] front-high unrounded vowels are recommended.

MISARTICULATIONS OF [r]

- Consonantal [r] develops relatively late; it is frequently still in error during the preschool years.
- Irwin and Wong (1983) reported that, even at age 6, only 82% of all [r] realizations were correct in spontaneous speech.
- [r] can be produced as a trill.
- **Trill** a sound produced by the vibratory action of the active articulator tapping rapidly against a place of articulation.
- The tongue tip against the alveolar ridge(apico-alveolar).

Linguistic Function

Frequency of Occurrence:

- [r] is frequent sounds in General American English.
- There are many consonant clusters with [r], which are also prevalent.

Phonotactics:

• [r] occurs in initiating syllables or in clusters.

Optimized Pairs:

• The most frequent substitutions for [r] include [w], [j], and [l].

Initial Remarks:

• The phonemic system of the client must be evaluated.

Phonetic Placement:

[w] for [r] Substitutions:

- Lip protrusion on [w] needs to be eliminated/reduced ([i] as a contrast of lip protrusion-no lip protrusion)
- Back portion of the tongue should not be elevated; try a wide open-mouth posture
- Trilled[r]: Tongue tip must be elevated to approximating (not touching) the alveolar ridge area.

[j] for [r] Substitutions:

• Elevation of the tongue or tongue tip is an important factor.

[I] for [r] Substitutions:

- Trilled[r]: Release the contact between tongue tip and alveolar ridge.
- Raise lateral edges of the tongue so airflow is directed medially.

Sound Modification Methods

- 1. [d]-[r] method.
- 2. [t]-[r] method.
- 3. [I]-[r] method.
- 4. [j]-[r] method.

Coarticulatory Conditions:

- High-front vowel [i]
- Central vowel [^].

MISARTICULATIONS OF [θ] AND [δ]

- Among the latest sounds to develop in the speech of children.
- difficulties in articulating them extend into the beginning school year.
- Common errors are the substitution of [t/θ] and [d/ð].
- Other misarticulations include the substitution of the labiodental fricatives [f] and [v] for [θ] and [ð].

Phonetic Description:

- [θ] and [δ] can be produced in two ways:
- 1. Interdental- the tongue tip is protruded slightly between the front incisors.
- 2. Addental- apico-dental: the tongue tip approaches the inner surface of the front incisors.
- For both productions, the tongue remains relatively flat.

Linguistic Function

Frequency of Occurrence:

- [ð] ranks of approximately 10 among 24 consonants.
- [θ] ranks approximately 21 out of 24 consonants.

Phonotactics:

- Both [θ] and [ð] are found in word-initial and word-final positions.
- [ð]occurs primarily in word-initial positions.
- [θ] occurs approximately half the time in word-initial positions, the other half fairly evenly split between word-medial and word-final positions.

Therapeutic Suggestions

- **Phonetic Placement-** Interdental Productions:
 - **1.** the tongue tip *slightly* protruded between the upper and lower incisors.
 - 2. the top of the tongue lightly touching the lower edges of the front teeth.
 - **3.** the underside of the tongue resting on the top edges of the lower incisors.
 - 4. the body of the tongue relatively flat.
 - Amirror will provide excellent visual feedback.
- Airflow provides tactile feedback.

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Sound Modification Methods

- **1.** [t]-[θ] method.
- **2.** [f]-[θ] method.
- **3.** [s]-[θ] method.
- Coarticulatory Conditions:
- High-front vowels offer the best coarticulatory conditions following or preceding these sounds.

MISARTICULATIONS OF [f] AND [v]

- [f] is one of the earliest fricatives to emerge.
- Mastered between 3 and 4 years of age.
- Voiced [v] is noted as being later in acquisition than its voiceless cognate.
- 90% of the children had mastered [f] by age 4, compared to only 51% for [v].
- Therapy for [f] should be initiated prior to [v].

D Phonetic Description:

- [f] and [v] are labiodental fricatives.
- Inner edge of the lower lip in close contact with the edges of the upper incisors.

Types of Misarticulation:

- 1. [p/f] and [b/v] substitutions.
- 2. Bilabial fricative substitution $[\phi]/[f]$ or $[\beta]/[v]$.

Therapeutic Suggestions

D Phonetic Placement:

- Bite down on the lower lip to develop an awareness of the labiodental articulation.
- client then glide the lower lip along the cutting edges of the upper teeth toward the inside of the lip.
- In case of [p/f] substitution, the presence of airflow should be targeted.
- Tactile and Visual feedback play arole.

- **Sound Modification Methods:**
 - [p]-[f] method.

Coarticulatory Conditions:

- Vowels with lip rounding should be avoided.
- Front vowels are of great importance.

Cycles Approach

- Developed by Hodson and Paden (1983).
- Intended for children who meet the following criteria:
- Highly unintelligible (very difficult to understand)severe to profound.
- ✓ Frequently leave out or omit speech sounds.
- Replace some sounds with other sounds.
- Don't use very many different consonant sounds.
 - Treat <u>phonological processes</u>, which are error patterns in children's speech. (final consonant deletion, fronting, stopping.....).

- Each process is targeted for a short amount of time and then cycling through other phonological processes.
- Target certain error pattern for 6 weeks and then switch to target other patterns for another 6 weeks.
- After all phonological processes are targeted, the cycles start over again and the original process(pattern) is targeted again.
- Therapy is continued for each process until it is eliminated from the child's conversational speech.

- Have a list of all of the patterns.
- Prioritize them by starting with the ones that are :
- Easiest for the child to do.
- Stimulable.
- ✔ Affects intelligibility.

How to Run Each Session:

- 1) Review.
- 2) Auditory Bombardment.
- 3) Target Word Cards.
- 4) **Production Practice through Experiential Play.**
- 5) Stimulability Probe.
- 6) Auditory Bombardment.
- 7) Home Program.
 - Cycles are used to stimulate emergence of a specific sound or pattern, not mastery of it, depending on gradual development and conceptualization.

MINIMAL PAIR CONTRAST THERAPY

- A minimal pair is formed by two words that differ by one sound only.
- These minimal pairs are used to establish contrasts not present in the child's phonological system.
- It is considered a conceptual form of sound teaching.
- Minimal opposition contrast procedure targets the substitutions, and pattern errors.
- Dedicated to children with mild to moderate phonological disorders.

Maximal Oppositions Approach

- Maximal opposition word pairs differ in several features (e.g., sad and bad vary in place, manner, and voicing).
- Used with children who display a larger number of errors.
- The maximal oppositions method is proposed to create system-wide change.
- Maximal oppositions is more effective than minimal pairs and more generalization take place.
- Dedicated to children with moderate to severe phonological disorders.

Four major steps are commonly used:

- (1) Client is introduced to pairs through pictures or objects.
- (2) Client identifies picture/object named by clinician.
- (3) Roles are reversed and client must request or label picture/object.
- (4) Client is rewarded or each correct response or a chance to repair the communication breakdown.

Articulatory/Phonological Disorders in Selected Populations

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CHILDHOOD APRAXIA OF SPEECH: DISORDER OF SPEECH MOTOR CONTROL

- Developmental articulatory dyspraxia.
- Congenital articulatory apraxia.
- Developmental verbal apraxia.
- Developmental apraxia of speech(DAS).
- Developmental verbal dyspraxia (DVD).
- "Childhood apraxia of speech (CAS)".
- Refer to children who evidence a lack of motor control of the oral mechanism for speech production that is not due to other problems of muscular control.

Childhood apraxia of speech (CAS)

- Apraxia: inability to perform particular purposive actions.
- (ASHA, 2007b) definition:
 - Neurological childhood (pediatric) speech sound disorder.
 - The core impairment is : in **planning** and/or **programming** spatiotemporal parameters of movement sequences.
 - Precision and consistency of movements underlying speech are impaired.
 - Lack of sequential volitional control of the oral mechanism
 - Results in errors in speech sound production and prosody.
 - Absence of neuromuscular deficits (e.g., abnormal reflexes, abnormal tone).
- Disorders of known or unknown(idiopathic) neurological STUDENING and the student of the state of the state

Cont.

- Similarities and differences between adults with acquired apraxia of speech and children with CAS.
- The most important similarity is the lack of sequential volitional control of the oral mechanism.
- The major difference is that the neurological basis could never be verified in children with developmental apraxia of speech.

Childhood Apraxia of Speech Demographics

- Prevalence of occurrence is approximately 1 to 2 children per 1,000
- Over 80% of children with CAS have at least one family member with reported speech and/or language disorders (Velleman, 2003).
- CAS demonstrates higher rates of family history than other speech sound disorders, which suggests a genetic basis in at least some cases (Lewis et al., 2003).
- Up to 3% to 4% of children with speech delay are given the diagnosis of CAS (Delaney & Kent, 2004).
- • Symptoms of CAS are common among children with Down syndrome (Kumin & Adams, 2000).
- Approximately 60% of children with autism spectrum disorder have speech problems; about 13% report primarily symptoms of apraxia of speech (Marili, Andrianopoulos, Velleman, & Foreman, 2004).

Articulatory/Phonological Characteristics

- 1. Inconsistent errors in repeated productions.
- 2. Lengthened and disrupted coarticulatory transitions between sounds and syllables.
- **3.** Inappropriate prosody, especially in the realization of lexical or phrasal stress.
- **4.** More errors made in the sound classes involving more complex oral gestures.
- 5. Unusual errors not typically found in children with speech sound disorders(unusual substitutions).

Cont.

- 6. A large percentage of omission errors.
- 7. Difficulty producing and maintaining appropriate voicing.
- 8. Vowel and diphthong errors(tense-lax vowel contrasts, diphthong reduction).
- **9.** Difficulty sequencing speech sounds and syllables(sound transpositions, metatheses).
- **10.** Difficulties with nasality and nasal emission.

Cont.

- **11.**Groping behavior and silent posturing.
- Groping behavior:series of movements of the articulators in an attempt to find the exact articulatory position.
- Silent posturing: refers to the positioning of the articulators for a specific articulation without sound production.
- **12.** Prosodic impairment.
- 13. Difficulty in rhyming and syllabification.
- Children with CAS are highly unintelligible.
- Lack or very poor progress.

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Clinical Implications: Diagnostics

- The following assessment procedures are recommended:
- • Hearing screening
- • Language testing
- Thorough speech-motor assessment, including diadochokinetic rates, volitional movements (movements on commands).
- • Articulation test
- • Language sample
- Additional tests to examine the sequencing of sounds and syllables as well as their consistency.

Clinical Implications: Therapeutics

- 1. Intensive services are needed.
- 2. Remediation should progress systematically through hierarchies of task difficulty.
- 3. Remediation stresses sequences of movements.
- **4.** Many repetitions of speech movements are required.
- 5. The clinician must determine the need for auditory discrimination tasks.
- **6.** Remediation should emphasize selfmonitoring.

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Cont.

- 7. Input from multiple modalities is needed.
- 8. Remediation should include manipulation of prosodic features.
- **9.** If necessary, the clinician should teach compensatory strategies.
- **10.** The clinician must provide successful experiences.

MOTOR SPEECH DISORDERS: CEREBRAL PALSY

- Cerebral palsy (CP): is a nonprogressive disorder of motor control caused by damage to the developing brain during pre-, peri-, or early postnatal periods.
- Results in a wide variety of motor disabilities, dysarthria among them.
- Cerebral palsy constitutes the most common developmental motor impairment.
- Prevalence about 3 in every 1,000 births (Bigge, 1991).
- A set of problems noticed.

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Articulatory/Phonological Characteristics

- Dysfunctions in cerebral palsy include respiratory, phonatory, articulatory, prosodic abnormalities, and velopharyngeal inadequacies.
- Three types of involvement are found:
- 1. Spasticity.
- 2. Dyskinesia.
- **3.** Ataxia.

Spastic Involvement

- Spastic Hemiplegia
- Spastic Paraplegia
- Spastic Diplegia.
- Spastic quadriplegia.
- Spastic diplegics and quadriplegics are more likely to have speech disorders.

Respiratory, Phonatory, Resonatory Articulatory Symptoms

- **Respiratory Difficulties:**Reduced vital capacity resulting in incomplete breath support.
- Laryngeal Dysfunction: harsh voices, short phrasing and prosodic disturbances.
- Velopharyngeal inadequacies: hypernasality.
- Articulatory deficiencies: Muscle weakness, articulatory instability, affecting especially the production of fricatives and affricates, laborious, slow rate of speech.

Dyskinesias Involvement

- Athetoid conditions marked by unilateral or bilateral disturbances of posture,tonus, and motion.
- Their effects on speech performance are often even more severe.
- Less frequent than spastic involvement.
- The degree of limb dysfunction mirrors the impairments of the speech mechanism.

Respiratory, Phonatory, Resonatory Articulatory Symptoms

- **Respiratory Difficulties**: Breathing might be rapid and irregular, lack of thoracic respiratory movement, reverse breathing.
- Laryngeal Dysfunction: General hypertonicity, strained voice quality, hard glottal onset, and reduced intensity and prosody.
- Velopharyngeal Inadequacies: hypernasality.
- Articulatory Deficiencies: Abnormally large jaw movements, tongue movements are restricted highly dependent on jaw activity. Distortions of consonant as well as vowel productions

Ataxia Involvement

- Infrequent among clients with cerebral palsy.
- Incoordination of essentially hypotonic muscle action.
- **Respiratory Difficulties**: Shallow inspiration and lack of expiratory control.
- Laryngeal Dysfunction: Harsh voice production , reduced range of prosodic feature realization.
- Velopharyngeal Inadequacies: Hypernasality.
- Articulatory Deficiencies: Imprecise consonants and vowel distortions, inconsistent sound substitutions and omissions, and a general dysrhythmia.

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Phonological Processes Related to Temporal and Motor control

- Related to temporal coordination: devoicing of initial consonants or voicing of unvoiced sounds, variable realizations of voiced voiceless cognates, prevocalic voicing, consonant cluster reductions, final consonant deletions, stopping of fricatives or frication of stops, and weak syllable deletions.
- Related to motor control, errors of phonetic placement: Fronting, backing, stopping, gliding, lateral realization of apical and coronal fricatives, vowelization of [I] and [r], and nasalization.

Summary of Types of Cerebral Palsy

Type of Cerebral Palsy	Muscular Involvement	Speech Disorder
Spasticity 1. Hemiplegia	Upper and lower limbs on one side demonstrate hypertonicity	Speech is acceptable; may be a developmental delay
2. Paraplegia	Lower limbs and possibly torso musculature demonstrate hypertonicity	Possible problems with respiration and breath control
3. Diplegia	All four limbs are involved although the lower limbs are more severely affected. Torso and neck muscles may also be involved	Speech is variable depending on the extent of the neuromotor problem; prosodic and articulation difficulties may be present
4. Quadriplegia	Equal degree of spasticity in all four limbs	Dysphonia and articulation difficulties dependent upon the severity of the disorder
Athetosis	Impairment of voluntary movements due to extreme hypertonicity or extreme flaccidity; involuntary continuous muscle movements are present	Speech difficulties although variable in severity; speech is generally slow with poor articulation; problems with phonation, stress, and rhythm
Ataxia DENTS-HUB.com	Incoordination of movement with inability to maintain posture and balance	Speech problems are typically present; articulation and problems with rhythm are evident Uploaded By: Sulaf Sala

Clinical Implications: Diagnostics

- The primary communicative impairment is clearly motor speech in nature.
- Children with cerebral palsy share some common problems with respiration, phonation, resonation, and articulation.
- Assess kind and degree of influence each of these systems may have on speech.

Problems With

- Respiration:
- Difficulties initiating, sustaining vocalization.
- Variations in loudness that may affect word and sentence stress.
- Inability to sustain vocalization for multisyllabic words or longer sentences.
- Loss of expiratory support at end of utterance.

Cont.

• Phonation:

- Interruptions in phonation.
- Breathy and harsh voice.
- Pitch and intensity variations.
- Problems in coordinating voicing and articulation.
- **Resonation:**hypernasality, lack of intelligibility.
- Articulation:
- Difficulties in achieving speech sound productions.
- Sound distortions.
- Disorganized phonological systems, language and learning to read problems.

Assessment

- Data from the following areas should be supplemented:
- • Cognitive skills.
- Sensory and perceptual abilities beginning with an audiological evaluation.
- • Client's emotional behavior.
- • Feeding/eating characteristics.
- • Language competence.

Capute (1974)

- Reported that about 50% to 60% of the population with cerebral palsy show some degree of mental retardation.
- □ WITH:
- Impaired language development.
- Learning difficulties.
- Academic problems.
- Higher auditory detection thresholds.
- Poorer speech reception thresholds.
- Poorer speech discrimination.

Prespeech Skills

- **1.** Head control with stability of the neck and shoulder girdle.
- 2. A coordinated pattern of respiration and phonation.
- **3.** A variety of feeding experiences to enhance normal feeding patterns.
- 4. Babbling practice.

Clinical Implications: Therapeutics

- First, some prespeech prerequisites must be met.
- Second, communication and speech-language stimulation.
- In infants, it might start with vocal play and babbling practice.
- For elder children facilitation of desired movements while inhibiting the abnormal reflex patterns.
- Coordination of respiration, phonation, resonation, and articulation.

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Cont.

- Establishing temporal coordination and motor control of the speech musculature.
- Increase the speed, range, and accuracy of movement of the tongue, lips, and jaw.
- Maintenance of body and head tonus as well as with respiration, phonation, and resonation.
- Oral exercises usually preceded phonetic placement.
- Selection of the target sound was guided by stimulability, consistency, and visibility and whether the sound was an early or late developing sound.

Hardy (1983) and Crary (1993)

- 1. Consonants that are realized correctly in prevocalic positions but are misarticulated in postvocalic positions should be treated first.
- 2. Distortions should be treated before substitutions.
- S. Training articulatory omissions and substitutions that fall short of the target because of motor involvement should be delayed.

Cont.

- **4.** A multiple auditory-visual stimulation approach is preferred over auditory stimulation alone.
- 5. Voice–voiceless distinctions should be trained by slowing the speech process.
- 6. It is important to remember that some children with cerebral palsy cannot achieve (normal) articulation,-augmentative communication-may be used.

CLEFT PALATE AND CLEFT LIP

- **Clefting** refers to a division of a continuous structure by a cleavage.
- Failure of the palate to fuse during fetal development.
- No single cause for clefting exists; "clefting is a clinical outcome of many possible diseases" (Shprintzen, 1995, p. 5).
- Etiologies cause a failure of the regular median fusion of the embryo's oral-facial structures between the 8th and 12th weeks of gestation.
- Occurring in 1 of about 700 births (Brogan & Woodings, 1976).

Classification

- 1. Clefts of prepalate:
- • Cleft lip.
- • Cleft of alveolar process.
- • Cleft of prepalate.
- 2. Clefts of the palate:
- • Clefts of soft palate.
- • Clefts of hard palate.
- 3. Clefts of prepalate and palate.
- 4. Facial clefts.
- 5. Submucous clefts, bifid uvula.

Articulatory/Phonological Characteristics

- Articulatory and phonological skills that resemble those of younger normally developing children.
- Consonant cluster reductions, omission errors.
- Compensatory errors:substitutions or distortions are produced more posteriorly in the vocal tract (Glottal stop), (pharyngeal fricatives for oral fricatives).
- Hypernasality and nasal emissions.
- May demonstrate phonological disorders: deletion of final consonants, syllable reduction, and backing.

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Clinical Implications: Diagnostic

- A team of specialists for successful assessment and management.
- Diagnostics involving children with clefts is an ongoing process.
- Middle-ear infections.
- velopharyngeal port incompetency (VPI).
- Substitution of glottal stops for stop-plosives.
- Dental anomalies and problems with occlusion

Assessment

- 1. Speech sampling and analysis, including sound inventory and phonological pattern development.
- 2. Stimulability probes.
- 3. Intelligibility judgments.
- **4.** Oral-facial examination.

Kinds of Errors

- 1. Consonant distortions associated with nasal emissions:
- Nasal emission due to a persistence of velopharyngeal inadequacy.
- Nasal emission due to oronasal fistulae.
- Nasal emission that is speech sound specific.
- 2. Vowel distortions secondary to hypernasality.
- 3. Compensatory articulations.
- **4**. Atypical backed articulation.

Clinical Implications: Therapeutics

- Many children with cleft palates undergo palate repair by the age of 2-3 months.
- 1. Improve the placement of consonant productions by promoting a more forward place of articulation.
- 2. Improve velopharyngeal valve function and decrease hypernasal resonance quality.
- 3. Modify compensatory articulations.
- **4.** If developmental phonological errors exist, improve the child's phonological system (Van Demark & Hardin, 1990).

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MENTAL DISABILITY

- Mental retardation is a disability characterized by significant limitations both in intellectual functioning and in adaptive behavior as expressed in conceptual, social, and practical adaptive skills. This disability originates before age 18. (AAMR, 2002, p. 8)
 - Three criteria stand out:
 - 1. Subaverage intellectual functioning.
 - 2. Limitations in adaptive skills.
 - 3. Manifestation before 18 years of age.
- Prevalence of this disorder to be about (.78%) of the population
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Classification

Classification	IQ Score	Percentage of Persons with a Mental Disability
Mild	69 to 55	89.0%
Moderate	54 to 40	6.0%
Severe	39 to 25	3.5%
Profound	below 25	1.5%

Articulatory/Phonological Characteristics

- 70% of these children have some form of speech production difficulty (Fristoe & Lloyd, 1979).
- Their speech has been described as indistinct, slurred, and sluggish.
- Lack of articulatory precision and appropriate pauses and phrasing (Weiss et al., 1987).

Types of Disorders

- 1. Speech sound errors are more common than in the nondisabled population.
- 2. Deletion of consonants is the most frequent error.
- **3.** Errors are typically inconsistent.
- **4.** Phonological processes are similar to children who are not mentally disabled but with a higher frequency of occurrence.
- The most common phonological processes are

□ Reduction of consonant clusters.

Final consonant deletion.

Assessment Procedures

- 1. Articulation test.
- 2. Spontaneous speech sample.
- 3. Motor speech capabilities.
- 4. Hearing acuity and middle-ear function.
- 5. Language.
- 6. Assessment of the environment.

Clinical Implications: Therapeutics

- 1. Use overlearning and repetition.
- 2. Train in the natural environment.
- 3. Begin as early as possible.
- 4. Follow developmental guidelines.
- **5.** Concentrate more on overall intelligibility rather than on training individual sounds.
- 6. Enlist the help of the client's caregivers.
- 7. Direct all therapeutic activities to communication training serving the daily routine.
- 8. Task analysis strategy, this typically translates into short, repetitive, reinforced activities.

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Important Notes

- Traditional motor approaches are not efficient
- The cycles approach is much more appropriate
- In these cases, time needed have been doubled for the children.
- A training period of 3 years or more may be required before substantial intelligibility gains are observed.
- Hodson (1989)summarizes by saying, "Mentally retarded children seem to be especially in need of a comprehensive phonological remediation approach because they lack the normal cognitive abilities requisite for integration of isolated phoneme parts" (p. 331).

Swift and Rosin (1990)for Down Syndrome.

- Single words and early two-word utterances are emphasized.
- In structured sound play, the clinician selects objects and toys that should elicit intended sounds.
- Melodic speech, visual cues, cued speech, auditory bombardment, and an auditory training.
- Augmentative communication.

HEARING IMPAIRMENT

- Hearing loss (or hearing impairment) is a generic term for any diminished ability in normal sound reception.
- Types of Hearing Loss:
- Conductive hearing loss.
- Sensorineural hearing loss.
- mixed hearing loss.

Severity of Hearing Loss

- 26 to 40 dB HL = mild hearing loss
- 41 to 55 dB HL = moderate hearing loss
- 56 to 70 dB HL = moderately severe hearing loss
- 71 to 95 dB HL = severe hearing loss
- >95 dB HL = profound loss
 (Bess & McConnell, 1981)

Articulatory/Phonological Characteristics

- Speech production in the hearing impaired is affected by the degree of hearing impairment and the frequencies involved.
- The greater the hearing loss, the more likely errors will extend from consonant to vowel productions to errors in stress, pitch, and voicing.

Types of Errors

- Consonant production is characterized by deletions and substitutions.
- Both initial and final consonant deletions occure.
- Final consonant deletions are far more prevalent.
- Frequently occurring substitutions include:
- (1) confusion of voiced and voiceless cognates.
- (2) substitution of stops for fricatives and liquids.
- (3) confusion between oral and nasal consonants.
- ([t, d, s, z, ∫, ʒ,t∫,dʒ]) are more likely to be in error.
- Affricates were below 50% accuracy, consonants with even lower percentages of accuracy included [z] and [ð].

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Cont.

- Word-finally sounds demonstrated a lower percentage of accuracy.
- H.I use at least partially rule governed phonological systems.
- They use phonological processes more frequently.
- The overall intelligibility of speech is often reduced, specially as linguistic complexity increases.
- Vowel errors include tense for lax (and lax for tense) substitutions, especially the front vowels [i] and [I].
- Diphthongs are often produced as monophthongs and vice Versa.
- Prosodic features can also be affected.

Clinical Implications: Diagnostics

- Dunn and Newton (1994) procedures:
- 1. Speech-motor assessment.
- 2. Syllable imitation.
- **3.** Administration of the Phonetic Level Evaluation (PLE) (Ling, 1976).
- 4. Spontaneous speech sample.
- 5. Analysis of the segmental and suprasegmental characteristics of the spontaneous speech sample.

Clinical Implications: Therapeutics

- The remedial task is mainly directed to the improvement of the client's speech intelligibility.
- Speech intelligibility: is defined generically as that aspect of oral speech-language output that allows a listener to understand what a speaker is saying.
- **Two Prerequisites:**
- **1.** The improvement of the residual hearing by speech signal amplification.
- 2. The maximal use of the level of residual hearing for speech perception through systematic articulatory training.

Dunn and Newton (1994) Program

- 1. Establish a suprasegmental base.
- 2. Teach the segmental speech sounds.
- **3.** Generalize a stable production by using different phonetic contexts and new syllable types.

DYSARTHRIAS

- **Dysarthrias:** are neuromuscular speech disorders (Marquardt, 1982).
- Denotes group of articulation disorders caused by neurogenic abnormalities, by the impairment in (central and/or peripheral) nervous system that control and coordinate speech.
- Dysarthrias have many different causes.
- Paralytic conditions and coordination impairments of the voluntary musculature required for speech production.

Articulatory/Phonological Characteristics

- Main types:
- 1. Spastic dysarthria
- 2. Ataxic dysarthria
- 3. Hypokinetic dysarthria
- 4. Hyperkinetic dysarthria
- 5. Flaccid dysarthria
- 6. Mixed dysarthria

Main Deficiencies

- Respiration: Irregular, generally shallow breathing patterns rapid inspiration, incomplete expiration phases, waste of expiratory air during speaking.
- Phonation: Strained voice; deviations from suitable loudness levels (either too loud or too soft) and voice quality (either too harsh or too breathy).
- **Resonation:** Hypernasality and nasal air emission.

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- Articulation: Labored, indistinct sound articulation, resulting in distortions, omissions or substitutions, (bradylalia), (tachylalia).
- The most common articulation errors are **Distortions** and **Omissions**.
- Prosody: Narrow range of intonational configurations ("monopitch"), ("monoloudness"), sometimes exaggerated stress and intonation patterns.

Summary of Features of the Various Types of Dysarthria

Types	Features	
Spastic Dysarthria		
(Resulting from uppe	r motor neuron system disorders. Example: Pseudobulbar palsy.)	
Respiration:	Low respiratory frequency with shallow inspiration and lack of expiratory control.	
Phonation:	Strained, harsh, low-pitch voice; reduced pitch and loudness ranges.	
Resonation:	Hypernasality; nasal air emission.	
Articulation:	Slow, labored, imprecise phoneme realization, especially of consonants.	
Ataxic Dysarthria		
(Resulting from cereb	ellar lesions. Example: Cerebellar ataxia.)	
Respiration:	Shallow inspiration and lack of expiratory control. Rapid, irregular, forced breathing patterns.	
Phonation:	Forced, hoarse-breathy, trembling voice. Generally reduced (but sometimes excessive) use of pitch and loudness.	
Resonation:	Normal.	
Articulation:	Slow, imprecise phoneme realization, especially of consonants. Sound prolongations. Irregular pausing between words, syllables, and sounds.	
Hypokinetic Dysarthrid	2	
(Resulting from disor	ders of the extrapyramidal system. Example: Parkinsonism.)	
Respiration:	Frequent respirations with shallow inspiratory phases and lack of expiratory control.	
Phonation:	Harsh, tremorous voice; reduced pitch and loudness levels.	
Resonation:	Normal.	
ENTS-HUB.com	Fluctuating imprecise articulation, Articulatory bursts, Low placed By: Sulaf Salay	

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Cont.

Hyperkinetic Dysarthria (Resulting from disorders of the extrapyramidal system. Examples: Athetosis, chorea.)

Respiration:	Frequent respirations with shallow inspirations and incomplete expirations; lack of respiratory control.	
Phonation:	Strained, tremorous voice. Uncontrolled but generally reduced ranges in the expressive use of pitch and loudness.	
Resonation:	Alternating hypernasality.	
Articulation:	Variable imprecision of phoneme, especially consonant, realization.	
Flaccid Dysarthria		
(Resulting from low	wer motor neuron system disorders. Example: Bulbar palsy.)	
Respiration:	Shallow, audible inspirations. Uneven, incomplete expirations. Low respiratory frequency; low expiratory air pressure.	
Phonation:	Breathy, hoarse voice lacking expressive pitch and loudness variation.	
Resonation:	Marked hypernasality with nasal air emission.	
Articulation:	Slow, imprecise phoneme realization, especially of consonants.	

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General Treatment Goals

- **1.** Help the person become a productive patient.
- **2.** Modify abnormalities of posture, tone, and strength.
- 3. Modify respiration.
- 4. Modify phonation.
- 5. Modify resonation.
- 6. Modify articulation.
- 7. Modify prosody.
- 8. If indicated, provide alternative or augmentative modes of communication.

Dworkin (1991) Speech Subsystems

- The first-order subsystems consist of resonation and respiration.(Treated First).
- The second order is phonation.(Treated Next).
- The third order consists of articulation and prosody.(Treated Finally).
- Inhibition and Facilitation techniques will probably need to precede the specific subsystem treatments.

Dworkin (1991) Treatment Objectives

- 1. Promote adequate orofacial postures.
- 2. Promote integration of orofacial reflexes.
- 3. Improve orofacial muscle tone and strength.
- **4.** Improve range, speed, timing, and coordination of orofacial muscle activities.

Apraxia of Speech versus Dysarthria

Apraxia of Speech Absence of any muscular weakness, paralytic condition, or discoordination.

Speech process of articulation is primarily affected.

Speech errors result from disruption of the central nervous system's programming of oral movements.

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Dysarthria

Presence of muscular weakness. Change in muscular tone secondary to neurologic involvement.

All processes for speech are affected: respiration, phonation, resonation, and articulation. Speech errors result from disruption of the central and

peripheral nervous system's control of muscular movements.

Consistent, predictable articulatory prode By: Sulaf Salaymeh