

## C A S E R E P O R T

## Two cases of neglected posterior fracture-dislocation of the shoulder with ipsilateral humeral shaft fracture

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**Summary.** Posterior shoulder fracture-dislocations are rare. A combination of this injury with ipsilateral humeral shaft fracture is an extremely rare event. We report two cases of posterior shoulder fracture-dislocation with ipsilateral fracture shaft of humerus treated in our department. We highlight the rarity of the condition and the potential risk of recognize only the shaft fracture. We emphasize the importance of complete physical and radiological examination (x-rays and CT scan) in such cases to ensure early detection and its subsequent surgical treatment. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** glenohumeral fracture dislocation, humeral shaft fracture, posterior shoulder dislocation

### Introduction

Posterior shoulder dislocations and posterior shoulder fracture-dislocations occur rarely. Posterior shoulder fracture-dislocations associated with humeral shaft fracture are extremely infrequent and, in literature, not even one case regarding the treatment with plate and screws is present (1).

The major critical aspect in these cases, considering the exceptionality, is the accuracy of the preoperative clinical evaluation and the diagnostic assessment to suggest the surgeon the most adequate surgical treatment option and the selection of the correct fixation device to treat the lesion.

Following are two case studies including clinical follow-up evaluation and diagnostic follow-up assessment a year after the traumatic injury treated at our Orthopedic and Traumatology Ward.

### Case report No. 1

34 years old male patient (G.M.) transported at the Emergency Room of the Ospedale San Bortolo of

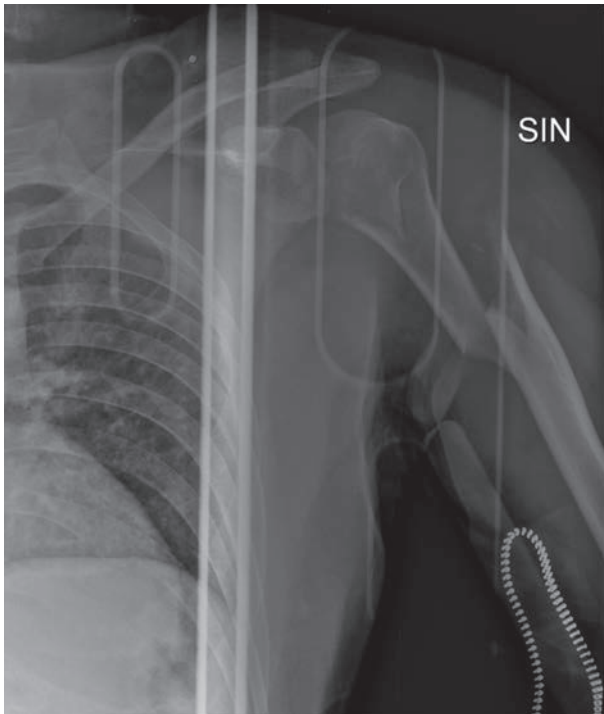
Vicenza following to a high-energy motor vehicle accident (motorcycle fall). Patient complained of severe pain and reported impairment at the level of the left upper limb, showing signs of abduction and antalgic position. Swelling was present at the level of the deltoid and proximal humerus. No vessel or nerve deficit was noted.

The two-planes radiological assessment performed in the Emergency Room showed findings of humeral shaft fracture, 12A2 as according to the AO Classification (Fig. 1, 2).

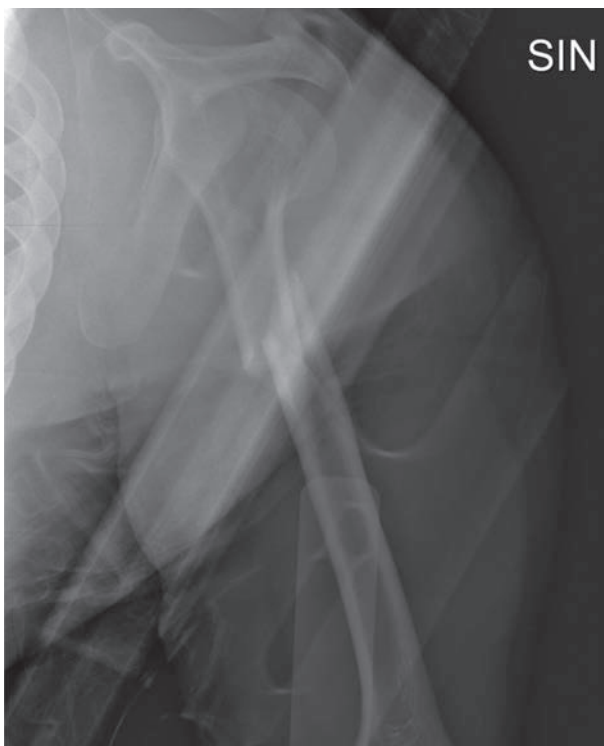
Therefore, immobilization with a Desault-type shoulder brace was performed; patient was admitted to our Orthopedic and Traumatology Ward and recommended to undergo surgical procedure of internal fixation with intramedullary nailing.

Three days after, patient was taken into the operating room and, after being placed on the operating table, underwent fluoroscopy procedure at the level of the head of the humerus showing evidence of posterior shoulder fracture-dislocation of the humeral head (Fig. 3).

Therefore, the surgical approach was modified to an open surgery for reduction of the fracture-disloca-



**Figure 1.** Preoperative X-ray (AP view)

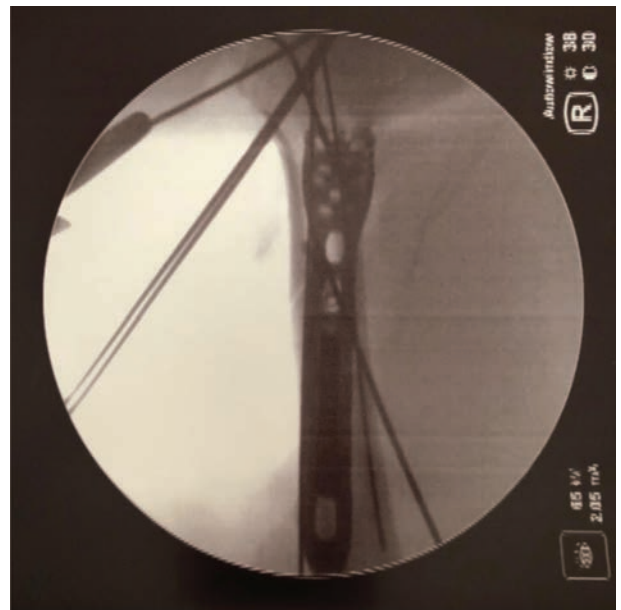


**Figure 2.** Preoperative X-ray (sagittal view)

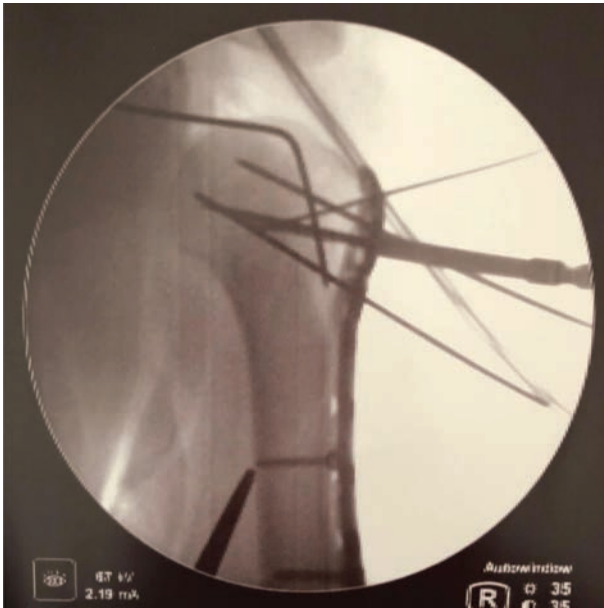


**Figure 3.** Posterior fracture dislocation at preoperative fluoroscopy

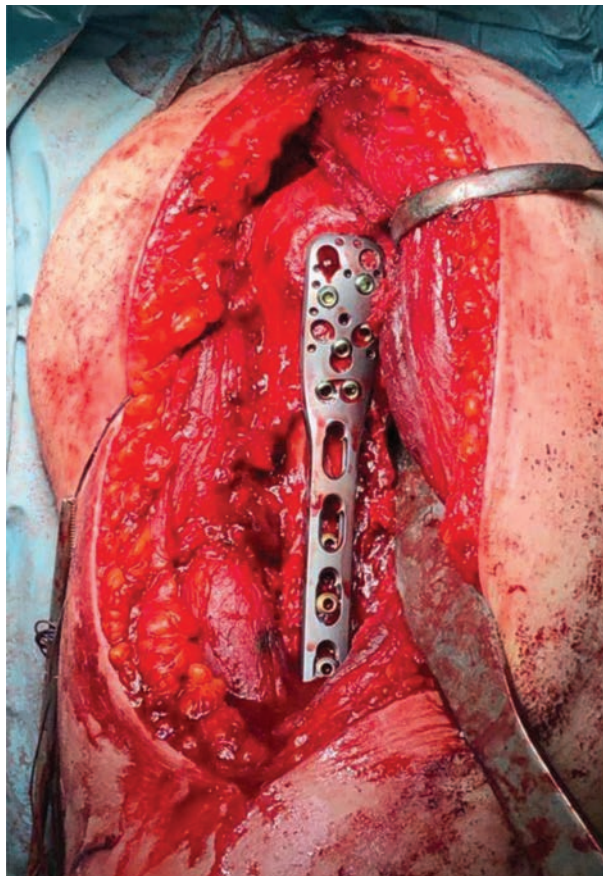
tion of the head of the humerus and the humeral shaft fracture: deltopectoral approach for placement of titanium plate and screws (Philos Depuy-Synthes®) were performed (Fig. 4-6).



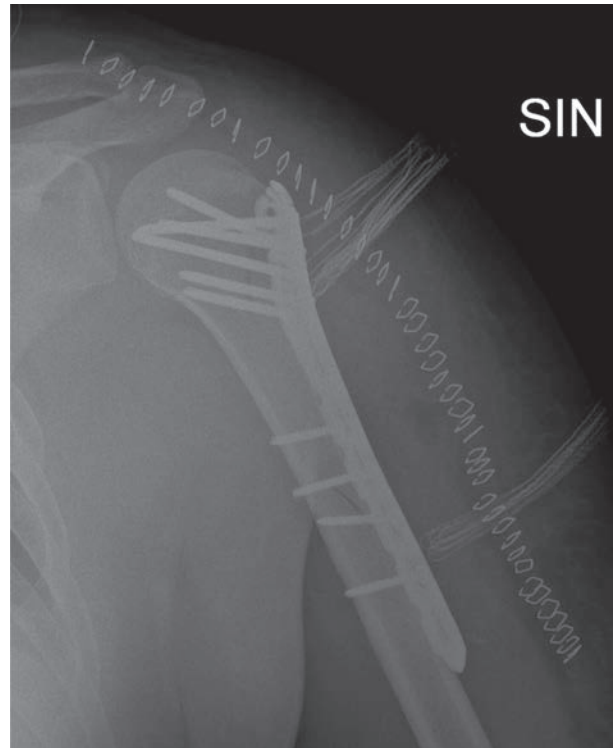
**Figure 4.** Intraoperative reduction with k-wires and stabilization with plate and screws (sagittal view)



**Figure 5.** Intraoperative reduction with k-wires and stabilization with plate and screws (AP view)



**Figure 6.** Final position of the plate and screws

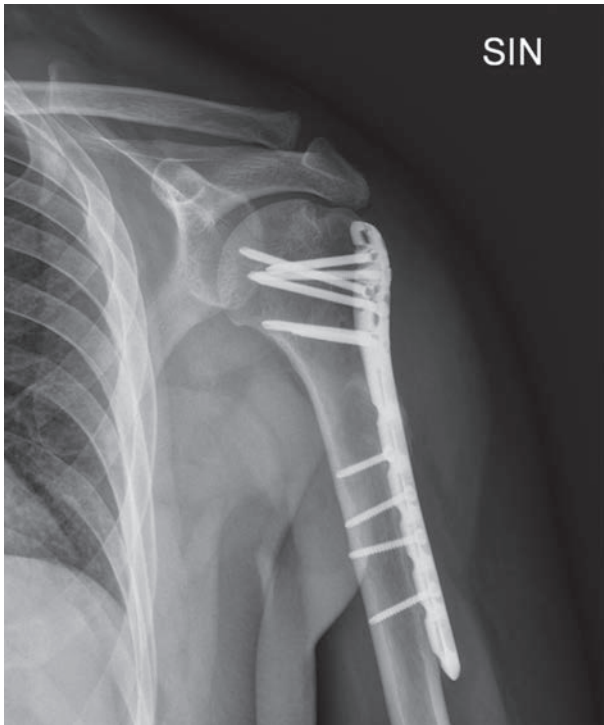


**Figure 7.** Postoperative X-ray

The postoperative follow-up x-rays performed the night of the surgery showed a reduction of dislocation and fractures (Fig. 7). Patient was discharged later and underwent clinical and radiological follow-up assessments periodically. One year after the surgical procedure, the reduction of the dislocation and of the fractures was maintained, presenting no radiological findings of avascular necrosis (Fig. 8, 9). The anterior flexion was 120 degrees, the abduction 110 degrees, the external rotation 30 degrees and the internal rotation was at L1.

## Case report No. 2

57 years old male patient (M.M.) transported by the Emergency Services at the Ospedale San Bortolo of Vicenza, following to an accident with an agricultural machinery. Patient presented contusions at the level of the lower limbs and evident swelling of the right shoulder and arm. There was evidence of complete shoulder impairment, but with preserved range of motion and sensitivity of hand and wrist. The x-rays



**Figure 8.** One year follow up x-ray.



**Figure 9.** One year follow up x-ray

studies performed at the Emergency Room showed signs of humeral shaft fracture, 12A1 as according to the AO Classification (Fig. 10, 11). Therefore, a Desault-type shoulder brace was placed, and patient was admitted for undergoing surgical procedure of intramedullary nailing.

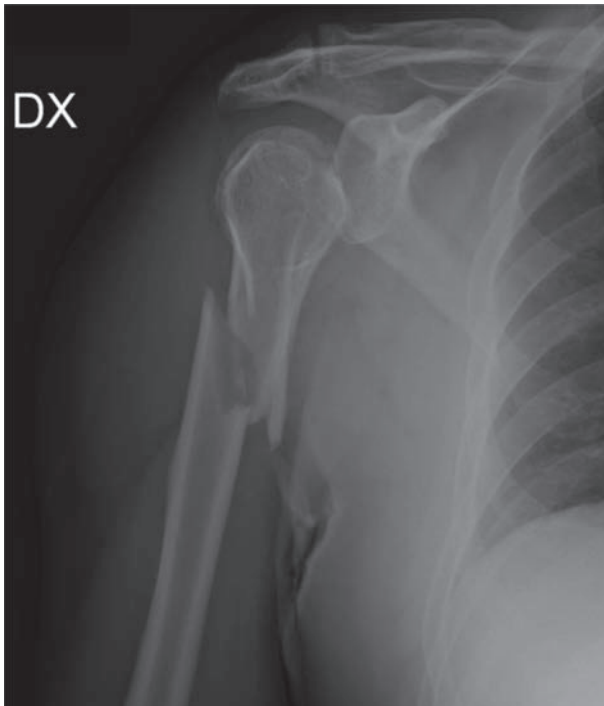
The following day, after an accurate review of the radiological images, a CT Scan of the proximal humerus was performed with evidence of posterior shoulder fracture-dislocation of the head of the humerus in addition to the previously identified fracture (Fig. 12, 13a, 13b).

Hence, the surgical plan was changed to a reduction of the fracture-dislocation of the humerus and the humerus shaft fracture with (anterior) deltopectoral approach for placement of titanium plate and screws (Philos DePuy-Synthes®).

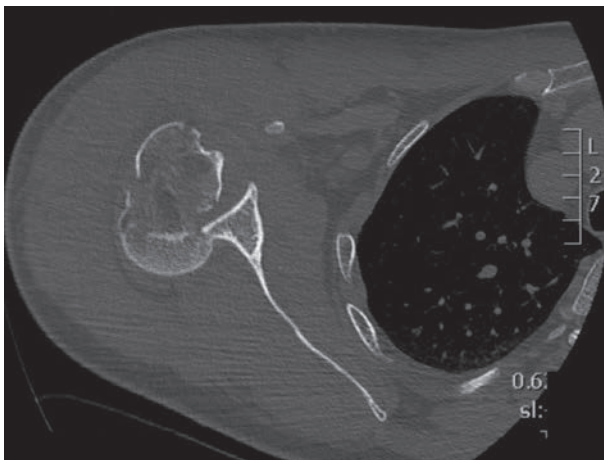
The postoperative follow-up x-rays and CT Scan (Fig. 14, 15) showed the reduction of dislocation and



**Figure 10.** Preoperative X-ray (AP view)

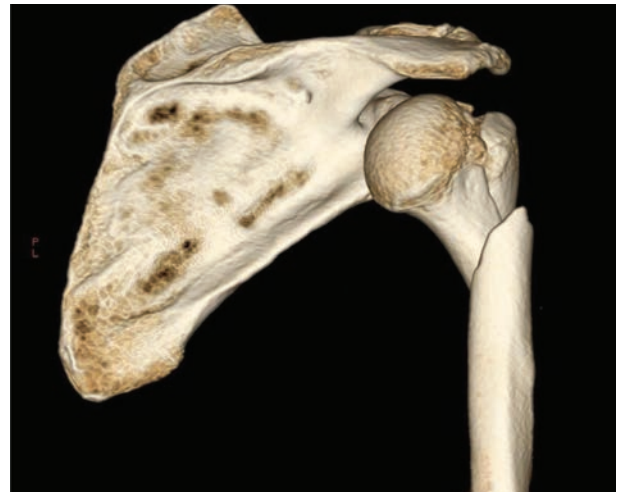


**Figure 11.** Preoperative X-ray (AP view - intrarotation)



**Figure 12.** Preoperative CT scan (coronal plane)

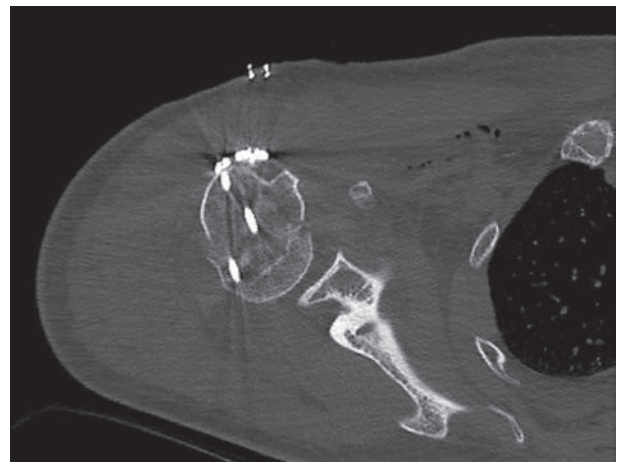
fractures. Four months after the surgical procedure, the reduction of the dislocation and of the fractures was maintained, with no radiological findings of avascular necrosis (Fig. 16, 17). The anterior flexion was 110 degrees, the abduction 105 degrees, the external rotation 30 degrees and the internal rotation was at L1.



**Figure 13a.** Preoperative CT scan (3D reconstruction)



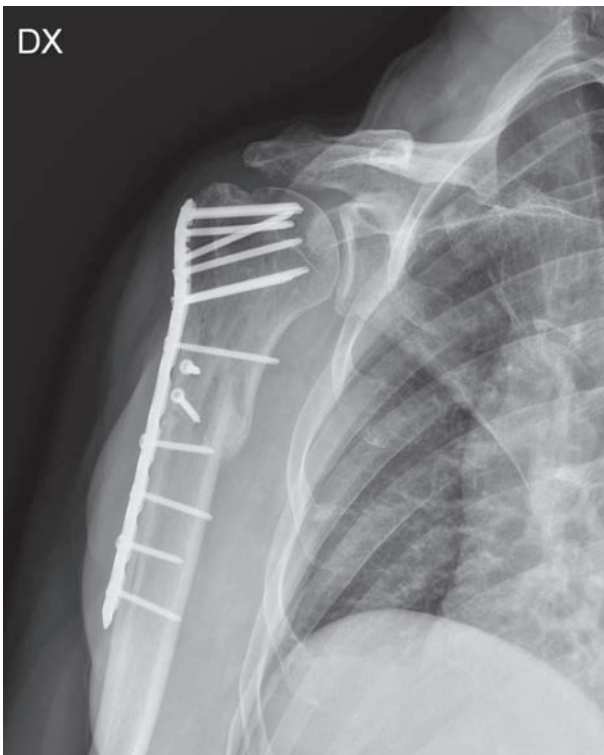
**Figure 13b.** Preoperative CT scan (3D reconstruction)



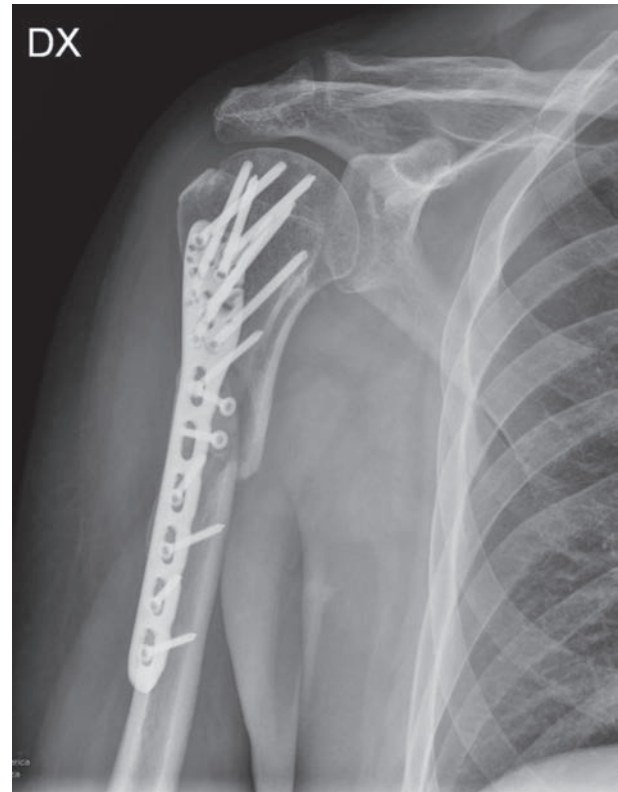
**Figure 14.** Preoperative CT scan (axial plane)



**Figure 15.** Preoperative CT scan (coronal plane)



**Figure 16.** Four months follow up x-ray (AP view)



**Figure 17.** Four months follow up x-ray (AP view - intrarotation)

## Discussion

Posterior shoulder dislocation is a rare event, bound to the peculiar resistance of the soft tissues at the level of the posterior region of the joint. In general, this change occurs secondary to excessive and involuntary contractions of the muscles, electroconvulsive therapy, spasticity and seizures (1-5). It can also be associated with high-energy traumatic injuries with the limb in abduction, internal rotation or elevation. The energy absorbed can likewise lead to a fracture of the head in addition to the dislocation, although this type of event is extremely infrequent.

The combination of posterior shoulder fracture-dislocation and ipsilateral proximal humeral shaft fracture is not present in literature.

Li et al documented a case of posterior shoulder fracture-dislocation with distal humeral shaft fracture. At first, the surgical treatment option was the use of fixation devices (plate and screws) at the level of the

midshaft, disregarding the head of the humerus. Only later, one month after the first surgical treatment, an open surgery was performed to reduce the dislocation and, fortunately, the clinical outcomes at the one-year follow-up evaluation were satisfying, and the diagnostic assessments showed no signs of necrosis (1).

Furthermore, in literature, a few cases of posterior shoulder dislocation associated with ipsilateral humeral fracture are described. Good outcomes with closed surgery were obtained in the cases with an early diagnosis of dislocation, otherwise a secondary surgical procedure to repair the joint status resulted necessary (3, 5-10).

The critical aspect results in the precision and accuracy of the physical examination of the proximal and distal joints adjacent to the fracture, considering the fact that the dislocation can coexist in the presence of a fracture and that is not always detected with the first-line diagnostic assessments (1, 7).

The presence of fractures at the level of the humeral shaft can determine potential underestimation and diagnostic mistakes since the operator of the clinical and diagnostic assessments is more focused on these fractures, disregarding other possible surrounding joint lesions less evident in the conventional radiological diagnostic study.

Therefore, the physical examination results extremely fundamental; in this case the evaluation of the local swelling at the level of the posterior deltoid, proximal to the shaft fracture.

Other signs to evaluate wisely are the reduction of the protuberance of the head of the humerus anteriorly under the acromion, and the increase of the protuberance of the coracoid (typical of the posterior shoulder dislocation) although not always present (1).

However, considering the difficulty of the physical examination often performed in a limited time-frame, in patients with multiple traumatic injuries and poorly cooperative; the evaluation and the interpretation of the diagnostic assessment plays inevitably a fundamental role.

Unfortunately, it is not always possible to perform the correct axillary plane in the radiological images performed at the time of the hospitalization and the scarcely accurate evaluation of the images, combined with a fast physical examination, can lead the surgeon

to inappropriate decisions regarding the surgical treatment and fixation device, with severe clinical consequences and healthcare legal implications.

In our case studies, the additional diagnostic assessment performed in the operating room (Case No. 1) and the CT Scan study (Case No. 2) were fundamental to obtain the correct examination of the lesions and, thus, to perform the proper surgical procedure. The follow-up evaluations showed evidence of radiological improvement and clinical recovery with good clinical outcomes, considering the entity of the fracture and the surgical treatment with plate and screws.

## Conclusions

The accuracy of the physical examination and of the diagnostic assessment is fundamental for the diagnosis and the adequate treatment of these lesions since they are extremely rare and therefore difficult to be detected. Hence, we recommend performing a pre-operative CT Scan study in case of uncertainty or in the presence of suspected clinical findings, in order to resolve those type of insidious clinical pictures.

**Conflict of interest:** Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article

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