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Minimal Incision Lateral Temporal Brow lift: An Evaluation Study

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Abstract

Background and Objective: The lateral brow is crucial for facial aesthetics, often descending with age due to skin laxity, gravity, and the absence of brow retractors. The aim of this study is to elevate the lateral brow using a minimal, inconspicuous incision within the temporal hairline.

Methods: This retrospective observational study, conducted in Duhok, Iraq, from October 1, 2022, to the end of March 2023, examines the outcomes of a minimal incision temporal brow lift technique over a 6-month period, involving 25 patients. Inclusion criteria required patients to be over 18 years of age, with no prior brow lift procedures or facial trauma, and a minimum follow-up of 6 months. Patients with unrealistic expectations, such as those who anticipated results beyond the reasonable capabilities of a minimal incision brow lift, were excluded to ensure that patient satisfaction aligned with achievable outcomes. Additionally, specific hair characteristics—such as sparse hair, a wide, non-hairy temporal area, or thin or shaved sideburns in male patients—were taken into account. Preoperative assessments were performed with patients awake and standing to evaluate brow position and any asymmetries. Neurotoxin injections to the orbicularis oculi muscle were administered 14 days postoperatively to prevent brow descent.

Results: Gender differences in satisfaction were observed, with a higher satisfaction rate among females (14, 56%) compared to males (1, 4%). Satisfaction was also higher under local anesthesia (9.36%) versus general anesthesia (6.24%). Complications reported included internal stitch exposure 1 (4%), unilateral neuropraxia 1 (4%), skin necrosis 1 (4%), scar alopecia 1 (4%), asymmetry 1 (4%), and chronic postoperative pain 4 (16%).

Conclusions: This minimal incision brow lift is a practical, safe method for brow elevation, though further research is needed to confirm long-term benefits.

Keywords: Complications, Lateral brow lift, Techniques

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Introduction

Aging is an inevitable process, with most signs appearing on the face. One of the most prominent indicators of aging is lateral brow hooding and brow ptosis, which give an appearance of sadness and fatigue. Among the contributing factors to lateral brow descent, gravity and the impact of facial mimetic muscles are often the most significant.[1] Depending on the portion of the eyebrow being addressed, different mechanisms are involved in the surgical elevations of the brow complex. Medially, eyebrow elevation depends on weakening of the depressor muscles plus soft tissue release; the frontalis is the only brow elevator that is allowed to do its job unopposed.[2,3] Laterally, frontalis action is weak or nonexistent, so that lateral brow elevation depends completely on mechanical fixation after appropriate soft tissue release. The oblique line temporal ligamentous adhesion acts as a fulcrum about which the lateral brow descends, as the upward force of the frontalis muscle does not extend to this region.[4,5] Numerous techniques to raise the eyebrow complex have been documented over the past century. The historical background of eyebrow lift techniques reflects the evolution of methods over the past century, leading to the development of more refined and minimally invasive procedures. Early approaches in the 20th century primarily involved open brow lift techniques, which required long incisions across the scalp or forehead, often resulting in visible scarring and extended recovery times. These techniques, while effective in raising the brow, were associated with significant side effects, such as hair loss along the incision lines and longer recovery periods. With the advent of endoscopic brow surgery, it appeared feasible to elevate the brow complex predictably with few incisions and minimal side effects.[6] Many surgeons have expressed frustration with the unpredictable outcomes of endoscopic brow lifting, despite its widespread adoption. Increased skin laxity, upper eyelid lipoatrophy, and galeal fat pad ptosis are important factors in brow ptosis; however, the aging face is primarily driven by gravity and the actions of the facial muscles.[7,8] Given that the eyes and eyebrows are the most expressive and the first features that other people notice about a person, it makes sense to place more emphasis on periorbital aesthetics. While the brows are a curtain of emotion, the eyes have been referred to as the window to the soul. Being able to communicate a wide range of emotions with one's eyes and eyebrows is a crucial nonverbal communication skill that can help people communicate across linguistic and cultural divides. The aging forehead and brow can result in the inadvertent expression of melancholy, rage, or exhaustion, even though the abnormally raised brow can cause the so-called surprised look.[9,10] While similar brow lift procedures have been performed before, particularly with the advent of endoscopic brow lifts in the 1990s, our technique in Duhok may represent a further refinement. Historically, brow lift procedures began with extensive incisions like the coronal brow lift, which involved long scalp incisions and resulted in more scarring and longer recovery. Endoscopic techniques revolutionized the field by reducing incision size and recovery time. Our approach builds on these innovations by focusing on even smaller, inconspicuous incisions that offer quicker recovery and fewer complications. While the use of minimal incisions has been explored, the specific details and refinements of our technique might not have been documented before. The aim of this study was to elevate the lateral brow using a minimal, inconspicuous incision within the temporal hairline.

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Patients and methods

This retrospective observational study was conducted in Duhok, Iraq, from October 1, 2022, to the end of March 2023, spanning a 6-month period and involving a total of 25 patients of both sexes who underwent the minimal incision lateral brow lift procedure. The patient cohort ranged in age from 18 years and older, with an average age between 40 and 55, representing individuals seeking aesthetic improvement for age-related brow sagging. Inclusion criteria consisted of patients aged 18 years and older, with no prior history of invasive or non-invasive brow lift procedures, no trauma to the upper face area, a minimum follow-up period of 6 months, and the provision of both pre-operative and postoperative photographs. Exclusion criteria included patients with unrealistic expectations, sparse hair or a wide, non-hairy temporal-to-brow area, male patients with thin or shaved sideburns, elderly patients seeking a natural eyebrow appearance, those with a history of failed pretrichial brow lifts, and individuals with bleeding disorders or on blood-thinning medications. The proposed technique in a minimal incision temporal brow lift involves a specialized approach to enhance outcomes and refine the traditional procedure. In this surgery, small incisions, typically around 2 cm, are made near the hairline in the temporal region to minimize visible scarring. Through these incisions, the outer brow is elevated by manipulating and repositioning underlying tissues, resulting in a more youthful appearance and reduction of wrinkles. The lifted tissues are then secured with sutures or small anchors to maintain the brow's new position. The incisions are closed with stitches hidden within the hairline, allowing for quicker recovery and more natural results for patients with mild to moderate brow sagging. All patients in the study signed a consent form before undergoing the procedure, indicating their understanding and agreement to participate. A thorough preoperative evaluation was conducted to assess eyebrow position, asymmetries, and various vectors of brow elevation. This assessment was done with patients awake and in a standing position to ensure accuracy in evaluation and planning. Fourteen days post-operation, neurotoxin injections (botulinum toxin) were administered to the lateral portion of the orbicularis oculi muscle (20 to 30 units) to prevent the pulldown effect of the muscle, minimizing recurrence risk and supporting the success of the temporal brow lift. The study protocol was approved by the Ethics Committee of the Kurdistan Higher Council of Medical Specialties. Descriptive statistics by using SPSS ver. 26 were used to summarize the characteristics of the study population. Satisfaction rates, complication frequencies, and gender-based variations were analyzed using chi-square and Fisher's exact tests where applicable. The correlation between the type of anesthesia and patient satisfaction was evaluated using logistic regression. A p-value of less than 0.05 was considered statistically significant. Patient satisfaction was assessed through a combination of subjective feedback and objective evaluation. After the procedure, patients were asked to rate their satisfaction with the results during follow-up visits, which included questions about their overall happiness with the brow's appearance, symmetry, and the naturalness of the result

Results

The study included a total of 25 patients who underwent the minimal incision lateral brow lift procedure. The majority of the patients were female, comprising 96% (24 patients), with only 4% (1 patient) being male. The age of the patients ranged from 18 to 55 years, with most patients falling within the middle-aged group (40-55 years). Table (1) highlights key outcomes of the minimal incision temporal brow lift, with notable gender differences showing a higher

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satisfaction rate among females (14, 56%) compared to males (1.4%). Satisfaction was also higher under local anesthesia (9.36%) versus general anesthesia (6.24%). Complications reported included internal stitch exposure 1 (4%), unilateral neuropraxia 1 (4%), skin necrosis 1 (4%), scar alopecia 1 (4%), asymmetry 1 (4%), and chronic postoperative pain 4 (16%). There were no cases of seroma, hematoma, infection, or bilateral neuropraxia.

Table (1): Outcomes analysis of minimal incision temporal brow lift: gender and procedural influence and the number of patients in each category, accompanied by the percentage (%) for each condition or outcome.

Patients	Male	Female	General Anesthesia	Local Anesthesia	2 Internal stitches	3 Internal stitches
Satisfied	1 (4%)	14 (56%)	6 (24%)	9 (36%)	2 (8%)	13 (52%)
Unsatisfied	0 (0%)	2 (8%)	0 (0%)	2 (8%)	2 (8%)	0 (0%)
Seroma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Hematoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Infection	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Internal stich exposure	0 (0%)	1 (4%)	0 (0%)	1 (4%)	0 (0%)	1 (4%)
Unilateral neuropraxia	0 (0%)	1 (4%)	0 (0%)	1 (4%)	0 (0%)	1 (4%)
Bilateral neuropraxia	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Skin necrosis	0 (0%)	0 (0%)	0 (0%)	1 (4%)	0 (0%)	0 (0%)
Scar alopecia	0 (0%)	1 (4%)	0 (0%)	0 (0%)	0 (0%)	1 (4%)
Asymmetry	0 (0%)	1 (4%)	0 (0%)	1 (4%)	1 (4%)	0 (0%)
Chronic postoperative pain	0 (0%)	4 (16%)	0 (0%)	4 (16%)	0 (0%)	4 (16%)
Patients	Male n (%)	Female n (%)	General Anesthesia n (%)	Local Anesthesia n (%)	2 Internal Stitches n (%)	3 Internal Stitches n (%)
Satisfied	1 (4%)	14 (56%)	6 (24%)	9 (36%)	2 (8%)	13 (52%)
Unsatisfied	0 (0%)	2 (8%)	0 (0%)	2 (8%)	2 (8%)	0 (0%)
Seroma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Hematoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Infection	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Internal stich exposure	0 (0%)	1 (4%)	0 (0%)	1 (4%)	0 (0%)	1 (4%)
Unilateral neuropraxia	0 (0%)	1 (4%)	0 (0%)	1 (4%)	0 (0%)	1 (4%)
Bilateral neuropraxia	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Skin necrosis	0 (0%)	0 (0%)	0 (0%)	1 (4%)	0 (0%)	0 (0%)
Scar alopecia	0 (0%)	1 (4%)	0 (0%)	0 (0%)	0 (0%)	1 (4%)
Asymmetry	0 (0%)	1 (4%)	0 (0%)	1 (4%)	1 (4%)	0 (0%)
Chronic postoperative pain	0 (0%)	4 (16%)	0 (0%)	4 (16%)	0 (0%)	4 (16%)

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Table (2) reveals a gender distribution among the patients, with a significant majority being female, accounting for 24 (96%) of the total. This gender disparity reflects the common interest in cosmetic procedures among women. Among the patient satisfaction levels, 15 (60%) reported being satisfied with the outcome of their temporal brow lift, while 2 (8%) expressed dissatisfaction. The table also illustrates the prevalence of specific postoperative complications, such as asymmetry, chronic postoperative pain, internal stitch exposure, scar alopecia, and unilateral neuropraxia, with each accounting for 1 (4%) of the cases. Furthermore, the table sheds light on the choice of anesthesia used during the procedure. A majority of patients, 19 (76%), received the surgery under local anesthesia, which is a common choice for less invasive cosmetic procedures, while 6 (24%) underwent the operation with general anesthesia.

Table (2): General properties of patients underwent temporal brow lift operation

General Properties	n (%)
Gender	
Female	24 (96%)
Male	1 (4%)
Total	25 (100%)
Satisfaction	
Satisfied	15 (60%)
Unsatisfied	2 (8%)
Complications	
Asymmetry	1 (4%)
Chronic post-operative pain	4 (16%)
Internal stitch exposure	1 (4%)
Scar alopecia	1 (4%)
Unilateral neuropraxia	1 (4%)
Type of Anesthesia Used	
General anesthesia	6 (24%)
Local anesthesia	19 (76%)
Total	25 (100%)
Internal Stitches	
2 Internal stitches	6 (24%)
3 Internal stitches	19 (76%)
Total	25 (100%)

The comparison between general and local anesthesia in patients undergoing temporal brow lift reveals significant differences in satisfaction and complications. All patients (100%) who received general anesthesia were satisfied, whereas only 47.37% of those under local anesthesia reported satisfaction, with 10.53% expressing dissatisfaction. Additionally, no complications were reported in the general anesthesia group, while patients under local anesthesia experienced various complications, including asymmetry (5.26%), chronic post-operative pain (21.05%), internal stitch exposure (5.26%), scar alopecia (5.26%), and unilateral neuropraxia (5.26%), Table (3).

Table (3): Differences in satisfaction and complications between general and local anesthesia in patients undergoing temporal brow lift

Satisfaction status of studied cases	Type of anesthesia used temporal brow lift operation			
	General anesthesia		Local anesthesia	
	No.	%	No.	%
Satisfied	6	100	9	47.37
Unsatisfied	0	47.37	2	10.53
Asymmetry	0	0	1	5.26
Chronic post-operative pain	0	0	4	21.05
Internal stich exposure	0	0	1	5.26
Scar alopecia	0	0	1	5.26
Unilateral neuropraxia	0	0	1	5.26
Total	6	100	19	100

The data shows that 58.33% of female patients (14 of 24) reported satisfaction with their temporal brow lift, while 2(8.33%) were unsatisfied. Complications in the female group included asymmetry 1(4.17%), chronic post-operative pain 4(16.67%), internal stitch exposure 1(4.17%), scar alopecia 1(4.17%), and unilateral neuropraxia (14.17%). In contrast, the single male patient reported

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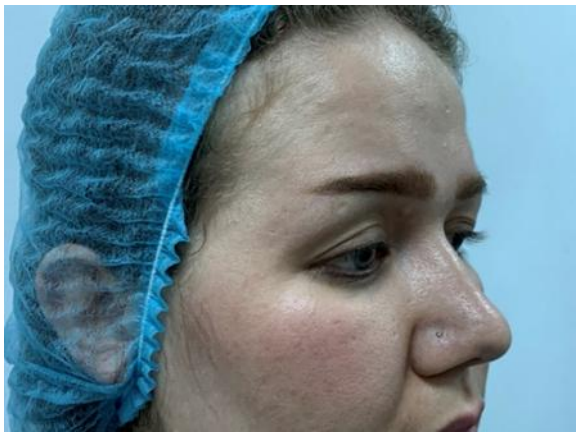
100% satisfaction and no complications, Table (4).

Table (4): Distribution of patients underwent temporal brow lift operation according to satisfaction and gender of patient

Satisfaction status of patients underwent temporal brow lift operation	Female		Male	
	No.	%	No.	%
Satisfied	14	58.33	1	100
Unsatisfied	2	8.33	0	0
Asymmetry	1	4.17	0	0
Chronic post-operative pain	4	16.67	0	0
Internal stich exposure	1	4.17	0	0
Scar alopecia	1	4.17	0	0
Unilateral neuropraxia	1	4.17	0	0
Total	24	100	1	00



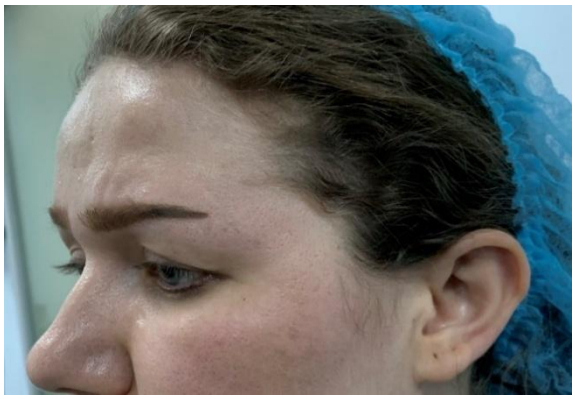
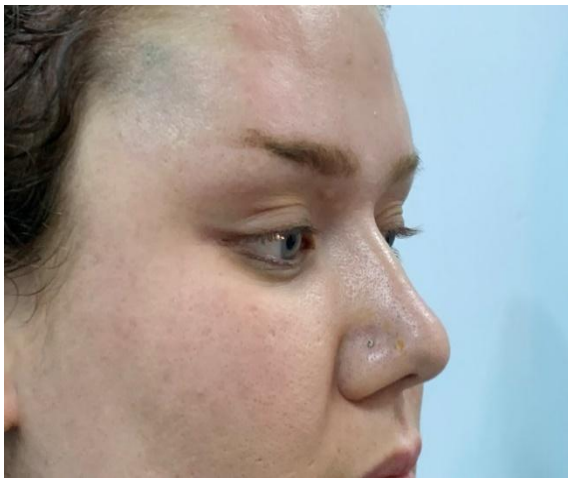


Figure (1): Preoperative photos f a patient before undergoing the procedure for temporal brow lift.

Figure (1) under local anesthesia (the natural brow position was clear before the procedure. The skin and brow appear to show mild signs of ptosis (drooping) and aging, which the temporal brow lift aims to correct),



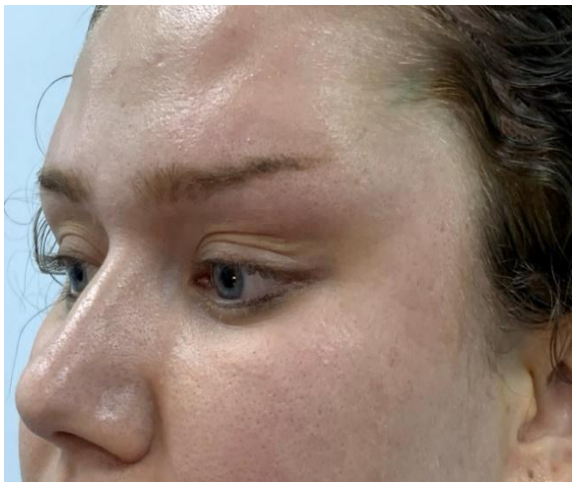


Figure (2): Postoperative photos of the same patient directly after the procedure.

Figure (2) The skin appears slightly swollen and red, which is typical in the immediate postoperative phase. The overall brow shape seems more arched compared to the preoperative images, indicating a successful brow elevation.

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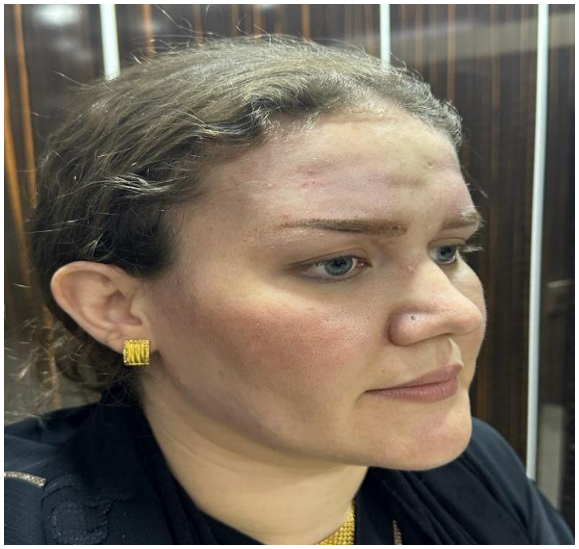

Figure (3): Same patient six months after undergoing the temporal brow lift procedure.

Figure (3) The brow region appears well-healed, with a natural and elevated brow position compared to the preoperative state. Any swelling or redness seen in the immediate postoperative photos has resolved, and the overall facial appearance is more refined. The brow arch remains lifted, contributing to a more youthful and refreshed look. There are no visible scars or significant post-surgical marks, indicating a successful healing process

Discussion

Brow elevation is often an essential factor in an attractive periorbital region. For select patients seeking aesthetic treatment of that area, a subcutaneous temporal browlift performed in the office under local anesthesia has proven effective, reproducible, and inexpensive. [1,2] Our preferred technique, the temporal or lateral browlift with limited incision (the length is typically around 2 centimeters) in the subcutaneous plane, has been well described previously. [3,6] The presented data on patients undergoing temporal brow lift operations reveal substantial disparities in satisfaction rates and postoperative complications based on the type of anesthesia administered. The stark contrast in satisfaction rates, with 100% satisfaction under general anesthesia compared to 47.37% under local anesthesia, suggests a potential influence of anesthesia choice on patient contentment. These findings align with previous studies that have demonstrated the impact of anesthesia type on patient-reported outcomes in various surgical procedures in patients undergoing temporal brow lift operations. Similar studies have found higher satisfaction rates among patients undergoing procedures with general anesthesia, emphasizing the importance of considering patient preferences and experiences when choosing the appropriate anesthesia method.[6,7] Moreover, the observed variations in specific complications underscore the need for a nuanced approach in anesthesia selection. The absence of asymmetry in both groups is noteworthy, suggesting that this complication may be unrelated to the type of anesthesia. However, the higher incidence of chronic postoperative pain, internal stitch exposure, scar alopecia, and unilateral neuropraxia in the local anesthesia group aligns with existing literature. Senthil reported similar complications associated with local anesthesia, indicating a potential correlation between local anesthesia and specific adverse effects. The potential correlation between local anesthesia and specific adverse effects in a temporal brow lift may be due to several factors. Under local anesthesia, the patient remains awake, which could lead to increased muscle movement or tension during the procedure, making it more challenging for the surgeon to perform precise adjustments. Additionally, local anesthesia may not fully block all pain sensations, potentially causing discomfort that could interfere with the surgery. In contrast, general anesthesia provides a completely relaxed and controlled environment, minimizing patient movement

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and discomfort, which could reduce the risk of complications such as asymmetry, chronic pain, or stitch exposure. [8] The data on satisfaction status among patients who underwent temporal brow lift operations reveal interesting gender-based differences. The data shows that 58.33% of female patients (14 of 24) reported satisfaction with their temporal brow lift, while 2 (8.33%) were unsatisfied. Complications in the female group included asymmetry 1 (4.17%), chronic postoperative pain 4 (16.67%), internal stitch exposure 1 (4.17%), scar alopecia 1 (4.17%), and unilateral neuropraxia (14.17%). In contrast, the single male patient reported 100% satisfaction and no complications. Agreeing with these results, studies by Koch et al and Cho et al have indicated gender-based variations in patient satisfaction and complications following cosmetic surgeries as who underwent temporal brow lift operations.[11,12] Isern et al reported that female patients tend to be more critical of aesthetic outcomes, potentially influencing their satisfaction rates.[13] Additionally, Herruer et al found that male patients undergoing similar procedures often exhibit higher satisfaction levels, possibly due to different aesthetic expectations or social factors.[14] Men have less specific aesthetic goals compared to women, seeking broader goals like a refreshed appearance. Social factors and pragmatic expectations contribute to their higher satisfaction with cosmetic procedures. Men often prefer subtle changes and less social scrutiny, leading to higher self-reported satisfaction rates. The observed gender-specific differences in complications, with females experiencing asymmetry, chronic post-operative pain, internal stitch exposure, scar alopecia, and unilateral neuropraxia, align with existing literature.[11,15] Others have documented gender-related variations in post-operative outcomes, emphasizing the need for tailored approaches in cosmetic surgery.[10,16] The current study revealed a higher satisfaction rate among males compared to females when general anesthesia was administered (100% versus 44.44%, respectively). General anesthesia is linked to higher satisfaction rates in cosmetic procedures like temporal brow lifts due to its complete unconsciousness, greater surgical precision, and perceived comprehensiveness. It also enhances patient confidence in the outcome and improves postoperative pain management, leading to a smoother recovery process. These results resonate with studies by Koch et al and Cho et al suggested that males undergoing cosmetic procedures may have different expectations and are generally more satisfied with the outcomes.[11,12] Regarding the number of internal stitches, the table demonstrates varying satisfaction rates and complications associated with different stitch counts. For instance, the use of three internal stitches in females under local anesthesia is associated with an 11.11% dissatisfaction rate, the higher satisfaction associated with the use of three internal stitches in females under local anesthesia may be due to the greater stability and support provided by the additional sutures. More stitches allow for better fixation and even distribution of tension across the brow area, leading to improved symmetry and a more secure, long-lasting result. This finding aligns with studies by Su et al who have highlighted the importance of suture techniques in achieving optimal aesthetic outcomes and minimizing complications.[17]

Conclusion

The minimal incision lateral temporal brow lift promises to be an effective and minimally invasive technique for addressing lateral brow ptosis and hooding. Our retrospective review of patients over a 6-month period showed improvements in brow position and a refreshed appearance. This technique offers practical advantages, including quick

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surgery, minimal incisions, and no need for specialized instruments. Further research is needed to validate these findings and explore long-term outcomes, but it represents a valuable addition to facial rejuvenation procedures.

Recommendations

Future studies should include a larger sample size and a longer follow-up period to better evaluate the long-term efficacy and safety of the minimal incision lateral brow lift technique. A comparative study between this technique and other brow lift methods (such as endoscopic or traditional open brow lifts) would provide valuable insights into its relative benefits. Additionally, incorporating objective measurement tools, such as standardized scoring systems for aesthetic outcomes, alongside patient satisfaction surveys, could improve the reliability of the results.

Limitations of the Study

This study has several limitations that may affect the interpretation and generalizability of its findings. First, the relatively small sample size of 25 patients limits the ability to generalize the outcomes of the minimal incision lateral brow lift to a larger population. Additionally, the short follow-up period of six months restricts the evaluation of long-term results, making it challenging to determine the durability of the outcomes and potential for late-onset complications. The study also lacks a control group or a comparison with alternative brow lift techniques, which could have provided a more comprehensive perspective on the specific advantages or disadvantages of this minimal incision technique. Lastly, patient satisfaction was assessed subjectively, which may introduce bias due to personal expectations and individual perceptions that could vary widely among patients. Further research with larger sample sizes, longer follow-up periods, and objective satisfaction measures is necessary to validate these preliminary findings.

Conflicts of interest

The author reports no conflicts of interest.

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