



## Coracoid Process Fracture Associated With a Distal Clavicle Fracture: A Case Report

Alexander I. Avdeev<sup>1,2</sup>, Dmitrii G. Parfeev<sup>1</sup>, Danil D. Parshin<sup>2</sup>, Ekaterina V. Sinitsyna<sup>2</sup>

<sup>1</sup> Vreden National Medical Research Center of Traumatology and Orthopedics, St. Petersburg, Russia

<sup>2</sup> St. Petersburg State Pediatric Medical University, St. Petersburg, Russia

### Abstract

**Background.** Fracture of the distal clavicle fracture associated with a coracoid process fracture is extremely rare in the practice of an orthopedic surgeons. Therefore, there is no common approach to the treatment of patients with this type of bone injuries of the shoulder girdle.

**Aim of the study** – to demonstrate positive experience of conservative treatment of the coracoid process fracture combined with hook plate fixation for distal clavicle fracture.

**Case presentation.** We present a rare clinical case of a closed distal clavicle fracture associated with coracoid process fracture. Trauma occurred when the patient fell down the stairs on his abducted upper limb. After examination, the distal clavicle fracture was fixed with a hook plate. Intraoperatively, X-rays showed a satisfactory position of the coracoid process of the scapula. Therefore, it was decided not to fix it additionally. CT scans three months after the surgery showed bone fragments consolidation. Removal of the hook plate and screws from the clavicle was performed.

**Conclusion.** Presented clinical case illustrates successful treatment result of this type of fractures without fixation of the coracoid process fracture. The hook plating allows to stabilize bone fragments and restore ligament tension, which makes this implant non-alternative for fixation of this type of injuries.

**Keywords:** acromioclavicular joint injury, distal clavicle fracture, coracoid process fracture, hook plate.

---

**Cite as:** Avdeev A.I., Parfeev D.G., Parshin D.D., Sinitsyna E.V. Coracoid Process Fracture Associated With a Distal Clavicle Fracture: A Case Report. *Traumatology and Orthopedics of Russia*. 2023;29(3):118-123. (In Russian). <https://doi.org/10.17816/2311-2905-14793>.

✉ Alexander I. Avdeev; e-mail: [spaceship1961@gmail.com](mailto:spaceship1961@gmail.com)

Submitted: 11.07.2023. Accepted: 11.08.2023. Published online: 12.09.2023.

© Avdeev A.I., Parfeev D.G., Parshin D.D., Sinitsyna E.V., 2023

## Перелом клювовидного отростка лопатки в сочетании с переломом акромиального конца ключицы: клинический случай

А.И. Авдеев<sup>1,2</sup>, Д.Г. Парфеев<sup>1</sup>, Д.Д. Паршин<sup>2</sup>, Е.В. Сеницына<sup>2</sup>

<sup>1</sup> ФГБУ «Национальный медицинский исследовательский центр травматологии и ортопедии им. Р.Р. Вредена» Минздрава России, г. Санкт-Петербург, Россия

<sup>2</sup> ФГБОУ ВО «Санкт-Петербургский государственный педиатрический медицинский университет» Минздрава России, г. Санкт-Петербург, Россия


### Реферат


**Актуальность.** Перелом акромиального конца ключицы в сочетании с переломом основания клювовидного отростка лопатки в практике травматолога-ортопеда встречается крайне редко. В связи с этим отсутствует единый подход к лечению пациентов с повреждениями костей плечевого пояса такого типа. **Целью** данной публикации является демонстрация положительного опыта консервативного лечения перелома клювовидного отростка лопатки в сочетании с остеосинтезом перелома акромиального конца ключицы крючковидной пластиной.

**Описание случая.** Мы представляем редкий клинический случай закрытого перелома акромиального конца ключицы в сочетании с переломом основания клювовидного отростка лопатки, наступивший в результате падения пациентки с лестницы с опорой на отведенную верхнюю конечность. После обследования было принято решение о фиксации акромиального конца ключицы крючковидной пластиной. Интраоперационно после остеосинтеза акромиального конца ключицы на рентгенограммах отмечалось удовлетворительное положение клювовидного отростка лопатки, в связи с чем было принято решение дополнительно его не фиксировать. Оперативное вмешательство, как и послеоперационный период, протекали без особенностей. При выполнении компьютерной томографии через 3 мес. после операции отмечена консолидация отломков. Выполнено удаление крючковидной пластины с винтами из ключицы.

**Заключение.** Представленный клинический случай иллюстрирует результат лечения такого типа переломов без фиксации клювовидного отростка лопатки с достижением отличного клинического результата. По нашему мнению, применение крючковидной пластины позволяет стабилизировать костные отломки и восстановить натяжение связок, что делает этот имплантат безальтернативным для фиксации такого типа повреждений.

**Ключевые слова:** травма акромиально-ключичного сустава, перелом акромиального конца ключицы, перелом клювовидного отростка, крючковидная пластина.

 **Для цитирования:** Авдеев А.И., Парфеев Д.Г., Паршин Д.Д., Сеницына Е.В. Перелом клювовидного отростка лопатки в сочетании с переломом акромиального конца ключицы: клинический случай. *Травматология и ортопедия России*. 2023;29(3):118-123. <https://doi.org/10.17816/2311-2905-14793>.

 Авдеев Александр Игоревич; e-mail: [spaceship1961@gmail.com](mailto:spaceship1961@gmail.com)

Рукопись получена: 11.07.2023. Рукопись одобрена: 11.08.2023. Статья опубликована онлайн: 12.09.2023.

© Авдеев А.И., Парфеев Д.Г., Паршин Д.Д., Сеницына Е.В., 2023

## BACKGROUND

The incidence of distal clavicle injuries in the structure of clavicle fractures varies from 10% to 30% [1, 2, 3]. Fractures of the coracoid process are even less common: 3-16% of all scapula fractures [4]. Cases of combined injury of the distal clavicle and the coracoid process are described only in a few publications, which, in turn, indicates the lack of a unified approach to the treatment of this category of patients [5, 6, 7, 8]. Difficulties in selecting a treatment method for a patient are associated with the determination of reasonable limits of the surgical aggression and require balanced approach for trauma surgeon's part.

*Aim of the study* — to demonstrate positive experience of conservative treatment of the coracoid process fracture combined with hook plate fixation for distal clavicle fracture.

## CASE PRESENTATION

A 45-year-old female patient sustained a right shoulder injury in August 2022 as a result of a fall from a ladder on the abducted upper extremity. Physical examination revealed deformity of the right shoulder area, acute pain in the projection of the right acromioclavicular joint, positive piano key symptom. Range of motion in the shoulder joint was severely limited due to a pronounced pain syndrome. X-ray of the right shoulder

shows radiologic signs of a closed fracture of the distal part of the right clavicle with displacement of fragments associated with a closed fracture of the coracoid process (Fig. 1).

Identical vertical displacement of the central clavicle fragment and the coracoid process allowed to infer indirectly that the coracoclavicular ligaments were intact. In our opinion, the hook plate was and remains the preferred implant for this purpose. On the first day of hospital stay, the patient underwent the surgery: open reduction of fragments, fixation with a hook plate and screws. Based on control X-rays, the final intraoperative decision was made not to fix the coracoid process of the scapula additionally (Fig. 2).

After the reduction of the clavicle fragments and restoration of anatomical relationships in the acromioclavicular joint, anatomical reduction of the coracoid process occurred due to the restoration of the tendon pull balance of the muscles fixed to the coracoid process. Therefore, it was decided not to additionally fix the coracoid process.

Postoperative period was uneventful. The patient was discharged for outpatient treatment on the 5th day after surgery. The right upper extremity was put in a sling for 4 weeks from the date of surgical treatment. Twelve weeks later, the patient underwent a CT scan of the area of surgical intervention, which showed CT signs of bone union of both the distal clavicle and the



**Fig. 1.** X-ray of the right acromioclavicular (AC) joint in AP view. Signs of closed fracture of the right distal clavicle with displacement of fragments combined with coracoid process fracture

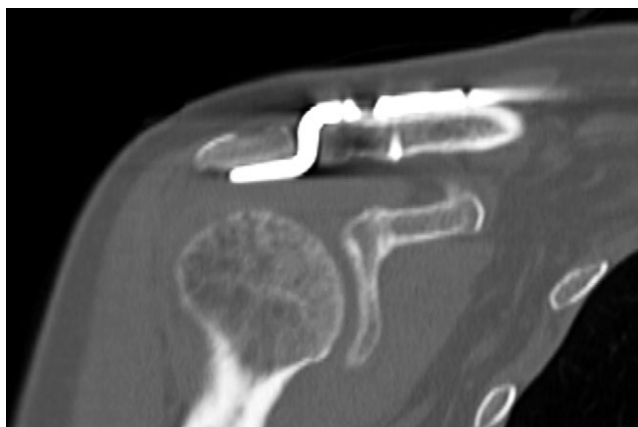


**Fig. 2.** Fig. 2. Intraoperative X-ray of the right AC joint in AP view after open manual reduction and fixation of the right distal clavicle with a hook plate. Displacement of fragments is eliminated

coracoid process (Fig. 3). Based on clinical tests, instrumental findings, and time elapsed since the surgery, the patient was recommended to have the fixator removed from the right clavicle.

X-rays taken at the time of implant removal also show signs of bone union and absence of subluxation (Fig. 4).

In December 2022, elective removal of the hook plate and screws from the distal part of the right clavicle was performed. Clinical recovery was achieved (Fig. 5).



**Fig. 3.** Right shoulder CT scan 3 months after surgery. CT signs of bone union of the distal clavicle and coracoid process



**Fig. 4.** X-ray of the right AC joint in AP view 3 months after surgery. Signs of bone union without subluxation



**Fig. 5.** X-ray of the right AC joint in AP view after implants removal

## DISCUSSION

There are very few publications that are in one way or another related to fracture of the coracoid process [9, 10, 11]. As a consequence, there is no unified approach to the treatment of this type of fracture.

According to A. Iqbal et al., only three cases of isolated fracture of the coracoid process out of nine presented had surgical treatment options, namely, ligament refixation, open reduction with internal fixation, and, finally, percutaneous screw insertion. In all presented clinical cases, patients were able to return to active sports within 3 to 12 months, regardless of the chosen treatment option [12].

Simultaneous fractures of the distal clavicle and coracoid process are even less frequently described. In a similar clinical case presented by W. Zhang et al. in addition to fixation of the acromioclavicular joint with a hook plate, fixation of the coracoid process with a 3.5 mm cannulated screw was performed. Three months after surgery, the shoulder joint function was restored, and the patient had no complaints [13]. Despite the positive result achieved in the presented case, we would like to note the difference in approaches and different degrees of surgical aggression in the treatment of patients with similar pathology.

M.M. Broekman et al. compiled and analyzed the results of treatment of 37 patients with dislocation of the distal part of the clavicle and fracture of the coracoid process. In 22 cases, the preferred treatment option was surgical, and in

12 cases both the acromioclavicular joint and the coracoid process were fixed, in 9 cases only the acromioclavicular joint was fixed, and in one case only the coracoid process was fixed. As a conclusion, the authors note that even though there is a large sample for such a rare pathology, it is impossible to scientifically justify certain recommendations for the treatment of this category of patients [14].

In our opinion, in cases of satisfactory position of the fragments of the coracoid process, it is possible to get along without its additional fixation, which minimizes the risk of intraoperative complications and overall reduces the extent of surgical intervention.

## CONCLUSION

Presented clinical case illustrates treatment result of this type of fractures without fixation of the coracoid process of the scapula with excellent clinical outcome. In our opinion, the use of the hook plate allows to stabilize bone fragments and restore ligament tension, which makes this implant non-alternative for fixation of this type of injuries.

## DISCLAIMERS

### Author contribution

All authors made equal contributions to the study and the publication.

All authors have read and approved the final version of the manuscript of the article. All authors agree to bear responsibility for all aspects of the study to ensure proper consideration and resolution of all possible issues related to the correctness and reliability of any part of the work.

**Funding source.** This study was not supported by any external sources of funding.

**Disclosure competing interests.** The authors declare that they have no competing interests.

**Ethics approval.** Not applicable.

**Consent for publication.** Written consent was obtained from the patient for publication of relevant medical information and all of accompanying images within the manuscript.

## REFERENCES

1. Nordqvist A., Petersson C. The incidence of fractures of the clavicle. *Clin Orthop Relat Res.* 1994;300:127-132.
2. Postacchini F., Gumina S., De Santis P., Albo F. Epidemiology of clavicle fractures. *J Shoulder Elbow Surg.* 2002;11(5):452-456. doi: 10.1067/mse.2002.126613.
3. Robinson C.M. Fractures of the clavicle in the adult. Epidemiology and classification. *J Bone Joint Surg Br.* 1998;80(3):476-484. doi: 10.1302/0301-620x.80b3.8079.
4. Knapik D.M., Patel S.H., Wetzel R.J., Voos J.E. Prevalence and Management of Coracoid Fracture Sustained During Sporting Activities and Time to Return to Sport: A Systematic Review. *Am J Sports Med.* 2018;46(3):753-758. doi: 10.1177/0363546517718513.
5. Jettoo P., de Kiewiet G., England S. Base of coracoid process fracture with acromioclavicular dislocation in a child. *J Orthop Surg Res.* 2010;5:77. doi: 10.1186/1749-799X-5-77.
6. Pedersen V., Prall W.C., Ockert B., Haasters F. Non-operative treatment of a fracture to the coracoid process with acromioclavicular dislocation in an adolescent. *Orthop Rev (Pavia).* 2014;6(3):5499. doi: 10.4081/or.2014.5499.
7. Li J., Sun W., Li G.D., Li Q., Cai Z.D. Fracture of the coracoid process associated with acromioclavicular dislocation: a case report. *Orthop Surg.* 2010;2(2):165-167. doi: 10.1111/j.1757-7861.2010.00080.x.
8. Kim K.C., Rhee K.J., Shin H.D., Kim D.K., Shin H.S. Displaced fracture of the coracoid process associated with acromioclavicular dislocation: a two-bird-one-stone solution. *J Trauma.* 2009;67(2):403-405. doi: 10.1097/TA.0b013e3181ac8ef1.
9. Asbury S., Tennent T.D. Avulsion fracture of the coracoid process: a case report. *Injury.* 2005;36(4):567-568. doi: 10.1016/j.injury.2004.11.002.
10. Lee J.H., Kim J.R., Wang S.I. An unusual mechanism of coracoid fracture in a beginner golfer. *Knee Surg Sports Traumatol Arthrosc.* 2018;26(1):76-78. doi: 10.1007/s00167-017-4439-4.
11. Wollstein J., Tegtbur U., Meller R., Hanke A.A., Berndt T., Krettek C. et al. Isolated fracture of the coracoid process in a 14-year-old national water polo player: Case example. *Unfallchirurg.* 2019;122(1):79-82. (In German). doi: 10.1007/s00113-018-0547-y.
12. Iqbal A., Botchu R. Coracoid stress injury: a report of an unusual case and review of literature. *REJR.* 2020;10(3):174-178. doi: 10.21569/2222-7415-2020-10-3-174-178.
13. Zhang W., Huang B., Yang J., Xue P., Liu X. Fractured coracoid process with acromioclavicular joint dislocation: A case report. *Medicine (Baltimore).* 2020;99(39):e22324. doi: 10.1097/MD.00000000000022324.
14. Broekman M.M., Verstift D.E., Doornberg J.N., van den Bekerom M.P.J. Treatment of acromioclavicular dislocations with a concomitant coracoid fracture: a systematic review of 37 patients. *JSES Int.* 2022;7(2):225-229. doi: 10.1016/j.jseint.2022.12.014.

## Authors' information

✉ *Alexander I. Avdeev* — Cand. Sci. (Med.)

Address: 8, Akademika Baykova st., St. Petersburg, 195427, Russia

<https://orcid.org/0000-0002-1557-1899>

e-mail: spaceship1961@gmail.com

*Dmitrii G. Parfeev* — Cand. Sci. (Med.)

<https://orcid.org/0000-0001-8199-7161>

e-mail: dgparfeev@rniito.ru

*Danil D. Parshin*

<https://orcid.org/0009-0002-0010-1437>

e-mail: parshindanil1997@gmail.com

*Ekaterina V. Sinitsyna*

<https://orcid.org/0009-0002-9798-7886>

e-mail: katerin\_tomtit@mail.ru