



Retrospective Evaluation of 7 Years of Patients with Non-Syndromic Cleft Lip and Palate Treated in the Oral and Maxillofacial Surgery Service of the "Ángel Larralde" University Hospital (HUAL)

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Abstract

Background: To evaluate the incidence of patients diagnosed with non-syndromic cleft lip and palate according to gender, age, diagnosis, and treatment in the "Dr. Atilio Perdomo" Oral and Maxillofacial Surgery service of the "Dr. Ángel Larralde" University Hospital located in the state of Carabobo, Venezuela.

Methods: Data from all patients with non-syndromic cleft lip and palate who underwent corrective surgery in the service over 7 years (2016-2022) were retrospectively analyzed.

Results: During this period, a total of 305 patients underwent surgery. The year with the highest incidence was 2016, with 69 cases (22.62%). A higher incidence of diagnosis was observed in patients with complete cleft palate, with 77 patients (25.24%). Besides, A higher incidence of left lip cleft was found compared to other types of lip cleft, with 38 patients (12.45%). Regarding gender, 164 cases (54%) of male patients were recorded. The highest incidence was found in patients aged 0 to 3 years, with 166 cases (54%). About the techniques used, the most common technique to correct cleft lips was the technique described by Tennison Randall, with a total of 69 cases (22.62%).

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Introduction

Cleft Lip and Palate (CLP) is a common congenital anomaly in the craniofacial region. It is characterized by the lack of complete development of the structures that separate the oral and nasal cavities. CLP is a condition that exerts a profound influence on public health, given its intricate origins and its association with a range of functional and aesthetic challenges. Individuals affected by this condition often encounter difficulties with eating, breathing, hearing, and speech. Moreover, they may experience social stigmatization and endure negative effects on their psychosocial well-being. Consequently, the treatment of cleft lip and palate necessitates a comprehensive, multidisciplinary approach [1,2].

CLP occurs due to the nonunion of the facial processes during embryo development. Proper lip and palate development occurs due to events that require coordination of cell migration, growth, differentiation, and apoptosis. During the process of embryo development, neural crest cells separate from the neural folds and move through the mesenchymal tissue toward the developing craniofacial region. In the fourth week of human embryonic development, these cells contribute to the formation of the frontonasal prominence, as well as the paired maxillary processes and paired mandibular processes, which surround the lower part of the frontonasal prominence. The frontonasal prominence is divided into two nasal processes, one medial and one lateral.

Towards the end of the sixth week of development, fusion of the medial nasal processes occurs with each other and with the maxillary processes on each side, which gives rise to the formation of the upper lip and the primary palate, and begins the development of the secondary palate, with the growth of the maxillary processes from the paired palatal processes, these processes initially grow

vertically to the sides of the developing tongue. During the seventh week of development, the palatal layers rise to a horizontal position above the tongue and fuse in the midline to form a medial epithelial synthesis. In addition to fusing in the midline, the secondary palate fuses with the primary palate and nasal septum. However, any disturbance in growth during this critical time can fail the closing mechanism, leading to the formation of a labial or palatal cleft [3,4].

There are several categories for this clinical condition, one of which is based on the anatomy involved. Lip involvement can be on one side (right or left) or both sides and is classified as incomplete or complete if it affects the nasal tissues. The palate may have a complete or incomplete cleft (one-third or two-thirds), or there may be a cleft in both the lip and palate. When both the palate and the lip are affected on one side or both sides, it is defined as a cleft lip and palate; the involvement of all three structures is known as a naso-lip-palatine cleft. To make an accurate diagnosis during patient evaluation and classify the cleft according to its characteristics, Kernahann and Stark in 1971 provided a protocol with a diagram in which they subdivided the slits [5-7].

In epidemiological studies, cleft lip and palate are classified as "syndromic" or "non-syndromic." "Non-syndromic" cases are further classified as isolated, which are those without an underlying syndrome or additional secondary malformations, or as multiple, which are those with additional malformations that do not form a recognizable syndrome. These distinctions are relevant from the epidemiological perspective since they allow homogeneous subgroups of cases to be identified, and from the clinical point of view, to provide information on prognosis, risk of recurrence, diagnosis, and treatment plan [8].

The frequency of occurrence of Cleft Lip and Palate (CLP) varies depending on various factors, such as the population studied, the sample design, data collection, and the analysis methodology used. Based on the information available, it is important to note that these figures can vary considerably by ethnicity and geographic location [9-11].

The highest frequency of CLP has been noted to be among Asian and Native American populations, with an incidence of approximately 1 in every 500 births. On the other hand, Caucasian, Hispanic, and Latin American populations have an average frequency of around 1 in every 1,000 births. In contrast, the African population shows the lowest frequency, with approximately 1 in every 2,500 births. These differences in frequency may be influenced by genetic, environmental, and socioeconomic factors [10-12].

The frequency of Congenital Craniofacial Malformations (CCM), including lip-palate clefts, also varies by gender and cleft pattern. A greater prevalence of cleft lip and palate has been consistently observed in men, with a ratio of approximately 1.81 men for every woman. Cleft lip, whether with or without a cleft palate, is more common in men, while an isolated cleft palate is more typical in women, in various ethnic groups. Additionally, the gender ratio may vary depending on the severity of the cleft. According to the International Perinatal Database of Typical Orofacial Clefts (IPDTC) working group, it is estimated that approximately 10.3% of Cleft Lip (CL) cases are bilateral, while for the cleft lip and palate, this proportion rises to 30.2%. Regarding unilateral cases, it is observed that 36.9% of CL cases and 41.1% of CLP cases occur on the right side, suggesting that unilateral CLP cases have a higher frequency on the left side [13].

The objective of this study is to evaluate the incidence of patients

diagnosed with non-syndromic cleft lip and palate according to gender, age, diagnosis, and treatment who attended the Oral and Maxillofacial Surgery service of the "Ángel Larralde" University Hospital during the period 2016-2022.

Materials and Methods

A study was carried out in which retrospective review of medical records was carried out to analyze all cases of Cleft Lip and Palate (CLP) identified in the population of patients who attended and underwent surgery in the oral and maxillofacial surgery service of the University Hospital. "Ángel Larralde" (HUAL). In total, 1,800 pediatric patients were registered who attended the oral and maxillofacial surgery service for 7 years. From this population, a sample of 305 patients was identified who were classified into different categories according to the type of cleft lip and palate, including patients with unilateral and bilateral cleft lip, cleft palate, alveolar cleft, and sequelae of cheiloplasty and palatoplasty.

Inclusion criteria

For this study, pediatric patients with a diagnosis of non-syndromic lip, palate, and alveolar cleft were diagnosed and underwent surgical intervention in the oral and maxillofacial surgery service during the period 2016-2022.

Exclusion criteria

Patients with any associated syndromic pathology.

Correction techniques

For these cracks attended to in the service, the techniques used were the following:

- For lip cleft, the techniques of Mulliken (1976), Millard (1955), Tennison Randall (1954), and Ascensio (1953) were used [6].
- For the cleft palate, the techniques of Veau-Wardill-Kilner (1937), Von Langebeck (1860), and Furlow (1986) were used [6].

Methodology

Study design: This research is evaluative and descriptive, carrying out retrospective analysis of a longitudinal design, delimiting the time of information collection, and obtaining quantitative results. It was carried out in the "Dr. Atilio Perdomo" Department of Oral and Maxillofacial Surgery of the "Dr. Ángel Larralde" University Hospital located in the state of Carabobo, Venezuela.

Study population: The data of all non-syndromic cleft lip and palate patients who underwent corrective surgery in our service for 07 years (2016-2022) were retrospectively analyzed.

Data collection: The data linked to the sociodemographic profile and clinical characteristics are presented considering the analysis of medical records within the service during the period between 2016 and 2022, in addition to questionnaires completed by surgeons, residents, and health professionals. Variables such as age, gender, diagnosis, and type of surgical procedure performed were examined. Subsequently, these data sets were entered into tables in Excel format to perform statistical analysis.

Classification of clefts: For the diagnosis of the patients, the classification described by Kernahann and Stark in 1971 was used, using the Kernahann diagram. The patients were segregated into diagnoses of right, left, and bilateral unilateral lip cleft, primary and secondary palatal cleft, right and left unilateral alveolar cleft, and bilateral. In addition, the consequences of cheiloplasty and

Table 1: Morbidity from 2016 TO 2022.

Morbidity from 2016 to 2022								
	Gender	Population	Age (year)	Population	Diagnosis	Population	Treatment	Population
2016 - 2022	M	164	0-3	166	CLR	31	Graft for alveolar reconstruction	twenty
	F	141	03-06	74	CLL	38	Mulliken technical cheiloplasty	26
			06-09	35	CLB	25	Tennison Randall technical cheiloplasty	69
			09-12	10	CPP	2	Millard technical cheiloplasty	12
			12+	Twenty	CPS	68	Ascensio technical cheiloplasty	6
					CPC	77	Von Langebeck Technique Palatoplasty	38
					CAR	5	Palatoplasty Veau-Wardill-Kilner Technique	68
					CAL	6	Furlow Technique Palatoplasty	66
					CAB	8		
					SC	16		
				SP	29			
Total		305		305		305		305

Source: Clinical history with diagnoses of lip and palate clefts who attended the Oral and Maxillofacial Surgery service.

Abbreviations: M: Male, F: Female, CLR: Right labial cleft, CLL: Left labial cleft, CLB: Bilateral labial cleft, CPP: Primary cleft palate, CPS: Secondary cleft palate, CPC: Complete cleft palate, CAR: Alveolar cleft right, CAL: left alveolar cleft, CAB: bilateral alveolar cleft, SC: sequelae of cheiloplasty, SP: sequelae of palatoplasty

palatoplasty were added.

Statistical analysis

Demographic characteristics of the study population were presented as counts of categorical variables. A statistical analysis was carried out using clinical characteristics, gender, age, diagnosis, and type of surgery performed, evaluating these factors over time and comparing the results obtained.

Result

A total of 305 patients underwent surgery over 7 years (2016-2022). The year with the highest incidence was 2016, with a total of 69 cases (22.62%). A higher incidence of diagnosis was observed in patients with complete cleft palate, with a total of 77 patients (25.24%) (Table 1 and Graph 1). Furthermore, a higher incidence of left lip cleft was found compared to other types of lip cleft, with a total of 38 patients (12.45%). Regarding gender, a greater number of male patients were registered, with a total of 164 cases (54%) compared to the female gender, which presented a total of 141 cases (46%). Regarding the incidence according to age, the parameters

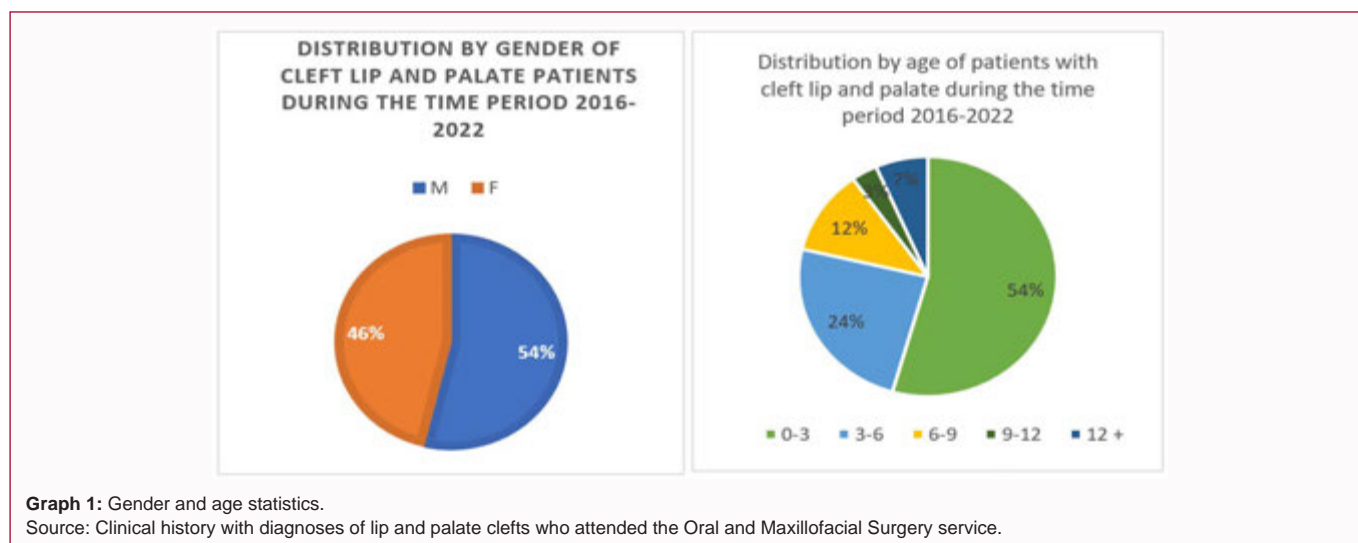
corresponding to the following age categories were evaluated: 0 to 3 years, 3 to 6 years, 6 to 9 years, 9 to 12 years, and more than 12 years.

Regarding the techniques used to correct cleft lip, the most used in the service was the technique described by Tennison Randall, with a total of 69 cases (22.62%). The most used technique to correct cleft palate was the Veau-Wardill-Kilner Technique, with 68 cases (22.29%) (Figures 1-4).

A statistically significant relationship was found between the diagnosis and the patient's gender. Cleft lip was present in 70 patients (74.46%) in males and 24 patients (25.53%) in females. Cleft palate was present in 67 patients (45.57%) in males and 80 patients (54.42%) in females. In general, a higher prevalence of cleft lip was observed on the left side and in males, while cleft palate had a higher incidence in females (Table 2).

Discussion

Vijay Kumar et al. conducted a study in which they evaluated 926 patients who underwent cleft lip surgery for 10 years (2007-2016) at a care center in the sub-Himalayan state of Himachal Pradesh in



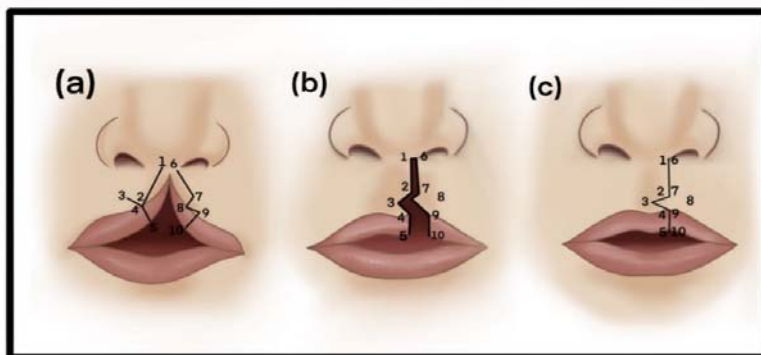


Figure 1: Cheiloplasty using the Tennison Randall Technique (1954).



Figure 2: Male pediatric patients undergoing primary Cheiloplasty.



Figure 3: Pre- and postoperative evolution of Cheiloplasty using the Tennison Randall technique (1954).



Figure 4: Preoperative and postoperative evolution of a patient operated on by Veau-Wardill-Kilner technical Palatoplasty (1937).

northern India. Of these patients, 507 (54.8%) were men and 419 (45.2%) were women, resulting in a ratio of men to women of 1.2 to 1. In the service, a higher number of male patients, with a total of 164 cases (54%), compared to the female gender, which presented a total of 141 cases (46%), which is equivalent to a ratio of men to women of 1.16 to 1 [14].

In the study by Tito Osita Chukwuanukwu et al., a total of 280 patients with cleft lip and palate deformities were evaluated over 12 years in southeastern Nigeria. The results showed that Cleft Palates (CLP) were more common in men, representing 66.1% of cases. Conversely, when examining isolated Cleft Palates (CP) and Lip Clefts (CL), it was found that these conditions were more prevalent

among women, with 67.2% and 56% respectively. Additionally, a majority of the participants (71.43%) fell within the age range of 0 to 3 years old [15].

Regarding lip cleft, comparing the findings with those seen in the HUAL, a higher incidence of diagnoses was observed in 70 patients (74.46%) in males and 24 patients (25.53%) in females. However, cleft palate was present in 67 patients (45.57%) in males and 80 patients (54.42%) in females. In general, a higher prevalence of cleft lip was observed on the left side and in males, while cleft palate had a higher incidence in females. Furthermore, it is observed that the highest incidence was found in patients aged between 0 and 3 years, with a total of 166 cases (54%). These results are consistent with previous

Table 2: Patient morbidity diagnosis – gender relationship.

Patient morbidity diagnosis-gender relationship					
	Male gender		Female gender		
	Diagnosis	Population	Diagnosis	Population	
	CLR	22	CLR	9	
	CLL	26	CLL	12	
	CLC.	22	CLC.	3	
	CPP	2	CPP	0	
	CPS	28	CPS	40	
	CPC	37	CPC	40	
	CAR	3	CAR	2	
	CAL	3	CAL	3	
	CAB	5	CAB	3	
	SC	6	SC	10	
	SP	10	SP	19	
	Total	164	Total	141	

Source: Clinical history with diagnoses of lip and palate clefts who attended the Oral and Maxillofacial Surgery service.

Abbreviations: CLR: Right Labial Cleft; CLL: Left Labial Cleft; CLB: Bilateral Labial Cleft; CPP: Primary Cleft Palate; CPS: Secondary Cleft Palate; CPC: Complete Cleft Palate; CAR: Alveolar Cleft

research that has highlighted variability in the presentation of cleft palates and suggest the importance of an individualized evaluation and multidisciplinary approach to the management of these deformities. It is essential to consider the specific characteristics of each patient when planning treatment, to obtain the best functional and aesthetic results.

In the retrospective and cross-sectional study carried out by Claudio Peña Soto et al., 3,923 patients evaluated in Peru during the period 2006-2019 were analyzed. Regarding the surgical procedure, the most frequent interventions were cheiloplasty and palatoplasty. In the case of cheiloplasty, it was performed in 837 patients (47.42%), of which 320 were women and 517 were men. On the other hand, palatoplasty was performed in 689 patients (39.04%), of which 277 were women and 412 were men. Additionally, fistula repair was performed in 428 patients (42.29%), with 174 women and 254 men. It is important to highlight that cheiloplasty was the most frequent surgical intervention, with a total of 837 cases (47.42%) [16], compared with the analysis in the HUAL, it is observed that cheiloplasty using the technique described by Tennison Randall was the most used in this Oral and Maxillofacial Surgery Service, with a total of 69 cases (22.62%). On the other hand, to correct the cleft palate, the most used technique was palatoplasty using the Veau-Wardill-Kilner Technique, with a total of 68 cases (22.29%). These results highlight the importance of selecting and using appropriate surgical techniques to achieve the best results in the treatment of patients with cleft lip and palate. The choice of surgical technique should be based on individual considerations of each patient and the medical team's experience.

Conclusion

The present study offers clinical and epidemiological information on patients with lip and palate clefts who attended the Oral and Maxillofacial Surgery Service of the "Ángel Larralde" University Hospital (HUAL). It is concluded that in 2016 the highest incidence of cases was recorded, with a total of 69 surgeries, the most common diagnosis being complete cleft palate, with a total of 77 cases, in addition, a higher incidence of lip clefts was observed in patients' males compared to female patients, with left lip cleft being the most

common with 38 cases. The most commonly used technique to correct lip cleft was that described by Tennison Randall, while the Veau-Wardill-Kilner Technique was used to correct palatal cleft. A statistically significant relationship was found between the diagnosis and the patient's gender, with a higher prevalence of lip clefts on the left side in male patients, and a higher incidence of palatal clefts in female patients. These findings provide a solid foundation for future research and support the need to continue improving treatment strategies, to provide the best possible care to patients with cleft lip and palate deformities.

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