体外冲击波联合康复训练治疗髌骨软化症疗效观察

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摘要 目的:观察体外冲击波联合康复训练治疗髌骨软化症(CP)的临床疗效。**方法:**选取威海卫人民医院的CP患者60例,采用随机数字表法分为对照组、冲击波组、联合组,每组20例。对照组患者给予常规康复训练治疗,5次/周,共持续8周。冲击波组给予体外冲击波治疗,具体方法:①应用D20探头以14 Hz的频率、1.8~2.5 Bar的强度脉冲股四头肌、髂胫束、胫骨前肌、腓绳肌和小腿三头肌,每块肌肉脉冲800~1 000下,以放松肌肉;②应用D15探头以15 Hz的频率、1.5~2.5 Bar的强度,沿着髌骨边缘或股骨髌做圆周运动,脉冲时将髌骨推向对侧,尽量使冲击波可达到髌骨软骨面,每个点脉冲300下,1次/周,共持续8周。联合组给予康复训练和体外冲击波治疗,具体治疗方法和疗程同对照组和冲击波组。采用视觉模拟评分法(VAS)评估患者疼痛改善情况;采用Lysholm评分量表评定膝关节功能;采用Recht标准进行磁共振成像(MRI)检查评定分期;采用髌骨软化症的疗效评定标准进行疗效评定。**结果:**与治疗前比较,3组治疗8周后VAS评分均明显降低,Lysholm膝关节功能评分较治疗前显著增加,差异有统计学意义($P<0.05$)。与对照组比较,联合组治疗8周后,VAS评分明显更低,临床有效率明显更高,治疗8周后、随访3个月时,Lysholm膝关节功能评分均明显更高,差异具有统计学意义($P<0.05$)。与冲击波组比较,联合组随访3个月时VAS评分明显更低,Lysholm膝关节功能评分、临床有效率均明显更高,差异有统计学意义($P<0.05$)。**结论:**体外冲击波联合康复训练治疗CP可有效减轻患者的疼痛程度,提高膝关节功能,临床起效快、远期效果较好,值得临床推广应用。

关键词 髌骨软化症;冲击波疗法;康复训练;膝关节功能

髌骨软化症(chondromalacia patellae, CP)是发生于髌股关节面关节软骨的慢性病变^[1],是膝关节病变的常见类型,其发病率为7%~30%,通常见于中青年人群^[2-3],且病情易反复,严重影响正常工作和日常生活,若早期得不到及时有效的治疗,很有可能发展成不可逆的髌股关节炎^[3],一旦转化为髌股关节炎,不仅恢复较慢,且容易病情反复,迁延不愈^[4]。康复训练能改善髌股关节生物力线的紊乱^[3],体外冲击波治疗作为一种新颖治疗手段,对关节软骨的修复亦有积极作用^[5]。本研究应用体外冲击波联合康复训练治疗髌骨软化症,取得良好疗效,现报告

如下。

1 临床资料

1.1 病例选择标准

1.1.1 诊断标准 符合《中医病证诊断疗效标准》中关于CP的诊断标准^[6]。

1.1.2 纳入标准 ①符合上述的诊断标准;②核磁共振成像(magnetic resonance imaging, MRI)分期:I~III期;③年龄:25~65岁;④患侧关节无外伤、手术史等影响训练的因素,且近期未接受其他治疗;⑤能积极配合完成相关治疗,并愿意接受持续3个

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月的随访;⑥患者知情同意,并自愿签署知情同意书。

1.1.3 排除标准 ①凝血功能障碍或血友病等血液系统疾病者;②有严重的骨质疏松症;③合并风湿性关节炎或类风湿性关节炎、骨肿瘤、骨结核等严重骨关节疾病;④伴有严重的膝骨关节炎;⑤CP病情较重必须配合药物治疗;⑥妊娠期妇女;⑦经过保守治疗仍不能纠正的严重力学紊乱者或具备手术指征者。

1.1.4 脱落和终止标准 ①受试者依从性差,无法严格执行治疗方案;②受试过程中病情突然加重;③受试者中途退出。

1.2 一般资料

选取2017年9月至2018年12月在威海卫人民医院门诊和住院治疗的CP患者60例。采用随机数字表法分为对照组、冲击波组、联合组,每组20例。3组性别、年龄、病程等一般资料比较,差异无统计学意义($P>0.05$),具有可比性。见表1。本研究方案经威海卫人民医院伦理委员会审核通过。

表1 3组一般资料比较($\bar{x}\pm s$)

Table 1 Comparison of general data in three groups ($\bar{x}\pm s$)

组别	n	性别		年龄/岁	病程/年
		男	女		
对照组	20	9	11	47.40 $\pm$ 10.13	3.70 $\pm$ 1.53
冲击波组	20	8	12	50.16 $\pm$ 8.05	3.90 $\pm$ 1.19
联合组	20	8	12	48.10 $\pm$ 11.73	3.70 $\pm$ 1.66

2 方法

2.1 治疗方法

2.1.1 对照组 给予常规康复训练治疗,本研究训练负荷的设定采用重复训练的最大数值(repetition maximum, RM)方式。①靠墙静蹲:患者靠墙站立,躯干紧贴墙壁,双下肢分开与肩同宽,脚尖朝前,膝关节屈曲在90°以上无疼痛不适的角度保持至力竭,休息1 min,共3次。②直腿抬高:患者仰卧位,膝关节伸直,踝关节背曲并施加阻力,嘱患者在0°~45°范围内抗阻直腿抬高。③抗阻伸膝:患者端坐位,于踝关节上方处施加阻力,嘱患者在无痛范围内小范围抗阻伸膝。④抗阻屈膝:患者俯卧位,踝关节后上方处施加阻力,嘱患者在无痛范围内小范围抗阻屈膝。⑤抗阻后抬腿:患者俯卧位,膝关节伸直位,踝关节上方处施加阻力,嘱患者在0°~20°范围内抗阻后抬腿。⑥抗阻侧抬腿:患者侧卧位,患侧在上,健侧在下,膝关节伸直位,踝关节上方处施加阻

力,嘱患者在0°~30°范围内抗阻侧抬腿;以上肌肉抗阻收缩动作组数均为6RM $\times$ 3,组间休息30 s。

⑦大腿前群肌肉牵伸:患者俯卧位,治疗师或患者家属1只手按住患者骨盆处固定骨盆,1只手托住患者膝关节上方大腿处用力往上牵拉,牵拉到极限处暂停10 s,共3次。⑧大腿后群肌肉牵伸:患者仰卧位,膝关节伸直,将健腿和骨盆固定于治疗床上,治疗师或患者家属将患腿直腿抬高,1只手放于膝关节上方固定膝关节,1只手将足背屈,牵拉到极限处可暂停10 s,共3次。上述治疗5次/周,共8周。

2.1.2 冲击波组 使用冲击波治疗仪(瑞士Storz Medical公司,型号:MP100)给予冲击波治疗。具体操作如下:①放松肌肉:患者仰卧位或俯卧位,伸直膝关节并充分暴露患侧下肢,应用D20探头以14 Hz的频率、1.8~2.5 Bar的强度脉冲股四头肌、髂胫束、胫骨前肌、腓绳肌和小腿三头肌,每块肌肉脉冲冲击800~1 000下。②痛点冲击波治疗:患者仰卧位,伸直膝关节并充分暴露患侧下肢,应用D15的探头以15 Hz的频率、1.5~2.5 Bar的强度,探头沿髌骨边缘或股骨髁做圆周运动,脉冲时将髌骨推向对侧,尽量使冲击波可达到髌骨软骨面,每个点脉冲300下。以上治疗1次/周,共8周。此外,进行健康宣教,告知患者冲击波治疗期间适当休息,应避免引起症状加重的体育训练、剧烈运动等。

2.1.3 联合组 联合使用康复训练及冲击波治疗。康复训练方法同对照组,冲击波治疗同冲击波组。

2.2 观察指标

2.2.1 疼痛评分 采用视觉模拟评分法(visual analogue scale, VAS)评定患者疼痛改善情况,0分表示无痛,10分表示难以忍受的剧烈疼痛^[7]。

2.2.2 膝关节功能评分 采用Lysholm评分量表^[8]评定膝关节功能,内容包括疼痛、肿胀、绞锁、不稳定、跛行、下蹲、需要支持及上下楼梯等8个指标,总分为100分。分值越小表示膝关节功能障碍越严重。

2.2.3 膝关节MRI评定分期 对患者MRI检查,根据Recht分级标准进行MRI分期评定^[9]。①I期:典型表现为点状长T1、长T2信号,组织学改变为软骨分层结构消失,软骨表面光滑;②II期:髌软骨变薄和局部信号升高,软骨破裂范围<1.3 cm,组织学改变为软骨缺损深度<全层厚度的50%;③III期:T2加权成像显示髌软骨碎裂>1.3 cm,厚度明显变薄、软骨下骨可暴露,但<1 cm,组织学改变为软骨缺损深度达全层厚度的50%以上,但未见完全脱落;④IV期:局部软骨缺损,软骨下骨暴露>1 cm,

多有硬化和囊变,组织学改变为软骨全层缺损、剥脱,软骨下骨质暴露。

2.2.4 疗效评定 参照《中医病证诊断疗效标准》^[6]中有关 CP 的疗效评定标准进行评定。① 治愈:膝关节症状及体征消失,髌骨研磨试验呈阴性;② 好转:上下楼及半蹲时膝关节轻度疼痛,髌骨研磨试验弱阳性;③ 无效:症状及体征无改善,“打软腿”或“假绞锁”加重。有效率=(治愈+好转)/总例数 $\times 100\%$ 。

分别于治疗前、治疗 8 周后、随访 3 个月时进行疼痛评分、疗效评定、膝关节功能评定和 MRI 分期评定。

2.3 统计学方法

采用 SPSS 23.0 统计软件进行数据分析。计量资料以($\bar{x} \pm s$)表示,数据符合正态分布,组内治疗前后采用重复测量方差分析,组间比较采用单因素方差分析,两两比较采用 LSD 检验;计数资料采用 χ^2 检验,等级资料采用 Kruskal-Wallis 秩和检验。 $P < 0.05$ 为差异具有统计学意义。

3 结 果

3.1 3 组治疗前后 VAS 评分比较

见表 2。

表 2 3 组治疗前后 VAS 评分比较($\bar{x} \pm s$)

Table 2 Comparison of VAS scores in three groups before and after treatment ($\bar{x} \pm s$)

组 别	n	治疗前	治疗 8 周后	随访 3 个月
对 照 组	20	4.95 $\pm$ 1.10	3.35 $\pm$ 1.35 ¹⁾	1.90 $\pm$ 1.07 ¹⁾
冲击波组	20	5.00 $\pm$ 0.73	2.90 $\pm$ 1.25 ¹⁾²⁾	2.70 $\pm$ 1.34 ¹⁾
联 合 组	20	5.15 $\pm$ 0.93	2.25 $\pm$ 1.33 ¹⁾²⁾	1.50 $\pm$ 1.19 ¹⁾³⁾

注:与治疗前比较,1) $P < 0.05$;与对照组比较,2) $P < 0.05$;与冲击波组比较,3) $P < 0.05$ 。

Note: Compared with before treatment, 1) $P < 0.05$; Compared with the control group, 2) $P < 0.05$; Compared with the shockwave group, 3) $P < 0.05$.

表 5 3 组临床疗效比较

Table 5 Comparison of clinical efficacy in three groups

组 别	n	治疗 8 周后				随访 3 个月			
		治愈	好转	无效	有效率/%	治愈	好转	无效	有效率/%
对 照 组	20	0	16	4	80	2	17	1	95
冲击波组	20	2	17	1	95 ¹⁾	0	17	3	85
联 合 组	20	4	16	0	100 ¹⁾	6	13	1	95 ²⁾

注:与对照组比较,1) $P < 0.05$;与冲击波组比较,2) $P < 0.05$ 。

Note: Compared with the control group, 1) $P < 0.05$; Compared with the shockwave group, 2) $P < 0.05$.

3.2 3 组治疗前后 Lysholm 膝关节功能评分比较

见表 3。

表 3 3 组治疗前后 Lysholm 膝关节功能评分比较($\bar{x} \pm s$)

Table 3 Comparison of Lysholm knee function scores in three groups before and after treatment ($\bar{x} \pm s$)

组 别	n	治疗前	治疗 8 周后	随访 3 个月
对 照 组	20	65.92 $\pm$ 9.20	78.89 $\pm$ 13.75 ¹⁾	86.32 $\pm$ 10.97 ¹⁾
冲击波组	20	66.34 $\pm$ 10.93	86.24 $\pm$ 11.23 ¹⁾²⁾	83.60 $\pm$ 12.54 ¹⁾
联 合 组	20	65.78 $\pm$ 9.03	90.84 $\pm$ 10.36 ¹⁾²⁾	92.05 $\pm$ 9.69 ¹⁾²⁾³⁾

注:与治疗前比较,1) $P < 0.05$;与对照组比较,2) $P < 0.05$;与冲击波组比较,3) $P < 0.05$ 。

Note: Compared with before treatment, 1) $P < 0.05$; Compared with the control group, 2) $P < 0.05$; Compared with the shockwave group, 3) $P < 0.05$.

3.3 3 组治疗前后膝关节 MRI 分期比较

见表 4。

表 4 3 组治疗前后膝关节 MRI 分期比较

Table 4 Comparison of MRI staging of knee in three groups before and after treatment

组 别	n	时 间	I	II	III
对 照 组	20	治疗前	7	7	6
		治疗 8 周后	7	7	6
		随访 3 个月	7	7	6
冲击波组	20	治疗前	7	7	6
		治疗 8 周后	7	7	6
		随访 3 个月	7	7	6
联 合 组	20	治疗前	8	6	6
		治疗 8 周后	8	6	6
		随访 3 个月	8	6	6

3.4 3 组临床疗效比较

见表 5。

4 讨 论

4.1 康复训练可增加 CP 患者膝关节稳定性

临床治疗 CP 的非手术治疗方法主要包括口服药物、关节腔内注射、物理因子治疗等,但由于 CP 发病率高、易复发,长期口服药物可能会导致肝肾功能受损或疾病恶化等^[10-11];而关节腔内注射又会带来感染等诸多不良反应,因此系统、规范化的康复训练在临床治疗 CP 中被应用得越来越多。本研究显示,康复训练 8 周后、随访 3 个月时,CP 患者膝关节 VAS 评分均明显比治疗前降低,Lysholm 膝关节功能评分均明显比治疗前提高,治疗总有效率分别为 80%、95%。这提示,康复训练可有效改善 CP 患者的疼痛症状和膝关节稳定性,提高膝关节功能。有研究表明 CP 的发生与膝关节周围肌力下降及髌股关节面压力不均衡密切相关^[12-13]。此外,膝关节周围软组织的僵硬也会使关节稳定性进一步下降^[14-15]。因此,本研究通过靠墙静蹲、直腿抬高、抗阻伸/屈膝、抗阻后/侧抬腿、大腿前/后群肌肉牵伸等康复训练改善膝关节周围肌力和周围软组织的柔韧性,以达到纠正髌骨关节生物力学和增加膝关节稳定性的效果,减少髌骨关节面软骨的磨损,从而提高膝关节功能。但这种单纯的康复训练,往往起效较慢,一般需要花费 8 周甚至更长的时间才能有效改善患者膝关节周围肌力^[16],CP 患者康复的信心容易受到影响,因此在临床康复治疗中亟需找到其他可行的方法以弥补这一缺点。

4.2 体外冲击波治疗可有效修复 CP 患者髌骨关节软骨

体外冲击波疗法是一种非侵入性治疗技术,具有安全、有效、无创、无副作用等优势,近年来常被应用于治疗骨性关节炎^[17]、骨折延迟愈合或不愈合^[18]及肱骨外上髁炎^[19]等疾病。本研究显示,与治疗前比较,冲击波组治疗 8 周后 VAS 评分明显降低,Lysholm 膝关节功能评分提高;与对照组比较,冲击波组 VAS 评分明显更低,Lysholm 膝关节功能评分明显更高。这提示,体外冲击波治疗可有效减轻 CP 患者疼痛程度,促进髌骨关节软骨修复,从而提高膝关节功能。这可能与体外冲击波的作用机制有关,具体包括:① 通过其剪切力、拉应力松解粘连组织^[20];② 通过温热效应改善局部血流、刺激局部神经感受器^[21];③ 通过改善 mRNA 的表达,起到保护关节软骨的作用^[22],作用于软骨细胞的结构上,对软骨细胞的活性有直接作用^[23-24];④ 通过机械传

导抑制炎症因子,促进细胞增殖和新血管生成,进而诱发组织再生和修复^[25]。但在随访 3 个月时发现部分患者膝关节功能评分不升反降,且临床有效率(85%)比治疗 8 周(95%)更低,这提示,冲击波组治疗在短期内虽可有效修复 CP 患者髌骨关节软骨,提高膝关节功能,但其并未从根本上彻底纠正髌骨关节生物力学紊乱的情况,导致部分患者在停止冲击波治疗后,髌骨关节软骨出现再次被磨损的情况;此外,也有研究对体外冲击波疗效提出疑义^[26-27]。

4.3 体外冲击波联合康复训练治疗 CP 的远期疗效更佳

本研究尝试采用体外冲击波联合康复训练治疗 CP,研究结果显示,与治疗前比较,联合组治疗 8 周后、随访 3 个月时 VAS 评分均明显降低,Lysholm 膝关节功能评分均明显提高;与对照组比较,联合组治疗 8 周后 VAS 评分明显更低,Lysholm 膝关节功能评分、临床有效率均明显更高;与冲击波组比较,联合组治疗 8 周后 VAS 评分、Lysholm 膝关节功能评分无明显差异,但在随访 3 个月时,与冲击波组比较,联合组 VAS 评分明显更低,Lysholm 膝关节功能评分、临床有效率均明显更高。这提示,联合组治疗 CP 可以在短期内有效修复 CP 患者髌骨关节软骨,提高膝关节功能;同时有效弥补原有 2 种方法单独应用时的不足,提高治疗的远期疗效。这可能与以下原因有关:① 系统、规范的康复训练可有效提高膝关节稳定性和周围软组织柔韧性,这样可对髌骨软骨起到了一定的保护作用,避免经冲击波治疗后的软骨再次发生过度磨损的情况^[28];② 冲击波治疗可有效抑制关节内的炎症因子,较快减轻患者疼痛,使患者神经系统尽快恢复对神经肌肉的动员能力,改善膝关节周围的肌力,从而提高膝关节功能^[29]。在本研究中,3 组治疗前后 VAS 评分、膝关节功能评分均有明显改善,但 MRI 分期并无明显差异,这可能与 MRI 检查间隔时间较短有关,也提示髌骨软化症的软骨修复是一个长期的过程,在临床康复治疗过程中需要多渠道评估临床疗效。

5 小 结

体外冲击波联合康复训练治疗 CP 可有效减轻患者的疼痛程度,提高膝关节功能,临床起效快、远期效果较好,值得临床推广应用。

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Effect of Modified Compound Xiaozhang Powder for Patients with Shoulder-Hand Syndrome after Cerebral Infarction by Using Fumigation and Washing combined with Acupuncture

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ABSTRACT Objective: To observe the clinical efficacy of modified compound Xiaozhang powder by fumigation and washing combined with acupuncture in the treatment of shoulder-hand syndrome after cerebral infarction. **Methods:** Eighty patients with shoulder-hand syndrome after cerebral infarction were selected in Huairou District Hospital of Traditional Chinese Medicine. The patients were randomly divided into control group ($n=40$) and observation group ($n=40$). The control group was given routine medical treatment and rehabilitation training. Rehabilitation training 20-30 min a time, one time per day, five times per week, continuous treatment for one month. The observation group was treated with modified compound Xiaozhang powder by using fumigation and washing combined with acupuncture on the basis of the control group. Fumigation and washing treatment: modified compound Xiaozhang powder plus water decoction, leaving 1 500-2 000 mL of traditional Chinese medicine decoction, put into a constant temperature bucket, when the water temperature is reduced to 40-50°C, put the hemiplegic swollen hand in the medicine solution, while soaking, dipping liquid from the elbow to the wrist while rubbing to knead to the interphalangeal joint, 20 minutes a time, two times per day, five days per week, continuous treatment for one month. Acupuncture treatment: using Xingnaokaqiao acupuncture method to acupuncture at Jiquanxia, Chize, Neiguan acupoint, without leaving needle; acupuncture at Jianyu, Jianliao, Quchi acupoint, directly needling 0.5-1 inch, twisting and tonifying method for one minute, retaining needle 20 minutes a times, once a day, once every other day, three times a week, continuous treatment for one month. The upper limb motor function was evaluated by the Fugl-Meyer motor function rating scale (FMA-U), the activities of daily living was evaluated by the Modified barthel index (MBI), the pain degree of the affected limbs was evaluated by the pain visual analogue scale (VAS), the shoulder range of motion (ROM) was measured by protractor, and the degree of hand edema was measured by drainage method. **Results:** Compared with before treatment, FMA-U, MBI and shoulder range of motion in the two groups after treatment for one month increased significantly, while VAS score and the degree of hand edema difference decreased significantly, and the difference was statistically significant ($P<0.05$). Compared with the control group, the FMA-U, MBI, shoulder ROM of the observation group after treatment for one month were significantly higher, the VAS score and the degree of hand edema difference in the observation group were significantly lower, and the difference was statistically significant ($P<0.05$). The total effective rate in the observation group (92.5%) was significantly higher than that in the control group (67.5%), and the difference was statistically significant ($P<0.05$). **Conclusion:** Modified compound Xiaozhang powder by using fumigation and washing combined with acupuncture can effectively improve the degree of hand swelling and relieve pain of patients with shoulder-hand syndrome after cerebral infarction, improve upper limb motor function, shoulder ROM and activities of daily living, and it has a good curative effect.

KEY WORDS cerebral infarction; shoulder hand syndrome; modified compound Xiaozhang powder; fumigation and washing; acupuncture

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Effect of Extracorporeal Shock Wave combined with Rehabilitation Training on Patients with Chondromalacia Patellae

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ABSTRACT Objective: To observe the clinical effect of extracorporeal shock wave combined with rehabilitation training on patients with chondromalacia patellae (CP). **Methods:** Sixty patients with CP were treated in Weihaiwei People's Hospital were randomly divided into the control group ($n=20$), the shock wave group ($n=20$) and the combined group ($n=20$). The control group were given routine rehabilitation training, five times a week, continuous treatment for eight weeks. The shock wave group was treated with extracorporeal shock wave therapy. The D20 was probed to pulse the quadriceps femoris, iliotibial band, tibialis anterior muscle, hamstring muscle and triceps muscle of the leg with the frequency of 14 Hz and the intensity of 1.8-2.5 Bar. Each muscle was pulsed 800-1000 times to relax the muscles. According to the frequency of 15 Hz and the intensity of 1.5-2.5 Bar, the D15 was used to move the patella along the edge of the patella or the condyle of the femur. During the pulse, the patella was pushed to the opposite side, so that the shock wave could reach the cartilage surface of the patella as far as possible. The pulse at each point was 300 times, one time a week, continuous treatment for eight weeks. The combined group was given rehabilitation training and divergent extracorporeal shock wave therapy, and the specific treatment method and course of treatment were the same as those in the control group and shock wave group. Visual analogue score (VAS) was used to evaluate the pain improvement, Lysholm scale was used to evaluate knee joint function; Magnetic resonance imaging (MRI) was used to evaluate the staging of patellar osteomalacia according to Recht criteria; The curative effect was evaluated according to the curative effect evaluation standard of chondromalacia patellae. **Results:** Compared with before treatment, the VAS score decreased significantly and the Lysholm knee joint function score increased significantly in the three groups after treatment for eight weeks, and the difference was statistically significant ($P<0.05$). Compared with the control group after treatment for eight weeks, the VAS score in the combined group was significantly lower, and clinical effective rate in the combined group was significantly higher, Compared with the control group after treatment for eight weeks and follow up after discharge for three months, the Lysholm knee joint function score in the combined group were significantly higher, and the difference was statistically significant ($P<0.05$). Compared with the shock wave group, the VAS score in the combined group after follow up discharge for three months was significantly lower, and the Lysholm knee joint function score and clinical effective rate were significantly higher, and the difference was statistically significant ($P<0.05$). **Conclusion:** Extracorporeal shock wave combined with rehabilitation training for CP can effectively reduce the pain degree of patients and improve the function of knee joint. It is worthy of clinical application with the quick and long-term clinical effect.

KEY WORDS chondromalacia patellae; shock wave therapy; rehabilitation training; knee joint function

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