

# Journal of Orthopedics Study and Sports Medicine

Genesis-JOSSM-2(1)-18  
Volume 2 | Issue 1  
Open Access

## Nonunion Periprosthetic Fracture after Total Elbow Arthroplasty (Clinical Case)

Igor Arsenev\*, Gurgen Kesyan and Rashid Urazgil'deev

N.N. Priorov National Medical Research Center of Traumatology and Orthopedics

\***Corresponding author:** Igor Arsenev, N.N. Priorov National Medical Research Center of Traumatology and Orthopedics

**Citation:** Arsenev I, Kesyan G, Urazgil'deev. Nonunion Periprosthetic Fracture after Total Elbow Arthroplasty (Clinical Case). J Orthop Study Sports Med. 2(1):1-7.

**Received:** October 11, 2024 | **Published:** November 10, 2024

**Copyright** © 2024 genesis pub by Arsenev I. CC BY-NC-ND 4.0 DEED. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives 4.0 International License. This allows others distribute, remix, tweak, and build upon the work, even commercially, as long as they credit the authors for the original creation.

### Abstract

One of the main reasons for revision elbow arthroplasty, after infection and aseptic loosening, is periprosthetic fractures. Moreover, 54-56% of patients after revisions require surgeries again due to poor bone quality and extensive bone loss.

### Objective

The aim of this short case report is to demonstrate the complex nonunion periprosthetic fracture after total elbow arthroplasty

### Method

This is a case of a 63 years old female with a pain and instability in her dominant right shoulder caused by nonunion periprosthetic fracture. The 3.5 mm PHILOS System and long bone allograft used.

**Result**

We got a good fixation of the fracture. By the 5th day after the operation, the patient was already able to free passive movement in her right elbow without any pain, deformity or instability. Her symptoms improved over the next two weeks.

**Conclusion**

Aseptic loosening after total elbow arthroplasty can flow with or without periprosthetic fracture. In isolated cases, we see the true fracture due to trauma or iatrogenic damage. Following the osteosynthesis principles and using the bone allografts can managed in many issues with periprosthetic fractures after primary or revision elbow replacement.

**Keywords**

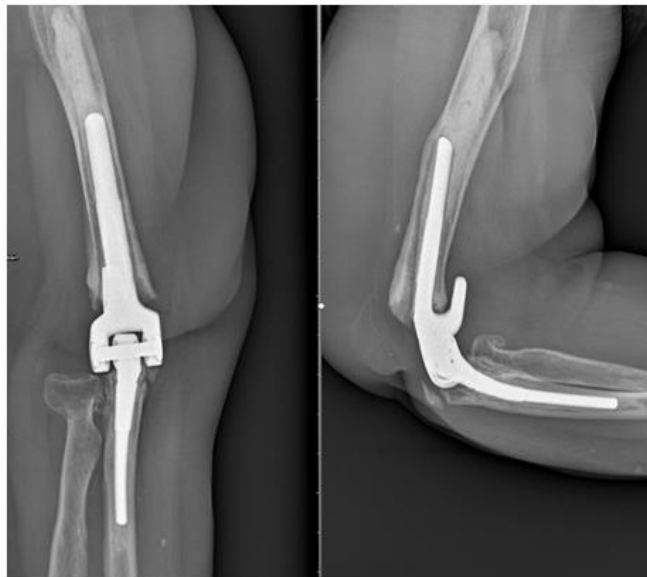
Arthroplasty, Elbow Replacement, Periprosthetic Fracture

**Introduction**

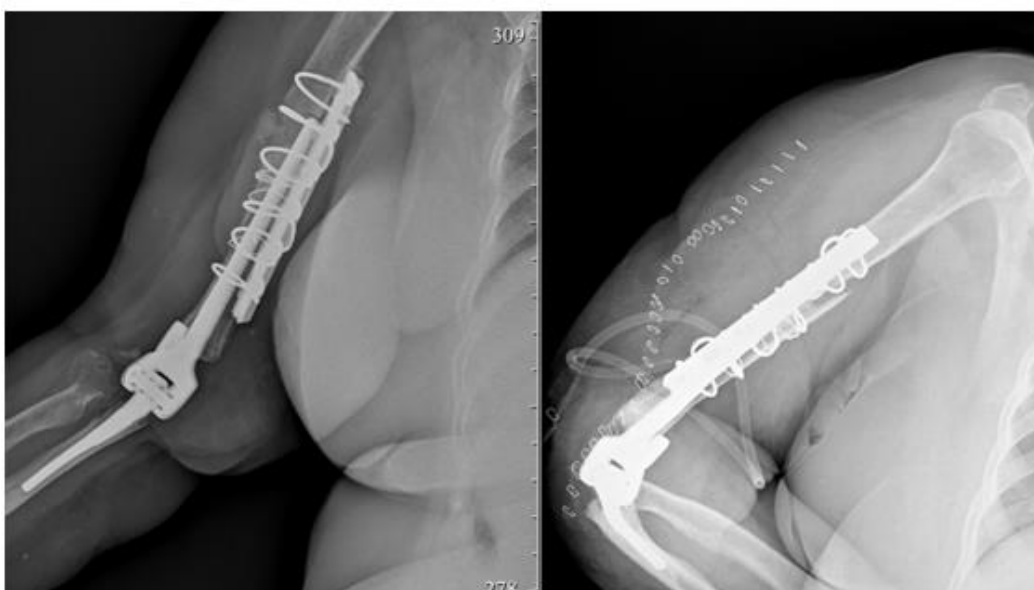
Currently no total joints replacement (hip, knee or shoulder) requires as many revisions as elbow arthroplasty due to many complications. The recent literature is conflicting, but the complication rate ranges from 11% to 38% [1]. In addition, most world authors claim that the frequency of repeated surgery is increasing. Currently 54-56% of patients after revisions elbow arthroplasty require surgeries again [2-4]. One of the main reasons for revisions, after infection and aseptic loosening, is periprosthetic fractures [1,2,5]. Their frequency is about 5-29% after primary replacement, moreover 20% revisions are failing and need the next operation [2,6-8]. Such patients require a comprehensive approach due to progressive bone loss and soft tissue contracture. Treatment methods include the open reduction and internal fixation (ORIF), bone allograft implantation with or without revision arthroplasty [2].

**Materials and Methods**

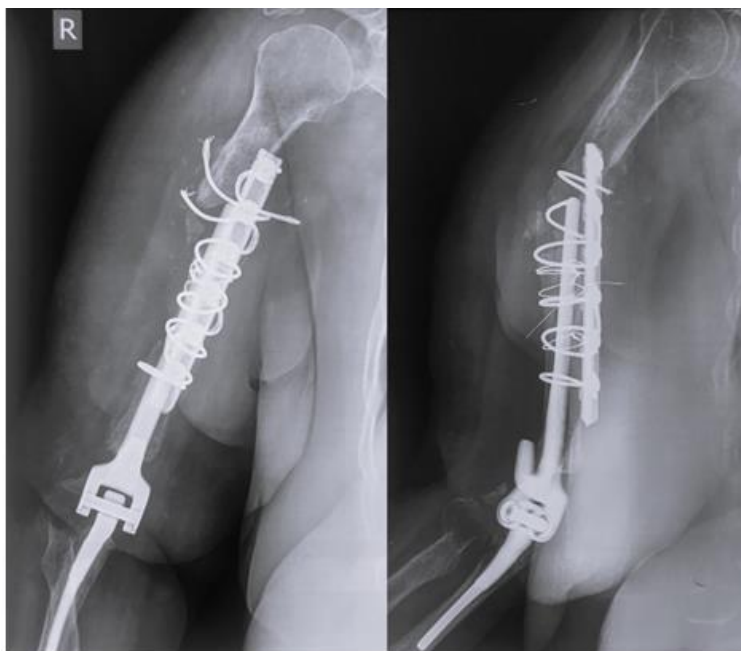
This is a short case report of a patient with nonunion periprosthetic fracture after revision arthroplasty of the dominant right elbow. 63 years old female presented with pain and instability in right shoulder. In 2022, she had a primary elbow arthroplasty due to posttraumatic arthritis. The aseptic loosening developed two years after operation (Figure 1). In January 2024, the patient underwent the revision surgery using a long humeral stem. During the operation, the radial nerve was injured. The periprosthetic fracture indicated shortly after operation as well. The next step was ORIF with plate and cerclage wiring (Figure 2). The operation failed. By June 2024, the patient had a nonunion periprosthetic fracture. After examination in our hospital, we saw a deep radial nerve injury with muscular atrophy of the forearm and hand, instability in shoulder and dislocation of the plate and cerclage wirings (Figure 3). The patient was operated on using regional anesthesia. Unfortunately, the unrecoverable radial nerve injury was found, but the humeral stem was stable. The extracting of the plate and cerclages was very difficult. The 3.5 mm PHILOS System and long bone allograft used (Figure 4). The bone allograft was placed on the nonunion periprosthetic fracture and fixed with three cerclage wirings. We managed to get a good fixation of the fracture. By the 5th day after the operation, the patient was already able to free passive movement in her right elbow without any pain, deformity or instability. Her symptoms improved over the next two weeks.



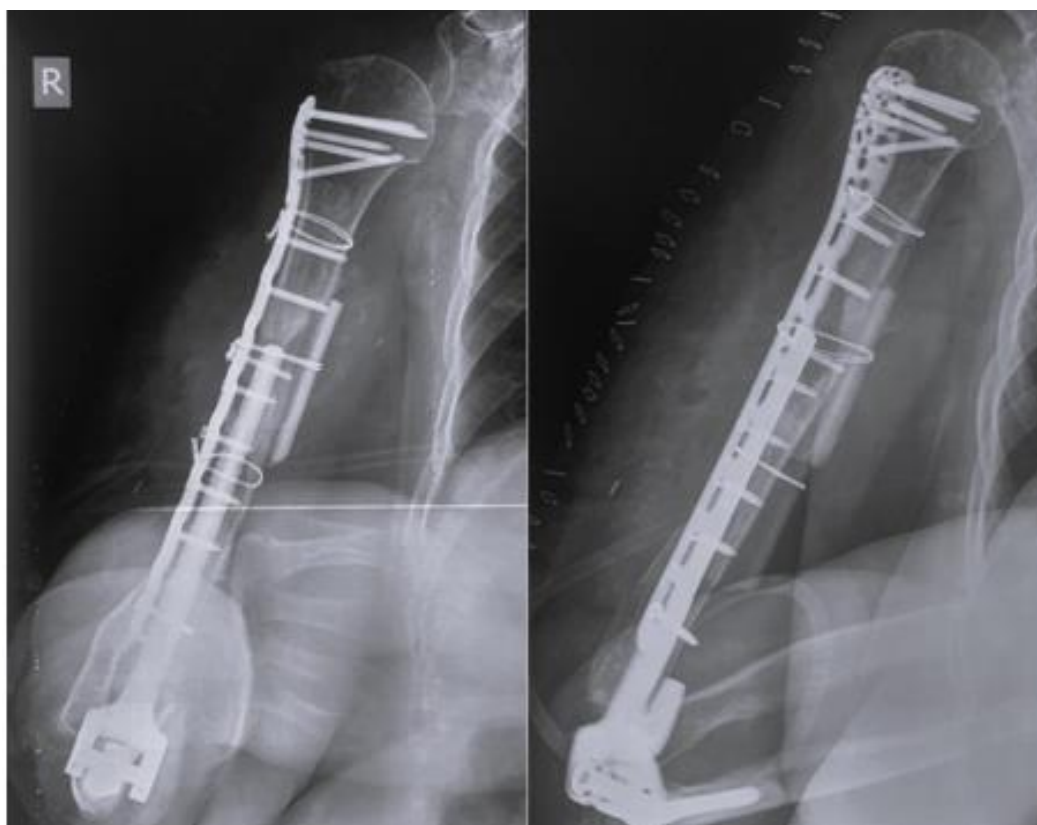
**Figure 1:** The aseptic loosening (two years after primary elbow arthroplasty).



**Figure 2:** Periprosthetic fracture after revision elbow arthroplasty.



**Figure 3:** Preoperative radiographs showing nonunion, instability and dislocation of the plate and cerclage wirings after multiple surgeries



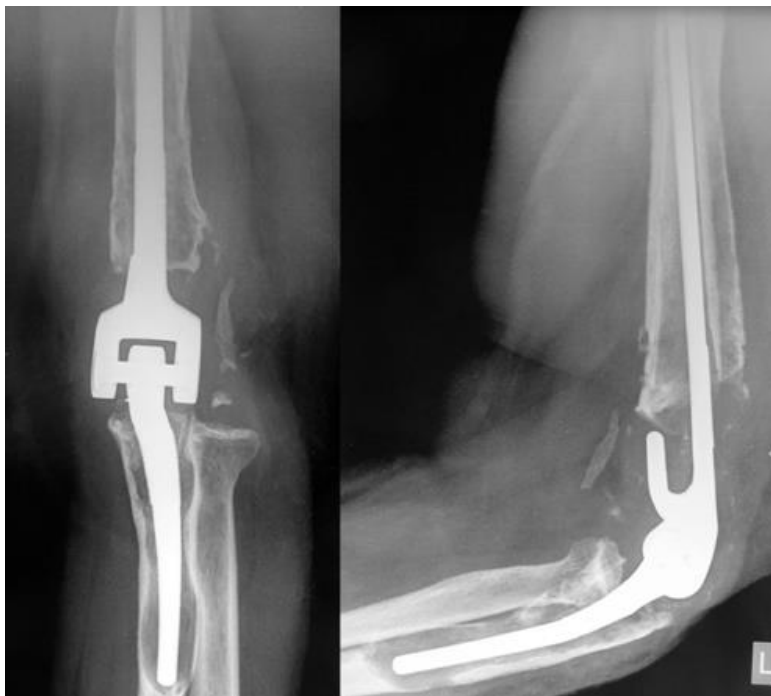
**Figure 4:** Using the 3.5 mm PHILOS System and long bone allograft.



**Figure 5:** The bone allograft fixed with three cerclage wirings.



**Figure 6:** Aseptic loosening with periprosthetic fracture.



**Figure 7:** Aseptic loosening without periprosthetic fracture.

## Discussion

To the best of our knowledge, aseptic loosening and periprosthetic fractures occur in parallel very often [2]. In 78% of cases, the cause of the fracture was not determined. It was hardly possible to understand the fracture, or the loosening was primary [2,9]. Periprosthetic nonunion fracture associated with poor bone quality, extensive bone loss and soft tissue contracture [5]. The frequently repeated movements in the elbow course the gradually aseptic loosening. In addition, high physical activity in young and osteoporosis in old are the contributing factors. Take it from there we can suppose that aseptic loosening and periprosthetic fractures are the parts of a single process. In the beginning, we see the fracture, which is clouding the loosening, or vice versa. In our opinion, the aseptic loosening can flow in two variants:

- 1) Aseptic loosening with periprosthetic fracture (Figure 6).
- 2) Aseptic loosening without periprosthetic fracture (Figure 7).

Very rarely do we see a true fracture due to trauma or intraoperative iatrogenic damage. Our case report shows the fracture following intraoperative injury of bone. In all cases, we should recreate bone stock using a bone allograft even if we see the traumatic fracture. It is very important to prevent the loosening in the future, because bone allograft has osteogenic, osteoinductive, osteoconductive properties and mechanical strength. The next important point is correct osteosynthesis with sufficient levels of fixation.

## Conclusion

Aseptic loosening after total elbow arthroplasty can flow with or without periprosthetic fracture. In isolated cases, we see the true fracture due to trauma or iatrogenic damage. Following the osteosynthesis principles and using the bone allografts can managed in many issues with periprosthetic fractures after primary or revision elbow replacement.

## References

1. Chaudhry H, MacDonald SJ, Howard JL, McCalden RW and Naudie DD et al. (2020) Clinical Outcomes and Midterm Survivorship of an Uncemented Primary Total Hip Arthroplasty System. *J of Arthroplasty*. 35(6):1662-1666.
2. Kesyan GA, Arsen'ev IG, Urazgil'deev RZ, Karapetyan GS and Levin AN et al. (2021) Current trends and prospects for total elbow arthroplasty (literature review). *N.N. Priorov J Traumatology Orthop*. 28(3):75-92.
3. Geurts EJ, Viveen J, van Riet RP, Kodde IF and Eygendaal D. (2019) Outcomes after revision total elbow arthroplasty: a systematic review. *J Shoulder Elbow Surg*. 28(2):381–386.
4. Barret H, Laumonerie P, Delclaux S, Arboucalot M and Bonneville N et al. (2021) Revision total elbow arthroplasty with the semiconstrained Coonrad/Morrey prosthesis follow-up to 21 years. *J Bone Joint Surg Am*. 103(7):618–628.
5. Chiang YS, Chen SH, Liu KC, Yang CC and Chien JT. (2021) Nail-stem construct method for periprosthetic humeral fractures with recalcitrant nonunion after total elbow arthroplasty: A surgical technique. *Tzu Chi Med J*. 35(2):171-175.
6. Kim JM, Mudgal CS, Konopka JF and Jupiter JB. (2021) Complications of total elbow arthroplasty. *J Am Acad Orthop. Surg*. 19(6):328–339
7. O'Driscoll SW and Morrey BF. (1999) Periprosthetic fractures about the elbow. *Orthop Clin North Am*. 30(2):319–325.
8. Sanchez-Sotelo J, O'Driscoll S and Morrey BF. (2002) Periprosthetic humeral fractures after total elbow arthroplasty: treatment with implant revision and strut allograft augmentation. *J Bone Joint Surg Am*. 84(9):1642–1650.
9. Foruria AM, Sanchez-Sotelo J, Oh LS, Adams RA and Morrey BF. (2011) The surgical treatment of periprosthetic elbow fractures around the ulnar stem following semiconstrained total elbow arthroplasty. *J Bone Joint Surg Am*. 93(15):1399–1407.