



Original Article

Acromioclavicular dislocation: treatment and rehabilitation. Current perspectives and trends among Brazilian orthopedists[☆]



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ABSTRACT

Objective: To evaluate the approaches and procedures used by Brazilian orthopedic surgeons in treatment and rehabilitation of acromioclavicular dislocation of the shoulder.

Methods: A questionnaire comprising eight closed questions that addressed topics relating to treatment and rehabilitation of acromioclavicular dislocation was applied to Brazilian orthopedic surgeons over the three days of the 45th Brazilian Congress of Orthopedics and Traumatology, in 2013.

Results: A total of 122 surgeons completely filled out the questionnaire and formed part of the sample analyzed. Most of them came from the southeastern region of the country. In this sample, 67% of the participants would choose surgical treatment for patients with grade 3 acromioclavicular dislocation. Regarding the preferred technique for surgical treatment of acute acromioclavicular dislocation, a majority of the surgeons used subcoracoid ligature with acromioclavicular fixation and transfer of the coracoacromial ligament (25.4%). Regarding complications found after surgery had been performed, 43.4% and 32.8% of the participants, respectively, stated that residual deformity of the operated joint and pain were the complications most seen during the postoperative period.

Conclusions: Although there was no consensus regarding the treatment and rehabilitation of acromioclavicular dislocation, evolution had occurred in some of the topics analyzed in this questionnaire applied to Brazilian orthopedists. However, further controlled prospective studies are needed in order to evaluate the clinical and scientific benefit of these trends.

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Luxação acromioclavicular: tratamento e reabilitação. Perspectivas e tendências atuais do ortopedista brasileiro

R E S U M O

Palavras-chave:

Articulação acromioclavicular

Luxação do ombro

Reabilitação

Objetivo: Avaliar as condutas e os procedimentos feitos pelos cirurgiões ortopédicos do Brasil no tratamento e na reabilitação das luxações acromioclaviculares do ombro.

Métodos: Foi aplicado um questionário de oito questões fechadas que abordavam tópicos relacionados ao tratamento e à reabilitação das luxações acromioclaviculares aos cirurgiões ortopédicos brasileiros nos três dias do 45º Congresso Brasileiro de Ortopedia e Traumatologia de 2013.

Resultados: Preencheram completamente o questionário e fizeram parte da amostra analisada 122 cirurgiões. A maior parte era proveniente da Região Sudeste. Na amostra, 67% dos participantes optariam pelo tratamento cirúrgico em pacientes com luxação acromioclavicular grau 3. Em relação à técnica preferida para tratamento cirúrgico das luxações acromioclaviculares agudas, a maioria dos cirurgiões usa amarrilho subcoracoide com fixação acromioclavicular e transferência do ligamento coracoacromial (25,4%). Quando perguntados sobre complicações encontradas após a cirurgia, 43,4% e 32,8% dos participantes, respectivamente, responderam que deformidade residual na articulação operada e dor foram as complicações mais vistas no período pós-operatório.

Conclusões: Apesar de não haver consenso no tratamento e na reabilitação das luxações acromioclaviculares, há evolução em alguns tópicos analisados no questionário aplicado para os ortopedistas nacionais. No entanto, mais estudos prospectivos controlados são necessários para avaliar o benefício clínico e científico dessas tendências.

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Introduction

The acromioclavicular joint is a diarthrodial joint that involves the medial joint facet of the acromion and the distal portion of the clavicle. It connects the scapular belt to the axial skeleton. Stabilization of this joint is achieved by means of the joint capsule and the acromioclavicular and coracoclavicular ligaments.

Acromioclavicular dislocation is one of the commonest injuries of the shoulder and accounts for 9% of all injuries.¹ It occurs mainly in sports activities that involve contact and in traffic accidents. A previous study demonstrated that the incidence was 1.8 cases of acromioclavicular dislocation per 10,000 inhabitants per year, and that these cases mostly occurred among men aged 20–39 years.² Over recent years, several studies have been conducted with a view to improving the treatment and rehabilitation of this injury. However, there is still no consensus on this subject in the literature.³

The high incidence of these injuries and the great importance of social and economic factors relating to them, along with the enormous divergences in the literature on this subject, make it extremely pertinent to assess the current approaches and trends relating to this matter in Brazil.

The aim of this study was to evaluate the approaches and procedures followed by Brazilian orthopedic surgeons in treatment and rehabilitation of cases of acromioclavicular dislocation. The results from this study would make it possible to delimit the national trends regarding this subject and to provide guidance for future good-quality studies.

Material and methods

This was a descriptive study in which a questionnaire was applied to a sample of orthopedic surgeons in Brazil. The questionnaire was drawn up and approved by the present authors in such a way that it would be very simple and easy to understand. It consisted of eight closed questions that addressed topics such as the surgeons' numbers of years of experience and their current numbers of surgical procedures performed, along with a variety of other matters relating to the treatment and to rehabilitation subsequent to acromioclavicular dislocation of the shoulder ([Appendix A](#)).

The questionnaire was applied to Brazilian orthopedic surgeons during the three days of the 45th Brazilian Congress of Orthopedics and Traumatology, in 2013. Participants only filled out the questionnaires if they had concluded medical residency in orthopedics and were performing surgical procedures to treat acromioclavicular dislocation. In this manner, 130 questionnaires were filled out and eight of these were excluded: three because the surgeon belonged to another country (Bolivia, Colombia and Peru) and five because they had been incompletely filled out. Thus, 122 questionnaires were completely filled out. To resolve any queries that emerge while the questionnaires were being answered, two researchers were at hand throughout the period in which the questionnaires were applied.

Descriptive statistics on the variables involved were performed on the data extracted from the questionnaire, in order to characterize the sample.

The data were analyzed using the SPSS for Windows software, version 16.0, and the significance level used was 5%.

Results

A total of 122 orthopedic surgeons completely filled out the questionnaire and formed part of the sample analyzed. The distribution of the surgeons as a function of their region of origin and numbers of years of experience are presented in [Table 1](#). In relation to the surgeons' length of experience of shoulder surgery, 69% had less than 5 years of experience (which was defined according to the date on which they were awarded the title of specialist in orthopedics and traumatology). The relationship between the surgeons' experience of surgery relating to acromioclavicular dislocation and their field of orthopedic activity is shown in [Table 2](#). When asked about their approach toward a patient presenting grade 3 acromioclavicular dislocation, 67% of the participants stated that they would choose surgical treatment. This approach was more commonly found among surgeons with more than 5 years of experience. In relation to the preferred technique for surgical treatment of acute acromioclavicular dislocation, the largest proportion of the surgeons stated that they used subcoracoid ligature with acromioclavicular fixation and transfer of the coracoacromial ligament (25.4%) or subcoracoid ligature with acromioclavicular fixation alone (24.6%) ([Table 3](#)). However, when surgery is necessary for chronic acromioclavicular dislocation (injuries lasting for more than 6 weeks),^{2,3} the participants' preference was much more predominantly for the surgical technique consisting of subcoracoid ligature with acromioclavicular fixation and transfer of the coracoacromial ligament (41%) ([Table 4](#)). Regarding the duration of use of immobilization after the surgical procedure, the majority

of the surgeons (67.2%) used this after the surgery for three to 6 weeks. In relation to athletes returning to their sports activity after conservative treatment of acromioclavicular dislocation, 41.8% considered that a period of 3 months was ideal. [Table 5](#) shows that the professionals with more than 10 years of experience suggested that the return to sports after conservative treatment ought to be later ($p=0.004$). [Table 6](#) presents the lengths of time until the return to sports, subsequent to surgical treatment of acromioclavicular dislocation, and their correlation with the surgeon's experience. When asked about complications encountered after the surgery, 43.4% and 32.8% of the participants, respectively, responded that residual deformity in the joint that was operated and pain were the complications that were most seen. There was a significant correlation between professionals with less length of surgical experience and presence of more local pain and less residual deformity ($p=0.032$).

Discussion

This survey, which was conducted during the principal orthopedics congress of Brazil, demonstrates that there is still no consensus among Brazilian orthopedists regarding management of acromioclavicular dislocation.

The uncertainty regarding the ideal treatment for acromioclavicular dislocation can be seen even in the most ancient medical descriptions from the time of Hippocrates and Galen.⁴ Historically, although acromioclavicular dislocation can be considered conceptually to be a simple injury, an enormous variety of surgical techniques has been described, which makes it more difficult to define which technique or approach would provide a better result for these injuries.

Table 1 – Distribution of the surgeons as a function of their region of origin and number of years of experience.

Region	Years of experience						Total		p
	<5 years		5–10 years		10 years				
	n	%	n	%	n	%	n	%	
North	2	2.4	1	5.0	0	0.0	3	2.5	0.79
Northeast	4	4.8	1	5.0	2	11.1	7	5.7	
Center-west	13	15.5	1	5.0	4	22.2	18	14.8	
Southeast	54	64.3	13	65.0	9	50.0	76	62.3	
South	11	13.1	4	20.0	3	16.7	18	14.8	
Total	84	100.0	20	100.0	18	100.0	122	100.0	

Table 2 – Relationship between surgical experience and surgeons' orthopedic specialty.

Specialty	Years of experience						Total		p
	<5 years		5–10 years		10 years				
	n	%	n	%	n	%	n	%	
Shoulder	21	25.0	14	70.0	9	50.0	44	36.1	0.005
Knee	7	8.3	1	5.0	2	11.1	10	8.2	
Spine	2	2.4	0	0.0	0	0.0	2	1.6	
Hand	2	2.4	2	10.0	2	11.1	6	4.9	
Foot	2	2.4	0	0.0	0	0.0	2	1.6	
General	28	33.3	2	10.0	4	22.2	34	27.9	
Hip	3	3.6	1	5.0	0	0.0	4	3.3	
Others	19	22.6	0	0.0	1	5.6	20	16.4	
Total	84	100.0	20	100.0	18	100.0	122	100.0	

Table 3 – Techniques preferred for surgical treatment of acute acromioclavicular dislocation and relationship with surgical experience.

Acute acromioclavicular dislocation	Years of experience						Total		p
	<5 years		5–10 years		10 years				
	n	%	n	%	n	%	n	%	
Phemister (acromioclavicular fixation)	13	15.5	1	5.0	2	11.1	16	13.1	0.422
Bosworth (coracoclavicular fixation)	4	4.8	1	5.0	1	5.6	6	4.9	
Subcoracoid ligature + acromioclavicular fixation	20	23.8	6	30.0	4	22.2	30	24.6	
Subcoracoid ligature;+ acromioclavicular fixation +;transfer of coracoacromial ligament	22	26.2	3	15.0	6	33.3	31	25.4	
Fixation using anchors + acromioclavicular fixation	18	21.4	3	15.0	2	11.1	23	18.9	
Fixation using open button (tightrope)	4	4.8	2	10.0	3	16.7	9	7.4	
Other arthroscopic techniques	1	1.2	1	5.0	0	0.0	2	1.6	
Other open techniques	2	2.4	3	15.0	0	0.0	5	4.1	
Total	84	100.0	20	100.0	18	100.0	122	100.0	

Table 4 – Techniques preferred for surgical treatment of chronic acromioclavicular dislocation and relationship with surgical experience.

Chronic acromioclavicular dislocation	Years of experience						Total		p
	<5 years		5–10 years		10 years				
	n	%	n	%	n	%	n	%	
Phemister (acromioclavicular fixation)	5	6.0	0	0.0	0	0.0	5	4.1	0.289
Bosworth (coracoclavicular fixation)	8	9.5	0	0.0	1	5.6	9	7.4	
Subcoracoid ligature + acromioclavicular fixation	19	22.6	5	25.0	4	22.2	28	23.0	
Subcoracoid ligature + acromioclavicular fixation + transfer of coracoacromial ligament	31	36.9	9	45	10	55.6	50	41.0	
Fixation using anchors + acromioclavicular fixation	11	13.1	1	5	0	0	12	9.8	
Reconstruction using flexor tendons	3	3.6	1	5.0	1	5.6	5	4.1	
Fixation using open button (tightrope)	1	1.2	0	0.0	1	5.6	2	1.6	
Other arthroscopic techniques	1	1.2	1	5.0	0	0.0	2	1.6	
Other open techniques	5	6.0	3	15.0	1	5.6	9	7.4	
Total	84	100.0	20	100.0	18	100.0	122	100.0	

Table 5 – Return to sport after conservative treatment of acromioclavicular dislocation.

Sport – conservative	Years of experience						Total		p
	<5 years		5–10 years		10 years				
	n	%	n	%	n	%	n	%	
1 month	0	0.0	1	5.0	0	0.0	1	0.8	0.004
2 months	12	14.3	4	20.0	0	0.0	16	13.1	
3 months	30	35.7	11	55.0	10	55.6	51	41.8	
4 months	17	20.2	1	5.0	0	0.0	18	14.8	
>4 months	25	29.8	3	15.0	8	44.4	36	29.5	
Total	84	100.0	20	100.0	18	100.0	122	100.0	

Table 6 – Return to sport after surgical treatment of acromioclavicular dislocation.

Sport – surgical	Years of experience						Total		p
	<5 years		5–10 years		10 years				
	n	%	n	%	n	%	n	%	
1 month	2	2.4	2	10.0	0	0.0	4	3.3	0.019
2 months	9	10.7	1	5.0	0	0.0	10	8.2	
3 months	26	31.0	3	15.0	3	16.7	32	26.2	
4 months	17	20.2	6	30.0	1	5.6	24	19.7	
>4 months	30	35.7	8	40.0	14	77.8	52	42.6	
Total	84	100.0	20	100.0	18	100.0	122	100.0	

The first modern procedure was performed in 1860. During the 1930s and 1940s, a variety of types of nonsurgical treatment were described. In 1941, Bosworth⁵ described the technique of fixation of the clavicle to the coracoid process, using a screw that was passed through “blindly”. During that same period, Mumford⁶ described resection of the most distal 2 cm of the clavicle. In 1972, Weaver–Dunn described a technique for resection of the distal extremity of the clavicle.⁷ Since then, surgeons have agreed that high-grade injuries should be treated surgically, and injuries of grades I and II conservatively. In our study, 70% of the orthopedists had more than 5 years of experience and stated that they treated grade I and grade II injuries conservatively.

According to the systematic review of Beitzel et al.,⁸ the most accepted method for injuries of grades I and II consists of a brief period of immobilization using an American or functional sling to support the weight of the upper limb and limit the stress on the coracoclavicular ligaments. This period of immobilization may be associated with local measures (gel or topical anti-inflammatory agents) and treatments for symptoms. Patients are encouraged to start to perform passive movements at the end of the first week, in order to reduce the pain and avoid the morbidity relating to long periods of immobilization. Scapular stabilization and core exercises are started in the third week. Contact sports and weightlifting are avoided for up to 4 months. In the questionnaire of this study, 41.8% of the orthopedists stated that they released their patients for sports activities 3 months after the surgery, but the orthopedists with more experience suggested that patients should return to sports later on.

Unlike in relation to the treatment for type I and II injuries, there was a certain degree of discrepancy and divergence of opinions regarding the best treatment for type III injuries, although initial conservative treatment for these injuries was said to be well tolerated. Some recent studies have demonstrated that conservative treatment for grade III injuries alters the kinematics of the scapula.⁹ In treatments for athletes, individual factors need to be taken into account, such as the type of sport, time during the championship season when the injury occurred, level of activity, playing position in team sports and type of ball-throwing activity. In our opinion, patients who are not athletes and present type III injuries should initially be managed nonsurgically, focusing on appropriate rehabilitation. If the pain persists and their activities are limited, surgical treatment is indicated. In cases of contact or collision sports, in which there is a risk that grade III injuries could evolve to grade V injuries, initial surgical treatment is indicated. Although surgical treatment is the type of treatment most indicated for injuries of grades IV, V and VI, two level II studies showed that the results from nonsurgical treatment were superior to those from surgical treatment.^{10,11} However, these studies were conducted in the 1980s, when the surgical techniques were not as refined as they are today. In the present study, 67% of the orthopedists said that they would indicate surgical treatment for cases of grade III acromioclavicular dislocation.

There is a certain scarcity of studies reporting on the best time for treating acromioclavicular dislocation. In cases of grade III injuries, waiting for 3–4 weeks initially and then reassessing the patient seems to be the approach most

indicated.¹² In some cases, if the pain persists, together with significant functional limitation of the limb, surgical techniques that do not involve grafts or other biological materials should be used, since bringing the clavicle closer to the scapula gives rise to good healing because of the friable recently injured tissues.

More than 200 surgical techniques have been described for treating acromioclavicular dislocation.³ It is unusual to find studies demonstrating that one technique presents results that are superior to those of another fixation technique. For procedures in which the aim is to reconstruct the coracoclavicular ligament using local or free grafts, use of this ligament together with a portion of the conjoint, semitendinosus or long palmar tendon, among others, has been well described.^{13–18} Transfer of the coracoacromial ligament, which was generically described as the Weaver–Dunn procedure, remains popular for reconstruction of the coracoclavicular ligaments. The technique includes transfer of the coracoacromial ligament and its insertion in the acromion, to the distal third of the clavicle, with modifications involving ligatures around the clavicle. Although excellent results have been reported through using this technique, a certain degree of subluxation and complications of fixation has been described. One of the causes that provide an explanation is that the resistance of the coracoacromial ligament is around 25% of the resistance of the coracoclavicular ligament, as shown through recent biomechanical studies.^{19–22} Moreover, this non-anatomical reconstruction only ensures coronal stability and does not correct the instability in the transverse or axial plane.

In relation to anatomical and non-anatomical surgical procedures, there is no consensus regarding the best technique. Franchini et al.²³ and Tauber et al.¹⁵ used a synthetic and the semitendinosus ligament, respectively, in comparisons with non-anatomical procedures (modified Weaver–Dunn) and reported that the functional scores were slightly higher in the group with anatomical reconstruction. However, the study by Franchini was a prospective case series and the study by Tauber et al.¹⁵ was a retrospective study. Temporary fixation with wires in the acromioclavicular joint remains one of the direct repair methods most used because of its ease of use and rapidity. Variations in this technique, through using the meniscus to reinforce the superior acromioclavicular ligament were described by Sage and Salvatore.²⁴ Zaricznyj²⁵ added the extensor tendon of the fifth finger to this fixation, in order to reinforce the coracoclavicular ligaments. Bundens and Cook²⁶ emphasized the importance of suturing the fascia of the trapezius and the deltoid over the clavicle. We found that the technique most used for treating acute and chronic acromioclavicular dislocation consisted of acromioclavicular fixation in association with subcoracoid ligature and coracoacromial transfer.

Arthroscopic techniques have been described for treating injuries of grades III, IV and V. An initial joint inspection should be made because the rate of occurrence of associated lesions is 30%, consisting especially of superior labral anterior posterior (SLAP) lesions. A lateral viewing portal and two anterior working portals are used to prepare the coracoid and construct the bone tunnels through which Endobuttons will be passed. Boileau et al.¹³ described the arthroscopic Weaver–Dunn–Chuinard technique in 10 patients who were

treated for grade III and IV chronic acromioclavicular dislocation and showed good results. In the present study, very few orthopedists reported having experience of the arthroscopic technique.

Complications such as migration of wires of Endobuttons, breakage of materials, infection, pain and/or residual subluxation, reaction to suturing wires and recurrences have been described. When asked about the postoperative complications that they most frequently observed, independent of the time, 43.4% and 32.8% of the participants, respectively, responded that residual deformity of the joint that had been operated and local pain were the most prevalent complications during the postoperative period. This shows that there was a significant correlation between professionals with shorter lengths of surgical experience and presence of more local pain and less residual deformity.

Conclusion

In our study, we sought to show the therapeutic management used by Brazilian orthopedists in relation to acromioclavicular dislocation. Although this is a conceptually simple injury, its treatment is surrounded by a diversity of approaches and divergent surgical techniques. Nonetheless, there is a certain degree of consensus that grade I and II acromioclavicular dislocations should be treated conservatively. Moreover, there was lower incidence of surgical complications among orthopedists with more than 5 years of experience of shoulder surgery.

Conflicts of interest

The authors declare no conflicts of interest.

Appendix A. Questionnaire on surgery for acromioclavicular dislocation

Cidade/Estado: _____

ESPECIALIDADE:

OMBRO JOELHO COLUNA MÃO PÉ TUMOR GERAL QUADRIL OUTROS

1 - Anos de experiência em cirurgia do Ombro: _____ anos.

2 - Qual sua conduta no paciente com LAC III?

CIRÚRGICO NÃO CIRÚRGICO

3 - No tratamento cirúrgico de LAC agudos (cirúrgicos), qual sua técnica preferida?

- Phenister(fixação acromioclavicular)
- Bosworth(fixação clavículo-coracoide com parafuso)
- Amarrilho subcoracoide + fixação acromioclavicular
- Amarrilho subcoracoide + fixação acromioclavicular + transferencia de ligamento coracoacromial
- Fixação com ancoras + fixação acromioclavicular
- Reconstrução com tendões flexores
- Fixação com botão(tight-rope) aberto
- Fixação com botão(tight-rope) artroscópico
- Outras técnicas artroscópicas
- Outras técnicas abertas

4 - No tratamento cirúrgico das LAC crônicas (cirúrgicos), qual sua técnica preferida?

- Phenister(fixação acromioclavicular)
- Bosworth(fixação clavículo-coracoide com parafuso)
- Amarrilho subcoracoide + fixação acromioclavicular
- Amarrilho subcoracoide + fixação acromioclavicular + transferencia de ligamento coracoacromial

- Fixação com ancoras + fixação acromioclavicular
- Reconstrução com tendões flexores
- Fixação com botão(tight-rope) aberto
- Fixação com botão(tight-rope) artroscópico
- Outras técnicas artroscópicas
- Outras técnicas abertas

5 – Quanto tempo de imobilização você recomenda:

- < 3 SEMANAS 3-6 SEMANAS
- > 6 SEMANAS NÃO IMOBILIZA

6 - Quanto tempo você considera ideal para o retorno ao esporte no tratamento conservador:

- 1 MESES 2 MESES
- 3 MESES 4 MESES
- > 4 MESES

7 - Quanto tempo você considera ideal para o retorno ao esporte no tratamento cirúrgico:

- 1 MESES 2 MESES
- 3 MESES 4 MESES
- > 4 MESES

8 – Principal complicação observada

- SEM COMPLICAÇÕES
- INFECÇÃO
- DEFORMIDADE RESIDUAL
- DOR LOCAL
- RESTRIÇÃO DE ADM

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