·临床研究·

关节镜下保留残束重建前交叉韧带的疗效

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【摘要】 **目的**: 评价保留残束重建前交叉韧带治疗前交叉韧带部分束损伤的临床疗效。**方法**: 自 2002 年 1 月至 2009 年 12 月, 采用保留残束重建前交叉韧带 57 例, 其中男 39 例, 女 18 例; 年龄 16~49 岁, 平均 28.5 岁; 左膝 33 例, 右膝 24 例; 运动伤及训练伤 40 例, 交通事故伤 7 例, 生活扭伤 10 例。前抽屉试验阳性 23 例, 弱阳性 6 例; Lachman 试验阳性 19 例, 弱阳性 4 例; 前抽屉试验和 Lachman 试验均阳性 5 例; 侧方应力试验(内侧)阳性 24 例。Rolimeter 检查胫骨前移 7.5~11.5 mm, 平均 8.7 mm。国际膝关节文献委员会评分(IKDC)70.0±7.5, 膝关节 Lysholm 评分 68.0±6.3。受伤至手术时间 1 周~12 个月, 平均 3.1 个月。**结果**: 关节镜下前内侧束重建 32 例, 后外侧束重建 25 例。术后 57 例均获随访, 平均时间 22.5 个月(13~37 个月)。末次随访膝关节活动度达 120°~130°, 前抽屉试验及 Lachman 试验均阴性 54 例, 前抽屉试验弱阳性 2 例, Lachman 试验弱阳性 1 例; 术后 Rolimeter 检查膝关节稳定性良好。术后 IKDC 评分 92.0±4.9, Lysholm 评分 91.0±3.7, 均较术前提高。**结论**: 保留残束重建前交叉韧带, 有利于移植物血供建立、胶原纤维爬行替代、本体感觉恢复和膝关节的稳定性。

【关键词】 前交叉韧带; 关节镜; 移植物; 修复外科手术; 膝关节
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Arthroscopic reconstruction of anterior cruciate ligament with preservation of the remnant bundle *QI Wei, WANG Jun-liang, QU Feng, LI Shu-yuan, LIU Chang, and LIU Yu-jie. The Sixth Department of Orthopaedics, General Hospital of Chinese PLA, Beijing* 100853, *China*

ABSTRACT **Objective**: To evaluate clinical effects of arthroscopic anterior cruciate ligament (ACL) reconstruction with preservation of the remnant bundle. **Methods**: From January 2002 to December 2009, 57 patients with ACL partial rupture were treated with preservation of the remnant bundle. There were 39 males and 18 females, with an average age of 28.5 years old (ranged, 16 to 49 years old). Thirty-three patients had injuries in the left knees, and 24 patients had injuries in the right knees. Forty patients had injuries caused by sports, 7 patients had injuries caused by traffic accidents and 10 patients had injuries caused by daily sprain. The anterior drawer test showed positive results in 23 patients, weakly positive results in 6 cases; Lachman test showed positive results in 19 patients, and weakly positive in 4 patients. Both anterior drawer test and Lachman test showed positive results in 5 patients; and valgus stress test (medial) showed positive results in 24 patients. The mean value of Rolimeter measurement was 8.7 mm, (ranged, 7.5 to 11.5 mm). The mean International Knee Documentation Committee (IKDC) score was 70.0±7.5 and the Lysholm score was 68.0±6.3. The duration from injury to surgery was 1 week to 12 months, with an average of 3.1 months. **Results**: There were 32 patients treated with anteromedial bundle reconstruction and 25 patients treated with poterolateral bundle reconstruction. Fifty-seven patients were followed up, and the mean follow-up time was 22.5 months (ranged, 13 to 37 months). The anterior drawer test and Lachman test were all negative at 1 month post-operation. At the end of the follow-up, the range of motion of all the knees was 120 to 130 degree. There were 54 patients with negative results of anterior drawer test and Lachman test, 1 with weakly positive result of anterior drawer test and 2 with weakly positive results of Lachman test. The measurements of Rolimeter showed excellent stability of the knee. The mean IKDC score was 92.0±4.9 and the mean Lysholm score was 91.0±3.7, which all improved compared to preoperative scores. **Conclusion**: Arthroscopic reconstruction of anterior cruciate ligament with preservation of the remnant bundle has satisfactory effects on the knee stability, which could increase the angiogenesis and collagen of the ACL and improve the proprioception of the knee.

KEYWORDS Anterior cruciate ligament; Arthroscopes; Transplants; Reconstructive surgical procedures; Knee joint

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前交叉韧带 (anterior cruciate ligament, ACL)在维持膝关节机械稳定的同时, 也有助于维持膝关节的平衡[1]。传统的关节镜下 ACL 重建, 为便于手术操作和避免髁间窝撞击, 主张清除 ACL 残束或残端进

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行重建[2]。近几年,越来越多的学者主张保留残束重建 ACL[3-6]。自 2002 年 1 月至 2009 年 12 月采用保留残束重建 ACL 部分损伤 57 例,获得满意疗效。

1　资料与方法

1.1　临床资料　本组男 39 例,女 18 例;年龄 16~49 岁,平均 28.5 岁;体重指数(BMI)19.9~29.9 kg/m^2,平均 25.3 kg/m^2;左膝 33 例,右膝 24 例;运动训练伤 40 例,交通事故伤 7 例,生活扭伤 10 例。主要临床症状为患侧肢体无力、膝关节交锁、疼痛、肿胀,跑步、上下楼梯、登高、下山时膝关节不稳,股四头肌萎缩。23 例前抽屉试验阳性,6 例弱阳性;19 例 Lachman 试验阳性,4 例弱阳性;5 例两项均为阳性;24 例侧方应力试验(内侧)阳性。41 例合并半月板损伤,其中 31 例内侧半月板损伤,10 例外侧半月板损伤。Rolimeter 检查胫骨前移 7.5~11.5 mm, 平均为 8.7 mm。国际膝关节文献委员会评分 (IKDC)[7] 70.0±7.5,膝关节 Lysholm 等[8]评分 68.0±6.3。X 线检查未见异常,MRI 检查显示 ACL 实质信号异常,部分 ACL 纤维信号异常和部分连续性存在(图 1a)。受伤至手术时间 1 周~12 个月,平均 3.1 个月。

1.2　治疗方法　麻醉后取仰卧位,采用前内侧或前外侧入路行膝关节镜检查进一步明确诊断。术中发现 ACL 前内侧束断裂(图 2a)32 例,后外侧束断裂(图 3a)25 例。清理 ACL 残端瘢痕组织,保留未断裂的残留束支。合并半月板损伤者先行半月板手术。

取同侧腘绳肌腱,剔除肌肉组织,以 80 N 的力预张后备用。用 2-0 Ethibond 缝线(美国强生爱惜康公司)编织缝合肌腱, 根据测量的多股肌腱直径, 采用美国 Smith-Nephew 公司 ACL 定位器, 选择与肌腱相同直径的钻头钻取胫骨和股骨隧道。前内侧束定位点位于内侧髁间棘与外侧半月板连线的中点, 紧靠后外侧束胫骨止点的前内侧; 重建后外侧束的胫骨定位点位于前内侧束胫骨止点的后外侧。股骨隧道定位: 重建前内侧束时采用 11:00(右膝)和 1:00(左膝)位置,重建后外侧束时采用 9:00 (右膝) 和 3:00 (左膝)位置,隧道内口紧靠残留束支的股骨止点(图 2b,3b),骨隧道的直径应与肌腱的直径相一致。注意避免损伤残留束支和止点。根据骨隧道直径和长度选择合适长度的 Endobutton 祥和界面螺钉或 Rigidfix 横钉等固定材料。

图 1　患者,男,27 岁,左膝前交叉韧带后外侧束损伤 (矢状位 MRI)　**1a.** 箭头示 ACL 断裂部(术前)　**1b.** 箭头示重建后的肌腱移植物(术后 12 个月)

Fig.1　A 27-year-old male patient with posterolateral bundle rupture of ACL of left knee (sagittal plane, MRI)　**1a.** The arrow showed the partial rupture of ACL before operation　**1b.** The arrow showed the reconstructed ligament (12-month post-operation)

镜下屈伸膝关节观察移植物是否与髁间窝撞击和残留束支的张力。术后关节腔内放置负压引流,支具保护 12 周, 按照康复程序进行股四头肌功能练

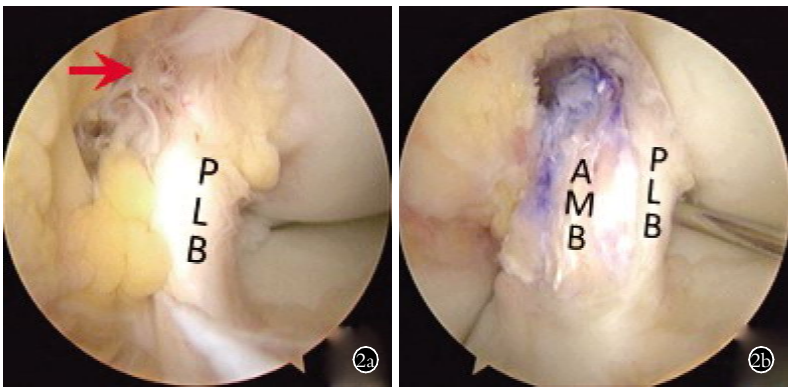

图 2　患者,男,20 岁,左膝 ACL 前内侧束(AMB)损伤　**2a.** 箭头示 ACL 前内侧束断裂部,后外侧束(PLB)完好　**2b.** 重建后的 AMB 及保留的 PLB

Fig.2　A 20-year-old male patient with AMB rupture of ACL of left knee　**2a.** The arrow showed the ruptured of AMB　**2b.** The reconstructed AMB and remnant of PLB

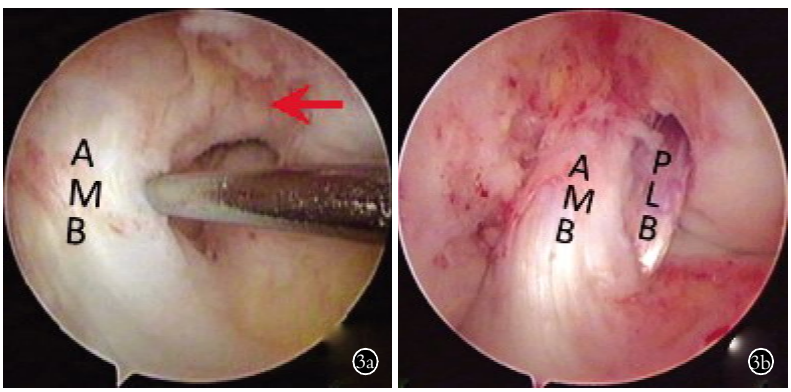

图 3　患者,男,19 岁,左膝 ACL 后外侧束(PLB)损伤　**3a.** 箭头示 ACL 后外侧束断裂部,前内侧束(AMB)完好　**3b.** 重建后的 PLB 及保留的 AMB

Fig.3　A 19-year-old male patient with PLB rupture of ACL of left knee　**3a.** The arrow showed the ruptured of PLB　**3b.** The reconstructed PLB and the remnant of AMB

习。第 1 周后将支具设置在 0°~30°位,之后每周增加 15°,1 个月后膝关节活动度达 90°~120°。3 个月后进行一般日常活动,6 个月后练习慢跑,1 年后可进行体育运动。

1.3 观察指标与方法　术后 1、3、6、12 个月门诊复查,摄膝关节正侧位 X 线片,与术后即刻 X 线片比较,观察有无移植物固定失败、骨隧道扩大;膝关节 MRI 观察关节内肌腱移植物有无松动,并评估关节软骨、半月板有无退变;Rolimeter 检查胫骨前移度,患侧与健侧对比、术前与术后对比评价膝关节稳定性。术后部分患者行关节镜二次探查,与标准术式重建 ACL 术后关节镜二次探查对比,观察疗效。

1.4 疗效评价方法　采用国际膝关节文献委员会(IKDC)[7]及膝关节 Lysholm 等[8]评分系统评价患肢功能。按 Molster 方法[9]将 Lysholm 评分> 87 分定为优,77~86 分为良,67~76 分为可,<66 分为差。

1.5 统计学处理　采用 Statistic 统计软件进行分析。数据以均数±标准差表示,术前与末次随访时膝关节评分比较采用配对设计定量资料的 t 检验,胫骨前移度测量值比较采用有重复测量的方差分析,P<0.05 为差异有统计学意义。

2　结果

2.1 术后疗效观察　本组术后切口均Ⅰ期愈合,无膝关节感染、血管及神经损伤等并发症发生。57 例获门诊或电话随访,时间 13~37 个月,平均 22.5 个月。术后 1 个月膝关节活动度达 90°~100°,前抽屉试验及 Lachman 试验均为阴性。末次随访时,膝关节活动度达 120°~130°,54 例前抽屉试验及 Lachman 试验阴性,2 例前抽屉试验弱阳性、Lachman 试验阴性,1 例 Lachman 试验弱阳性、前抽屉试验阴性。X 线片示骨隧道位置良好,隧道无扩大。MRI 检查示重建韧带信号正常(图 1b)。

2.2 术后关节镜二次探查　保留残束重建 ACL 术后关节镜二次探查,发现 ACL 移植物张力良好,移植物表面滑膜覆盖(图 4);ACL 标准术式重建术后 3 年关节镜二次探查,镜下可见 ACL 张力良好,但滑膜覆盖不良(图 5)。

2.3 胫骨前移度 Rolimeter 测量　胫骨前移度测量结果:健侧(2.2±0.7) mm,患侧术前(7.7±1.7) mm,术后即刻(2.1±0.6) mm,术后 1 个月(2.1±0.7) mm,术后 3 个月(2.2±0.8) mm,术后 6 个月(2.3±0.5) mm,术后 12 个月(2.3±0.4) mm。术后各时间点与术前比较,F=360.540,P=0.000,术后各时间点胫骨前移度均小于术前;术后各时间点与健侧比较,F=1.145,P=0.336,术后各时间点胫骨前移度与健侧比较差异无统计学意义。

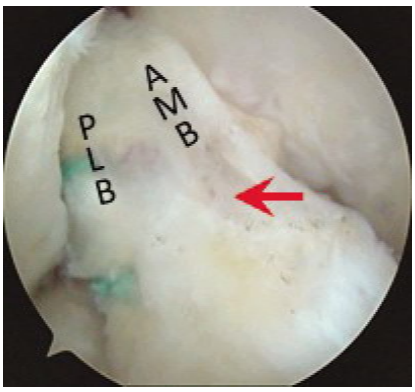

图 4　患者,女,36 岁,右膝 ACL 后外侧束(PLB)损伤,保留 AMB 重建 PLB 术后 13 个月二次关节镜探查,箭头示滑膜覆盖良好

Fig.4　A 36-year-old female patient with PLB rupture of ACL of right knee, at 13 months after operation, a second look of a single-bundle ACL reconstruction, the arrow showed the coverage of the synovium on the reconstructed ACL

图 5　患者,男,21 岁,右膝 ACL 损伤,保留残束与标准术式 ACL 重建术后 3 年二次关节镜探查,箭头示滑膜覆盖不良

Fig.5　A 21-year-old male patient with ACL rupture of right knee, at 3 years after operation, a second look of a standard ACL reconstruction, the arrow showed less synovium on the reconstructed ACL

2.4 膝关节功能评分　IKDC 各项评分见表 1,Lysholm 各项评分见表 2。术后末次随访 Lysholm 评分及 IKDC 评分均较术前提高。Lysholm 评分分级:

表 1　57 例前交叉韧带损伤患者术前术后 IKDC 评分比较($\bar{x}\pm s$,分)

Tab.1　Comparison of pre- and post-operative IKDC scores of 57 patients with anterior cruciate ligament injuries($\bar{x}\pm s$, score)

时间	疼痛			肿胀		交锁(例)	无打软腿的活动	有规律的活动	活动功能	主观功能评价	总分
	无疼痛的活动	频率	程度	无肿胀的活动	程度						
术前	2.6±1.2	6.2±2.3	7.5±2.2	2.6±1.3	2.7±1.3	30	2.6±1.2	2.5±1.2	27.0±3.4	6.4±2.4	70.0±7.5
术后	3.6±1.1	8.5±2.2	9.3±0.9	3.7±1.1	3.7±1.2	1	3.5±1.0	3.6±0.9	34.4±2.8	8.7±1.9	92.0±4.9*

注:与术前比较,*t=−18.540,P=0.000

Note: Compared with preoperative score, *t=−18.540, P=0.000

表 2　57 例前交叉韧带损伤患者术前术后 Lysholm 评分比较($\bar{x}\pm s$, 分)

Tab.2　Comparison of pre- and post-operative Lysholm scores of 57 patients with anterior cruciate ligament injuries($\bar{x}\pm s$, score)

时间	跛行	支撑	交锁	关节不稳	疼痛	肿胀	爬楼梯	下蹲	总分
术前	4.0±1.1	3.2±1.9	11.3±3.0	15.5±6.3	13.7±6.2	7.6±2.8	8.8±1.0	3.9±1.1	68.0±6.3
术后	4.9±0.4	5.0±0.0	14.3±2.1	22.3±4.2	21.5±4.7	9.2±1.6	9.4±1.5	4.4±0.8	91.0±3.7**

注：与术前比较，**t=−23.767，P=0.000

Note：Compared with preoperative score，**t=−23.767，P=0.000

优 42 例，良 10 例，可 5 例。

3　讨论

ACL 部分束损伤，有时临床表现并不太明显，往往容易发生漏诊或误诊。但是，认真查体和 MRI 检查对 ACL 部分束损伤具有诊断意义[10]，矢状位上可显示残留的 ACL 束支。前内侧束损伤患者前抽屉试验阳性而 Lachman 试验阴性；后外侧束损伤者表现为前抽屉试验阴性，而 Lachman 试验阳性多见。

有学者主张 ACL 部分损伤患者可行保守治疗，认为手术效果未必好于保守治疗[11]。研究发现 42%~50%的 ACL 完全断裂是由部分断裂发展而来[12-13]。主要原因是残余纤维难以承受巨大应力，继发 ACL 完全断裂，因此 ACL 损伤后应尽早重建。Demirag 等[14]和 Zhang 等[15]分别对 40 例和 62 例 ACL 部分损伤的患者随机分成保留残束组及标准术式组进行前瞻性对比研究，IKDC 及 Lysholm 评分、物理检查、患者满意度调查问卷及术后膝关节检查差异均无统计学意义，但是发现标准术式组术后骨隧道扩大，尤其是胫骨隧道扩大明显高于保留残束组。Adachi 等[16]对比研究了 40 例保残重建及 40 例标准重建 ACL 的临床疗效，发现保残重建后膝关节稳定性无明显增强，但是位置感觉更加灵敏。本研究对 ACL 部分损伤患者采用保留未受损伤束支的方法重建 ACL，术后终末随访疗效满意。

ACL 重建术后关节镜二次探查，发现保留残束重建 ACL 的肌腱移植物滑膜覆盖优于不保留残束者。笔者动物实验研究也证实了保留残束重建 ACL 滑膜覆盖良好，有利于肌腱移植物血管化、胶原蛋白再生[17]。

综上所述，ACL 部分损伤早期保留残束重建，可促进肌腱移植物的血管、神经纤维和胶原纤维再生，有助于膝关节本体感觉和功能恢复。

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·经验交流·

胸锁钩钢板治疗胸锁关节脱位的临床观察

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【摘要】 **目的**: 观察应用胸锁钩钢板治疗胸锁关节脱位患者的临床治疗效果。**方法**: 2010 年 6 月至 2012 年 6 月对 7 例胸锁关节脱位患者行胸锁钩钢板复位固定术治疗, 其中男 5 例, 女 2 例; 年龄 38~54 岁, 平均 42.3 岁; 病程 1~4 周。术前患者均有外伤史, 患侧胸锁关节肿胀、疼痛明显, 患侧肩关节活动明显受限。术前 X 线片及 CT 证实为胸锁关节脱位, 根据 Rockwood 评分法对术后疗效进行评价。**结果**: 本组 7 例胸锁关节脱位患者按 Rockwood 评分法进行评价, 优 6 例, 良 1 例。术后未出现内固定松动、断裂, 未出现再次脱位, 肩关节功能良好, 胸锁关节无疼痛, 外观无畸形, 患肢活动自如无疼痛。**结论**: 胸锁钩钢板治疗胸锁关节脱位, 手术操作简单, 固定可靠, 疗效肯定, 值得临床推广。

【关键词】 胸锁关节;　脱位;　骨折固定术
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Clinical applications of sternoclavicular hook plate for the treatment of sternoclavicular joint dislocation　*CHEN Fang-hu, ZHAO Xiao-ping, ZHENG Wen-biao, ZENG Han-bing, RAN Bo, HUANG Hui, and WANG Hai-bao. Department of Orthopaedics, Taizhou Municipal Hospital, Taizhou* 318000, *Zhejiang, China*

ABSTRACT　**Objective**: To observe the clinical therapeutic effects of sternoclavicular hook plate for the treatment of sternoclavicular joint dislocation. **Methods**: From June 2010 to June 2012, 7 patients with sternoclavicular joint dislocation were treated with sternoclavicular hook plate fixation. Among the 7 patients, 5 patients were male and 2 patients were female, and the average age was 42.3 years, ranging from 38 to 54 years. The course of the disease ranged from 1 to 4 weeks. All the patients had trauma history. The clinical manifestations included: obvious swelling and pain of sternoclavicular joint, restricted shoulder joint activity. The sternoclavicular joint dislocation was proved by preoperative X-ray and CT. The postoperative curative effect was evaluated according to Rockwood scoring method. **Results**: According to Rockwood scoring method, the excellent results obtained in 6 cases, good in 1. There were no complications such as internal fixation loosening or broken, second dislocation, pain in the sternoclavicular joint, and deformity. The function of shoulder joint was good, and the limb activity was free and no pain appeared. **Conclusion**: The sternoclavicular hook plate for the treatment of sternoclavicular joint dislocation has follow advantages: simple procedure, stable fixation, definite therapeutic effects.

KEYWORDS　Sternoclavicular joint;　Dislocations;　Fracture fixation
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胸锁关节脱位是一种比较少见的关节脱位, 分前脱位与后脱位两类。胸锁关节脱位的治疗方法较多, 目前仍以手术治疗为主, 手术复位后常采用张力带胸锁关节固定术治疗, 但往往固定不牢, 造成脱位复发、疼痛、半脱位畸形等并发症[1-2]。目前也有使用重建钢板固定, 最新锁定钢板内固定治疗, 但术后脱位复发、疼痛、半脱位等并发症并没有明显改善。自 2010 年 6 月至 2012 年 6 月收治 7 例胸锁关节脱位患者采用新型胸锁钩关节钢板复位固定术治疗, 手术操作简单, 术后恢复快, 术后脱位复发、疼痛、半脱位均未发生, 效果良好, 现报告如下。

1　临床资料

本组共 7 例, 其中男 5 例, 女 2 例, 均为胸锁关节前脱位。年龄 38~54 岁, 平均 42.3 岁; 病程 1~4 周。

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