Original Article | Journal of Orthopaedic Case Reports 2026 November:16(11):Page 568-573

An Innovative Approach to Chronic and Neglected Acromioclavicular Joint Dislocation: A Cost-Effective and Reliable Solution

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Learning Point of the Article:

Learning point: Chronic, neglected AC joint dislocations (Rockwood grades 3–5) can be reliably reconstructed with a simple Mersilene tape looped around the coracoid and through the clavicle, plus lateral clavicle excision, without grafts, hardware or costly implants, giving durable stability and good function at low cost.

Abstract

Introduction: Acromioclavicular (AC) joint dislocation accounts for a substantial proportion of shoulder injuries, and chronic or neglected cases – where the coracoclavicular (CC) ligaments have lost healing potential – pose particular management challenges. Numerous surgical techniques exist, but many are limited by graft weakness, hardware complications, or cost. This study presents a technique for chronic AC joint reconstruction using synthetic tape combined with lateral clavicle excision.

Materials and Methods: In this retrospective study, 11 patients with delayed presentation (≥6 weeks post-injury) and Rockwood grade 3–5 AC joint dislocation underwent surgery using a 30 cm × 5 mm Mersilene tape to reconstruct the CC ligaments, without fixation hardware or grafts, combined with lateral clavicle excision. Patients were assessed pre- and post-operatively using the AC joint instability (ACJI) score, visual analog scale (VAS) pain score, and Constant-Murley score, with follow-up to 2 years.

Results: Mean patient age was 46.6 years, with a male-to-female ratio of 3:1. The mean ACJI score improved from 63.7 pre-operatively to 81.4 at 2 years. VAS pain score improved from 6.41 pre-operatively to 2.68 at 6 months and 1.25 at 12 months. Constant-Murley score improved from 51 to 92.08 at 12 months. One patient had a 20% vertical clavicle displacement without clinical complaints; all other patients achieved stable, satisfactory outcomes in pain, cosmesis, and shoulder function.

Discussion: Unlike techniques reliant on graft healing or hardware fixation – which carry risks of graft weakening, stress fracture, or implant-related complications – this Mersilene tape technique avoids implant removal and provides durable mechanical support for CC ligament reconstruction. It offers a cost-effective alternative to imported graft materials while achieving comparable or superior functional outcomes.

Conclusion: This synthetic tape-based technique for chronic AC joint reconstruction is rapid, reproducible, and cost-effective, providing durable and predictable clinical outcomes with low morbidity.

Keywords: Acromioclavicular joint dislocation, coracoclavicular ligament reconstruction, mersilene tape, chronic shoulder instability, lateral clavicle excision.

Introduction

The acromioclavicular (AC) joint, a diarthrodial joint, accounts for 40–50% of shoulder injuries [1,2]. Dislocations of the AC joint occur more frequently in males than females (5:1 ratio) and are more often incomplete than complete (2:1 ratio) [3]. Patients with AC joint injuries often experience changes in

Access this article online

Website: www.jocr.co.in

DOI: https://doi.org/10.13107/jocr.2026.v16.i11.8554

Author's Photo Gallery



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Submitted: 26/08/2026; Review: 17/09/2026; Accepted: October 2026; Published: November 2026

DOI: https://doi.org/10.13107/jocr.2026.v16.i11.8554

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Figure 1: SHOWING PRE OP ABDUCTION UPTO 100*



Figure 2: SHOWING PRE OP FORWARD FLEXION UPTO 90*



Figure 3: SHOWING POST OP ABDUCTION UPTO 180*

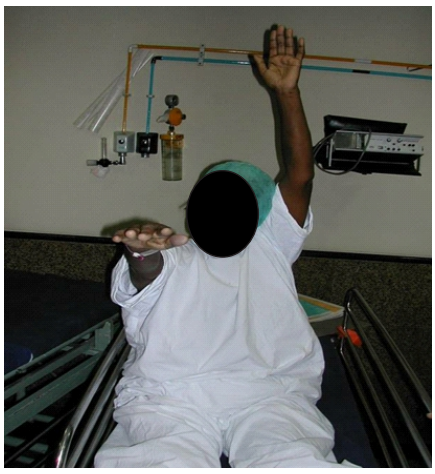


Figure 4: SHOWING PRE OP FORWARD FLEXION ON LEFT SIDE COMPARED TO RIGHT UPTO 90*



Figure 5: SHOWING PRE OP DECREASED INTERNAL ROTATION ON RIGHT SIDE COMPARED TO LEFT SIDE



Figure 6: SHOWING PRE OP DECREASED EXTERNAL ROTATION ON RIGHT SIDE COMPARED TO LEFT SIDE

scapular orientation, leading to rotator cuff injuries and chronic pain [4]. Biomechanical studies underscore the importance of anatomically reconstructing the coracoclavicular (CC) ligaments in cases of unstable AC joint injuries [5].

The treatment strategy for chronic AC joint instability (ACJI) differs from that of acute cases. In the acute phase, the AC and CC ligaments have the potential to heal, thus the treatment focuses on aligning the torn ligament ends during tissue healing. However, this healing potential is lost after 3 weeks [6]. Various techniques have been documented for treating AC joint dislocation, including primary joint fixation, CC ligament reconstruction, clavicle excision, dynamic muscle transfers, coracoacromial ligament transfer, and various fixation methods. Combinations of these techniques are now prevalent [7].

This case series presents a technique for AC joint reconstruction in chronic cases of Rockwood types 3, 4, and 5, utilizing a synthetic tape alongside lateral clavicle excision. This method is demonstrated to be rapid, economical, effective, and associated with low morbidity and favorable clinical outcomes (Fig.1-9).



Figure 7: SHOWING POST OP FORWARD FLEXION SIMILAR ON BOTH SIDES



Figure 8: SHOWING POST OP INTERNAL ROTATION SIMILAR ON BOTH SIDES



Figure 9: SHOWING POST OP INTERNAL ROTATION SIMILAR ON BOTH SIDES

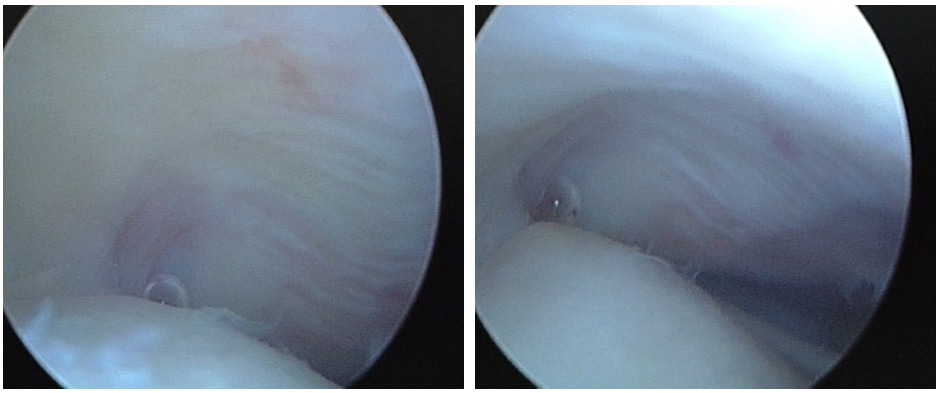


Figure 10 & 11: FIGURE 10 AND 11 ATHROSCOPY SHOWING BURSAL SURFACE OF ROTATOR CUFF

Materials and Methods

In this retrospective study, we evaluated 11 patients with delayed presentation (6 weeks or more post-injury) who underwent surgery. Patients were excluded if they had associated fractures, brain injuries, cognitive impairments, or abnormal shoulder function before injury.

Technique

Our technique utilizes a simple 30 cm × 5 mm Mersilene tape (Polyethylene Terephthalate) (Ethicon- Johnson and Johnson) to replicate the function of the CC ligaments, without the need for a fixation device, hardware, or graft.

The patient, under general anesthesia, is placed in the beach-chair position, with a sandbag placed under the ipsilateral scapula. Two incisions are used in this technique. The first is a 3–4 cm horizontal incision over the lateral-most end of the clavicle. The second is a 3 cm vertical incision placed over the coracoid process. Across the first incision, the lateral clavicle end is exposed, and the lateral 7–10 mm of the clavicle is excised using an oscillating saw. Any deltoid-trapezial fascia/muscle fibers found interposed within the ACJ must be cleared, so that the clavicle can be reduced back to the level of the acromion. A 3.2 mm drill bit is used to drill a hole in the clavicle about 10 mm from the excised edge.

Across the second incision, the dissection is taken down to the base of the coracoid process. Two retractors are placed on either side of the coracoid, with care, avoiding overzealous retraction. Bluntly dissect down to the coracoid base.

Next, using Mixter forceps, the Mersilene tape is passed under the coracoid near its base. The intervening tissue between the two incisions is bluntly dissected from the 1st incision above toward the 2nd incision below. This facilitates shuttling the two limbs of the Mersilene tape from the coracoid base to the clavicle. The medial limb of the tape is brought out posterior to the clavicle. This medial limb is then passed through the 3.2 mm clavicle hole, from superior to inferior, to exit below the clavicle. The assistant then reduces the clavicle down to the acromion, and while holding this reduction, the

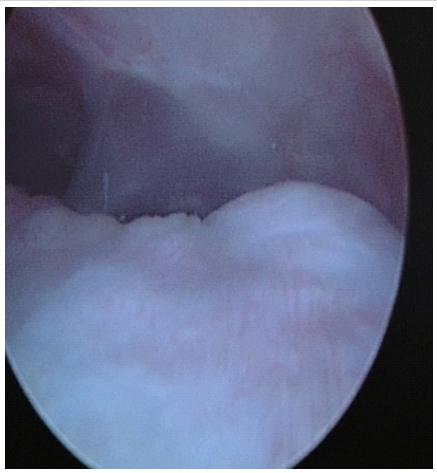


Figure 12: ATHROSCOPY SHOWING SUBSCAPULARIS MUSCLE

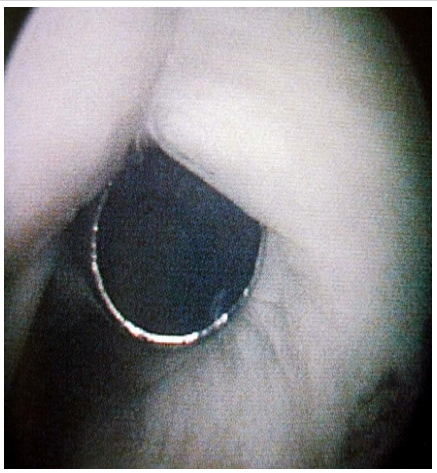


Figure 13: ATHROSCOPY SHOWING SUBSCAPULARIS MUSCLE RESECTION



Figure 14: patient positioned in beach chair position.



Figure 15: pre operative marking done on the patients shoulder.

surgeon knots the two ends of the Mersilene tape under the coracoid base through the 2nd incision. At least 4 knots on the Mersilene tape are preferred. The assistant gently releases the force applied to the reduced clavicle, and the reduction is then maintained by the tape (Fig. 10-15).

Post-operative care

Patients' upper limbs are supported in a sling for 3–4 weeks, with no weight lifting allowed. All patients were discharged on the 2nd post-operative day after dressing changes. Sutures were removed at 2 weeks, and gentle pendular exercises commenced based on pain tolerance. Shoulder-strengthening exercises were progressively intensified after a month.

Results

The procedure was performed on 11 patients with neglected AC joint dislocations of Rockwood grades 3 to 5, with a mean age of 46.6 years. The right shoulder was involved in 8 of 12 cases, with a male-to-female ratio of 3:1. Injuries were caused by falls in 10 cases and road traffic accidents in 2 cases. Pre- and post-operative assessments of pain, daily activities, cosmesis, and range of motion showed satisfactory functional outcomes without paracervical or trapezius pain.

One patient experienced a 20% vertical displacement of the clavicle's lateral end, but had no clinical complaints. The mean post-operative ACJI score improved from 63.7 pre-operatively to 81.4 post-operatively at 2 years. The visual analog scale score improved from 6.41 pre-operatively to 2.68 at 6 months and 1.25 at 12 months. The Constant Murley score improved from 51 pre-operatively to 92.08 at 12 months. At final follow-up, all patients had satisfactory outcomes in terms of pain, cosmesis, and shoulder function. The AC joint was stable both clinically and radiologically in all cases (Table 1 & 2).

Discussion

Despite various surgical techniques for treating these injuries, achieving long-term functional outcomes has been challenging [8]. Techniques include fixing the AC joint with K-wires or tension bands or reconstructing the CC ligaments with various materials. The clavicle hook plate is a simple and beneficial method, but complications, such as hardware prominence and fixation loss are significant [9]. Arirachakaran et al. found that loop suspensory fixation of the CC joint yields better functional scores than hook plates for AC joint dislocations [10].

Most techniques assume the CC ligaments will heal to their original length and strength, but if they do not, these methods may fail. Reconstruction can avoid this issue by using local tissue sources or tendon grafts, either autografts or allografts, to align the clavicle and coracoid. Initial reconstruction techniques by Weaver and Dunn involved ligament transfer [11], but this method had higher risks of dislocation compared to anatomical ligaments. Dewar and Barrington [12] described coracoid bone transposition, which carries high risks of bone fracture and nerve injury.

Autologous graft use for CC ligament reconstruction loses up to

Table 1: Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	FLEXION RANGE OF MOTION-PRE OP	80.75	20	13.599	3.041
	FLEXION RANGE OF MOTION POST	158.75	20	9.301	2.08
Pair 2	ABDUCTION_PRE	58.5	20	9.881	2.209
	ABDUCTION POST	141	20	12.732	2.847
Pair 3	EXTRNAL_ROTATION_PRE	17	20	5.938	1.328
	EXTERNAL_ROTATION POST	58.5	20	9.881	2.209
Pair 4	INTERNAL_ROTATION_PRE	30.5	20	7.763	1.736
	POST OP INTERNAL	64.25	20	6.742	1.508
Pair 5	OSS PRE	9.35	20	1.496	0.335
	OSS POST	34.85	20	5.214	1.166

Table 2: Paired Samples Test

		Paired Differences					t	Df	Significance	
		Mean	SD	SE	95% Confidence Interval of the Difference				One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	FLEXION RANGE OF MOTION-PRE OP - FLEXION RANGE OF MOTION	-78	12.711	2.842	-83.949	-72.051	-27.442	19	< .001	< .001
Pair 2	ABDUCTION_1 - ABDUCTION	-82.5	13.328	2.98	-88.738	-76.262	-27.683	19	< .001	< .001
Pair 3	EXTRNAL_ROTATION_1 - EXTERNAL_ROTATION	-41.5	7.797	1.743	-45.149	-37.851	-23.804	19	< .001	< .001
Pair 4	INTERNAL_ROTATION_1 - POST OP	-33.75	7.759	1.735	-37.381	-30.119	-19.454	19	< .001	< .001
Pair 5	RANGE OF MOTION PRE OP - POST OP	-25.5	5.643	1.262	-28.141	-22.859	-20.209	19	< .001	< .001

30–40% of its original strength [13], and early graft weakness during necrosis and revascularization can lead to failure [14]. In addition, the graft remains weak post-fixation, increasing the risk of stress fractures [15].

Studies have shown that CC ligaments provide superior stability, while AC ligaments provide anterior-posterior stability [8,16,17]. Beitzel et al. concluded that both ligaments should be anatomically repaired for optimal function, but our case did not include AC ligament repair and resulted in no functional outcome changes.

Anatomical AC joint reduction and CC ligament reconstruction are essential for achieving good clinical and imaging results, regardless of the material used. Mersilene tape avoids implant-related complications and does not require removal, offering favorable functional outcomes and pain-free shoulder movement. This method is cost-effective compared to imported alternatives, making it more accessible and providing good objective and subjective outcomes with minimal complications.

Conclusion

This technique offers a cost-effective, rapid, robust, and reproducible solution with durable and predictable outcomes for treating chronic AC joint dislocations.

Clinical Message

Chronic and neglected AC joint dislocations (Rockwood grades 3–5) can be reliably managed using a simple, low-cost Mersilene tape reconstruction of the CC ligaments combined with lateral clavicle excision, avoiding the need for grafts or fixation hardware. This technique offers durable joint stability, significant pain relief, and improved shoulder function, making it a reproducible and accessible option, particularly in resource-limited settings.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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Conflict of Interest: Nil
Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this article

How to Cite this Article

Rathod V, Munshi P. An Innovative Approach to Chronic and Neglected Acromioclavicular Joint Dislocation: A Cost-Effective and Reliable Solution. J Orthop Case Rep. 2026 November;16(11):568-573. doi: 10.13107/jocr.2026.v16.i11.8554.