

Comparison of palatal fistula incidence post palatoplasty with Veau-wardill kilner technique between men and women

Rania Ghifara Syaharani¹, Gabriella Benedictine Oetomo^{1,*}, Malika Fadiyah¹, Coen Pramono Danudiningrat² and Ni Putu Mira Sumarta²

¹ Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia.

² Department of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia.

World Journal of Advanced Research and Reviews, 2024, 23(03), 3062–3069

Publication history: Received on 18 August 2024; revised on 24 September 2024; accepted on 27 September 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.23.3.2975>

Abstract

Cleft palate is a congenital abnormality that occurs in the mouth and surrounding structures. The most used classification of cleft palate by Veau (1931). To repair the palatal defect, shape and function, surgical correction is necessary. There are various types of palatoplasty techniques that can be used, such as Veau-Wardill-Kilner. Palatoplasty may causes complications such as palatal fistula. Department of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, Airlangga University has been carrying out a social service for cleft lip and palate surgery repair since year 2008 in various regions in Indonesia. However, until now, there is no data available related with the incidence of palatal fistula.

Purpose: To observe the comparison between the palatal fistula incidence post palatoplasty using Veau-Wardill-Kilner technique based on gender.

Methods: This study based on 113 palatoplasty cases using Veau-Wardill-Kilner technique taken from Oral and Maxillofacial Cleft Palate Surgery Social Service data, Faculty of Dental Medicine, Airlangga University from the period of 2013 until 2022. Data analysis used Kruskal-Wallis on IBM SPSS version 29 Windows.

Results: from 113 patients, 20 cases (17,7%) showed that there is developed palatal fistula. Between the incidence of palatal fistula in men and women observed after palatoplasty procedure using Veau-Wardill-Kilner, higher percentages of palatal fistula were found in women ($p=0.426$).

Conclusion: The incidence of palatal fistula post palatoplasty using Veau-Wardill-Kilner technique in women is higher than men.

Keywords: Cleft palate; Palatal fistula; Palatoplasty; Veau-Wardill-Kilner

1. Introduction

Cleft palate is a congenital defect that occurs in the mouth and surrounding structures. The occurrence of cleft palate is influenced by both genetic and non-genetic factors. Cleft palate can cause several dental abnormalities, such as hypodontia, hyperdontia, microdontia, ectopic teeth, impaction, transposition, delayed growth, crown and root malformations, and caries (Vyas *et al.*, 2020). In addition, anatomical deformities can also occur in the lips, nose, alveoli, palate, maxilla, mandible, or soft palate muscles (Dewi, 2019). Patients will also have difficulty speaking, eating, and ear infections can occur (Vyas *et al.*, 2020).

* Corresponding author: Gabriella Benedictine Oetomo

Various classifications of cleft palate have been developed. However, the classification that is quite often used is the classification by Veau. The Veau classification system was created to improve the previous system which was considered too complex and impractical (Houkes *et al.*, 2023). According to Veau, there are four types of cleft palate, including: class I: cleft only in the soft palate; class II: cleft in the soft and hard palate; class III: cleft in the soft and hard palate extending unilaterally through the alveolus; and class IV: cleft in the soft and hard palate extending bilaterally through the alveolus (Subramanyam *et al.*, 2020).

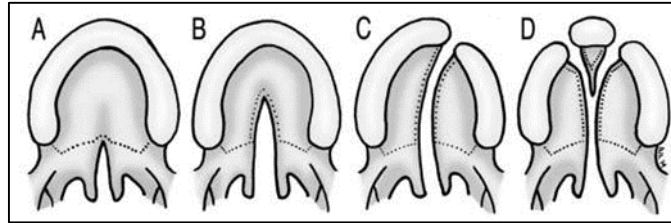


Figure 1 Veau's Classification of Cleft Palate (Shkoukani *et al.*, 2014)

Cleft palate sufferers can undergo palatoplasty to restore the normal shape and function of the palate (Naidu *et al.*, 2021). There are various types of palatoplasty techniques that can be used, such as Veau-Wardill-Kilner for incomplete cleft palate (Sadhu and Chauhan, 2023). The Veau-Wardill-Kilner technique is able to increase the length of the palate (Naidu *et al.*, 2022). However, Veau-Wardill-Kilner may leave the membranous bone exposed (Aboulhassan *et al.*, 2023).

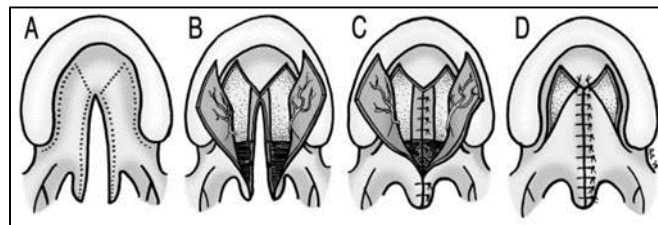


Figure 2 Veau-Wardill-Kilner palatoplasty (Shkoukani *et al.*, 2014)

Palatoplasty can cause complications, namely the appearance of a palatal fistula. Fistula is an abnormal connection between the nose and mouth through the palate (Katsube *et al.*, 2023). In a palatal fistula, there will be a channel between the oral and nasal cavities that forms scar tissue through the epithelialization process (Pascawinata and Rahmat, 2018). Palatal fistula can appear as an asymptomatic hole or be characterized by speech disorders, regurgitation, and difficulty maintaining oral health (Park *et al.*, 2022). The incidence of fistula after cleft palate surgery varies up to 45% (Eltahir, 2021).



Figure 3 Palatal Fistula (Rossell-Perry, 2015)

Risk factors for palatal fistula can be due to surgical techniques (Park *et al.*, 2022). Errors in palatoplasty techniques that may cause fistulas include lack of mobilization, tissue tension, injury during reintubation, poor tissue handling, failure of layered closure, bleeding, and infection (Mahran and Rizq, 2023). Park *et al.* (2022) reported that 3.1% of patients experienced palatal fistulas after palatoplasty procedure using the Veau-Wardill-Kilner technique. Therefore, before performing palatoplasty, dentists specializing in oral and maxillofacial surgery need to consider the various risks that may occur (Pollard *et al.*, 2021).

Brosco-Dutka (2021) developed a protocol for fistula classification. It is stated that this needs to be done to find out how to prevent and treat palatal fistulas. Another study stated that the classification of palatal fistula is important for treatment planning and communication between craniofacial specialists (Haukes R. *et al.*, 2023). There are five regions where palatal fistula occurs, including region 1 in the pre-alveolar and/or alveolar arch, region 2 in the post-alveolar, region 3 in the hard palate after the incisive foramen, region 4 in the transition area between the hard and soft palate, and region 5 in the soft palate.

The Department of Oral and Maxillofacial Surgery, Airlangga University has been conducting social service activities for cleft lip and palate surgery since 2008 in various regions in Indonesia. Some of the regions that have been visited include Lombok, Situbondo, Bima, Tuban, Kudus, Semarang, Kupang, Probolinggo, Sampang, and Kediri. Until now, there has been no research evaluating the incidence of palatal fistula after palatoplasty in the social service of the Department of Oral and Maxillofacial Surgery, Airlangga University. The incidence of palatal fistula is considered to be influenced by surgical techniques and can affect the quality of life of sufferers. Therefore, researchers are interested in discussing this further. It is hoped that this study can be a basis for consideration by dental specialists in oral and maxillofacial surgery and patients in performing palatoplasty.

2. Material and methods

2.1. Type and Design of Research

The type of research used in this study is observational analytical clinical research with a retrospective study design. The study was conducted by tracing secondary data without any treatment. The population in this study were palatoplasty patients who came and were recorded in the Community Service data for Cleft Palate Social Services, Oral and Maxillofacial Surgery, Faculty of Dentistry, Airlangga University for the period January 2013 to December 2022. This study used total sampling, namely all patients who were treated and recorded in the Community Service data for Cleft Palate Social Services, Oral and Maxillofacial Surgery, Faculty of Dentistry, Airlangga University for the period January 2013 to December 2022 that were in accordance with the inclusion and exclusion criteria of the study. The inclusion criteria of this study were patients with primary palatoplasty treatment at the Cleft Palate Social Service of Oral and Maxillofacial Surgery, Faculty of Dentistry, Airlangga University who were recorded in the data using the Veau-Wardill-Kilner technique of all ages and genders, undergoing postoperative control, and experiencing palatal fistula. The exclusion criteria of this study were patients at the Cleft Palate Social Service of Oral and Maxillofacial Surgery, Faculty of Dentistry, Airlangga University who underwent secondary palatoplasty. The study was conducted at the Special Dental and Oral Teaching Hospital (RSKGM-P) of Airlangga University which was carried out from July 2023 to September 2023.

2.2. Ethical Eligibility Test and Data Collection

The researcher conducted an ethical eligibility test at the Dental and Oral Teaching Special Hospital, Faculty of Dentistry, Airlangga University and collected patient data from January 2013 to December 2022 who met the inclusion and exclusion criteria.

2.3. Recording Patients with Palatal Fistula

The researcher recorded data on patients with palatal fistula after postoperative control. According to Brosco-Dutka, there are five regions where palatal fistula occurs, namely region 1 in the pre-alveolar and/or alveolar arch, region 2 in the post-alveolar, region 3 in the hard palate after the incisive foramen, region 4 in the transition area between the hard and soft palate, and region 5 in the soft palate. The classification of the palatal fistula region is only a descriptive analysis.

2.4. Data Processing and Statistical Testing

In this study, a comparative test was conducted to determine the comparison of palatal fistula incidence between men and women. Data processing was carried out using IBM SPSS Software Statistical Product and Service Solution (SPSS) data is presented in tabular form. The data was processed by conducting it as a descriptive analysis to determine the distribution of samples based on gender and age. Descriptive analysis was also conducted to determine the distribution of palatal fistula incidents based on gender, age, and the distribution of palatal fistula regions based on the Veau-Wardill-Kilner techniques. Normality test was carried out using the Kolmogorov-Smirnov Test and homogeneity test with the Levene Test. Correlation test was carried out with One Way ANOVA if the data was normally distributed and was carried out with the Kruskal-Wallis test if the data was not normally distributed.

3. Results

The data obtained in this study came from the data of Community Service for Cleft Palate Social Service of Oral and Maxillofacial Surgery, Faculty of Dentistry, Airlangga University. After selecting the inclusion and exclusion criteria, a total of 113 palatoplasty patient data were obtained that could be analyzed.

Table 1 Demographic Data of Palatoplasty Patients

Category		Frequency	%
Gender	Men	60	53
	Women	53	47
Age	Babies and Toddlers (<5 years)	61	54
	Children (5-9 years)	27	24
	Teenager (10-18 years)	18	16
	Adult (19-59 years)	7	6

Table 5.1 shows the demographic data of palatoplasty patients in the form of gender and age that have been analyzed descriptively. A total of 60 people (53%) of all palatoplasty patients in this study were men and 53 others (47%) were women. Based on the age category by the Ministry of Health, patients who underwent palatoplasty at the age of infants and toddlers were 61 people (54%); children were 27 people (24%); adolescents were 18 people (16%); and adults were 7 people (6%).

Table 2 Distribution of Incidence of Palatal and Regional Fistula in Palatoplasty Patients

Category		Frequency	%
Palatal Fistula	Yes	20	17,7
	No	93	82,3
Palatal Fistula Region	Regio 1	0	0
	Regio 2	1	5
	Regio 3	5	25
	Regio 4	1	5
	Regio 5	13	65

Based on table 5.2, it is known that of all patients, there were 20 patients or 17.7% who experienced palatal fistula. Meanwhile, 93 patients or 82.3% did not experience palatal fistula. The distribution of palatal fistula regions is very diverse. In this study, palatoplasty patients most often experienced palatal fistula in region 5, namely 13 people or 65%. Then, followed by region 3 as many as 5 people or 25%; regions 2 and 4 as many as 1 person or 5%; and no patients experienced palatal fistula in region 1.

Table 3 Distribution of Palatal Fistula Incidents Based on Gender and Age of Palatoplasty Patients

Category		Incident	%
Sex	Men	9	45
	Women	11	55
Age	Babies and Toddlers (<5 tahun)	10	50
	Children (5-9 tahun)	4	20
	Teenager (10-18 tahun)	5	25
	Adult (19-59 tahun)	1	5

Table 5.3 shows that the incidence of palatal fistula in women is higher than men, namely 11 people each (55%). Based on age category, there were 10 incidents of palatal fistula (50%) that occurred in infants and toddlers; 4 incidents (20%) in children; 5 incidents (25%) in adolescent and 1 incident (5%) occurred in adulthood.

Table 4 Contingency Coefficient Test Results

Variable	Palatal Fistula	Frequency	Kruskal-Wallis	Information
Gender	Yes	20 (17,7%)	0.426	There is no significant difference
	No	93 (82,3%)		

*signification $\alpha = 0,05$

3.1. Analysis of Research Results

The data must be tested with a data normality test and a data homogeneity test before we decide the type of comparative test that we will use. The results of the data normality test can be interpreted that the data is not normally distributed, so the comparative test we use is Kurkal-Wallis. Kruskal-Wallis test in this study uses a significance value of $\alpha = 0.05$. If the significance value is less than 0.05, it can be stated that there is a significant difference. Conversely, if the significance value is more than 0.05, it is stated that there is no significant difference. Based on table 5.4, the results of the correlation test between the incidence of post-palatal fistula and surgical techniques are that there is no significant difference between the incidence of palatal fistula in men and women ($p = 0.426$).

4. Discussion

Based on the demographic table, it is known that from a total of 113 samples undergoing palatoplasty, the number of men patients was greater than women patients. This is inconsistent with a study in the Netherlands which reported that the prevalence of cleft palate in men is less than cleft palate in women (Pool, *et al.*, 2020). In a study by Zhu *et al.* (2021) in China and Widhani *et al.* (2022) in Indonesia, it was also reported that the incidence of cleft palates in women was more frequent. The exact explanation for the difference in prevalence is still being debated. Differences in craniofacial development time are considered to be one of the contributing factors. Genetic variation may also be a supporting factor (Pool, *et al.*, 2020). The study stated that women's hormones can be related to the palatine process. In women, the shift of the palatal shelves from vertical to horizontal occurs one week longer than in men. This will affect the appearance of clefts (Nagase *et al.*, 2010). Based on table 5.3, the incidence of palatal fistula post palatoplasty in women is higher than men. Studies by Balushi *et al.* (2017 and Buller *et al.* (2023) also showed equivalent results, while studies by Mahajan *et al.* (2018) and Park *et al.* (2021) reported that the incidence of palatal fistulas was greater in men but there was no significant relationship.

According to the Ministry of Health, there are five age categories, such as infants and toddlers (<5 years), children (5-9 years), adolescents (10-18 years), adults (19-59 years), and the elderly (>60 years). In this study, most patients who underwent palatoplasty were one year old. This is in accordance with the theory that there are three palatoplasty time ranges, which is early (6-9 months), standard (10-18 months), and late (>18 months) (Naidu *et al.*, 2022). A study by Skolnick *et al.* (2022) reported that 85% of operators performed palatoplasty on patients aged 9-12 months. Several other researchers stated that the age of 12 to 18 months is the best time. The timing was chosen to promote scar tissue formation and considerably increase speech ability (Laras *et al.*, 2020; Ruslin *et al.* 2019).

In this study, the most cases of palatal fistula based on age category were infants and toddlers, especially patients aged 2 years. Based on 20 patients who experienced palatal fistula, only two patients underwent palatoplasty within the standard time frame. Most of the others had undergone late palatoplasty. Starting from the age of two years, speech ability will develop so if palatoplasty is not performed before that age, the development of speech will be disrupted (Naidu *et al.*, 2022). The results of late palatoplasty will be less satisfactory due to the patients with a mature skeletal shape "because it requires additional incisions so that tension in the midline will increase (Vieira *et al.*, 2020).

This study was conducted in various regions in Indonesia and some were in rural places. A small proportion of patients in this study were in the adult age category. In rural places, it is extremely rare to meet patient age requirements for surgery. One possible cause is the late diagnosis of clefts and the lack of resources to immediately treat cleft palate. Many cleft palate sufferers undergo surgery because of social services such as in this study due to financial constraints (Ruslin *et al.*, 2019). A study by Harb *et al.* (2021) stated that cleft palate patients with low socioeconomic status will undergo palatoplasty later than patients with good socioeconomic status. There are many factors that influence this situation, such as the lack of access to health services, transportation, geographic location, education, and so on. A study

by Meara *et al.* (2015) also stated that the problem of patients in rural places is the difficulty of getting treatment because they have to pay for medical expenses and transportation. Patients also have less knowledge about treatment options. This will certainly increase the risk of post-operative complications for patients.

In this study, the overall incidence of palatal fistula was 17.7%, which is higher than the incidence in North Carolina, which was 1.6% (Losken *et al.*, 2011). However, these results are still lower than studies in Thailand and China which stated that the incidence of fistula was 26.07% and 77.8% (Saothonglang *et al.*, 2021; Mak *et al.*, 2006). Studies by Vityadewi and Bangun (2013) in Jakarta, Indonesia showed the percentage of palatal fistula after palatoplasty was 20.4%.

According to Brosco-Dutka (2021), there are five regions where palatal fistula occurs. In this study, the highest incidence of fistula occurred in region 5, namely the soft palate. A study by Mahajan *et al.* (2018) showed different results, which were higher in the anterior or hard palate at 65.57%. Likewise, a study by Garg *et al.* (2019) stated that the location of the most palatal fistulas was in the incisive foramen. This is because dissection in the anterior palate is more difficult, especially in the nasal layer. A study by Murthy (2011) showed that the location of palatal fistulas most often occurred between the hard and soft palates. Possible causes of this are lack of mobilization and tissue deficiency. Palatal fistula in region 5 can occur because during palatoplasty to prevent increased tension, an additional incision is made on the lateral soft palate. Even though the additional incision has been made, there is still tension that is difficult to avoid, which can cause palatal fistula (Vieira *et al.*, 2020). Palatal fistula can also occur if there is excessive tension or the palatal tissue is too thin (Pramono, 2023).

The results of Kruskal-Wallis test between the incidence of post-palatal fistula in men and women showed no significant difference ($p=0.426$). The percentage of palatal fistula incidence that did not differ much between men and women means that Veau-Wardill-Kilner technique is good for repairing cleft palates in men and women. According to Mahajan *et al.* (2018), Sakran *et al.* (2020), and Katusabe *et al.* (2018) study, reported that there was no significant relationship between surgical techniques and the appearance of fistulas. This may be influenced by the distribution of cases using various surgical techniques, where in this case the Veau-Wardill-Kilner technique was used more. Several studies have stated that the Veau-Wardill-Kilner technique has a low incidence of palatal fistula. Even a study by Pollard *et al.* (2021) showed zero results. There are several reasons for this. According to surgeons, the Veau-Wardill-Kilner technique is suitable for repairing incomplete cleft palates (Naidu *et al.*, 2022). This technique also produces good midfacial in the long term (Balushi *et al.*, 2017). The pushback flap suture is expected to close the gap well and improve speech function (Ariawan *et al.*, 2021). In addition, Veau-Wardill-Kilner can lengthen the palate and produce a better retroposition position of the levator muscle (Naidu *et al.*, 2022). However, Abdel-Aziz and Ghandour (2010) studies showed conflicting results. After palatoplasty using the Veau-Wardill-Kilner technique, there were two patients with incidents of palatal fistula between the hard and soft palate. One study also stated that there was a 12% incidence of postoperative palatal fistula with the Veau-Wardill-Kilner technique (Abdel-Aziz and Ghandour, 2011). This may be caused by the difficulty of elevating the oral and nasal mucosa because it is attached to the midline of the posterior edge of the hard palate, resulting in mucosal tears. In addition, Veau-Wardill-Kilner only uses one layer of anterior mucosa, which can be a risk factor for palatal fistula (Shkoukani *et al.*, 2014). There is no palatoplasty technique that can simultaneously prevent incidents of palatal fistula, good speech development, and reduce facial hypoplasia. Each technique certainly has its own advantages and disadvantages (Naidu *et al.*, 2022).

The skill or experience of the operator may play a role in the incidence of palatal fistula. The operator must minimize tension and maintain blood vessel supply so that healing can occur. A study by Park *et al.* (2022) stated that different operator experiences in each palatoplasty technique can affect the incidence of palatal fistula. Onah *et al.* (2020) also stated that the incidence of palatal fistula was higher in operations performed by less experienced operators.

Another factor that can be a risk factor for palatal fistula incidents in this study is postoperative care. After palatoplasty, the food consumed by the patient needs to be considered. Patients should consume liquid and soft foods for one month. This is because hard textured foods can damage palatoplasty sutures (Salim *et al.*, 2023). Coughing and sneezing can also damage the sutures so patients are advised to open their mouths when sneezing (Raghavan *et al.*, 2018).

The results of palatoplasty are not easy to measure because they require a sufficient number of samples, long-term follow-up, and various data to evaluate the results (Naidu *et al.*, 2022). Some patients only had a check-up for 7 days so that the healing process was not optimal and the appearance of a fistula could not be known. Then, some preoperative and postoperative clinical photos were unclear. It is hoped that this study can be a basis for consideration by dental specialists in oral surgery and patients in performing palatoplasty and can reduce the risk of palatal fistula.

5. Conclusion

From this study it can be concluded that the incidence of palatal fistula after palatoplasty with the Veau-Wardill-Kilner technique is higher in men than in women.

Compliance with ethical standards

Acknowledgments

The authors are grateful to the instructor and the entire team of the Department of Oral and Maxillofacial Surgery at the Faculty of Dental Medicine, Airlangga University, East Java, Indonesia, for their assistance with this study.

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

The study was approved by the Airlangga University Dental and Oral Hospital (RSGM) (18/UN3.9.3/Etik/PT/2023).

Statement of informed consent

Informed and written consent was obtained from all of respondent and participant of this study.

References

- [1] Abdel-Aziz, M, Ghandour, H. Comparative study between VY pushback technique and Furlow technique in cleft soft palate repair. *European Journal of Plastic Surgery*. 2011; 34:27-32.
- [2] Aboulhassan, MA, Refahee, SM, Sabry, S, Abd-El-Ghafour, M. Correction to: Effects of two fap palatoplasty versus furlow palatoplasty with buccal myomucosal fap on maxillary arch dimensions in patients with cleft palate at the primary dentition stage: a cohort study. *Clinical Oral Investigations*. 2023; 1-1.
- [3] Ariawan, D, Nugroho, AY, Anam, MN, Yulvie, W. Oronasal Fistula Closure Using Modified VY Pushback Technique: A Case Report. *Journal of International Dental and Medical Research*. 2021; 14(2):773-776.
- [4] Balushi, AA, Sahib, MM, Balushi, TA. Palatal Fistula Post-Cleft Palate Repair: A Tertiary Center Experience in Oman. *Modern Plastic Surgery*. 2017; 7(03):21-30
- [5] Eltahir, MAA. Oronasal Fistula: A Complication of Cleft Palate Surgery. 2021.
- [6] Garg, R, Shah, S, Uppal, S, Mittal, RK. A statistical analysis of incidence, etiology, and management of palatal fistula. *National journal of maxillofacial surgery*, 2019; 10(1):43–46.
- [7] Houkes, R, Smit, J, Mossey, P, Don Griot, P, Persson, M, Neville, A, ... & Breugem, C. Classification systems of cleft lip, alveolus and palate: results of an international survey. *The Cleft Palate Craniofacial Journal*. 2023; 60(2):189-196.
- [8] Katsube, M, Utsunomiya, N, Katayama, Y, Yamanaka, H, Tsuge, I, Sowa, Y, Sakamoto, M, Morimoto, N. Interposition grafting of collagen-gelatin sponge impregnated with basic fibroblast growth factor in primary palatoplasty. *Regenerative Therapy*. 2023; 24:288-293.
- [9] Katusabe, JL, Hodges, A, Galiwango, GW. et al. Challenges to achieving low palatal fistula rates following primary cleft palate repair: experience of an institution in Uganda. *BMC Res Notes*. 2018; 11:358
- [10] Mahajan, RK, Kaur, A, Singh, SM, Kumar, P. A retrospective analysis of incidence and management of palatal fistula. *Indian journal of plastic surgery: official publication of the Association of Plastic Surgeons of India*. 2018; 51(3):298–305.
- [11] Mahran, H, Rizq, M. Management of oronasal fistula in patients with cleft palate by double-flap technique: Short-term follow-up. *The Egyptian Journal of Surgery*. 2022; 41(3):1298-1302.
- [12] Murthy J. Descriptive study of management of palatal fistula in one hundred and ninety-four cleft individuals. *Indian journal of plastic surgery: official publication of the Association of Plastic Surgeons of India*. 2011; 44(1):41–46.

- [13] Naidu, P, Yao, CA, Chong, DK, Magee III, WP. Cleft palate repair: A history of techniques and variations. *Plastic and Reconstructive Surgery Global Open*. 2022; 10(3).
- [14] Nagase, Y, Natsume, N, Kato, T, Hayakawa, T. Epidemiological Analysis of Cleft Lip and/or Palate by Cleft Pattern. *Journal of maxillofacial and oral surgery*. 2010; 9(4):389–395.
- [15] Ningruma, LP, Saputroa, ID, Zarasadea, L. Corelation of parents' profiles of children with late cleft repair in Surabaya cleft lip and palate centre (January 2015–December 2017). *Jurnal Rekonstruksi & Estetik*. 2020; 6(1).
- [16] Onah, II, Amanari, CO, Onwuagha, I, Jac-Okereke, CA. OUTCOMES OF CLEFT PALATE SURGERIES AT THE NATIONAL ORTHOPAEDIC HOSPITAL, ENUGU, NIGERIA: NOVEMBER 2008 - NOVEMBER 2013. *Annals of Ibadan postgraduate medicine*. 2020; 18(1):S39– S44.
- [17] Park, MS, Seo, HJ, Bae, YC. Incidence of fistula after primary cleft palate repair: a 25-year assessment of one surgeon's experience. *Archives of Plastic Surgery*. 2022; 49(01): 43-49.
- [18] Pascawinata, A, Rahmat, M. PENATALAKSANAAN FISTULA ORONASAL MENGGUNAKAN TEKNIK PEDICLE ROTATIONAL FLAP DAN AUTOGRAFT DARI SIMPHISIS MANDIBULA. *B-Dent: Jurnal Kedokteran Gigi Universitas Baiturrahmah*. 2018; 5(2):116-123.
- [19] Pollard, SH, Skirko, JR, Dance, D, Reinemer, H, Yamashiro, D, Lyon, NF, Collingridge, DS. Oronasal fistula risk after palate repair. *The Cleft Palate-Craniofacial Journal*. 2021; 58(1):35-41.
- [20] Pool, SM, der Lek, LMV, de Jong, K, Vermeij-Keers, C, Mouës-Vink, CM. Embryologically based classification specifies gender differences in the prevalence of orofacial cleft subphenotypes. *The Cleft Palate-Craniofacial Journal*. 2021; 58(1):54-60.
- [21] Pramono C. The use of surgical template for palatal fistula repair in cleft palate using tongue flap: 3 case report. *International journal of surgery case reports*. 2023; 111:108808.
- [22] Raghavan, U, Vijayadev, V, Rao, D, Ullas, G. Postoperative management of cleft lip and palate surgery. *Facial Plastic Surgery*. 2018; 34(06):605-611.
- [23] Rossell-Perry, P. Flap necrosis after palatoplasty in patients with cleft palate. *BioMed research international*. 2015.
- [24] Ruslin, M, Dom, L, Tajrin, A, Hajrah Yusuf, AS, Arif, SK, Tanra, AH, Ou, KL, Forouzanfar, T, Thamrin, SA. Establishing cleft services in developing countries: Complications of cleft lip and palate surgery in rural areas of Indonesia. *Archives of plastic surgery*. 2019;46(6):511–517
- [25] Sakran, KA, Liu, R, Yu, T, Al-Rokhami, RK, He, D. A comparative study of three palatoplasty techniques in wide cleft palates. *International Journal of Oral and Maxillofacial Surgery*. 2021; 50(2):191-197.
- [26] Saothonglang, K, Punyavong, P, Winaikosol, K, Jenwitheesuk, K, Surakunprapha, P. Risk factors of fistula following primary palatoplasty. *Journal of Craniofacial Surgery*. 2021; 32(2):587-590.
- [27] Shkookani, MA, Lawrence, LA, Liebertz, DJ, Svider, PF. Cleft palate: A clinical review. *Birth Defects Research Part C: Embryo Today: Reviews*. 2014; 102(4):333–342
- [28] Skolnick, GB, Keller, MR, Baughman, EJ, Nguyen, DC, Nickel, KB, Naidoo, SD, Olsen, MA, Patel, KB. Timing of Cleft Palate Repair in Patients With and Without Robin Sequence. *The Journal of craniofacial surgery*. 2021; 32(3):931–935
- [29] Subramanyam, D. An insight of the cleft lip and palate in pediatric dentistry-a review. *J Dent Oral Biol*. 2020; 5(2):1164.
- [30] Vityadewi, N, Bangun, K. Incidence of palatal fistula after one-stage palatoplasty and factors influencing the fistula occurrence. *Jurnal Plastik Rekonstruksi*. 2013; 2(4).
- [31] Vieira, PH, Denadai, R, Raposo-Amaral, CA, Sabbag, A, do Monte, TM, Raposo-Amaral, CE. Late Primary Palatoplasty in Skeletally Mature Patients: Obstacles and Outcomes. *Journal of Craniofacial Surgery*. 2020; 31(6):1544-1546.
- [32] Vyas, T, Gupta, P, Kumar, S, Gupta, R, Gupta, T, Singh, HP. Cleft of lip and palate: A review. *Journal of family medicine and primary care*. 2020; 9(6):2621–2625.
- [33] Widhani, RD, Utami, G, Irwansyah, D, Dessy, A, Surachman, AS, Adam, H. The Evaluation of Hospital Social Responsibility Services in Gatot Soebroto Indonesia Central Army Hospital in 2015–2019 of Cleft Lip and Palate Patients. *International Journal Of Medical Science And Clinical Research Studies*. 2022; 2(11):1346-1350.
- [34] Zhu, Y, Miao, H, Zeng, Q, Li, B, Wang, D, Yu, X, Wu, H, Chen, Y, Guo, P, Liu, F. Prevalence of cleft lip and/or cleft palate in Guangdong province, China, 2015–2018: a spatio-temporal descriptive analysis. *BMJ open*. 2021; 11(8):e046430.