

Content available at: <https://www.ipinnovative.com/open-access-journals>

IP Journal of Otorhinolaryngology and Allied Science

Journal homepage: <https://www.joas.co.in/>

## Original Research Article

## A retro-prospective study of cleft palatal fistulas: An analysis of prevalence, cause and location in operated cleft lip and palate cases

Denis Jacob Kurian<sup>1\*</sup>, Kiran Radder<sup>1</sup>, Anil Desai<sup>1</sup><sup>1</sup>Dept. of Oral Surgery, SDM College of Dental Sciences & Hospital, Dharwad, Karnataka, India

## ARTICLE INFO

## Article history:

Received 10-01-2024

Accepted 15-02-2024

Available online 27-02-2024

## Keywords:

Oral and Maxillofacial Surgery

Cleft palatal fistula

Oronasal fistula

## ABSTRACT

**I ntroduction:** One of the expected outcomes of palate repair is to achieve complete partition between nasal and oral cavity in addition to good speech. Any failure of achieving complete structural integrity of palate is labelled as an oronasal (palatal) fistula with persistent passage between oral and nasal cavity, it can occur at the anterior, posterior or mid palatal region

**A ims:** The aim of the study is to assess prevalence of palatal fistula, cause of palatal fistula, location of palatal fistula and to derive a more relevant surgical technique.

**Materials and Methods:** A retro-prospective study was conducted in operated cleft patients who showed presence of palatal fistula between the age group of 9 months to 7 years. The data collected included age, sex and type of cleft defect type, width of cleft palate type of surgery performed, size of fistula, location of fistula, duration of fistula formation postoperatively

**Results:** 8 palatal fistula were included. The fistula was located mostly at the anterior palatal region (50%) and secondly at the mid palatal region (38%). The occurrence of fistula in operated cleft lip and palate cases was noted mostly after V-Y pushback palatoplasty followed by Von Langenbeck

**Conclusion:** Among the surgical techniques used for palatoplasty, the Von Langenbeck is proven to be superior than V-Y pushback palatoplasty in accordance with the occurrence of palatal fistula. The anterior palate fistulas were the most common type in the study.

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: [reprint@ipinnovative.com](mailto:reprint@ipinnovative.com)

## 1. Introduction

Cleft palate repair is a surgery done in order to attain proper closure of the nasal floor, muscle tissue and oral mucosa.<sup>1</sup> Failure in regaining the proper structural integrity results in cleft palate fistula which can be either due to the residual non repaired cleft or the breakdown of the original repaired palate.<sup>2</sup>

The approach to palatal fistula depends on the symptoms associated, the site and dimensions of the fistula. The most common symptoms are speech distortions caused by nasal emissions; poor oral hygiene caused by food and

fluid seepage into the nasal cavity resulting in nasal lining inflammation.<sup>3</sup> Treatment Management must be planned with consideration of concerns of the patient and also, the evaluated findings since the fistula closure can be combined with other procedures like Velo-pharyngeal incompetence (VPI) correction, lip revision or bone graft. The incidence of palatal fistula can range from 0-35% with the average overall incidence of 8.6%.<sup>1-9</sup> The risk factors of palatal fistula repair ranges from the type of cleft defect, its dimensions, the surgeon's experience and the timing and technique of repair used for the procedure.

\* Corresponding author.

E-mail address: [denisf430@gmail.com](mailto:denisf430@gmail.com) (D. J. Kurian).

## 2. Objective of Study

The objectives of this study is to assess the prevalence, cause and location of palatal fistula and to derive a more relevant surgical technique.

## 3. Materials and Methods

A Retro-Pro prospective study was conducted in department of Oral and Maxillofacial Surgery, SDM College of Dental Sciences and Hospital, Dharwad. Subjects were patients with presence of palatal fistula who were operated for Unilateral complete cleft lip and Palate, Bilateral cleft lip and palate, Isolated cleft palate of age group 9 months to 7 years during June 2017 to June 2020.

Patients satisfying the following inclusion and exclusion criteria was included in the study.

### 3.1. Inclusion criteria

1. Age : 9 months - 7 years
2. Non syndromic patients
3. Isolated cleft palate
4. Unilateral cleft lip and Palate
5. Bilateral cleft lip and palate

### 3.2. Exclusion criteria

1. Age: Above 8 years & below 9 months
2. Syndromic patients
3. Patients who had undergone lip repair elsewhere and reported for treatment of cleft palate at our unit.

Demographic details were collected including the age and sex of all the patients operated for cleft lip and palate

The Parameters for Post-Operative Assessment were

#### 3.2.1. Age of patient

Children of 9 months to 7 years with cleft lip and palate was included in the study.

#### 3.2.2. Type of cleft

1. Unilateral complete cleft lip and palate
2. Bilateral cleft lip and palate
3. Isolated cleft palate

#### 3.2.3. Width of cleft palate

The initial width of the cleft palate was noted

#### 3.2.4. Type of surgery performed

The various type of surgeries performed in our unit for closure of cleft palate were Von Langenbeck, Veau wardill palatoplasty, Furlow's technique and Sommerlad technique

#### 3.2.5. Size of fistula

The size of the fistula was elicited using direct caliper measurement

## 4. Location of Fistula

The location of the palatal fistula was either in the anterior region, mid region or posterior region of the hard palae

### 4.1.

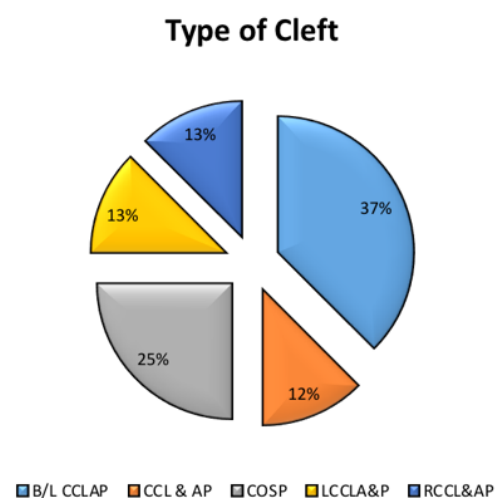
#### 4.1.1. Duration of fistula formation postoperatively

The duration from the primary surgery for cleft lip and palate to the occurrence of fistula was noted

## 5. Results

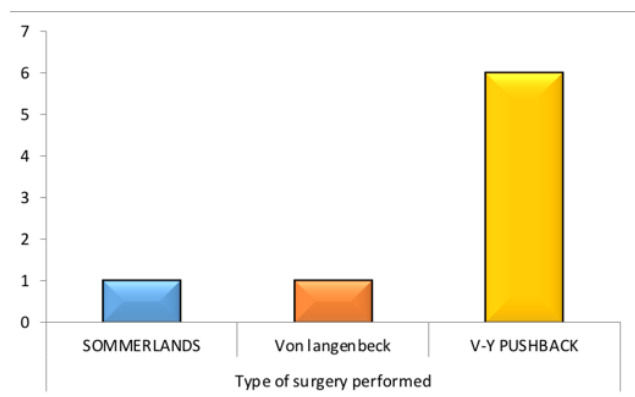
**Table 1:** Distribution of type of cleft, surgery performed and location of Fistula

		Frequency	Percent
Type of cleft	BCCLAP	3	37.5
	CCLAP	1	12.5
	COSP	2	25
	LCCLAP	1	12.5
	RCCLAP	1	12.5
Type of surgery performed	SOMMERLADS	1	12.5
	Von Langenbeck	1	12.5
	V-Y PUSHBACK	6	75
Location of fistula	APF	4	50
	APF,MPF	1	12.5
	MPF	3	37.5

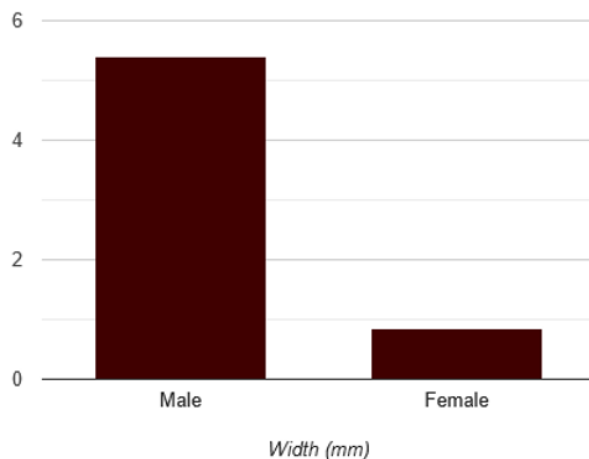


**Figure 1:** Distribution of types of cleft

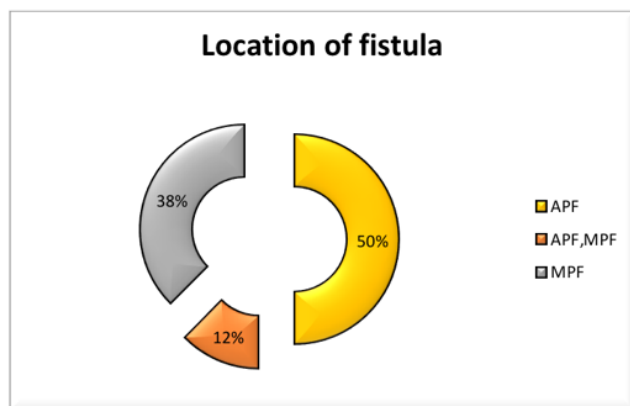
The occurrence of fistula in operated cleft lip and palate cases was seen mostly after V-Y pushback palatoplasty followed by Von Langenbeck and Sommerlads technique.



**Figure 2:** Type of surgery performed

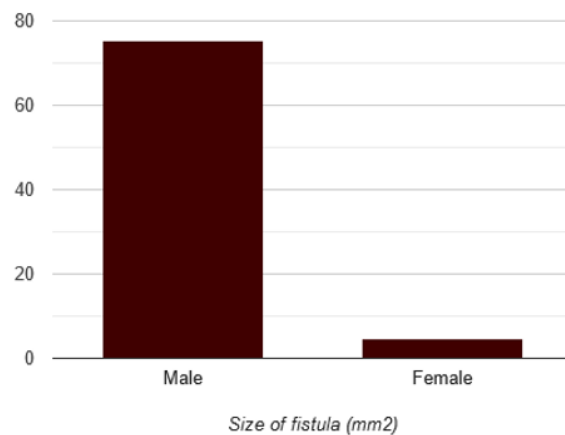


**Figure 5:** Width of cleft

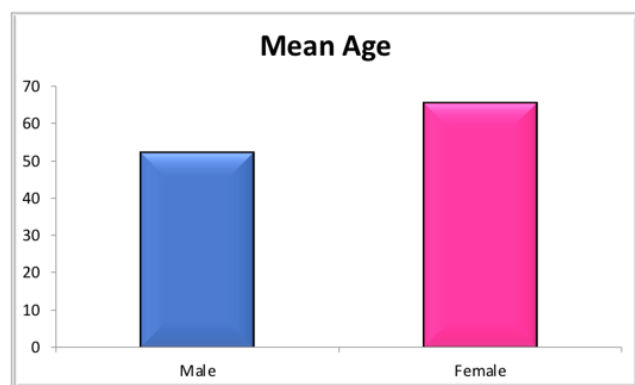


**Figure 3:** Location of fistula

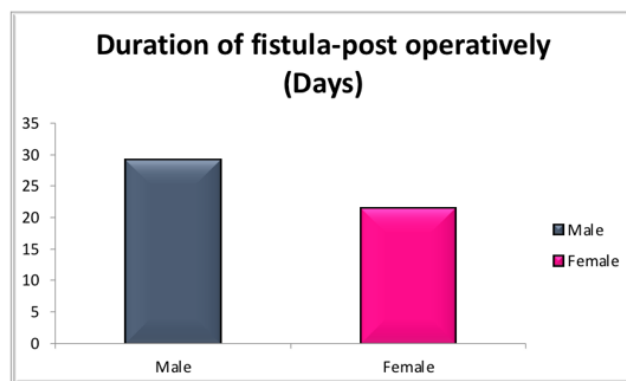
The fistula was located mostly at the anterior palatal region (50%) and secondly at the mid palatal region (38%). A combination of anterior and mid palatal fistula (12%) was also noted.



**Figure 6:** Size of fistula



**Figure 4:** Distribution of patients by gender



**Figure 7:** Duration of fistula-post operatively

1. The chi-square ( $\chi^2$ ) test is a useful statistical test to look at differences with categorical variables.

**Table 2:** Distribution of age, width of cleft, size of fistula and duration of fistula post-operatively

		Age (Months)	Width (mm)	Size Of Fistula (mm <sup>2</sup> )	Duration of fistula-post operatively (Days)
<b>Male</b>	N	6	6	6	6
	Mean	52	4.57	44.67	29.17
	Std. Deviation	29.90	5.40	75.27	8.28
<b>Female</b>	N	2	2	2	2
	Mean	65.50	1.60	4.08	21.50
	Std. Deviation	58.69	0.85	0.46	10.61
<b>Total</b>	N	8	8	8	8
	Mean	55.38	3.83	34.52	27.25
	Std. Deviation	34.20	4.78	66.33	8.81

**Table 3:** Statistical analysis of the parameters

		Observed N	Expected N	Residual	Chi square	P Value
<b>Type of cleft</b>	BCCLAP	3	1.6	1.4	2	0.736
	CCLAP	1	1.6	-0.6		
	COSP	2	1.6	0.4		
	LCCLAP	1	1.6	-0.6		
	RCCLAP	1	1.6	-0.6		
<b>Type of surgery performed</b>	V-Y PUSHBACK	6	2.7	3.3	6.25	0.044*
	VON LANGENBECK	1	2.7	-1.7		
	SOMMERLADS	1	2.7	-1.7		
<b>Location of fistula</b>	APF	5	4	1	0.5	0.48
	MPF	3	4	-1		

\*Statistical significance set at 0.05

**Figure 8:****Figure 9:**

- When there is one categorical variable from a single population, and would like to determine whether the sample is consistent with a hypothesized distribution, then we can use a  $\chi^2$  goodness-of-fit test.
- V-Y Pushback palatoplasty displays a statistically significant higher association with Palatal fistula when compared to Von langenbeck and Sommerlads type of surgery. (P=0.044) whereas Type of cleft and location

of fistula exhibits no statistically significant association with palatal fistula.

## 6. Discussion

Cleft palate is one of the foremost common congenital malformations in the orofacial region. Oronasal fistula



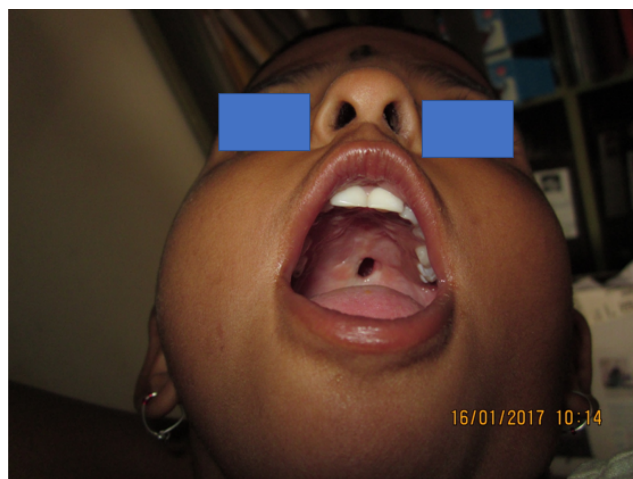
**Figure 10:**



**Figure 11:**



**Figure 12:**



**Figure 13:**

(ONF) or cleft palate fistula is often the most common complication related with cleft palate surgery. The tension produced by the cleft palate is the main reason for fistulas to appear during the repair process. This can lead to nasal regurgitation of food and hyper-nasality of the voice.<sup>10–12</sup>

Palate repair failures occur due to incompetent velopharyngeal seal which may be a resultant of insufficient motion in soft palate or when the entire repaired palate is not long enough. One method to increase anteroposterior length of the palate is by having multiple mucoperiosteal flaps in the hard palate.<sup>13</sup> In our study, out of the 1040 cleft lip and cleft palate surgeries conducted between June 2017 and June 2020. Various surgical techniques were used standardizing the sample to reduce the number of interfering factors as much as possible. The techniques include von Langenbeck technique, Veau Wardil pushback palatoplasty, Furlow's technique, Sommerlads.

In the study, the age at which individuals underwent primary palatoplasty ranged from 9 months to 7 years (Table 2) and is in line with the prime time to carry out cleft palate and lip repair which is around 12 - 18 months of age according to the American Cleft Palate-Craniofacial Association (1993).<sup>4,14</sup>

As per the study 20 patients reported with complications related to cleft palatal fistula. Only patients with the following criteria were included in the study, which included between 9 months and 7 years of age, non-syndromic and patients with isolated, unilateral and bilateral cleft lip or palate. Patients who had undergone lip repair or prior related surgeries at another cranio-facial unit were not included in the study. The time frame between the initial palatoplasty and the appearance of fistula averaged 29.17 days for males and 21.50 days for females (Table 2, Figure 6). In the study's limited sample size, it was observed that the ratio of affected male to female was 3:1 which is in line with studies carried out by Amaratunga in 1998



that showed higher occurrence in males than in females for unknown reasons.<sup>15</sup> The mean age for corrective surgery in males were 52 months and females were 65.5 months (Table 2, Figure 4). There was no statistical significance to showcase a relationship between the age of corrective surgery and occurrence of fistula. There were 4 types of cleft presented in the study as shown in Table 1 and Figure 1, 37.5% had bilateral complete cleft lip, alveolus and palate, 25% had cleft of secondary palate, 12.5% each had either complete cleft lip including the anterior palate or left cleft lip and anterior palate. Most of the studies do not consider the cleft side as a variable when it comes to occurrence of fistulas. This was considered statistically but revealed no positive correlation between the left or right unilateral clefts. The distribution in the type of palatoplasty is shown in Figure 2, of the total, 75% of the cases had V-Y pushback surgeries while 12.55% each had Sommerlads or Von Langenbeck surgeries which are in tandem with studies showing higher rates of fistula with V-Y pushback compared to other palatoplasty techniques.<sup>9,16</sup> The width of the cleft ranged from 0.85 cm to 5.4 cm (Table 2, Figure 5). Studies have shown a direct correlation between the width of a cleft and increased occurrence of a fistula.<sup>15,17–19</sup> Three types of fistulas were observed in the study, the distribution based on location are shown in Figure 3 and are as follows; 50% at Anterior palatal fissure, 37.5% in the mid-palatal fissure and 12.5% was in the anterior and mid-palatal fissure. This is in congruence with studies having larger sample size in which the anterior palate fistulas were most prominent<sup>16,20</sup>. The size of the fistula ranged from 0.46 mm<sup>2</sup> to 75.27 mm<sup>2</sup> (Table 2, Figure 6).

The study has not considered certain aspects such as occurrence of certain problems during the surgical procedure which is likely due to the lack of information gathered from retrospective studies which deals with no observance of all stages in rehabilitation.<sup>19</sup> It is of utmost importance to determine the occurrence and prevalence of palatal fistula since it plays a detrimental role to the quality of life. This will also allow in changing protocols in caregiving by professional staff by changing modes of rehabilitation which involves several specialties.

## 7. Conclusion

This study has demonstrated that the prevalence of palatal fistula after the initial cleft palate surgery is considered to be around the range of 2% to 45% from literature. There are several reasons for the occurrence of fistulas, these include the type of palatoplasty technique employed, the width of the cleft during the initial surgery, the age of the patient when the surgery is done and also the surgeon prior experience in the field. There was no co-relation between the age of corrective surgery and occurrence of fistula. The anterior region of palate had more occurrence of fistula than the mid palatal region and posterior region. In this study the

von langenbeck is proven to be superior than V-Y pushback palatoplasty in accordance with the occurrence of palatal fistula.

## 8. Summary

Oral nasal fistula (ONF) or palatal fistula are direct resultants of palate repair failures. These occur due to incompetent velopharyngeal seal which may be caused by insufficient motion in soft palate or when the entire repaired palate is not long enough. The approach to palatal fistula does not need to be in the form of surgical repair but on the severity of the associated symptoms. The study considered patients with non-syndromic unilateral and bilateral cleft and those who had prior related surgeries at another cranio-facial unit.

Multiple palatoplasty techniques are employed to correct cleft issues. Most methods used employ increasing the anteroposterior length of the palate by having multiple mucoperiosteal flaps in the hard palate. Among the surgeries the V-Y pushback technique compared to other palatoplasty techniques has the highest rate of fistula occurrence. Other findings include the direct correlation between the width of the cleft and increased occurrence of a fistula. The anterior palate fistulas were most prominent in the study. Other findings showed no statistical significance or proven correlation such as the time between the corrective surgery and occurrence of fistula. There is also no positive relationship based on the location of the cleft and incidence of fistulas.

Rigorous follow up to the palatoplasty is required to eliminate the occurrence of fistula which will lead to cost benefits and better well-being for the patient. This will reduce the number of secondary surgeries and related surgical risk by proper standardization and increased quality of treatment offered to the patients.

## 9. Source of Funding

None.

## 10. Conflict of Interest


None.

## References


1. Andersson EM, Sandvik L, Semb G, Abyholm F. Palatal fistulas after primary repair of clefts of the secondary palate. *Scandinavian J Plastic Reconstructive Surgery and Hand Surg*. 2008;42:296–9.
2. Bekercioglu M, Isik D, Bulut O. Comparison of the rate of palatal fistulation after two-flap and four-flap palatoplasty. *Scand J Plast Reconstr Surg Hand Surg*. 2005;39(5):287–9.
3. Amaratunga NA. Occurrence of oronasal fistulas in operated cleft palate patients. *J Oral Maxillofac Surg*. 1988;46(10):834–8.
4. Agrawal K. Cleft palate repair and variations. *Indian J Plast Surg*. 2009;42:102–9.
5. Abyholm FE, Borchgrevink HH, Eskeland G. Palatal fistulae following cleft palate surgery. *Scand J Plast Reconstr Surg*.

- 1979;13(2):295–300.
6. Cohen SR, Kalinowski J, Larossa D, Randall P. Cleft palate fistulas: a multivariate statistical analysis of prevalence, etiology, and surgical management. *Plast Reconstr Surg*. 1991;87(6):1041–7.
7. Maine RG, Hoffman WY, Palacios-Martinez JH, Corlew DS, Gregory GA. Comparison of fistula rates after palatoplasty for international and local surgeons on surgical missions in Ecuador with rates at a craniofacial center in the United States. *Plast Reconstr Surg*. 2012;129(2):319–26.
8. Losken HW, Van Aalst J, Teotia SS, Dean SB, Hultman S, Uhrich KS. Achieving low cleft palate fistula rates: surgical results and techniques. *Cleft Palate Craniofac J*. 2011;48(3):312–20.
9. Perko M. The History of Treatment of Cleft Lip and Palate. *ProgPediatr Surg*. 1986;20:238–51.
10. Katusabe JL, Hodges A, Galiwango GW, Mulogo EM. Challenges to achieving low palatal fistula rates following primary cleft palate repair: experience of an institution in Uganda. *BMC Res Notes*. 2018;11(1):358–358.
11. Passos VDAB, Carrara CFDC, Dalben GDS, Costa B, Gomide MR. Prevalence, cause, and location of palatal fistula in operated complete unilateral cleft lip and palate: retrospective study. *Cleft Palate Craniofac J*. 2014;51(2):158–164.
12. McCarthy JG, Surgery P. W.B. Saunders Company. 1989.
13. Nagase Y, Natsume N, Kato T, Hayakawa T. Epidemiological Analysis of Cleft Lip and/or Palate by Cleft Pattern. *J Maxillofac Oral Surg*. 2010;9(4):389–395.
14. & Parwaz M, & Sharma R, Parashar, Nanda, & Vipul, Biswas, et al. Width of cleft palate and postoperative palatal fistula—do they correlate. *Journal of plastic, reconstructive & aesthetic surgery*. 2008;.
15. Smith DM, Vecchione L, Jiang S. The Pittsburgh Fistula Classification System: a standardized scheme for the description of palatal fistulas. *Cleft Palate Craniofac J*. 2007;44(6):590–594.
16. Lu Y, Shi B, Zheng Q, Hu Q, Wang Z. Incidence of palatal fistula after palatoplasty with levator veli palatini repositioning according to Sommerlad. *Br J Oral Maxillofac Surg*. 2010;48(8):637–40.
17. Da C. Fistulae in the hard palate following cleft palate surgery. *Br J Plast Surg*. 1962;15:377–384.
18. Woo AS, Skolnick GB, Sachanandani NS, Grames LM. Evaluation of two palate repair techniques for the surgical management of velopharyngeal insufficiency. *Plast Reconstr Surg*. 2014;134(4):588–96.
19. Phua YS, Chialain TD. Incidence of oronasal fistulae and velopharyngeal insufficiency after cleft palate repair: an audit of 211 children born between. *Cleft Palate Craniofac J*. 1990;45(2):172–178.
20. Aziz A, Ghandour H. Comparative study between V-Y pushback technique and Furlow technique in cleft soft palate repair. *Eur J Plastic Surg*. 2010;34(1):27–32.

## Author biography

**Denis Jacob Kurian**, Assistant Professor  <https://orcid.org/0000-0001-7862-9608>

**Kiran Radder**, Professor  <https://orcid.org/0000-0003-1503-2067>

**Anil Desai**, Professor  <https://orcid.org/0000-0003-1513-2383>

**Cite this article:** Kurian DJ, Radder K, Desai A. A retro-prospective study of cleft palatal fistulas: An analysis of prevalence, cause and location in operated cleft lip and palate cases. *IP J Otorhinolaryngol Allied Sci* 2024;6(4):97-103.