

·BRIEF ARTICLES·

·短篇论著·

岛状背阔肌肌皮瓣与下斜方肌肌皮瓣修复项部皮肤软组织缺损的疗效比较

周思拓¹, 张怡坤², 曾纪章¹, 郭乐¹, 梁鹏飞¹, 张明华¹, 周捷¹, 谭鹭远², 张丕红¹

(1. 中南大学湘雅医院烧伤重建外科, 长沙 410008; 2. 中南大学湘雅医院整形美容外科, 长沙 410008)

[摘要] 目的: 项部皮肤软组织缺损常由电烧伤、肿瘤切除术后、感染或外伤等原因所致。该区域解剖结构复杂, 活动度大, 且邻近颈椎、大血管及重要神经, 缺损修复要求兼顾功能重建与外观满意。岛状背阔肌肌皮瓣因其血供恒定、切取面积大、旋转弧长, 被广泛应用于躯干及四肢的重建, 尤其是在胸背部及颈项部较大范围缺损的修复中表现出明显优势。下斜方肌肌皮瓣同样具有良好的血供基础, 且皮瓣质地适中, 蒂部相对平坦, 尤其适合修复枕部及上项部纵向分布的创面。但目前未对2种皮瓣在缺损范围、皮瓣大小、供区损伤及术后臃肿程度等方面进行比较, 尚不明确不同类型的项部缺损如何进行皮瓣选择。本研究比较2种皮瓣修复项部皮肤软组织缺损的修复面积、并发症、供区植皮需求及术后外形与功能恢复情况, 旨在为临床针对不同类型项部缺损选择合适的肌皮瓣提供参考依据。**方法:** 回顾性分析中南大学湘雅医院烧伤重建外科2010年1月至2024年12月采用岛状背阔肌肌皮瓣和下斜方肌肌皮瓣进行项部缺损修复的病例资料, 包括人口统计学、缺损原因、创面范围、修复皮瓣及其大小、供瓣区植皮情况和手术并发症等。**结果:** 6例采用背阔肌肌皮瓣修复项部皮肤软组织缺损的患者, 年龄19~65岁, 其中男5例, 女1例; 电烧伤4例, 隆突性皮肤纤维肉瘤1例, 嗜酸性肉芽肿1例; 创面大小16 cm×8 cm~26 cm×14 cm, 皮瓣大小28 cm×9 cm~35 cm×15 cm, 供瓣区植皮修复4例。5名采用下斜方肌皮瓣进行项部重建的患者, 年龄27~74岁, 其中男4例, 女1例; 电烧伤3例, 脑膜瘤术后复发侵犯枕项部皮肤软组织2例; 创面大小12 cm×6 cm~15 cm×8 cm, 皮瓣大小15 cm×7 cm~18 cm×9 cm, 供瓣区植皮修复1例。除1例老年患者术后出现低氧血症外, 其余患者无明显手术并发症。随访6~15(中位数9)个月, 所有患者均成功治愈, 颈部活动可, 有2例背阔肌肌皮瓣蒂部稍臃肿, 其余病例臃肿畸形不明显。**结论:** 岛状背阔肌肌皮瓣和下斜方肌肌皮瓣修复项部皮肤软组织缺损各有优缺点, 背阔肌肌皮瓣修复面积大, 但皮瓣蒂部容易出现臃肿; 下斜方肌肌皮瓣修复面积相对较小, 但适合修复枕项部纵向创面; 针对不同项部皮肤软组织缺损患者选择合适的组织瓣进行修复一般可取得较好的效果。

[关键词] 背阔肌肌皮瓣; 下斜方肌肌皮瓣; 项部; 组织缺损; 功能重建

Comparative efficacy of island latissimus dorsi myocutaneous flap versus lower trapezius myocutaneous flap for repair of posterior neck skin and soft tissue defects

ZHOU Situo¹, ZHANG Yikun², ZENG Jizhang¹, GUO Le¹, LIANG Pengfei¹, ZHANG Minghua¹,
ZHOU Jie¹, TAN Wuyuan², ZHANG Pihong¹

收稿日期(Date of reception): 2025-03-24

第一作者(First author): 周思拓, Email: zhousituo@aliyun.com, ORCID: 0009-0004-0788-9364; 张怡坤, Email: zhangyk0527@qq.com, ORCID: 0009-0006-7545-6450

通信作者(Corresponding author): 张丕红, 主任医师, Email: zp hong@aliyun.com, ORCID: 0000-0003-0911-148X

基金项目(Foundation item): 国家自然科学基金(81772084)。This work was supported by the National Natural Science Foundation of China (81772084).

开放获取(Open access): 本文遵循知识共享许可协议, 允许第三方用户按照署名-非商业性使用-禁止演绎4.0(CC BY-NC-ND 4.0)的方式, 在任何媒介以任何形式复制、传播本作品(<https://creativecommons.org/licenses/by-nc-nd/4.0/>)。

(1. Department of Burns and Reconstructive Surgery, Xiangya Hospital, Central South University, Changsha 410008;
2. Department of Plastic and Aesthetic Surgery, Xiangya Hospital, Central South University, Changsha 410008, China)

ABSTRACT

Objective: Posterior neck skin and soft tissue defects often result from electrical burns, post-tumor resection, infections, or trauma. The region has complex anatomy, high mobility, and proximity to the cervical spine, major vessels, and critical nerves; thus, reconstruction must balance functional restoration and aesthetic outcomes. The island latissimus dorsi myocutaneous flap, with its reliable blood supply, large harvestable area, and long rotation arc, is widely used for trunk and limb reconstruction and shows particular advantage for large defects in the thoracic, dorsal, and posterior cervical regions. The lower trapezius myocutaneous flap also has a robust vascular base, moderate flap texture, and a relatively flat pedicle, making it especially suitable for repairing longitudinal defects of the occipital and upper posterior neck. However, comparisons between these 2 flaps regarding defect coverage, flap size, donor-site morbidity, and postoperative bulkiness are lacking, and guidance for flap selection based on defect type remains unclear. This study aims to compare the defect coverage area, complications, donor site skin grafting requirements, and postoperative aesthetic and functional outcomes of the 2 flaps, to provide clinical reference for selecting appropriate myocutaneous flaps for different posterior neck defects.

Methods: We retrospectively analyzed cases from the Department of Burns and Reconstructive Surgery, Xiangya Hospital, Central South University, from January 2010 to December 2024, in which posterior neck defects were repaired using either island latissimus dorsi myocutaneous flaps or lower trapezius myocutaneous flaps. Data collected included demographics, etiology of defects, wound size, flap coverage and dimensions, donor site skin grafting, and surgical complications.

Result: Six cases (aged 19-65 years; 5 males, 1 female) received latissimus dorsi flap reconstruction: 4 electrical burns, 1 dermatofibrosarcoma protuberans, 1 eosinophilic granuloma; defect sizes 16 cm×8 cm to 26 cm×14 cm; flap sizes 28 cm×9 cm to 35 cm×15 cm; 4 required donor site skin grafting. Five patients (aged 27-74 years; 4 males, 1 female) received lower trapezius flap reconstruction: 3 electrical burns, 2 recurrent meningioma excisions affecting occipital/posterior neck skin; defect sizes 12 cm×6 cm to 15 cm×8 cm; flap sizes 15 cm×7 cm to 18 cm×9 cm; 1 required donor site grafting. Apart from 1 elderly patient who developed postoperative hypoxemia, no significant surgical complications were observed. Follow-up ranged from 6 to 15 months (median 9 months); all patients achieved successful healing with preserved neck mobility. Two latissimus dorsi flap patients had slight pedicle bulkiness; no other cases showed notable contour deformities.

Conclusion: Both island latissimus dorsi and lower trapezius myocutaneous flaps have advantages and limitations in repairing posterior neck skin and soft tissue defects. Latissimus dorsi flaps provide larger coverage but pedicles may appear bulky, whereas lower trapezius flaps offer smaller coverage but are suitable for longitudinal occipital and upper posterior neck defects. Selecting an appropriate flap based on defect characteristics generally yields satisfactory functional and aesthetic outcomes.

KEY WORDS

latissimus dorsi myocutaneous flap; lower trapezius myocutaneous flap; posterior neck; tissue defect; functional reconstruction

项部皮肤软组织在头部支撑、头颈运动、颈椎稳定和脊髓保护中起重要作用,但临床工作中偶尔可见烧伤、创伤或肿瘤切除后形成的项部组织缺损创面。该部位解剖比较复杂,深部重要组织结构较多,若不及时修复,可造成严重并发症,甚至导致患者死亡^[1-3]。Liu等^[4]提出对于项部深度创面,通常首选岛状背阔肌肌皮瓣(*latissimus dorsi musculocutaneous flap*, LDMF),次选岛状下斜方肌肌皮瓣(*lower trapezius musculocutaneous flap*, LTMF),但有关它们各自的优缺点及其临床个性化选择少见报道。中南大学湘雅医院烧伤重建外科采用个性化选择的岛状LDMF和LTMF进行项部缺损修复多例,获得较好治疗效果,现报告如下。

1 资料与方法

1.1 伦理声明

本研究获得中南大学湘雅医院伦理委员会的批准(审批号:2026060437)。所有参与者均签署了书面知情同意书。本研究遵循《赫尔辛基宣言》的原则。

1.2 资料选择

回顾性收集2010年1月至2024年12月中南大学湘雅医院烧伤重建外科收治的11例项部皮肤软组织缺损患者的临床资料。纳入标准:1)项部皮肤软组织缺损,有明确烧伤、创伤史或肿瘤侵犯,清创后或肿瘤切除后创面深达颈后区肌肉层或超过肌肉层。2)采用岛状LDMF和LTMF进行项部缺损修复。3)随访半年以上。排除标准:1)临床资料不完整;2)未配合完成随访。

1.3 手术方法

1.3.1 受区创面准备

烧伤创面清创要彻底,间生态的肌腱、神经、骨组织尽量保留,尤其注意肌束“夹心样坏死”和沿枕骨或椎体的“套袖状坏死”,必要时探查主要血管、神经受损情况;清除坏死组织后,反复用双氧水及生理盐水等冲洗。恶性肿瘤彻底根治性切除后用蒸馏水反复冲洗并湿敷创面。

1.3.2 LDMF切取

根据受区肌肉缺损情况、创面范围和方向及点、线、面、弧原则,设计以腋后襞至髂后上棘连线为轴线的LDMF,使其在足够覆盖创面的同时兼顾颈后肌群修复。按设计线在背阔肌前缘切口近端内寻找

胸背动、静脉及胸背神经,在背阔肌与前锯肌之间由外向内分离,并尽量保留腰背筋膜以利于肌肉修复。切取过程中严密结扎肋间血管穿支和腰血管分支,直至游离至胸背血管神经束进入背阔肌处,在此处近端离断背阔肌近端以减少蒂部组织量,结扎前锯肌支等胸背血管的分支,仔细分离胸背血管神经束至肩胛下血管分叉处,以此处为旋转点,检查皮瓣血运。一般情况下,胸背动脉的内、外侧支均需包含在肌皮瓣内,若创面窄长也可只切取胸背动脉外侧支营养的肌皮瓣。

1.3.3 LTMF切取

同样依照受区肌肉缺损、创面部位和大小及点、线、面、弧原则,设计切取远端达肩胛下角下方15~17 cm水平的LTMF。切开皮瓣远端,沿斜方肌深面自下向上分离,切断起自胸椎棘突部的斜方肌腱膜,将斜方肌或其腱膜缝合固定于肌皮瓣边缘皮肤,避免分离撕脱。结扎、切断肋间后动脉的肌支和胸椎棘旁穿支,在后正中线和肩胛骨内侧缘之间的中线上保留约3 cm宽的蒂部皮肤和肌肉,窄蒂长度视受区创面位置与大小而定,向上分离找到在肩胛上角内侧从小菱形肌和大菱形肌之间发出的颈横动脉降支并确保其进入蒂部,一般以此为旋转点。如有需要,可适当向近心端分离蒂部血管以增加修复范围,但需注意保留斜方肌的上三分之一以维持肩部稳定。修复同类型缺损,LTMF的手术时间较LDMF略短,出血量较少,但同时也受术中诸多因素(如助手协助熟练度及解剖变异等)影响。

1.3.4 肌皮瓣转移

肌皮瓣切取后以明道或暗道转位至项部创面,确保蒂部血管无受压扭曲、肌皮瓣可无张力覆盖缺损后,将肌瓣与创面边缘肌肉或筋膜组织缝合,并保持肌肉足够张力,然后缝合切口,置放引流。术后包扎和制动固定时,注意勿使蒂部受压扭转。供区尽量直接拉拢缝合,不能直接拉拢缝合者取中厚皮植皮修复并加压包扎。

1.4 术后处理

术后常规行抗炎、保温等治疗,颈部制动,患侧背部垫高,手术区适当悬空,并密切观察皮瓣血运和病情变化。适时换药,拔除引流管。后期在康复治疗师指导下有序进行功能锻炼,术后1周开始辅助轻微主动活动,术后第10~14天依据情况拆除伤口缝线后出院,嘱患者术后3~4周有限度行颈部主动运

动,逐渐加强。大范围植皮患者同时积极行弹力套加压、外涂药物等抗瘢痕治疗。

1.5 术后随访

术后1、3、6、12个月定期随访,观察术区外观和瘢痕情况,指导功能锻炼和抗瘢痕治疗,并进行量表评分。随访6~12个月时,测量头颈部活动度,并进行患者满意度评价。

1.6 统计学处理

采用SPSS 17.0统计学软件进行数据分析。采用Shapiro-Wilk法进行正态性检验,Levene检验方差齐性。非正态分布的计量数据以中位数(第1四分位数,第3四分位数)表示,2组比较采用Wilcoxon秩和检验, $P<0.05$ 为差异具有统计学意义。

2 结果

2.1 一般情况

6例采用LDMF修复项部缺损的患者,年龄19~65岁;其中男5例,女1例,电烧伤4例,隆突性皮肤纤维肉瘤1例,嗜酸性肉芽肿并皮肤溃疡1例;创面大小 $16\text{ cm}\times 8\text{ cm}\sim 26\text{ cm}\times 14\text{ cm}$,皮瓣大小 $28\text{ cm}\times 9\text{ cm}\sim 35\text{ cm}\times 15\text{ cm}$,供瓣区植皮修复4例。

5例采用LTMF进行项部重建的患者,年龄27~

74岁,其中男4例,女1例;电烧伤3例,脑膜瘤术后复发侵犯枕项部皮肤软组织2例;创面大小 $12\text{ cm}\times 6\text{ cm}\sim 15\text{ cm}\times 8\text{ cm}$,皮瓣大小 $15\text{ cm}\times 7\text{ cm}\sim 18\text{ cm}\times 9\text{ cm}$;供瓣区植皮修复1例。

除1例LTMF修复的老年患者术后出现低氧血症外,其余患者均无严重手术并发症。另LDMF和LTMF修复患者供瓣区植皮成活欠佳各1例,换药处理后取刃厚皮补充植皮,创面愈合。嗜酸性肉芽肿患者创面愈合后转肿瘤科行局部放射等治疗。

2.2 随访情况

随访6~15个月(平均9个月),11例患者均成功治愈,皮瓣颜色和质地与周围组织接近,颈部前屈、后仰、侧屈、旋转活动可。2例LDMF蒂部稍臃肿,其余病例臃肿畸形不明显;供瓣区直接拉拢缝合者遗留线性瘢痕,供瓣区植皮者局部质地柔软,色素较深,但不影响整体外观。11例患者均对治疗效果满意。围手术期指标:LTMF组手术时间更短、出血量更少、住院时间更短,但2组差异均无统计学意义(均 $P>0.05$,表1)。随访指标:LTMF组瘢痕评分更低(瘢痕更轻),差异无统计学意义($P>0.05$,表1)。功能评分:2组均恢复良好,差异无统计学意义($P>0.05$,表1)。总体疗效:11例均治愈,皮瓣成活良好,颈部活动满意;2例LDMF蒂部稍臃肿,供瓣区外观可接受;患者满意度100%。

表1 LDMF和LTMF组围手术期及术后随访情况

Table 1 Perioperative and postoperative follow-up data of the LDMF and LTMF groups

组别	<i>n</i>	手术时间/min	出血量/mL	住院时间/d	瘢痕评分	功能评分
LDMF组	6	154.0(135.5, 164.8)	140.0(105.0, 79.3)	16.5(13.5, 19.0)	4.8(3.8, 5.9)	9.0(7.8, 9.6)
LTMF组	5	132.0(117.0, 153.0)	110.0(82.5, 159.5)	15.0(11.0, 18.0)	4.0(2.5, 5.3)	9.0(8.3, 9.8)
<i>Z</i>		-1.282	-0.917	-0.921	-1.014	-0.551
<i>P</i>		0.200	0.359	0.357	0.311	0.582

非正态分布的计量数据以中位数(第1四分位数,第3四分位数)表示,比较采用秩和检验。

2.3 典型病例

病例1,男,21岁,万伏高压电烧伤项部、左手和双下肢6 h入院。体格检查:颈项部、左手和双下肢可见电烧伤创面,项部可见浅层肌肉坏死和缺损,创面大小约 $25\text{ cm}\times 13\text{ cm}$,左手拇指背、食指末节和中指中末节可见焦痂创面,右膝下部、双踝和足背可见大片焦痂创面,右小腿肿胀明显,双侧足背动

脉搏动未扪及,双足皮温低,趾端未见毛细血管充盈。急诊行双下肢筋膜切开减压术,积极补液、抗感染等治疗。伤后第3天全麻下侧卧位手术,彻底清除项部坏死组织,见颈后浅层肌群(斜方肌、夹肌、肩胛提肌和部分竖脊肌)坏死,以右侧项部肌肉缺损较多,清创后创面大小约 $26\text{ cm}\times 14\text{ cm}$,形状从左肩斜向右侧耳后。切取左侧岛状LTMF,肌皮瓣大小

35 cm×15 cm, 单纯血管蒂长约9 cm, 腋前分离隧道, 将肌皮瓣无张力转向项部, 缝合肌层修复项部创面, 置放引流。供瓣区于大腿外侧取中厚皮移植修复。后续行肢体创面手术。术后皮瓣成活, 供瓣区皮片生长良好。1年后随访, 项部活动基本正常, 皮瓣臃肿不明显, 供瓣区植皮处瘢痕柔软, 但色素较深, 患者满意(图1)。

病例2, 男, 74岁, 因脑膜瘤术后23年、枕项部皮肤肿物复发1年入院。患者23年前因颅内占位行手术治疗, 病理报告为脑膜瘤, 后因肿瘤复发又行开颅手术6次, 伽马刀治疗4次, 并多次行放射治疗。体格检查: 枕项部可见大小约10 cm×7 cm肿块, 明显凸起, 质硬有触痛, 移动度差。术前准备完善

后在全麻下手术, 肿块深达枕骨大孔和寰椎, 累及颈后绝大部分肌群, 包括斜方肌、夹肌、肩胛提肌、竖脊肌、半棘肌和部分椎枕肌, 一并切除后遗留创面15 cm×8 cm。设计并切取左侧岛状下斜方肌肌皮瓣, 大小约18 cm×8 cm, 其中窄蒂长约12 cm。将肌皮瓣无张力横向插入项部, 缝合肌层修复项部创面, 置放引流管。供瓣区直接拉拢缝合。术后第2天出现低氧血症, 氧饱和度一过性降至70%, 氧分压下降至80 mmHg(1 mmHg=0.133 kPa), 经气道抽吸、镇静止痛和呼吸支持治疗2 d后明显好转。术后皮瓣成活, 切口愈合后出院。术后病理报告: (枕顶部)非典型脑膜瘤, WHO2级。1年后随访, 项部活动基本正常, 皮瓣无臃肿畸形, 患者满意(图2)。



图1 LDMF岛状转移修复项部电烧伤创面

Figure 1 LDMF transfer for reconstruction of an electrical burn wound in the nuchal region

A: Preoperative wound condition. B: Wound condition after debridement. C: Posterior view at 1 year postoperatively. D: Left posterior view at 1 year postoperatively. E: Donor site condition at 1 year postoperatively. LDMF: Latissimus dorsi musculocutaneous flap.



图2 LTMF岛状转移修复项部肿瘤切除后创面

Figure 2 LTMF transfer for reconstruction of a nuchal defect following tumor resection

A: Preoperative appearance of the nuchal tumor. B: Preoperative MRI of the tumor. C: Wound condition after tumor resection. D: Intraoperative harvesting of the LTMF. E: Intraoperative view after myocutaneous flap transfer. F: Right posterior view at 1 year postoperatively. G: Posterior view at 1 year postoperatively. H: Left posterior view at 1 year postoperatively. LTMF: Lower trapezius musculocutaneous flap.

3 讨 论

项部深度创面在临床上相对少见,但偶尔遇到因烧(创)伤、感染或肿瘤切除后等原因所致的项部皮肤软组织缺损创面^[3-4]。该部位肌肉丰厚,深部有枕动脉、椎动脉、颈丛、臂丛和颈椎等重要结构,这些结构一旦遭受破坏必将出现严重并发症及后遗症^[5]。同时,颈后肌群对头颈灵活运动、头部支撑、颈椎稳定及脊髓保护有举足轻重的作用,对这些累及肌群的项部深度创面,需尽早积极修复^[5-8],特别是合并多处创面(如电烧伤)时,优先修复项部有利于后续治疗和护理。血供丰富的肌皮瓣非常适合覆盖这些伴有肌肉缺损的项部创面,一方面由于其具有较好的生物清除作用可挽救脊柱及其侧面的间生态腱性结构和韧带等组织,另一方面利用肌肉组织可在一定程度上重建项部缺损肌肉功能^[9]。

本组伴有肌肉缺损的项部创面11例,其中电烧伤7例,肿瘤切除后创面3例,嗜酸性肉芽肿并皮肤溃疡1例;采用LDMF修复6例,LTMF修复5例。相比之下,LDMF较LTMF切取面积稍大,修复的创面也较大。但是,LTMF非常适合顶枕部的头部创面修复,特别是一些开颅术后难愈性创面,最远可达枕外粗隆以上^[1,10-11]。尽管研究^[12]报道LTMF可通过保留与肋间后动脉分支间的吻合血管,切取一些边缘的背阔肌,从而扩展LTMF宽度或在延长LTMF的缺乏斜方肌的远端部分携带少量背阔肌来填塞受区的无效腔和覆盖重要结构,但为了减轻损伤,此法临床应用较少。因腰背部皮肤移动性有限,供瓣区能直接拉拢缝合的皮瓣切取宽度一般需<9或10 cm^[13-14]。考虑腰背部植皮外观和功能影响较项部植皮小,本组病例均未在项部受区植皮。LDMF供瓣区植皮修复有4例,LTMF供瓣区植皮修复有1例。2例供瓣区植皮成活欠佳者均发生在脊柱旁,可能与此处仰卧位时受压明显、术后制动和体位护理困难有关。此外,胸背动脉穿入背阔肌处距离其起始处大约9 cm,尽管近端的背阔肌组织不携带血管,但为了避免转移到项部后肌皮瓣近端张力过高,需切取一定宽度的超出创面范围的近端组织,从而容易形成局部臃肿畸形,需后期修薄^[15-16]。本组有2例LDMF蒂部稍臃肿,但均未接受修整手术。随访发现LDMF和LTMF岛状转移修复伴有肌肉缺损的项部创面后不仅皮瓣颜色和质地与周围组织接近,颈部前屈、后仰、侧屈、旋转活动均大致满意,包括肿瘤切除后颈后肌群绝大部分缺损的典型病例2,说明这

2种肌皮瓣均能较好地替代颈后肌群,可在一定程度上恢复项部肌肉功能。

本组1例LTMF修复的老年患者术后出现低氧血症,可能与患者术区疼痛不能主动咳嗽排痰或精神紧张致气道痉挛有关。幸运的是,术后严密观察、及时发现、妥善处理(经气道抽吸、镇静止痛和呼吸支持治疗)后短期即明显好转,未出现明显肺部感染和缺氧性损害等严重并发症。对于项部肌肉大部分缺损修复术后患者,如何摆放体位或使用颈托等外固定,进行局部制动的同时保证患者的呼吸道通畅,尚需不断摸索。另外,这些颈项部手术术后容易形成血肿,影响呼吸甚至导致窒息,应予高度重视,密切观察;当然,术后严密观察皮瓣血运也极其重要,避免皮瓣受压,特别是蒂部,如有血管危象情况发生,应妥善处理,必要时手术探查^[17-18]。本组11例均未出现血管危象,皮瓣成活良好。

LDMF和LTMF岛状转移修复项部皮肤软组织缺损创面,特别是伴有肌肉缺损时,符合移植物相似替代原则^[19-20],颜色、质地、大小和厚度均比较匹配。相比之下,背阔肌肌皮瓣修复面积大,目前最大可修复约26 cm×14 cm大小创面,但该方式目前也存在一定缺陷,例如皮瓣蒂部容易出现臃肿,患者平卧可有不适感,但随访患者术后2年左右不适感基本消失;下斜方肌皮瓣修复面积相对较小,但对修复靠近项部的长纵形创面有得天独厚的优势,修复后外形较满意。综上所述,若项部创面较大且靠近一侧肩颈则可优先选择LDMF,如果项部缺损为长条形且宽度在9 cm内则可优先选择LTMF。针对不同项部皮肤软组织缺损情况选择合适的组织瓣进行修复,一般可取得较好的效果。

作者贡献声明: 周思拓 实验构思与设计,数据采集、分析及解释,论文撰写;张怡坤 实验构思和设计,研究实施,数据采集,论文撰写;曾纪章 数据采集、分析及解释,论文撰写;郭乐、张明华、周捷、谭骛远 数据采集,论文撰写;梁鹏飞 研究实施,数据采集,论文撰写;张丕红 论文修改与审阅。所有作者阅读并同意最终的文本。

利益冲突声明: 作者声称无任何利益冲突。

参考文献

- [1] 吴清晨,胡海琴,叶秀珍.头颈部肿瘤患者皮瓣移植修复术后皮瓣坏死的影响因素分析[J].浙江临床医学,2024,26(9):1350-1351.

- WU Qingchen, HU Haiqin, YE Xiuzhen. Analysis of influencing factors of skin flap necrosis after skin flap transplantation in patients with head and neck tumor[J]. *Zhejiang Clinical Medical Journal*, 2024, 26(9): 1350-1351.
- [2] 张家平, 张警泓. 理念与技术相互促进, 引领面颈部美学修复重建的发展[J]. *中国美容整形外科杂志*, 2023, 34(7): 385-387. <https://doi.org/10.3969/j.issn.1673-7040.2023.07.001>.
- ZHANG Jiaping, ZHANG Jinghong. Mutual promoting of concepts and technologies lead the way to developments of faciocervical aesthetic restoration[J]. *Chinese Journal of Aesthetic and Plastic Surgery*, 2023, 34(7): 385-387. <https://doi.org/10.3969/j.issn.1673-7040.2023.07.001>.
- [3] 王磊, 李养群, 唐勇, 等. 下斜方肌肌皮瓣修复枕颈部恶性肿瘤切除后创面的临床效果[J]. *中华肿瘤杂志*, 2019, 41(8): 621-624.
- WANG Lei, LI Yangqun, TANG Yong, et al. Clinical effects of lower trapezius myocutaneous flap in repairing wounds after resection of malignant tumor in occipital and nuchal region[J]. *Chinese Journal of Oncology*, 2019, 41(8): 621-624.
- [4] Lin C, Lin C, Chen Y, et al. Reconstruction of deep posterior neck burns with pedicled latissimus dorsi musculocutaneous flap: a single-center experience[J]. *Burns*, 2020, 46(5): 1185-1191. <https://doi.org/10.1016/j.burns.2020.01.014>.
- [5] 杜伟力, 沈余明, 陈忠, 等. 多部位电烧伤毁损性创面修复方法的探讨[J/OL]. *中华损伤与修复杂志(电子版)*, 2024, 19(2): 99-105[2025-01-31]. <https://doi.org/10.3877/cma.j.issn.1673-9450.2024.02.002>.
- DU Weili, SHEN Yuming, CHEN Zhong, et al. Study on the repair of destructive wounds caused by multi-site electrical burns[J/OL]. *Chinese Journal of Injury Repair and Wound Healing. Electronic Edition*, 2024, 19(2): 99-105[2025-01-31]. <https://doi.org/10.3877/cma.j.issn.1673-9450.2024.02.002>.
- [6] Xie T, Wang M, Zang M, et al. Inclusion of a latissimus dorsi segment in an extended lower trapezius musculocutaneous flap facilitates complex defect reconstruction[J]. *J Plast Reconstr Aesthetic Surg*, 2022, 75(9): 3155-3165. <https://doi.org/10.1016/j.bjps.2022.04.053>.
- [7] 余明薇, 王慙, 王倩, 等. 低位背阔肌肌皮瓣在肩背部及上肢软组织深度缺损修复中的应用[J]. *组织工程与重建外科杂志*, 2022, 18(2): 111-114. <https://doi.org/10.3969/j.issn.1673-0364.2022.02.005>.
- YU Mingwei, WANG Min, WANG Qian, et al. Application of low skin paddle pedicled latissimus dorsi myocutaneous flap in repairing the deep soft tissue defect of the shoulder, back and upper limb[J]. *Journal of Tissue Engineering and Reconstructive Surgery*, 2022, 18(2): 111-114. <https://doi.org/10.3969/j.issn.1673-0364.2022.02.005>.
- [8] Zenga J, Sharon JD, Santiago P, et al. Lower trapezius flap for reconstruction of posterior scalp and neck defects after complex occipital-cervical surgeries[J]. *J Neurol Surg B Skull Base*, 2015, 76(5): 397-408. <https://doi.org/10.1055/s-0034-1544123>.
- [9] 薛晓东, 邓津菊, 刘建云, 等. 岛状上斜方肌肌皮瓣修复颌颈部高压电烧伤七例[J]. *中华烧伤杂志*, 2005, 21(4): 300-301. <https://doi.org/10.3760/cma.j.issn.1009-2587.2005.04.026>.
- XUE Xiaodong, DENG Jinju, LIU Jianyun, et al. Island upper trapezius myocutaneous flap for repairing high-voltage electrical burns in the maxillofacial, cervical and nuchal region: report of 7 cases[J]. *Chinese Journal of Burns*, 2005, 21(4): 300-301. <https://doi.org/10.3760/cma.j.issn.1009-2587.2005.04.026>.
- [10] 谢婷璐, 刘元波, 韩婷璐, 等. 远端携带一部分背阔肌的下位斜方肌肌皮瓣手术设计和初步临床应用[J]. *中国修复重建外科杂志*, 2021, 35(3): 349-355. <https://doi.org/10.7507/1002-1892.202009114>.
- XIE Tingjun, LIU Yuanbo, HAN Tinglu, et al. Flap design and preliminary clinical experience of the lower trapezius musculocutaneous flap carrying a portion of the latissimus dorsi muscle[J]. *Chinese Journal of Reparative and Reconstructive Surgery*, 2021, 35(3): 349-355. <https://doi.org/10.7507/1002-1892.202009114>.
- [11] 苏文玲, 赵德安. 游离前臂桡侧皮瓣重建头颈肿瘤术后缺损[J]. *中南大学学报(医学版)*, 2015, 40(10): 1121-1125. <https://doi.org/10.11817/j.issn.1672-7347.2015.10.011>.
- SU Wenling, ZHAO De'an. Free radial forearm flap for reconstruction of head and neck soft tissue defects after tumor resection[J]. *Journal of Central South University. Medical Science*, 2015, 40(10): 1121-1125. <https://doi.org/10.11817/j.issn.1672-7347.2015.10.011>.
- [12] 徐建洪, 刘玉杰, 刘媛媛. 带蒂肌皮瓣修复颈部深度高压电烧伤的效果(附9例分析)[J]. *青岛大学学报(医学版)*, 2020, 56(1): 98-100. <https://doi.org/10.11712/jms.2096-5532.2020.56.016>.
- XU Jianhong, LIU Yujie, LIU Yuanyuan. Effect of pedicled myocutaneous flap in repairing deep high-voltage electrical burns of the neck: an analysis of 9 cases[J]. *Journal of Qingdao University. Medical Sciences*, 2020, 56(1): 98-100. <https://doi.org/10.11712/jms.2096-5532.2020.56.016>.
- [13] Karimi H, Akhoondinasab MR, Kazem-Zadeh J, et al. Comparison of the results of early flap coverage with late flap coverage in high-voltage electrical injury[J/OL]. *J Burn Care Res*, 2017, 38(2): e568-e573[2025-02-02]. <https://doi.org/10.1097/BCR.0000000000000422>.
- [14] Lee NH, Seo DH, Roh SG, et al. Free flap reconstruction of a challenging defect in the posterior cervicthoracic region using the transverse cervical artery[J]. *Arch Hand Microsurg*, 2020, 25(4): 314-319. <https://doi.org/10.12790/ahm.20.0059>.
- [15] 徐祥, 李涛, 陈振兵, 等. 应用超薄皮瓣技术改进胸背动脉穿支皮瓣的修复效果[J]. *中华显微外科杂志*, 2017, 40(5): 438-440. <https://doi.org/10.3760/cma.j.issn.1001-2036.2017.05.006>.
- XU Xiang, LI Tao, CHEN Zhenbing, et al. Improving the repairing effect of thoracodorsal artery perforator flap through ultra-thin flap technology[J]. *Chinese Journal of Microsurgery*,

- 2017, 40(5): 438-440. <https://doi.org/10.3760/cma.j.issn.1001-2036.2017.05.006>.
- [16] 庞有明, 李武. 皮瓣修薄法在股前外侧皮瓣游离移植重建血运后的应用[J]. 实用手外科杂志, 2017, 31(2): 202-204. <https://doi.org/10.3969/j.issn.1671-2722.2017.02.022>.
PANG Youming, LI Wu. The application of thin flap repairing method after revascularization in femoral anterolateral free flap [J]. Journal of Practical Hand Surgery, 2017, 31(2): 202-204. <https://doi.org/10.3969/j.issn.1671-2722.2017.02.022>.
- [17] Singh M, Rios Diaz AJ, Cauley R, et al. Use of pedicled trapezius myocutaneous flap for posterior skull reconstruction [J/OL]. J Craniofac Surg, 2015, 26(6): e532-e535[2025-02-03]. <https://doi.org/10.1097/SCS.0000000000002033>.
- [18] 覃凤均, 陈旭, 陈忠, 等. 头部电烧伤合并颅骨全层坏死、缺损八例的治疗总结[J/OL]. 中华损伤与修复杂志(电子版), 2013, 8(6): 42-44[2025-01-30]. <https://doi.org/10.3877/cma.j.issn.1673-9450.2013.06.012>.
QIN Fengjun, CHEN Xu, CHEN Zhong, et al. Treatment summary of 8 cases of electrical scalp burns complicated with full-thickness necrosis and defect of the skull[J/OL]. Chinese Journal of Injury Repair and Wound Healing. Electronic Edition, 2013, 8(6): 42-44[2025-01-30]. <https://doi.org/10.3877/cma.j.issn.1673-9450.2013.06.012>.
- [19] 沈余明. 烧伤科医师应进一步加强对皮瓣的研究[J/OL]. 中华损伤与修复杂志(电子版), 2020, 15(4): 275-280[2025-02-01]. <https://doi.org/10.3877/cma.j.issn.1673-9450.2020.04.008>.
SHEN Yuming. Burn surgeons should further strengthen the study of skin flap[J/OL]. Chinese Journal of Injury Repair and Wound Healing. Electronic Edition, 2020, 15(4): 275-280[2025-02-01]. <https://doi.org/10.3877/cma.j.issn.1673-9450.2020.04.008>.
- [20] 韩岩. 重度组织缺损的修复[J]. 中华整形外科杂志, 2020, 36(3): 221-230. <https://doi.org/10.3760/cma.j.cn114453-20200312-00138>.
HAN Yan. Reconstruction of severe tissue defect[J]. Chinese Journal of Plastic Surgery, 2020, 36(3): 221-230. <https://doi.org/10.3760/cma.j.cn114453-20200312-00138>.

(责任编辑 彭敏宁)