·临床研究·

喙肩韧带内侧半转位重建喙锁韧带治疗肩锁关节完全脱位

董文伟, 史增元, 刘振新, 毛海蛟
(宁波大学医学院附属医院骨科, 浙江　宁波　315000)

【摘要】 **目的**: 探讨喙肩韧带内侧半转位重建喙锁韧带治疗肩锁关节完全脱位的手术方法和疗效。**方法**: 2006 年 1 月至 2012 年 6 月, 采用喙肩韧带内侧半转位重建喙锁韧带, 同时辅以锁骨钩钢板和克氏针内固定治疗肩锁关节完全脱位 26 例, 男 18 例, 女 8 例; 年龄 25~51 岁, 平均 36.7 岁; 手术时间为伤后 3~12 d, 平均 5 d。按照 Rockwood 分型: Ⅲ型 4 例, Ⅴ型 22 例。临床表现为局部肿胀、压痛伴弹跳感, 肩关节活动受限, 术前拍摄双侧肩关节标准应力位 X 线片, 测量患侧喙锁间隙为(16.2±5.0) mm, 较健侧(7.6±1.0) mm 明显增宽。术后通过 X 线片检查和 Constant-Murley 评分对手术疗效进行评价。**结果**: 术后切口均Ⅰ期愈合, 无感染、内固定断裂、再脱位的发生。所有患者获得随访, 时间 12~30 个月, 平均 18 个月。于术后 1 个月拔除克氏针、8~10 个月取出内固定钢板。到末次随访时肩关节活动均基本恢复正常, 而且获得了一个无痛的关节。按 Constant-Murley 评分, 优 24 例, 良 2 例。喙锁间隙距离患侧为(7.7±1.2) mm, 健侧为(7.6±1.0) mm, 两侧比较差异无统计学意义(P>0.05)。**结论**: 采用喙肩韧带内侧半转位重建喙锁韧带, 加喙锁韧带缝合、锁骨钩钢板和克氏针内固定综合治疗, 效果良好。

【关键词】 肩锁关节;　脱位;　喙肩韧带;　喙锁韧带
DOI: 10.3969/j.issn.1003-0034.2015.04.011

Treatment of complete acromioclavicular joint dislocation with transfer of the medial half of the coracoacromial ligament to reconstruct the coracoclavicular ligament

DONG Wen-wei, SHI Zeng-yuan, LIU Zheng-xin, and MAO Hai-jiao. Department of Orthopaedics, the Affiliated Hospital of Medical College of Ningbo University, Ningbo 315000, *Zhejiang, China*

ABSTRACT　**Objective**: To explore the operation methods and clinical effects of transfer of the medial half of the coracoacromial ligament to reconstruct the coracoclavicular ligament in treating complete acromioclavicular joint dislocation. **Methods**: From January 2006 to June 2012, 26 patients with acute complete acromioclavicular joint dislocation underwent surgery. Transfer of the medial half of the coracoacromial ligament to reconstruct the coracoclavicular ligament, additional clavical hoot plate and Kirschner wires fixation, were performed in all the patients. Among the patients, 18 patients were male and 8 patients were female, with an average age of 36.7 years old (ranged from 25 to 51 years). The duration from injury to operation was from 3 to 12 days with an average of 5 days. According to the Rockwood classification, 4 cases were grade Ⅲ and 22 cases were grade Ⅴ. Clinical manifestation included local swelling, tenderness with snapping, limitation of shoulder joint motion. In preoperative bilateral shoulder joint X-rays, the injured coracoclavicular distance was (16.2±5.0) mm which was significantly wider than that of uninjured sides (7.6±1.0) mm. Clinical results were evaluated according to X-rays and Constant-Murley score. **Results**: All incisions obtained primary healing after operation without complication of infection, internal fixation breakage, redislocation. All the patients were followed up from 12 to 30 months with an average of 18 months. Kirschner wires and internal fixation plate were removed at 1 month and 8-10 months after operation, respectively. At final follow-up, the motion of shoulder joint recovered to normal and a no pain joint was obtained. According to Constant-Murley score, 24 cases got excellent results and 2 cases good. There was no significant difference after operation between the injured coracoclavicular distance and the uninjured contralateral side [(7.7±1.2) mm vs (7.6±1.0) mm), P>0.05]. **Conclusion**: Transfer of the medial half of the coracoacromial ligament to reconstruct the coracoclavicular ligament, additional fixation using hook plate and Kirschner wires is the effective surgical method in treating complete acute acromioclavicular joint dislocation.

KEYWORDS　Acromioclavicular joint;　Dislocations;　Coracoacromial ligament;　Coraoclavicular ligament
Zhongguo Gu Shang/China J Orthop Trauma, 2015, 28(4): 340-344　www.zggszz.com

肩锁关节脱位是最常见的肩部运动性损伤之一, 临床上治疗肩锁关节脱位的手术方法很多, 但对于最佳的手术方式至今仍没有达成共识[1]。自 1972 年

通讯作者: 史增元　E-mail: szy580@sohu.com
Corresponding author: SHI Zeng-yuan　E-mail: szy580@sohu.com

Weaver 等[2]报道的 Weaver-Dunn 术式以来,各种改良的 Weaver-Dunn 术已经成为治疗肩锁关节脱位的常用方法。但近期有研究表明喙肩韧带对肩关节前上方的稳定性起一定的作用，转位后会造成肱骨头向前上方移位或不可修复的肩袖撕裂[3]。笔者通过对喙肩韧带的解剖学研究[4],在临床上应用喙肩锁韧带内侧半部分转位并喙锁韧带重建的方法治疗肩锁关节脱位,获得较好的临床效果,现报告如下。

1　资料与方法

1.1　临床资料

2006 年 1 月至 2012 年 6 月，治疗急性肩锁关节脱位 26 例,其中男 18 例,女 8 例;年龄 25~51 岁,平均 36.7 岁;车祸伤 18 例,摔伤 5 例,砸伤 3 例;合并颅脑外伤 1 例,肋骨骨折 8 例。临床表现为患肩局部肿胀、压痛伴弹跳感,肩关节活动受限。术前拍摄双侧肩关节标准应力位 X 线片,测量患侧喙锁间隙为(16.2±5.0) mm,较健侧的(7.6±1.0) mm 明显增宽。根据 Rockwood 分类标准[5]:Ⅲ型 4 例,Ⅴ型 22 例。手术时间为伤后 3~12 d,平均 5 d。手术探查喙锁韧带中间撕裂 24 例,锁骨起点处撕裂 2 例。

1.2　治疗方法

1.2.1　手术方法　全身麻醉后,取平卧位、患肩垫高,将患肩和患侧上肢消毒后铺无菌手术巾。采用喙锁韧带缝合、喙肩韧带内侧半转位(图 1),同时辅以锁骨钩钢板和克氏针固定的方法。沿锁骨外侧 1/3 至肩峰下 3 cm 切口[4](图 2),切开皮肤及皮下组织,切断三角肌肩峰端起点处向远端剥离，暴露喙肩韧带,以及撕裂的肩锁关节囊,探查喙锁韧带。对于韧带中间撕裂病例用 2 号爱惜邦线缝合喙锁韧带的锁骨端和喙突端 4 针,暂不打结缝合。复位肩锁关节及脱位软骨盘,用 2 枚克氏针交叉固定,透视关节复位及内固定位置良好,置锁骨钩钢板固定。切开喙肩韧带内侧半(图 3),用骨刀切取喙肩韧带内侧半肩峰端附着处骨片 5 mm×10 mm(图 4)。用滑动锁结打结法(图 6)、收紧断裂喙锁韧带。对于起点撕脱病例,采用 Krackow 等[6]发明的方法缝合后穿骨固定。用骨刀在锁骨结节前上方凿出 10 mm×10 mm 的粗糙面,喙肩韧带内侧半拉紧转位,将骨片固定予锁骨骨床(图 5)。修补肩锁关节囊及三角肌斜方肌腱联合,逐层缝闭切口。

1.2.2　术后处理　术后患肩“U”形石膏固定 2 周,拆除石膏后主动肩关节伸屈收展功能锻炼。术后 1 个月拔除内固定克氏针,8~10 个月后拆除锁骨钩钢板。

1.3　观察项目与方法

术后常规拍摄双肩关节正位片，对比内固定拆除后患侧及健侧喙锁间隙距离,检查复位维持情况。根据 Constant-Murley[7]评分对末次随访时患肩疼痛度(15 分)、日常功能(20 分)、肩关节活动度(40 分)及患肩力量(25 分)进行评价。总分 90 分以上为优,80~90 分为良,70~80 分为可,69 分以下为差。

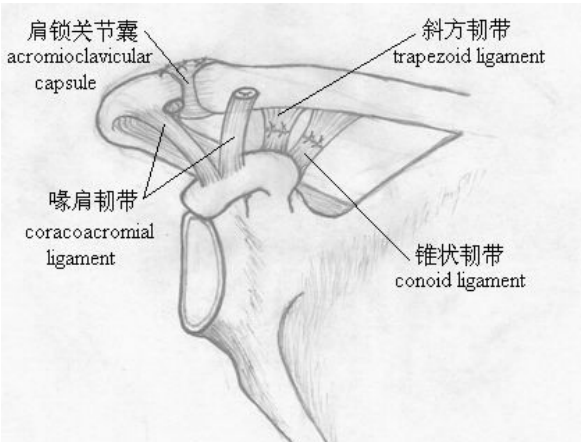


图 1　肩锁韧带内侧半部分转位并喙锁韧带缝合示意图

Fig.1　Schematic drawing of transfer of the medial half of the acromioclavicular ligament and repair of the coracoclavicular ligament

1.4　统计学分析

采用 SPSS17.0 进行统计学分析,对末次随访时患侧平均喙锁间隙距离与健侧平均喙锁间隙距离进行配对 t 检验。以 $P<0.05$ 为差异有统计学意义。

2　结果

2.1　观察随访结果

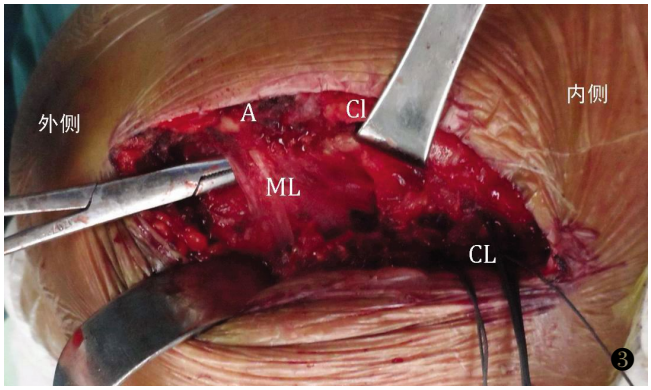
本组患者均获得随访，时间 12~30 个月，平均 18 个月。于术后 1 个月取出克氏针,术后 8~10 个月后拆除钩钢板。术后 2 周行患肩“U”形石膏固定,经过主动功能锻炼，至末次随访时所有患者的肩关节活动基本恢复正常,而且获得了一个无痛的关节。分别在锁骨钩钢板取出后和随访时拍摄双肩关节标准正位片,对比检查复位丢失情况,至末次随访时患侧喙锁间隙为(7.7±1.2) mm,与健侧(7.6±1.0) mm 比较,差异无统计学意义($P>0.05$)。所有患者切口Ⅰ期愈合,无感染、内固定断裂,复位均没有明显丢失,没有出现脱钩、肩峰端骨质吸收等钩钢板相关的并发症。典型病例见图 7。

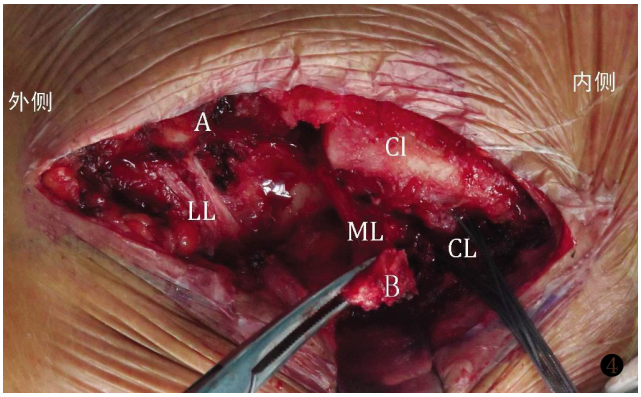
2.2　疗效评价结果

末次随访时 Constant-Murley[7]评分:疼痛 14.0±1.8,肩关节日常功能 18.0±1.6,肩关节活动度 37.0±1.8,肩关节力量 23.0±1.9,总分 92.0±4.1(85~100 分);优 24 例,良 2 例。

3　讨论

肩锁关节脱位手术治疗的主要目的是修复创伤、恢复功能[8],通过替代或重建撕裂的喙锁韧带来





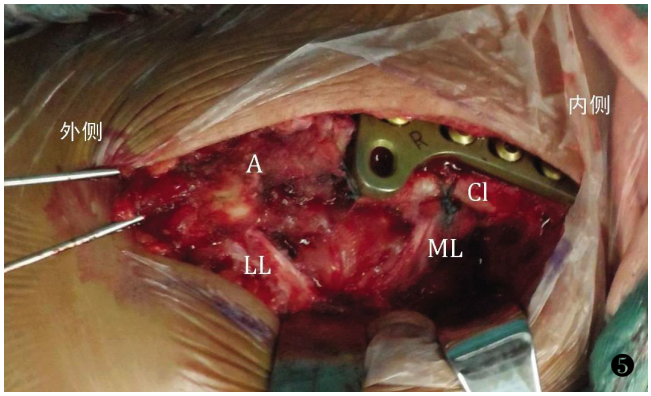


图 2　沿锁骨外侧 1/3 至肩峰下 3 cm 做皮肤切口　A 肩峰，Cl 锁骨远端　**图 3**　分别在锥状韧带和斜方韧带用爱惜邦线留置 2 针后，暴露喙肩韧带内侧半在肩峰的起点并切开内侧半　A 肩峰，Cl 锁骨远端，ML 喙肩韧带内侧半，CL 喙锁韧带　**图 4**　凿取喙肩韧带内侧半肩峰起点处部分骨皮质 0.5 cm×1 cm 左右并转位喙肩韧带内侧半　A 肩峰，Cl 锁骨远端，LL 喙肩韧带外侧半，ML 喙肩韧带内侧半，CL 喙锁韧带，B 肩峰端骨片　**图 5**　肩锁关节复位后用锁骨钩钢板和克氏针固定。滑动锁结重建喙锁韧带，穿骨缝合固定转位的喙肩韧带内侧半　A 肩峰，Cl 锁骨远端，LL 喙肩韧带外侧半，ML 喙肩韧带内侧半

Fig.2　The skin incision was made from lateral 1/3 of the clavicle to inferior 3 cm of the acromion. A was acromion and Cl was distal end of clavicle

Fig.3　A number-2 Ethibond sutures were placed into conoid ligament and trapezoid ligament, exposured the medial half of coracoacromial ligament in the acromion and splitted the medial half. A was acromion, Cl was distal end of clavicle, ML was medial half of the coracoacromial ligament, CL was coracoclavicular ligament　**Fig.4**　Chiselled bone cortex about 0.5 cm×1 cm in the acromion starting point of medial half of the coracoacromial ligament, and transferred to the medial half of acromiocoracoid ligament. A was acromion, Cl was distal end of clavicle, LL was lateral half of the coracoacromial ligament, ML was medial half of the coracoacromial ligament, CL was coracoclavicular ligament, B was bone fragment of the acromion　**Fig.5**　The acromioclavicula joint was reduced and fixed with clavicle hook plate and Kirschner wire. The coracoclavicular ligament was sutured with a sliding self-locking knot. The medial half of the coracoacromial ligament was fixed on the anterior border of the clavicle with osteosutures. A was acromion, Cl was distal end of clavicle, LL was lateral half of the coracoacromial ligament, ML was medial half of the coracoacromial ligament

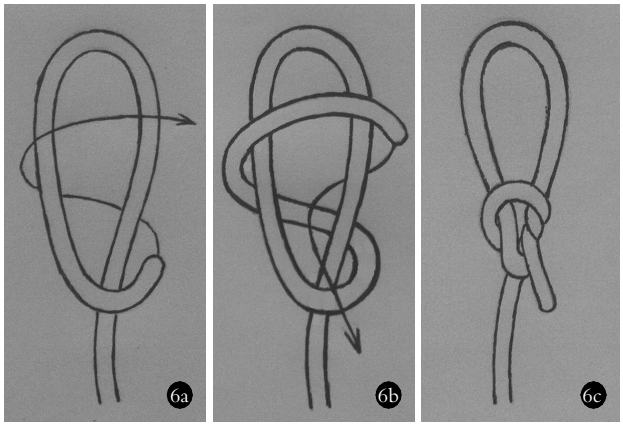


图 6　滑动锁结示意图

Fig.6　Schematic drawing of sliding self-locking knot

达到锁骨远端的稳定。Salem 等[9]报道了用锁骨钩钢板固定联合韧带修复治疗 25 例肩锁关节脱位患者，有 23 例获得了随访，平均随访时间 30 个月，拆除钢板后有 8 例出现再脱位，其中 3 例脱位的程度超过 50%。王春祯等[10]通过锁骨钩钢板配合喙肩韧带转移治疗肩锁关节脱位对照研究发现，喙肩韧带转移加强修补喙锁韧带可以明显防止术后再脱位的发生。笔者采用喙锁韧带缝合、喙肩韧带内侧半转位加强喙锁韧带的方法，经过平均 18 个月的随访，内固定拆除后没有再脱位的发生。

李百川等[11]通过对肩锁关节脱位术后常见并发症的研究发现合理重建喙锁及喙肩韧带是治疗肩锁关节脱位的基本要求，韧带的确切重建及术中切实可靠的坚强固定是减少术后并发症的有效手段。钩

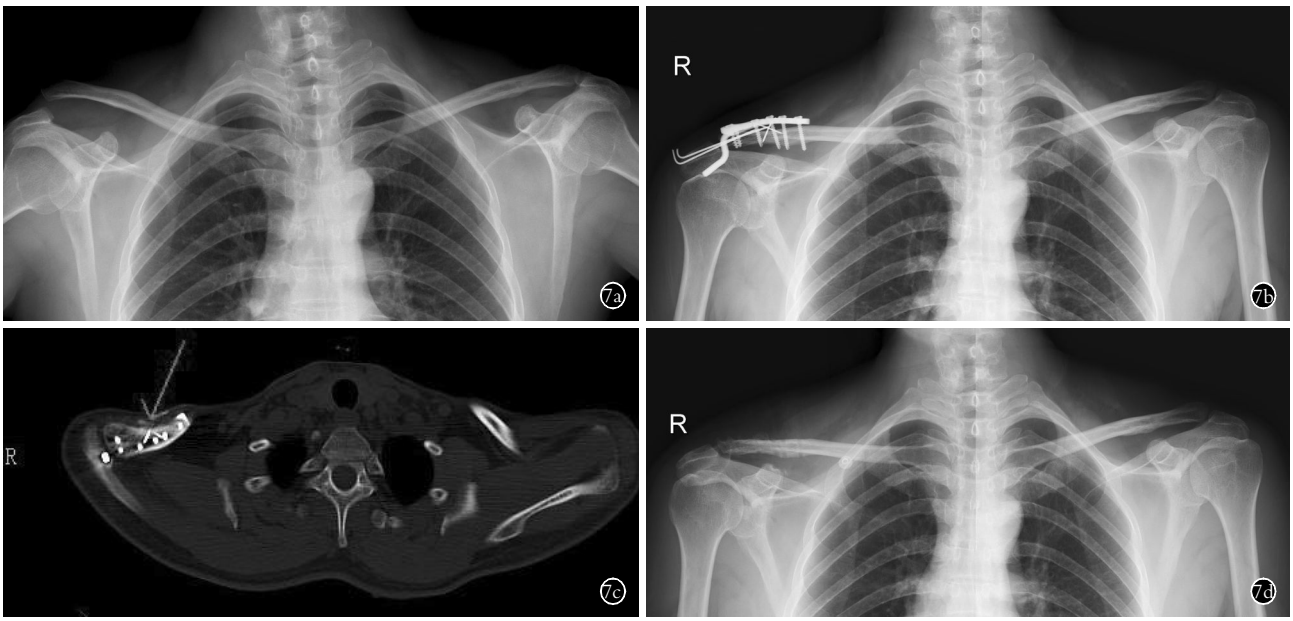


图 7　女性患者,43 岁,车祸伤致急性肩锁关节脱位　**7a.** 术前双侧肩锁关节正位 X 线片示右肩Ⅴ型肩锁关节脱位(Rockwood 分类)　**7b.** 术后 1 个月双侧 X 线片对照显示右肩锁关节脱位复位良好　**7c.** 术后 7 个月复查 CT 示喙肩韧带内侧半与锁骨已经骨性愈合　**7d.** 末次随访时双侧肩锁关节 X 线片对照显示右侧喙锁间隙已恢复正常

Fig.7　A 43-year-old female patient with acute acromioclavicular dislocation caused by road accident　**7a.** Preoperative AP acromioclavicular joint X-ray showed the right acromioclavicular dislocation with type Ⅴ (according to Rockwood classification)　**7b.** One month after operation, X-ray confirmed satisfactory reduction of the acromioclavicular joint　**7c.** CT scan showed bone already healed between clavicle and medial half of the coracoacromial ligament at 7 months after operation　**7d.** At final follow-up, X-ray showed the right coracoclavicular distance restored

钢板通过锁骨近端的钢板固定和穿过肩峰的盾钩形成杠杆作用,对锁骨产生持续而稳定的压力,达到垂直方向的稳定。从而为喙锁韧带及其周围软组织的愈合,提供一个稳定而无张力的内环境。

稳定的肩锁关节有利于锁骨远端的再血管化,可以为修复后肩锁关节周围软组织的有效愈合创造良好条件。钩钢板固定后肩锁关节仍存在水平方向的不稳,Kienast 等[12]应用远端带垂直钩固定肩峰的钩钢板来达到肩锁关节的稳定,共治疗 Rockwood Ⅲ-Ⅴ型肩锁关节脱位 313 例,其中 225 例获得了平均 30 个月的随访,取得了较好的疗效。本研究通过钩钢板联合应用交叉克氏针固定，来控制肩锁关节水平方向的不稳。Hoffler 等[13]和 von Heideken 等[14]分别报道了钩钢板治疗后,早期脱钩并发症的出现。辅以克氏针进行肩锁关节早期固定，可以有效防止类似并发症的产生。根据本研究结果显示,术后 1 个月拔除克氏针再行关节功能锻炼，基本不影响患肩关节功能恢复。

多数学者认为同时修复喙肩韧带和喙锁韧带对急性肩锁关节脱位术后获得水平和垂直方向的稳定非常重要[11,15]。由于喙锁间隙狭窄,喙锁韧带修补后打结困难。常规的外科结固定容易松脱,不能保证韧带断端密切接触。对于中间断裂的患者,采用经喙锁韧带 2 个附着处缝合 4 针，再用滑动锁结固定的缝合法，可以有效防止因韧带自身张力而引起的断端分离,保证修复重建后韧带的良好愈合,避免内固定取出后再脱位的发生。

通过对国人喙肩韧带的解剖学研究，测量其宽度为 16~26 mm,中间平均厚度为 1.28 mm[4]。在临床上设计了通过喙肩韧带内侧半部分转位的方法,加强了重建后喙锁韧带的强度，同时也保留喙肩弓的功能。手术时需完整暴露喙肩韧带,以肩峰为基底锐性分离内侧半 10 mm，凿取韧带黏附的肩峰部分骨质。术中注意切取韧带时保留周围软组织,以保证韧带和骨片的血供。行喙肩韧带内侧半转位加强重建喙锁韧带时,应将植入处锁骨对应的骨皮质去掉、凿出粗糙面,以保证移植后韧带与锁骨的骨性愈合。

因此,喙锁韧带修复喙肩韧带内侧半转位加强,同时辅以克氏针及锁骨钩钢板固定联合治疗新鲜肩锁关节完全脱位的临床效果理想，韧带的愈合可以有效防止内固定拆除后再脱位和后期骨性关节炎的发生。

参考文献

[1] Beitzel K, Cote MP, Apostolakos J, et al. Current concepts in the treatment of acromioclavicrlar joint dislocations[J]. Arthroscopy, 2013, 29(2): 387-397.

[2] Weaver JK, Dunn HK. Definitive procedure for complete acromioclavicular separation[J]. J Bone Joint Surg Am, 1972, 54(6): 1187-1194.

[3] 王娟,黄富国. 喙肩韧带内侧半对肩关节前上方稳定作用的生物力学研究[J]. 中国修复重建外科杂志,2009,23(1):49-51.
Wang J, Huang FG. A biomechanical study on coracoacromial ligament as anterosuperior restraint of should joint[J]. Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi, 2009, 23(1): 49-51. Chinese.

[4] 尹维刚,刘秀清,崔成立,等. 肱二头肌短头腱喙肱肌腱喙肩韧带内侧半重建喙锁韧带的应用解剖[J]. 中国临床解剖学杂志,2001,19(4):326-328.
Yin WG, Liu XQ, Cui CL, et al. Applied anatomy of transposition with tendon o f biceps brachii short head, coracobrachialis tendon and coracoacromial ligament for reconstructing the coracoclavicular ligament[J]. Zhongguo Lin Chuang Jie Pou Xue Za Zhi, 2001, 19(4): 326-328. Chinese.

[5] Williams GR, Nguyen VD, Rockwood CA. Classification and radiographic analysis of acromioclavicular dislocations[J]. Appl Radiol, 1989, 18: 29-34.

[6] Krackow KA, Thomas SC, Jones LC. Ligament-teddon fixation: analysis of a new stitch and comparison with standard techniques[J]. Orthopedics, 1988, 11(6): 909-917.

[7] Constant CR, Murley AH. A clinical method of functional assessment of the shoulder[J]. Clin Orthop Relat Res, 1987, (214): 160-164.

[8] 赵勇,董福慧. 肩锁关节脱位治疗的热议与冷思考[J]. 中国骨伤杂志,2011,24(3):183-185.
Zhao Y, Dong FH. Heated discussion and calm thinking about treatment of acromioclavicrlar joint dislocation[J]. Zhongguo Gu Shang/China J Orthop Trauma, 2011, 24(3): 183-185. Chinese.

[9] Salem KH, Schmelz A. Treatment of Tossy Ⅲ acromioclavicular joint injuries using hook plates and ligament suture[J]. J Orthop Trauma, 2009, 23(8): 565-569.

[10] 王春祯,李登禄,牟世祥. 锁骨钩钢板配合喙肩韧带转移治疗青壮年新鲜 Tossy Ⅲ型肩锁关节脱位的病例对照研究[J]. 中国骨伤,2012,25(7):576-579.
Wang CZ, Li DL, Mu SX. Case-contral study on clavicular hook plate combined with ligament transfer in the treatment of acromioclavicrlar joint dislocation of type Tossy Ⅲ in young patients[J]. Zhongguo Gu Shang/China J Orthop Trauma, 2012, 25(7): 576-579. Chinese with abstract in English.

[11] 李百川,张明,石丹,等. Tossy Ⅲ度肩锁关节脱位术后常见并发症[J]. 中国骨伤,2009,22(2):95-97.
Li BC, Zhang M, Shi D, et al. Postoperative complications of acromioclavicrlar joint dislocation of Tossy Ⅲ[J]. Zhongguo Gu Shang/China J Orthop Trauma, 2009, 22(2): 95-97. Chinese with abstract in English.

[12] Kienast B, Thietje R, Queitsch C. Mid-term results after operatives treatment of Rockwood Grade Ⅲ-Ⅴ acromioclavicular joint dislocations with an ac-Hook-Plate[J]. Eur J Med Res, 2011, 16: 52-56.

[13] Hoffler CE, Karas SG. Transacromial erosion of a locker subacromial hook plate: case report and review of literature[J]. J Shoulder Elbow Surg, 2010, 19(3): e12-15.

[14] von Heideken J, Boström Windhamre H, Une-Larsson V, et al. Acute surgical treatment of acromioclavicrlar dislocation type V with a hook plate: superiority to late reconstruction[J]. J Shoulder Elbow Surg, 2013, 22(1): 9-17.

[15] Tauber M. Management of acute acromioclavicular joint dislocations: current concepts[J]. Arch Orthop Trauma Surg, 2013, 133(7): 985-995.

(收稿日期:2014-01-15　本文编辑:王玉蔓)

·读者·作者·编者·

本刊关于一稿两投和一稿两用等现象的处理声明

文稿的一稿两投、一稿两用、抄袭、假署名、弄虚作假等现象属于科技领域的不正之风,我刊历来对此加以谴责和制止。为防止类似现象的发生,我刊一直严把投稿时的审核关,要求每篇文章必须经作者单位主管学术的机构审核,附单位推荐信(并注明资料属实、无一稿两投等事项)。希望引起广大作者的重视。为维护我刊的声誉和广大读者的利益,凡核实属于一稿两投和一稿两用等现象者,我刊将择期在杂志上提出批评,刊出其作者姓名和单位,并对该文的第一作者所撰写的一切文稿 2 年内拒绝在本刊发表,同时通知相关杂志。欢迎广大读者监督。

《中国骨伤》杂志社