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ORIGINAL ARTICLE

Truly anatomic coracoclavicular ligament reconstruction with 2 Endobutton devices for acute Rockwood type V acromioclavicular joint dislocations

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Background: Truly anatomic coracoclavicular ligament reconstruction (TACCR) according to the original insertions is a creative new method for the treatment of severe acromioclavicular separation. This research analyzed the clinical and radiologic results of TACCR in 25 patients with at least 2-year follow-up.
Methods: The study enrolled 25 patients with Rockwood type V acromioclavicular joint dislocations who underwent TACCR using 2 Endobutton (Smith & Nephew Inc., Andover, MA, USA) devices from May 2013 to October 2015. Patients were assessed with clinical and radiologic follow-up at 3, 6, 12, 18, and 24 months postoperatively. The clinical assessments consisted of the visual analog scale and the Constant score. The radiographic evaluations were performed by measurements of the coracoclavicular distance.
Results: The mean follow-up was 34 ± 6.8 months (range, 24-48 months). The visual analog scale and Constant scores revealed significant advancements from 5 ± 0.9 (range, 4-7) and 45 ± 5.6 (range, 30-54) scores preoperatively to 0 ± 0.5 (range, 0-2) and 95 ± 2.9 (range, 91-98) scores at 24 months postoperatively, respectively. The coracoclavicular distance significantly decreased from 23 ± 5.4 mm (range, 16-34 mm) preoperatively to 8 ± 0.9 mm (range, 7-10 mm) at the final follow-up.
Conclusions: TACCR represents a safe, reliable and creative surgical technique that yields good to excellent clinical and radiologic outcomes in the treatment of severe acromioclavicular separation.
Level of evidence: Level IV; Case Series; Treatment Study

Keywords: Acromioclavicular joint dislocations; coracoclavicular ligaments; truly anatomic reconstruction; original insertions; trapezoid ligament; conoid ligament

The First Affiliated Hospital of Nanjing Medical University Ethics Committee approved this study (2013-SR-126).

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The incidence of acromioclavicular (AC) dislocation is rising due to the growing numbers of traffic accidents and sports injuries.[12] Although most AC dislocations can be treated nonoperatively, high-grade separations with ruptures of the coracoclavicular (CC) ligaments may require operative treatment to reconstruct the anatomy, alleviate pain, and improve

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Table I Patient information*

Patient	Sex	Age (y)	Side	Follow-up (mo)	Preoperative scores		Preoperative injured CC distance (mm)
					VAS	Constant	
1	F	35	L	48	6	48	16
2	M	55	L	46	6	52	27
3	F	53	L	45	5	50	28
4	M	49	R	42	5	54	34
5	F	32	R	41	6	40	31
6	M	56	L	38	7	48	17
7	M	35	R	37	6	50	19
8	F	38	L	36	7	48	17
9	M	34	R	35	5	42	16
10	F	50	L	34	7	42	33
11	M	47	L	34	5	54	17
12	M	28	R	34	4	52	20
13	F	53	R	33	6	44	19
14	M	32	R	32	5	47	21
15	F	18	L	32	5	46	30
16	M	67	R	31	6	44	18
17	M	63	L	30	6	42	26
18	M	71	L	29	5	48	28
19	M	62	R	28	5	46	23
20	M	19	L	28	5	42	26
21	M	46	L	27	5	46	23
22	F	24	L	26	4	30	22
23	M	37	R	25	6	44	23
24	F	34	R	24	6	44	24
25	F	39	L	24	4	34	20

CC, coracoclavicular; *VAS*, visual analog scale; *F*, female; *L*, left; *M*, male; *R*, right.
* All patients were Rockwood type V.

strength.[12,13,25,32] Various types of operative procedures have been reported in the literature, but there is still no gold standard technique in the treatment of AC separation.[8-10,20,24,29,31]

At present, the tendency to restoring the CC ligaments as anatomically as possible is increasing, but most of these techniques do not recreate the conoid and trapezoid ligaments separately and cannot be regarded as the truly anatomic CC ligament reconstructions (TACCRs).[2,14,16,23,26,33,35] Here, we describe an improved TACCR technique involving an open approach to achieve anatomic reconstruction of the torn CC ligaments according to the original insertions by using 2 Endobutton devices (Smith & Nephew Inc., Andover, MA, USA) loaded with 2 continuous loop (CL) sutures and 2 No. 2 Ethibond sutures (Ethicon Inc., Somerville, NJ, USA). The aim of the research was to analyze the clinical and radiologic results of TACCRs performed in 25 patients with high-grade AC separations. We hypothesize that TACCR using 2 Endobutton devices is a promising technique that leads to superior functional results up to 24 months postoperatively compared with other techniques in the literature.

Materials and methods

Patient population

The study was designed as a consecutive case series report. From May 2013 to October 2015, 25 consecutive patients (15 men and 10 women) with AC dislocations were treated in the First Affiliated Hospital of Nanjing Medical University by TACCR with 2 Endobutton devices (Table I). The inclusion criteria were (1) Rockwood grade V AC separation, (2) no other injuries in the ipsilateral upper limb, (3) no preceding operations performed on the impaired shoulder, and (4) no other associated injuries. Informed written consent was obtained from all patients.

According to the Rockwood classification, all patients had type V dislocations. The diagnoses were confirmed with preoperative radiographs that included anteroposterior and axillary views. The average age was 43 ± 14.6 years (range, 18-67 years). The left side was affected in 14 patients and the right in 11. The dominant shoulder was impaired in 17 patients. The causes of injury included falls in 12, traffic accidents in 7, and sports injuries in 6. All operations were performed an average of 7 ± 2.4 days (range, 3-12 days) after the injury by the same experienced surgeon.