

## CHAPTER II

### LITERATURE REVIEW

#### 2.1. ORAL-FACIAL CLEFT

Cleft Palate Foundation stated that cleft lip and cleft palate comprise the fourth most common birth defect in the United States. One of every 700 newborns is affected by cleft lip and/or cleft palate. Another foundation, March of Dimes Birth Defects Foundation (1999), mentioned that oral-facial cleft occurs in approximately 1 in every 1,000 white babies born, 1.7 per 1,000 births among Asians, more than 3.6 per 1,000 births among American Indians and about 1 per 2,500 among African-Americans.

Cleft lip and cleft palate are congenital defects, or birth defects, which occur very early in pregnancy. During early pregnancy, separate areas of the face develop individually and then join together. If some parts do not join properly, the result is a cleft. So, cleft is a result of incomplete development of the lip or palate during embryogenesis.

The causes of oral-facial cleft are not well understood. According to Cleft Palate Foundation, the majority of clefts appear to be due to a combination of genetics and environmental factors. The recurring risks of a cleft condition are dependent upon many factors, including the number of affected persons in the family, the closeness of affected

relative, the race and sex of all affected persons, and the severity of the clefts. Some studies also suggest the similar idea that a number of genes may be involved as well as environmental factors, such as drugs, infections, maternal illnesses, maternal alcohol use and, possibly, deficiency of B vitamin folic acid. One-third of babies born with oral-facial cleft have relatives who are or were once affected with the same problem.

According to March of Dimes Birth Defects Foundation, it is hardly known about how to prevent oral-facial clefts. The foundation stated that:

a 1995 study suggested that taking multivitamins containing folic acid before conception and during the first two months of pregnancy may help prevent cleft lip/palate and isolated cleft palate. ...Women who are planning pregnancy or who are pregnant should avoid alcohol, which also can cause a number of mental and physical birth defects. ...Women who take medications for chronic illnesses should check with their doctors before they become pregnant. ... All pregnant women should use only medications prescribed by a physician who knows of the pregnancy, and get early and regular prenatal care, beginning with a pre-pregnancy visit. Families with a history of cleft lip/palate, isolated cleft palate, or any other condition of which clefting is a part, may wish to discuss the chances of recurrence with a genetic counselor. (1999: 4)

The problems that may be associated with oral-facial clefts are feeding, ear disease and speech development. Babies with cleft lip usually do not have much trouble feeding. Those with cleft lip/palate and those with isolated cleft palate sometimes do. A cleft in the roof of the mouth makes it difficult for the baby to suck forcefully enough to draw milk through a nipple. Babies with cleft palate are also susceptible to middle ear disease, which may cause mild to moderate hearing loss. If treated

properly in infancy and childhood, the hearing loss need not be permanent.

Concerning the speech problem, Lenore Daniels Miller (1999: 2), a speech and language pathologist stated that:

for the most part children who are born with clefts of the lip only do not experience speech or resonance problems (related to clefting itself), ... The child who is born with a cleft of the palate (with or without a cleft of the lip) presents a problem initially simply because of the opening in the roof of the mouth which is preventing the soft palate to close off the space between the nasal cavity and the mouth cavity. Because of this, sounds, which must come out directly through the mouth, may be greatly distorted or impossible for the child to make.

## 2.2. PHONETICS

Roger Lass (1984: 1) in his book *Phonology: an introduction to basic concepts* differentiates phonetics from phonology. He stated that phonetics:

is a rather more 'neutral' study of the sounds themselves as phenomena in the physical world, and the physiological, anatomical, neurological, and psychological properties of the human beings that make them.

According to Peter Roach (1991), phonetics deals with all speech sounds. It is concerned with speech sounds without reference to their function or role in any particular language. Phonetics tries to describe how the speech sounds are made, to classify them and to give some idea of their nature.

John Laver (1994: 120) in his book *Principles of Phonetics* mentioned:

The parts that make major contributions to the performance of speech are the lungs, the larynx, the vocal tract (made up of the pharynx and the oral cavity, the tongue, the lips and the jaw), and the nasal system (made up of the soft palate and the nasal cavity).

Below is the figure of sagittal view of the vocal apparatus, identifying different vocal organs and their parts.

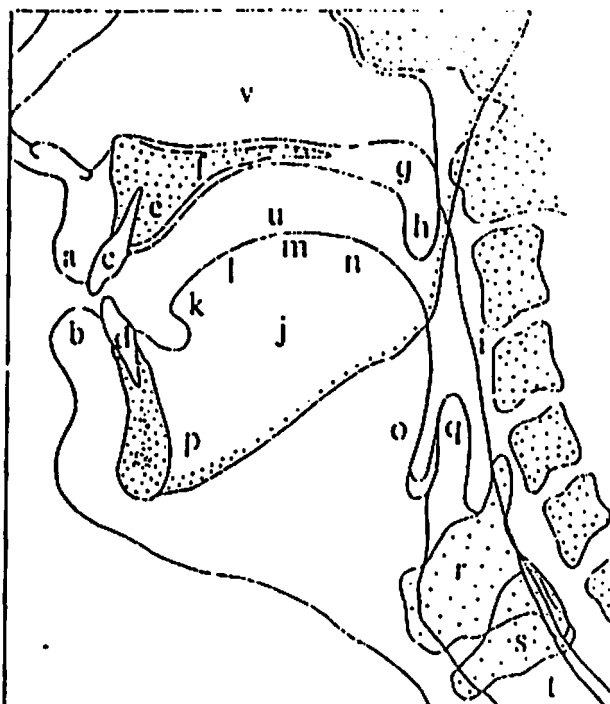


Figure 3. Sagittal view of the vocal apparatus, identifying different vocal organs and their parts.

- |                   |                         |                      |
|-------------------|-------------------------|----------------------|
| a. Upper lip      | i. Pharynx wall         | q. Epiglottis        |
| b. Lower lip      | j. Body of the tongue   | r. Thyroid cartilage |
| c. Upper teeth    | k. Tip of the tongue    | s. Cricoid cartilage |
| d. Lower teeth    | l. Blade of the tongue  | t. Trachea           |
| e. Alveolar ridge | m. Front of the tongue  | u. Oral cavity       |
| f. Hard palate    | n. Back of the tongue   | v. Nasal cavity      |
| g. Soft palate    | o. Root of the tongue   |                      |
| h. Uvula          | p. Lower jaw (mandible) |                      |

In the case of soft palate, which is related to cleft palate, Peter Ladefoged (1975: 4) in his book *A course in Phonetics* mentioned:

The soft palate is a muscular flap that can be raised to press against the back of the wall of the pharynx and shut off the nasal tract, preventing air from going out through the nose. In this case there is said to be a velic closure. This action separates the nasal tract from the oral tract so that the air can go out only through the mouth.

Concerning the phonetic transcription in this study, Marsono (1986), in his book: *Fonetik*, has classified Indonesian vowel into ten types, diphthong into three types and consonant into eleven types.

Table 2.2.1

INDONESIAN VOWELS

1	[i]	/i/	front, high, upper	ibu, kita
2	[ɪ]		front, high, lower	pinggir, kelingking
3	[e]	/e/	front, middle, upper	ekor, enak
4	[ɛ]	/ɛ/	front, middle, lower	nenek, dendeng
5	[a]	/a/	front, low	ada, apa
6	[ə]		central, middle	emas, iseng
7	[ɔ]	/o/	back, middle, lower	otot, roti
8	[o]		back, middle, upper	toko, kado
9	[U]	/u/	back, high, lower	ukur, urus
10	[u]		back, high, upper	udara, utara

Table 2.2.2.

INDONESIAN DIPHTHONGS

1	[ ai ]	up, closed, forward	<i>pakai, nilai, sampai</i>
2	[ oi ]	back, closed, forward	<i>amboi, sepoi-sepoi</i>
3	[ au ]	up, closed, backward	<i>saudara, lampau, kacau</i>

Table 2.2.3.

INDONESIAN CONSONANTS

1	Bilabial	moving the tongue and lips together	p, b, m
2	Labiodental	lower lip and upper front teeth	f, v, w
3	Apiko dental	tip of the tongue is raised to the upper teeth	t, d
4	Apiko alveolar	tip of the tongue is raised to the alveolar ridge	n, l, r
5	Apiko palatal	tip of the tongue is raised to the hard palate	d
6	Lamino alveolar	tip and blade of the tongue is raised to the alveolar ridge	s, z
7	Lamino palatal	tongue blade and back of the alveolar ridge	ʃ
8	Medio palatal	middle of the tongue is raised to the hard palate	c, j, n, y
9	Dorsovelar	back of the tongue is raised to the soft palate	k, g, ŋ, x
10	Laringal	glottis in the open position	h
11	Glottal	vocal cords are held tightly together	ʔ

In this study, the writer is also used the English terms for the phonemes. In this case, the theories from Peter Ladefoged (1975: 6) are used. He said that:

In order to form consonants, the airstream through the vocal tract must be obstructed in some way. Consonants can therefore be classified according to the place and manner of this obstruction.

The following are the places and manners of articulation by Ladefoged (1975: 6):

### 1. Places of articulation

- a. ***Bilabial*** : made with the two lips
- b. ***Labiodental*** : lower lip and upper front teeth
- c. ***Dental*** : tongue tip or blade and upper front teeth
- d. ***Alveolar*** : tongue tip or blade and the alveolar ridge
- e. ***Retroflex***: tip of the tongue and the back of the alveolar ridge
- f. ***Palato Alveolar*** : tongue blade and the back of the alveolar ridge
- g. ***Palatal*** : front of tongue and hard palate
- h. ***Velar*** : back of the tongue and soft palate

### 2. Manners of articulation:

- a. ***Stop*** : complete closure of the articulators involved so that the airstream cannot escape through the mouth.

There are two possible types of stop:

- **Nasal stop** : a sound produced if the air is stopped in the oral cavity but the soft palate is down so that it can go out through the nose.
  - **Oral stop** : If in addition to the articulatory closure in the mouth, the soft palate is raised so that the nasal sound is blocked off, then the airstream will be completely obstructed. Pressure in the mouth will build up and an oral stop will be formed.
- b. ***Fricative*** : close approximation of two articulators so that the airstream is partially obstructed and turbulent airflow is produced.
  - c. ***Approximant*** : the approach of one articulator towards another but without the tract being narrowed to such an extent that a turbulent airstream is produced.
  - d. ***Lateral*** : obstruction of the airstream at a point along the center of the oral tract, with incomplete closure between one or both sides of the tongue and the roof of the mouth.
  - e. ***Trill*** : sometimes is called roll and occurs in some forms of Scottish English words such as "rye" and "raw".



## **2.3. RELATED STUDIES**

### **2.3.1. KELLY MABRY DOWNING MS, CCC-SLP**

Kelly Mabry Downing, a speech and language pathologist for University of Connecticut Health Science Center, mentioned in one of her articles at *Wide Smiles Magazine* "Early speech stimulation in the cleft lip/palate child birth to 12 months" (1996) that speech is affected by the structural deviations associated with cleft in two major ways. First, the way the cleft-born child says certain sounds may be different from the non-cleft child due to his unique mouth structure. Second, his voice may have a nasal quality if the cleft affects the soft palate or if the hard palate is unrepaired. Sometimes after surgery, a child may have a small hole, called fistula that allows air to flow into the nose, which usually affects speech only slightly.

In the other article, "Stimulating early speech development: twelve months to three years" (1996), Downing emphasizes the importance of the blowing and sucking treatment. A cleft-born child may have difficulty with air coming out of the nose and the result is the presence of nasal voice. That's why, he should be encouraged to direct his airflow to his mouth, rather than nose, by the blowing games such as bubbles, feathers, tissue, etc. However, it should be noted that he should not exert too much pressure while he blows because it may lead to articulation errors or errors in speech sounds. The sucking treatment or game is a great way to teach a cleft-born child how to build up negative

pressure in his mouth. These treatments are not meant to strengthen muscles. Rather, they are to encourage correct lip and tongue placement of consonants, such as /p, b, t, d, m, n, w /.

### **2.3.2. MARGIE WELLS-FRIEDMAN**

Other speech and language pathologist, Margie Wells-Friedman, in her article "Early speech treatment in infants" (1996) in *Wide Smiles Magazine* pointed out that children with cleft lip and palate are at very high risk of developing speech disorders because of the anatomical difference and the high incidence of hearing problems due to fluid during the speech development years. When they are still babies, the speech development appears to be normal especially because the things, which are evaluated, are items like recognizing name, playing at age level with toys, cooing, using vowels and saying three consonants including m, n, and y.

Wells-Friedman said that the things, which are difficult to test, are the actual forming tongue movements for future consonant sounds and that old soft palate. The tongue tends to make contacts further back in the mouth so t, d, k, g are all made in the middle of the palate and sound the same. Sometimes nasal noises, like snorts, are substituted for some sounds, usually s, sh, ch or p, b, t, etc. Other times the child will produce, sh, ch further back in the throat. If all of these things are learned initially

and practiced, they are then much harder to correct later, from an SLP 's point of view.

### **2.3.3. LENORE DANIELS MILLER, Sc.D., CCC-SLP**

Miller brings a broader discussion about the speech and language of child with clefts. Some terms, which are used specifically relative to speech considerations for the child with cleft palate, are velo-pharyngeal competence, velo-pharyngeal sufficiency, or velo-pharyngeal adequacy as terms to describe the effective working of the velo-pharyngeal mechanism. In this mechanism, the palate is long and mobile enough to effect a tight seal so that air does not escape into the nasal cavity, except for 'm', 'n', and 'ng', but rather is directed out through the mouth.

According to Miller, the development of the sounds of speech progress from the more simple gross sounds to more complex sounds, or, going from simple to more highly coordinated as with the development of other motor skills. Early developing sounds for all children appear to be 'm' and 'n', which are nasal sounds, and 'b', 'd', and 'g', or plosive sounds. These plosive sounds are very important in the early analysis of children with repaired cleft of the palate in that the child must be able to have tight seal of the velo-pharyngeal mechanism and hold the air within the oral cavity and then release it forcefully. Nasalization of plosives may occur if there is difficulty with the appropriate device of the velo-pharyngeal

mechanism. The sounds will go through the nose, with a 'b' produced as an 'm', a 'd' produced as an 'n', and a 'g' produced as an 'ng'.

The child whose velo-pharyngeal mechanism is not working adequately is said to have velo-pharyngeal incompetence, or velo-pharyngeal insufficiency, or velo-pharyngeal inadequacy. When this occurs, he may have hypernasality, which means that the air and sounds are coming through the nasal cavity at undesired times. Hypernasal resonance refers to the tone of the voice for voiced sounds.

When someone is producing sounds that do not have tone to them, such as 'p', 't', 'k', 's', 'f', 'sh', 'ch', and air is observed on mirror coming through the nostrils, he is said to have nasal escape, or nasal emission. This can be seen on a mirror but not heard, or it can be audible and can take various forms, with great deal of turbulence noted at times.

There are a wide variety of compensatory types of mannerism and productions, which may be seen in people with velo-pharyngeal insufficiency or inadequacy in an attempt to compensate for ineffective valving. Sometimes they attempt to try to compensate for being unable to effectively valve at the level of their velo-pharyngeal sphincter and try to prevent the air from going out through the nose. Some things that are seen may include trying to stop the air at the level where the sound is produced, the vocal folds, and this will produce glottal stop sound. Sometimes they will try to trap the air at the back of the throat, especially for sibilant sounds, such as the 's' and the 'sh', and produce a pharyngeal

fricative. They may also engage in facial grimacing, again in an effort to prevent or modify the flow of air and sound through the nose instead of through the mouth. In the other variety, they may hold their tongue in a backward and upward position in an effort to close off the space and try to effect velo-pharyngeal closure.

## **CHAPTER III**

# **PRESENTATION AND ANALYSIS OF THE DATA**