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### Key Words

Frenulum, sleeve, circumcision, phimosis, preputial skin

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## A Comparative Study of Frenulum Sparing Circumcision: Versus Sleeve Technique of Circumcision

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### ABSTRACT

Circumcision, a surgical procedure to remove the foreskin of the penis, is a widely performed operation with cultural, religious and medical significance. Although commonly done in the neonatal period, it can be performed at any age. Originating around 15,000 years ago for ritualistic purposes, circumcision became medically recognized in the 19th century. Globally, one-third of men are circumcised, with religious practices dominating among Jews, Muslims and other ethnic groups, while medical indications like phimosis are more prevalent in Western countries. Medical conditions such as diabetes mellitus and lichen sclerosus, linked to penile cancer, are common reasons for circumcision. Additional benefits include reduced risks of urinary tract infections (UTIs), HIV, HPV, syphilis, herpes and penile cancer, as well as decreased cervical cancer rates in sexual partners. Circumcision methods are categorized as device-based or classical surgical approaches, including Gomco clamp, Plastic bell and the Sleeve technique. The Sleeve technique is widely favored for its precise excision of preputial layers, reduced complications and favorable cosmetic outcomes. Frenulum-sparing techniques, which preserve the frenulum to minimize ischemic pain and improve patient satisfaction, are gaining attention. However, comparative studies on the safety and efficacy of the Sleeve versus frenulum-sparing techniques remain limited. This review investigates these techniques to evaluate their outcomes, safety profiles and complications.

## INTRODUCTION

**Circumcision Overview:** Circumcision is the surgical removal of the foreskin (prepuce), performed globally for cultural, religious, medical and public health reasons. While often carried out in infancy, it is suitable at any age. Historically, it dates back 15,000 years, with the earliest evidence in Ancient Egypt around 2300 B.C. Initially ritualistic, it gained medical recognition in the 19th century<sup>[1-5]</sup>.

**Reasons for Circumcision:** Religious circumcision is prevalent among Jews, Muslims, Black Africans and Australian Aborigines. In Western countries, it addresses medical issues like phimosis, linked to diabetes mellitus or lichen sclerosus, which heightens penile cancer risk. Other medical indications include paraphimosis, balanitis, posthitis, localized carcinoma and condylomata acuminata.

**Health Benefits:** Circumcision reduces risks of urinary tract infections, HIV (up to 60%), HPV, syphilis, herpes, penile cancer and cervical cancer in partners. Organizations like UNAIDS and WHO endorse it as a preventive measure against HIV.

**Surgical Techniques:** Techniques include device-based methods (Gomco clamp, Mogen clamp, PrePex, Plastibell) and classical approaches (dorsal slit, sleeve technique). The sleeve technique, excising foreskin layers under direct vision, minimizes complications and yields favorable outcomes. The frenulum-sparing method, preserving the frenulum, offers reduced postoperative pain and higher patient satisfaction.

**Research Focus:** While both sleeve and frenulum-sparing techniques are effective, comparative studies on their safety and outcomes are limited. This study aims to evaluate these methods comprehensively.

### Aims and Objectives:

**Aims:** To compare the frenulum sparing circumcision with sleeve technique.

**Objectives:** To study outcome of frenulum sparing circumcision, to study the complication of frenulum sparing circumcision

## MATERIALS AND METHODS

**Study Design:** This randomized comparative study was conducted in the Department of Surgery at a tertiary care hospital.

**Study Setting:** The study was carried out in the Department of Surgery at the tertiary care hospital, with approval and clearance granted by the institutional ethics committee.

**Study Duration:** 18 months.

**Sample Size:** A total of 200 patients were enrolled, with each group consisting of 100 patients. Participants were divided into two groups based on the circumcision technique used: Group 1 underwent the sleeve technique and Group 2 underwent the frenulum-sparing technique.

**Sampling Method:** Patients were randomly assigned to either group using a random sampling method.

### Inclusion Criteria:

- Patients aged between 18 and 65 years.
- Individuals seeking circumcision for religious reasons.
- Patients who consent to participate in the study.

### Exclusion Criteria:

- Long redundant prepuce.
- Frenular breve.
- Scarred frenulum.
- Suspected underlying penile cancer.
- Severe posthitis.
- Balanitis Xerotica Obliterans (BXO) involving the entire foreskin.

This randomized comparative study was conducted after obtaining informed consent from all enrolled patients. A total of 200 patients, matched by age, were randomly assigned to two groups, with 100 patients in each group. Group A consisted of 100 patients who underwent circumcision using the sleeve technique, while Group B comprised 100 patients who underwent circumcision using the frenulum-sparing technique.

**Group A: Sleeve Technique:** A circumferential incision was made on the inner preputial skin, leaving a 0.25-0.5cm band near the corona, followed by a second incision on the penile skin. A longitudinal cut connected the two, and the strip of skin was removed. Bleeding was controlled with bipolar diathermy and the edges were sutured using 4-0 Vicryl or chromic stitches. The wound was dressed with petroleum-coated Jelonet and clean gauze.

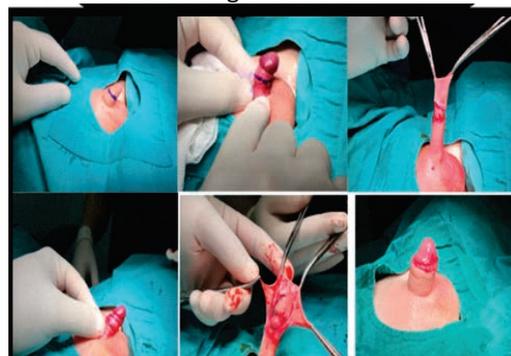


Fig. 1: Sleeve Technique

**Group B: Frenulum Sparing Circumcision:** The technique involves the initial creation of a dorsal slit that extends three-fourths of the distance from meatus to the corona. Then, lateral incisions from the proximal end of the dorsal slit are made obliquely, parallel to the corona maintaining their original distance from the margin. The two incisions terminate at the preputial edge, 3-4 millimeters away from the frenulum on either side. The skin and mucosal margins are approximated with 40 synthetic absorbable sutures after control of minor bleeding points with bipolar cautery. The frenular artery is not encountered during the procedure. The prepuce should easily be drawn over the coronal margin and remain in position, leaving the meatus well exposed.



**Fig. 2: Frenulum Sparing Circumcision**  
Dressing was removed after 24 hours and neomycin ointment applied to wound daily for one week. Patient was followed up at discharge 1 week, 2 weeks for wound healing, infection, patient satisfaction and both groups will be compared.

**Statistical Analysis:** Data were analyzed using IBM SPSS Version 20.0. Descriptive statistics were presented in the form of numbers and percentages. The normality of the data was tested using the Shapiro-Wilk or Kolmogorov-Smirnov test. Based on the normality of the data, appropriate parametric or non-parametric tests were applied. Associations between non-parametric variables were evaluated using the Pearson Chi-square test. Proportional comparisons were conducted using the Z test for two sample proportions. A p-value of <0.05 was considered statistically significant.

**RESULTS AND DISCUSSIONS**

**Table-1: Age Wise Distribution of Patients in Both Groups**

Age group (years)	Frenulum Sparing Circumcision	Percentage	sleeve technique of circumcision	Percentage	P-value
18-25	10	10.00%	16	16.00%	0.55
26-35	26	26.00%	23	23.00%	
36-45	30	30.00%	26	26.00%	
46-55	28	28.00%	25	25.00%	
>55	6	6.00%	10	10.00%	

The distribution of Frenulum Sparing Circumcision and Sleeve Technique Circumcision across different age

groups showed no significant difference in the 18-25 age group (P=0.55). The percentages were similar across other age groups, though further analysis was needed to determine statistical significance in those groups.

**Table-2: Distribution According to Indication for Circumcision**

Indication for circumcision	Frenulum Sparing	Percentage	sleeve technique	Percentage	P-value
Phimosis	60	60.00%	56	56.00%	0.98
Cosmesis	15	15.00%	17	17.00%	
Balanitis	11	11.00%	12	12.00%	
Posthitis	8	8.00%	8	8.00%	
Adjunct to TURP	6	6.00%	7	7.00%	

Phimosis, the most common reason for circumcision, was managed in 60 cases (60.00%) using the frenulum-sparing technique and 56 cases (56.00%) using the sleeve technique. The p-value of 0.98 indicates that there is no significant difference between the two techniques for treating phimosis. For cosmetic reasons, circumcision was performed in 15 cases (15.00%) with the frenulum-sparing technique and 17 cases (17.00%) with the sleeve technique. Balanitis, an inflammation of the glans, led to circumcision in 11 cases (11.00%) with the frenulum-sparing technique and 12 cases (12.00%) with the sleeve technique. Circumcision due to posthitis, or inflammation of the foreskin, was equally represented in 8 cases (8.00%) for both techniques. Additionally, as an adjunct to transurethral resection of the prostate (TURP), circumcision was carried out in 6 cases (6.00%) using the frenulum-sparing technique and in 7 cases (7.00%) using the sleeve technique. Overall, the distribution of indications is similar between the two techniques, with no significant statistical differences.

**Table 3: Operative Characteristics in Both Groups**

Operative characteristics	Frenulum Sparing	Sleeve technique	p-value
Mean operative time (min.)	104.56±8.66	106.22±8.76	P<0.0001
Mean blood loss	9.80±3.32	10.12±3.81	0.52
Mean VAS score	10.72±5.08	10.91±5.22	0.79
Mean healing time (days)	75.93±5.71	77.51±5.92	0.056
Local oedema	39(39.00%)	46(46.00%)	0.44

The Frenulum Sparing technique had a significantly shorter mean operative time (P < 0.0001) compared to the Sleeve Technique. No significant differences were observed in mean blood loss, VAS score, or local oedema between the two techniques. The mean healing time approached significance (P=0.056).

**Table 4: Distribution According to Clinical Data of Individual Patients**

Clinical data of patients	Frenulum Sparing	Sleeve technique	p-value
Intraoperative bleeding volume	60.53±25.2	64.12±26.12	0.32
Surgical time in (min)	122.93±5.76	124.01±6.18	0.20
Wound healing time (days)	40.13±11.56	42.05±12.98	0.27
Recovery Time	22.17±7.02	25.01±7.16	0.005
Patients Satisfaction	79.18%	60.15%	-

The Frenulum Sparing technique showed less recovery time (22.17±7.02 days) compared to the Sleeve Technique (25.01±7.16 days), with a significant P-value of 0.005. There were no significant differences in intraoperative bleeding volume, surgical time, or wound healing time between the two techniques. Patient satisfaction was higher with the Frenulum Sparing technique at 79.18% compared to 60.15% with the Sleeve Technique<sup>[6,7]</sup>.

Table 5: Distribution According to Complication

Complication	Frenulum Sparing	Sleeve technique	p-value
Bleeding	5	11	0.13
Urinary retention	0	1	-
Infection	5	13	0.059

The Frenulum Sparing technique had fewer complications compared to the Sleeve Technique, with non-significant differences in bleeding (P=0.13) and infections (P=0.059). Urinary retention was reported only in the Sleeve Technique group.

This randomized comparative study was conducted in the Department of Surgery at a tertiary care hospital, with a total duration of 18 months. Prior to the conducted a study, ethical approval was obtained from the institutional ethics committee and informed consent was taken from all participants. A sample of 200 patients, aged 18-65 years, was enrolled and randomly assigned into two groups of 100 patients each. Group A underwent circumcision using the sleeve technique, while Group B underwent the frenulum-sparing technique. The surgical procedures were performed under local anesthesia. Group A's sleeve technique involved circumferential incisions and skin removal with stitches, while Group B's frenulum-sparing technique preserved the frenulum and used absorbable sutures for closure. Postoperative care included wound dressing, daily application of neomycin ointment and follow-up at 1 and 2 weeks to assess wound healing, infection rates and patient satisfaction. Statistical analysis was performed using IBM SPSS Version 20.0. Descriptive statistics, normality tests, parametric/non-parametric tests, Chi-square tests and Z-tests were applied, with a p-value of <0.05 considered statistically significant. The most common indication for circumcision was phimosis and both techniques showed no significant differences in managing it or other conditions like posthitis, balanitis and as an adjunct to TURP. The study results showed most postoperative characteristics such as mean blood loss and healing time were similar between the groups, though the Frenulum-Sparing technique had a significantly shorter operative time and recovery period. Patient satisfaction was higher in the Frenulum-Sparing group (79.18%) compared to the Sleeve technique group (60.15%)<sup>[7-10]</sup>.

## CONCLUSION

There were fewer complications, such as bleeding and infections, in the Frenulum-Sparing group, though these differences were not statistically significant. Urinary retention was reported only in the Sleeve technique group. Overall, the Frenulum-Sparing technique demonstrated benefits in terms of quicker recovery and higher patient satisfaction.

## REFERENCES

- Hassan, Y., H. Rasool, A.A. Rather, Y. Ahmad and I. Rasool, 2022. Religious Circumcision (Khatna) and Circumcision Mishaps in Kashmiri Children. *Afr. J. Paediatric Surg.*, 19: 213-216.
- Simpson, E., J. Carstensen and P. Murphy., 2014. Neonatal circumcision: new recommendations & implications for practice. *Mo Med.*, 111: 222-230.
- Sanjeev, J. and J. Dharmendra., 2021. A Hospital Based Comparative Study to Evaluate Outcome of Circumcision: Conventional Dorsal Slit Technique Versus Sleeve Technique in Adult Patients. *Int J Med Res Prof.*, 7: 49-52.
- Timmermans, F.W., S.E. Mokken, S.C.Z.P. Toulabi, M.B. Bouman and M. Özer, 2021. A review on the history of and treatment options for foreskin reconstruction after circumcision. *Int. J. Impotence Res.*, 34: 424-433.
- Morris, B.J., S. Moreton, J.N. Krieger and J.D. Klausner, 2022. Infant Circumcision for Sexually Transmitted Infection Risk Reduction Globally. *Global Health: Sci. Pract.*, Vol. 10 .10.9745/ghsp-d-21-00811.
- Gerharz, E.W. and C. Haarmann, 2000. The first cut is the deepest? Medicolegal aspects of male circumcision. *BJU Int.*, 86: 332-338.
- Chavan, N. and N. Mokal, 2008. Modified safe technique for circumcision. *Indian J. Plast. Surg.*, 41: 47-50.
- Rosato, E., R. Miano, S. Germani and A.D. Asimakopoulos, 2024. Phimosis in Adults: Narrative Review of the New Available Devices and the Standard Treatments. *Clin. Pract.*, 14: 361-376.