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ORIGINAL ARTICLE

A Comparative Assessment of Outcomes of Skin Only Versus Deep Plane Brow Lift

KAMAL UDDIN KHAN[1], FARZANA ABDULLAH[2]
[1]*Associate Professor, Head of Department of Burns & Plastic Surgery, Bolan University of Medical & Health Sciences Quetta*
[2]*Consultant Dermatologist, Cosmetico cosmetic surgery clinic Islamabad*
Correspondence to: Kamaluddin Khan, Email: dr.kamalafridi.kk@gmail.com, Cell: 03116961814

ABSTRACT

Background: Facial aging is often visible in the way the eyebrows begin to move downward. When you are young, your eyebrows typically arch from side to side and sit either at or just above the supraorbital ridge. When the upper eyelid becomes laterally hooded, together with crow's feet, the face appears fatigued or angry.

Materials and Methods: A randomized controlled trial was conducted from June 2022 to January 2023 in which patients with age range of 40 to 65 years with weak brows and upper eyelid hooding were recruited. While those patients who had previous history of ocular procedures, neuromuscular disorders, and having previous forehead surgeries were excluded from the study.

Results: Patients' ages were approximately 52 years in both groups and most were female (60%). Preoperatively, the mean height of the brow was very close to being identical on both sides, regardless of its lateral tail or mid-brow section (lateral tail ~ 12.3 mm, mid-brow ~14.8 mm above reference line, p>0.5). After dichotomization, 94% of patients having deep-plane surgery were happy or very happy (scores 4–5), as opposed to 88% in the skin-only group.

Conclusion: When compared, deep plane brow lifting achieved greater brow lift and patient satisfaction at 1-year follow-up in those of South Asian descent, outperforming skin-only brow lifting. Satisfaction with the result was very high for everyone, but the deep plane group experienced larger improvements in lateral and central brow lift.

Keywords: Browlift, Eyelid, Eyebrows, Ocular Procedure.

INTRODUCTION

Facial aging is often visible in the way the eyebrows begin to move downward. When you are young, your eyebrows typically arch from side to side and sit either at or just above the supraorbital ridge[1,2]. When the upper eyelid becomes laterally hooded, together with crow's feet, the face appears fatigued or angry. Such changes can upset the symmetry of the upper face and occasionally affect one's ability to see things properly[2,3]. Brow lift surgery helps move the eyebrows back to a younger and more attractive place. For some time now, many types of surgical approaches have been available, from straight cutting above the brow to using an endoscope and offering incisions across the top of the head. Traditional direct brow lifts, known as supra-brow excision, are not complicated and work well, but they leave obvious scars[4]. A forehead lift using an endoscope or a coronal technique spares the front area and raises the brows more widely, unlike trans-blepharoplasty which uses a blepharoplasty incision to go up from under the eyebrows[5]. All techniques differ in how much they can injury the area, scar or last and it's not clear which is better for everyone.

Lately, experts have looked into the use of "deep plane" techniques for lifting the brows. Just like deep plane facelifts, they release deep tissues such as the orbicularis oculi and periosteum and support them instead of just tightening the skin[6]. It is thought that stronger soft tissue can hold an elevation for a longer time. A "deep plane" direct brow lift basically lifts the brow by redistributing and elevating the lower part of the eyelid muscle[7]. By using them, patients with thick skin or sagging brows get better results than with skin-only surgery alone[8].

Differences in facial structure among South Asians can play a part in how a brow lift is planned. Normally, Asian eyebrows are placed higher on the forehead, their upper eyelid folds are broader and there is more fat around their eyes than in Caucasian eyelids[9]. Among elderly Asian patients, eyelid hooding appears to be a bigger issue than brow descent. Unless tailored, the usual high-brow procedure may worsen these issues; that's why surgeons in Asia combine supra- and sub-brow work with changes to the orbital ring muscle to fix brow sag and eyelid excess at the same time[10]. It is important to realize that Asian patients usually feature a durable and thick dermis with extra fibrous subcutaneous tissue which often blurs superficial lift results and leads to more scars after surgery[11]. Yet, a few Asian patients go for direct brow lifts due to the improved method of hiding scars. Surgeons need to be aware of the types of ethnic faces seen in Balochistan and consider that people prefer rejuvenation surgery that is gentle and leaves the smallest scars. All in all, there are several brow lifting techniques, including tiny (blepharoplasty browpexy), large (open coronal) and evolving permanent solutions involving the deeper muscular or bone layers.

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MATERIALS & METHODS

A randomized controlled trial was conducted at the department of plastic surgery and dermatology of Bolan Medical College and Teaching hospital Quetta for the assessment of skin only varuses deep plane borrow lift in which adults with age range of 40 to 65 years were recruited from June 2022 to January 2023 with weak brows and upper eyelid hooding. The clinical trial was conducted under the PRISMA guidelines and Hilinski declaration, as ethical approval was obtained from institutional review board of medical college. While those patients who had previous history of ocular procedures, neuromuscular disorders, and having previous forehead surgeries were excluded from the study.

Prior written informed consent was obtained from all the study participants, and 100 patients were clubbed into two groups, i.e. Group A: a skin-only brow lift. A pair of curved, elliptical cuts were removed just above each brow, taking some of the subcutaneous tissue as well. We left the frontalis muscle without surgery, only moving and suturing the skin and subcutaneous flap onto the frontalis fascia to create some elevation. A deep plane brow lift was performed on Group B. Under this technique, a small prehairline incision (using an endoscope) was made above the hairline. A blunt technique was used to expose the tissue both under the scalp and below the forehead bone. We cut the taste muscle and the periosteum on the lower brow and then used permanent stitches to fix the taste muscle higher on the deep temporal fascia. So, in Group B a surgeon reinforced the deeper orbicularis and SMAS, leaving out only a skin tug. Two surgeons did both procedures with the patient under general anesthesia at a tertiary hospital in Balochistan. Surgical recovery was based on similar routine practices.

Assessments of the results were made by unaware observers and the patients 6 weeks, 6 months and 12 months after surgery. We used brow position as our main metric. Comparisons were made by checking the difference in height between the lateral brow tail and the mid-pupil on each photograph and with a

reference line horizontally placed on the face. The scores were averaged out from several independent raters. Secondary outcomes were assessed as how satisfied patients were (measured from 1 = not satisfied at all to 5 = extremely satisfied) and the frequency of complications which included sensory changes, scarring, hair loss, hematoma and need for revisions. At 12 months, we used a questionnaire to see if patients were satisfied.

Statistical Analysis: Using SPSS, we compared the differences in continuous factors (brow elevation and satisfaction scores) with Student's t-test and in categorical outcomes (presence of numbness and satisfaction) using chi-square tests. Getting a p-value less than 0.05 was thought to be significant.

RESULTS

Both groups were equivalent in measures at the beginning of the experiment (Table 1). Patients' ages were approximately 52 years in both groups and most were female (60%). Preoperatively, the mean height of the brow was very close to being identical on both sides, regardless of its lateral tail or mid-brow section (lateral tail ~ 12.3 mm, mid-brow ~14.8 mm above reference line, p>0.5). There were no withdrawals from the study and each of the 100 patients completed follow-up to the 12-month endpoint.

Table 1: Assessment of Pre-operative Traits of Both Study Groups.

Characteristic	Group A (Skin Only)	Group B (Deep Plane)	p-value
Number of patients	50	50	-
Mean age (years)	52.3 ± 4.5	52.1 ± 4.8	0.85
Gender (Female %)	60%	60%	1.00
Preoperative lateral brow height (mm)	12.3 ± 1.2	12.3 ± 1.3	0.98

Elevation was much higher in deep-plane brow lift patients (Table 2). In the deep plane group, the average change in lateral eyebrow height was 7.8 mm and in central position was 6.9 mm. In the skin-only group, the measurements were 5.2 mm laterally and 4.7 mm centrally (both differences were significant). Brow height symmetry was similar in both groups, averaging not more than 1 millimeter (mean difference in asymmetry <1 mm), with no difference between them (p=0.45). Patient-reported outcomes. Overall, patients were very satisfied and satisfaction was even greater for those in the deep-plane group. Respondents in Group B rated their satisfaction on average 0.4 points higher than respondents in Group A (p=0.02). After dichotomization, 94% of patients having deep-plane surgery were happy or very happy (scores 4–5), as opposed to 88% in the skin-only group.

Table 2: Comparative Assessment of Browlift Techniques in Study Groups on appliance of Independent Sample T test.

Measurement	Group A (mm)	Group B (mm)	p-value
Lateral brow elevation	5.2 ± 1.0	7.8 ± 1.2	<0.001
Central brow elevation	4.7 ± 0.9	6.9 ± 1.0	<0.001

Scar troubles were more common in the skin-only (direct) lift (as noted in Table 3). Visible or noticeable scar changes (mild swelling or dip at the incision) affected 12% of patients in Group A but only 4% in Group B (p=0.04). Numbers 34% in Group A and 58% in Group B showed transient forehead numbness (supraorbital nerve stretch) because of the different methods of skull base access (p=0.01). All sensory changes were slight and lasted between 3 and 6 months. None of the patients had lasting nerve damage. Minor side effects (edema and ecchymosis) were the same in both groups. Of the patients in Group A and Group B, one and two, respectively, had minor revision; this difference did not reach the level of statistical significance. No patients in either group experienced hematomas, infections or severe hair loss.

Because deep-plane patients experienced extra dissection, the time it took surgeons to operate was longer, at 120 minutes ± 15 minutes, than the short 60 minutes ± 10 minutes for skin-only surgery (p<0.001). Patients experienced low amounts of blood loss and only slight differences in hospital length. Not one of our patients needed to learn new techniques.

Table 3: Comparative Assessment of Post-Surgical Complications in Study Groups.

Complication	Group A (Skin Only)	Group B (Deep Plane)	p-value
Scar issues (%)	12%	4%	0.04
Transient numbness (%)	34%	58%	0.01
Revision rate (%)	2%	4%	0.56

DISCUSSION

A deep plane brow lift raised the brows much higher than a skin-only brow lift, but led to more sensory changes in the South Asian people studied. Both methods resulted in satisfied patients, as before. As an example, a big ASPS surgeon survey showed that 98–99% of patients were happy with all types of brow lift procedures. Our results found that deep-plane patients enjoyed higher satisfaction ratings which may be linked to the larger lift. Even the skin-lift arm had an 88% satisfaction rating which is consistent with reports that many patients appreciate moderate correction[12].

Our data support classic biomechanical knowledge: a skin lift done without fat mainly uses the tension in small, delicate tissues which might relax with time. The technique makes the ligamentous tissues that come from the orbicularis/SMAS support the face. Previously, it was observed that results from foundation extensions often last longer[13]. For facial lifting in Asian patients, we often rely on the subSMAS technique because their dermis is more robust and use subperiosteal elements in our deep plane lifts to supersede the powerful retaining ligaments under their eyes. These techniques are especially developed for Asian patients and, for example, the Shu and He's brow lift excises and reattaches the orbicularis oculi muscle to accommodate the special traits[14]. Unlike the deeper lifts, skin lifting without detaching the muscle left the orbicularis unchanged which likely resulted in a smaller amount of lift (as its pull was unaffected).

There were differences in how the scars appeared. For Group A, a direct (supra-brow) excision left thin scars just over the brow in some cases. As seen before, even when a browlift scar is in the optimum spot, it might still hypertrophy in the skin of Asian patients unless the problem is addressed[15]. In comparison, the incision from the deep-plane group was made in the part of the scalp with hair, giving the scar less noticeable. Surgeons usually make this choice: coronal/endoscopic lifts bring about broad changes and have little scarring, but direct lifts may expose scars, a fact that some Asian patients, who often hide scars, are willing to deal with[16]. Our data reveals that a small number of deep-plane patients reported problems with scars.

Patients in Group B most often complained of changes in their senses. The high rate of transient numbness in the deep-plane group is not unexpected, since the techniques used sever branches of the supraorbital nerve[17]. Even standard direct lifts are known to leave the patient with partial numbness after surgery which usually improves over many months, according to Booth et al. We see that our deep-plane figure is 58% and our version that only includes skin is 34%. Over time, all these issues were resolved and patients realized this was reasonable for them[18].

Research shows that both endoscopic and open coronal lifts result in similar outcomes in the early period. As a fact, Dayan et al. showed that endoscopic and coronal techniques gave almost the same level of brow elevation after one year[19]. With our deep-plane method, we get the same effects as the subperiosteal or endoscopic, method, but the benefit is in having the open-up operation instead. Dayan et al. discovered that the brow level remained elevated longer after open lifts with our procedure than it did after open lifts alone, suggesting that deep support from the transposers may boost longevity.

Experts in Asian anatomy stress certain issues that affect the area: dense frontal tissue, more fat near the eyes and a greater

height of the eyebrows[20]. We have found that Balochistani patients commonly want lateral hooding taken care of and like keeping their brow strongly arched. Therefore, the lateral tail is mostly raised when possible. The authors of the study discovered that lifting the lateral muscles by internal browpexy provided more lateral lift than an external (temporal) lift during blepharoplasty. We saw more lateral lift with the deep-plane technique than we did with standard lateral lift, much like Zandi managed when using a very submuscular approach[21].

Results of surgery depend on how each patient responds, how skilled the surgeon is and the ability to heal. Therefore, we only investigated descent for a year; we could not see how it changed over a longer period. Since cultural and genetic features in Balochistan could differ from most South Asian populations, conclusions made here might not apply to those groups. In addition, patients were aware of their incision type which might have affected their subjective feelings about their experience. The truth is, reports from other centers may indicate slightly after higher complication rates; often we see less numbness than 60% in the deep-plane arm.

CONCLUSION

When compared, deep plane brow lifting achieved greater brow lift and patient satisfaction at 1-year follow-up in those of South Asian descent, outperforming skin-only brow lifting. Satisfaction with the result was very high for everyone, but the deep plane group experienced larger improvements in lateral and central brow lift. Those who opted for skin-only lifts had limited mobility after surgery and more visible scars, but they got shorter treatment time and little temporary numbness.

Recommendations: This research highlights why using the right techniques matter for each person's needs and features. Deep tissue methods may be required in South Asian (e.g. Balochistani) patients since their muscle and skin tend to be thicker. Further research should be conducted in ethnic Asian patients to validate these outcomes after a longer period. At the end of the day, a surgeon needs to propose both nonskin and skin-only approaches and pick the method that will best both enhance the patient's appearance and control possible risks.

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