Functional Outcomes in Patients with Acromioclavicular Dislocation Treated with Coracoclavicular Stabilization and Acromioclavicular Cerclage

Fernando M. Lossada Finol, Julio Carruyo Avila
Orthopaedic and Trauma Surgery Service, Hospital Coromoto de Maracaibo, Venezuela

ABSTRACT

Introduction: The treatment of acromioclavicular dislocations using a coracoclavicular stabilization system with high-strength sutures achieves reduction of the dislocation and maintains acromioclavicular joint stability. However, some modifications incorporate additional surgical techniques, such as acromioclavicular cerclage, to provide stabilization in different planes. **Objective:** To evaluate functional outcomes, functional scores, and complications in patients with acromioclavicular dislocations treated with coracoclavicular stabilization and acromioclavicular cerclage. **Materials and Methods:** Forty-two patients with traumatic type IIIb, IV, or V acromioclavicular dislocations of less than 2 weeks' duration were prospectively evaluated. Patients with associated fractures or glenohumeral instability were excluded. The Visual Analog Scale and the Constant-Murley score were used. **Results:** The mean age was 31.26 ± 10.7 years, and most patients were female (54.8%). After surgery, 71.4% of patients went from experiencing severe pain (7-10 points) to no pain (0 points). The Constant-Murley score improved from 1.17 ± 0.37 before treatment to 3.88 ± 0.32 after treatment, reflecting an improvement in the patients' clinical condition. **Conclusions:** Coracoclavicular stabilization with acromioclavicular cerclage is a valid treatment option that provides good functional outcomes and improved scores in patients with acute type IIIb, IV, or V acromioclavicular dislocations.

Keywords: Acromioclavicular dislocation; functional scores; coracoclavicular stabilization; acromioclavicular cerclage.
Level of Evidence: IV

Resultados funcionales en pacientes con luxación acromioclavicular tratada con estabilización coracoclavicular y cerclaje acromioclavicular

RESUMEN

Introducción: El tratamiento de las luxaciones acromioclaviculares con un sistema de estabilización coracoclavicular con suturas de alta resistencia logra reducir la luxación y mantener estable la articulación acromioclavicular, aunque existen modificaciones que suman otras técnicas quirúrgicas (cerclaje acromioclavicular) para estabilizar en diferentes planos. **Objetivo:** Evaluar los resultados funcionales, las escalas funcionales y las complicaciones en pacientes con luxaciones acromioclaviculares tratadas con estabilización coracoclavicular y cerclaje acromioclavicular. **Materiales y Métodos:** Se evaluó prospectivamente a 42 pacientes con luxación acromioclavicular tipos IIIb, IV y V, con menos de 2 semanas de evolución y traumáticas. Se excluyó a pacientes con fracturas asociadas e inestabilidad glenohumeral. Se utilizaron la escala analógica visual y la escala de Constant-Murley. **Resultados:** La edad de los pacientes era de 31.26 ± 10.7 años, y predominaba el sexo femenino (54,8%). El 71,4% pasó de tener dolor intenso (7-10 puntos) a no sentir dolor (0 punto) después del procedimiento quirúrgico. El puntaje de la escala de Constant-Murley (1,17 ± 0,37) antes y (3,88 ± 0,32) después del tratamiento mejoro la condición clínica del paciente. **Conclusiones:** La técnica de estabilización coracoclavicular con cerclaje acromioclavicular se considera una opción válida que permite obtener buenos resultados funcionales en pacientes con luxaciones acromioclaviculares tipos IIIb, IV y V agudas, con mejoría de los puntajes.

Palabras clave: Luxación acromioclavicular; puntajes funcionales; estabilización coracoclavicular; cerclaje acromioclavicular.
Nivel de Evidencia: IV

Received on May 22nd, 2024. Accepted after evaluation on March 24th, 2026 • Dr. FERNANDO M. LOSSADA FINOL • fmlf73@gmail.com https://orcid.org/0000-0003-0828-2164

How to cite this article: Lossada Finol FM, Carruyo Avila J. Functional Outcomes in Patients with Acromioclavicular Dislocation Treated with Coracoclavicular Stabilization and Acromioclavicular Cerclage. *Rev Asoc Argent Ortop Traumatol* 2026;91(4):299-305. https://doi.org/10.15417/issn.1852-7434.2026.91.4.1968

INTRODUCTION

The ability to classify acromioclavicular dislocations, identify the structures involved, and characterize the different patterns of displacement makes it possible to select the appropriate surgical treatment to reduce and control vertical, horizontal, and rotational instability.[1,2] The various surgical techniques used to treat acromioclavicular dislocations have proven effective and provide stable reduction.[3-6]

Surgical treatment of this condition aims to achieve anatomic reduction of the acromioclavicular dislocation and repair the injured structures. For type IIIb (ISAKOS Upper Extremity Committee) and types IV, V, and VI (Rockwood classification) dislocations,[1] dynamic stabilization techniques for the acromioclavicular joint are used, involving sutures, grafts, tapes, screws, anchors, or suture buttons. These procedures may be performed arthroscopically and provide reliable stabilization.[3–6]

The addition of shoulder arthroscopy to acromioclavicular dislocation repair allows associated glenohumeral joint pathology to be identified and treated.[7–9] Coracoclavicular stabilization with high-strength sutures can reduce the dislocation and maintain acromioclavicular joint stability, although some modifications incorporate additional surgical techniques (acromioclavicular cerclage) to provide multiplanar stabilization.[3,8,10]

One of the surgical alternatives proposed for the management of patients with acromioclavicular dislocation is coracoclavicular stabilization combined with acromioclavicular cerclage. This technique has yielded good results in type IIIb, IV, and V dislocations by providing vertical, horizontal, and rotational stability and reducing the risk of instability and loss of reduction.[3,8,11,12]

The objective of this study was to evaluate functional outcomes, scores, and complications in patients with acromioclavicular dislocations treated with coracoclavicular stabilization and acromioclavicular cerclage.

MATERIALS AND METHODS

A prospective explanatory study was conducted. Patients with acromioclavicular dislocation underwent coracoclavicular stabilization combined with acromioclavicular cerclage. The sample consisted of 42 patients. Diagnostic shoulder arthroscopy was performed in all cases. All patients with type IIIb, IV, or V acromioclavicular dislocations resulting from a traumatic event were included. Two patients were excluded because of associated fractures, glenohumeral instability, and incomplete clinical and radiographic evaluations at the end of follow-up.

This study was approved by the hospital's ethics committee.

Functional Assessment

Patients were evaluated before and after surgery. During history taking, data were collected on age, sex, sports activity, acromioclavicular dislocation classification, and complications. On physical examination, patients had shoulder pain and a positive piano key sign for acromioclavicular dislocation. The diagnosis was confirmed with anteroposterior shoulder radiographs and Alexander views. The rotator cuff and long head of the biceps tendon were evaluated by ultrasound to identify associated lesions. The Visual Analog Scale (VAS) and Constant-Murley score were also administered.

Surgical Procedure

The patients provided informed consent. They were placed in the beach-chair position. Aseptic and antiseptic preparation was performed, and sterile drapes were applied. Then, they underwent ultrasound-guided interscalene brachial plexus block and general anesthesia.

The procedure was performed by a shoulder surgeon. Diagnostic shoulder arthroscopy was performed to identify associated lesions. The coracoid process was then skeletonized from lateral to medial, preserving the conjoint tendon, and a 2-mm-wide, high-strength polyethylene tape was passed through the subcoracoid region from medial to lateral.

A superior shoulder approach of approximately 4 cm was performed over the acromioclavicular joint. Two 2.7-mm clavicular tunnels were created in an anteroposterior direction under direct visualization, at 2 and 4 cm from the lateral margin of the clavicle, respectively. The medial end of the tape was retrieved through the lateral clavicular tunnel and the lateral end through the medial clavicular tunnel, creating a figure-of-eight configuration. The acromioclavicular dislocation was manually overreduced through the supraclavicular approach, with fluoroscopic confirmation, and the tape was tied over the posterior aspect of the clavicle (Figure).

The acromion was then tunneled from lateral to medial under fluoroscopic guidance. One end of the tape was passed from medial to lateral using a PDS suture and then tied, achieving acromioclavicular stabilization (Figure). The wound was closed in layers. Patients were immobilized in a sling for 21 days and then began passive exercises, which continued until the sixth week.

Postoperatively, VAS scores were <3, and Constant-Murley scores were >80 points, indicating excellent outcomes, at 3, 6, 9, 12, and 24 months. Radiographic follow-up with anteroposterior shoulder views was also performed at 3, 6, 9, 12, and 24 months, with no loss of reduction.

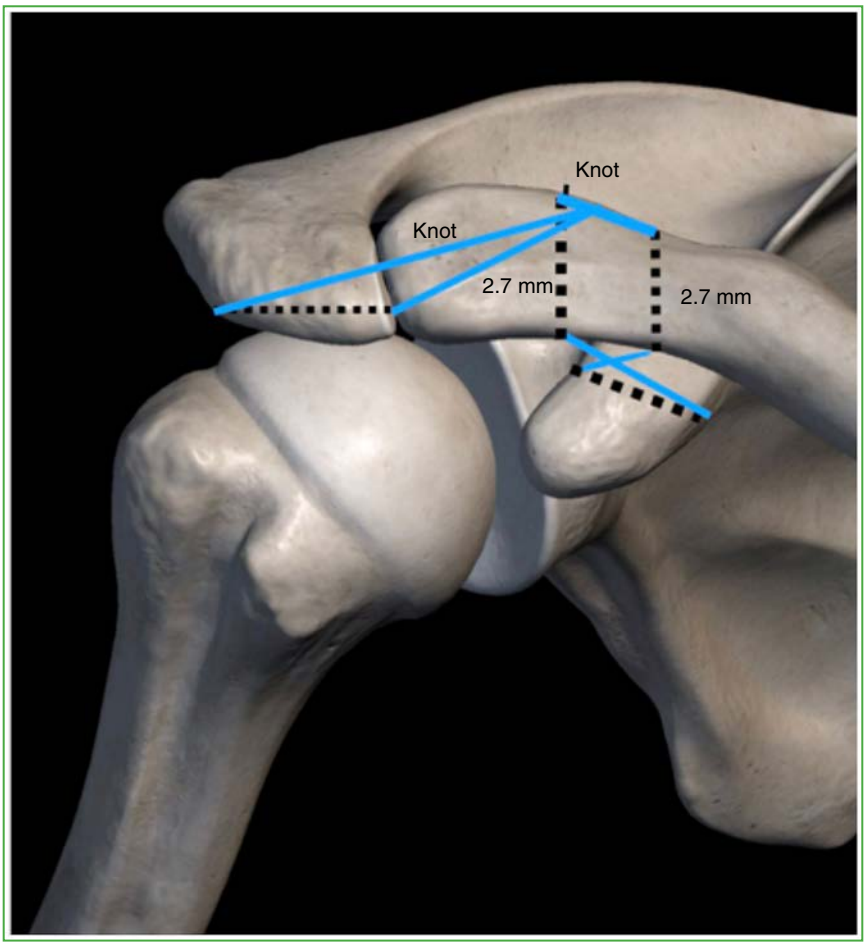

Figure. Two 2.7-mm clavicular tunnels are shown, created in an anteroposterior direction at 2 and 4 cm from the lateral margin of the clavicle. The medial end of the tape is retrieved through the lateral clavicular tunnel and the lateral end through the medial clavicular tunnel, creating a figure-of-eight configuration. The acromion is tunneled from lateral to medial, and one end of the tape is passed from medial to lateral and tied.

Statistical Analysis

The data were summarized in statistical tables using absolute and relative frequencies, the latter expressed as percentages. Descriptive statistics were used, with means and standard deviations calculated for scale variables. Inferential statistics were used to test the research hypothesis, using the paired Student's *t*-test and 99% confidence intervals. Statistical analyses were performed using SPSS version 25 and Excel for Windows.

RESULTS

Table 1 shows the general characteristics of patients with acromioclavicular dislocation who underwent coracoclavicular stabilization and acromioclavicular cerclage. This type of injury was more common in women (54.8%) and among patients who participated in sports (cycling, 40.5%; soccer, 9.5%).

Table 1. Data on patients who underwent coracoclavicular stabilization and acromioclavicular cerclage.

	Number	%
Age (mean ± SD)	(31.26 ± 10.7)	
18-30	26	61.9
31-57	16	38.1
Gender		
Female	23	54.8
Male	19	45.2
Sports activity		
Cycling	17	40.5
Soccer	4	9.5
Baseball	2	4.8
Other	1	2.44
None	18	42.8
Total	42	100

The most common type of acromioclavicular dislocation was type V (54.8%). All patients underwent open reduction with coracoclavicular stabilization and acromioclavicular cerclage assisted by shoulder arthroscopy (Table 2). Most patients (88.1%) had no complications. Suture dehiscence occurred in 9.5% and surgical site infection in 2.4%.

Table 2. Clinical characteristics of patients who underwent coracoclavicular stabilization and acromioclavicular cerclage.

Characteristic	Number	%
Classification of acromioclavicular dislocation		
IIIb	11	26.2
IV	8	19.0
V	23	54.8
Surgical treatment used		
Open reduction + CC stabilization and AC cerclage + shoulder arthroscopy	42	100
Surgical complications (follow-up at 3, 6, 9, 12, and 24 months)		
Suture dehiscence	4	9.5
Surgical site infection	1	2.4
None	37	88.1
Total	42	100

CC = coracoclavicular; AC = acromioclavicular.

Before surgery, 83.3% of patients had a Constant-Murley score <50 (poor), whereas after surgery, 88.1% had a score of 88-100 (excellent). Of note, 71.4% improved from <50 points (poor) to 88-100 points (excellent), with follow-up assessments at 3, 6, 9, 12, and 24 months (Table 3).

Table 3. Constant-Murley Score before and after treatment.

Constant-Murley Score Before	Constant-Murley Score After (follow-up at 3, 6, 9, 12, and 24 months)				Total	
	65-79 points (Good)		88-100 points (Excellent)		Number	%
	Number	%	Number	%		
<50 points (Poor)	5	11.9	30	71.4	35	83.3
50-64 points (Fair)	0	0.0	7	16.7	7	16.7
Total	5	11.9	37	88.1	42	100.0

Surgical treatment resulted in a change in clinical assessment based on the Constant-Murley scale, from 1.17 ± 0.37 before treatment to 3.88 ± 0.32 at 3, 6, 9, 12, and 24 months after surgery. Analysis of this change showed that surgical treatment significantly improved the patients' clinical condition (p <0.001) (Table 4).

Table 4. Constant-Murley Score before and after treatment.

Mean score	Before	After (follow-up at 3, 6, 9, 12, and 24 months)	p (99%) Student's t-test for paired samples	Confidence interval	
				Lower	Upper
	1.17 ± 0.37	3.88 ± 0.32	0.000	-2.85	-2.57

Another outcome measure used to evaluate the effectiveness of surgical treatment was the VAS. Pain intensity was compared before and after treatment. Before treatment, severe pain (7–10 points) was predominant, occurring in 83.3% of patients, whereas after treatment, one patient reported no pain. Of note, 71.4% of patients improved from severe pain (7–10 points) to no pain (0 points) during follow-up at 3, 6, 9, 12, and 24 months (Table 5).

Table 5. Visual Analog Scale (VAS) scores before and after treatment.

Pain intensity assessment Before	VAS After (follow-up at 3, 6, 9, 12, and 24 months)				Total	
	0 (No pain)		1–3 (Mild pain)		Number	%
	Number	%	Number	%		
4-6 (Moderate)	7	16.7	0	0.0	7	16.7
7-10 (Severe)	30	71.4	5	11.9	35	83.3
Total	37	88.1	5	11.9	42	100.0

VAS: no pain (0); mild (1-3); moderate (4-6); severe (7-10).

A change in pain intensity before (1.12 ± 0.32) and after (3.38 ± 0.37) surgical treatment was demonstrated using the VAS to assess changes in pain over the 24-month postoperative period (Table 6).

Table 6. Visual Analog Scale (VAS) scores before and after treatment.

	Before	After (follow-up at 3, 6, 9, 12, and 24 months)	p (99%) Student's t-test for paired samples	Confidence interval	
Mean score				Lower	Upper
	1.12 ± 0.32	3.88 ± 0.37	0.000	2.57	2.85

VAS: no pain (0); mild (1-3); moderate (4-6); severe (7-10).

DISCUSSION

In this study, the mean patient age was 31.26 ± 10.7 years, with a predominance of women (54.8%) and patients who participated in cycling. Type V acromioclavicular dislocation was the most common (54.8%). These results differ from those reported by Boström et al., who included 124 patients with a mean age of 40 years (range, 18–64), 91% of whom were men; 61 patients had an acromioclavicular dislocation.[13] These findings indicate that acromioclavicular dislocations can occur in both male and female adults.

In this study, all patients were treated with open reduction, coracoclavicular stabilization, and acromioclavicular cerclage assisted by shoulder arthroscopy. Complications included suture dehiscence (9.5%) and surgical site infection (2.4%). Saier et al. biomechanically demonstrated that only combined acromioclavicular and coracoclavicular reconstruction could adequately restore physiological horizontal stability of the acromioclavicular joint, which is consistent with the technique used in our study.[4] In contrast, Gaytán et al. reported no complications when using a double-button fixation system for acromioclavicular dislocations. The complications observed in our study may have been related to some patients not attending postoperative wound-care visits as scheduled.[14]

In a study by Natera-Cisneros et al., 10 patients with acromioclavicular dislocation were evaluated, and significant improvements from preoperative values were observed in the VAS (from 5.2 ± 2.40 to 1.7 ± 2.07) and Constant-Murley scores (95.6 ± 3.28 and 9.2 ± 0.67, respectively).[9]

Similarly, Pan et al. analyzed 179 patients and found that the use of tape was associated with a significantly lower VAS pain score, with no significant differences in Constant-Murley scores.[15] This is consistent with the findings of our study, in which 71.4% of patients improved from severe pain (7-10 points) to no pain (0 points) after surgery, while 71.4% improved from a Constant-Murley score of <50 points (poor) to 88-100 points (excellent).

The limitations of this study include the short follow-up period and the lack of a control group treated with a different surgical technique for comparison.

CONCLUSIONS

Coracoclavicular stabilization with acromioclavicular cerclage is a valid treatment option that provides good functional outcomes and improved scores in patients with acute type IIIb, IV, and V acromioclavicular dislocations.

Conflicts of interest: The authors declare no conflicts of interest.

J. Carruyo Avila ORCID ID: https://orcid.org/0000-0002-6995-6292

REFERENCES

1. Beitzel K, Mazzocca AD, Bak K, Itoi E, Kibler WB, Mirzayan R, et al. ISAKOS upper extremity committee consensus statement on the need for diversification of the Rockwood classification for acromioclavicular joint injuries. *Arthroscopy* 2014;30(2):271-8. https://doi.org/10.1016/j.arthro.2013.11.005
2. Aliberti GM, Kraeutler MJ, Trojan JD, Mulcahey MK. Horizontal instability of the acromioclavicular joint: A systematic review. *Am J Sports Med* 2020;48(2):504-10. https://doi. org/10.1177/0363546519831013
3. Martetschläger F, Tauber M, Habermeyer P, Selim HA. Arthroscopic coracoclavicular and acromioclavicular stabilization of acute acromioclavicular joint dislocation by suspensory fixation system. *Arthrosc Tech* 2019;8(6):e611-5. https://doi.org/10.1016/j.eats.2019.02.002
4. Saier T, Venjakob AJ, Minzlaff P, Föhr P, Lindell F, Imhoff AB, et al. Value of additional acromioclavicular cerclage for horizontal stability in complete acromioclavicular separation: a biomechanical study. *Knee Surg Sports Traumatol Arthrosc* 2015;23(5):1498-505. https://doi.org/10.1007/s00167-014-2895-7
5. Allahabadi S, Chahla J. Editorial commentary: coracoclavicular joint reconstruction for acromioclavicular dislocation: double bundle techniques are anatomically and biomechanically favored. *Arthroscopy* 2023;39(2):222-4. https://doi.org/10.1016/j.arthro.2022.10.019
6. Srimongkolpitak S, Apivatgaroon A, Chernchujit B, Atiprayoon S. Arthroscopic-assisted coracoclavicular stabilization with anchorless transosseous double-row acromioclavicular ligament complex repair: The acute acromioclavicular joint dislocation. *Arthrosc Tech* 2022;11(9):649-59. https://doi.org/10.1016/j. eats.2022.05.012
7. Ibañez F, Della Vedova F, Lepore S, Reybet JA, Taborro B, Aeschlimann M, et al. Asistencia artroscópica en reconstrucción de luxación acromioclavicular: descripción de técnica y reporte de resultados. *Artroscopía (Buenos Aires)* 2016;23(3):115-9. Available at: https://revistarelart.com/ediciones-anteriores/images/artroscopia/volumen-23-nro-3/PDFS/23_03_03_galan.pdf
8. Lossada Finol F, Carruyo Ávila JA. Luxación acromioclavicular tipo V tratada con tenosuspensión coracoclavicular y cerclaje acromioclavicular asistida por artroscopía. *Artroscopía (Buenos Aires)* 2023;30(3):131-3. Available at: https://revistarelart.com/index.php/revista/article/view/325/335
9. Natera-Cisneros L, Santiago-Boccolini H, Sarasquete-Reiriz J. Tratamiento de la inestabilidad acromioclavicular crónica. *Acta Ortop Mex* 2015;29(3):164-71. Available at: https://www.scielo.org.mx/pdf/aom/v29n3/v29n3a5.pdf
10. Karargyris O, Murphy RJ, Arenas A, Bolliger L, Zumstein MA. Improved identification of unstable acromioclavicular joint injuries in a clinical population using the acromial center line to dorsal clavicle radiographic measurement. *J Shoulder Elbow Surg* 2020;29(8):1599-605. https://doi.org/10.1016/j. jse.2019.12.014
11. Gómez-Mont-Landerreche J, Rodríguez-Martínez V, Flores-Carrillo A, Castañeda-Garduño J. Restablecimiento de la estabilidad horizontal en luxaciones acromioclaviculares III-V mediante la reconstrucción anatómica de los ligamentos coracoclaviculares y acromioclaviculares; técnica quirúrgica. *Acta Ortop Mex* 2022;36(2):128-33. https://doi.org/10.35366/108129
12. García-Gudiño VM, Proaño-Durán JC, Ordoñez-Oñate TE, Chaves-Calderón SX, Muñoz-Granja SJ. Comparison of radiological results of surgical repair of Rockwood V acromioclavicular dislocation with the modified Endobutton vs. Phemister technique. *Sapienza: International Journal of Interdisciplinary Studies* 2022;3(8):19-23. https://doi.org/10.51798/sijis.v3i8.545
13. Boström Windhamre H, von Heideken J, Une-Larsson V, Ekström W, Ekelund A. No difference in clinical outcome at 2-year follow-up in patients with type III and V acromioclavicular joint dislocation treated with hook plate or physiotherapy: a randomized controlled trial. *J Shoulder Elbow Surg* 2022;31(6):1122-36. https://doi.org/10.1016/j.jse.2021.12.003
14. Gaytán-Fernández S, Blanco-Ochoa LC, Barragán-Hervella RG, Montiel-Jarquín AJ, Sánchez-Durán MA, García-Galicia A. Manejo quirúrgico de la luxación acromioclavicular grado III con sistema de anclaje doble botón. *Acta Ortop Mex* 2019;33(5):314-8. Available at: https://www.scielo.org.mx/pdf/aom/v33n5/2306-4102-aom-33-05-314.pdf
15. Pan X, Lv RY, Lv MG, Zhang DG. TightRope vs clavicular hook plate for Rockwood III-V acromioclavicular dislocations: A meta-analysis. *Orthop Surg* 2020;12(4):1045-52. https://doi.org/10.1111/os.12724