

# 上睑下垂患者提上睑肌肌力与术后眼睑闭合的相关性

刘欣<sup>1</sup>, 杜安石<sup>1</sup>, 王艳<sup>2</sup>, 谭青青<sup>2</sup>, 李俊萍<sup>1</sup>, 郭玉楠<sup>1</sup>, 兰长骏<sup>1,2</sup>

1. 成都东区爱尔眼科医院眼整形科, 四川 成都 610051

2. 川北医学院附属医院/川北医学院眼视光医学院, 四川 南充 637000

**摘要:** **目的** 探讨先天性上睑下垂患者术前提上睑肌肌力与术后眼睑闭合的相关性, 为临床不同肌力上睑下垂的手术方式选择和预后判断提供参考依据。 **方法** 纳入先天性上睑下垂患者 83 例 122 眼, 行提上睑肌缩短术或额肌瓣悬吊术, 测量术前提上睑肌肌力和术后第 1 d、7 d、1 个月、3 个月、6 个月的眼睑闭合情况, 分别对两种术式提上睑肌肌力与术后眼睑闭合之间的相关性进行分析研究。 **结果** 提上睑肌缩短术术前提上睑肌肌力与术后眼睑闭合不全测量值之间呈负相关 ( $r=-0.3301, P<0.01$ ), 术前肌力越好, 术后眼睑闭合不全测量值越低; 额肌瓣悬吊术不具有相关性 ( $r=-0.2291, P=0.1257$ )。两种术式均为术后时间越长, 眼睑闭合不全测量值越小, 提上睑肌缩短术后 3 个月闭合, 额肌瓣悬吊术后 6 个月仍有部分未闭合。 **结论** 提上睑肌缩短术术前提上睑肌肌力与术后眼睑闭合有关, 肌力越好, 闭合程度越好, 所需时间越短。额肌瓣悬吊术术前提上睑肌肌力与术后眼睑闭合无关。提上睑肌缩短术闭合早, 提上睑肌缩短术为更优选择。

**关键词:** 先天性上睑下垂; 提上睑肌缩短术; 额肌瓣悬吊术; 提上睑肌肌力; 眼睑闭合; 相关性

**中图分类号:** R765.21; R777.1+5

**文献标志码:** A

**文章编号:** 1673-3770(2025)05-0070-06

**引用格式:** 刘欣, 杜安石, 王艳, 等. 上睑下垂患者提上睑肌肌力与术后眼睑闭合的相关性[J]. 山东大学耳鼻喉眼学报, 2025, 39(5):70-75. LIU Xin, DU Anshi, WANG Yan, et al. Investigation of the correlation between levator palpebrae superioris muscle strength and postoperative eyelid closure in patients with blepharoptosis[J]. Journal of Otolaryngology and Ophthalmology of Shandong University, 2025, 39(5):70-75.

## Investigation of the correlation between levator palpebrae superioris muscle strength and postoperative eyelid closure in patients with blepharoptosis

LIU Xin<sup>1</sup>, DU Anshi<sup>1</sup>, WANG Yan<sup>2</sup>, TAN Qingqing<sup>2</sup>, LI Junping<sup>1</sup>, GUO Yunan<sup>1</sup>, LAN Changjun<sup>1,2</sup>

1. Department of Ocular Plastic Surgery, Chengdu Eastern Aier Eye Hospital, Chengdu 610051, Sichuan, China

2. Affiliated Hospital of North Sichuan Medical College; Medical School of Ophthalmology & Optometry, North Sichuan Medical College, Nanchong 637000, Sichuan, China

**Abstract: Objective** To investigate the correlation between the strength of the levator palpebrae superioris muscle and postoperative eyelid closure in patients with congenital blepharoptosis, aiming to provide a reference basis for surgical method selection and prognosis assessment in clinical practice. **Methods** A total of 122 eyes from 83 patients with congenital blepharoptosis were included in this study. Surgical procedures involved either shortening of the levator palpebrae superioris muscle or frontalis muscle flap suspension. Prior to surgery, the muscle strength of the levator palpebrae superioris was measured and recorded. Subsequently, eyelid closure was assessed on postoperative day one, day seven, month one, month three, and month six for patients who underwent the same surgical procedure. The correlation between preoperative muscle strength of the levator palpebrae superioris and postoperative eyelid closure was analyzed. **Results** The strength of the levator palpebrae superioris muscle exhibits a negative correlation with the degree of postoperative eyelid closure insufficiency in patients with shortening of the levator palpebrae superioris muscle ( $r=-0.3301, P<0.01$ ). However, no significant correlation was observed in cases involving frontalis muscle flap suspension operation ( $r=-0.2291, P=0.1257$ ). The longer the postoperative time, the smaller the eyelid closure insufficiency in both surgical methods. After a 3-month shortening of the levator palpebrae superioris muscle, complete eyelid closure was achieved. However, even after a 6-month frontalis muscle flap suspension, partial non-closure still persisted. **Conclusion** The robustness of the muscle plays a crucial role in achieving proficient eyelid closure post-operatively following levator palpebrae muscle shortening surgery. A stronger muscle results in enhanced closure and reduced closure time. In contrast, the strength of the upper eyelid muscle has minimal significance for eyelid

closure post-operatively during frontal muscle flap suspension surgery. Levator palpebrae muscle shortening surgery facilitates earlier eyelid closure post-operatively, making it the optimal choice.

**Key words:** Congenital Blepharoptosis; Shortening of the levator palpebrae superioris muscle; Frontalis muscle flap suspension operation; Muscle strength of the levator palpebrae superioris; Closure of eyelids; Correlation

先天性上睑下垂是指出生时提上睑肌发育不良,上睑低于正常位置,遮盖部分或全部瞳孔,影响外观、视力和小儿脊柱正常发育等<sup>[1-2]</sup>。手术是目前治疗先天性上睑下垂唯一有效方式,提上睑肌缩短术和额肌瓣悬吊术是最常用的手术方式。有报道显示提上睑肌缩短术治疗单纯性先天性上睑下垂的成功率可达 81.8%<sup>[3]</sup>,且术后提上睑肌功能得到较好改善。额肌瓣悬吊术则是中重度先天性上睑下垂提上睑肌肌力差但额肌功能正常患者的首选术式。本研究对两种术式先天性上睑下垂患者术前的提上睑肌肌力与术后眼睑闭合的相关性进行分析,为临床医生在术式选择、手术设计及术后疗效等方面提供参考,以便术前医患沟通。

## 1 材料与方法

### 1.1 研究对象

纳入 2016 年 6 月~2021 年 6 月在成都东区爱尔眼科医院行提上睑肌缩短术或额肌瓣悬吊术的先天性上睑下垂患者 83 例 122 眼,其中男 56 例 83 眼、女 27 例 39 眼;3~50 岁(16.82±12.31)岁;右眼 26 例,左眼 18 例,双眼 39 例;其中先天性小睑裂综合征 7 例 14 眼,均行内外眦成形术后半年及以上;提上睑肌缩短术 53 例 76 眼,额肌瓣悬吊术 30 例 46 眼。

纳入标准:①诊断为先天性上睑下垂;②行提上睑肌缩短术或额肌瓣悬吊术治疗;③知情同意者。

排除标准:①神经源性、肌源性、机械性等后天性上睑下垂和假性上睑下垂;②有手术禁忌证者。

本研究符合《赫尔辛基宣言》,并且经医院伦理委员会审核通过(批准证号:DQAIER202408004)。

### 1.2 研究方法

根据提上睑肌肌力、年龄、麻醉方式等选择提上睑肌缩短术或额肌瓣悬吊术,根据《上睑下垂诊治专家共识》<sup>[4]</sup>,将所有患者分为肌力正常组(肌力≥10 mm),肌力良好组(肌力为 7~<10 mm),肌力中等组(肌力为 4~<7 mm)和肌力差组(肌力<4 mm),肌力差者多选择额肌瓣悬吊术,肌力中等至正常者多选择提上睑肌缩短术,少数特殊患者,如无法配合而需行全麻手术的儿童及少数成年患者,全

麻术中无法良好地评估提上睑肌缩短量,亦选择行额肌瓣悬吊术。

#### 1.2.1 提上睑肌缩短术手术步骤

设计上睑重睑线并标记,沿此切开皮肤,切除部分睑板前眼轮匝肌,暴露睑板。于睑板面分离切断提上睑肌腱膜,分离部分提上睑肌。向下牵拉并缩短相应长度提上睑肌,褥式缝合固定于睑板上 1/3,观察上睑高度,调整至上睑位于角膜上缘下 1~2 mm。间断缝合提上睑肌残端与睑板,最后间断缝合皮肤切口。

#### 1.2.2 额肌瓣悬吊术手术步骤

设计上睑重睑线及额肌瓣范围并标记,沿此切开皮肤,切除部分眼轮匝肌,自轮匝肌下向额上分离,按标记范围行皮肤及额肌腱膜间分离,于额肌腱膜瓣两侧向上切开适量范围,向下牵引额肌瓣。褥式缝合固定额肌瓣于睑板上 1/3,观察上睑高度,调整至上睑位于角膜上缘下 1 mm。间断缝合皮肤切口。测量并记录术前提上睑肌肌力,记录不同肌力患者术后第 1 d、7 d、1 个月、3 个月、6 个月的眼睑闭合情况,用直尺测量患者自然闭眼时上睑缘与下睑缘之间的最大距离,即为闭合不全睑裂高度。分别对两种术式提上睑肌肌力与术后眼睑闭合之间的相关性进行分析。

### 1.3 统计学处理

应用 SPSS 25.0 软件。采用 Spearman 相关、相关性分析散点图、拟合曲线综合分析术前不同提上睑肌肌力与术后眼睑未闭合程度的相关性。检验水准选取  $\alpha=0.05$ 。

## 2 结果

两种术式术后眼睑位置都位于角膜上缘下约 1~2 mm 处,都得到有效矫正。

### 2.1 两种术式术前提上睑肌肌力与术后眼睑闭合情况相关性分析

提上睑肌缩短术术前提上睑肌肌力与术后眼睑闭合不全测量值之间呈负相关,术前提上睑肌肌力越好,术后眼睑闭合不全测量值越低;额肌瓣悬吊术术前提上睑肌肌力与术后眼睑闭合不全测量值之间不具有相关性。见图 1。

## 2.2 两种术式患者术后各时间点眼睑闭合不全情况分析

两种术式均表现为术后时间越长,眼睑闭合不

全测量值越小,提上睑肌缩短术后 3 个月闭合,额肌瓣悬吊术后 6 个月仍有部分未闭合。见图 2。

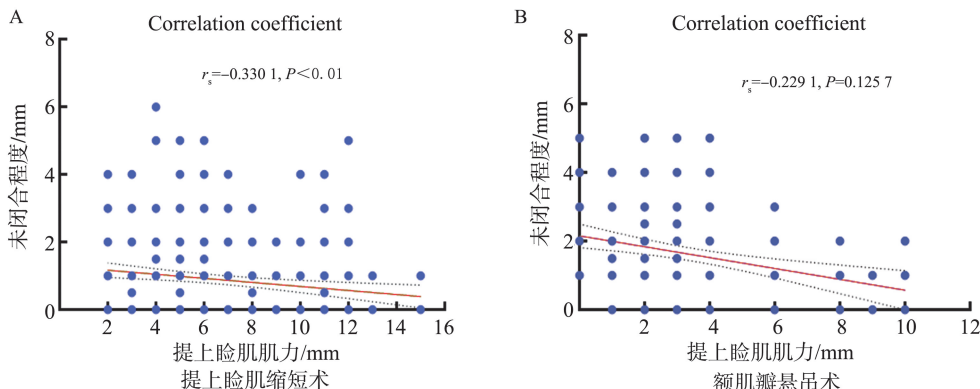


图 1 两种术式术前提上睑肌肌力与术后眼睑闭合不全情况相关性分析散点图

A: 提上睑肌缩短术; B: 额肌瓣悬吊术

Figure 1 The relationship between the strength of the levator palpebrae superioris muscle and postoperative closure of eyelids in patients with the levator palpebrae superioris muscle and frontalis muscle flap suspension operation

A: The levator palpebrae superioris muscle surgery; B: The frontalis muscle flap suspension operation

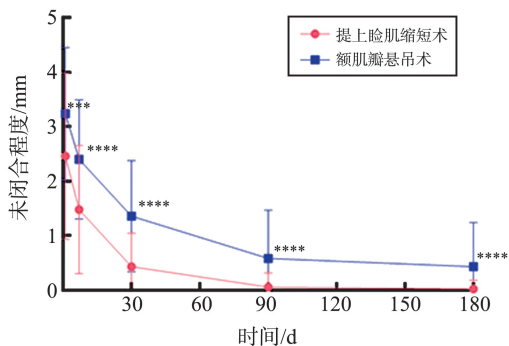


图 2 两种术式患者术后各时间点眼睑闭合不全情况折线图

Figure 2 Line chart of eyelid closure imperfecta at different time points after surgery for two types of surgical procedures

## 3 讨论

上睑下垂是临床常见眼科疾病,若不及时矫正,会给患者的外观、视力及生活质量带来较大影响,先天性单侧上睑下垂严重者可形成弱视,双侧上睑下垂严重,因需仰首视物,形成一种仰头皱额的特殊姿态,可影响颈椎、脊柱正常发育等<sup>[5-7]</sup>。先天性上睑下垂主要是与提上睑肌发育异常相关,因此,明确提上睑肌的解剖结构对手术治疗至关重要。提上睑肌自总腱环开始,沿眶上壁走行,向前至眶缘呈扇形散开,继续行至眶缘下方时转变成较为宽大的腱膜组织,最后向前下方行至睑板上缘。其内可见为横纹肌组织,光镜下其肌纤维呈细长带状,平行排列成束,肌膜完整且平滑<sup>[8]</sup>。提上睑肌肌纤维排列紊乱、玻璃样变性、线

粒体损伤、肌球蛋白分布等病理改变与先天性上睑下垂的发病机制相关<sup>[9-12]</sup>。手术是先天性上睑下垂主要治疗方式,提上睑肌缩短术和额肌瓣悬吊术是目前临床应用较多的两种手术方式,但术后可能存在眼睑闭合不全的风险,探讨术前提上睑肌肌力与术后眼睑闭合情况之间的关系,有助于术式的选择、预后的判断及术前医患双方的沟通。

明确相同术式,不同肌力术后眼睑闭合的差异性及原因,可有效减少术后眼睑闭合不全及暴露性角膜炎等相关并发症的发生。常见的上睑下垂术后并发症包括眼睑闭合不全、暴露性角膜炎、结膜脱垂、倒睫、欠矫和过矫等,且对睑板腺、泪膜和角膜地形图均有影响<sup>[13]</sup>。临床上对上睑下垂术后并发症有较多报道,单纯对眼睑闭合不全进行的研究报道则较少。本文对上睑下垂患者术前提上睑肌肌力与术后眼睑闭合情况的相关性进行研究,结果显示提上睑肌缩短术术前提上睑肌肌力越好,术后眼睑闭合不全程度越轻。分析原因可能是提上睑肌缩短术主要是根据肌力大小调整提上睑肌的缩短量,肌力越好,缩短量越小,对术后眼睑活动影响越小<sup>[14-15]</sup>。额肌瓣悬吊术术前提上睑肌肌力与术后眼睑闭合情况不具有相关性。分析原因可能是额肌瓣悬吊术是借助额肌收缩来提升眼睑<sup>[16]</sup>,直接缝合额肌瓣和睑板<sup>[17]</sup>,未对提上睑肌造成影响。

提上睑肌缩短术术后眼睑闭合较早,额肌瓣悬吊术闭合较晚,提上睑肌缩短术组在术后 3 个月闭合,额肌瓣悬吊术组术后 6 个月仍有部分未闭合。

可能与术后水肿、瘢痕演变过程有关。提上睑肌缩短术是通过缩短一部分提上睑肌,直接增强提上睑肌的作用,额肌瓣悬吊术则采用重睑切口利用额肌为动力,借助额肌力量上抬眼睑<sup>[18-19]</sup>。提上睑肌缩短术后瘢痕不明显,主要表现为眼睑水肿,术后 1 个月及以后水肿基本消失,对眼睑闭合程度的影响力减小。瘢痕增生通常在伤口闭合后的 4~8 周内出现,一般可持续 6~8 个月,后渐趋静止<sup>[20]</sup>。额肌瓣悬吊术术后有明显的瘢痕期,术后 3~6 月处于瘢痕形成相对恒定期,对眼睑闭合影响较大。

明确不同术式术后眼睑闭合的情况,可以帮助临床医生判断预后,利于医患沟通。有研究认为额肌瓣悬吊术可有效改善患者术后眼睑闭合不全<sup>[21]</sup>,这与额肌瓣悬吊术的手术特点有关,额肌瓣悬吊术主要是利用额肌瓣为动力的悬吊作用,较好地保留了额肌血供及生理机能,对面神经没有损伤而造成麻痹和功能失调,使眼轮匝肌的神经功能完好,所以有效地减少了眼睑闭合不全的发生<sup>[22-23]</sup>。有学者比较硅胶条睑板额肌悬吊术与最大提上睑肌切除术治疗提上睑肌肌力 $\leq 4$  mm 的 44 例单侧先天性上睑下垂患者的手术效果,随访 1 年半,发现两组均获得良好的手术效果,提上睑肌缩短术和额肌瓣悬吊术对上睑提肌功能不佳的单侧上睑下垂患者效果相当,均可作为治疗先天性上睑下垂的术式之一<sup>[24]</sup>。关小荣等<sup>[18]</sup>对重度上睑下垂进行研究,表明,术后同一时间点,提上睑肌缩短术者眼睑闭合不全消失,而额肌瓣悬吊术者仍然存在相当比例的眼睑闭合不全,认为闭合眼睑时,提上睑肌缩短术者上睑自然悬挂位置低,容易闭合;而额肌瓣悬吊术者上睑自然悬挂位置较高,不易闭合。另有学者<sup>[25-26]</sup>发现提上睑肌缩短术后既形成双眼皮折痕,又无明显创面,而若创面明显或出现瘢痕增生等,则严重影响患者美观甚至造成心理负担,对抑郁质人格患者影响更明显。提上睑肌缩短术可保持原有的眼肌运动方向,可获得较为满意的矫正效果,且并发症少,所以是矫正先天性上睑下垂最符合解剖学、最精确和最常见的手术方式<sup>[27]</sup>。结合本研究提上睑肌缩短术术后眼睑闭合早的结果,临床上应尽量选择提上睑肌缩短术。但若出现患者年龄小,提上睑肌未发育完全,或因患者配合度差需在全身麻醉下行手术等情况,无法灵活观察及调整提上睑肌缩短量时,可选择额肌瓣悬吊术,则需告知患者术后眼睑闭合恢复时间较长等情况。

综上所述,提上睑肌缩短术术前提上睑肌肌力越好,术后眼睑闭合越好,术后眼睑恢复到完全闭合所需时间越短。提上睑肌缩短术术后眼睑闭合早,可作为临床首选术式。此外,本研究存在术后观察时间较短的不足之处,在今后的研究中,可将术后观察时间延长至 1~2 年,以期更好地指导临床。

## 参考文献:

- [1] Zikić Z, Ljutica M, Karabeg R, et al. Outcomes of early correction of congenital myogenic ptosis using transconjunctival levator plication[J]. *Med Arch*, 2020, 74(3): 205-209. doi:10.5455/medarh.2020.74.205-209
- [2] Rosenberg JB, Andersen J, Barmettler A. Types of materials for frontalis sling surgery for congenital ptosis[J]. *Cochrane Database Syst Rev*, 2019, 4(4): CD012725. doi:10.1002/14651858.CD012725.pub2
- [3] Nabie R, Manouchehri V, Aminmozaffari S, et al. Levator muscle resection for simple congenital ptosis: its impact on preoperative levator function and dose-response ratio[J]. *Can J Ophthalmol*, 2023, 58(3): 235-238. doi:10.1016/j.jco.2022.01.008
- [4] 《上睑下垂诊治专家共识》制定专家组. 上睑下垂诊治专家共识[J]. *中华医学杂志*, 2017, 97(6): 406-411. doi:10.3760/cma.j.issn.0376-2491.2017.06.002
- [5] Marengo M, Macchi I, Macchi I, et al. Clinical presentation and management of congenital ptosis[J]. *Clin Ophthalmol*, 2017, 11: 453-463. doi:10.2147/OPHTH.S111118
- [6] 范先群. 眼整形外科学[M]. 北京: 北京科学技术出版社, 2009
- [7] 赵敏, 涂惠芳, 陆秀兰, 等. 先天性上睑下垂患儿术后角膜曲率及眼表变化的研究[J]. *中华医学美容美容杂志*, 2022, 28(2): 115-118. doi:10.3760/cma.j.issn.1671-0290.2022.02.011  
ZHAO Min, TU Huifang, LU Xiulan, et al. Corneal curvature and ocular surface changes after operation in congenital ptosis[J]. *Chinese Journal of Medical Aesthetics and Cosmetology*, 2022, 28(2): 115-118. doi:10.3760/cma.j.issn.1671-0290.2022.02.011
- [8] 庞润晖, 王娟, 史俊虎, 等. 重度上睑下垂联合筋膜鞘组织的病理学临床观察[J]. *实用医学杂志*, 2021, 37(12): 1641-1644. doi:10.3969/j.issn.1006-5725.2021.12.025  
PANG Runhui, WANG Juan, SHI Junhu, et al. Pathological and clinical observation of severe ptosis combined with fascial sheath tissue[J]. *The Journal of Practical Medicine*, 2021, 37(12): 1641-1644. doi:10.3969/j.issn.1006-5725.2021.12.025

- [9] 白蓉, 赵瑜, 李军, 等. 先天性上睑下垂患者提上睑肌腱膜纤维特征及其与病情的相关性[J]. 临床眼科杂志, 2022, 30(4): 344-348. doi: 10.3969/j.issn.1006-8422.2022.04.013  
 BAI Rong, ZHAO Yu, LI Jun, et al. The characteristics of levator aponeurosis in patients with congenital ptosis and their correlation with the disease[J]. *Journal of Clinical Ophthalmology*, 2022, 30(4): 344-348. doi: 10.3969/j.issn.1006-8422.2022.04.013
- [10] 金书红, 白慧玲, 王一鹏, 等. 单纯性先天性上睑下垂患者提上睑肌的超声生物显微镜测厚及组织学观察[J]. 中华实验眼科杂志, 2015, 33(10): 940-944. doi:10.3760/cma.j.issn.2095-0160.2015.10.016  
 JIN Shuhong, BAI Huiling, WANG Yipeng, et al. Thickness and histopathology of levator palpebrae superioris muscle in patients with simplex congenital blepharoptosis[J]. *Chinese Journal of Experimental Ophthalmology*, 2015, 33(10): 940-944. doi:10.3760/cma.j.issn.2095-0160.2015.10.016
- [11] 罗彦竹, 黎冬平, 周娜, 等. 不同程度单纯性先天性上睑下垂患者提上睑肌的病理研究[J]. 中华实验眼科杂志, 2021, 39(12): 1038-1045. doi:10.3760/cma.j.cn115989-20200917-00653  
 LUO Yanzhu, LI Dongping, ZHOU Na, et al. Pathological study of the levator palpebrae superioris muscle in patients with different severities of simple congenital ptosis[J]. *Chinese Journal of Experimental Ophthalmology*, 2021, 39(12): 1038-1045. doi: 10.3760/cma.j.cn115989-20200917-00653
- [12] Quaranta-Leoni FM, Secondi R, Quaranta-Leoni F, et al. Histological findings of levator muscle in unilateral congenital ptosis in different age groups[J]. *Acta Ophthalmol*, 2020, 98(3): e363-e367. doi:10.1111/aos.14284
- [13] Yesilkaya EC, Ozyurek EBA, Dursun T, et al. The effects of blepharoptosis surgery on meibomian gland, tear film, and corneal topography[J]. *Beyoglu Eye J*, 2023, 8(3): 214-220. doi:10.14744/bej.2023.99266
- [14] 冯蕾, 刘志强, 李冰. 提上睑肌缩短联合睑板部分切除与单纯改良额肌瓣悬吊术治疗重度上睑下垂的效果及安全性分析[J]. 中国美容医学, 2023, 32(3): 12-15  
 FENG Lei, LIU Zhiqiang, LI Bing. The effect and safety analysis of levator palpebral muscle shortening combined with partial tarsal resection and simple modified frontal muscle flap suspension in the treatment of severe blepharoptosis[J]. *Chinese Journal of Aesthetic Medicine*, 2023, 32(3): 12-15
- [15] 李燕飞, 刘凤华, 陈元芝. 改良提上睑肌缩短术治疗成年重度先天性上睑下垂[J]. 眼科, 2018, 27(5): 362-365. doi:10.13281/j.cnki.issn.1004-4469.2018.05.009  
 LI Yanfei, LIU Fenghua, CHEN Yuanzhi. Modified shortening of levator palpebrae superioris for the treatment of severe congenital ptosis in adults[J]. *Ophthalmology in China*, 2018, 27(5): 362-365. doi: 10.13281/j.cnki.issn.1004-4469.2018.05.009
- [16] 苏旺铭, 王帝, 李燕玲. 额肌瓣悬吊术矫正先天性上睑下垂效果观察[J]. 中国医疗美容, 2021, 11(8): 37-39. doi:10.19593/j.issn.2095-0721.2021.08.008  
 SU Wangming, WANG Di, LI Yanling. Observe the effect of frontal muscle flap suspension in correcting congenital blepharoptosis[J]. *China Medical Cosmetology*, 2021, 11(8): 37-39. doi:10.19593/j.issn.2095-0721.2021.08.008
- [17] 董刚, 王菁洁. 额肌瓣悬吊术与提上睑肌缩短术在重度上睑下垂患儿中的疗效对比[J]. 山西医药杂志, 2020, 49(6): 697-699. doi:10.3969/j.issn.0253-9926.2020.06.023  
 DONG Gang, WANG Jingjie. Comparison of therapeutic effects between frontalis muscle flap suspension and levator palpebrae superioris shortening in children with severe ptosis[J]. *Shanxi Medical Journal*, 2020, 49(6): 697-699. doi:10.3969/j.issn.0253-9926.2020.06.023
- [18] 关小荣, 董永孝, 张少华, 等. 超常量提上睑肌缩短及额肌瓣悬吊治疗重度先天性上睑下垂效果比较[J]. 国际眼科杂志, 2015, 15(11): 2015-2017. doi:10.3980/j.issn.1672-5123.2015.11.50  
 GUAN Xiaorong, DONG Yongxiao, ZHANG Shaohua, et al. Efficacy comparison of severe congenital ptosis treated with excessive levator shortening and frontalis muscle flap suspension[J]. *International Eye Science*, 2015, 15(11): 2015-2017. doi: 10.3980/j.issn.1672-5123.2015.11.50
- [19] 喻静文, 张丹娜, 耿闫, 等. 先天性重度上睑下垂筋膜鞘悬吊联合上睑提肌缩短术的治疗效果[J]. 中华眼外伤职业眼病杂志, 2023, 45(3): 168-173. doi:10.3760/cma.j.cn116022-20221109-00438  
 YU Jingwen, ZHANG Danna, GENG Yan, et al. Clinical efficacy of conjoint fascial sheath suspension combined with levator muscle shortening for congenital severe blepharoptosis[J]. *Chinese Journal of Ocular Trauma and Occupational Eye Disease*, 2023, 45(3): 168-173. doi:10.3760/cma.j.cn116022-20221109-00438
- [20] Limandjaja GC, Niessen FB, Scheper RJ, et al. Hypertrophic scars and keloids; overview of the evidence and practical guide for differentiating between these abnormal

- scars[J]. *Exp Dermatol*, 2021, 30(1): 146-161. doi: 10.1111/exd.14121
- [21] 王新玲, 王建宏. 额肌瓣悬吊术与上睑提肌缩短术矫治上睑下垂疗效比较[J]. *中国美容医学*, 2019, 28(11): 36-39
- WANG Xinling, WANG Jianhong. Comparison of the effect of frontalis muscle flap suspension and levator palpebrae superioris muscle shortening in the treatment of blepharoptosis[J]. *Chinese Journal of Aesthetic Medicine*, 2019, 28(11): 36-39
- [22] Ji CY, Li RT, He W, et al. The aesthetic analyzing of midface ratio after folding aponeurosis of levator palpebrae superioris muscle in the ptosis correction [J]. *J Craniofac Surg*, 2018, 29(2): 482-485. doi:10.1097/SCS.0000000000004158
- [23] Antus Z, Salam A, Horvath E, et al. Outcomes for severe aponeurotic ptosis using posterior approach white-line advancement ptosis surgery[J]. *Eye*, 2018, 32(1): 81-86. doi:10.1038/eye.2017.128
- [24] Kumar SV, Goel S, Kumar V, et al. Surgical outcomes of tarsofrontalis sling surgery using silicon rod versus supramaximal levator resection in unilateral congenital ptosis with poor levator function [J]. *Int Ophthalmol*, 2023, 43(3): 957-964. doi: 10.1007/s10792-022-02497-x
- [25] Zhou J, Chen WL, Qi ZL, et al. Minimally invasive conjoint fascial sheath suspension for blepharoptosis correction[J]. *Aesthetic Plast Surg*, 2019, 43(4): 956-963. doi:10.1007/s00266-019-01382-w
- [26] 胡君, 彭昌福. 重睑术后要求修复单睑患者的心理状况及影响因素调查[J]. *山东大学耳鼻喉眼学报*, 2024, 38(3): 61-66. doi:10.6040/j.issn.1673-3770.0.2023.094
- HU Jun, PENG Changfu. A survey of psychological conditions and factors influencing patients requesting single-lid repair after blepharoplasty[J]. *Journal of Otolaryngology and Ophthalmology of Shandong University*, 2024, 38(3): 61-66. doi: 10.6040/j.issn.1673-3770.0.2023.094
- [27] 王燕霞, 谢静, 王葳. 先天性上睑下垂相关基础及手术方式的研究进展[J]. *齐齐哈尔医学院学报*, 2023, 44(13): 1253-1257. doi: 10.3969/j.issn.1002-1256.2023.13.012
- WANG Yanxia, XIE Jing, WANG Wei. Research progress on related basis and surgical methods for treating congenital ptosis[J]. *Journal of Qiqihar Medical University*, 2023, 44(13): 1253-1257. doi: 10.3969/j.issn.1002-1256.2023.13.012

(编辑:李纬)