Functional results of arthroscopic treatment of degenerative pathology of the shoulder. A single-center observational study with 3 years of follow-up.

Hugo Ernesto Villarroel Rovere [1ID] *, Carlos Alberto Jaramillo Becerra [1ID], Gustavo Adolfo Jose Matheus Valdivieso [1ID], Gabriel Machado De La Rosa [1ID], Leshlie Janine De La Torre Mendoza [1ID]

1. Orthopedics and Traumatology Service, Alcívar Hospital, Guayaquil, Ecuador.

Abstract

Introduction: This study aimed to determine the functional results of patients who underwent arthroscopy for various degenerative pathologies of the shoulder.

Methods: The present observational study was conducted in the Alcívar Hospital Traumatology Service. Between 2020 and 2022, 25 patients aged 18 and 75 who underwent arthroscopy for various shoulder diseases were evaluated. During follow-up, the Rowe scale was used to measure the evolution of patients with shoulder instability, and the modified Constant scale was used for the other pathologies in the presurgical and postsurgical stages at 3 and 6 months.

Results: The average follow-up was 4 months. The average score of the preoperative modified constant test was 30.9/100 points; after 3 months of evolution, it improved to 56.6/100; at 6 months, it was 92/100 points. In the Rowe test in the preoperative period, the average was 35/100 points; in the third month of recovery, it was 65.6/100 points, and 1 patient progressed to 6 months with 75/100 points.

Conclusions: Arthroscopic surgery shows favorable results, as it is minimally invasive and has shorter recovery periods.

Keywords:

MeSH: Arthroscopy, Shoulder, Shoulder Injury, Shoulder Pain.

Abbreviations

MR: rotator cuff.

Supplementary information

No supplementary materials are declared.

Acknowledgments

Not declared.

Authors' contributions

Hugo Ernesto Villarroel Rovere: Conceptualization, data curation, formal analysis, acquisition of funds, research, writing - original draft.
Carlos Alberto Jaramillo Becerra: Conceptualization, Data curation, Formal analysis.
Gustavo Adolfo Jose Matheus Valdivieso: Acquisition of funds, Research, Methodology, Resources, Supervision, Validation, Visualization.
Gabriel Machado De La Rosa: Writing - original draft, Writing - revision and editing.
Leshlie Janine De La Torre Mendoza: Conceptualization, data curation, formal analysis, acquisition of funds.
All the authors have read and approved the final version of the manuscript.

Financing

The authors of this article financed the expenses of this research.

Availability of data and materials

Not declared.

Surgery

Introduction

The shoulder is one of the joints considered of greater complexity due to the mobility and participation of various structures, such as the scapula, clavicle, and humerus, in conjunction with tendons, ligaments, and muscles, which together maintain a balance between joint movements and stability on the glenohumeral, acromioclavicular, sternoclavicular and thoracic scapular joints. Given these particularities, the shoulder is prone to be a site of multiple injuries and pathologies, both traumatic and degenerative [1,2].

Shoulder affectations can be located at the osteoarticular and periarticular levels and neighboring alterations, rheumatic diseases, and other referred areas. Osteoarticular and periarticular effects are more frequently related to traumatic and degenerative factors. The most frequent are subacromial syndrome, tendinopathies, and, for the most part, rotator cuff injuries, such as ruptures, inflammation, and fibrosis. The prevalence of rotator cuff injuries (RCIs) is variable; however, these injuries increase with age and can occur symptomatically and asymptomatically, generating functional limitations and affecting quality of life [3,4].

The treatment ranges from conservative through modifications of daily activities, medications, and physiotherapy to surgical management, all concerning the patient's symptoms and states for the elimination of pain and restoration of the mechanics of the shoulder. The trend is to perform less invasive procedures, so arthroscopy is an excellent option with good patient recovery results [5 -7].

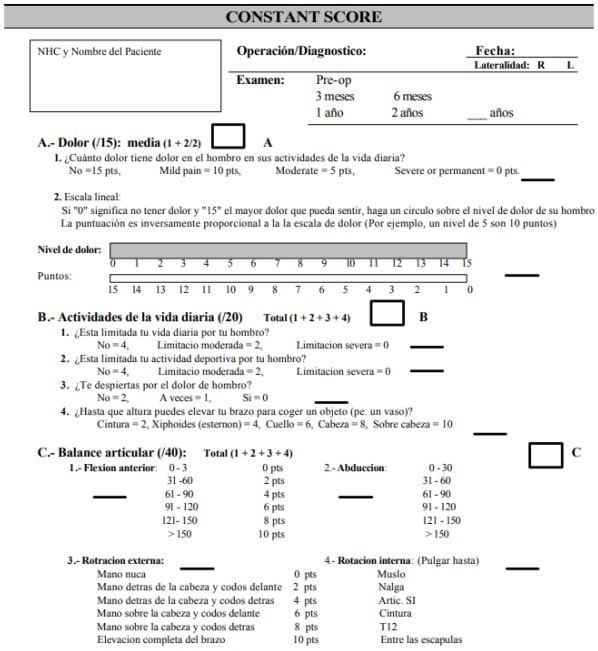
Currently, various methods are used to evaluate different shoulder pathologies, including the modified Constant Murley Scale, which allows the evaluation of patients after treatment of various shoulder pathologies, such as arthroplasty, rotator cuff injuries, and adhesive capsulitis. However, it could be more specific for assessing shoulder instability; for this situation, the Rowe scale is used [8,9].

The study's objective is to determine the functional results of patients who have undergone arthroscopy for various degenerative diseases of the shoulder.

Materials and methods

During the period 2020 to 2022, the trauma department of the Alcívar Hospital treated 29 patients with pathologies associated with the shoulder, of which 25 patients underwent arthroscopic surgery during that period, through a prospective study that included the following criteria of inclusion: patients aged 18 to 75 years, undergoing arthroscopic surgery, complete medical history, and a follow-up period of 3 to 6 months after surgery. The following were considered exclusion criteria: revision surgeries, irreparable rupture, incomplete medical history, loss to follow-up, and fractures associated with shoulder pathology. Data collection was obtained from the clinical records of the Alcívar Hospital database, and the application of shoulder functional assessment scales such as the Constant and Murley Scale was modified except to assess shoulder instability, where the Rowe Scale was used. These scales were applied during preoperative and post-surgical evolution. The first scale combines subjective and objective evaluation on a final score of 75 because it does not consider the force parameter with the appropriate transformation to equivalence over 100 points. The Rowe scale assesses three parameters, stability, mobility, and function, on a score of 100.

Figure 1. Modified Constant Test.



CONSTANT SCORE

NHC y Nombre del Paciente

Operación/Diagnostico: **Fecha:**

Lateralidad: R L

Examen: Pre-op
3 meses 6 meses
1 año 2 años ___ años

A.- Dolor (/15): media (1 + 2/2) ☐ **A**

1. ¿Cuánto dolor tiene dolor en el hombro en sus actividades de la vida diaria?
No =15 pts, Mild pain = 10 pts, Moderate = 5 pts, Severe or permanent = 0 pts. ___

2. Escala lineal:
Si "0" significa no tener dolor y "15" el mayor dolor que pueda sentir, haga un circulo sobre el nivel de dolor de su hombro a
La puntuación es inversamente proporcional a la la escala de dolor (Por ejemplo, un nivel de 5 son 10 puntos)

Nivel de dolor: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Puntos: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ___

B.- Actividades de la vida diaria (/20) **Total** (1 + 2 + 3 + 4) ☐ **B**

1. ¿Esta limitada tu vida diaria por tu hombro?
No = 4, Limitacio moderada = 2, Limitacion severa = 0 ___

2. ¿Esta limitada tu actividad deportiva por tu hombro?
No = 4, Limitacio moderada = 2, Limitacion severa = 0 ___

3. ¿Te despiertas por el dolor de hombro?
No = 2, A veces = 1, Si = 0 ___

4. ¿Hasta que altura puedes elevar tu brazo para coger un objeto (pe. un vaso)?
Cintura = 2, Xiphoides (esternon) = 4, Cuello = 6, Cabeza = 8, Sobre cabeza = 10 ___

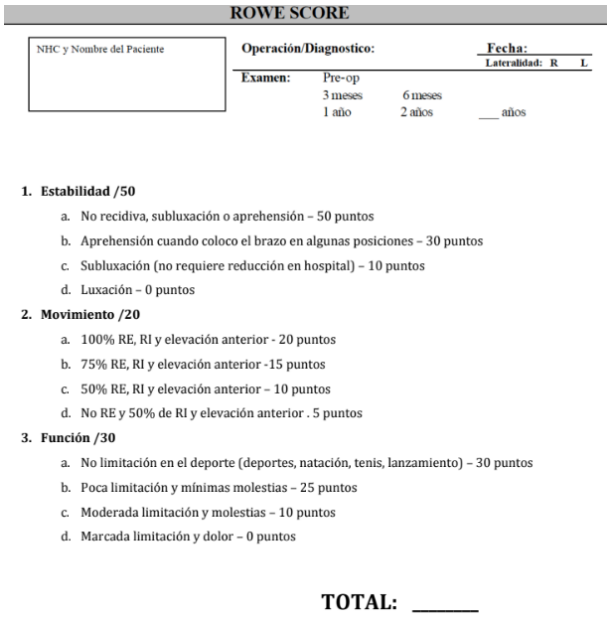
C.- Balance articular (/40): **Total** (1 + 2 + 3 + 4) ☐ **C**

1.- Flexion anterior:			**2.- Abduccion**:	
	0 - 3	0 pts		0 - 30
	31 -60	2 pts		31 - 60
___	61 - 90	4 pts	___	61 - 90
	91 - 120	6 pts		91 - 120
	121- 150	8 pts		121 - 150
	>150	10 pts		>150

3.- Rotracion externa: ___		**4.- Rotacion interna**: (Pulgar hasta) ___	
Mano nuca	0 pts	Muslo	
Mano detras de la cabeza y codos delante	2 pts	Nalga	
Mano detras de la cabeza y codos detras	4 pts	Artic. SI	
Mano sobre la cabeza y codos delante	6 pts	Cintura	
Mano sobre la cabeza y codos detras	8 pts	T12	
Elevacion completa del brazo	10 pts	Entre las escapulas	

Source: Argentine Arthroscopy Association

Figure 2. Rowe's test.



ROWE SCORE

NHC y Nombre del Paciente

Operación/Diagnostico: Fecha:

Lateralidad: R L

Examen: Pre-op
3 meses 6 meses
1 año 2 años ___ años

1. **Estabilidad /50**
   a. No recidiva, subluxación o aprehensión – 50 puntos
   b. Aprehensión cuando coloco el brazo en algunas posiciones – 30 puntos
   c. Subluxación (no requiere reducción en hospital) – 10 puntos
   d. Luxación – 0 puntos
2. **Movimiento /20**
   a. 100% RE, RI y elevación anterior - 20 puntos
   b. 75% RE, RI y elevación anterior -15 puntos
   c. 50% RE, RI y elevación anterior – 10 puntos
   d. No RE y 50% de RI y elevación anterior . 5 puntos
3. **Función /30**
   a. No limitación en el deporte (deportes, natación, tenis, lanzamiento) – 30 puntos
   b. Poca limitación y mínimas molestias – 25 puntos
   c. Moderada limitación y molestias – 10 puntos
   d. Marcada limitación y dolor – 0 puntos

TOTAL: _____

Source: Spanish Society of Shoulder and Elbow Surgery

Results

During the study period, 25 (100%) patients who underwent surgery were evaluated with an average follow-up of 4 months (Table 1). There were 12 (48%) patients with the right shoulder and 13 (52%) with the left shoulder. Eighty percent of the cases attended were male, and 20% were female. The ages ranged from 18 to 35 years with 7 (28%) patients, from 36 to 50 years with 5 (20%) patients, from 51 to 65 years with 8 (32%) patients and over 65 years with 4 (16%) patients. The surgeries performed in 2021 were 7 (28%), and in 2022, 18 (72%).

Table 1. Demographic data.

Gender	Total	Percentage
Male	20	80%
Female	5	20%
Affected side		
Right	12	48%
Left	13	52%
Age range		
18 a 35 años	7	28%
36 a 50 años	5	20%
51 a 65 años	8	32%
Over 65 years	4	16%

Table 2. Reasons for consulting the study group.

Main reasons for consultation	Total	Percentage
Trauma from falls	10	40%
Chronic pain with no apparent cause	8	32%
Dislocations	4	16%
Others (Pain associated with work activity, direct trauma, accidents)	3	12%
Total	**25**	**100%**

Among the reasons for consultation, 10 (40%) cases were due to injuries due to falls, 8 (32%) due to chronic pain with no apparent cause, 4 (16%) due to dislocations and 3 (12%) due to chronic pain due to work activity. direct trauma and car accidents (Table 2). Of the total patients undergoing surgery, 7 (28%) had between 7 and 9 months of postsurgical recovery, 4 (16%) had between 4 and 6 months, 9 (36%) had between 2 and 3 months, and 5 (20%) had a recovery time equal to or less than 1 month (Table 3).

Table 3. Postsurgical recovery time.

Time	Number	Percentage
≤ 1 mes	5	20%
2 to 3 months	9	36%
4 to 6 months	4	16%
7 to 9 months	7	28%
Total	**25**	**100%**

Of the 25 patients who underwent surgery, 17 were classified with a diagnosis of ICD 10 M-75.1 Rotator cuff syndrome (RM) and 8 with ICD 10 M-46.0 Shoulder dislocation. The modified Constant test was applied to the MR patients, while the Rowe test was used for the remaining 8 patients.

MR patients in the preoperative period presented an average of 30.9/100 points in the applied test. The following average data were obtained about evaluating the articular ranges: anterior flexion of 61°, abduction of 60°, external hand rotation behind the head and elbows in front, and internal rotation. The average managed to bring the thumb up to the gluteal area.

After the surgical procedure, the modified Constant test was applied at 3 and 6 months of evolution. Six patients were evaluated at 3 months, presenting a modified Constant score of 56.6/100, and concerning the joint ranges, an average of 120° anterior flexion was evidenced. In 90° abduction to

external rotation, the average could bring his hand behind the head and elbows behind, and in internal rotation, he could get his thumb to the sacral joint I.

At 6 months of evolution, 3 patients were evaluated, of which they presented a Constant score of 92/100, of which an average anterior flexion of 150° was found, abduction 150°, to external rotation the average presented total elevation of the arm and internal rotation were able to bring their thumb up to T12 (Table 4).

Table 4. Average in modified Constant's test and Rowe's test.

Injury time	Constant	Rowe
Presurgical	30.9	35
3 months	56.6 (Δ +25.7)	65.6 (Δ +30.6)
6 months	92 (Δ +35.4)	75 (Δ +9.4)

Of the 8 patients with shoulder dislocation, 7 had shoulder joint dislocation, and 1 had acromioclavicular dislocation. Within the glenohumeral joint lesions, 2 patients were identified with Hill-Sachs and 3 with Bankart/Hill-Sachs.

Once the Rowe test was applied in the preoperative period, the average was 35/100 points; in the third month of postoperative recovery, the average was 65.6/100 points, and 1 patient progressed to 6 months with a score of 75/100 points.

Discussion

The present study shows a significant predominance of the male sex with 80% and the female sex with 20%. This same relationship can be seen in the survey by Cisneros et al., where the predominance of patients with shoulder pathologies is the male sex 64% and the female sex 36%; this may be related to activities in the labor field and sports activities carried out by males compared to women [3].

The age range that predominated was between 51 and 65 years 8 (32%), which is similar to other studies, such as Luke S, where the average age was 56.2 years, as well as Cisneros and Navarro in their research, where shoulder pathologies were more significant between 4 and 5 decades [10].

The injured shoulder was predominantly left at 52% compared to the right at 48% compared to other studies where it was the right; this can be seen in the study by Oh Luke, where pathologies in the left shoulder predominate at 57%. This may be related to various anatomical, hormonal, biomechanical, and environmental factors, such as work or physical activity of the patient where pivoting is present, repetitive activities with the arm and sudden elevation of the shoulder, as well as direct contact being frequent mechanisms that generate shoulder level injuries [11,12].

In the study, the results of arthroscopic repair of the different shoulder pathologies had an average follow-up of 4 months with good prognoses; however, better results were evidenced in other studies with a minimum follow-up of 12 months [13].

In this study, the longer the recovery time was, the more significant the improvement in the Constant score. After 3 months of recovery, they showed improvement in joint ranges with an average anterior flexion of 120° and abduction of 90°; in external rotation, the average was able to bring his hand behind the head and elbows behind; and in internal rotation, he was able to bring his thumb up to the SI joint. At 6 months, with average articular ranges in anterior flexion of 150° and abduction of 150°, to external rotation, the average presented complete elevation of the arm, and in internal rotation, they were able to bring their thumb up to T12, which is correlated with studies carried out by Cisneros, wherein the fourth month, an improvement in the ranges of movement was demonstrated in a more significant proportion. In addition, in this study, abduction ranges more effective than 90 degrees were obtained in 89% of cases, and other similar studies, such as Andrews's with 90%, reported ranges greater than 120 degrees. However, Pol E. Huijsmans et al. in a survey of 264 cuff injuries treated arthroscopically, found an improvement in pain in the postoperative period with subjective results above 90%. Several of these studies are supported by the initiation of physical rehabilitation programs after the intervention, generating optimal results, as well as the patient's subjective perception. Various studies generally report good functional results between 75% and 95% of patients after undergoing arthroscopy and rehabilitation therapies [14 -17].

With the patients with dislocations who underwent the Rowe test in the preoperative period, the average was 35/100. In the third month of postoperative recovery, the average was 65.6/100 points, and 1 patient evolved up to 6 months with a score. Hachem et al. obtained similar results of 75/100 points in the study, where the presurgical average was 25.2/100 and at 6 months 84.7/100 [18 -20].

Conclusions

Arthroscopy shows promising results in recovery time, which is associated with age as a factor of better evolution. Arthroscopy is a less invasive intervention method with less surgical morbidity and allows improvement in the amplitude of movements, reducing pain.

References

1. Guevara BG. Editorial Commentary: In Contrast to Chronic, Degenerative Rotator Cuff Tears, the Critical Shoulder Angle in Traumatic Rotator Cuff Tears Can Be Ignored. Arthroscopy. 2023 Feb;39(2):232-233. doi: 10.1016/j.arthro.2022.10.025. PMID: 36603993.

2. McDermott ER, Tennent DJ, Song DJ. Improving visualization in shoulder arthroscopy. Clin Shoulder Elb. 2023 Feb 22. doi: 10.5397/cise.2022.01291. Epub ahead of print. PMID: 37088880.

3. Rojas J, Familiari F, Bitzer A, Srikumaran U, Papalia R, McFarland EG. Patient Positioning in Shoulder Arthroscopy: Which is Best? Joints. 2019 Oct 11;7(2):46-55. doi: 10.1055/s-0039-1697606. PMID: 31879731; PMCID: PMC6930847.

4. Varacallo M, El Bitar Y, Mair SD. Rotator Cuff Syndrome. 2022 Sep 4. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 30285401.

5. Lee JH, Chun YM, Kim DS, Lee DH, Shin SJ. Effects of neuromuscular electrical muscle stimulation on the deltoid for shoulder function restoration after reverse total shoulder arthroplasty in the early recovery period: a prospective randomized study. Arch Orthop Trauma Surg. 2023 Jun;143(6):3037-3046. doi: 10.1007/s00402-022-04515-0. Epub 2022 Jul 8. PMID: 35804165.

6. Wagner ER, Woodmass JM, Welp KM, Chang MJ, Higgins L, Warner JJP. Early postoperative recovery comparisons of superior capsule reconstruction to tendon transfers. J Shoulder Elbow Surg. 2023 Feb;32(2):276-285. doi: 10.1016/j.jse.2022.07.029. Epub 2022 Sep 15. PMID: 36115613.

7. Galasso O, Mercurio M, Luciano F, Mancuso C, Gasparini G, De Benedetto M, Orlando N, Castricini R. Arthroscopic capsular release for frozen shoulder: when etiology matters. Knee Surg Sports Traumatol Arthrosc. 2023 Nov;31(11):5248-5254. doi: 10.1007/s00167-023-07561-2. Epub 2023 Sep 13. PMID: 37702747; PMCID: PMC10598184.

8. de Almeida Filho IA, de Castro Veado MA, Fim M, da Silva Corrêa LV, de Carvalho Junior AE. Functional assessment of arthroscopic repair for recurrent anterior shoulder instability. Rev Bras Ortop. 2015 Dec 6;47(2):214-21. doi: 10.1016/S2255-4971(15)30089-6. PMID: 27042624; PMCID: PMC4799403.

9. Godinho PC, Godinho AC, Rondon JVCG, Oliveira Neto FC, Alves TA, Godinho GG. Arthroscopic Bankart Procedure: Clinical Outcomes with a Minimum Follow-Up of 10 Years. Rev Bras Ortop (Sao Paulo). 2021 Oct 28;57(3):462-466. doi: 10.1055/s-0041-1731418. PMID: 35785133; PMCID: PMC9246532.

10. Cisneros I. Cirugía del manguito rotador vía artroscópica: resultados HNGAI 2006-2008. 2009. [Tesis de especialidad]. Universidad Nacional Mayor de San Marcos. https://hdl.handle.net/20.500.12672/14655

11. Ma R, Brimmo OA, Li X, Colbert L. Current Concepts in Rehabilitation for Traumatic Anterior Shoulder Instability. Curr Rev Musculoskelet Med. 2017 Dec;10(4):499-506. doi: 10.1007/s12178-017-9449-9. PMID: 29038953; PMCID: PMC5685970.

12. Oak SR, Klein B, Verma NN, Kerzner B, Fortier LM, Chava NS, Reinold MM, Bedi A. Rehabilitation and Return to Play of the Athlete after an Upper Extremity Injury. Arthrosc Sports Med Rehabil. 2022 Jan 28;4(1):e163-e173. doi: 10.1016/j.asmr.2021.09.033. PMID: 35141548; PMCID: PMC8811509.

13. Kang RW, Mahony GT, Harris TC, Dines JS. Posterior instability caused by batter's shoulder. Clin Sports Med. 2013 Oct;32(4):797-802. doi: 10.1016/j.csm.2013.07.012. Epub 2013 Aug 22. PMID: 24079435.

14. Carbone A, Limpisvasti O. Understanding Batter's Shoulder: Diagnosis, Treatment, and Outcomes. Curr Rev Musculoskelet Med. 2022 Dec;15(6):547-551. doi: 10.1007/s12178-022-09795-y. Epub 2022 Nov 24. PMID: 36418814; PMCID: PMC9789263.

15. Huijsmans PE, Pritchard MP, Berghs BM, van Rooyen KS, Wallace AL, de Beer JF. Arthroscopic rotator cuff repair with double-row fixation. J Bone Joint Surg Am. 2007 Jun;89(6):1248-57. doi: 10.2106/JBJS.E.00743. PMID: 17545428.

16. Saridakis P, Jones G. Outcomes of single-row and double-row arthroscopic rotator cuff repair: a systematic review.

J Bone Joint Surg Am. 2010 Mar;92(3):732-42. doi: 10.2106/JBJS.I.01295. PMID: 20194334.

17. Park JY, Lhee SH, Choi JH, Park HK, Yu JW, Seo JB. Comparison of the clinical outcomes of single- and double-row repairs in rotator cuff tears. Am J Sports Med. 2008 Jul;36(7):1310-6. doi: 10.1177/0363546508315039. Epub 2008 Apr 15. PMID: 18413680.

18. Hachem A, Del Carmen-Rodriguez M, Rondanelli R, Rius X, Molina-Creixell A, Cañete San Pastor P, Hernandez-Gañan J, Cabo Cabo FJ. Arthroscopic bone block metal-free fixation for anterior shoulder instability. Short-term functional and radiological outcomes. Rev Esp Cir Ortop Traumatol. 2022 Jul-Aug;66(4):281-289. English, Spanish. doi: 10.1016/j.recot.2021.05.007. Epub 2021 Jul 31. PMID: 34344618.

19. García-Vega M, De la Cuadra P, Jiménez J, Occhi B, Boserman M. Arthroscopic bankart repair for the management of anterior shoulder instability: Mid- and long-term results. Revista Española de Cirugía Ortopédica y Traumatología. 2021 Julio; 65(4).

20. Hurley ET, Matache BA, Wong I, Itoi E, Strauss EJ, Delaney RA, Neyton L, Athwal GS, Pauzenberger L, Mullett H, Jazrawi LM; Anterior Shoulder Instability International Consensus Group. Anterior Shoulder Instability Part I-Diagnosis, Nonoperative Management, and Bankart Repair-An International Consensus Statement. Arthroscopy. 2022 Feb;38(2):214-223.e7. doi: 10.1016/j.arthro.2021.07.022. Epub 2021 Jul 29. PMID: 34332055.

Declarations

Ethics committee approval and consent to participate

The study was approved by the Alcívar Hospital ethics committee.

Publication consent

Not needed when images, radiographs and specific studies of patients are not published.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Authors' information

Hugo Ernesto Villarroel Rovere, Specialist in Traumatology and Orthopedics from the University of Guayaquil (Guayaquil, 2004). Doctor of Medicine and Surgery from the University of Guayaquil. a. Orthopedist-Traumatologist, Member of the team and director of the postgraduate course in Orthopedics and Traumatology, Alcívar Hospital, Guayaquil, Ecuador.
Email: villarroelr@hotmail.com
ORCID https://orcid.org/0000-0002-0847-0344

Carlos Alberto Jaramillo Becerra, Physician from the National University of Loja (Loja, 2002). Specialist in traumatology and orthopedics from the University of Guayaquil (Guayaquil, 2013). High specialty in medicine> Medical and surgical care of the diseases of the spine by the National Autonomous University of Mexico (Federal District, 2017). Chief, Orthopedics and Traumatology Service, Alcívar Hospital, Guayaquil, Ecuador.
Email: dr.jaramillobecerracarlos@gmail.com
ORCID https://orcid.org/0009-0002-0680-4547

Gustavo Adolfo Jose Matheus Valdivieso, Surgeon from the University of Los Andes (Venezuela, 2020). Specialist in Traumatology and Orthopedics by the Hospital General Del Este Dr. Domingo Luciani (Venezuela, 2020). Attending physician of the Orthopedics and Traumatology Service of the Alcívar Clinic.
Email: jessivane19@hotmail.com
ORCID https://orcid.org/0009-0003-3367-1572

Gabriel Machado De La Rosa, Attending Physician at the Alcívar Hospital Traumatology and Orthopedics Service.
Email: gabrielmachado28-10@hotmail.com
ORCIDhttps://orcid.org/0009-0007-9306-8141

Leshlie Janine De La Torre Mendoza, Physician from the Santiago de Guayaquil Catholic University, (Ecuador, 2016). Resident Physician of the Orthopedics and Traumatology Service, Alcívar Hospital, Guayaquil.
E-mail:ldelatorre28@hotmail.com
ORCID https://orcid.org/0000-0003-2377-4554

Editor's Note

The Revista Actas Médicas (Ecuador) remains neutral with respect to jurisdictional claims in published maps and institutional affiliations.

Received: May 12, 2023
Accepted: August 19, 2023
Published: December 2, 2023
Editor: Dra. Mayra Ordoñez Martínez..

How to cite:

Villarroel H, Jaramillo C, Matheus G, Machado De La Rosa G, De La Torre L. Functional results of arthroscopic treatment of degenerative shoulder disease. A single-center observational study with 3 years of follow-up. Medical Records (Ecuador) 2023; 33 (2): 83-89.

Correspondence: Hugo Ernesto Villarroel Rovere, E-mail: villarroelr@hotmail.com

Address: Coronel 2301 and Azuay. Orthopedics and Traumatology Service, Alcívar Hospital, Guayaquil, Ecuador. Phone: (5934) 3720100