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渐进性肌肉放松训练对下肢骨折术后早期康复的影响

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[摘要] 目的: 探讨渐进性肌肉放松训练(progressive muscle relaxation training, PMRT)对下肢骨折术后康复的影响。方法: 前瞻性纳入下肢胫腓骨骨折患者120例, 随机分为PMRT组和对照组, 各60例。2组均实施手术复位固定, 术后对照组给予常规治疗护理, PMRT组在常规治疗护理基础上接受PMRT, 每天2次, 每次30 min。对比干预前、干预1周后, 采用Zung焦虑自评量表(Self-rating Anxiety Scale, SAS)评估患者焦虑状况, 采用视觉模拟评分法(Visual Analogue Scale, VAS)评估患者疼痛状况, 对比2组术后开始患肢肌肉舒缩活动的时间和术后补救性镇痛比例, 通过测量患肢周径评估患者术后肢体肿胀程度。结果: 干预前, 2组一般资料、术前SAS、VAS疼痛评分和患肢周径差异无统计学意义($P>0.05$)。干预后, PMRT组SAS评分(30.8 ± 4.1 vs 33.5 ± 4.7 , $t=3.353$, $P=0.001$)和VAS疼痛评分(3.1 ± 1.4 vs 3.9 ± 1.7 , $t=2.814$, $P=0.006$)显著小于对照组, 开始患肢肌肉舒缩活动的时间[(21.8 ± 7.5) h vs (25.4 ± 8.2) h, $t=2.509$, $P=0.013$]显著早于对照组, 补救性镇痛比例(18.3% vs 36.7% , $\chi^2=5.057$, $P=0.025$)显著低于对照组, 患肢周径[(37.4 ± 1.8) cm vs (38.3 ± 2.1) cm, $t=2.521$, $P=0.013$]差异小于对照组。结论: PMRT可以减轻下肢骨折术后焦虑、疼痛症状, 改善患肢肿胀程度, 为术后早期功能锻炼创造有利条件, 有助于术后康复。

[关键词] 渐进性肌肉放松训练; 下肢骨折; 胫腓骨骨折

Effect of progressive muscle relaxation training on postoperative rehabilitation of lower extremity fracture

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Abstract **Objective:** To explore the effect of Progressive muscle relaxation training (PMRT) on the postoperative rehabilitation of lower limb fracture. **Methods:** One hundred and twenty patients with tibia and fibula fracture were randomly divided into a PMRT group and a control group ($n=60$ in each group). The 2 groups were all performed surgical reduction and fixation. After the operation, the control group received routine treatment and nursing. Group PMRT received PMRT on the basis of conventional treatment, 2 times a day, 30 min each time. The anxiety state was assessed by Zung Self-rating Anxiety Scale (SAS). The level of pain was measured by Visual

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Analogue Scale (VAS). The time of starting muscle relaxation and remedial action after the operation and the proportion of postoperative remedial analgesia were compared between the 2 groups. The degree of limb swelling after surgery was assessed by measuring the circumferential diameter of the affected limb. **Results:** Before the intervention, there was no statistical significance between the 2 groups of general data, preoperative SAS, VAS pain scores and circumferential limb diameter ($P>0.05$). The SAS score (30.8 ± 4.1 vs 33.5 ± 4.7 , $t=3.353$, $P=0.001$) and VAS pain score (3.1 ± 1.4 vs 3.9 ± 1.7 , $t=2.814$, $P=0.006$) in the PMRT group were significantly lower than those in the control group. The time of starting limb muscle contractions [(21.8 ± 7.5) h vs (25.4 ± 8.2) h, $t=2.509$, $P=0.013$] in the PMRT group was significantly earlier than that in the control group. The remedial analgesic ratio (18.3% vs 36.7% , $\chi^2=5.057$, $P=0.025$) in the PMRT group was significantly lower than that in the control group. The limb circumference [(37.4 ± 1.8) cm vs (38.3 ± 2.1) cm, $t=2.521$, $P=0.013$] in the PMRT group were less than that in the control group. **Conclusion:** PMRT can reduce the postoperative anxiety and pain symptoms, improve the swelling degree of the affected limb, create favorable conditions for early postoperative functional exercise, and contribute to postoperative rehabilitation.

Keywords progressive muscle relaxation training; lower extremity fracture; tibia and fibula fracture

骨折术后疼痛、焦虑症状既增加患者身心痛苦, 又制约术后早期功能锻炼, 并影响骨折康复^[1-2]。因此, 减轻术后疼痛、缓解焦虑负性情绪对促进骨折术后康复具有积极临床意义^[3-4]。前期研究^[5-6]显示: 渐进性肌肉放松训练(progressive muscle relaxation training, PMRT)对减轻多种疾病相关的急慢性疼痛、改善疾病相关焦虑抑郁情绪、提高生理功能具有一定临床应用价值, 但在骨折中缺乏系统性研究。笔者认为PMRT与骨折术后强调早期进行患处肌肉舒缩活动具有类似之处, 可能有助于促进血液循环、消除炎症水肿。本研究以下肢胫腓骨骨折患者为研究对象, 探讨PMRT对术后疼痛、焦虑和患肢周径的影响。

1 资料与方法

1.1 资料

前瞻性纳入2017年1月至12月解放军福州总医院骨科收治的120例下肢胫腓骨骨折患者。其中男86例、女34例, 年龄21~52(36.2 ± 13.1)岁。纳入标准: 1)单侧下肢胫腓骨骨折; 2)年龄18~60岁; 3)实施手术复位带锁髓内钉内固定术。排除标准: 1)非手术切开复位固定者; 2)接受体外冲击波、中药治疗可能干扰本研究者; 3)病理性骨折或不稳定性骨折者; 4)伴有下肢血管或软组织疾病者; 5)存在明确精神、心理障碍者; 6)伴有下肢血管或软组织疾病者; 7)病变累及膝关节或膝上; 8)韧带、肌肉或软组织断裂者; 9)合并全身重要脏器功能障碍者; 10)其他可能干扰本研究结果

者。患者按随机数字表法随机分为对照组($n=60$)和PMRT组($n=60$), 2组采用相同的麻醉和手术方式, 2组在性别、年龄、骨折部位、类型、术中指标等一般资料方面差异无统计学意义($P>0.05$, 表1)。本研究经医学伦理委员会批准(批号: L2016-47), 取得患者知情同意。

1.2 干预方式

对照组行常规治疗护理, 包括: 1)加强健康宣教与心理指导, 消除患者紧张恐惧心理, 取得理解与支持; 2)术后冰敷、抬高患肢; 3)术后逐步给予进水、进食; 4)严密观察患肢血运情况; 5)术后常规给予口服非甾体类药物镇痛, 镇痛效果不佳时给予弱阿片类药物口服补救镇痛; 6)术后早期功能锻炼: 术后1~2周内炎症水肿期以患肢肌肉舒缩活动为主, 鼓励患者术后在疼痛可以忍受的情况下尽早开始。

PMRT组在常规治疗护理基础上, 在生物反馈仪监测下给予PMRT。训练前告知临床意义、操作流程和要领, 指导全身心投入训练, 注意仔细体会放松感受。训练前排空小便, 平卧休息10 min, 安静状态下根据中华医学会音像出版社制作的自我放松教程进行PMRT, 在研究者指导下逐步掌握训练步骤和方法。按照手、前臂、上臂、肩部、颈部、头面部、胸腹和腿部顺序将全身肌群依次训练, 首先紧张一个部位的肌肉并注意仔细体会这种紧张感, 保持该紧张感10 s, 然后放松5~10 s, 体验放松时肌肉的感觉。训练期间, 以生物反馈仪记录放松前后肌电, 通过肌肉紧张与放

松时肌电水平有无显著变化来评判患者是否达到PMRT效果, 并以此纠正不准确的训练方式, 指导患者掌握PMRT要领。住院期间, 每天下午13时和晚上20时分别进行1次PMRT, 每次30 min。

1.3 观察指标

1.3.1 焦虑评分

采用焦虑自评量表(Self-rating Depression Scale, SAS)评估干预前、后患者焦虑状况, 该量表为华裔教授Zung于1971年研制编写, 用于评估近1周内焦虑水平, 共分20个条目, 每个条目采用4级评分, 各条目得分相加之和为粗分, 再根据公式转换成标准分。国内常模标准分50分为分界值, >50分表示存在焦虑。SAS量表具有较好的信度和效度, 是目前临床普遍常用的焦虑自评工具^[7]。

1.3.2 疼痛评分

参照文献[8], 采用视觉模拟评分法(Visual Analogue Scale, VAS)评估干预前、后活动患肢时疼痛情况, 该评分法使用一个0~10 cm的游动标尺, 患者在标尺上选择代表疼痛程度的刻度, 其

中0代表无痛, 10代表难以忍受的最剧烈的疼痛。

1.3.3 补救性镇痛比例

术后常规给予相同的口服非甾体类药物镇痛, 如镇痛效果不佳出现无法忍受的疼痛, 再给予弱阿片类镇痛药物口服补救镇痛, 计算: 补救性镇痛比例=补救性镇痛例数/该组总例数×100%。

1.3.4 患肢周径

测量干预前、后患肢周径。测量时患者取仰卧位, 屈曲膝关节, 放松下肢, 使腓肠肌稍与床面分离, 用刻度卷尺在膝关节下方10 cm所处平面环绕1周, 读出并记录为患肢周径。

1.3.5 患肢肌肉舒缩活动开始时间

鼓励患者术后在疼痛可以忍受的情况下尽早开始, 记录2组患者术后患肢肌肉舒缩活动的开始时间。

1.4 统计学处理

使用SPSS 18.0统计软件进行分析, 计量资料采用均数±标准差($\bar{x}\pm s$)表示, 组间比较采用 t 检验; 计数资料采用例数或百分比表示, 组间比较采用卡方检验, $P<0.05$ 为差异具有统计学意义。

表1 2组下肢骨折患者一般资料比较($n=60$)

Table 1 Comparison of general data of patients with lower limb fractures in the two groups ($n=60$)

参数	对照组	PMRT组	t/χ^2	P
性别			0.657	0.418
男	41	45		
女	19	15		
年龄/岁	35.7 ± 12.4	36.9 ± 12.8	0.522	0.603
骨折部位			0.853	0.356
左侧	37	32		
右侧	23	28		
骨折类型			1.087	0.297
闭合性骨折	47	42		
小伤口开放性骨折	13	18		
手术时间/min	80.5 ± 15.3	84.5 ± 14.5	1.470	0.144
术中出血量/mL	120.5 ± 50.2	118.6 ± 48.5	0.211	0.833
术前焦虑评分	58.7 ± 5.2	58.3 ± 5.1	0.425	0.671
术前疼痛评分	8.3 ± 1.5	8.5 ± 1.7	0.683	0.496
术前患肢周径/cm	41.2 ± 2.5	41.9 ± 2.6	1.503	0.135

2 结果

2.1 2组术后焦虑和疼痛评分比较

干预后, PMRT组焦虑评分(30.8 ± 4.1 vs 33.5 ± 4.7 , $t = -3.353$, $P = 0.001$)和疼痛评分(3.1 ± 1.4 vs 3.9 ± 1.7 , $t = -2.814$, $P = 0.006$)均显著低于对照组, 差异均具有统计学意义($P < 0.01$, 图1)。

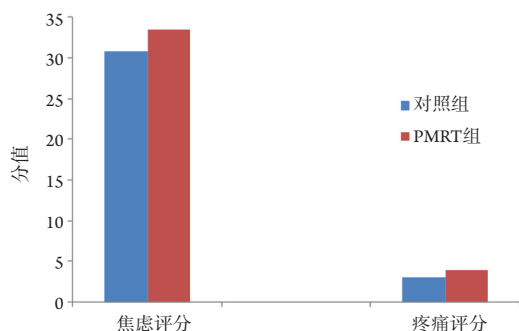


图1 2组下肢骨折患者干预后焦虑、疼痛评分比较

Figure 1 Comparison of anxiety and pain scores of patients with lower limb fracture after intervention in the two groups

2.2 2组术后患肢肌肉舒缩活动开始时间、补救性镇痛比例和患肢周径比较

术后, PMRT组患肢肌肉舒缩活动开始时间显著早于对照组, 补救性镇痛比例显著低于对照组, 患肢周径差异小于对照组, 差异均具有统计学意义($P < 0.05$, 表2)。

表2 2组下肢骨折患者术后患肢肌肉舒缩活动开始时间、补救性镇痛比例、患肢周径比较($n=60$, $\bar{x} \pm s$)

Table 2 Comparison of onset time of limb muscles, remedial analgesia rate and limb circumference in patients with lower limb fracture after operation in the two groups ($n=60$, $\bar{x} \pm s$)

组别	患肢肌肉舒缩活动开始时间 /h	镇痛药使用比例 /%	患肢周径 /cm
对照组	25.4 ± 8.2	36.7	38.3 ± 2.1
PMRT组	21.8 ± 7.5	18.3	37.4 ± 1.8
t/χ^2	2.509	5.057	2.521
P	0.013	0.025	0.013

3 讨论

下肢骨折术后1~2周为炎症水肿期, 此时功能锻炼以患肢肌肉舒缩活动为主, 但是常常受到疼痛、焦虑症状的阻碍和制约, 导致早期功能锻炼不足或延迟, 不利于炎症水肿的消退和整体康复^[9-10]。研究^[11]表明: 疼痛和焦虑可通过下丘脑、垂体、肾上腺和交感神经, 作用于神经内分泌系统, 释放过量的糖皮质激素, 抑制炎症细胞因子生成, 降低免疫功能, 不利于骨折的早期愈合。

近年来, 不少研究^[12-13]发现PMRT可以减轻慢性疾病患者的负性情绪、提高治疗适应性、改善免疫生理功能。另外, PMRT还可以发挥减轻慢性疼痛的作用, 对癌性疼痛、术后急性疼痛具有临床效果^[14-15]。目前, PMRT在骨折术后应用的部分临床研究^[16-17]发现PMRT可以改善骨折术后疼痛症状、焦虑情绪、睡眠质量等主观症状, 但缺乏更为客观的指标进行系统性评价。本研究将PMRT应用于下肢骨折术后患者的康复治疗中, 利用生物反馈仪来评判患者PMRT方法是否正确, 提高了患者对PMRT流程和要领的掌握程度, 进而最大限度保障了PMRT的效果。本研究发现: PMRT既显著改善下肢骨折患者术后疼痛症状评分, 也减少了术后需要实施补救性镇痛的比例, 因此不论是从主观症状还是客观镇痛指标来看, PMRT均具有显著改善术后疼痛的作用。另外, 本研究通过SAS评分量表发现PMRT能够改善骨折术后焦虑症状, 有助于减轻外伤和手术导致的心理应激反应。此外, PMRT组术后开始患肢肌肉舒缩活动的时间也明显提前, 这也是PMRT组患者骨折术后疼痛获得显著改善效果的有力佐证。笔者认为: 骨折术后疼痛和焦虑症状的改善, 有助于患者尽早开始功能锻炼, 提高康复治疗的依从性。患肢肿胀是反映骨折术后炎症水肿状况的客观指标之一, 本研究中接受PMRT的患者术后患肢肿胀显著改善, 一方面可能与PMRT本身发挥作用有关, 另一方面也可能与PMRT减轻了患者疼痛和焦虑, 进而使患者遵医嘱进行患肢肌肉舒缩活动的时间提前、依从性提高有关。Zhou等^[18]发现: PMRT可以改善乳腺癌术后住院期间焦虑、抑郁等负性情绪, 促进患者心理康复。Xie等^[16]研究发现: PMRT可以减轻下肢骨折患者术后焦虑水平, 提高自我效能

感,有助于早期康复。Kobayashi等^[19]通过功能磁共振(fMRI)观察到PMRT可以抑制受试者大脑活动,促使受试者进入PMRT的专注状态,这可能是PMRT减轻焦虑、疼痛不适症状困扰的机制之一。笔者认为:PMRT与骨折术后早期进行患肢肌肉舒缩活动具有类似之处,本身也可能具有一定促进血液循环、消除炎症水肿的作用。值得注意的是,PMRT操作过程中,应处于安静环境,尽量减少外界干扰,并在经过专业培训的医护人员指导下进行,通过生物反馈仪以监督和纠正患者训练过程,帮助患者掌握训练要领,避免患者在训练过程中发生意外损伤。

综上所述,PMRT可以减轻下肢骨折术后疼痛和焦虑症状,改善患肢肿胀程度,可以为术后早期功能锻炼创造有利条件,进而有助于骨折术后康复。本研究设计上的局限性和不足之处在于没有应用盲法,因此很难完全避免受试者和研究者的主观因素对研究结果带来的影响,可能导致研究结果存在一定偏倚,这需要今后开展更加系统、完善的研究来进一步探讨。

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