DOI: https://doi.org/10.54393/pjhs.v6i7.3380

PAKISTAN JOURNAL OF HEALTH SCIENCES
(LAHORE)
https://thejas.com.pk/index.php/pjhs
ISSN (E): 2790-9352, (P): 2790-9344
Volume 6, Issue 07 (July 2025)

Original Article

OPEN ACCESS

Head and Neck Cancer Reconstruction with or without Internal Lining Using Various Flaps in a Tertiary Care Hospital

Muhammad Razzaq Dogar[1], Zubair Anwar[1], Vijay Kumar Khatri[2*], Ghulam Shabir Mahar[3,4], Abdul Waheed[5] and Allah Bux Mushtaq[6]

[1]Department of ENT and Head and Neck Surgery, Jinnah Postgraduate Medical Centre, Karachi, Pakistan
[2]Department of ENT, Al-Tibri Medical College and Hospital, Isra University, Karachi, Pakistan
[3]Department of ENT, Ghulam Mohammad Mahar Medical College, Sukkur, Pakistan
[4]Department of ENT and Head and Neck Surgery, Sir Syed College of Medical Science for Girls, Karachi, Pakistan
[5]Department of ENT, Mohammad Medical College, Mirpurkhas, Pakistan

ARTICLE INFO

Keywords:
Surgical Reconstruction, Surgical Flaps, Cosmetic Surgery

How to Cite:
Dogar, M. R., Anwar, Z., Khatri, V. K., Mahar, G. S., Waheed, A., & Mushtaq, A. B. (2025). Head and Neck Cancer Reconstruction with or without Internal Lining Using Various Flaps in a Tertiary Care Hospital: Head and Neck Cancer Reconstruction: Internal Lining Using Various Flaps. Pakistan Journal of Health Sciences, 6(7), 237-242. https://doi.org/10.54393/pjhs.v6i7.3380

***Corresponding Author:**
Vijay Kumar Khatri
Department of ENT, Al-Tibri Medical College and Hospital, Isra University, Karachi, Pakistan
doctor_vijay@hotmail.co.uk

Received Date: 12th June, 2025
Revised Date: 23rd July, 2025
Acceptance Date: 28th July, 2025
Published Date: 31st July, 2025

ABSTRACT

Reconstructive surgeries of the head and neck with or without the use of internal lining must be thoroughly evaluated for post-operative complications and functional outcomes unclear phrasing. **Objectives:** To compare the surgical outcomes, complication rates, and functional outcomes of head and neck cancer reconstruction surgeries performed with or without internal lining using various flap techniques in a Tertiary Care Hospital setting. **Methods:** This one-year prospective comparative study at Al-Tibri Medical College included 139 head and neck cancer patients undergoing resection and reconstructive surgery with or without internal lining. Data on demographics, tumor, surgical, and postoperative outcomes were analyzed using SPSS version 23.0, applying appropriate statistical tests with significance set at $p<0.050$. **Results:** From 139 patients, operative time was significantly longer in Group A (with flap and internal lining) than in Group B ($p<0.001$). Postoperative complications were more common in Group A, with higher rates of wound infection (15.7% vs. 5.8%, $p=0.040$) and overall complications (28.6% vs. 11.6%, $p=0.010$). Functional outcomes favored Group B, with significantly better swallowing (82.6% vs. 55.7%, $p=0.007$) and speech intelligibility (79.7% vs. 60%, $p=0.040$). Hospital stays over 7 days were more common in Group A (35.7% vs. 14.5%, $p=0.009$). The need for secondary intervention was higher in Group A, but not statistically significant. Overall, Group B demonstrated fewer complications and better postoperative functional recovery. **Conclusions:** Head and neck reconstruction without internal lining resulted in fewer complications, shorter hospital stay, and better functional recovery thanreconstruction with internal lining. Careful patient selection can optimize outcomes and surgical efficiency.

INTRODUCTION

According to the global ranking, head and neck cancers rank as the seventh most common cancers. They are reported with various groups of tumors, and mainly include the aero-digestive tract. Head and neck cancers are still a challenge to manage, and require an extensive multidisciplinary approach to treat advanced levels of disease, like surgical techniques, systemic approach and radiotherapy. Generally, the treatment is based on two key components, such as site-specific or histology-specific. Further studies are required to explore the strategiesfor the management of such advanced diseases and reduce the rate of complications [1]. Head and neck cancers create a specific health burden globally, and even with advanced management and techniques, the mortality and morbidity rates are significant [2]. Head and neck reconstructive procedures followed by new advanced methods have an

DOI: https://doi.org/10.54393/pjhs.v6i7.3380

impact on patient outcomes, specifically single-stage restoration of a massive area, including mucosal lining of the oral cavity to pharyngeal and esophageal region. The reconstruction approach depends on either maintaining the structural integrity or simply restoring function. According to recent studies, a specific algorithm provides better outlines for reconstruction procedures with improved patient outcomes [3]. Reconstructive surgeries using free tissue relocation of a specially pectoralis major flap with or without internal lining must be guideline specific to achieve a positive outcome. The functional outcomes include breathing, swallowing, vocalization and mastication [4]. Moreover, among the young population and especially females, cosmetic appearance after reconstructive surgeries is one of the considering factors. With the advancements in surgical procedures, reconstructive surgeries of the head and neck region using flaps either with or without internal lining have now become the first line of treatment [5]. It can aid in improving both the cosmetic and functional aspects using tissues from various sites (having similar features to the defective site) [6]. The use of flaps in reconstructive head and neck surgeries is being reported increasingly, with a success rate of 95 to 98 % cases [7]. Literature reports that as high as 97 % of head and neck reconstructive cases require flaps for recovering from deficits and restoration of the underlying structures [8]. In around 20 to 30 % of head and neck cancers, recurrence takes place at the primary tumor site, causing failure of reconstructive surgeries in the majority of cases [9]. It remains a challenging task where recurrence takes place after surgery. In such cases, the options for treatment are chemotherapy, salvage surgery, palliative care, radiation and/or a combination of any two from them [10]. The basic purpose is to repair the malignant regions and make it less invasive, with maximum restoration of other healthy tissues and underlying structures. Presently, for reconstructive surgeries, micro-vascular transfer of free tissue in the region of the head and neck is the most common [11]. Head and neck reconstruction is a very complex process. The range of reconstruction varies from simple lining defects to complex defects that involve bone and soft tissue [12]. However, one of the most important aspects of reconstructive surgery, the success rate depends on how early the disease is diagnosed and a proper management plan accordingly [13]. An early presentation along with TNM stage is low reconstruction will be easier in comparison to patients that present late or with advanced TNM stage of cancer, causing difficult and challenging reconstruction with an extensive invasive procedure [14]. Patients' cosmetic requirements and fitness for major surgery are key aspects for successful reconstruction of head and neck surgeries using flaps [15]. In this way, optimal functional as well as aesthetic outcomes are achieved [16]. The use of free flaps helps in providing a more reliable wound coverage with a better functional outcome, with superior cosmetic and minimal morbidity of the donor site [17]. Depending upon the site of size and composition of the recipient's defects, various free flaps are used. In addition, the preference of both patient and surgeon and the expertise of the surgeon are of paramount importance [18]. Flaps from perforators have gained rapid popularity because of their main benefits, which spare the underlying muscle, resulting in reduced morbidity of the donor site and possibly improving outcomes aesthetically [19]. Regarding the choice of flaps, most surgeons tend to prefer small soft tissue and lining defects, while larger defects of soft tissue have a complex, composite variety requiring reconstruction of bone as well [20].

Head and neck cancer reconstruction following tumor resection is a complex surgical process aimed at restoring both functional and aesthetic outcomes. Various flap techniques, with or without internal lining, are used to repair defects; however, the choice of technique can significantly influence postoperative complications and patient recovery. Despite advances in reconstructive surgery, there remains limited comparative evidence regarding the effectiveness of reconstruction with versus without internal lining in terms of functional outcomes and complication rates. Furthermore, data from tertiary care settings in developing countries are scarce, highlighting the need for studies that evaluate these approaches in local clinical practice. This study aimed to compare the surgical outcomes, complication rates, and functional results of head and neck cancer reconstruction performed with or without internal lining using various flap techniques in a tertiary care hospital setting.

METHODS

This prospective comparative study was carried out at the Department of Ear, Nose and Throat (ENT) of multiple tertiary care hospitals for a period of one year (from June 2024 to May 2025). Ethical approval was obtained from the IRB of Al-Tibri Medical College and Hospital, IERC/ATMC/14(01-2024)/50. Using a purposive sampling technique, patients that undergoing cancer resection in the region of the head and neck, which followed reconstructive surgery either with or without internal lining using various flap techniques, were included in the study. Patients above the age of 18 years of either gender, with confirmed head and neck cancer (histopathologically) that require surgical excision along with reconstruction. For the reconstruction technique, free, regional or local flaps were used. In addition, patients having a complete medical record and follow-up data were included in the research. Patients having incomplete operative or clinical data, with

DOI: https://doi.org/10.54393/pjhs.v6i7.3380

recurrent cancer needing salvage surgery, and patients who were lost to follow-up after surgery were excluded from the research. The sample size was calculated using the Open EPI freely available online software for sample size calculation. Using a 95% confidence level and 5% margin of error, and frequency of complications rates from head and neck reconstructive surgeries at 10 % as reported in a study, the sample size came out to be 139 [21]. Patients were divided into two groups (A and B), group A including patients undergoing reconstruction with internal lining, while group B included patients who underwent reconstruction without internal lining. For data collection, patient consent was taken, and a self-designed questionnaire was used. Collected data included demographics such as age, gender, smoking status and co-morbidities. In terms of tumor characteristics, the site, size and TNM staging were recorded. Type of resection and flap used (free, local or regional), operative time and whether internal lining was used were also recorded. Post-operative complications included necrosis of the flap, dehiscence of the wound or infection. Functional outcomes included swallowing or speech, duration of hospital stay and any need for revision of surgery. The measure of outcomes included primary outcomes such as the rate of complication and survival of flap in both groups, while secondary outcomes included recovery of function, duration of hospital stay and any need for secondary intervention. Data analysis was carried out using SPSS version 23.0. Mean and standard deviation were reported for continuous variables after testing of data normality. Data were compared by applying the Student's t-test or Mann-Whitney U test as appropriate. Frequency and percentages were reported for categorical variables and were tested using chi-square or Fisher's exact test for comparison. A p-value of <0.050 was taken as statistically significant.

RESULTS

The study presents the baseline demographic and clinical characteristics of the study population. The mean age of patients was comparable between the two groups (54.2 ± 11.3 years in Group A vs. 53.7 ± 10.8 years in Group B, p=0.780). There was no significant difference in gender distribution, smoking status, or presence of co-morbidities between the groups. Tumor characteristics, including site, size, and TNM stage, were also similar across both groups. The most common tumor site was the oral cavity in both groups, followed by the oropharynx. Segmental mandibulectomy was the most frequently performed resection type in both groups, with no statistically significant difference (p=0.770). In Group A, flap types included free (54.3%), local (28.6%), and regional (17.1%) flaps. Operative time was significantly longer in Group A thanGroup B (6.5 ± 1.2 vs. 5.1 ± 1.0 hours, p<0.001)(Table 1).

Table 1: Demographic Information and History of Patients

Variables		Group A (n=70)	Group B (n=69)	p-value
Age (Years)	–	54.2 ± 11.3	53.7 ± 10.8	0.780
Gender	Male	50 (71.4%)	47 (68.1%)	0.670
	Female	20 (28.6%)	22 (31.9%)	
Smoking Status	–	28 (40%)	27 (39.1%)	0.910
Co-Morbidities	–	30 (42.9%)	31 (44.9%)	0.820
Tumor Site	Oral Cavity	40 (57.1%)	38 (55.1%)	0.960
	Oropharynx	18 (25.7%)	19 (27.5%)	
	Others	12 (17.1%)	12 (17.4%)	
Tumor Size (cm)	–	3.8 ± 1.1	3.7 ± 1.0	0.640
TNM Stage	T3	39 (55.7%)	41 (59.4%)	0.680
	T4	31 (44.3%)	28 (40.6%)	
	N0	53 (75.7%)	50 (72.5%)	
	N1	17 (24.3%)	19 (27.5%)	
Type Of Resection	Segmental Mandibulectomy	44 (62.9%)	45 (65.2%)	0.770
	Composite Resection	26 (37.1%)	24 (34.8%)	
Flap Type	Free	38 (54.3%)	-	–
	Local	20 (28.6%)	-	
	Regional	12 (17.1%)	-	
Operative Time (Hours)	-	6.5 ± 1.2	5.1 ± 1.0	<0.001*

Results outline the postoperative complications following head and neck reconstructive surgery. Flap necrosis occurred in 8.6% of patients in Group A. Wound dehiscence was observed in 11.4% of Group A and 5.8% of Group B patients (p=0.240). Wound infection was significantly more common in Group A (15.7%) than in Group B (5.8%) (p=0.040). The overall complication rate was significantly higher in Group A (28.6%) than in Group B (11.6%) (p=0.010) (Table 2).

Table 2: Post-Operative Complications After Head and Neck Reconstructive Surgery (n=139)

Complications	Group A (n=70)	Group B (n=69)	p-value
Flap Necrosis	06 (8.6%)	–	–
Wound Dehiscence	08 (11.4%)	04 (5.8%)	0.240
Wound Infection	11 (15.7%)	04 (5.8%)	0.040*
Any Complication	20 (28.6%)	08 (11.6%)	0.010*

Findings summarize the functional outcomes at follow-up. Unimpaired swallowing was reported in 55.7% of Group A than82.6% of Group B (p=0.007). Good speech intelligibility was achieved in 60% of Group A versus 79.7% of Group B patients (p=0.040). Hospital stays longer than 7 days were significantly more common in Group A (35.7%) than in Group B (14.5%) (p=0.009). The need for secondary intervention was higher in Group A (11.4%) than in Group B (4.3%), although this difference did not reach statistical significance (p=0.130)(Table 3).

DOI: https://doi.org/10.54393/pjhs.v6i7.3380

Table 3: Functional Outcome of Patients After Head and Neck Reconstructive Surgery (n=139)

Functional Outcomes	Group A (n=70)	Group B (n=69)	p-value
Swallowing Unimpaired	39 (55.7%)	57 (82.6%)	0.007 *
Speech Intelligibility (Good)	42 (60%)	55 (79.7%)	0.04 *
Hospital Stay >7 Days	25 (35.7%)	10 (14.5%)	0.009 *
Secondary Intervention Required	08 (11.4%)	03 (4.3%)	0.130

DISCUSSION

In this study of 139 patients, baseline demographics, smoking status, co-morbidities, and tumor characteristics were somewhat similar between groups. Operative time was significantly longer in Group A (with flap and internal lining) than in Group B ($p<0.001$). Postoperative complications were more common in Group A, with higher rates of wound infection (15.7% vs. 5.8%, p=0.040) and overall complications (28.6% vs. 11.6%, p=0.010). Functional outcomes favoured Group B, with significantly better swallowing (82.6% vs. 55.7%, p=0.007) and speech intelligibility (79.7% vs. 60%, p=0.040). Hospital stays over 7 days were more common in Group A (35.7% vs. 14.5%, p=0.009). The need for secondary intervention was higher in Group A, but not statistically significant. Overall, Group B demonstrated fewer complications and better postoperative functional recovery. In line with our research, the published literature that has compared head and neck reconstructive surgeries with or without internal lining has reported similar results [22]. In our research, an operative time was reported in our study in group A (with internal lining). Similarly, in other studies, a prolonged operative time was observed with internal lining due to the use of additional tissue preparation and setting [23]. In addition, higher rates of complication (especially wound dehiscence and infection) were reported in more extensive reconstructions (with flap) as thanthose without a flap. Literature also states similar findings, the possible reason behind higher rates of complications due to surgery-induced trauma and a higher risk of ischemia [24]. By the conclusion of some studies, similar findings were found in the present study. With regards to the functional outcomes such as swallowing and speech, reconstruction was easier when surgery was simple, provided the defect was adequately closed without internal lining [25]. In line with our study, longer duration of hospital stay was reported in other research as well, since internal lining flap procedures needed a more complex approach [26]. Moreover, the functional outcomes are only assessed for short-term follow-ups (one month), not reflecting long-term recovery. Furthermore, the varying expertise of surgeons and perioperative care might have influenced the outcomes. For patient safety, we need to work for early and proper diagnostic criteria.

This study has several limitations, including its relatively short follow-up period, which restricts the assessment of long-term functional and oncological outcomes. Additionally, variations in surgical expertise, flap selection, and perioperative care across centers may have influenced the results. The sample size and purposive sampling technique may also limit the generalizability of the findings. Future multicenter studies with larger cohorts and longer follow-up durations are recommended to better evaluate long-term functional recovery, quality of life, and optimal reconstructive strategies for head and neck cancer patients.

CONCLUSIONS

This study demonstrated that head and neck reconstructive surgery without the use of internal lining is associated with reduced operative time, postoperative complications, and better functional outcomes thanreconstruction with internal lining. While flap survival rates in Group A were acceptable, the higher rates of wound infection, longer hospital stay, and reduced swallowing and speech function highlight the need for careful patient selection and technique optimization when using internal lining. Reconstruction without internal lining may be a preferable option in suitable cases, balancing surgical efficiency with improved postoperative recovery. Further prospective studies are warranted to confirm these findings and guide reconstructive decision-making.

Authors' Contribution

Conceptualization: MRD
Methodology: MRD, ZA, VKK, GSM, AW
Formal analysis: MRD, GSM, AW
Writing and Drafting: ZA, VKK, ABM
Review and Editing: ZA, VKK, ABM, MRD, GSM, AW

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Chow LQ. Head and Neck Cancer. New England Journal of Medicine.2020Jan;382(1):60-72.doi: 10.1056/NEJMra1715715.
[2] Gupta B, Johnson NW, Kumar N. Global Epidemiology of Head and Neck Cancers: A Continuing Challenge. Oncology.2016Jun;91(1):13-23.doi:10.1159/000446117.
[3] Chim H, Salgado CJ, Seselgyte R, Wei FC, Mardini S. Principles of Head and Neck Reconstruction: An

DOI: https://doi.org/10.54393/pjhs.v6i7.3380

Algorithm to Guide Flap Selection. In Seminars in Plastic Surgery.2010 May; 24(02): 148-154. doi: 10.1055/s-0030-1255332.

[4] Spoerl S, Schoedel S, Spanier G, Mueller K, Meier JK, Reichert TE *et al.* A Decade of Reconstructive Surgery: Outcome and Perspectives of Free Tissue Transfer in the Head and Neck. Experience of A Single Center Institution. Oral and Maxillofacial Surgery. 2020Jun;24(2):173-9.doi:10.1007/s10006-020-00838-7.

[5] Kim HS, Chung CH, Chang YJ. Free-Flap Reconstruction in Recurrent Head and Neck Cancer: A Retrospective Review of 124 Cases. Archives of Craniofacial Surgery.2020 Feb; 21(1): 27. doi: 10.7181/acfs.2019.00738.

[6] Mark M, Eggerstedt M, Urban MJ, Al-Khudari S, Smith R, Revenaugh P. Designing an Evidence-Based Free-Flap Pathway in Head and Neck Reconstruction. World Journal of Otorhinolaryngology-Head and Neck Surgery.2022 Jun; 8(02): 126-32. doi: 10.1002/wjo2.22.

[7] Crawley MB, Sweeny L, Ravipati P, Heffelfinger R, Krein H, Luginbuhl A *et al.* Factors Associated with Free Flap Failures in Head and Neck Reconstruction. Otolaryngology–Head and Neck Surgery.2019Oct; 161(4): 598-604. doi: 10.1177/0194599819860809.

[8] Goh CS, Kok YO, Yong CP, Tan EW, Goh LG, Chew KY *et al.* Outcome Predictors in Elderly Head and Neck Free Flap Reconstruction: A Retrospective Study and Systematic Review of the Current Evidence. Journal of Plastic, Reconstructive and Aesthetic Surgery. 2018 May; 71(5): 719-28. doi: 10.1016/j.bjps.2017.12.011.

[9] Goel AN, Raghavan G, St John MA, Long JL. Risk Factors, Causes, And Costs of Hospital Readmission After Head and Neck Cancer Surgery Reconstruction. Journal of the American Medical Association Facial Plastic Surgery.2019 Mar; 21(2): 137-45. doi: 10.1001/jamafacial.2018.1197.

[10] Hamoir M, Schmitz S, Suarez C, Strojan P, Hutcheson KA, Rodrigo JP *et al.* The Current Role of Salvage Surgery in Recurrent Head and Neck Squamous Cell Carcinoma.Cancers.2018Aug;10(8):267.doi:10.3390/cancers10080267.

[11] Zimmer DI, Lamarre E. Free Flap Reconstruction of Skull Base Defects. Cerebrospinal Fluid Rhinorrhea-E-Book: Comprehensive Guide to Evaluation and Management.2023Jan:276.doi: 10.1016/B978-0-323-87072-6.00046-6.

[12] Largo RD and Garvey PB. Updates in Head and Neck Reconstruction. Plastic and Reconstructive Surgery. 2018Feb;141(2):271e-85e.doi:10.1097/PRS.0000000000004070.

[13] Thariat J, Carsuzaa F, Beddok A, Deneuve S, Marcy PY, Merlotti A *et al.* Reconstructive Flap Surgery in Head and Neck Cancer Patients: An Interdisciplinary View of the Challenges Encountered by Radiation Oncologists in Postoperative Radiotherapy. Frontiers in Oncology.2024 Apr; 14: 1379861. doi: 10.3389/fonc.2024.1379861.

[14] Schutte HW, Heutink F, Wellenstein DJ, van den Broek GB, van den Hoogen FJ, Marres HA *et al.* Impact of Time to Diagnosis and Treatment in Head and Neck Cancer: A Systematic Review. Otolaryngology–Head and Neck Surgery.2020 Apr; 162(4): 446-57. doi: 10.1177/0194599820906387.

[15] Mody MD, Rocco JW, Yom SS, Haddad RI, Saba NF. Head and Neck Cancer. The Lancet.2021Dec;398(10318):2289-99.doi:10.1016/S0140-6736(21)01550-6.

[16] Zebolsky AL, Patel N, Heaton CM, Park AM, Seth R, Knott PD. Patient-Reported Aesthetic and Psychosocial Outcomes After Microvascular Reconstruction for Head and Neck Cancer. Journal of the American Medical Otolaryngology–Head and Neck Surgery.2021Dec;147(12):1035-44.doi:10.1001/jamaoto.2021.1563.

[17] Russell J, Pateman K, Batstone M. Donor Site Morbidity of Composite Free Flaps in Head and Neck Surgery: A Systematic Review of the Prospective Literature. International Journal of Oral and Maxillofacial Surgery.2021Sep;50(9):1147-55.doi:10.1016/j.ijom.2020.12.009.

[18] Gabrysz-Forget F, Tabet P, Rahal A, Bissada E, Christopoulos A, Ayad T. Free Versus Pedicled Flaps for Reconstruction of Head and Neck Cancer Defects: A Systematic Review. Journal of Otolaryngology-Head and Neck Surgery.2019Jan; 48(1): 13. doi: 10.1186/s40463-019-0334-y.

[19] Marchi F, Iandelli A, Pace GM, Bellini E, Tirrito A, Costantino A *et al.* Surgical Outcomes of Profunda Artery Perforator Flap in Head and Neck Reconstruction: A Systematic Review and Meta-Analysis. Head and Neck. 2025 Jan; 47(1): 98-111. doi: 10.1002/hed.27891.

[20] Abouyared M, Katz AP, Ein L, Ketner J, Sargi Z, Nicolli E *et al.* Controversies in Free Tissue Transfer for Head and Neck Cancer: A Review of the Literature. Head and Neck.2019Sep;41(9):3457-63.doi:10.1002/hed.25853.

[21] Sattar T, Nazir I, Jabbar M, Malik J, Afzal S, Hanif S *et al.* Current Innovations in Head and Neck Cancer: From Diagnostics to Therapeutics.Oncology Research.2025Apr;33(5):1019.doi:10.32604/or.2025.060601.

[22] Molteni G, Gazzini L, Sacchetto A, Nocini R, Comini LV, Arietti V *et al.* Mandibular Reconstruction in Head and

DOI: https://doi.org/10.54393/pjhs.v6i7.3380

Neck Cancer: Which Is the Gold standard? European Archives of Oto-Rhino-Laryngology.2023Sep; 280(9): 3953-65. doi: 10.1007/s00405-023-08050-5.

[23] Haribhakti VV. Restoration, Reconstruction and Rehabilitation in Head and Neck Cancer. Springer. 2019 Jun. doi: 10.1007/978-981-13-2736-0

[24] Kwon D, Genden EM, de Bree R, Rodrigo JP, Rinaldo A, Sanabria A *et al.* Overcoming Wound Complications in Head and Neck Salvage Surgery. Auris Nasus Larynx. 2018Dec;45(6):1135-42.doi:10.1016/j.anl.2018.03.008.

[25] Riechelmann H, Dejaco D, Steinbichler TB, Lettenbichler-Haug A, Anegg M, Ganswindt U *et al.* Functional Outcomes in Head and Neck Cancer Patients. Cancers.2022Apr;14(9):2135.doi:10.3390/cancers14092135.

[26] Lindeborg MM, Sethi RK, Puram SV, Parikh A, Yarlagadda B, Varvares M *et al.* Predicting Length of Stay in Head and Neck Patients Who Undergo Free Flap Reconstruction. Laryngoscope Investigative Otolaryngology.2020Jun;5(3):461-7.doi:10.1002/lio2.410.