A REVIEW OF CLASSIFICATION SYSTEMS FOR CLEFT LIP AND PALATE PATIENTS- I. MORPHOLOGICAL CLASSIFICATIONS

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ABSTRACT

Clinicians should know classifications of cleft lip and palate as grading the severity of condition will help in communication, diagnosis and treatment planning. Each classification system has some deficiencies and some advantages over others. Some classification systems are simple while others are complicated incorporating more information regarding the anomaly. Some systems are descriptive while others have graphic representation. Systems with graphic representation have been explained with examples. Classification systems for cleft lip and palate can be further classified into two groups i.e.; Morphological classifications and Embryological classifications. This paper looks at the morphological classifications of cleft lip and palate while the second article will look at the embryological classifications. Occurrence of cleft lip and palate features are different in different regions of the world. So, a clinician should adopt the classification system which best suits and covers all the necessary features of diagnostic and therapeutic interest.

Keywords: *Cleft lip, Cleft Palate, Congenital anomaly, Classification.*

INTRODUCTION

Cleft lip and palate is one of the most common congenital anomalies[1]. It includes 65% of all head and neck anomalies[2]. Incidence of cleft lip and palate is 1 in 700 live births[3]. In Asia, prevalence of cleft lip and palate is 1 in 500 births. In Pakistan, incidence of cleft lip with or without cleft palate is 1.91 in 1000 live births[4]. Etiology of cleft lip and palate is multifactorial and includes environmental and genetic reasons. Medications, intake of anticonvulsants, radiation, smoking, alcohol consumption and more than 300 syndromes are associated with cleft lip and palate[5].

Cleft lip and palate presents many features at different levels of severity and need multidisciplinary approach. The cleft lip and palate team must consist of an Otorhinolaryngologist, Oral and Maxillofacial surgeon, Plastic surgeon, Speech therapist, Orthodontist and Prosthodontist who may or may not be rendering their services in the same institution. Classification systems may serve as an effective tool of communication for them. A thorough classification system gives information in a clear and comprehensive way. So, it seems logical to present different classification systems. Different classifications have been suggested which describes the condition of cleft, its extension and severity. It helps the cleft lip and palate team to name, grade, remember, plan and discuss the clinical scenario. If clinician refers the patient to any other hospital or cleft lip and palate center, along with other requirements, he should also attach a slip containing patient's name, age, name of classification system he used and the class or grade of severity of cleft lip and/or palate according to that classification. Classification system lets us organize large amounts of data into a comprehensive system and thus simplifies treatment planning.

An attempt has been made to search out electronic and printed literature for cleft lip and palate classification systems developed in the current and last century. Some classification systems are based on cleft lip and palate morphology, while other systems are based on embryologic principles. This paper deals with morphological classification system. The second part pertaining to embryological classification system will be published in the next issue of this journal.

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MORPHOLOGICAL CLASSIFICATION SYSTEM

Some of the morphological classifications are as follows:

1. DAVIS AND RITCHIE CLASSIFICATION:

The following classification was proposed by Davis and Ritchie in 1922.[6] This system broadly categorized the clefts into three groups according to position of cleft in relation to alveolar process.

Group I – Pre alveolar clefts:

- Unilateral cleft lip
- Bilateral cleft lip
- Median cleft lip

Group II - Post alveolar clefts:

- Cleft hard palate alone
- Cleft soft palate alone
- Cleft soft palate and hard palate
- Sub mucous cleft

Group III-Alveolar clefts:

- Unilateral alveolar cleft
- Bilateral alveolar cleft
- Median alveolar cleft
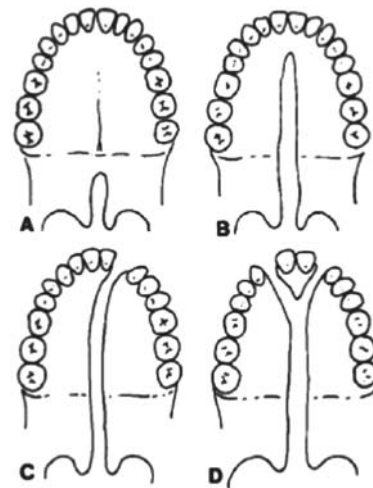
2. VEAU CLASSIFICATION:

Veau proposed the following classification in 1931.[7]

Group I (A) - Defects of the soft palate only

Group II (B) - Defects involving the hard palate and soft palate extending not further than the incisive foramen, thus involving the secondary palate alone.

Group III (C) – Complete unilateral cleft, extending from the soft palate to the alveolus, usually involving the lip

Group IV (D) - Complete bilateral clefts, resembles Group III but is bilateral. When cleft is bilateral, pre-maxilla is suspended from the nasal septum.

3. ARTURO SANTIAGO CLASSIFICATION:

Santiago A[8] proposed a classification in 1969 in which he used four digits to indicate presence of cleft and its location. Each digit is followed by letter to indicate condition of cleft (complete, incomplete or sub mucous).

Four digits represent the following four structures affected by cleft.

- The first digit refers to the lip.
- The second digit refers to the alveolus.
- The third digit refers to the hard palate.
- The fourth digit refers to the soft palate.

The numbers used as digits represents the condition of cleft.

- 0= No cleft
- 1= Midline cleft
- 2= Cleft on right side
- 3= Cleft on left side
- 4= Bilateral cleft

The letters indicate more specifically the type of cleft.

- A = An incomplete midline cleft
- B = An incomplete cleft of right side
- C = An incomplete cleft of left side
- D = Bilateral incomplete cleft
- E = Sub mucous cleft

Points to consider when using the Arturo Santiago Classification System:

- When a cleft is not described that it is complete or incomplete, it is always assumed as complete cleft.

- When clefts of lip, hard and soft palate are described without giving any information about alveolus, it is assumed that it is completely affected by cleft.

- All cases will be considered midline cleft unless otherwise specified.

EXAMPLES:

1. Cleft of soft palate: 0001

    The first three digits indicate that there are no clefts of lip, alveolus and hard palate and 1 indicates cleft of soft palate in midline.

2. Bilateral complete cleft lip and palate: 4411

    The first digit indicates bilateral cleft lip, second digit represents bilateral cleft alveolus, third digit show a midline cleft in hard palate and last digit midline cleft of soft palate.

3. Incomplete cleft of hard palate and complete cleft of soft palate: 001A1

    The first digit indicates no cleft in lip, second indicates no cleft in alveolus, third digit represents midline cleft of hard palate. The letter A shows that midline cleft is incomplete and last digit indicates a complete midline cleft of soft palate.

4. Sub mucous cleft of hard and soft palate: 001S1S

    The first digit indicates no cleft in lip, second digit indicates no cleft in alveolus, third digit shows that a midline cleft is present in hard palate. The letter S shows that this midline cleft is sub mucous. The fourth digit represents midline cleft of soft palate and the last letter S shows that this cleft is also sub mucous.

4:   LAHSAL CLASSIFICATION OF CLEFT LIP AND PALATE:

Kreins O (cited by Hodgkinson et al)[9] proposed LAHSHAL system for classification of cleft lip and palate patients which was modified on the recommendation of Royal College of Surgeons Britain in 2005 by omitting one "H" from the acronym "LAHSHAL".

LAHSAL system is a diagrammatic classification of cleft lip and palate. According to this classification, mouth is divided into six parts.

- Right lip
- Right alveolus
- Hard palate
- Soft palate   (LAHSAL)
- Left alveolus
- Left lip
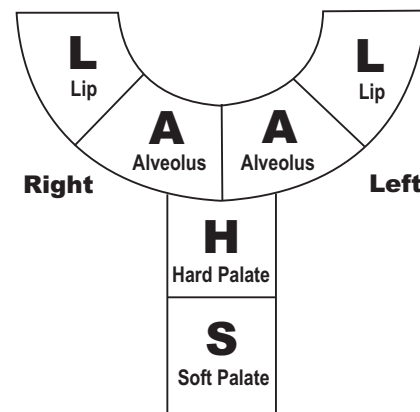
- The first character is for patient's right lip and last character for patient's left lip.

- LAHSAL code indicates complete cleft with capital letter and an incomplete cleft with small letter.

- No cleft is represented with a dot.

- EXAMPLES:

1. Bilateral complete cleft lip and palate

    The condition is bilateral cleft lip and palate, so there will be no dot and all letters of LAHSAL code will be written. As, cleft of lip and palate is complete, all the letters will be capital, so the patient with bilateral complete cleft lip and palate will be represented as LAHSAL.

2. Left complete cleft lip

    A complete cleft lip will be represented with letter "L", as it is left, so, this "L" will be written at the end. Patient with left cleft lip will be represented as L

3. Right incomplete cleft lip and alveolus

    Here, the cleft of lip and alveolus is incomplete, so they are represented with small "l" and "a".

To represent a cleft on right side, "l" and "a" will be written in start followed by four dots. Thus, patient with right incomplete cleft lip and alveolus will be represented as la. . . .

4.   Incomplete hard palate, complete soft palate defect

Cleft of hard palate is incomplete so it will be represented with "h" and cleft of soft palate is complete so it will be represented with "S", this patient will be represented as . . hS . .

5.   **ELNASSRY CLASSIFICATION:**

Elnassry[10] proposed following classification in 2007. He divided cleft lip and palate patients in to seven classes.

Class I: Unilateral cleft lip

Class II: Unilateral cleft lip and alveolus

Class III: Bilateral cleft lip and alveolus

Class IV: Unilateral complete cleft lip and palate

Class V: Bilateral complete cleft lip and palate

Class VI: Cleft hard palate

Class VII: Bifed uvula

DISCUSSION

Sherman[11] (1921) used four groups in his classification including clefts of lip without concomitant cleft palate. Davis and Ritchie[6] (1922) divided clefts into three groups which involved all kinds of clefts. This classification described clefts on individual basis but has not involved continuous clefts like cleft involving lip, hard palate and soft palate. Veau[7] (1931) presented a classification which involved four groups but the drawback was that isolated cleft lips were not involved in any of group. Pruzansky[12] (1953) tabulated clefts of lip and palate in to four categories. He did not include alveolar process as a separate entity because in his opinion the more complete the defect in the lip, the greater will be the cleft in alveolar process. While Davis and Ritchie[6] has emphasized alveolar process as an important factor in classification but Pruzansky has contradicted this as an important factor in classification.

Harkins et al[13] (1960) proposed a morphological classification of cleft lip and palate. This classification had two major groups, each group with two sub-groups. Two major groups are pre-palate and palate. Pre-palate is further divided into two groups, lip and alveolar process to incisive foramen. Palate is further divided into soft palate and hard palate to incisive foramen. Comparatively, it was the most comprehensive classification system of that time, which made provisions for describing the location (right, left and median), extent (1/3, 2/3, 3/3) and width of the cleft. Pfeifer[14] (1968) described three areas of head into which he divided human face and where malformations may be found. These areas are posterolateral area, dicephalic border and frontonasal area. He located clefts of lip, alveolus and palate in dicephalic region.

Santiago[8] (1969) proposed a classification system which can be used especially for machine record coding. This classification system consists of digits depending on whether the cleft is present or not and if present, whether it's complete, incomplete or sub mucous. Each digit is followed by letter to describe whether cleft is complete, incomplete or sub mucous. According to Santiago, this classification is encompassing a whole range of defects and by the use of machine coding, data can be retrieved and used for research purposes.

In 1976, Tessier[15] proposed a classification system for facial clefts in which he described 14 different types of clefts according to their location in relation to eye and orbit. Clefts of lip, alveolus and palate were numbered 1, 2 and 3. Kreins (cited by Hodgkinson et al[9], 2005) devised LAHSAL system which was symbolic representation to describe cleft lip and palate cases. This classification system was based on "Striped Y"classification of Kernahan[16] which is embryological classification and will be discussed in next article of this series. Elnassry[10] (2007) divided cleft and palate patients into seven classes mentioning clefts related to lip, alveolus, palate and uvula.

This article has described in detail the classification systems of cleft lip and palate which are simple and easy to use and therefore has gained more popularity. However, there is a limitation in the classification systems described in this paper. All of them do not properly indicate the severity/extent of the condition which has bearing on treatment planning. For example, repair of complete palate cleft with segment separation of 15 mm undoubtedly involves greater surgical complexity than one with segment separation of only 3mm. Moreover, cleft lip and palate with more

segment separation can best be managed initially by pre-surgical nasoalveolar molding plates and then surgical intervention. While cleft segments in close proximity to each other without collapse may not need presurgical nasoalveolar molding. There are certain classification systems which have described the clefts from a surgical complexity point of view but because of their difficult usage, they did not gain much popularity. The classification systems described in this paper have the advantage of their simple usage and thus are more commonly used.

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