STUDY PROTOCOL

A new minimally invasive, non-excisional, surgical browlift technique with minimal scarring: a protocol for a prospective observational study [version 1; peer review: 1 not approved]

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Abstract

Background

The aim of this study is to prospectively evaluate the new minimal invasive (MINE) browlift technique with possibly superior results and minimal visible scarring.

Methods

A prospective observational study will be performed on all available data from patients who will undergo a browlift procedure in the Haaglanden Medical Center from 1-6-2021 till 31-5-2022. Our goal is to include at least 50 patients (1 per week). Inclusion criteria are: patients with medical (i.e. brow-ptosis, facial paralysis) or cosmetic indication, patients with sufficient understanding of the Dutch or English language and willingness to participate in extra study specific follow-up moments and filling in of questionnaires. Exclusion criteria are: <18 years of age and patients with previous brow or eyelid surgery. Patients will be photographed pre- and postoperatively using the VECTRA camera. The database management software Castor will be used to store and collect the data from the questionnaire. The Medical Research Ethics Committee found this study not eligible to be submitted to the Dutch Medical Research Involving Human Subjects Acts (WMO). Written informed consent will be obtained from all patients.

Results

Outcomes measures to be evaluated include: scarring after procedure; functionality of eyebrow movement; amount of correction in brow ptosis, measured in VECTRA; longevity of procedure in months; aesthetic result as assessed by questionnaires; and adverse effects of the procedure.

Open Peer Review

Approval Status

1

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view

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Any reports and responses or comments on the article can be found at the end of the article.

Keywords

browlift, minimally invasive, surgical technique, frontalis suspension, outpatient procedure, non-excisional browlift

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Introduction

Ptosis of the forehead or eyebrows is a common problem, especially among the elderly. Using the muscles that move the eyebrows, a lot of expressions can be communicated and can be easily recognized. Laterally inclining eyebrows transmit sadness, medially inclining eyebrows transmit anger, low eyebrows transmit tiredness, drawn up eyebrows transmit surprise and properly aligned eyebrows transmit an alert, rested state allowing the mouth to smile^{1,2}. The position of the brow is affected by the corrugator supercilii, depressor supercilii, orbicularis oculi, and procerus (brow depressor muscles) and the frontalis muscle (brow elevator muscle)³. The motor innervation of these muscles is supplied by branches of the facial nerve. The temporal branch innervates the frontalis, superior part of the orbicularis oculi, the transverse head of the corrugator supercilii and superior part of the procerus muscles. The zygomatic branch innervates the inferior and medial parts of the orbicularis oculi, the inferior part of the procerus, the depressor supercilii and the oblique head of the corrugator supercilii muscles.

Common complaints of brow ptosis are a tired and heavy feeling of the eyes, problems watching television and reading, increased tearing and a limited field of vision¹⁻⁶. Continuous activation of the scalp and forehead muscles may additionally cause tension headaches and eyestrain⁴. On closer examination, the cause of this may be partly due to a too low position of the eyebrows. As a result, the skin of the upper eyelids is pushed down, as it were, so that it looks like there is too much skin there. In patients with brow ptosis, unintended emotions can be shown, which can be misinterpreted by others^{5,6}.

If the eyebrows are in a low position, a blepharoplasty alone makes little sense and sometimes no improvement occurs. It is better to first correct the cause of the deviation, the low position of the eyebrows, and then remove any remaining skin surplus from the upper eyelids. A wrong assumption is that the simultaneous treatment of blepharochalasis, and thus including a blepharoplasty procedure to the browlift procedure is not deemed beneficial. The added removal of upper eyelid skin in a single operation actually worsens the patient's appearance due to excessive traction of the skin, causing an increase in their brow ptosis giving the patient a tired, older and angry appearance^{5,7,8}. Therefore, patients desire a difference in brow stance that is both long-lasting and appears natural. Other factors that are included in decision-making are the visibility of scars, the cost of the procedure and practicality (procedure time, use of anaesthetics etc.).

Several techniques exist to treat ptosis of the eyebrows^{5,9-18}. Some only treat brow ptosis, and other techniques are also used for treating a wide spectrum of facial aging changes. Direct browlift and the traditional fascial suspension technique tend to leave a very noticeable scar above the eyebrow¹⁵⁻¹⁸. Other options such as the (mid-) forehead browlift and coronal browlift can be used to elevate the brow in patients with deep creases who are not candidates for extensive surgical procedures, although significant scars are still made¹⁹.

Foreheadplasty, or open browlift, techniques have also been used to lift the eyebrows, namely the forehead (pretrichial) incision, coronobregmatic incision, vertex incision, lambdoid incision, W-incisions, lambdoid paddle incision and the interlocking Ms⁵. These techniques take the same time as an endoscopic procedure and have the ability to adapt to various wrinkle, crease and forehead hairline considerations⁵. Other techniques, such as the transblepharoplasty or transpalpebral approach, use an upper blepharoplasty to resect the corrugator muscles and divide the procerus muscle along with temporal incisions to elevate the lateral eyebrow^{20,21}.

In 1994 Vasconez *et al.*²² first described the endoscopic browlift technique, which has been widely studied^{10-12,14,23-32}. This is a popular technique since advantages include less scarring, alopecia and numbness posterior to the scar. Despite a 70% satisfaction rate reported, the frequency of the endoscopic lift being performed by plastic surgeons has decreased³³. The endoscopic browlift is also a costly and lengthy procedure that requires an operation theatre and can't be performed on an outpatient basis. Additionally, reduced sensation has been described in endoscopic and open browlifts³⁴.

Although many options exist in the treatment of brow ptosis, there is of yet no golden standard. The technique developed by Dr. L.T. Tan presented in our previous article³⁵ combines traditional browlift approaches, such as the incision sites of the pretrichial and direct browlift without excising skin, with the dissection of frontalis muscle from the periost as used in the endoscopic browlift. Our technique found high satisfaction rates on scars (72.4%) and symptom improvement (72.4%) with minimal complications (long-lasting pain (n=4), cosmetic deterioration (n=3), noticeable subcutaneous lump (n=3), photophobia (n=1) and numbness (n=1)) and, in addition, does not require an operation theatre since only local anaesthesia is used. Thus our technique proves to be a more practical, cheaper alternative with optimal functional outcome and minimal scarring and therefore an optimal cosmetic result, especially when compared to more traditional browlift techniques. The aim of this study is to further evaluate the clinical and cosmetic data from patients who will undergo this procedure in the future and provide for more accurate measurement of the surgical effects.

Aetiology and pathophysiology

The majority of the brow ptosis cases occur as weakening (e.g. involutional changes) or descent of the periorbital and/or facial soft tissue. This typically occurs at the temporal side of the brow first, mainly and the most temporal 1/3 of the eyebrow. Anatomically, the frontalis muscle raises the eyebrow and the frontal branch of the facial nerve is responsible for the innervation of this muscle. Normally the frontalis muscle lifts the medial 2/3 of the eyebrow and with increasing age, laxity of tissues (in particular collagen) combined with the descent of facial/periorbital soft tissue, patients develop lateral brow droop.

In terms of differential diagnosis, brow ptosis can occur with the following diseases: 1) paralysis or weakness of the frontalis muscle (facial nerve palsy, Bell's palsy, acoustic

neuroma, surgical trauma, birth trauma, congenital diseases¹, myasthenia gravis, myotonic dystrophy, or oculopharyngeal muscular dystrophy); 2) involuntary contraction of the orbicularis oculi (blepharospasm or facial dystonias); and 3) mechanical causes, which can result in descent of the brow (neoplasms: basal cell carcinoma; squamous cell carcinoma; keratoacanthoma or melanoma).

Objectives

There is a need to provide relevant evidence in patient care in (aesthetic) brow surgery, since most browlift techniques are done from experience and not necessarily evidence based. So therefore we took a number of key questions into account:

1. Will the browlift relieve complaints (increase worthwhileness)?
2. What is the longevity of the procedure?
3. How natural will the forehead region appear after surgery? This will be assessed via:
 - a. Shape of the forehead
 - b. Visibility of scars
 - c. Abnormal wrinkle showing as a result of pulled up frontal muscles
4. Will there be any unforeseen adverse effects? This will be assessed via numbness.

The primary objective of this study is to determine if our browlift technique is comparable or superior to existing types of browlifts using facial observation questionnaires administered pre- and postoperatively:

- FACE-Q
 - Pre-operative
 - Age appraisal VAS
 - Age Appearance Appraisal
 - Face Overall
 - Forehead and Eyebrows
 - Forehead Eyebrows Scalp
 - Lines Forehead
 - Psychological
 - Post-operative
 - Age appraisal VAS
 - Age Appearance Appraisal
 - Decision
 - Face Overall
 - Forehead and Eyebrows
 - Forehead Eyebrows Scalp
 - Lines Forehead
 - Psychological
 - Outcome
- SF-36

Protocol

Ethics and consent

Research design. A prospective observational study will be performed on all available data from patients who undergo a browlift procedure in the Haaglanden Medical Center (HMC) from 1-6-2021 until 31-5-2022. The Medical Ethics board of the Haaglanden Medical Center judged that this research (protocol number N21.009/ML/ml) is mainly an evaluation of a common treatment method and therefore does not need a formal ethics approval procedure. Since this is an exploratory pilot study, no formal power and sample size calculation was done and we aim to include at least 50 patients (1 per week)

Inclusion and exclusion criteria

- Patients with medical (brow-ptosis, facial paralysis i.e.) or cosmetic indication.
- Sufficient understanding of the Dutch or English language
- Willingness to participate in extra study specific follow-up moments and filling in of questionnaires

Exclusion criteria

- Insufficient understanding of the Dutch/English language
- <18 years of age
- Patients with previous brow or eyelid surgery

Patient anamnesis and physical examination

History

Every patient that presents with droopy eyelids and/or eyebrows should undergo a thorough medical and family history, including at least the following aspects:

- Slowly progressive onset of the symptoms, together with a positive family history can indicate myotonic dystrophy or oculopharyngeal dystrophy.
- Assessment of possible fluctuation of the symptoms or presence of fatigue (which can be present in case of myasthenia gravis).
- A detailed history of surgery and/or trauma may point in the direction of damage to the frontal nerve or muscle scarring.
- Symptoms that could indicate a facial palsy.
- A detailed oncological history, stroke and/or head and neck tumours.

Physical examination

A complete plastic ophthalmic examination should be conducted in every patient, including:

- A visual acuity, pupillary and extraocular investigation
- A neurological examination of each cranial nerve
- The mentioned distances in [Figure 1](#) will be noted and measured
- A complete skin examination including if there is skin resting in the eye lashes

- The brow position will be noted in the situation of a relaxed frontalis muscle
- Possible prominent dynamic and static rhytids will be checked
- The location of the hairline will be noted
- In case of a paralytic brow, the physician will check for signs of facial trauma and/or scarring

All patients will be evaluated to check if there is dermatochalasis/ptosis and concomitant brow ptosis. Additionally, every patient scheduled for blepharoplasty will be checked if brow-repositioning surgery is necessary.

Surgical technique

Pre-operatively the patient is informed about the procedure and information is given about (visible) scar formation, asymmetry and post-operative pain.

The patient is evaluated in the upright position. The degree of ptosis and position of the hairline is noted and compared with the contralateral side. Manual elevation of the brow to the ideal position will help to determine how much of the visual field deficit is secondary to the brow ptosis alone. Since exuberant brow lifting may compromise eye closure, attention should be paid to any degree of lagophthalmos if present. Secondly, injections with xylocaine + adrenalin 1:100.000 are administered into the dermis and subdermal until the

periost of the lateral frontalis muscle region for adequate local anaesthesia. Two horizontal incisions (approximately 1-1.5 cm) are made, just above the lateral 1/3 of the eyebrow and the other just cranial to the hairline in line with the frontalis muscle. These locations are chosen to avoid injury to the frontal nerve (Figure 1). Secondly, the frontalis muscle is bluntly dissected from the underlying periost. The frontalis muscle is then suspended 2–5mm and fixated at the cranial site to the periost of the frontal bone using a 3-0 (Ethilon) suture. Then the muscle is also suspended 2–5mm at the caudal site using a 3-0 (firstly Ethilon, later Prolene) suture fixing it to the periost of the frontal bone. Attention is paid to achieve perfect symmetry between both sides. Finally, the skin is closed with Ethilon 5-0 sutures. The head is then wrapped with a bandage for 24-48 hours. The duration of the procedure is 20–30 minutes. For graphical depiction of technique, see Figure 2.

Complications

Surgical complications are relatively uncommon. However, bleeding, numbness and tingling, injury to the facial nerve resulting in paralytic brow ptosis, infection and postoperative asymmetry have been described in previous browlift studies^{25–35} and will be documented accordingly.

Data collection

Patients with an indication for brow correction will receive information to review study specific information. Two weeks after patients have received the study information, they will be asked to participate in our study. see Table 1 for patient assessment moments.

Figure 1. Photography of right eyelid & eyebrow for measurement of parameters. Measured with Emotrics software. **Informed consent was obtained for the usage of the patient's photograph* BLCD= Brow-lateral canthal distance, BMD= Brow-lid margin distance, MPD= Lid margin-pupil distance, BPD= Brow-pupil distance, BMCD= Brow-medial canthal distance, CAD= Canthal-nasal alar distance, BAD= Brow alar distance, PF= palpebral fissure height. All distances to the pupil are measured to the centre of the pupil

Figure 2. Graphical depiction of our technique, green lines depict incision sites (created in Adobe Illustrator).

Demographic information of patients will also be collected, such as age, race, and gender, as well as surgical indication and level of brow depression (see [Figure 1](#)).

Vectra XT. The Vectra XT 3D-imaging device (M3) produced by Canfield can be used for a wide variety of medical indications where accurate measurements can provide clear and clinically relevant information for both the practitioner and the patient.

A 3D-image can be easily made with the Vectra XT by correct positioning of the patient in front of the device. The device provides standard outlines, so correct positioning can be achieved relatively easily. The device and its accompanying

software subsequently provide the practitioner with some standard measurements, which can be supplemented with additional measurements. (see [Figure 1](#) for the overview). Additionally, the Vectra XT software can automatically provide before and after surgery differences in facial measurements by overlaying the produced photographs within one patient file.

Photographer instructions ([Table 2](#))

- 3D imaging photographs can only be made at HMC Bronovo, where the Vectra XT is situated.
- Create a separate patient file for every patient, where the different assessment moments can be safely stored and lastly compared.

Table 1. Patient assessment moments.

	Time +/-	Time interval	Research actions
Pre-op	Indication statement	T-2	Provision of study information and start patient review period
Inclusion	2 weeks after indication statement	T-1	Questionnaire, Photo, Measurements (VECTRA)
Per-op	0	T	Filming of procedure
Post-op	1 week	T1	Stich removal and assessment of wounds
	6 weeks	T2	Questionnaire, Photo, Measurements (VECTRA)
	6 months	T3	Questionnaire, Photo, Measurements (VECTRA)
	12 months	T4	Questionnaire, Photo, Measurements (VECTRA)
	24 months	T5	Questionnaire, Photo, Measurements (VECTRA)
	36 months	T6	Questionnaire, Photo, Measurements (VECTRA)
	48 months	T7	Questionnaire, Photo, Measurements (VECTRA)
	60 months	T8	Questionnaire, Photo, Measurements (VECTRA)

Table 2. Photography positions and distance to patient.

Position	Degrees	Distance	Command
Anatomical (frontal)	0	50 & 90cm	The photo needs to capture the upper limit of the head till the "jugular notch". If it's possible a grid function could be useful making the photos. For close-up the photo needs to capture the upper limit of the head till the "nasal bridge"
Oblique left	45 left	50 & 90cm	The patient's body needs to turn 45 degrees and the patient needs to look straight forward. Only turning the face is incorrect.
Oblique right	45 right	50 & 90cm	The patient's body needs to turn 45 degrees and the patient needs to look straight forward. Only turning the face is incorrect.
Lateral left	90 left	50 & 90cm	The patient's body needs to turn 90 degrees and the patient needs to look straight forward. Only turning the face is incorrect.
Lateral right	90 right	50 & 90cm	The patient's body needs to turn 90 degrees and the patient needs to look straight forward. Only turning the face is incorrect.

- Ensure correct positioning: align the patient's eyes within the horizontal and vertical green bars which are provided within the standard Face Sculptor software.
- Inform the patient to sit still looking straight forward, ensuring that the patient looks at their own eyes in the centre of the mirror on the device.
- Once the 3D picture is made, measure the parameters as depicted in [Figure 1](#) and save the photograph within the patient file clearly stating the assessment moment.

Patient instructions

- To ensure high quality photos and for the best comparison it's important that the patient has a neutral facial expression and is not wearing (or is wearing minimal) make-up.
- The patient should be seated to ensure stable positioning for optimal photography.
- To have a clear view of the patient's face, their hair needs to be tied or tucked away such that none of the observed facial features are hidden.
 - It's advisable to have some disposable hair clips for patients with long hair.

Outcomes

1. Scarring after procedure
2. Functionality of eyebrow movement
3. Amount of correction in brow ptosis, measured in VECTRA
4. Longevity of procedure in months
5. Aesthetic result as assessed by questionnaires
6. Adverse effects of procedure

Methods of data analysis

For analyses we will use descriptive statistics and inferential statistics. A Kolmogorov-Smirnov test, a Q-Q plot and Levene's test will first test all data for normality. Categorical variables will be expressed as n (%). Continuous normally distributed variables will be expressed by their mean and standard deviation, not normally distributed data by their median and interquartile range for skewed distributions. To test groups, categorical variables will be tested using the Pearson's Chi-square test or Fisher's exact test, when appropriate. Normally distributed continuous data will be tested with the independent samples Students t-test and in case of skewed data, with the independent samples Mann-Whitney U-test. Not normally distributed data will be tested by a Log rank test. When appropriate, for testing multiple possible factors for survival, a Cox proportional hazards analysis will be used. Statistical Package for Social Sciences (SPSS, Chicago, IL, USA Version 20.0) will be used to prepare the database and for statistical analysis.

Handling and storage of data and documents

The local data originating from the HMC-population will be coded. Each subsequent included and eligible case will be

given a number, which is linked to the identifying patient details. The key to translate the code will be held by the main investigator in the HMC, Dr. de Jongh. The coded data will be stored by the aforementioned local investigators of this study in a spreadsheet that is secured by a password only known by these investigators. Only they will therefore have access to this data. Data will be kept in storage for 15 years. After the study ends the data will be made available on request. Each request will be assessed by dr. de Jongh.

Conclusion

This study will evaluate the quality of life related to and quantified data for this new browlift procedure. This will hopefully lead to an increased number performed under local anesthesia in an ambulatory setting. Follow-up studies should investigate our browlift technique in specific patient subgroups (for example patients with a peripheral facial palsy).

Study status

Ongoing; completion is expected in the first quarter of 2023.

Dissemination

The results of this study will be presented at scientific meetings and published in peer-reviewed medical journals.

Data availability

Underlying data

No underlying data are associated with this article.

Extended data

figshare: Data Protocol Browlift Study. <https://doi.org/10.6084/m9.figshare.17207579.v1>³⁶

This project contains the following files:

- FACE-Q Age Appearance Appraisal.pdf
- FACE-Q Age Appraisal VAS.pdf
- FACE-Q Decision.pdf
- FACE-Q Face Overall.pdf
- FACE-Q Forehead and Eyebrows.pdf
- FACE-Q Lines Between Eyebrows.pdf
- N21.009 P1a. Verklaring niet WMO d.d. 09-04-2021 [24407].pdf
- Proefpersoneninformatie voor deelname Wenkbrauwlift Versie 2. 17-03-2020.docx

Data are available under the terms of the [Creative Commons Attribution 4.0 International license](#) (CC-BY 4.0).

Author contributions

Idea for the study: FdJ, SP, KW, LT

Developing study design with appropriate outcome measurements: FdJ, SP, LK, ES, KI, KW, LT

In hospital logistics: FdJ, LK, ES

Drafting the protocol: FdJ, LK, ES, SP, KI, KW, LT

Final approval: FdJ, LK, ES, SP, KI, KW, LT

References

1. Ellenbogen R: **Transcoronal eyebrow lift with concomitant upper blepharoplasty.** *Plast Reconstr Surg.* 1983; **71**(4): 490–9.
[PubMed Abstract](#) | [Publisher Full Text](#)
2. Ellenbogen R: **Medial brow lift.** *Ann Plast Surg.* 1980; **5**(2): 151–2.
[PubMed Abstract](#) | [Publisher Full Text](#)
3. Lee TS, Wang L, Han R, et al.: **Options in Repositioning the Asymmetric Brow from Paralysis and Trauma.** *Facial Plast Surg.* 2017; **33**(6): 627–38.
[PubMed Abstract](#) | [Publisher Full Text](#)
4. Finsterer J: **Ptosis: causes, presentation, and management.** *Aesthetic Plast Surg.* 2003; **27**(3): 193–204.
[PubMed Abstract](#) | [Publisher Full Text](#)
5. Sundine MJ, Connell BF: **The Open Browlift.** *Facial Plast Surg.* 2018; **34**(2): 128–38.
[PubMed Abstract](#) | [Publisher Full Text](#)
6. Connell BF, Marten TJ: **The male foreheadplasty. Recognizing and treating aging in the upper face.** *Clin Plast Surg.* 1991; **18**(4): 653–87.
[PubMed Abstract](#)
7. Flowers RS, Ceydeli A: **The open coronal approach to forehead rejuvenation.** *Clin Plast Surg.* 2008; **35**(3): 331–51; discussion 29.
[PubMed Abstract](#) | [Publisher Full Text](#)
8. Matarasso A: **Endoscopically assisted forehead-brow rhytidoplasty: theory and practice.** *Aesthetic Plast Surg.* 1995; **19**(2): 141–7.
[PubMed Abstract](#) | [Publisher Full Text](#)
9. Troilius C: **A comparison between subgaleal and subperiosteal brow lifts.** *Plast Reconstr Surg.* 1999; **104**(4): 1079–90; discussion 91–2.
[PubMed Abstract](#)
10. Dayan SH, Perkins SW, Vartanian AJ, et al.: **The forehead lift: endoscopic versus coronal approaches.** *Aesthetic Plast Surg.* 2001; **25**(1): 35–9.
[PubMed Abstract](#) | [Publisher Full Text](#)
11. McKinney P, Sweis I: **An accurate technique for fixation in endoscopic brow lift: a 5-year follow-up.** *Plast Reconstr Surg.* 2001; **108**(6): 1808–10; discussion 11–4.
[PubMed Abstract](#) | [Publisher Full Text](#)
12. Jones BM, Grover R: **Endoscopic brow lift: a personal review of 538 patients and comparison of fixation techniques.** *Plast Reconstr Surg.* 2004; **113**(4): 1242–50; discussion 51–2.
[PubMed Abstract](#) | [Publisher Full Text](#)
13. Sidle DM, Loos BM, Ramirez AL, et al.: **Use of BioGlue surgical adhesive for brow fixation in endoscopic browplasty.** *Arch Facial Plast Surg.* 2005; **7**(6): 393–7.
[PubMed Abstract](#) | [Publisher Full Text](#)
14. Papadopoulos NA, Eder M, Weigand C, et al.: **A review of 13 years of experience with endoscopic forehead-lift.** *Arch Facial Plast Surg.* 2012; **14**(5): 336–41.
[PubMed Abstract](#) | [Publisher Full Text](#)
15. Rafaty FM, Goode RL, Fee WE Jr: **The brow-lift operation.** *Arch Otolaryngol.* 1975; **101**(8): 467–8.
[PubMed Abstract](#) | [Publisher Full Text](#)
16. Johnson CM, Jr., Anderson JR, Katz RB: **The brow-lift 1978.** *Arch Otolaryngol.* 1979; **105**(3): 124–6.
[PubMed Abstract](#) | [Publisher Full Text](#)
17. Lewis JR Jr: **A method of direct eyebrow lift.** *Ann Plast Surg.* 1983; **10**(2): 115–9.
[PubMed Abstract](#) | [Publisher Full Text](#)
18. Ueda K, Harii K, Yamada A: **Long-term follow-up study of browlift for treatment of facial paralysis.** *Ann Plast Surg.* 1994; **32**(2): 166–70.
[PubMed Abstract](#) | [Publisher Full Text](#)
19. Angelos PC, Stallworth CL, Wang TD: **Forehead lifting: state of the art.** *Facial Plast Surg.* 2011; **27**(1): 50–7.
[PubMed Abstract](#) | [Publisher Full Text](#)
20. Knize DM: **Limited-incision forehead lift for eyebrow elevation to enhance upper blepharoplasty.** *Plast Reconstr Surg.* 1996; **97**(7): 1334–42.
[PubMed Abstract](#) | [Publisher Full Text](#)
21. Knize DM: **Limited incision forehead lift for eyebrow elevation to enhance upper blepharoplasty.** *Plast Reconstr Surg.* 2001; **108**(2): 564–7.
[PubMed Abstract](#) | [Publisher Full Text](#)
22. Vasconez LO, Core GB, Gamboa-Bobadilla M, et al.: **Endoscopic techniques in coronal brow lifting.** *Plast Reconstr Surg.* 1994; **94**(6): 788–93.
[PubMed Abstract](#) | [Publisher Full Text](#)
23. de la Fuente A, Santamaría AB: **Endoscopic forehead lift: is it effective?** *Aesthet Surg J.* 2002; **22**(2): 113–20.
[PubMed Abstract](#) | [Publisher Full Text](#)
24. Iblher N, Manegold S, Porzelius C, et al.: **Morphometric long-term evaluation and comparison of brow position and shape after endoscopic forehead lift and transpalpebral browpexy.** *Plast Reconstr Surg.* 2012; **130**(6): 830e–40e.
[PubMed Abstract](#) | [Publisher Full Text](#)
25. Graf RM, Tolazzi AR, Mansur AE, et al.: **Endoscopic periosteal brow lift: evaluation and follow-up of eyebrow height.** *Plast Reconstr Surg.* 2008; **121**(2): 609–16; discussion 17–9.
[PubMed Abstract](#) | [Publisher Full Text](#)
26. Graf R: **Discussion: Morphometric long-term evaluation and comparison of brow position and shape after endoscopic forehead lift and transpalpebral browpexy.** *Plast Reconstr Surg.* 2012; **130**(6): 841e–2e.
[PubMed Abstract](#) | [Publisher Full Text](#)
27. Javidnia H, Sykes J: **Endoscopic brow lifts: have they replaced coronal lifts?** *Facial Plast Surg Clin North Am.* 2013; **21**(2): 191–9.
[PubMed Abstract](#) | [Publisher Full Text](#)
28. Jones BM, Lo SJ: **The impact of endoscopic brow lift on eyebrow morphology, aesthetics, and longevity: objective and subjective measurements over a 5-year period.** *Plast Reconstr Surg.* 2013; **132**(2): 226e–38e.
[PubMed Abstract](#) | [Publisher Full Text](#)
29. Behmand RA, Guyuron B: **Endoscopic forehead rejuvenation: II. Long-term results.** *Plast Reconstr Surg.* 2006; **117**(4): 1137–43; discussion 44.
[PubMed Abstract](#) | [Publisher Full Text](#)
30. Guyuron B: **Endoscopic forehead rejuvenation: I. Limitations, flaws, and rewards.** *Plast Reconstr Surg.* 2006; **117**(4): 1121–33; discussion 34–6.
[PubMed Abstract](#) | [Publisher Full Text](#)
31. Ramirez OM: **Why I prefer the endoscopic forehead lift.** *Plast Reconstr Surg.* 1997; **100**(4): 1033–9; discussion 43–6.
[PubMed Abstract](#) | [Publisher Full Text](#)
32. Stanek JJ, Berry MG: **Endoscopic-assisted brow lift: revisions and complications in 810 consecutive cases.** *J Plast Reconstr Aesthet Surg.* 2014; **67**(7): 998–1000.
[PubMed Abstract](#) | [Publisher Full Text](#)
33. Chiu ES, Baker DC: **Endoscopic brow lift: a retrospective review of 628 consecutive cases over 5 years.** *Plast Reconstr Surg.* 2003; **112**(2): 628–33; discussion 34–5.
[PubMed Abstract](#) | [Publisher Full Text](#)
34. Guillot JM, Rouso DE, Replogle W: **Forehead and scalp sensation after brow-lift: a comparison between open and endoscopic techniques.** *Arch Facial Plast Surg.* 2011; **13**(2): 109–16.
[PubMed Abstract](#) | [Publisher Full Text](#)
35. De Jongh FW, Sanches EE, Kooiman L, et al.: **A new minimally invasive surgical browlift technique with minimal scarring.** *Journal of plastic, reconstructive & aesthetic surgery: JPRAS.* 2021; Submitted.
36. Pouwels S: **Data Protocol Browlift Study.** *figshare.* Journal contribution. 2021. <http://www.doi.org/10.6084/m9.figshare.17207579.v1>

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The authors present a protocol of a study aimed to prospectively evaluate a new "minimal invasive" browlift technique.

The motivation for the described prospective study (in this protocol) stems from a previous study conducted by the authors (which I assume was retrospective?) showing favorable results. The previous paper (De Jongh FW, Sanches EE, Kooiman L, *et al.*: A new minimally invasive surgical browlift technique with minimal scarring. Journal of plastic, reconstructive & aesthetic surgery: JPRAS. 2021; Submitted), does not seem to have been published yet, so is unavailable for scrutiny. The major strengths of this study protocol include the use of reproducible photographic assessment/measurements for outcomes, and also the very long follow-up (5 years) for assessment of longevity of the surgical correction. Also, the use of subjective questionnaires makes the outcome assessment (objective and subjective) overall robust.

Nonetheless, given a previous paper by the same group describing this technique and showing preliminary results, I am not sure that publishing a protocol of a currently running prospective study is of significant interest. It would make more sense to publish a review article with an overview of brow lift techniques (their mechanisms, strengths, and limitations), therein introducing the new technique, and briefly describing the future directions (e.g. the prospective study underway).

Furthermore, the authors state that "this is an exploratory pilot study" – given the results of the first study that has been submitted, and given the conclusions stated by the authors: "our technique proves to be a more practical, cheaper alternative with optimal functional outcome and minimal scarring and therefore an optimal cosmetic result, especially when compared to more traditional browlift techniques", ideally a randomized trial to compare the outcomes of the novel technique to more traditional approaches should have been planned. If randomization is impractical, at least a prospective comparison between techniques is merited.

Regarding the investigated novel brow-lift technique, the description of surgical technique is not completely clear. The figure only depicts the incision lines. My main concerns:

1. The "lateral" suprabrow incision, as seen in the figure, is not significantly smaller than the approach many surgeons now advocate when performing a direct brow lift. As we try to

avoid the supraorbital nerve, combined with the fact that brow-ptosis is usually less prominent in the medial brow (thus lift and contouring are focused on the more lateral aspects), direct brow-lifts incisions are often performed mid-laterally. Therefore, the presented technique does not seem to spare the patients a considerable length of supra-brow incision.

2. In this technique "the frontalis muscle is bluntly dissected from the underlying periosteum. The frontalis muscle is then suspended 2–5mm and fixated at the cranial site to the periosteum of the frontal bone."

In order to achieve a meaningful brow-lift, the pretrichial and endoscopic brow-lift approaches necessitate dissection all the way down (and over) the superior orbital rim. Even then (and in the sub-periosteal plane), the amount of lift and longevity of lift are somewhat inferior to the direct lift approach (due to the mechanical advantage as the incisions are close to the brows). Furthermore, the authors' technique seems to involve dissection in the sub-aponeurotic plane, which would mean that for an adequate lift the periosteum would need to be elevated at the region of the superior orbital rim (and sub-brow). There is no mention of these considerations in the technique description. It might be described in more details in the paper describing the previous results (but is yet to be published).

Further specific points:

- Abstract: "The aim of this study is to prospectively evaluate the new minimal invasive (MINE) browlift technique" - Should it rather be "a new"?
- Since the current focus of this paper/protocol is not to be a general review, the introduction is long and contains many general details (e.g. details of anatomy and a passage describing why blepharoplasty should not be performed for treating brow ptosis) that do not serve the scope of the paper – It should be much more focused and concise dealing only with the aspects of the technique described. In fact, the last paragraph of the introduction almost suffices in "introducing" the scope of the paper.
- Typo: "The majority of the brown ptosis cases..."
- "Will there be any unforeseen adverse effects? This will be assessed via numbness." Should add assessment of injury to the frontal branch of the facial nerve.
- Physical examination:
Will any of the brow-lifts be combined with upper blepharoplasty? If so, Bells phenomenon, lagophthalmos and assessment of the lids should be done.
- Photographer instructions and Patient instructions: These sections add little to the understanding of the project, and are somewhat overly technical (seems more fitting for the in-house protocol for the study execution). Table 2 should suffice (perhaps as a supplement) in the context of publication.
- Data Analysis: "Normally distributed continuous data will be tested with the independent samples..."
The assessment should rather be for dependent samples as this would be a within-subject design (before-after) and not a comparison between case-control.

Is the rationale for, and objectives of, the study clearly described?

Partly

Is the study design appropriate for the research question?

No

Are sufficient details of the methods provided to allow replication by others?

Partly

Are the datasets clearly presented in a useable and accessible format?

Not applicable

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Oculoplastic surgery, Orbital Disease and surgery, Lacrimal Disease and surgery, Bio-statistics

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

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