Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Preoperative Lift Test and Levator Palpebrae Superioris Complex Suspension (LPSC) for Ptosis in Ocular Myasthenia Gravis: A Retrospective Study

Sunyuan Yao
Shanghai Ninth People's Hospital
Ming Lin
Shanghai Ninth People's Hospital
Xia Ding
Shanghai Ninth People's Hospital
Jin Li
abcd1971206@126.com

Shanghai Ninth People's Hospital

Research Article

Keywords: Ocular myasthenia gravis, Ptosis, Levator palpebrae superioris complex(LPSC) surgery, Preoperative eyelid lift test, Exposure keratitis

Posted Date: June 10th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9422072/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Objective

To analyze the clinical outcomes of preoperative lift testing combined with levator palpebrae superioris complex (LPSC) surgery in patients with ocular myasthenia gravis (OMG) and ptosis.

Design

Retrospective study.

Subjects, Participants, and/or Controls

Twenty-six patients (41 eyes) with OMG-associated ptosis were included. No control group was involved.

Methods, Intervention, or Testing

Patients underwent preoperative lift testing followed by LPSC surgery. Clinical outcomes were evaluated by margin reflex distance 1 (MRD1), eyelid closure and blinking function, incidence of exposure keratitis, and pathological examination of levator muscle tissue, with postoperative follow-up of 6 months.

Main Outcome Measures

Changes in MRD1, surgical correction rate, eyelid function, incidence of exposure keratitis, and pathological findings.

Results

Preoperative lift testing predicted surgical tolerance, with 90.24% of patients passing the test. The MRD1 value significantly improved from −0.93 ± 1.55 mm preoperatively to 2.43 ± 0.42 mm at 6 months postoperatively ($p < 0.001$), with a complete correction rate of 90.2%. Active eyelid closure in the awake state was retained in 75% of operated eyes, complete blinking was achieved in 86.5%, and the incidence of exposure keratitis was 10%. Pathological examination revealed characteristic “sandwich-like” levator muscle fat infiltration in 56.25% of patients.

Conclusion

In patients with OMG and ptosis, an integrated strategy combining preoperative lift testing with LPSC surgery effectively and safely corrected severe ptosis. This approach achieved satisfactory functional and cosmetic outcomes while reducing the risk of postoperative exposure keratitis, providing a tailored surgical option for this high-risk patient population.

Key Message

Known: Ocular myasthenia gravis (OMG)-associated ptosis is a challenging condition often resistant to medical therapy, with surgical correction historically limited by high risks of postoperative complications such as exposure keratitis.

New: A preoperative lift test combined with levator palpebrae superioris complex (LPSC) surgery significantly improves ptosis correction (MRD1: −0.93 ± 1.55 mm to 2.43 ± 0.42 mm, $p < 0.001$) while reducing exposure keratitis incidence to 10%, demonstrating superior safety and efficacy compared to traditional techniques.

New: Pathological analysis reveals "sandwich-like" fibrofatty infiltration in 56.25% of OMG patients, suggesting chronic structural remodeling of the levator muscle as a potential biomarker for surgical candidacy and disease progression.

New: The integrated LPSC approach preserves dynamic eyelid function (86.5% effective blinking) and ocular surface stability, offering a tailored solution for high-risk OMG patients with negative Bell's phenomenon.

Introduction

Myasthenia gravis (MG) is an autoimmune disorder caused by antibodies targeting postsynaptic components of the neuromuscular junction, clinically characterized by fatigue-induced muscle weakness.[1] Symptoms improve with rest and worsen with repeated exertion.Ocular myasthenia gravis (OMG), a subtype of MG, primarily manifests as weakness of the extraocular and levator muscles, leading to ptosis and diplopia.[2] Primary treatments include long-acting anticholinesterases (e.g.pyridostigmine), corticosteroids, other immunosuppressants, and surgical intervention.[3] However, only 20%-40% of OMG patients respond to pyridostigmine, particularly those with diplopia rather than isolated ptosis.[4] Ptosis, a prominent symptom in OMG that affect both visual function and facial appearance, is defined as a marginal reflex distance (MRD) of less than 2 mm or bilateral asymmetry exceeding 2 mm. In 2014, Shimizu et al. performed ptosis surgery on eight myasthenia gravis patients, demonstrating the efficacy of blepharoplasty for OMG, especially in cases with residual ptosis despite multiple drug treatments. They proposed four surgical criteria: stable general medical condition, at least two years of medication history, persistent ptosis with minimal diurnal variation, and impaired quality of life.[5] In 2015, Belliveau et al. performed ptosis correction in OMG patients using either the posterior approach Fasanella-Servat procedure or levator advancement surgery.[6] In 2018, Brogan et al. performed 16 external levator advancement (ELA) procedures in 11 MG patients, highlighting the importance

of preoperative assessment for adverse Bell's phenomenon and corneal sensation to identify patients at risk for postoperative exposure keratopathy.[7]

Bell's phenomenon, characterized by the reflex upward rotation of the globe during eyelid closure,was first described in 1823. [8] This physiological mechanism facilitates tear film distribution, thereby

contributing to ocular surface lubrication and protection against corneal desiccation. However, its absence or significant diminution—termed a negative Bell's phenomenon—poses a notable challenge in oculoplastic surgery. Particularly in ptosis correction, Bell's phenomenon (-) is considered a relative contraindication due to the elevated risk of postoperative corneal exposure, necessitating meticulous preoperative assessment and tailored in surgical planning.

For patients with ptosis concurrent with a negative Bell's phenomenon(-), traditional surgical techniques exhibit distinct characteristics and limitations in clinical practice. Silicone rod suspension is currently a relatively common procedure, particularly suitable for selected cases of moderate to severe ptosis; however, it faces the challenge of a relatively high recurrence rate[9][10]. Although levator aponeurosis shortening provides good postoperative blinking and eyelid closure, it is generally suitable only for mild to moderate ptosis and limited in cases of severe ptosis. In cases of severe ptosis with a negative Bell's phenomenon, the application of frontalis muscle flap suspension demands particular caution, due to the substantial postoperative lagophthalmos and delayed resolution of upper eyelid lag, which increase the risk of corneal complications, alongside other adverse effects such as eyelid edema, upper eyelid lag, brow pulling, forehead wrinkles, eyelid–globe dissociation, and uncoordinated ocular movements.[11]

In patients with OMG presenting severe ptosis that remains stable and unresponsive to therapeutic interventions,levator function is often significantly impaired. Traditional surgical approaches struggle to effectively eyelid elevation while ensuring ocular surface safety and maintaining dynamic function. To address this clinical need, the present study proposes a clinical strategy that combines preoperative traction lift test to screen surgical candidates with a modified levator palpebrae superioris complex (LPSC) suspension. Through a retrospective analysis of 26 OMG patients with severe ptosis and Bell's phenomenon (-), the comprehensive efficacy of this strategy in correcting myasthenic ptosis, preserving postoperative upper eyelid mobility and preventing exposure keratitis was evaluated. The findings are expected to inform stratified surgical decision-making for this high-risk patient population and contribute to the development of novel surgical techniques that effectively balance functional improvement with ocular surface protection.

Methods

This retrospective study analyzed 26 OMG patients (41 eyes) with severe ptosis who demonstrated sustained clinical stability for at least 2 years following treatment cessation, characterized by stable ocular symptoms without evening worsening and Bell's phenomenon(-). All patients were treated at the Department of Ophthalmology, Ninth People’s Hospital, Shanghai Jiao Tong University School of Medicine, from January 2019 to June 2024, and provided written informed consent prior to participation.

Preoperative Assessment

Preoperative examinations included measurements of palpebral fissure height, levator muscle strength, ocular motility, MRD1 and Bell’s phenomenon. All patients underwent orbital imaging, including

ultrasonography (B-scan mode and UBM for levator muscle), computed tomography, and/or magnetic resonance imaging.

Preoperative Lift Test

All patients performed a 7-day preoperative lift test.(Fig. 1) Adhesive tape was attached to the upper eyelid margin and gently elevated the eyelid 2 mm above the margin of pupillary (corresponding to an MRD1 of 4 mm), then fixed to the forehead above the eyebrow. The lift was maintained for 6-8h daily. A successful tolerance to simulated elevation outcome was defined as maintenance of eyelid position with a natural closure gap < 1 mm,accompanied by absence of dryness, burning sensation, or morning corneal discomfort indicating adequate baseline tear production, tear film stability, and blink function to sustain postoperative ocular surface hydration. Patients meeting these criteria were considered suitable for safe surgical correction at the target elevation height. Conversely, failure to tolerate the simulated state—manifested as a palpebral fissure>2mm, frequent blinking, or conjunctival hyperemia suggests insufficient compensation.

Levator Palpebrae Superioris Complex

1. After local infiltration anesthesia with 2% lidocaine containing 1:200,000 epinephrine, a skin incision was made along the premarked line. 2) The orbicularis oculi muscle anterior to the tarsal plate was excised, the anterior orbital septum was opened, and preseptal fat was removed to expose the levator aponeurosis(e.g. Figure 2A). 3) The aponeurosis was bluntly dissected along the Müller's muscle to the transverse ligament. Approximately 10 mm of levator muscle was exposed and pulled downward, then secured to the middle-upper third of the tarsal plate with three pairs of 5 – 0 absorbable mattress sutures(e.g. Figure 2B,C). 4) The eyelid height was adjusted to 2 mm below the superior corneal limbus, and the restrictive superficial ligament was removed(e.g. Figure 2D). The eyelid was advanced until tension-free contact between upper and lower margins was achieved, ensuring adequate postoperative blinking and closure. 5)Pathological examination was performed on excised muscle specimens.

All patients underwent postoperative evaluations (MRD1, PFH) at 6 months to evaluate the occurrence of corresponding complications.

1.Awake Static Closure and Blinking Function

Evaluated via photos and video recordings. Complete eyelid closure and effective blinking were defined as full corneal coverage during blinking.

2.Corneal Epithelium

Assessed via slit-lamp examination for transparency and epithelial integrity.

3. Complications

Exposure keratitis: Patients with incomplete upper eyelid closure postoperatively may experience prolonged corneal exposure, leading to symptoms such as corneal dryness, epithelial defects, and foreign body sensation. For these complications, appropriate therapeutic measures should be implemented, including the use of artificial tears and antibiotic eye drops to improve corneal condition.

Recurrence: If MRD1 returns to preoperative levels, adjust medications for myasthenia gravis treatment. Surgical revision may be necessary to improve upper eyelid height.

Undercorrection: MRD1 < 2mm but shows improvement over preoperative measurements. A second surgery may be performed to enhance upper eyelid height.

Overcorrection: MRD1 > 6mm.

Statistical Analysis

Data were analyzed using SPSS 20.0. Categorical variables were expressed as percentages (%) and compared using chi-square tests. Continuous variables were analyzed by ANOVA after homogeneity testing. Statistical significance was set at $p < 0.05$.

Results

A total of 26 female patients with ocular myasthenia gravis (OMG) involving 41 eyes were included in this study. The mean age was 47.98 ± 18.96 years (range: 15–70 years). None of the patients had a history of blepharoptosis surgery. Preoperative assessment revealed the following characteristics: palpebral fissure height ≤ 5 mm, levator muscle function ≤ 4 mm (indicating severe ptosis, corresponding to muscle strength grade 0–1), moderate limitation of ocular motility, and absence of Bell's phenomenon.

A total of 26 female OMG patients (41 eyes) were included, with a mean age of 47.98 ± 18.96 years (range 15–70 years). None of them had a history of blepharoptosis surgery.

Preoperative assessmentrevealed the following characteristics: palpebral fissure height ≤ 5 mm, levator strength≤4mm (indicating severe ptosis, corresponding to muscle strength 0–1), moderate ocular motility impairment, and Bell's phenomenon (-).

1. Rectus Muscle Findings

Ultrasound results showed no significant thickening of the bilateral rectus muscles, with thickness values within the normal range (approximately 2.3 mm to 4.2 mm).(Table 1) Orbital CT scans revealed mild thickening of the inferior rectus muscle or segments of the extraocular muscles in some patients.

Contrast-enhanced MRI scans in certain cases demonstrated homogeneous enhancement of the extraocular muscles, suggesting possible inflammation or associated changes.

2. Eye Position

Some patients exhibited mild proptosis, accompanied by slight thickening of certain extraocular muscles (e.g. rectus muscles or superior/inferior rectus muscles), though overall morphology and signal intensity remained normal.

3. Ultrasound Biomicroscopy (UBM) Findings

UBM results showed tendon sheath thickening and increased echogenicity, suggesting fat infiltration or degenerative changes indicative of severe tendon sheath pathology (fatty degeneration).(Table 1) Mild muscle thickening and heterogeneous echogenicity in extraocular muscles suggested early fatty degeneration or mild inflammation, indicating mild muscle pathology (fatty degeneration).

Table 1
The Imaging examinations of patients (including ultrasound, CT, MRI and UBM)

Project	Ultrasound	CT	MRI	UBM imaging
Extraocular muscle	Normal thickness	Mild thickening of extraocular muscles	Partial thickening of rectus muscles with homogeneous enhancement	Thickened aponeurosis with increased echogenicity; mild thickening of levator muscle with heterogeneous echoes
Eye Position	/	Mild proptosis	Mild proptosis	/
Tendinous/Muscular Lesions (Lipomatosis)	/	/	Muscle thickening possibly due to inflammation, no definite lipomatosis	Lipomatosis present in tendon sheath and muscle

4.Elevation Test:

90.24% (37 eyes) tolerated the eyelid elevation test without experiencing symptoms including xerophthalmia, conjunctival hyperemia, or corneal discomfort during daily activities. These cases were considered eligible for subsequent surgical intervention, with a relatively low probability of developing exposure keratitis postoperatively. 9.76% (4 eyes) failed to tolerate the elevation test, presenting with clinical manifestations such as conjunctival hyperemia, frequent blinking, and punctate corneal epithelial

defects. These cases were deemed unsuitable for surgery, as forced operation would presumably confer a significantly higher risk of postoperative corneal complications, particularly exposure keratitis.

5.Surgical Outcomes:

The mean preoperative MRD1 was − 0.93 ± 1.55 mm, which significantly improved to 2.43 ± 0.42 mm postoperatively ($t = -14.55$, $p < 0.001$). The 95% confidence interval [-2.81, -2.79] confirmed a significant postoperative improvement. During the 6-month postoperative follow-up period, no recurrence was observed in any patient as evidenced by the maintenance of MRD1. Additionally, there were no cases of undercorrection, and all patients demonstrating satisfactory symmetry compared to the contralateral healthy eye.

6.Eyelid Function Outcomes

Postoperative assessment of eyelid function (Fig. 3,4)revealed that complete eyelid closure was achieved in 75% of cases (30 eyes), while effective blinking was observed in 86.5% of cases(35 eyes). Chi-square analysis indicated a significant association between incomplete closure and ineffective blinking ($\chi^2 = 17.65$, $p < 0.05$).

7.Pathology:

Among 16 specimens, 9 (56.25%) showed “sandwich-like” fibrofatty infiltration within the levator aponeurosis—muscle fibers interspersed between fatty layers—suggesting structural remodeling rather than simple fat accumulation (Fig. 5,6).This finding suggests that fatty infiltration may represent a key pathological feature in the ocular changes of OMG patients, supporting the potential role of adipose tissue in disease progression and providing a basis for further investigation into its pathological mechanisms.

8.Complications:

Four patients (10%) developed exposure keratitis, all resolving with artificial tears, eye ointment, and protective taping during sleep. One patient experienced overcorrection 6 months after surgery (MRD1 = 7mm) due to disease fluctuation, successfully managed with botulinum toxin injection.

Discussion

To manage OMG patients with severe ptosis and Bell’s phenomenon (-), we developed a novel treatment strategy that incorporates a preoperative traction test to screen suitable surgical candidates with a modified levator palpebrae superioris complex procedure. This study analyzed the clinical outcomes of

26 patients (41 eyes) treated with this strategy, demonstrating its effectiveness in better maintaining postoperative ocular surface stability while achieving satisfactory ptosis correction.

Regarding preoperative assessment, the traction test was performed to simulate postoperative eyelid mechanics and evaluate ocular surface compensatory capacity. During this procedure, patients were instructed to perform eye movements, reading, and light activities. This dynamic“time-accumulated effect”test serves as an effective tool for identifying patients with limited tear film reserve, thereby minimizing postoperative corneal complications. Radiologically, no significant extraocular muscles thickening was detected by ultrasound, CT, or MRI, indicating no major pathological changes despite minor anomalies in some cases.These imaging findings hold dual clinical significance. First, imaging helps to exclude orbital and intracranial space-occupying lesions, ensuring that the ptosis is indeed caused by myogenic or neurogenic dysfunction rather than secondary to tumors, inflammation, or trauma. Second, the stability observed in imaging findings suggests that ptosis has entered a relatively stable phase with no significant active inflammation or progressive muscle atrophy, indicating an appropriate timing for corrective surgery.

Pathologically, OMG patients exhibit “sandwich-like” fatty infiltration within the levator aponeurosis, distinguishing it from the simple aponeurosis thinning observed in congenital or senile ptosis. Fatty infiltration most likely reflects chronic inflammation-induced muscle atrophy and structural remodeling, the severity of which constitutes a critical determinant in surgical decision-making, necessitating either selective shortening of healthy muscle bundles or aponeurotic repair. Although the progression of fatty degeneration remains unclear, findings from ultrasound biomicroscopy suggest that early surgical intervention following stabilization with immunotherapy may prevent irreversible changes in this disease. Furthermore, we propose that progressive degeneration requires dynamic surgical timing assessment, for which ultrasound biomicroscopy (UBM) could serve as a valuable monitoring tool. Future studies integrating high-resolution imaging with multi-time-point sampling are warranted to elucidate degeneration patterns and optimize individualized management for OMG.

Compared to silicone frontalis suspension, which is widely used in patients with poor levator function and is associated with a 26% incidence of postoperative exposure keratopathy (primarily related to incomplete eyelid closure and postoperative lagophthalmos).[12], the levator palpebrae superioris complex procedure employed in this study demonstrated significant advantages. Functionally, complete eyelid closure was achieved in 75% of cases (30 eyes), while effective blinking was observed in 86.5% of cases(35 eyes). Notably, all patients achieved complete restoration of blinking function postoperatively (with only one case of overcorrection and no recurrence), thereby allowing the formation of a stable tear film and ensuring protection of the ocular surface. Morphologically, stable eyelid contours and satisfactory eyelid margin symmetry were attained in all cases. Operationally, the procedure required relatively short operative time and caused minimal trauma to the surrounding tissues. Importantly, the incidence of exposure keratitis was only 10% (4 individuals), a significant reduction compared to the 26% incidence rate previously reported with silicone frontalis suspension. Several factors may contribute to this reduction. First, preoperative traction testing allowed for careful assessment of eyelid mobility and

levator function, enabling the selection of patients whose eyelid dynamics were favorable for surgery, which helps to avoid postoperative lagophthalmos. Second, refined surgical maneuvers and intraoperative attention to eyelid margin alignment and closure reduced the overall incidence of incomplete eyelid closure.[13] Third, the optimized surgical technique used in our study may minimize excessive eyelid elevation and better preserve eyelid closure function, thereby reducing corneal exposure. These findings highlight the importance of individualizing surgical technique selection based on levator function and ocular surface protection capacity. Therapeutic measures for the patients with exposure keratitis included artificial tears, protective eye ointments, eyelid closure strips, and prophylactic antibiotic eye drops, with regular follow-up to monitor corneal healing. Following treatment, patients showed marked symptom improvement, with gradual healing of corneal surface injuries and resolution of discomfort, tearing, and pain.

The present study has several limitations. First, its retrospective design and relatively small sample size may limit the statistical power and generalizability of the findings. The observed 10% incidence of exposure keratitis requires validation in a larger prospective cohort. Second, the evaluation of long-term outcomes—including the stability of surgical correction and the progression of adipose infiltration—may be constrained by the mid-term follow-up duration. Longer follow-up studies are needed to confirm the durability of this surgical approach.

Future development of postoperative outcome assessment systems is warranted. Such systems should enable quantitative evaluation using multidimensional data (e.g. upper eyelid lift height, visual function, quality of life) and incorporate biomarkers to predict outcomes more accurately. Multicenter clinical data analysis could further refine surgical indications, enabling personalized treatment and optimizing patient satisfaction. Future research should also focus on reducing postoperative complications (e.g. exposure keratitis, recurrence of ptosis) and improving rehabilitation strategies.

Conclusion

Preoperative evaluation of the levator palpebrae superioris using ultrasound biomicroscopy, combined with the tape traction test to assess ocular surface compensatory capacity, followed by treatment with the modified LPSC, enables patients to regain effective blinking function postoperatively. This approach significantly improves upper eyelid lag and lagophthalmos, thereby promoting the restoration of tear film stability. The comprehensive treatment strategy effectively reduces the incidence of exposure keratitis and lowers the risk of postoperative recurrence, and is recommended for broader application in patients with ocular myasthenia gravis–related ptosis and a negative Bell’s phenomenon.

Declarations

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Shanghai Ninth People's Hospital. The study adhered to the tenets of the Declaration of Helsinki. Written informed consent was obtained from all

participants. For participants under the age of 16, written informed consent was obtained from their parents or legal guardians.

Consent for publication

Written informed consent for publication of clinical details and/or clinical images was obtained from the patient(s) and/or their legal guardians.

Availability of data and materials

The datasets used and/or analyzed during the current study are not publicly available due to patient privacy concerns but are available from the corresponding author on reasonable request.

Funding

This work was supported by the National Natural Science Foundation of China (NSFC) under the Young Scientists Fund [grant number 82401309].

References

1. Garcia Estevez DA, Fernandez JP. Myasthenia gravis. Update on diagnosis and therapy. Med Clin (Barc). 2023;161(3):119–27.
2. Nair AG, et al. Ocular myasthenia gravis: a review. Indian J Ophthalmol. 2014;62(10):985–91.
3. Shuey NH. Ocular myasthenia gravis: a review and practical guide for clinicians. Clin Exp Optom. 2022;105(2):205–13.
4. Evoli A, et al. Therapeutic options in ocular myasthenia gravis. Neuromuscul Disord. 2001;11(2):208–16.
5. Shimizu Y, et al. Surgical treatment for medically refractory myasthenic blepharoptosis. Clin Ophthalmol. 2014;8:1859–67.
6. Belliveau MJ, Oestreicher JH. Ptosis Repair in Ocular Myasthenia Gravis. Semin Ophthalmol. 2017;32(5):564–8.
7. Brogan K, Farrugia ME, Crofts K. Ptosis Surgery in Patients with Myasthenia Gravis: A Useful Adjunct to Medical Therapy. Semin Ophthalmol. 2018;33(3):429–34.
8. Yoon JS, Lew H, Lee SY. Bell's phenomenon protects the tear film and ocular surface after frontalis suspension surgery for congenital ptosis. J Pediatr Ophthalmol Strabismus. 2008;45(6):350–5.
9. Ben Simon GJ, et al. Frontalis suspension for upper eyelid ptosis: evaluation of different surgical designs and suture material. Am J Ophthalmol. 2005;140(5):877–85.
10. Lee MJ, et al. Frontalis sling operation using silicone rod compared with preserved fascia lata for congenital ptosis a three-year follow-up study. Ophthalmology. 2009;116(1):123–9.
11. Xing Y, et al. Modified Combined Fascia Sheath and Levator Muscle Complex Suspension With Muller Muscle Preservation on Treating Severe Congenital Ptosis. Ann Plast Surg. 2019;82(1):39–

45.
12. van Sorge AJ, et al. Exposure keratopathy following silicone frontalis suspension in adult neuro- and myogenic ptosis. Acta Ophthalmol. 2012;90(2):188–92.
13. Lee JH, et al. Maximal levator resection in unilateral congenital ptosis with poor levator function. Br J Ophthalmol. 2017;101(6):740–6.

Figures



Figure 1

Schematic illustration of Preoperative Lift Test

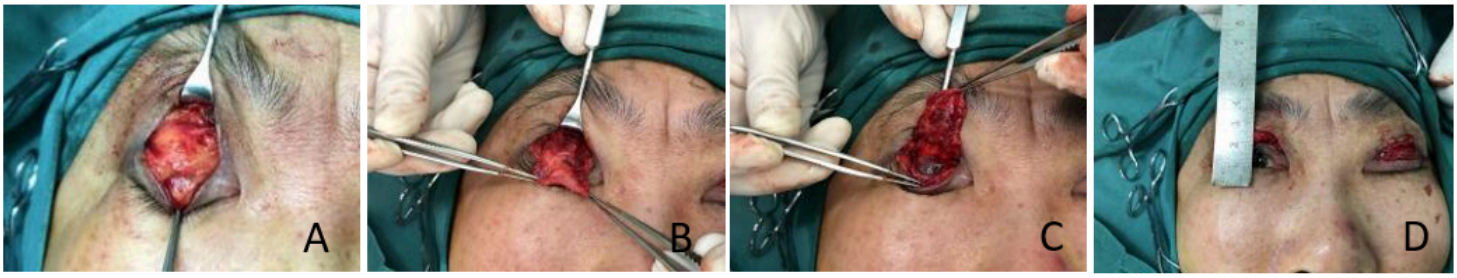


Figure 2

Surgical Procedure of LPSC



Figure 3

The blinking and closure picture of patient A: (a) Preoperative eye-opening status. (b) Postoperative eye-closing status. (c) Postoperative eye-opening status.



Figure 4

The blinking and closure picture of patient B: (a) Preoperative eye-opening status. (b) Postoperative eye-closing status. (c) Postoperative eye-opening status.

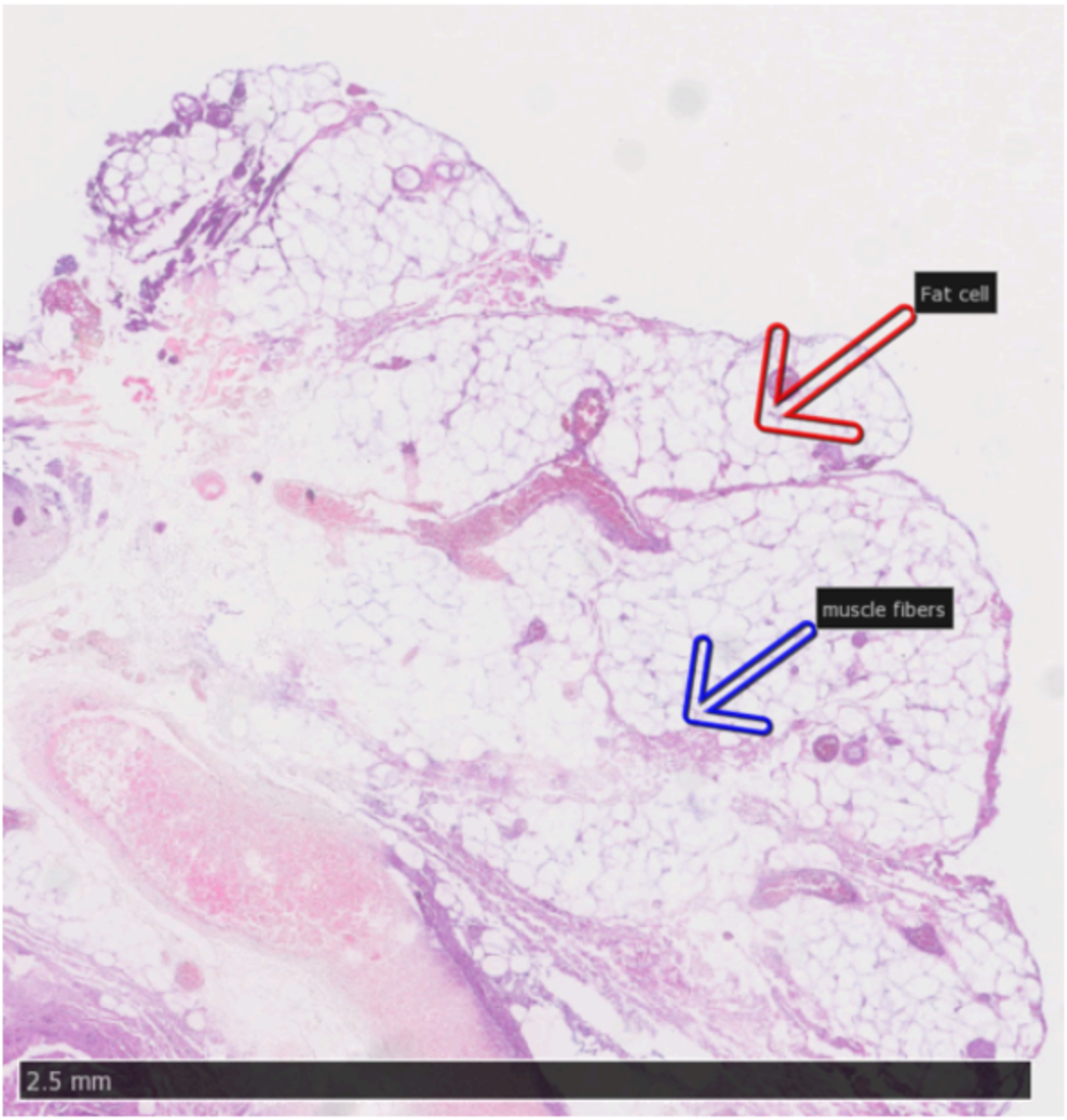


Figure 5

Histological section of the levator palpebrae superioris in a patient. Fibrotic tissue is marked by a blue arrow, while adipocyte infiltration is marked by a red arrow. Scale bar = 2.5 mm.

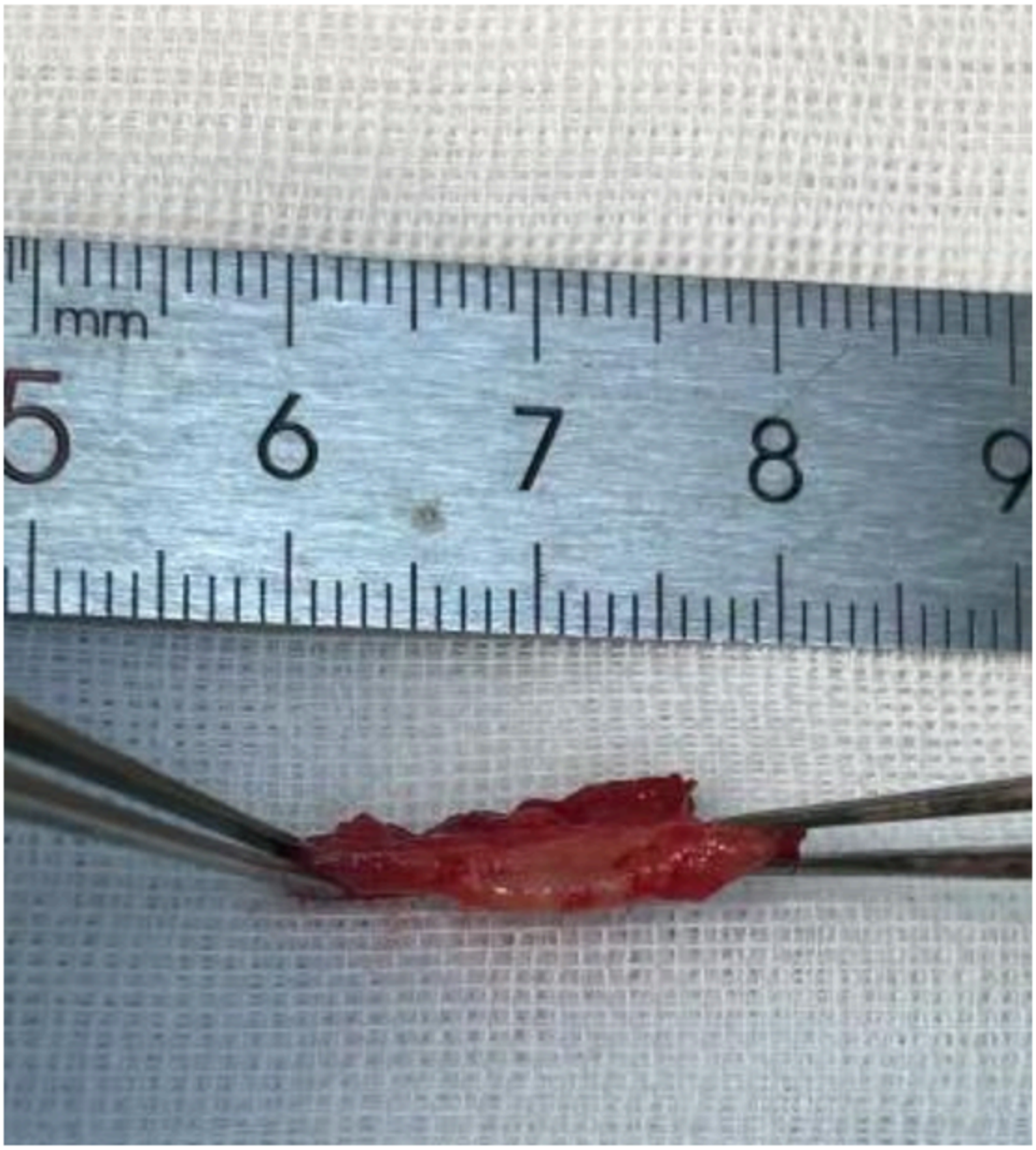


Figure 6

Gross specimen of the resected levator palpebrae superioris muscle from a patient The stretched length is 2 cm.