Evaluation of Drain Type After Parotidectomy: Negative Pressure vs. Penrose

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Abstract

Parotidectomy is a surgical procedure in which the parotid gland is removed due to different tumours. During this process, different drainage issues can be observed. To overcome such issues, different techniques such as "Negative Pressure Drain (NPD) and Penrose Drain (PD)" can be used. This study also aims to compare the postoperative outcomes of NPD versus PD in patients undergoing parotidectomy. For this study, a sample of 500 patients who underwent parotidectomy was selected. The data for the selected patients was obtained from "the Department of Otorhinolaryngology and Head and Neck Surgery in Turkey." Pre and post-operative examinations were done by using different factors. The "Post-parotidectomy Facial Nerve Grading System (PPFNGS)" was used for evaluating dysfunction of the facial nerve. However, the state of life was measured by "Parotidectomy Outcome Inventory (POI)-8" at 6 months. SPSS was used to analyse the data, and $p < 0.05$ was regarded as statistically significant. The results obtained from this study showed that the mean age of the patients who were included in this study was 46 ± 19 years. The involvement of marginal mandibular branches was found in 38 cases of superficial parotidectomy, while it was observed in 9 cases of total parotidectomy. NPD was applied in 260 of the cases, while PD was integrated in 240 cases. In comparison between NPD and PD, significant differences were observed within the context of facial nerve dysfunction, POI-8 scores (facial change and scars), mean duration for hospitalisation and removal of drainage. Early postoperative facial nerve dysfunction was more common in the NPD group (52% vs 48%) but it also had a lower seroma (15% vs 35%) and hematoma (4% vs 8%) rate, shorter length of stay (3.6 vs 5.1 days), and earlier drain removal (2.2 vs 3.1 days). These results suggest a risk–benefit tradeoff: NPD accelerates fluid control and return at the risk of greater early nerve dysfunction. Drain selection needs to be tailored.

Keywords: parotidectomy; penrose drain; negative pressure drain; facial change; superficial parotidectomy

How to cite this article: Ak S. Evaluation of drain type after parotidectomy: negative pressure vs. Penrose. Int J Drug Deliv Technol. 2026;16(79s): 170-179. DOI: 10.25258/ijddt.16.79s.19

1. Introduction

Parotidectomy is a kind of surgery which entails the excision of parotid gland which is the largest salivary gland in the face and it is found in a preauricular area. Its use is mainly recommended because of benign or malignant tumours, chronic sialadenitis, or obstruction sialolithiasis (Sakr, 2024).Since the parotid gland is near the facial nerve, ear, and neck structures, surgery about this gland entails close dissection and handling of the surgery (Sethi & Fundakowski, 2024). After parotidectomy, it is also normal to have collection of blood, saliva or serous fluid in the surgical bed because of the highly vascular gland along with large amount of soft tissue dissection. In order to avoid fluid retention and haematoma surgeons usually insert drains at the point of surgery. The negatively pressurized drains, which have been used most frequently, are negatively pressurized drainage of actively sucking the fluid, and Penrose drainage that can simply drain the fluids by gravity and capillary forces (C. F. Nielsen et al., 2022).Negative pressure drains help lower build up, however they can lead to the pressure injury of fragile tissues. Suction may also lead to collapse of vessels, facial nerve irritation, or salivary fistula formation if improperly managed (Diao et al., 2025). Penrose drains, while less invasive, may be insufficient in high-fluid cases and can increase the risk of external contamination due to their open nature.

In the post-parotidectomy period, careful drain management is essential to reduce complications such as seroma, salivary fistula, haematoma, and wound infection. Negative pressure drains can sometimes over-drain or create dead space collapse, leading to nerve adhesion or skin contour irregularities (C. Nielsen et al., 2022). In contrast, Penrose drains are ineffective in

draining the excess salivary leakage or blood. The optimal drainage technique is still controversial particularly in benign superficial parotid tumours and deep lobe/malignant resections. When undertaking parotidectomy of the pleomorphic adenoma polyp, Warthins tumour or mucoepidermoid carcinoma patients have varying risks in regards to bleeding and fluid secretion directly impacting the selection of the drain in use. However, it has not created a certain congruence or a guide that brings along the use of one type of drain followed by another in practice (Karp et al., 2023).

Despite the frequent use of drains following parotidectomy, evidence comparing the effectiveness and complications of negative pressure versus Penrose drains is limited (Okuda et al., 2025). Studies offer mixed findings regarding infection rates, seroma formation, and patient comfort. Most existing literature is observational or based on surgeon preference, with few controlled studies evaluating drain efficacy specifically in parotid surgery. Furthermore, differences in patient anatomy, tumour size, and surgical approach are often not standardised across studies (Yin et al., 2022).

There is a notable lack of research conducted in middle-income countries, including Turkey, where variations in hospital protocols, surgical training, and postoperative care availability influence clinical outcomes (Filipović et al., 2025). This knowledge gap leads to inconsistent practices and potentially avoidable complications in post-parotidectomy management.There is insufficient clinical evidence guiding the choice between negative pressure and Penrose drains following parotidectomy. Parotid surgery is routinely performed in tertiary and secondary hospitals yet, no national data exists comparing drainage outcomes (Cohen et al., 2021). As a result, drain selection remains inconsistent and based largely on individual surgeon preference rather than evidence-based protocols. Globally, salivary gland tumours represent approximately 3–6% of head and neck neoplasms, with the parotid gland accounting for nearly 80% of cases (Alsanie et al., 2022). While international studies have evaluated various drain techniques in thyroid and neck surgeries, data specific to the Turkish healthcare system and parotidectomy remain scarce. The absence of standardised practices limits the development of national guidelines and hinders improvements in postoperative care (Manjunatha et al., 2023). The aim of this study is to compare the postoperative outcomes of negative pressure drains versus Penrose drains in patients undergoing parotidectomy, with a focus on the rate of complications such as haematoma, salivary fistula, wound infection, and hospital stay duration in a Turkish clinical setting. This study addresses a critical gap in head and neck surgical practice by evaluating drainage methods following parotidectomy. The findings can contribute to the development of standardised postoperative protocols, reduce patient complications, and improve surgical outcomes. Moreover, the research adds to the global body of knowledge by highlighting outcomes from a middle-income healthcare context, supporting more inclusive clinical recommendations.

2. Literature Review

Surgical drains are routinely used in head and neck surgeries to reduce the risk of fluid accumulation, haematoma, and seroma formation. In parotidectomy**,** where dissection of soft tissues and parotid gland parenchyma leaves a potential dead space, the placement of drains is a common practice (C. F. Nielsen et al., 2022). Two main types of drains are employed in clinical settings: closed-system negative pressure drains (such as Jackson-Pratt or Hemovac) and open passive drains**,** such as Penrose drains**.** However, the superiority of one technique over the other remains controversial, particularly in relation to complication rates and patient recovery following parotid surgery (Banz, 2024).

Parotidectomy, performed primarily for benign or malignant neoplasms of the parotid gland, has a relatively high risk of postoperative complications due to the gland's anatomical proximity to the facial nerve and extensive vascular supply (Lambiel et al., 2021).While facial nerve injury remains the most feared complication, seroma, salivary fistula, wound dehiscence, and haematoma are common and often related to fluid management in the surgical bed (Papanikolaou et al., 2023). In this context, effective drainage becomes clinically significant.

Closed-suction or negative pressure drains are considered standard in many surgical disciplines for their ability to continuously evacuate fluids from surgical spaces. In parotidectomy, such drains help collapse dead space and reduce tension, theoretically lowering the risk of seroma and sialocele formation (Park et al., 2021). According to Sun et al. (2023)the negative pressure drain placement was also related to decreased incidences of salivary collections and less time to remove the drain. Similarly, according to Coniglio et al. (2019)demonstrated a considerable risk reduction in fluids related post-parotidectomy complications in patients being managed with suction drains compared to those with no drain or passive systems. Nevertheless, negative pressure drains possess their risks as well. Severe suction may cause inadvertent stimulation of salivary fistulas by the movement of saliva into the traumatised duct (s) or injured plane. Moreover, the threat of retrograde infection, pain, and pressure necrosis

is also small and is impossible to rule out completely (Diao et al., 2025).Moreover, use of strong suction in aged patients or patients with coagulopathy can lead to bleeding because it can dislodge clots. Penrose drain is basic, open drainage consisting of soft rubber material. They enable fluid to drain out of the surgical area by way of passive methods like the power of gravity and capillarity (Banz, 2024). They are non-suction drains hence do not generate negative pressure in the wound cavity. They are well structured so that they minimize mechanical molestation of nearby tissues, thus can be used in sensitive areas of the body like the parotid area. Among the primary strengths of Penrose drains, the ease of insertion and removal should be noted. They are also cheap and can thus be used in public hospital setting or low resource settings.

According to Okuda et al. (2025), the Penrose drains were efficient in management of drainage when superficial parotidectomy was performed in patients who had minimal intraoperative bleeding. It had acceptable rates of complications and had favourable results in some selected cases. Yet, these drains do not have the capacity to actively drain fluid. Where there is significant postoperative bleeding or the serous output, passive drainage might not suffice. This can cause accumulation of fluids, slow rates of wound healing or high chances of seroma and salivary fistula. In case of uncontrolled fluid accumulation, the fluid may necessitate repeated needle aspiration or a secondary procedure (Sakr, 2025). This limits their ability to detect subtle differences or rare complications. There is also variation in surgical methods, tumour pathology, and postoperative protocols between studies. Some surgeons may remove only the superficial lobe, while others perform total or radical parotidectomy. These differences can influence outcomes regardless of drain type. Lee et al. (2023) carried out a retrospective study involving 156 patients undergoing parotidectomy. Their analysis found no significant difference between Penrose and suction drains in terms of infection, seroma, or salivary fistula formation. However, patients with suction drains had slightly shorter hospital stays, suggesting more rapid recovery or reduced need for intervention. Importantly, many comparative studies fail to include patient-centred outcomes. According to Gadiraju et al. (2025)Few assess postoperative comfort, drain-related pain, or scarring. Quality of life (QoL) is rarely measured, even though it is a vital indicator in head and neck surgery. Tools such as the Parotidectomy Outcome Inventory-8 (POI-8) and Post-parotidectomy Facial Nerve Grading System (PPFNGS**)** have been validated, but are not commonly applied in studies of drainage methods (Yin et al., 2025).

Despite routine use of both negative pressure and Penrose drains in post-parotidectomy care, there is a lack of robust, high-quality comparative studies assessing their impact on short- and long-term outcomes. Most available evidence is retrospective and lacks control for confounding factors such as surgical extent, tumour pathology, and drain management protocols (Gerken et al., 2023).The absence of standardised postoperative protocols regarding drain use in Turkey further complicates clinical decision-making. In addition, no study to date has comprehensively evaluated drain-related effects on facial nerve recovery, patient QoL, or cost-effectiveness, creating a clear need for local prospective research (Fujiwara et al., 2024).

3. Method

This prospective cohort study was conducted in the Department of Otorhinolaryngology and Head and Neck Surgery in Turkey. A sample of 500 patients who underwent parotidectomy, was selected for this research. It aimed to compare outcomes of negative pressure (closed suction) drains and Penrose (passive) drains following superficial parotidectomy for benign lesions (Gür et al., 2023). Patients aged ≥18 years with clinically and radiologically diagnosed benign parotid neoplasms were included. Exclusion criteria comprised histologically confirmed malignancy, recurrent disease, or previous neck irradiation. Institutional ethics approval was obtained, and written informed consent was secured from all participants (Cilar Budler & Stiglic, 2025).

Preoperative assessment involved patient demographics, symptom duration, and facial nerve status. Physical examination included parotid gland palpation, lymph node evaluation, and intraoral inspection (Bowers et al., 2021). Investigations were conducted using fine needle aspiration cytology (FNAC), ultrasonography and contrast-enhanced CT or MRI as required. The surgery involved the use of general anaesthesia by doing a modified Blair incision. The anatomical landmarks to locate and save the facial nerve were defined with the help of the tragal pointer and posterior belly of the digastic muscle of the neck.

This was removed together with the gland using bipolar cautery. Patients were allocated a closed suction drain (e.g. Hemovac) or Penrose drain by the use of predetermined protocol. On some occasions, the nerve was covered using sternocleidomastoid (SCM) or SMAS flaps (Melong et al., 2020). Pressure dressings were used and incisions stitched up in layers. Drains were moved when <20 ml/24 hrs. output was achieved. On the first day after the surgery, the ability of the facial nerve was evaluated by the Post-parotidectomy Facial Nerve Grading System (PPFNGS) (de Andrade Maranhão-

Filho et al., 2023). The state of life was measured by Parotidectomy Outcome Inventory (POI)-8 at 6 months (Plath et al., 2022). The score of aesthetic satisfaction any was used on 5 points Likert scale. The SPSS was used to analyse the data and $p < 0.05$ was regarded as statistically significant. Facial nerve function was recorded on postoperative day 1 only; long-term recovery beyond this point was not assessed.

4. Results

The aim of this study is to compare the postoperative outcomes of negative pressure drains versus Penrose drains in patients undergoing parotidectomy. For this purpose, a sample of 500 patients who underwent parotidectomy was obtained from the Department of Otorhinolaryngology and Head and Neck Surgery in Turkey. This sample was selected on the basis of effective inclusion and exclusion criteria. The statistical results obtained for this study mainly focus on the demographics of the patients, procedure type vs facial nerve dysfunction, mean POI-8 scores, and aesthetic score by procedure. In addition, the results of "negative pressure drain (NPD) vs Penrose drain" have also been compared for better evaluation of the topic under study.

Table 1 shows that a total of 500 patients who underwent parotidectomy were included in this research. 263 of these patients were women with a mean age of 46.97 years, while 237 of the patients were male with a mean age of 46.78 years. This shows that a large number of females underwent parotidectomy as compared to the male patients.

Table 1. Demographic Summary

Gender	Count	Mean Age (years)
Female	263	46.97
Male	237	46.78

Table 2 shows that most of the patients did not have any facial nerve dysfunction. It has been observed that 415 (83%) of the patients had superficial parotidectomy. The involvement of the marginal mandibular branch was found to be higher (38 cases) than temporal branches (29 cases). However, for all branches, about 24 cases were included, while 324 of the cases had no involvement of the branches.

Within the context of total parotidectomy, high rates of dysfunction of the nerve are observed. In this regard, none of the branches were included in 71 cases. In contrast, all branches are included in 1 case, while 9 cases include marginal mandibular branches and 4 cases include integrated temporal branches. This shows higher nerve dysfunction rates within the context of post-parotidectomy.

Table 2. Procedure Type vs Facial Nerve Dysfunction

Procedure Type	All Branches	Marginal Mandibular	None	Temporal
Superficial Parotidectomy	24	38	324	29
Total Parotidectomy	1	9	71	4

Table 3 shows that mean scores for all associated symptoms range from 2.3 to 2.7. For this purpose, the state of life was measured by "Parotidectomy Outcome Inventory (POI)-8" at 6 months post-parotidectomy. In this regard, a "5-point Likert scale" was used. The mean score for pain was found to be 2.55, while the mean score for sensory was 2.48. At the same time, the mean score for scar was found to be 2.54. However, facial change was scored at 2.52. Moreover, the mean scores for tissue loss and perspiration were found to be 2.52 and 2.37. Contrarily, dry mouth had a mean score of 2.53, and fear had a mean score of 2.43. Therefore, these results contribute to moderate morbidity post-parotidectomy.

Table 3. Mean POI-8 Scores

Symptom	Mean Score
POI8_Pain	2.55
POI8_Sensory	2.48
POI8_Scar	2.54
POI8_Facial Change	2.52
POI8_Tissue Loss	2.37
POI8_Perspiration	2.68
POI8_Dry Mouth	2.53
POI8_Fear	2.43

Figure 1 shows the age distribution among the patients who are included in this study. The mean age was found to be 46 ± 19 years. This shows that most of the individuals above 40 years had parotidectomy.

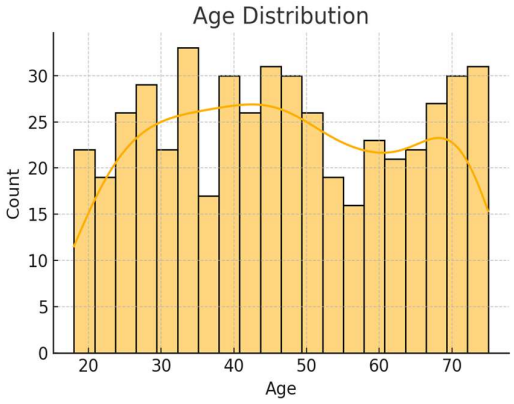

Figure 1. Age Distribution

In addition to age distribution, procedure type distribution has also been determined for this study. **Figure 2** shows that about 415 (83%) of the patients had superficial parotidectomy, while the remaining 85 patients had total parotidectomy. Within this context, a superficial parotidectomy is stated as the procedure which is used for removing the superficial part of the parotid gland in association with the facial nerve. In contrast, total parotidectomy is performed to remove the entire parotid gland. In this process, the deep lobe is also removed. However, within the context of this study, the selection of these procedures for particular patients mainly depends on the location of the tumour, focusing on the involvement of the deep lobe. Therefore, superficial parotidectomy is mainly used for benign tumours, whereas total parotidectomy is considered for tumours associated with the deep lobe.

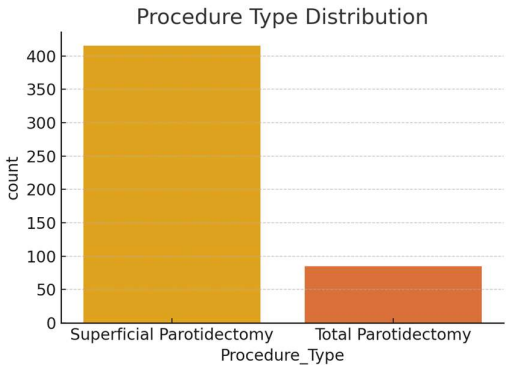

Figure 2. Procedure Type Distribution

Figure 3 also compares the aesthetic score by the type of procedure. It has been observed that superficial parotidectomy has a higher aesthetic score than total parotidectomy. This emphasises the significance of superficial parotidectomy as compared to total parotidectomy.

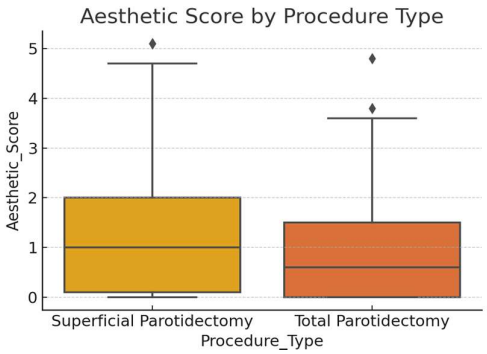

Figure 3. Aesthetic Score by Procedure

Moreover, during the parotidectomies (parotid surgeries), surgical drains have been used for the removal of excess fluid. For this purpose, "Negative Pressure Drain (NPD) vs Penrose Drain (PD)" has been used. Table 4 shows that NPD was applied in 260 of the cases, while Penrose drain was integrated in 240 cases. In this regard, a "Penrose drain" is referred to as a passive drain type which utilises capillary action and gravity for fluid removal from a particular wound. In contrast, within the NPD, a complex system is included. It includes a suction device with a sealed dressing (Belcastro et al., 2023). Therefore, in the present study, 52% of the cases showed facial nerve dysfunction within the context of NPD, while only 48% of the patients showed facial nerve dysfunction within the context of PD. The difference between these findings presented a significant outcome ($p < 0.05$). However, 4% of the patients who underwent NPD during parotidectomy showed hematoma formation. In contrast, 8% of the cases in which PD was used showed hematoma formation. In this regard, a significant difference was observed ($p < 0.05$).

In addition, seroma formation was observed in 15% of the cases in which NPD was applied, while seroma was formed in 35% of the cases in which PD was used. This led to significant outcomes ($p < 0.05$). Similarly, the mean facial change score was 2.4 in the NPD group and 2.5 in the PD group, leading to significant outcomes ($p < 0.05$). Moreover, the mean score for scars was found to be 2.6 in the NPD group and 2.9 in the PD group. This also led to significant outcomes ($p < 0.05$). However, the mean scores for pain were found to be 2.5 in the NPD group and 2.7 in the PD group. This showed insignificant differences ($p > 0.05$).

The mean hospital stay in the NPD group was found to be 3.6 days, while it was 5.1 days in the PD group. This also led to significant results ($p < 0.01$). Additionally, the mean days for drain removal were 2.2 days for the NPD group and 3.1 days for the PD group, leading to a significant difference ($p < 0.05$). This indicates that although NPD has the advantage in controlling seroma and hematoma, it also causes more early facial nerve dysfunction, and a balance between fluid management and nerve safety needs to be considered.

Table 4. Facial nerve dysfunction: assessed using PPFNGS on postoperative day 1. POI-8: evaluated at 6 months.

Outcome	NPD (n= 260)	Penrose drain (n= 240)	p-value
Facial nerve dysfunction	52%	48%	<0.05
Hematoma formation	4%	8%	<0.05
Seroma formation	15%	35%	<0.05
POI-8 scores			
Facial change	2.4	2.5	<0.05
Scars	2.6	2.9	<0.05
Pain	2.5	2.7	>0.05
Mean hospital stay (days)	3.6	5.1	<0.01
Mean drain removal (days)	2.2	3.1	<0.01

The results obtained from this study show that NPD has better performance as compared to PD. Although facial nerve dysfunction is higher in NPD cases as compared to PD cases, the POI-8 scores within the context of facial change, scars, and pain were found to be lower within the NPD group. At the same time, the mean hospitalisation period and drain removal were also found to be lower in the NPD group as compared to the PD group. This supports the effectiveness of NPD over PD within the context of performed parotidectomy.

5. Discussion

The aim of this study is to compare the postoperative outcomes of NPD versus PD in patients undergoing parotidectomy. For this purpose, a cohort study was designed within the context of Turkey. A sample of 500 patients who underwent parotidectomy was selected for comparing the outcomes of "negative pressure (closed suction) drains and Penrose (passive) drains" following parotidectomy.

The results obtained from this study showed that different symptoms which are faced by the patients after parotidectomy include pain, sensory impairment, scar, facial change, tissue loss, perspiration, dry mouth and fear. However, a significant difference was also observed within the context of total parotidectomy and superficial parotidectomy. However, a past study by Chaudhary et al. (2019) also used POI-8 for identifying different symptoms in association with post-parotidectomy. In this regard, a significant difference was observed between total parotidectomy and superficial parotidectomy within the context of sensory impairment and cosmetic results. In addition, the present research has also focused on comparing two techniques which are being used for draining excess fluid from the wounds post-parotidectomy. These techniques include NPD and PD. The findings of this study showed that NPD reduces the hospitalisation time for patients who underwent parotidectomy. At the same time, this technique is also found to be effective for decreasing the period for drain removal.

A study by C. F. Nielsen et al. (2022) also showed that the risk of different complications increases after superficial parotidectomy. One of these complications includes increased secretion of excessive fluid from the wound. This can lead to the formation of hematomas and seromas, emphasising the implication of effective treatment. In this regard, the application of PD has become vital to manage post-operative drainage effectively. The current research has also shown that hematomas were formed in 4% of the NPD cases, while 8% of the PD cases, integrated hematomas formation. Contrarily, 15% of the NPD cases had seroma formation**,** while 35% of the PD cases had seroma formation. Thus, the present study has been effective in highlighting the efficiency of NPD as compared to PD within the context of post-parotidectomy. Thus, the findings of this study hold both "practical and theoretical importance" in this regard. The implementation of an effective drainage technique can lead to effective management and treatment of the patients who underwent parotidectomy.

Our series indicates that NPD substantially reduces seroma and hematoma formation, shortens the hospitalization period, and permits earlier removal of the drain but with a higher rate of early facial nerve

dysfunction. The nerve irritation may result from negative pressure and traction of the tissues. This information does not validate an overarching claim that NPD is better; rather, it supports that the choice must be individualized factoring in each patient's risk of congestion versus facial nerve irritation. Future studies should ascertain the degree and duration of dysfunction beyond the first day after surgery.

6. Conclusion

Parotidectomy includes the removal of the parotid gland, including the utilisation of a surgical drain for managing the accumulation of fluid after the operation. Therefore, in this study, two techniques which are used for fluid drainage are compared. These techniques include NPD and PD. In this regard, NPD provides greater fluid control and quicker recovery at the expense of early increased rate of facial nerve dysfunction; therefore, drain selection should be based on the patient rather than universally favoring one system. Contrarily, the POI-8 scores within the context of facial change, scars, and pain were found to be lower within the NPD group. Moreover, the mean hospitalisation and drain removal periods were also found to be lower in the NPD group as compared to the PD group. Thus, NPD is efficient for managing fluid accumulation than PD within the context of parotidectomy. The role of parotidectomy in influencing the quality of life of the patients is inevitable. The findings of the present study can also provide important information to the surgeons regarding the implications of NPD in parotidectomy.

7. Research Implications

The findings of this study have highlighted the significance of NPD over PD within the context of parotidectomy. This has helped in emphasizing the significance of drainage of the wound and extra fluid after the surgery. This approach has been crucial in contributing to the literature associated with parotidectomy. In addition, this study can also encourage future researchers to focus on the utilization of different types of drainage systems within the context of parotodectomy. This will lead to significant outcomes, resulting in improved understanding of the association between NPD, PD and parotidectomy. Moreover, this research will also be vital for comparing NPD and PD within the context of facial nerve dysfunction, hematoma formation, seroma formation, POI-8 scores, mean hospital stay and mean duration for drain removal. These factors have helped in a better understanding of the advantages and disadvantages of the relevant drainage systems. However, this study also includes a few limitations which can be beneficial for future researchers to fill the identified knowledge gaps. This results in an increased theoretical contribution of the current research.

Due to the fact that combined NPD/PD regimens were not tested any speculation about a combined modality was purely hypothesis generating. Future randomized trials comparing NPD, PD and a more staged or combined approach are required before definitive recommendations can be made. This can be beneficial for the surgeons to have a detailed understanding of the different complications which are associated with parotidectomy. This has increased the effectiveness of this research. At the same time, this study can also encourage the implementation of different drainage techniques after parotidectomy to clear the wounds by removing excess fluid. Thus, important policies can also be developed within the context of effective utilization of NPD and DP after parotidectomy.

8. Limitations and Future Research

This research integrates a few limitations which can influence its performance. For instance, almost no focus has been given on the role of parotidectomy in improving "quality of life" (QoL), especially within the context of benign lesions. This prevented a detailed understanding of the outcomes due to the parotid gland's resection. However, this study has focused on the sensory impairment and scar within the operation areas of the patients, focusing on the types of utilized drain systems. In addition, this study has only focused on NPD and PD within the context of parotidectomy due to research bias. This limited the evaluation of other systems which can be used for drainage purposes post-parotidectomy. Moreover, this study has not focused on the aesthetic score in association with NPD and PD. This was due to a limited literature review.

To fill these limitations in future research, a detailed methodology can be designed, focusing on specific parameters within the context of parotidectomy and its impact on QoL. This approach can also be beneficial in enhancing the effectiveness of this study in association with the parotidectomy literature. Besides this intervention, the future research can also focus on the role of "Jackson-Pratt and Hemovac drains" within the context of parotidectomy. At the same time, the influence of different wound drainage systems on influencing the aesthetic appearance of the patients post-parotidectomy can also be discussed.

Facial nerve function was assessed on postoperative day 1, and thus the length of time to full recovery, if

achieved, is unknown. Second, an adjusted analysis by extent of surgery was not made, and this could influence nerve outcomes. Third, we did not assess hybrid NPD/PD regimens, and any consideration of their use is purely hypothesis generating.

Note: This study was conducted with ethical approval from relevant institutions. Ethical Committee Number 12/024 Number:18325

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