# MORPHOMETRIC EVALUATION OF BROW POSITION AFTER BROWPEXY DURING UPPER BLEPHAROPLASTY

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## ABSTRACT

### *Background*

nternal browpexy is an innovative minimally invasive auxiliary surgery, wherein the soft tissue below the eyebrow is attached to the bone through the upper eyelid, allowing for stabilization, and causes the eyebrow to return to an aesthetic and anatomical place in the upper part of the face.

### *Objectives*

The purpose of this study is to identify the effectiveness of internal browpexy for lifting eyebrows along with upper blepharoplasty.

### *Patients and Methods*

As a single-arm interventional study, that was carried out in Sulaymaniyah burn and reconstructive hospital. Sixteen participants were subjected to morphometric evaluation of brow position after internal browpexy during upper blepharoplasty.

### *Results*

Patients were evaluated immediately after surgery as well as 6-8 months after surgery. The average change in the condition of the eyebrows of the patients immediately after the surgery and a few months after the surgery was descent 6 to 6.50 mm and 2.69 to 3 mm, respectively.

### *Conclusion*

Internal browpexy along with blepharoplasty is effective and safe techniques for the correction of brow ptosis. An internal brow lift provides a reliable and natural brow lift and furrow reduction while minimizing cost, side effects scarring, and time.

**Keywords:** *Internal browpexy, Upper blepharoplasty, Browlift.*

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## INTRODUCTION

The eyes have frequently been referred to as the "mirror of the soul" throughout time [1]. The eyelids and eyebrows, in particular, differ between ethnicities, age groups, and genders [2]. Brow positioning has been considered to be one of the key elements in facial expression and beauty, and it is closely linked to a youthful appearance [3]. The eyebrow can express wide-ranging and subtle emotions, Elevated brows suggest surprise and, when lowered, they express fatigue and aging [4]. However, there is a lot of variation among the form and positioning of the brows, which makes it challenging to establish "ideal" standards for all faces [2]. In males, the brow is usually positioned at the superior orbital rim, while in females, it is slightly above the rim and in comparison, to men, women have more arched brows and a less noticeable fat pad [5]. Any change around the eyes leads to facial imbalance and lack of functional coordination; Therefore, it makes blepharoplasty as the choice for beauty improvement. Blepharoplasty is a surgical procedure in which eyelid skin, muscle, and fat are removed to restore the patient's beauty along with correcting any functional abnormalities [1]. The position between the lids and brows is tied to the mutual effects between connective tissue structures and muscles with the corresponding nerve pathways, and it is natural that eyelid surgery affects latent brow ptosis [6]. during this surgery, the criteria described as well as the structures around the eyes should be considered [7]. Patients with concerns around the eyes should have an expert evaluation of their treatment that includes both lids and brows; Because these structures work together, and a change in one affects the appearance and performance of another. Patients with drooping eyelids may have ptosis, dermatochalasis, brow ptosis, or a combination of them [8]. Reports have shown that in blepharoplasty surgery, there is a tendency for the eyebrow to move downward after removing the upper eyelid skin [9-11]. Corrections caused by upper eyelid surgery affect the lateral part- and most importantly the final position of the eyebrow [12]. Therefore, in order to achieve balanced facial rejuvenation and prevent eyebrow droop, eyebrow lift techniques such as TBL (Temporal brow lift) and IBP (internal browpexy) [13] should be considered to be performed in case of possible eyebrow droop following blepharoplasty [14].The minimally invasive methods of browpexy, which were introduced in 1990 by Doxanes and McCord, have been expanded for ptosis of the tail of the brow, which is the most common brow deficit, and include internal brow suspension accessed through an eyelid creases incision during blepharoplasty [15].

Previous practical studies have shown that transpalpebral browpexy can be used both as a separate method and as an auxiliary method with upper blepharoplasty for minor adjustments after an open coronal or endoscopic brow lift [16]. Nemet in a study in response to the question "Is transblepharoplasty internal browpexy suitable for everyone?" responds that patients with significant ptosis, heavy eyebrows, greater medial than lateral ptosis, or post-facial palsy are not good candidates for this procedure [17].

In this study, we are going to identify the effectiveness of internal browpexy for brow elevation, The purpose of this surgery is to achieve an attractive rejuvenation around the eyes by fixing the lateral eye brow to the desired position and elevation of the lateral eye brow. The aforementioned objectives of this approach are minimizing the possibility of complication, adding extremely little operating time to a typical upper eyelid blepharoplasty, and requiring no extra incisions (decrease chance of scarring)

## MATERIALS AND METHODS

### *A. Patients*

This is a single-arm interventional study that was carried out in Sulaymaniyah burn and reconstructive hospital between October 2021 and February 2023. In total 16 participants (14 women and 2 men) were included in this study. They were subjected to morphometric evaluation of brow position after internal browpexy during upper blepharoplasty, after providing a sufficient explanation about the procedure in detail to all patients, informed consent was obtained before each patient's involvement in this research. Eyelid evaluation consisted of a clinical examination of the eyelids, the lid crease, and excess skin and muscle. While evaluating the brows Height, symmetry, shape, and stability were all included. Patients who met the inclusion criteria were both genders, mild to moderate brow ptosis with no history of congenital or acquired peri-orbital or orbital pathology or surgery and no strabismus. Participants with severe brow ptosis, those undergoing further procedures that might interfere with morphometric measurements, those with a history of bleeding tendencies, and those with current infections at the site of surgery were excluded. Standard projections, including frontal, left, and right oblique, have been utilized to capture photos. To evaluate the results, measurements were taken of the brow position before

the procedure, immediately following surgery and at 6–8 months postoperatively. Then, the unpaired t-test is used to compare the results using Statical Package for Social Sciences version 25 (SPSS V25).

### *B. Surgical technique*

The procedure started with preoperative marking; patients were marked in the sitting position using a fine, non-permanent marker. Skin marking includes a blepharoplasty incision and marking the position of the brow by measuring the distance from the hairline to the junction between the middle and lateral thirds of the brow (Figure.1). Next, local anesthesia was administered using a solution of 2% lidocaine with epinephrine (1:100 000), the local anesthetic beneath the markings was injected (1.5 – 2 ml per side), then waiting for 10 -15 minutes after injection to permit the local anesthetic to have an adequate effect, After patients underwent standard upper blepharoplasty after excision of excess skin and muscle then Before closing the incision Dissection was carried out superiorly deep to the orbicularis muscle (submuscular plane). in the region of the lateral eyelid toward the orbital rim (Figures 2), when reaching 1cm above the orbital rim then the dissection was performed in the supra-periosteal plane using the blunt scissors Later, PDS 4-0 mattress suture was used to fix the upper margin of the brow to the periosteum 1cm above the orbital rim (FIG.3), We put the sutures tightly in the early stages in order to limit the mobility of the brows and immediate postoperatively, some degree of overcorrection is recommended, then The blepharoplasty incision was closed in a standard way with 6–0 proline This procedure was repeated on the contralateral side. The same approach of pre-operative measurement was employed for post-operative brow position measurement immediately and at 6-8 months postoperatively. In addition to measurements pre- and postoperative patient photographs were used to assess the longevity and efficacy of this technique in stabilization and elevation of the lateral eye brow.

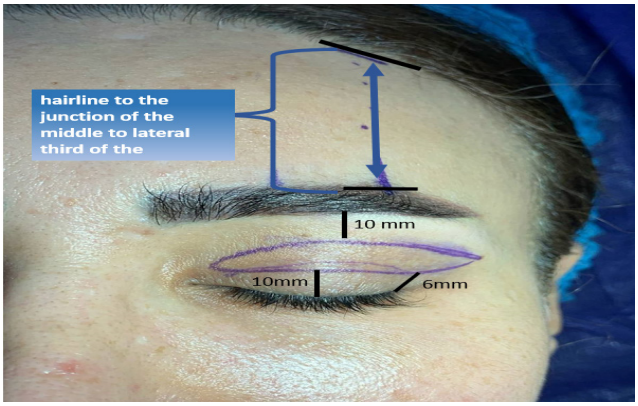


**Figure.1 Pre -operative marking.**

**Figure.2 Dissection in the region of the lateral eyelid toward the orbital rim (submuscular plane).**

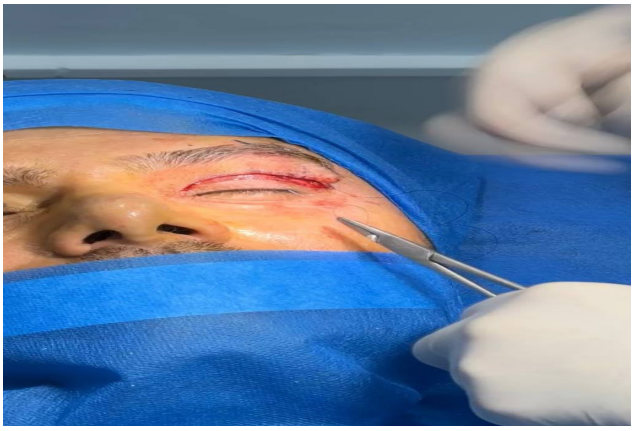

**Figure.3 Fix brow to the periosteum 1cm above the orbital rim (PDS 4-0 mattress suture).**

## RESULTS

A total of 16 patients suitable for browpexy during upper blepharoplasty underwent the procedure. They include 14 women and 2 men, who were in the age range of 36 to 54 years with a mean age of 45.56 years with a standard deviation of 5.773. The mean age of men was 39 and the mean age of women was 46.50 years. All patients completed the study including the 6-8 months follow-ups.

The surgical results are summarized in Tables 1 and 2. Follow-up was done 6 to 8 months after the surgery. The average change in the position of the right brow immediately after the surgery had a descent of 6 mm, and for the left brow, it had 6.50 mm descent, and the average change in the position of the right brow 6 to 8 months after the surgery had a descent of 2.69 mm. For the left brow, there was a 3 mm descent.

There was difference between the height of the right and left brows before and immediately after the surgery. Also, there was also difference between the right and left brows before and 6-8 months after the surgery.

**Table 1. Changes in brow height after surgery.**

| | Preop. measurement (SD) | Immediate postop. (SD) | 6-8 months postop. (SD) |
|---|---|---|---|
| **Right brow** | 48.25 (6.933) mm | 42.25 (6.618) mm | 45.56 (6.909) mm |
| **Left brow** | 48.81 (7.458) mm | 42.31 (6.973) mm | 45.81 (7.387) mm |

**Table 2.Statistical analysis of surgical results.**

| | Difference in change of Right brow height (mm) | Difference in change of Left brow height (mm) | p-value* |
|---|---|---|---|
| **Preop-Immediate postop** | 6 | 6.50 | 0.003 |
| **Preop-6 to 8 months postop** | 2.69 | 3 | 0.001 |

*** < 0.05, the difference is significant**

**Figure.4 A.Pre-Op B:Immediate Post-Op after Upper Blepharoplasty And Internal Bropexy.**

**Figure.5. A:Pre-Op B:6 months Post-Op after Upper Blepharoplasty And Internal Bropexy.**

**Figure.6 A:Pre-Op B:8 months Post-Op after Upper Blepharoplasty and Internal Bropexy**

## DISCUSSION

Considering that patients who come for upper eyelid evaluation usually have a ptosis component, the method adopted to lift or stabilize the brow should be such that consider the parameters like contour and height of brow, brow position, hairline position forehead rhytid, and the patient's desires. Although, brow lift techniques such as pretrichial, endoscopic, and coronal can provide a powerful lift for the patient, these methods are very expensive and prohibitive for patients who do not want to drastically change their appearance [(18)].

In this way, the position of the brows in patients who have problems with “droopy eyelids” or may be caused by primary anatomical abnormality, the condition of their brows should be evaluated. Therefore, choosing an appropriate surgical method should not only satisfy the patient's desires and expectations, but should also consider the relationship between the position of the upper eyelid and the degree of dermatochalasis with the position of the brow. In order to lift and stabilize the brow, as well as the degree of height that each method provides for the brow, a correct understanding of the available surgical methods is very important to obtain patient satisfaction and achieve optimal surgical results [(15)].

In general, brow lifting methods can be divided into two main types of non-surgical and surgical methods. Non-surgical methods for lifting eyebrows are generally temporary methods including botox injection [(19)]. Surgical methods to brows lift include methods that some of them have a temporary effect and some of them have a long-term effect, and they are divided into three categories of (i) trans-blepharoplasty eyebrow lift, (ii) direct eyebrow lift, and (iii) trans-forehead eyebrow lift [(20)].

One of the reliable surgical options has been identified as minimally invasive browpexy procedures, which include trans eyelid internal browpexy, or small incision external browpexy [(21)]. Browpexy methods can be used effectively to fix mild to moderate brow ptosis and also to stabilize and lift the lateral brow [(11)].

Regarding the choice of procedure, traditionally internal browpexy is chosen in patients with very fine or non-existent, brow cilia to avoid significant scarring. Therefore, at the last visit after external surgery, none of the patients complained of a clear or annoying brow scar. This evaluation proves the original description. The external method is always chosen for patients who have fuller brow cilia. On the other hand, browpexy for patients with severe medial brow ptosis can lead to peaked tail of the brow after surgery [(17)].

Previous studies and observations prove brow descent in patients undergoing upper blepharoplasty alone. These results show that in patients undergoing upper blepharoplasty, quantitated internal browpexy is an effective and reliable technique for lateral brow stabilization. Internal browpexy techniques result in more brow lift laterally than in the medially. Considering that laterally or arched brow and flat brow are associated with femininity and masculinity respectively, this point is very important. Therefore, the desired appearance after surgery as well as understanding the motivation of patients for surgery are two basic parameters for choosing the optimal method of brow lifting [(22)].

In the present study, the age range of the 16 patients (2 men; 14 women) was 36–54 years, and the mean age of the patients was 45.56 years. There were no major immediate or long-term complications (including loss of suspension, frontal nerve injury, hematoma, infection, or wound dehiscence), there was immediate temporary dimpling in 3 cases which were temporary and corrected by itself during 4weeks to 6 weeks, no patients required reoperation for recurrent brow ptosis or upper lid deformity. The average change in the position of the brow immediately after the surgery had a 6.00-6.50 mm descent.

The average change in eyebrow position 6 to 8 months after the surgery showed a decrease of 6 mm show by an average of 3.8 mm.

There was difference between the height of the right and left brows before and after the surgery.

The results of this study showed that browpexy is an effective method to maximize the improvement of the brow area during upper blepharoplast, the combination of browpexy with upper blepharoplasty is a significant improvement in the correction of mild brow ptosis

### *Conclusion*

In conclusion, browpexy along with blepharoplasty is effective and safe techniques for the correction of brow ptosis. An internal brow lift provides a reliable and natural brow lift and decrease the chance of increasing brow ptosis in those patients where their brows unstable and more prone for brow ptosis after doing upper blepharoplasty also minimizing cost, side effects, scarring and time.

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