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Original Article

Clinical Evaluation of Helical Rim Reconstruction Using a Unipedicle Flap: Benefits and Outcomes

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Abstract

Background: Helical rim deformities of the auricle due to trauma, burn injury, congenital deformity or oncological resection are a challenge to reconstruct. The unipedicular flap has been an important advancement. This flap is reliable vascularly, cosmetically appropriate, and provides minimal donor site morbidity.

Objectives: To assess the aesthetic, functional, and psychological outcomes of helical rim reconstruction using the unipedicular flap.

Patients and Methods: Between February 1 and June 1, 2025, a randomized trial was performed in Sulaimani Hospital and a private clinic on 14 adult patients with helical rim defects. Patients, as per the inclusion criteria, who were able to undergo surgery without general anesthesia and who gave consent were selected. Standard methods were used to evaluate surgical outcomes, aesthetic results, functional recovery, and satisfaction. Follow-up occurred at 1 month.

Results: The study included 14 patients (mean age 32.71 ± 10.07 years; 71.4% female, 28.6% male). Smoking status: 50% never smokers, 21.4% current smokers, 28.6% former smokers. Most (92.9%) underwent superiorly based local flap reconstruction, with 64.3% having defects of 2–3 cm. Satisfaction: 57.1% "satisfied" with appearance, 50% "very satisfied" with symmetry, and 57.1% "very satisfied" with helical rim contour. Flap take rate was 92.9%, with 13 patients achieving 75-99% flap take, and 7.9% developed epidermal necrosis. All patients were "very satisfied" with the comfort of wearing eyeglasses. Scar visibility was "neutral" for 50%, and 78.6% were "very satisfied" with donor site appearance.

Conclusion: Unipedicular flap helical rim reconstruction offers excellent outcomes, high satisfaction, and minimal complications, with a single-stage approach simplifying recovery and reducing distress.

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Introduction

The helical rim is fundamental to the structural and aesthetic attributes of the outer ear. Furthermore, where the skin is thin, supple, and draped over a comparatively stiff cartilaginous framework, defects in the helical rim represent a challenging surgical problem.

These defects may occur from trauma, burns, oncologic resections, congenital anomalies, or inflammatory conditions (1).

When it comes to restoring the form and function of an ear reconstructed from an auricular defect, especially one resulting from a burn, the task is challenging. Of the reconstruction techniques, the unipedicular flap has become a popular option for reliable vascularity with good cosmetic results due to the minimal morbidity at the donor site (2). Since this flap is de-vascularized with a single vascular pedicle, it is associated with a reliable blood supply, leading to improved healing and a lower incidence of necrosis compared with either skin grafts or multi-stage procedures (3).

The techniques we commonly use for helical rim reconstruction are primary closure, local flaps, full-thickness skin grafts, and composite grafts. In cases of small (<1.5 cm) defects, it is possible to close these primarily; larger or more complex defects, however, will often require a more sophisticated approach. Although they are effective for treatment, full-thickness and composite grafts experience disadvantages, including a mismatch in color and texture, resulting in less-than-perfect aesthetic outcomes (4). The drawbacks of the standard procedures have made surgeons lean towards local flaps, such as the unipedicular flap, which provides better vascularity and color matching along with minimal donor site morbidities (4).

The unipedicular flap technique has several advantages. It keeps the skin's native qualities, which are necessary for contour restoration, and eliminates the necessity for cartilage grafts in several cases, simplifying the procedure (5). Moreover, this method of using nearby tissue in the same surgical bed also guarantees good healing and fewer factors, such as necrosis, which is often observed in skin grafts or two-step procedures (6).

Despite its benefits, the unipedicular flap has limitations, with risk of flap necrosis, notching, and distortion of the auricular framework requiring meticulous flap design and tension management. The key to a good surgical outcome with low complications is an understanding of vascular anatomy and attention to detail during the operation (7).

The type of reconstruction is determined by the size and location of the defect and the individual's anatomy. Higher and/or more complicated defects have to be closed with methods such as unipedicular flap, although they can be primarily closed in relatively smaller defects. (8). This new technique proved to be efficient in a wide variety of helical rim defects and provides excellent aesthetic and patient satisfaction.

This study aims to assess the clinical outcomes and advantages of reconstruction of the helical rim with periauricular and postauricular unipedicular flap (superiorly or inferiorly based), a relatively recent procedure in this area. We will concentrate on surgical strategies, complication rates, and post-operative functional and aesthetic results.

Methods and patients

Study Design and Setting

his non-controlled, randomized trial evaluated the effectiveness of the unipedicular flap for helix rim reconstruction. Flap design and site preparation were critical to organize functionality and healing. Design: A cross-sectional study. Setting: Sulaimani Hospital for Plastic, Burn, and Reconstructive Surgery and a private clinic in Sulaimani. Duration February 1 2025, to June 1, 2025. The hospital has a fully equipped operating theatre for flap construction and postoperative management. The study involved patient recruitment, surgery, and follow-up care.

Patient selection

The study population includes adult patients considered for surgical ear repair for various indications, including congenital and acquired ear loss, primarily helical rim ear loss.

Inclusion Criteria

Adult patients who do not require general anesthesia (unlike children under 10 years old) were included. Additionally, patients suffering from auricular defects that necessitate helical rim reconstruction were eligible for the study. All patients must have provided informed consent to participate in the study.

Exclusion Criteria

Patients with active infections, chronic skin disorders, or uncontrolled systemic diseases (e.g., diabetes, cardiovascular issues) were excluded due to risks in healing. Those on immunosuppressive drugs, anticoagulants, or with bleeding disorders were excluded to avoid complications. Patients with cognitive impairments or unrealistic expectations of the procedure were also excluded. Individuals with prior auricular surgeries or non-compliance with follow-up and care instructions were excluded. Lastly, patients with total or subtotal ear deformities were excluded as the procedure may not be suitable.

Surgical Procedure

Flap Design

The flap was selected from either the inferior or superior pole based on the position and size of the defect. The width of the flap's base ranged from 0.5 to 1 cm, with a length of 5–10 Cm.

Anesthesia and Incision

Anesthesia was accomplished by locally infiltrating to the operative site Xylocaine 2% with 1:80 Epinephrine, and allowing a 20-minute delay for proper analgesia. A 15-gauge blade was used to incise the flap, followed by dissection starting from distal to proximal with scissors or blades (9).

Flap Insertion and Suturing

After ensuring hemostasis, the flap was inserted and sutured with 6.0 PDS (polydioxanone) or polypropylene sutures. If necessary, a stent was placed to maintain the proper form and position of the flap.

Dressing

At the surgical site, paraffin gauze was used

as dressing material, while dry gauze was applied over the flap in order to prevent it from infection (10).

Postoperative Care and Patient Instructions

Surgical patients were hospitalized for 1 day postoperatively. The first postoperative appointment was on day 3 and was related to the control of the wound, with removal of sutures done on days 3 and 7, respectively. At 1-month post-operation, a follow-up visit was arranged.

Patients were advised to sleep on the non-ablated side and not place weight on the flap to facilitate healing. They were also instructed to sleep with their head up (11). Showering was permitted 1 week after surgery, following the removal of the dressing.

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics version 26, with categorical variables (e.g., gender, flap type, satisfaction ratings) expressed as numbers and percentages (n, %) and numerical variables (e.g., age, defect size, surgery duration) reported as mean ± standard deviation (SD) along with minimum and maximum values. Descriptive and basic inferential statistics (chi-square or Fisher's exact test where applicable) were used. Categorical variables were analyzed to assess potential associations (e.g., defect size vs. satisfaction level). Confidence intervals were reported where appropriate.

Ethical consideration

Ethical approval for this study was granted by the Ethics Committee of the College of Medicine, University of Sulaimani (Approval Code: 365, issued on October 23, 2024). Written informed consent was obtained from all patients prior to their enrollment in the study.

Results

Demographic and Clinical Characteristics of Patients

The baseline demographic and clinical characteristics of patients undergoing helical rim reconstruction are summarized in Table 1. Most patients were female (71.4%, n=10), with an age range of 16 to 53 years. Approximately half of the patients were never smokers (50%, n=7), and the majority had no chronic diseases (85.7%, n=12), with hypertension being the only reported condition. Thermal trauma (64.3%, n=9) was the most common cause of injury, and defects were slightly more common on the right ear (57.1%, n=8). The upper third of the ear was the most frequently (57.1%, n=8) affected region, and most patients had normal surrounding skin (7.1%, n=1), while a minority presented with scarring. For detailed values and percentages, readers are referred to Table 1.

Table 1. Baseline Demographic and Clinical Characteristics of Patients Undergoing Helical Rim Reconstruction

Demographic and Clinical Characteristics of Patients		Values
Age (year)	Min	16
	Max	53
	Mean ± SD	32.71 ± 10.07
Gender	Male	4 (28.6%)
	Female	10 (71.4%)
	Male to female ratio	5:2
Smoking status	Never smoker	7 (50.0%)
	Current smoker	3 (21.4%)
	Former smoker	4 (28.6%)
Chronic disease	No	12 (85.7%)
	HTN	2 (14.3%)
Cause of injury	Blunt trauma	2 (14.3%)
	Sharp trauma	3 (21.4%)
	Thermal trauma	9 (64.3%)
Ear defect side	Left ear	6 (42.9%)
	Right ear	8 (57.1%)
Affected third of ear	Middle	1 (7.1%)
	Upper	8 (57.1%)
	Middle and upper	5 (35.7%)
Surrounding tissue	Normal skin	10 (71.4%)
	Scarring	4 (28.6%)

N=number; %= Percentage; Min=Minimum; Max=Maximum; SD= Standard deviation; HTN= Hypertension.

Preoperative and Intraoperative Surgical Details

The preoperative and intraoperative surgical details of unipedicular flap reconstruction are presented in Table 2. Most patients (92.9%, n=13) underwent superiorly based local flap reconstruction, with only one receiving an inferiorly based flap. The majority of injuries (78.6% n=11) were longstanding, exceeding six months in duration. Follow-up periods ranged from one to six months, with an average duration of approximately three and a half months (average: 3.64 ± 2.02 months). Defect sizes and flap dimensions varied among patients, with several different flap ratios employed based on individual defect characteristics. Surgical procedures were relatively short in duration(mean duration of 37.14 ± 8.48 minutes), and over approximately half of the patients(57.1%, n=8)received local anesthesia alone, while the rest received local anesthesia with sedation. For detailed figures and distributions, readers are referred to Table 2.

Table 2. Preoperative and Intraoperative Surgical Details of Unipedicular Flap Reconstruction.

Preoperative and Intraoperative Surgical Details		**Values**
Flap design and type	Superiorly based local flap	13 (92.9%)
	Inferiorly based local flap	1 (7.1%)
Injury to operation duration (months)	<1	1 (7.1%)
	1-3	2 (14.3%)
	>6	11 (78.6%)
Follow-up period (months)	Min	1
	Max	6
	Mean ± SD	3.64 ± 2.02
Defect size (cm)	Min	2
	Max	5
	Mean ± SD	3.25 ± 0.99
Flap dimension (L × W) cm	3:1	2 (14.3%)
	4:1	6 (42.9%)
	5: 1	3 (21.4%)
	5.5: 1.5	1 (7.1%)
	6: 1.5	2 (14.3%)
Surgery duration (minutes)	Min	30
	Max	60
	Mean ± SD	37.14 ± 8.48
Anesthesia type	Local anesthesia only	8 (57.1%)
	Local anesthesia with sedation	6 (42.9%)

N=number; %= Percentage; Min=Minimum; Max=Maximum; SD= Standard deviation; cm= Centimeter; L= Length; W= Width.

Aesthetic Outcomes and Patient Satisfaction

Aesthetic outcomes and patient satisfaction regarding helical rim reconstruction were assessed across several criteria, as shown in Table 3. Overall satisfaction was high (57.1%, n=8), with no patients reporting dissatisfaction in any category. Most patients (50.0%, n=7) rated the overall appearance of the reconstructed ear, its symmetry, and natural contour as either "satisfied" or "very satisfied." High satisfaction was also observed for color match and texture, with nearly all patients expressing positive ratings. Scar visibility received slightly more neutral responses (50.0%, n=7), though the majority still reported satisfaction. These findings reflect favorable (92.9%, n=13) aesthetic outcomes and patient perceptions following the unipedicle flap reconstruction

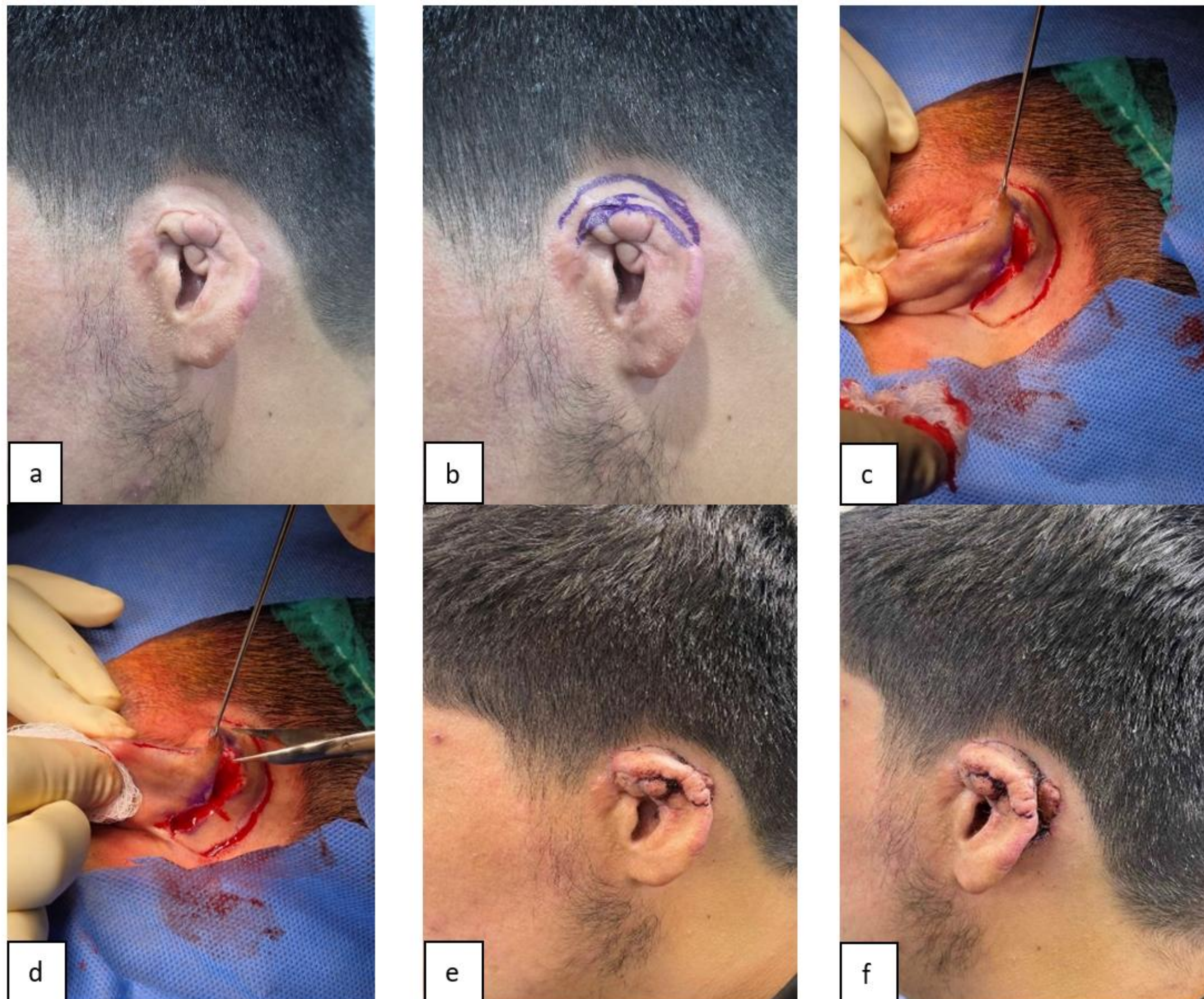


Figure 1. A 16-year-old male with a history of burn to the left ear was managed with a superiorly based post-auricular flap for surgical reconstruction and tissue coverage. The preoperative images are shown in panels a and b, the intraoperative images are presented in panels c and d, and the postoperative images are displayed in panels e and f.

Table 3. Aesthetic Outcomes and Patient Satisfaction.

Aesthetic outcomes	Patient satisfaction				
	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
Overall appearance of the reconstructed ear	0 (0.0%)	0 (0.0%)	3 (21.4%)	8 (57.1%)	3 (21.4%)
Symmetry compared to the opposite ear	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (50.0%)	7 (50.0%)
Natural contour of helical rim	0 (0.0%)	0 (0.0%)	0 (0.0%)	6 (42.9%)	8 (57.1%)
Scar visibility	0 (0.0%)	0 (0.0%)	7 (50.0%)	6 (42.9%)	1 (7.1%)
Color match of the flap	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (35.7%)	9 (64.3%)
Texture of the reconstructed area	0 (0.0%)	0 (0.0%)	0 (0.0%)	13 (92.9%)	1 (7.1%)

Functional Outcomes and Patient Satisfaction

Functional outcomes and patient satisfaction following helical rim reconstruction are summarized in Table 4. Notably, all (100% [n = 14]) patients rated these pertinent functions as "very" satisfied with wearing eyeglasses/sunglasses and head coverings (eg, hats, helmets), demonstrating that reconstruction did not alter daily functions. With regard to thermal sensitivity, 85.7% (n=12) were very satisfied. Likewise, 92.9% (n=13) of patients reported being very satisfied with the sensation of the reconstructed site. Significantly, none of the subjective functional parameters were rated unsatisfactory and results were uniformly very good after surgery.

Table 4. Functional Outcomes and Patient Satisfaction.

Functional outcomes	Patient satisfaction				
	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
Comfort wearing eyeglasses/sunglasses	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	14 (100.0%)
Comfort wearing head coverings (hats, helmets)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	14 (100.0%)
Sensitivity to temperature (cold/heat)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (14.3%)	12 (85.7%)
Sensation in the reconstructed area	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (7.1%)	13 (92.9%)

Donor Site Assessment and Patient Satisfaction

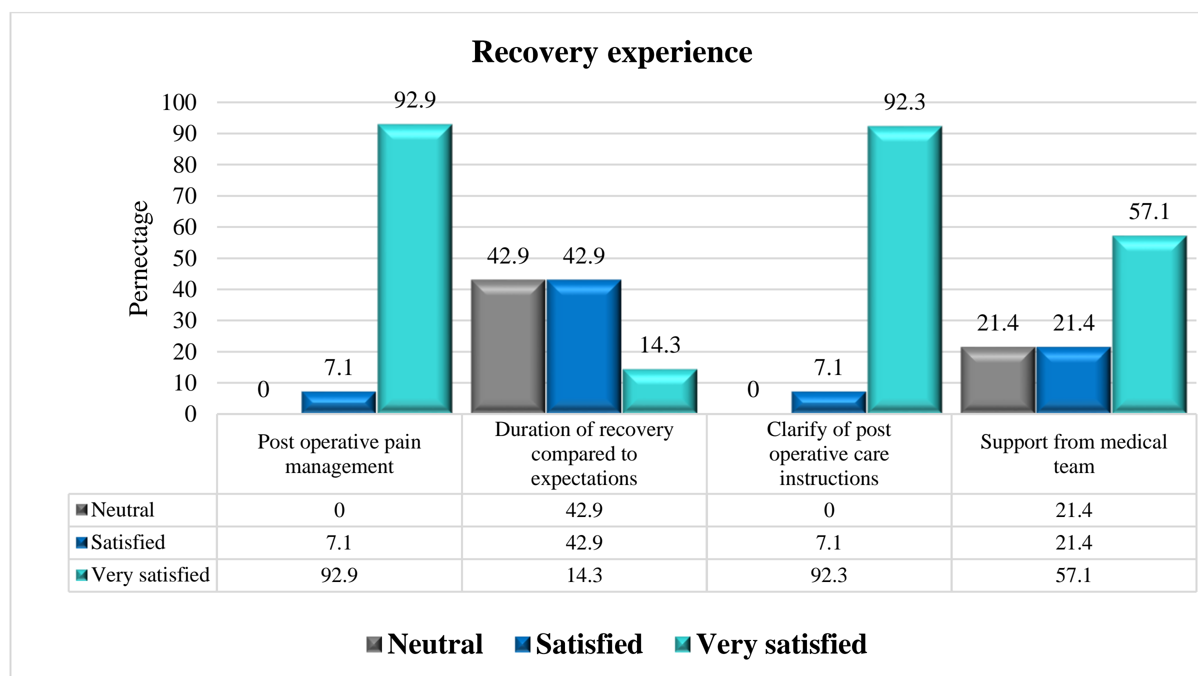
The donor site assessment and satisfaction of the patient were examined in variables, which were shown in Table 5. Most patients had a very satisfactory (n=11, 78.6%) scoring for the appearance of the donor site. When it comes to discomfort, 85.7% (n=12) rated themselves as very satisfied. Cure results were similarly excellent, as nearly all (92.9%; n= 13) of patients were very glad about the cure. As detailed in Table 5, donor site outcomes were also favorable, with no cases of dissatisfaction or any major donor site problems noted.

Table 5. Donor Site Assessment and Patient Satisfaction,

Donor site assessment	Patient satisfaction				
	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
Appearance of donor site	0 (0.0%)	0 (0.0%)	1 (7.1%)	2 (14.3%)	11 (78.6%)
Discomfort at donor site	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (14.3%)	12 (85.7%)
Healing of donor site	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (7.1%)	13 (92.9%)

Recovery Experience and Patient Satisfaction

Postoperative features of recovery and patient satisfaction have been evaluated here. Pain control was effectively managed, with 92.9% (n=13) of the patients reporting satisfaction on a high level. Likewise, postoperative care instructions were rated highly, with 92.9% (n=13) very satisfied with their clarity. Satisfaction with the length of recovery was more variable, with most patients reporting neutral or satisfied responses and a smaller proportion (14.3%, n=2) reporting very satisfied. Of the responses around support from medical team 57.1% (n=8) were very satisfied and others satisfied or neutral. With no dissatisfaction in any of these domains, the overall recovery experience was positive (see Figure 1).



	Post operative pain management	Duration of recovery compared to expectations	Clarify of post operative care instructions	Support from medical team
Neutral	0	42.9	0	21.4
Satisfied	7.1	42.9	7.1	21.4
Very satisfied	92.9	14.3	92.3	57.1

Figure 1. Recovery Experience and Patient Satisfaction

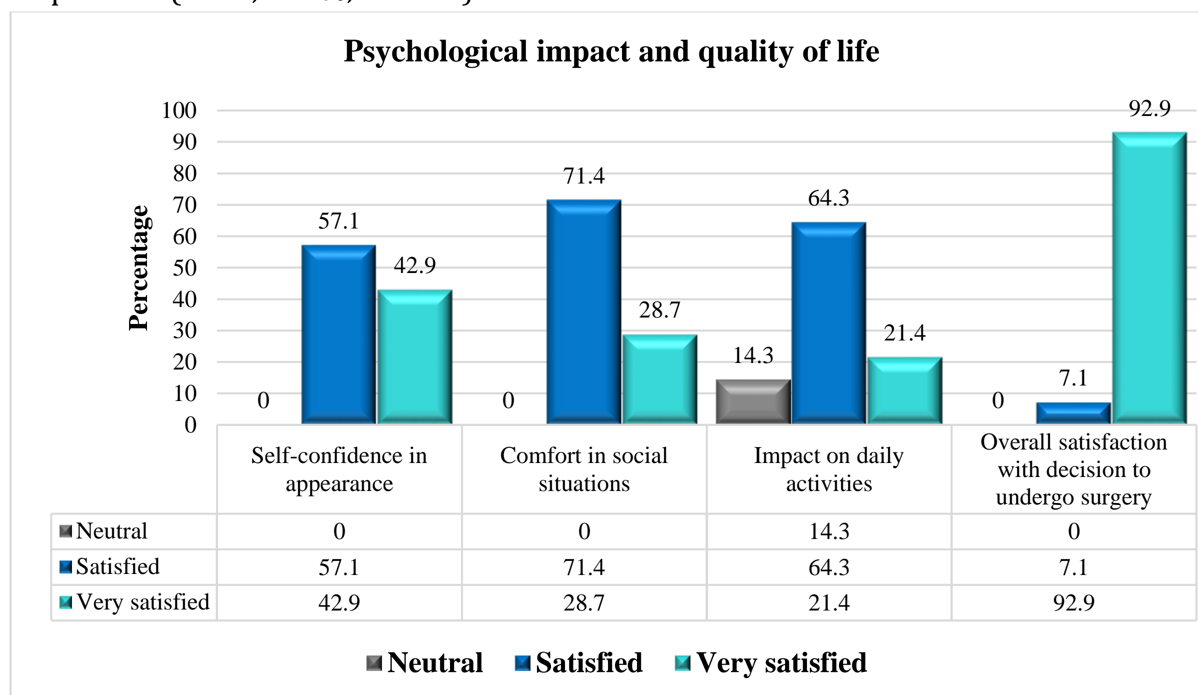
Psychological Impact and Quality of Life

Several domains were evaluated for psychological impact and quality of life after helix rim reconstruction, which are shown in Figure 2. On self-confidence about appearance, all the patients were satisfied; among them, 42.9% (n=6) were very satisfied. There was also an enhancement in social comfort (71.4%, n=10) satisfied and (28.6%, n=4) very satisfied. Regarding the daily activities, most were satisfied (64.3%, n=9), although some were very (21.4%, n=3). Neutral to satisfied comments were few. Notably, (92.9%, n=13) of patients were highly satisfied with their decision to undergo surgery, indicating an overall benefit to psychological well-being, as no patients reported dissatisfaction in any category.

Surgical Outcomes Summary

In the majority of cases, flap take rate was

high: (92.9%, n=13) had 75–99% viability. Overall assessment by the surgeon rated outcomes either good (71.4%, n=10) or excellent (28.6%, n=4). Complications were rare and consisted of one case (7.1%) verifying epidermal necrosis. In most of the patients, no other procedure was necessary (64.3%, n = 9), but it consisted of small measures like cartilage rearrangement or ear lobe separation. More strikingly, a good aesthetic result based on clinical evaluation was obtained in all patients (n=14, 100%, Table 6).



	Self-confidence in appearance	Comfort in social situations	Impact on daily activities	Overall satisfaction with decision to undergo surgery
Neutral	0	0	14.3	0
Satisfied	57.1	71.4	64.3	7.1
Very satisfied	42.9	28.7	21.4	92.9

Figure 2. Bar graph representing psychological outcomes, including self-confidence, social comfort, and satisfaction with the decision to undergo surgery

Table 6. Surgical Outcomes Summary.

Surgeon's observations		**Values**
Flap take rate	50-74%	1 (7.1%)
	75-99%	13 (92.9%)
Surgeon's overalls assessment	Good	10 (71.4%)
	Excellent	4 (28.6%)
Complications	No	13 (92.1%)
	Yes (epidermal necrosis)	1 (7.9%)
Additional procedure required	No	9 (64.3%)
	Concha and scapha cartilage rearrangements with a stent	3 (21.4%)
	Ear lobe separation done	2 (14.3%)
Clinical assessment outcome	Good aesthetic outcome	14 (100.0%)

Discussions

Helical rim defects can be challenging as they not only are a cosmetic concern, but also affect the function of the ear, therefore requiring reconstructive techniques that can restore contour and structural integrity and yield a satisfied patient (12). Because of the importance of the ear on facial symmetry, these surgical efforts need to be performed in such a way through fusion to allow for easy incorporation of the new ear tissue and low donor site morbidity (13). The unipedicle flap procedure provides a reliable, one-step method that allows for optimal coverage without need for staged procedures (14). In contrast to multi-stage approaches, which can prolong recovery and reduce predictability, this method reduces surgical burden whilst maintaining vascularity and therefore, tissue viability **(15).**

Unlike multi-stage approaches, which can prolong recovery and reduce predictability, this method lessens surgical burden while preserving vascularity and tissue viability.

Aesthetic outcomes play a pivotal role in reconstructive ear surgery, particularly in achieving both functional restoration and natural appearance (16). The effectiveness of the technique used is also shown by the report of satisfied with the reconstructed ear appearance among 57.1% of the patients in this study. This is due to the preservation of blood supply, skin quality and contour, as well as minimized donor site morbidity with the flap (17).

Symmetry with the contralateral ear is a major aesthetic parameter. Fifty percent of patients graded symmetry as "very satisfied," and 57.1% were similarly satisfied at restoration of curvature of the helical rim. We attribute these results to careful flap design as well as consistent tissue orientation made simple by the flexible and vascularly reliable unipedicle flap (18)(19). Compared to approaches like the postauricular tube flap or staged methods, this technique offers similar or better satisfaction with fewer complications(20). In a case series of modified Antia-Buch flaps, all patients reported satisfaction and preservation of ear anatomy(21). These findings are consistent with broader literature emphasizing that local flaps generally yield superior contour, symmetry, and patient-reported outcomes compared to skin grafts or more extensive staged techniques (22). Although scar visibility is an important factor in reconstructive design, scar appearance was rated as "neutral" by 50% of patients and positively by 42.9%, so the flap design used is believed to have reduced scarring. But as surgical techniques continue to evolve, there may be future improvements through further reductions in the visibility of scars and improved skin integration.

Local flaps based on superiorly-oriented blood supply represent a concept providing reliable vascularity, good and predictable cosmetic outcomes and high rates of patients' satisfaction that allows this technique to be considered a reliable alternative in auricular reconstruction. If you would like additional edits or a citation added, paste your request below! An example of such study is by Asirova et al., in which expert quality assessments in microtia reconstruction in 130 patients reported very high patient satisfaction rates (90% good) and significant post-reconstruction quality of life improvements **(23).** Similarly, Abukhder et al. conducted a systematic review on auricular reconstruction using autologous cartilage, highlighting that exceptional aesthetic results can be achieved when

performed by skilled surgeons (24). Further supporting these findings, Mohamed et al. explored bilateral microtia reconstruction, emphasizing the importance of technical refinements in achieving symmetry and patient satisfaction (25).

The results of our study are similar to those of the study of Sheen et al, who reported improvement in vascularity that can provide these multiple vascular advantages of a superiorly based flap in auricular reconstruction, which practiced Local Tissue Advancement for Superior Helical Rim Reconstruction. In addition to preventing necrosis and providing mechanical support, the authors highlight that functional and aesthetic success is especially important for facial attachments, like eyeglasses (26). Likewise, Kim and Choi in their case report on Helical Rim Advancement Flap with Postauricular Skin Flap showed that minimal loss of helical diameter with low risk of flap necrosis is achieved when the microcirculatory system of the flap is preserved, which supports the biennial flap as an effective flap with structural stability and postoperative viability post destruction (27).

Our results also correlate with the study entitled "Reconstruction of a Helical Rim Defect, Chondrocutaneous Advancement Flap," which highlights that the superiorly based flaps preserve contour and have lower necrosis rates, resulting in better vascularity. This information substantiates our high take rate of flaps and superior aesthetic outcomes, further validating the clinical effectiveness of our technique (5).

The main feature of our cases was thermal trauma which could lead to delayed scar healing. However, we've shown a positive effect using this method to aid scar recovery and general recovery. Ibrahem et al. (2008) conjectured that free ear reconstruction is especially difficult because of no elasticity of skin from scarring, lack of cartilaginous support, and loss of possible graft and local flap sites from thermal injuries. Besides this, perichondritis usually causes additional cartilage destruction, which makes the reconstruction more difficult (28).

Functional outcomes in this study were excellent, as all patients reported satisfaction regarding the use of head coverings and eyeglasses. The results show that the ear that had been reconstructed did not have a functional impact on their day-to-day activities, which also suggests the functional success of the ear. These results are consistent with what was found by Martina et al. (2013), stating that their post-operative comfort with spectacles was 76%. Conversely, in their study, they also observed challenges in ear hygiene maintenance, which the patients faced; this factor had not been emphasized in the current study (15).

Similarly, Widodo et al. Other studies (2022) have compared autologous and alloplastic reconstruction methods and argued that while restoration of function is usually accomplished, concerns about symmetry from a cosmetic standpoint is often at the front of the patients' minds (29). This highlights the need for both stability and aesthetic cohesion in reconstruction methods.

Regarding donor site outcomes, this study found minimal discomfort and high patient satisfaction (78.6%) with the aesthetic appearance of the donor area. This contrasts with findings by Abukhder et al. (2024), whose systematic review acknowledged that

autologous rib cartilage techniques generally yield satisfactory functional outcomes but may also present donor site morbidity and localized discomfort, affecting overall patient satisfaction (24).

Martina et al. (2013) further reported that 21% of patients experienced thoracic donor site discomfort, particularly sensations triggered by specific movements (15).

Optimizing patient recovery and satisfaction after reconstructive ear surgery depends as much on postoperative care as it does on surgical technique. Patients newly use this approach between their postoperative pain management and care instructions 92.9% of the time, identifying as "very satisfied" in both areas of postoperative care. Furthermore, 85.7% rated their recovery time as "satisfactory" or neutral, and there were no significant complications during the recovery period.

The main advantage of Helical Rim Reconstruction by unipedicular flap is that it is unilateral and done at one stage, causing less postoperative discomfort as compared to multi-stage techniques. Our method eliminates the need for multiple operations and the protracted recovery that spaced operations entail, enabling healing to speed up, minimizing burden on patients, and leading to better postoperative results, as compared to Nagata's method. Additionally, doing it under local anesthesia avoids general anesthesia risks such as post-operative nausea, systemic complications, and longer length of stay. The study by Mohammed et al. proved that local anesthesia improves patient comfort and speeds up recovery time, verifying the benefits seen in this study (12).

Similarly, Ibrahim et al., in a single-stage reconstruction method, evaluated and reported lower levels of early postoperative pain with requirements for analgesics after surgery being lower, further confirming our findings(14).

In addition to the functional restoration of auricular reconstruction, the psychosocial aspects are very important, as they improve patient self-confidence and their ability to return to social life. In the present study, patients were satisfied with their appearance in 57.1% of cases, and 71.4% of patients noted improved comfort around people after surgery. Our findings demonstrate the psychological advantages of our approach – results that are also consistent with other research.

In contrast to multi-stage techniques, which can prolong aesthetic uncertainty and psychological suffering, our single-stage method promotes timely psychosocial adaptation. National study by Jovic et al. Patients who had multi-stage reconstruction demonstrated increased anxiety from uncertainty regarding their final appearance (13).

Moreover, a critical review by Humphries et al. showed that autologous cartilage grafting has been limited by long recovery times and donor site morbidity grafting (30).

On the other hand, our method is comparable to single-stage procedures in negating long recovery periods that require patients to restrain their new ear from their self-image. In contrast, our technique minimizes surgical burden with maximal functional and psychosocial gain with immediate aesthetic incorporation and later emotional integration.

Additional research backs the psychosocial benefits of ear reconstruction. Kristiansen et al.

revealed that twenty-four % of patients who had undergone surgery began to feel more pleased, while three-quarters of individuals showed very little alteration in spirit (15).

This highlights the importance of psychosocial well-being in addition to function when planning reconstructive procedures.

Our findings provide evidence for the high success of helical rim reconstruction by unipedicular Flap, as 92.9% of patients had a flap take rate of 75-99%. Furthermore, the rate of complications was low (7.1%), with only one adverse event, epidermal necrosis, emphasising the safety and efficacy of the technique. This approach is less cumbersome and effective compared to other techniques like a chondrocutaneous advancement flap, which involves several stages and greater donor site morbidity. De Rosa et al. Chondrocutaneous advancement flaps are associated with a longer healing process and an increased risk of complications (31).

Similarly, Sood et al. examined modified helical rim advancement flaps, reporting variable success rates and aesthetic challenges (32).

Our unipedicular flap technique, by contrast, reduces operative complexity and postoperative risks, supporting a more streamlined recovery. Findings from Poutoglidis et al. further emphasize the importance of single-stage auricular reconstruction in minimizing patient discomfort while optimizing aesthetic outcomes (33).

Conclusion

Single pedicle flap-based Helical Rim reconstruction is an innovative approach in the repertoire of reconstructive surgeons to achieve desirable aesthetic and functional results with no increase in donor site morbidity as demonstrated by the current study. Compared to multi-stage techniques that encounter a prolonged period of uncertainty and stress, its single-stage characteristic allows recovery, reduced surgical burden and improved psychosocial integration. Patient-reported outcomes are high with the unipedicular flap, and comparative data with other interbody techniques demonstrate its efficacy and decreased complications.

Recommendations:

Further research is needed to address postoperative care, to confirm long-term results with larger samples, to fine-tune and design flaps with less morbidity, to compare patient-reported outcomes in single- and multi-stage approaches, and to assess psychosocial factors that indicate psychological adaptation following surgery.

Limitations: The small sample size and short follow-up period may limit the generalizability of the findings. The long-term effectiveness and potential complications warrant further studies with larger samples and longer follow-up.

Conflict of Interest Statement: The authors declare that there are no conflicts of interest.

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