

Jun 2015

COMMENTED by Reto Babst



-1w



0w
3RD
SURGERY



80w
3RD
SURGERY

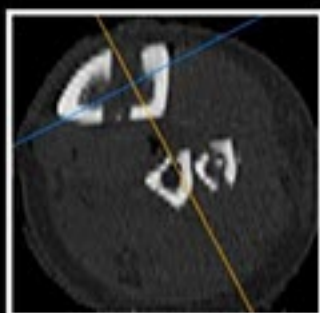


0w
IMPLANT
REMOVAL

PATIENT'S SURGICAL HISTORY

REFERRED PATIENT

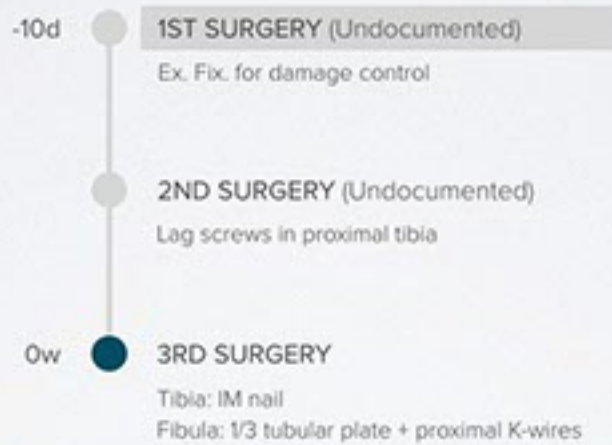




-10d

PATIENT'S SURGICAL HISTORY

REFERRED PATIENT



-lw



First-degree open fracture. This is a bending fracture, probably a direct fracture with lateral impact,...



PATIENT'S SURGICAL HISTORY

REFERRED PATIENT



PATIENT'S SURGICAL HISTORY

REFERRED PATIENT







...which was treated preliminarily with the external fixator.



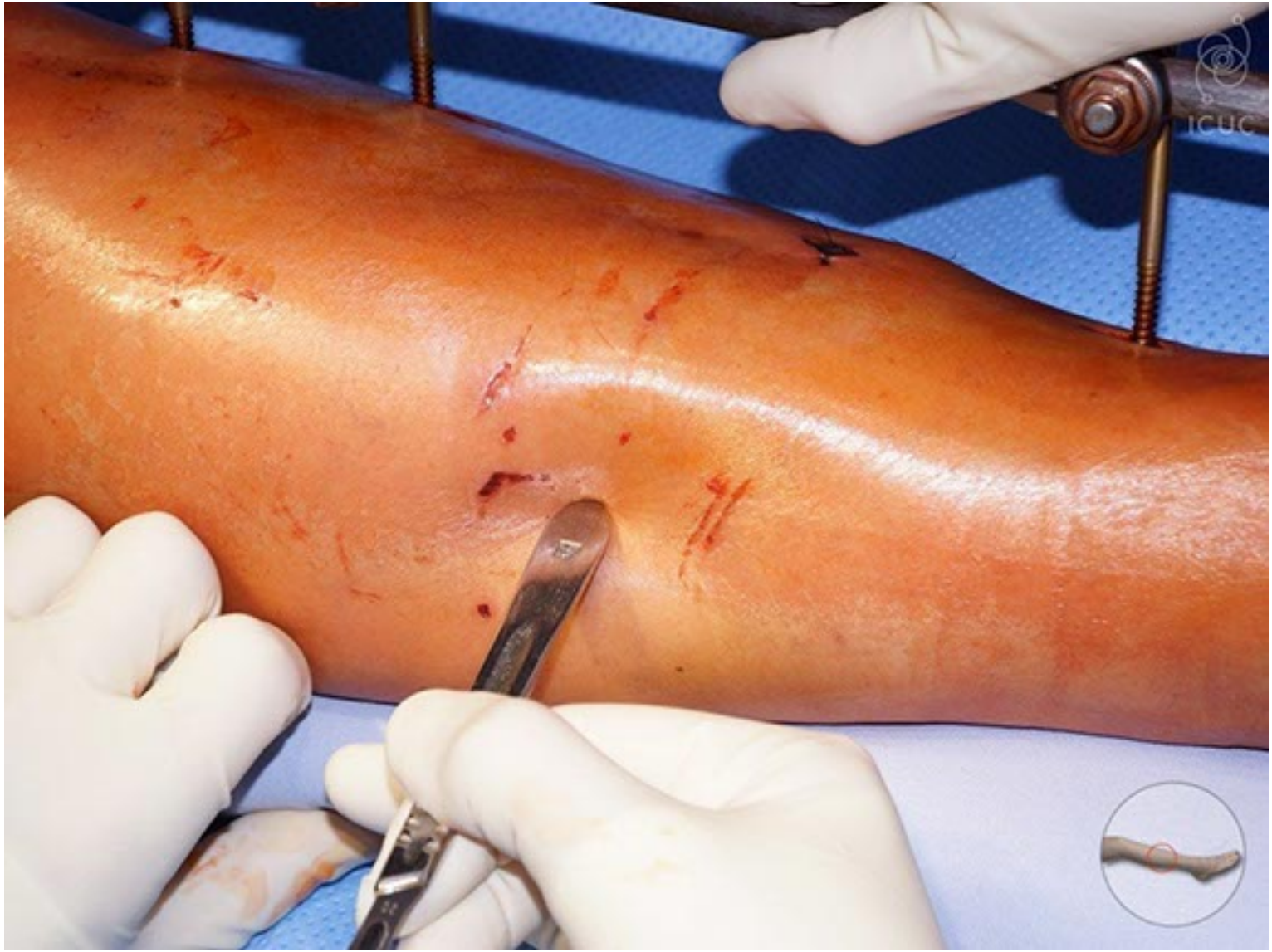
We can see from the small stab incisions and the small sutures at the level of the fracture that it was an open fracture. This is the open wound, which was sutured immediately.






Precise draping. The device is a monofixator, just a single tube.
This seems to be a good idea.



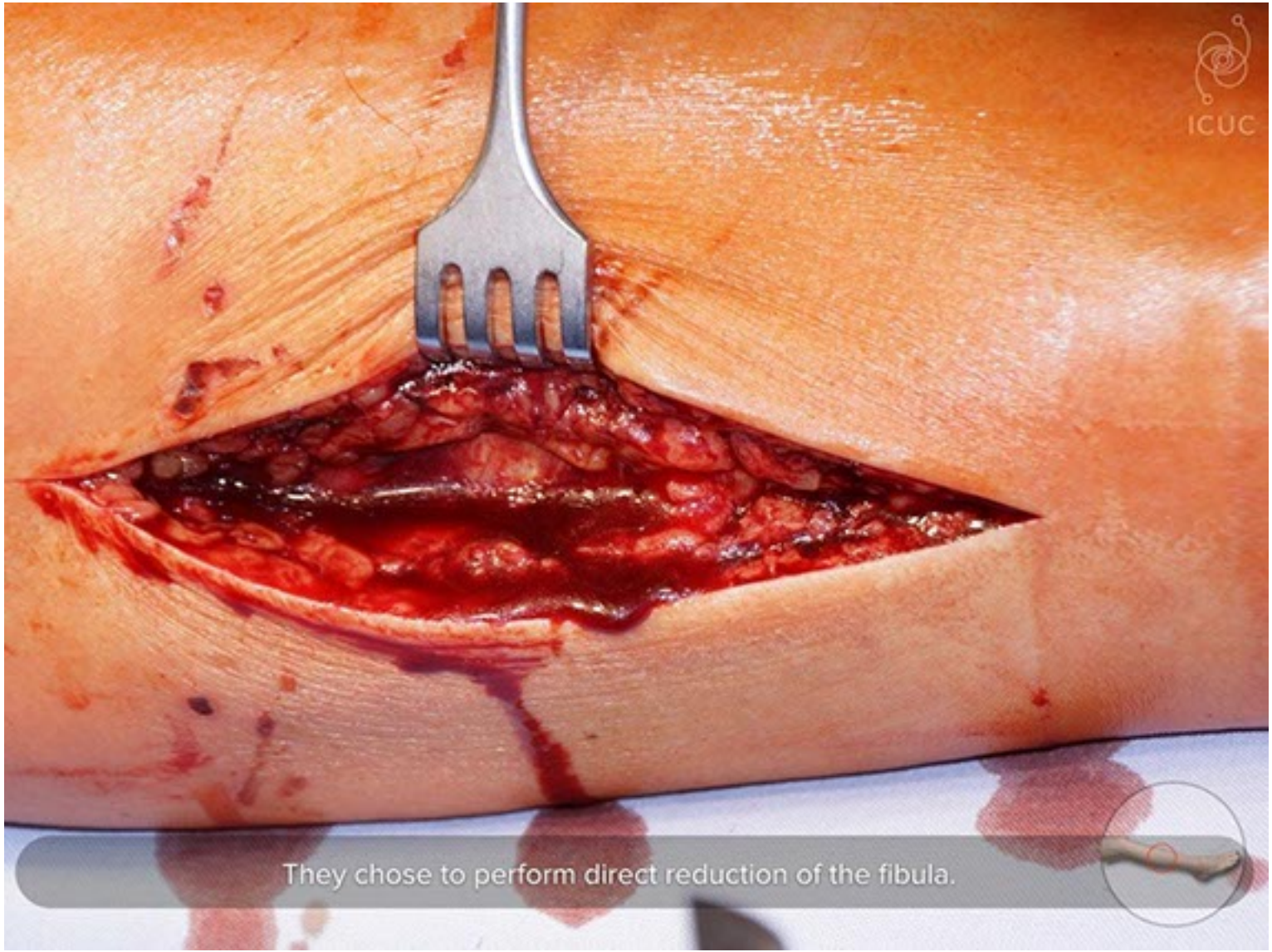






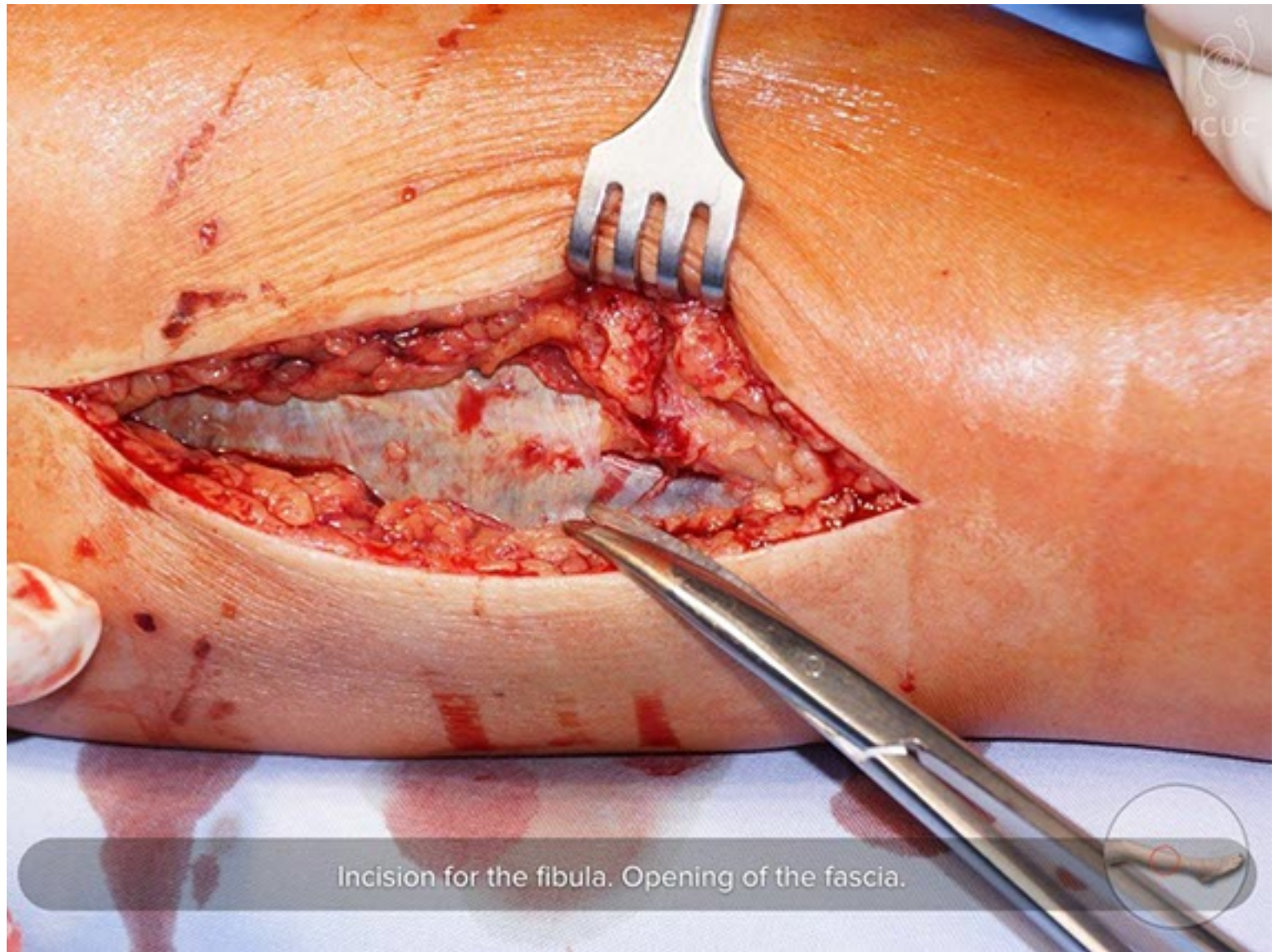
Considering the original injury and the primary treatment, the options for secondary treatment are nailing or plating. If a nail is used, the external fixator can be employed as a reduction tool to facilitate nail insertion. Or, you can choose plating. In this case, it may be better to align the fibula and stabilize it first.



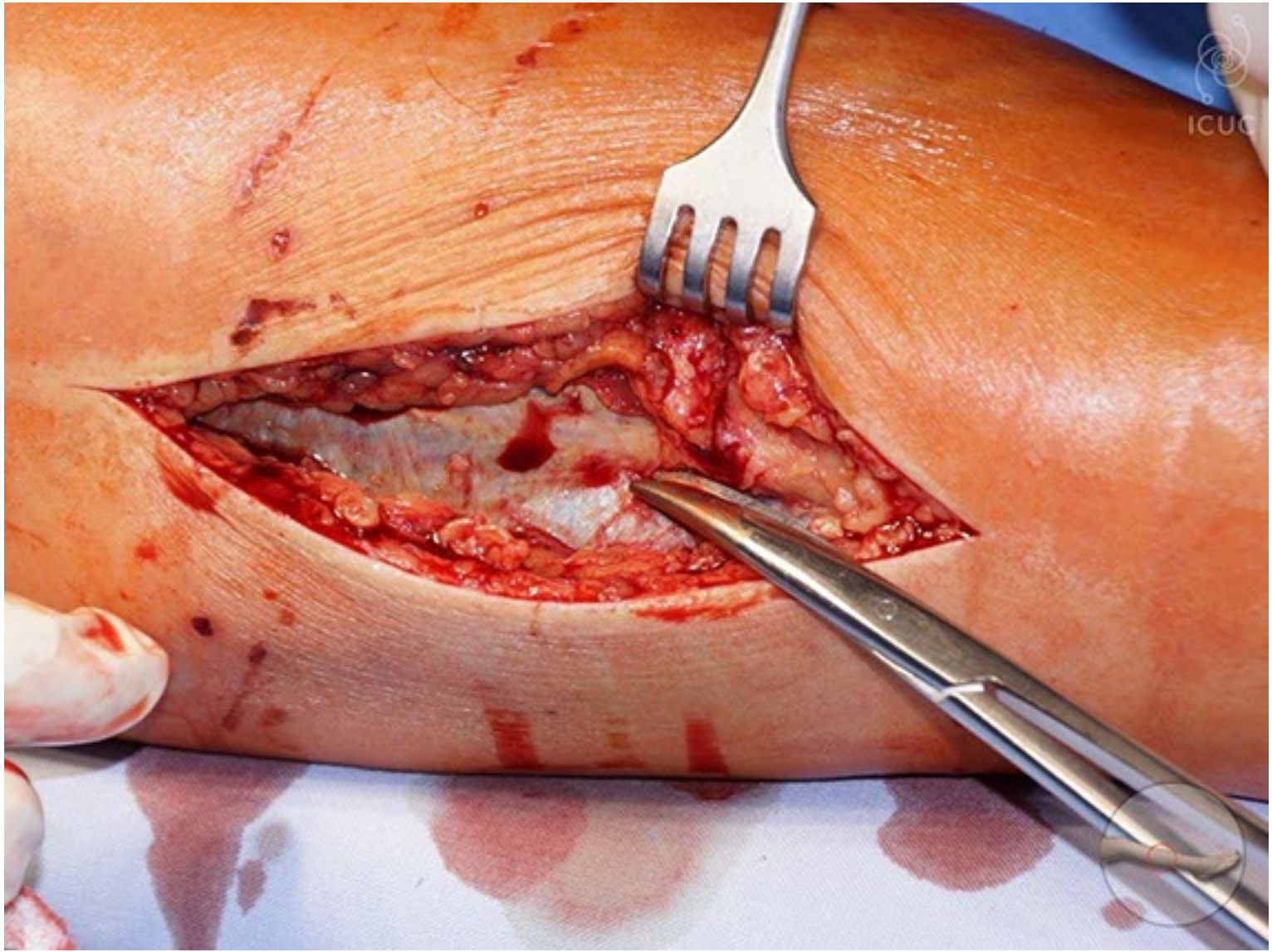


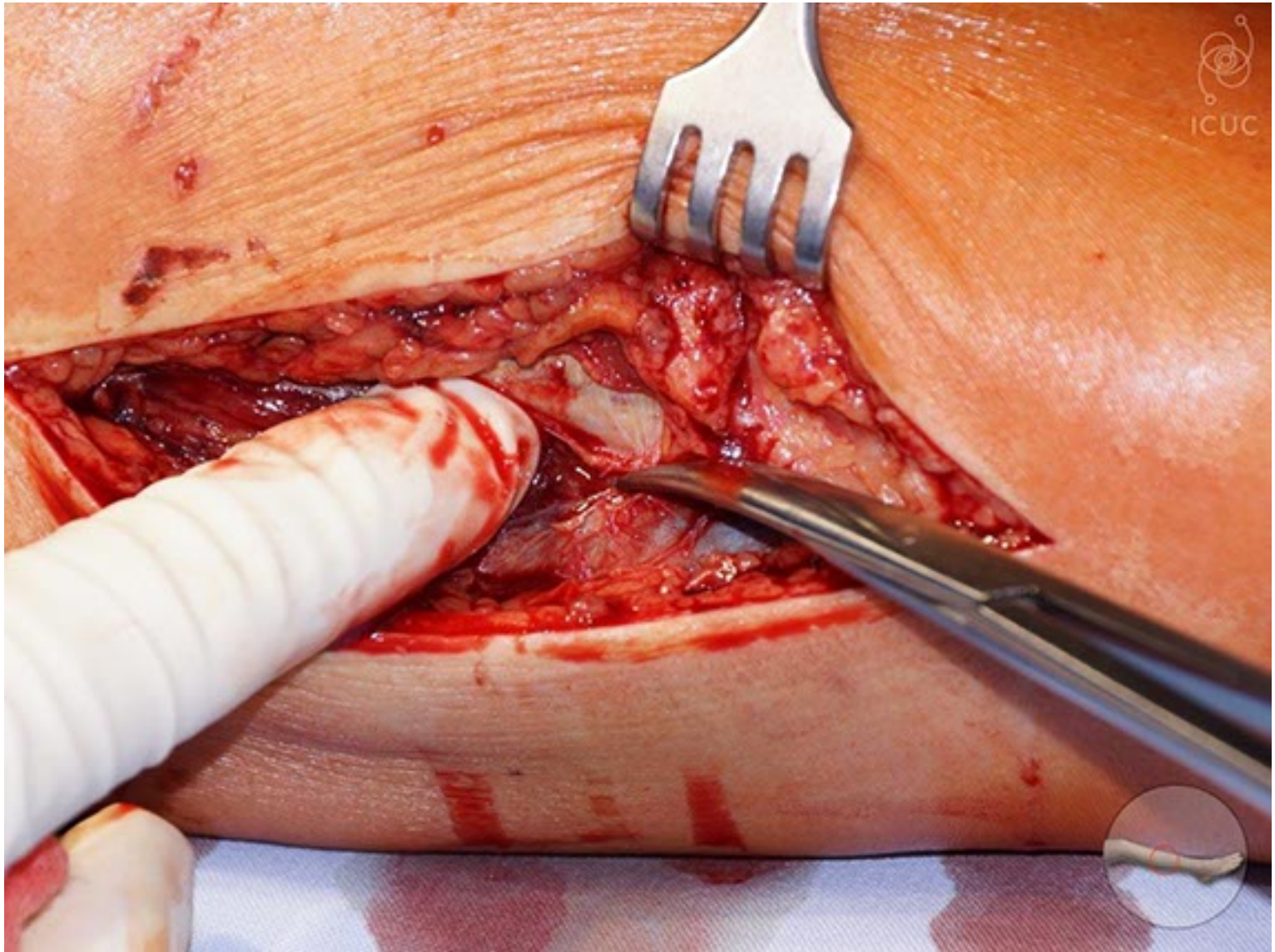
They chose to perform direct reduction of the fibula.

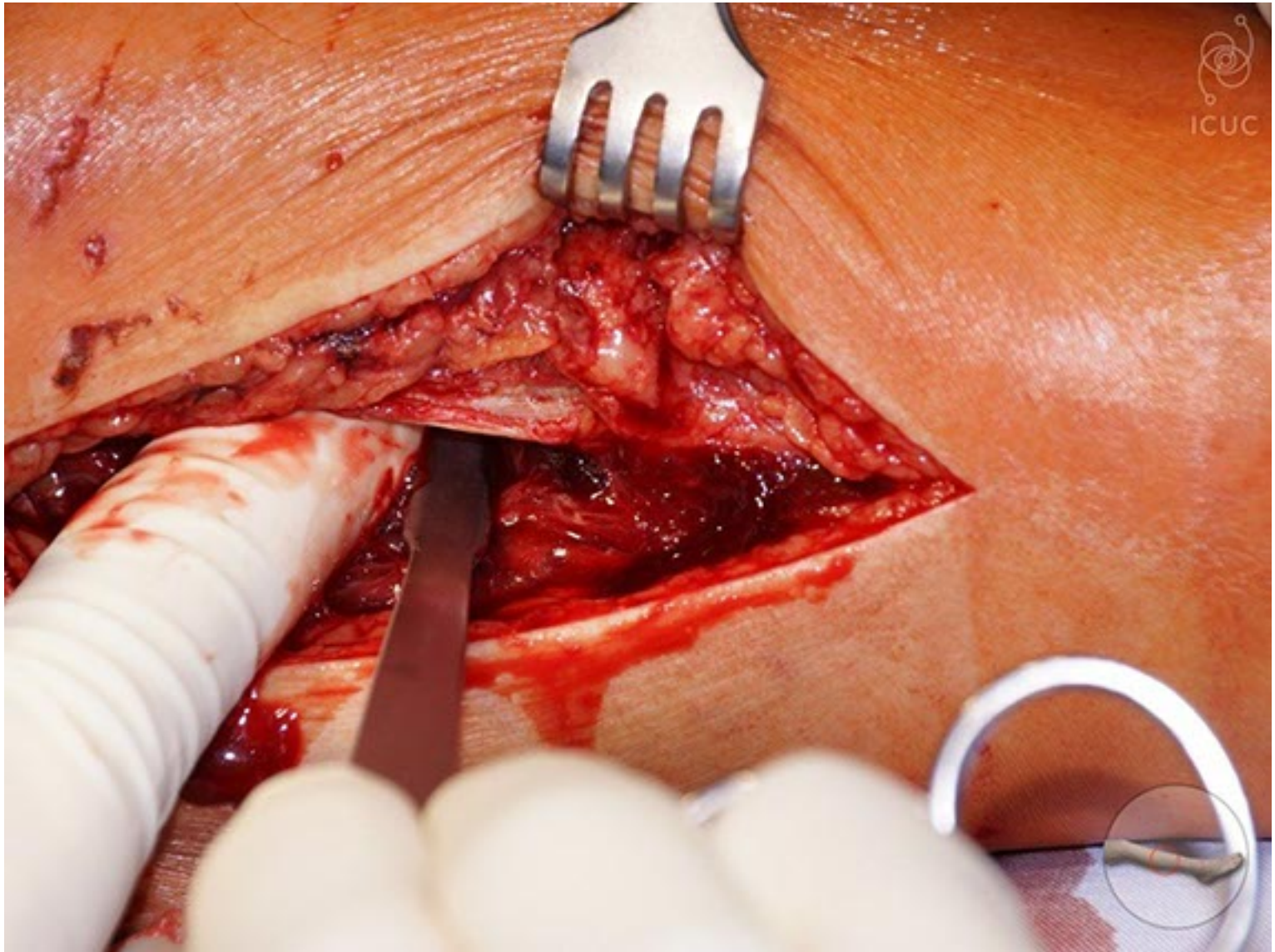


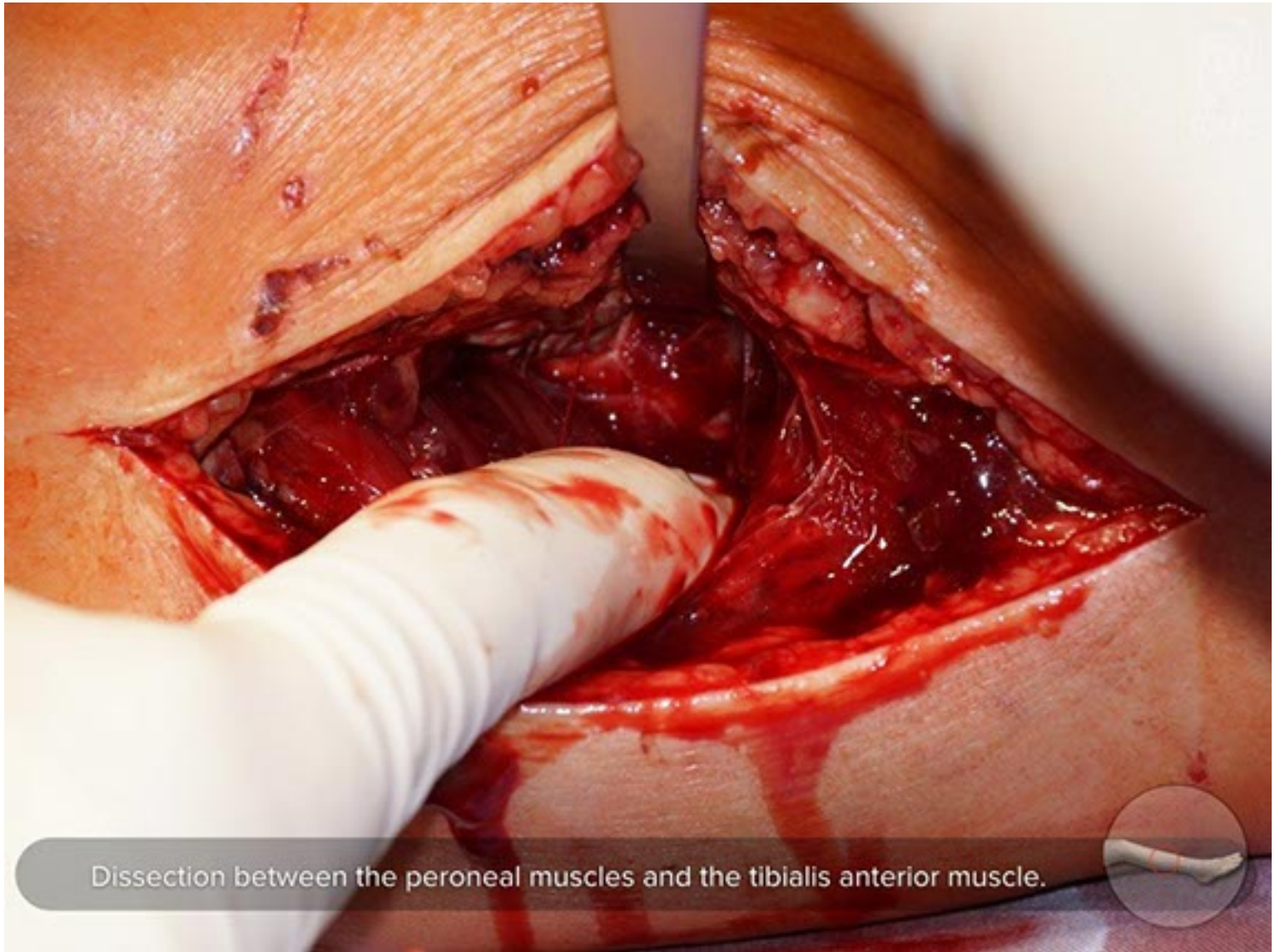


Incision for the fibula. Opening of the fascia.



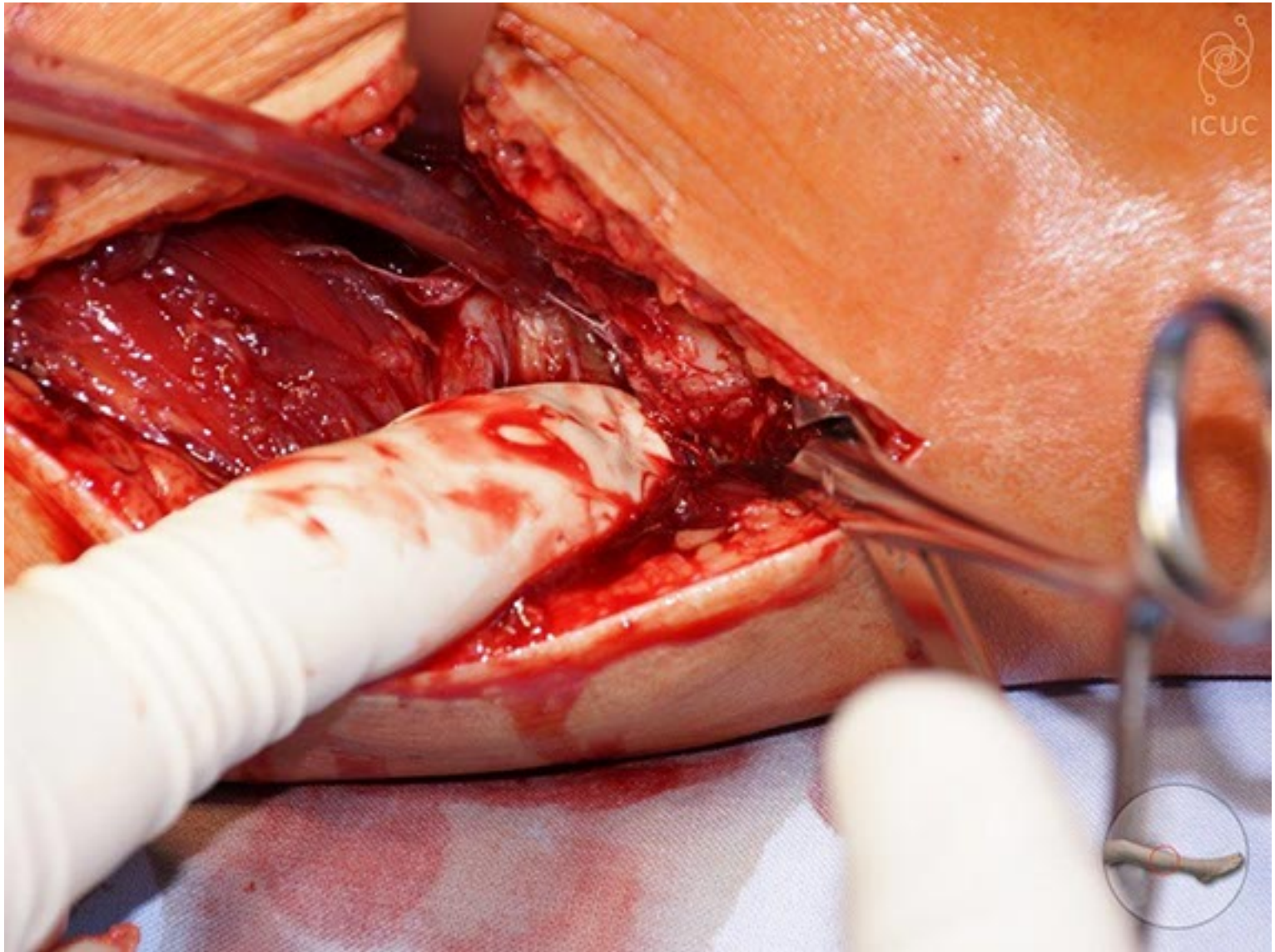


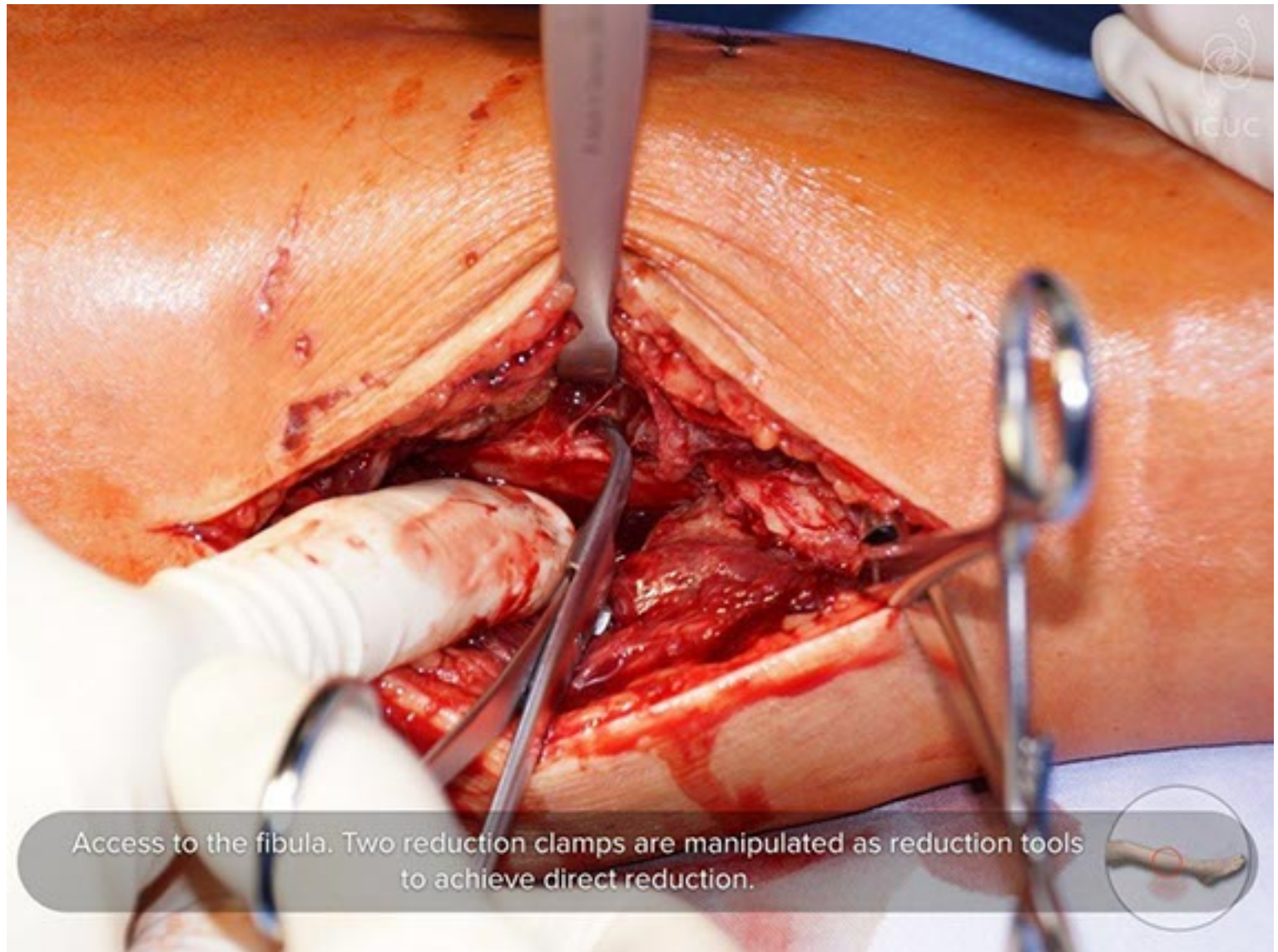




Dissection between the peroneal muscles and the tibialis anterior muscle.

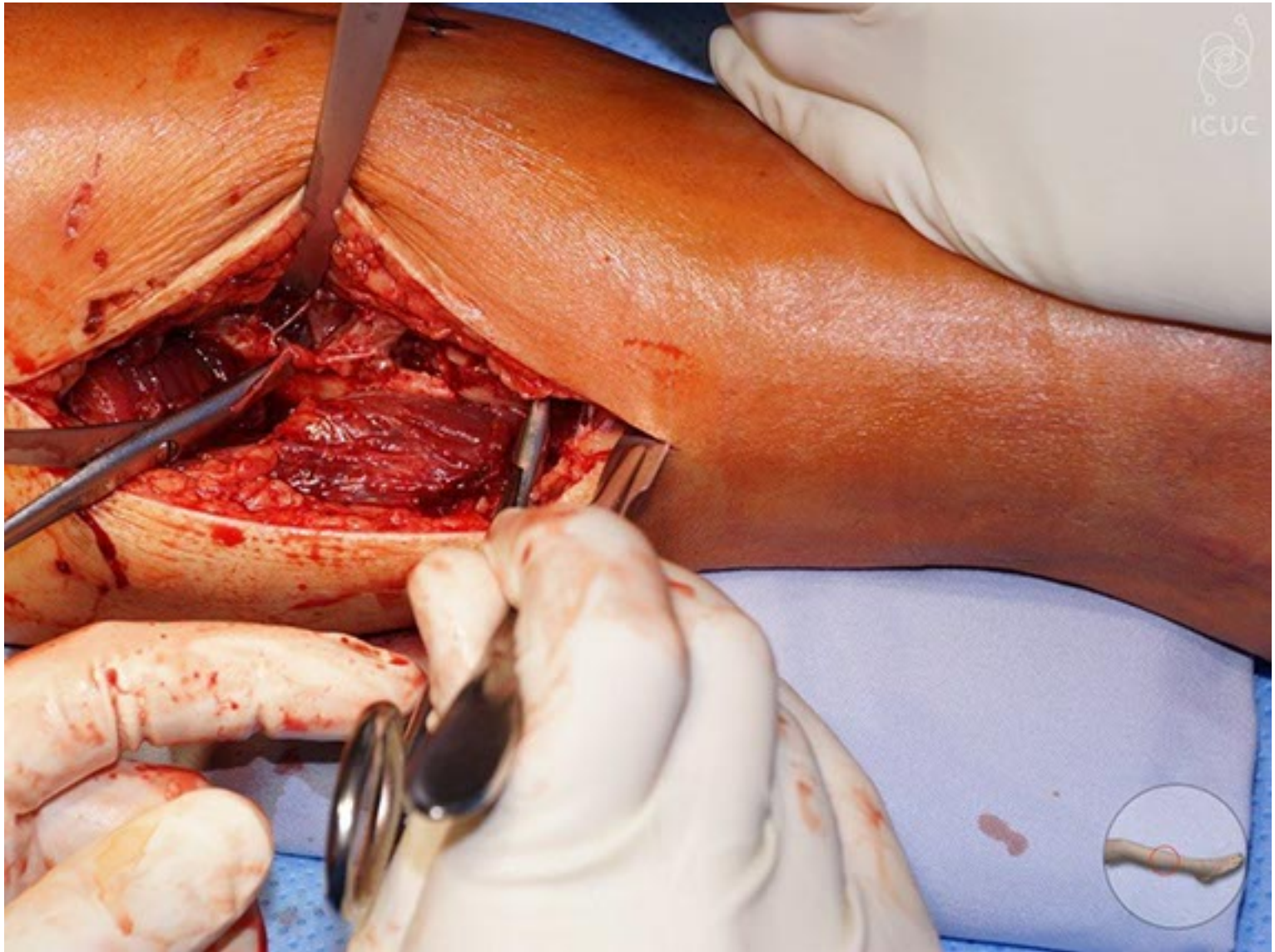


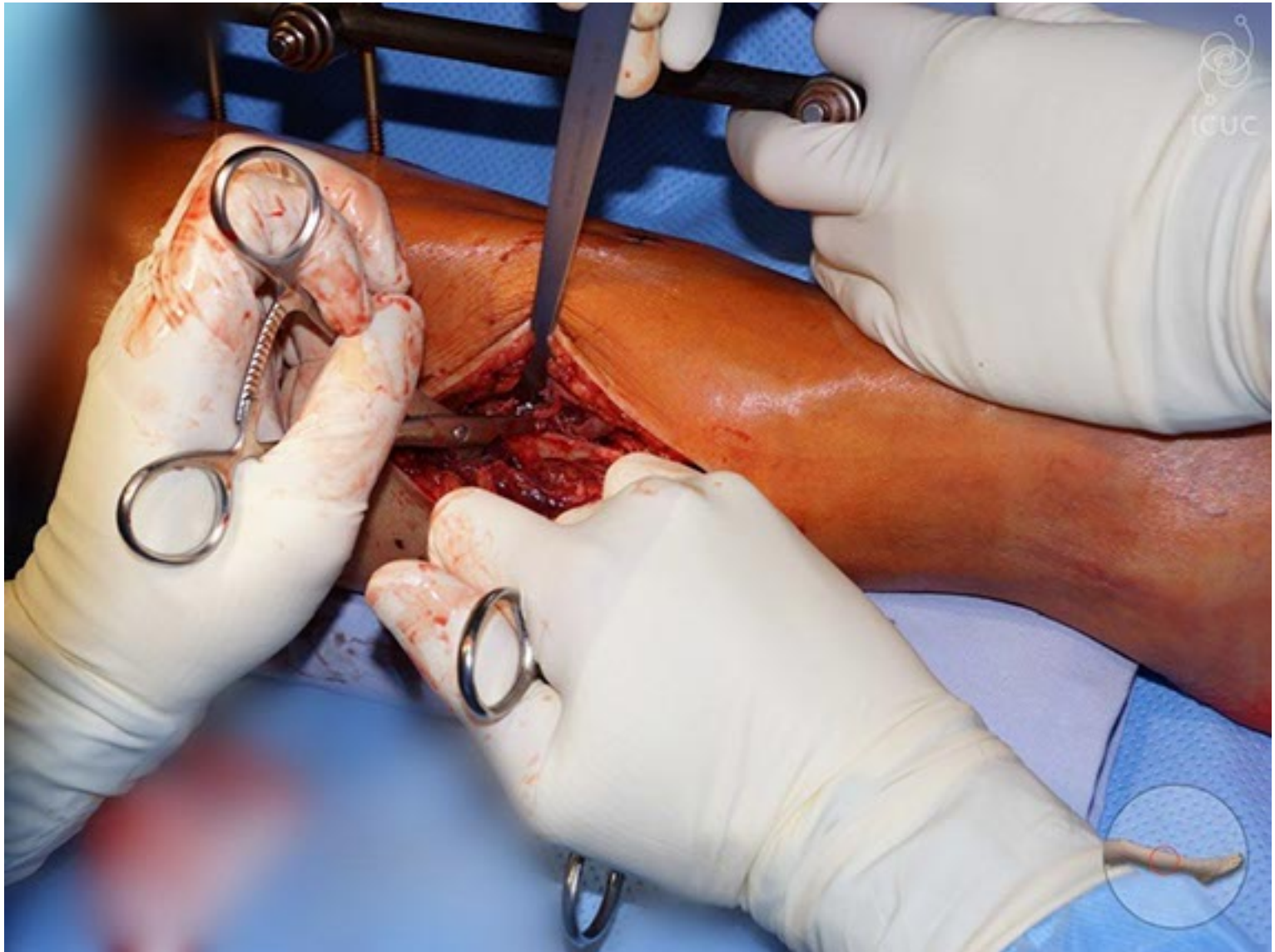


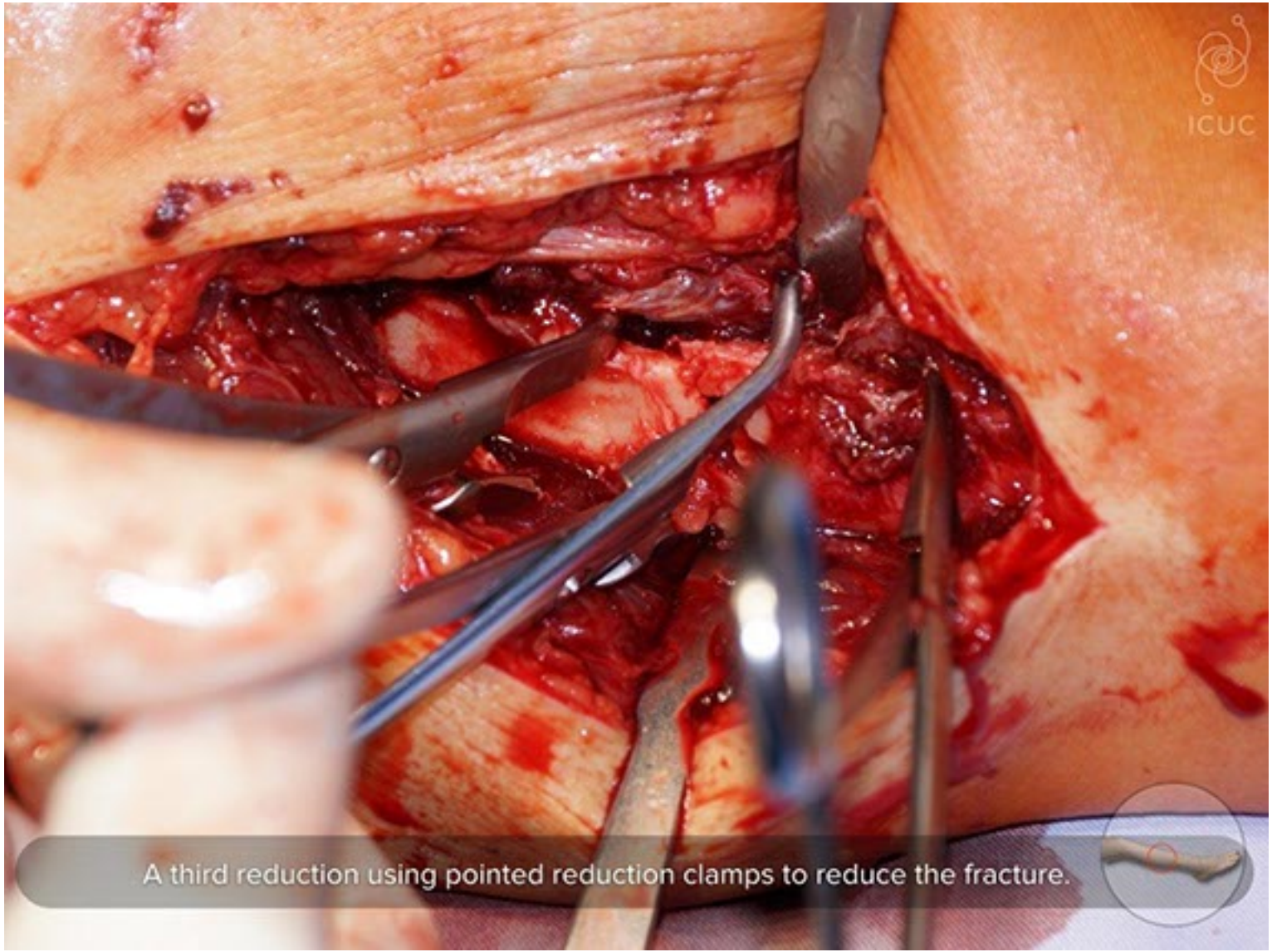


Access to the fibula. Two reduction clamps are manipulated as reduction tools to achieve direct reduction.



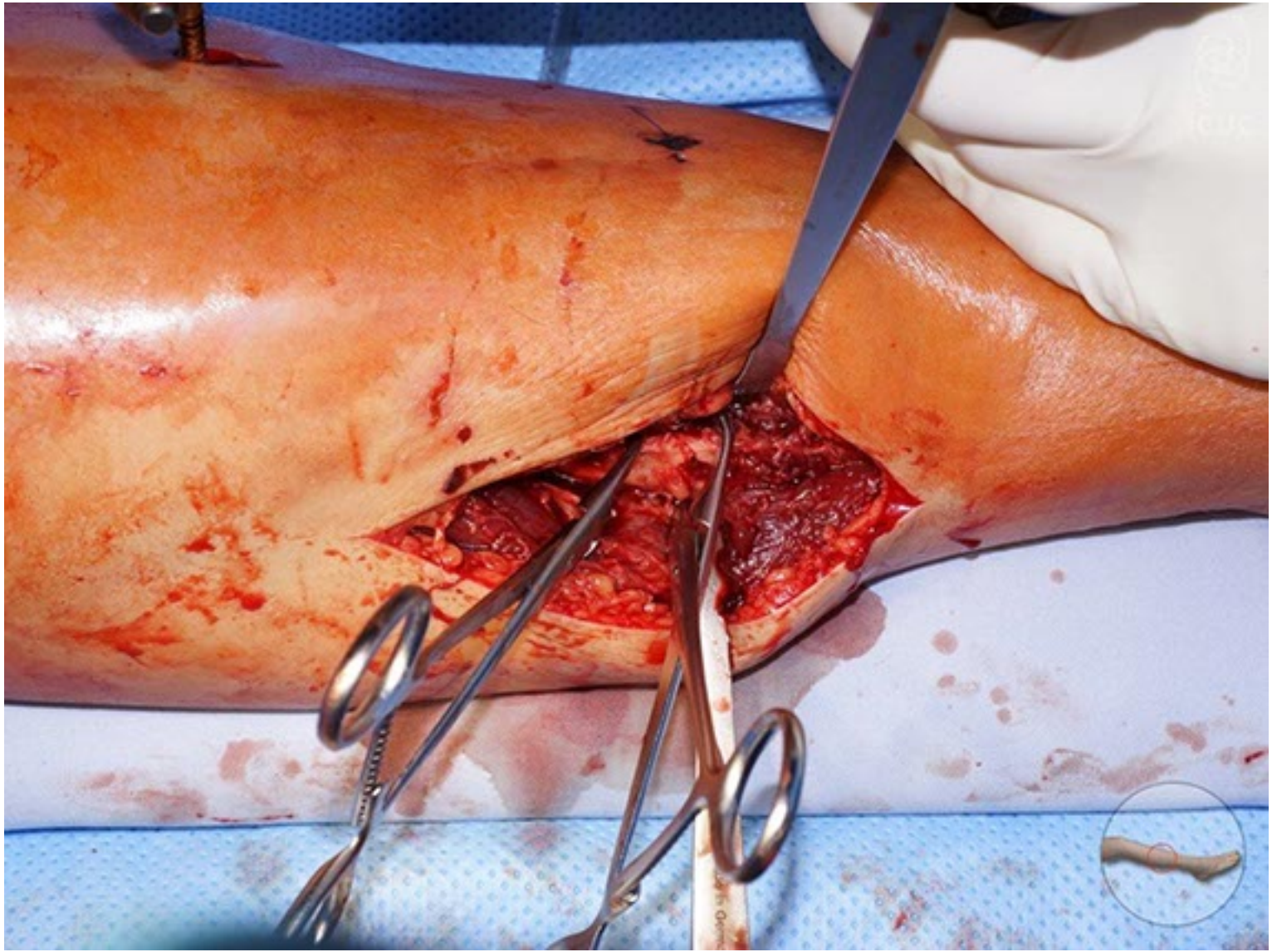


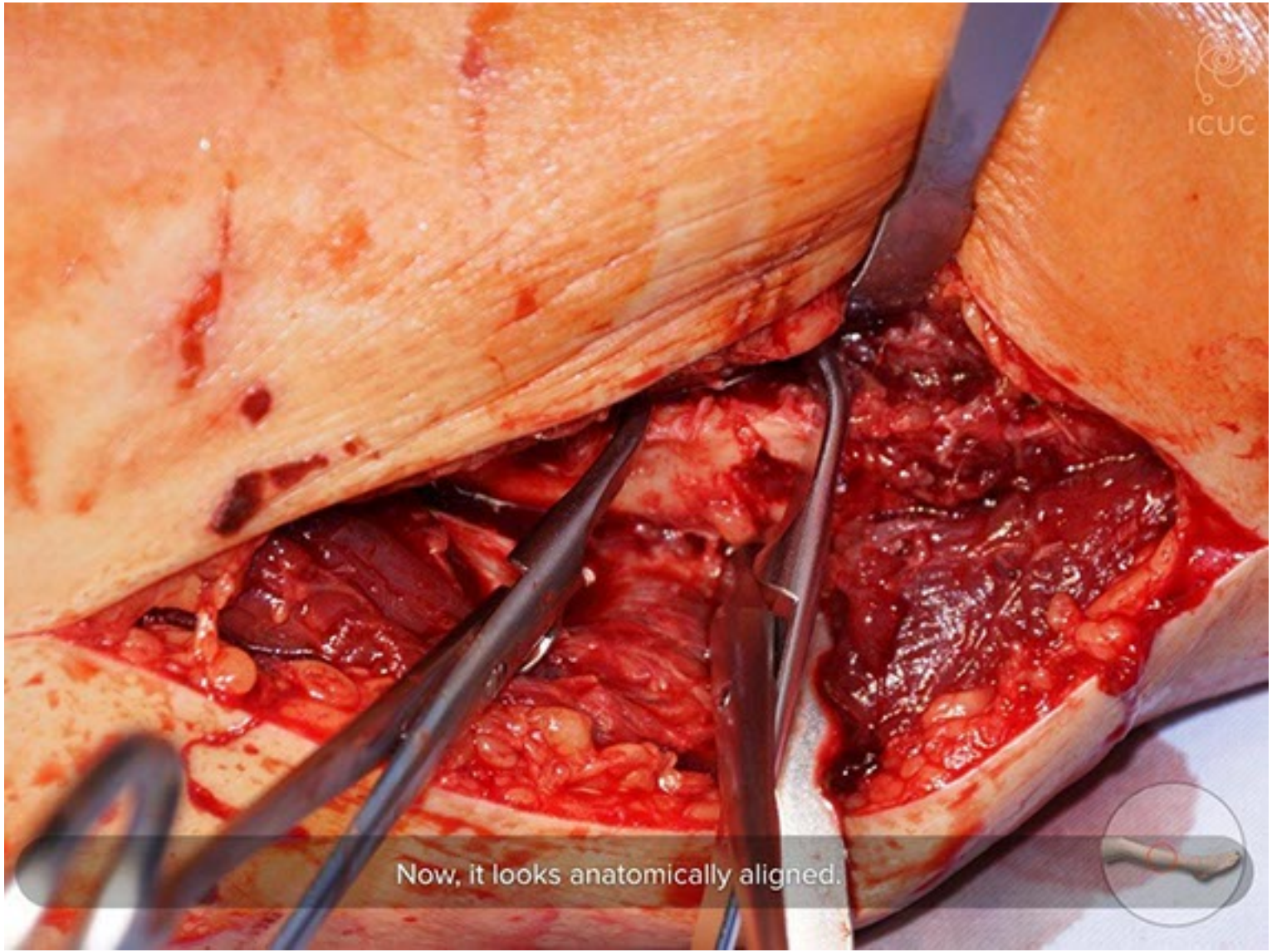




A third reduction using pointed reduction clamps to reduce the fracture.

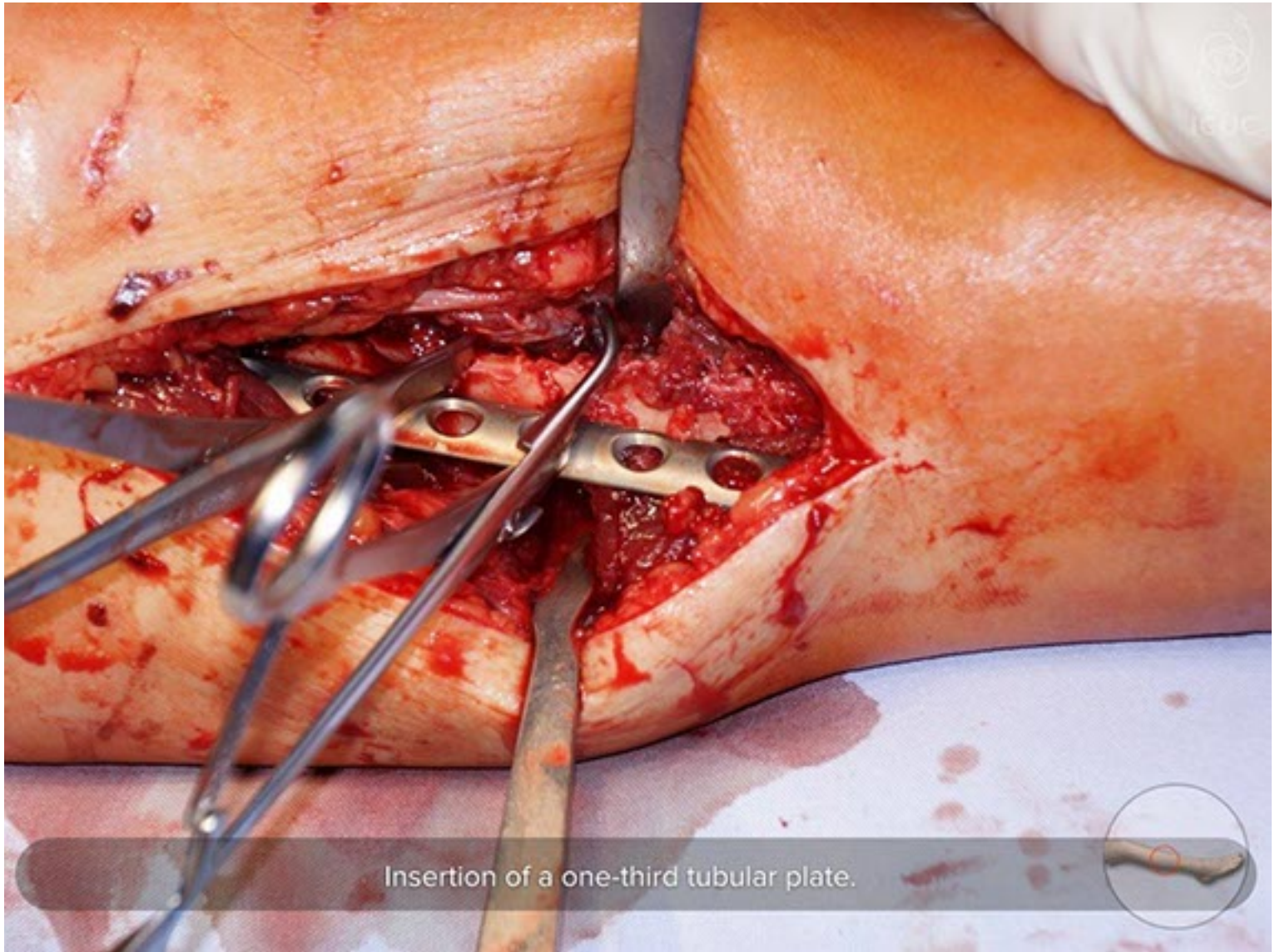




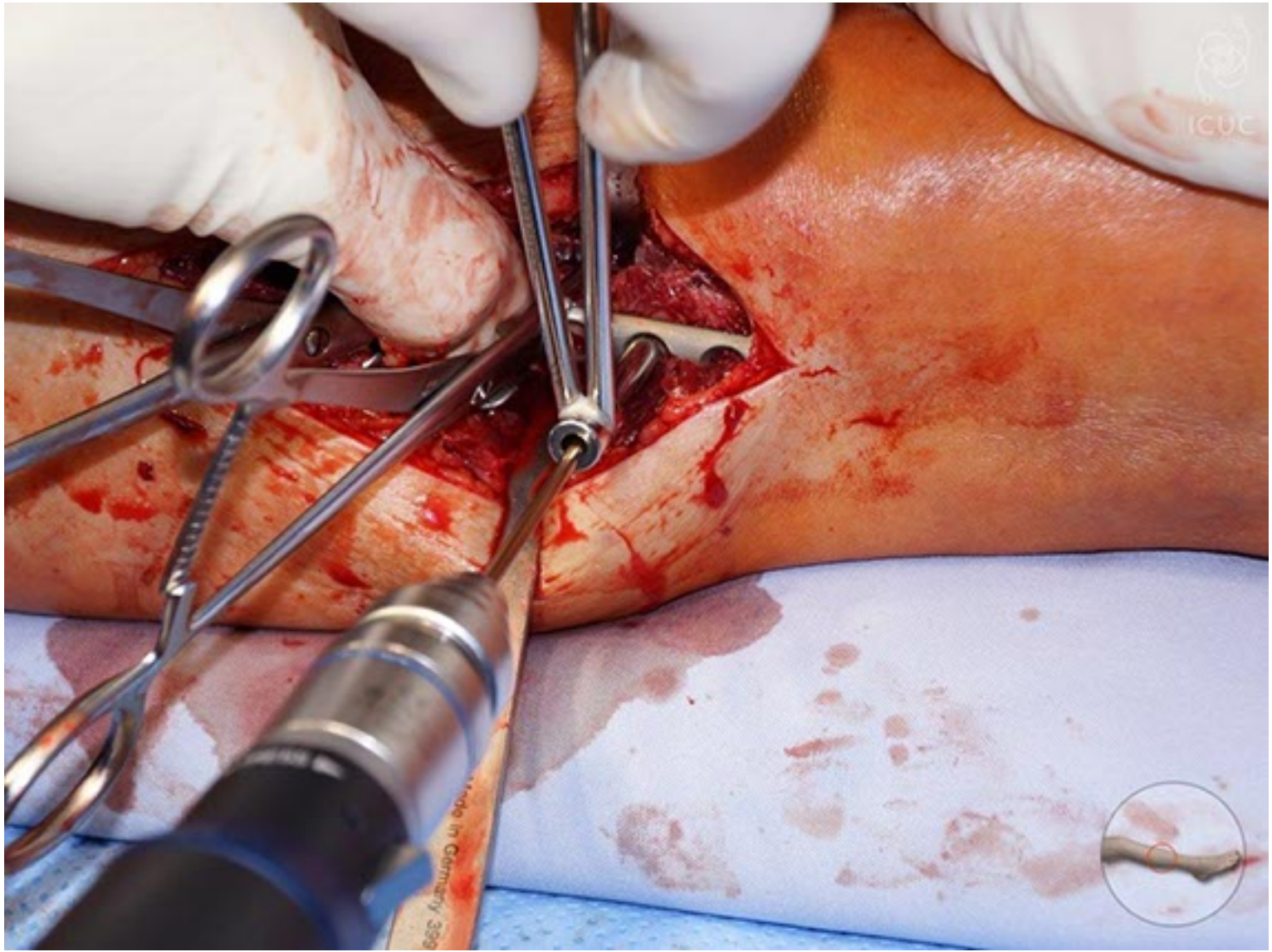


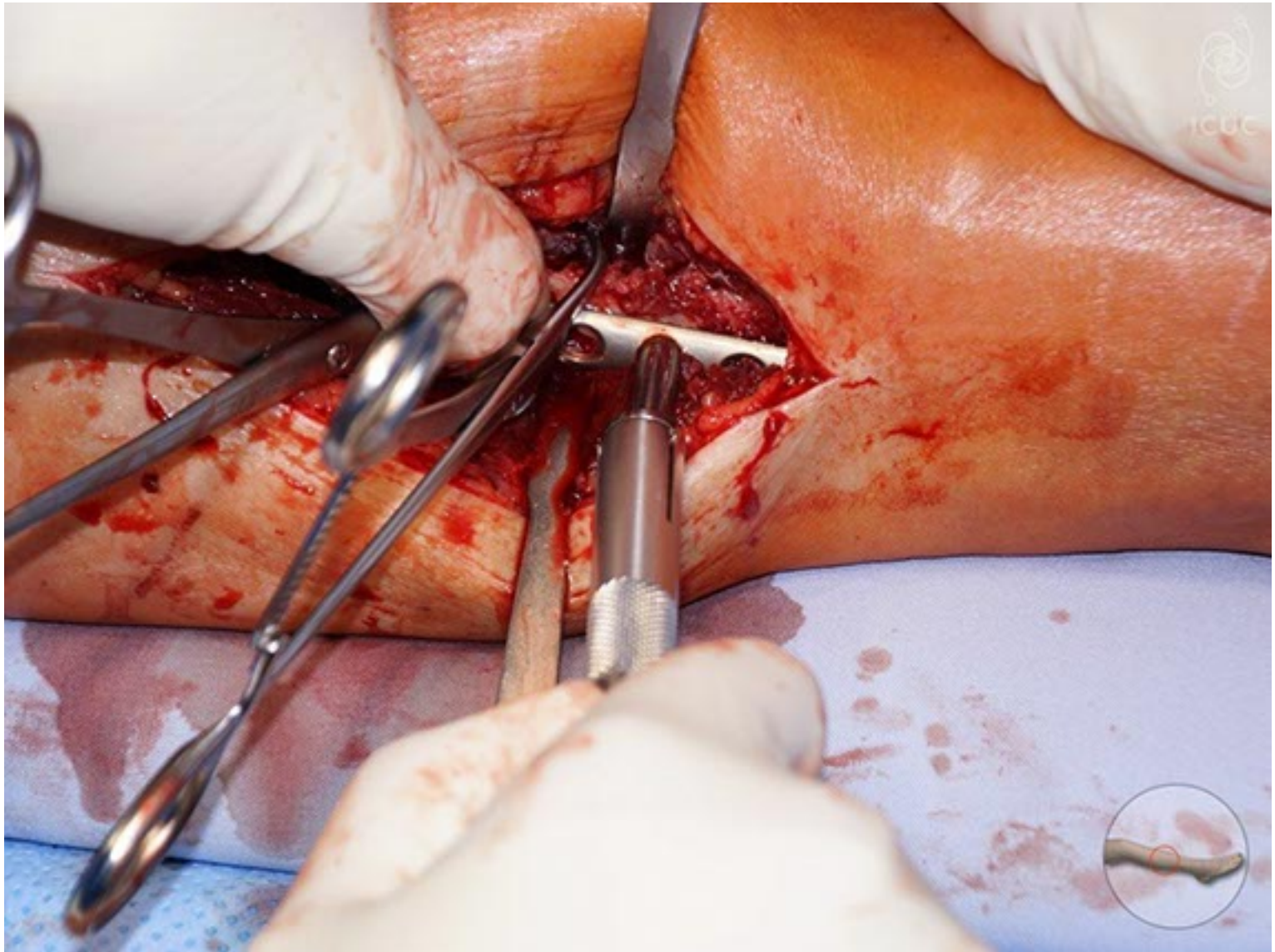
Now, it looks anatomically aligned.





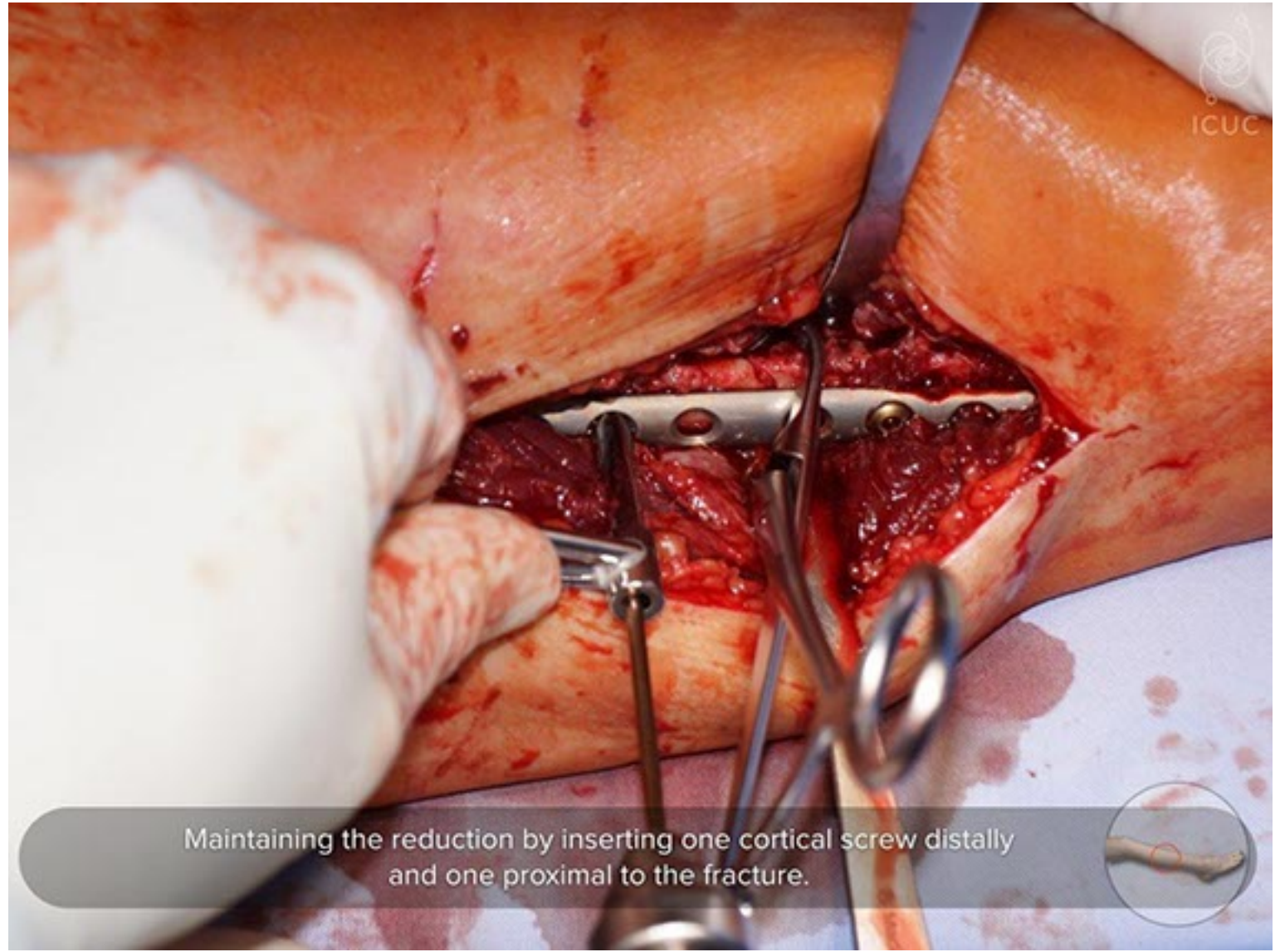
Insertion of a one-third tubular plate.





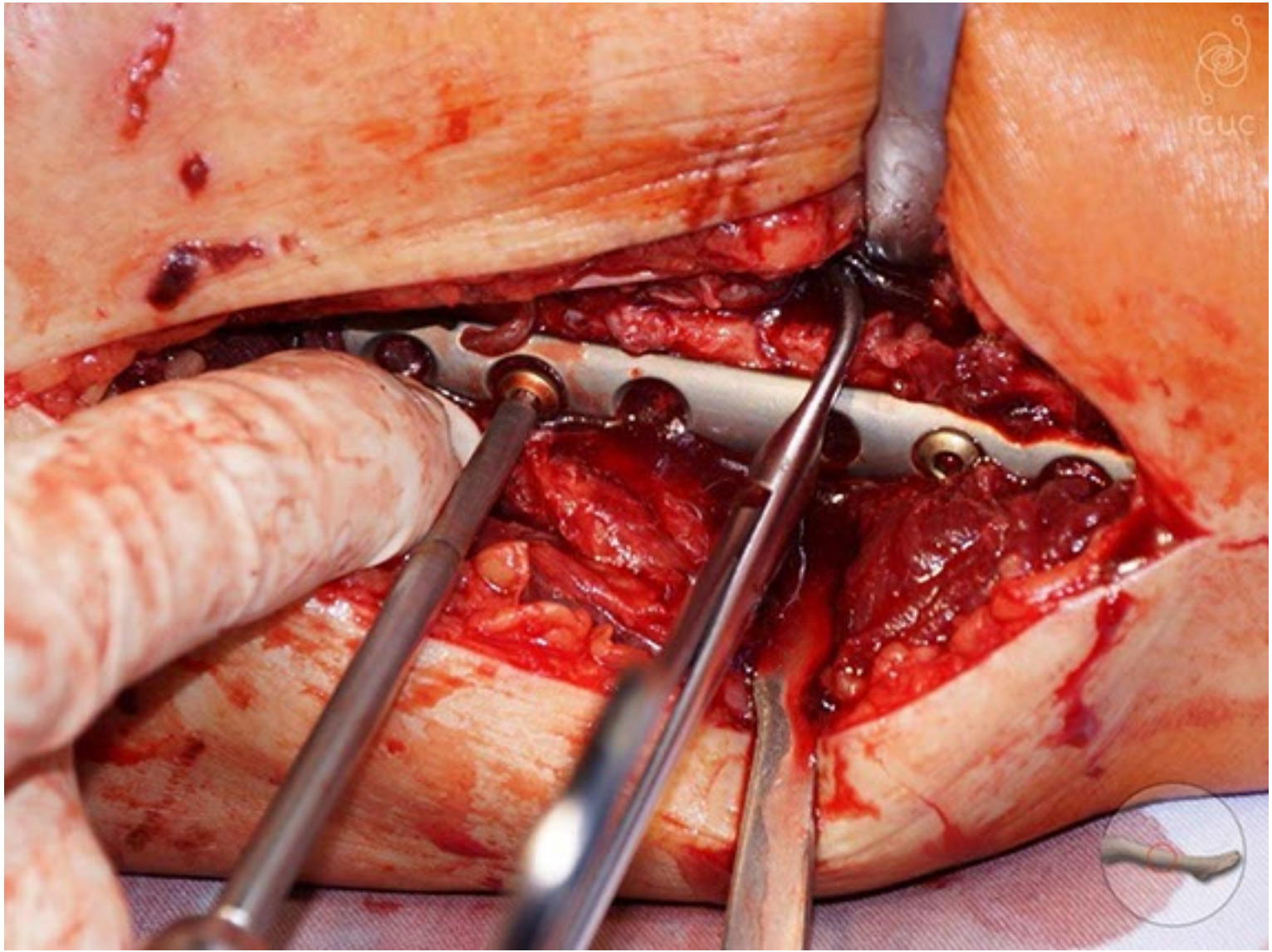
Maintaining the reduction by inserting one cortical screw distally and one proximal to the fracture.

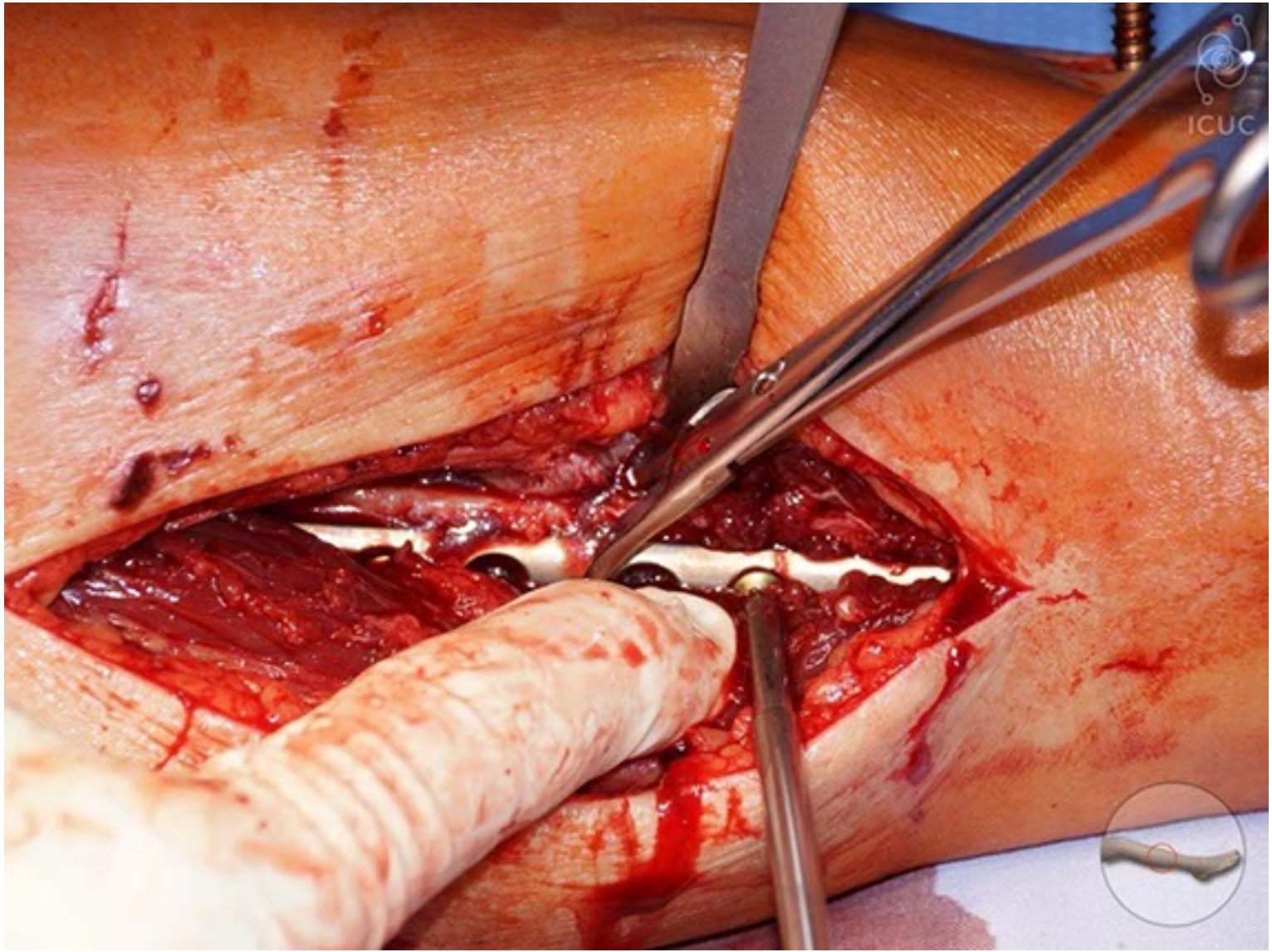




Maintaining the reduction by inserting one cortical screw distally and one proximal to the fracture.







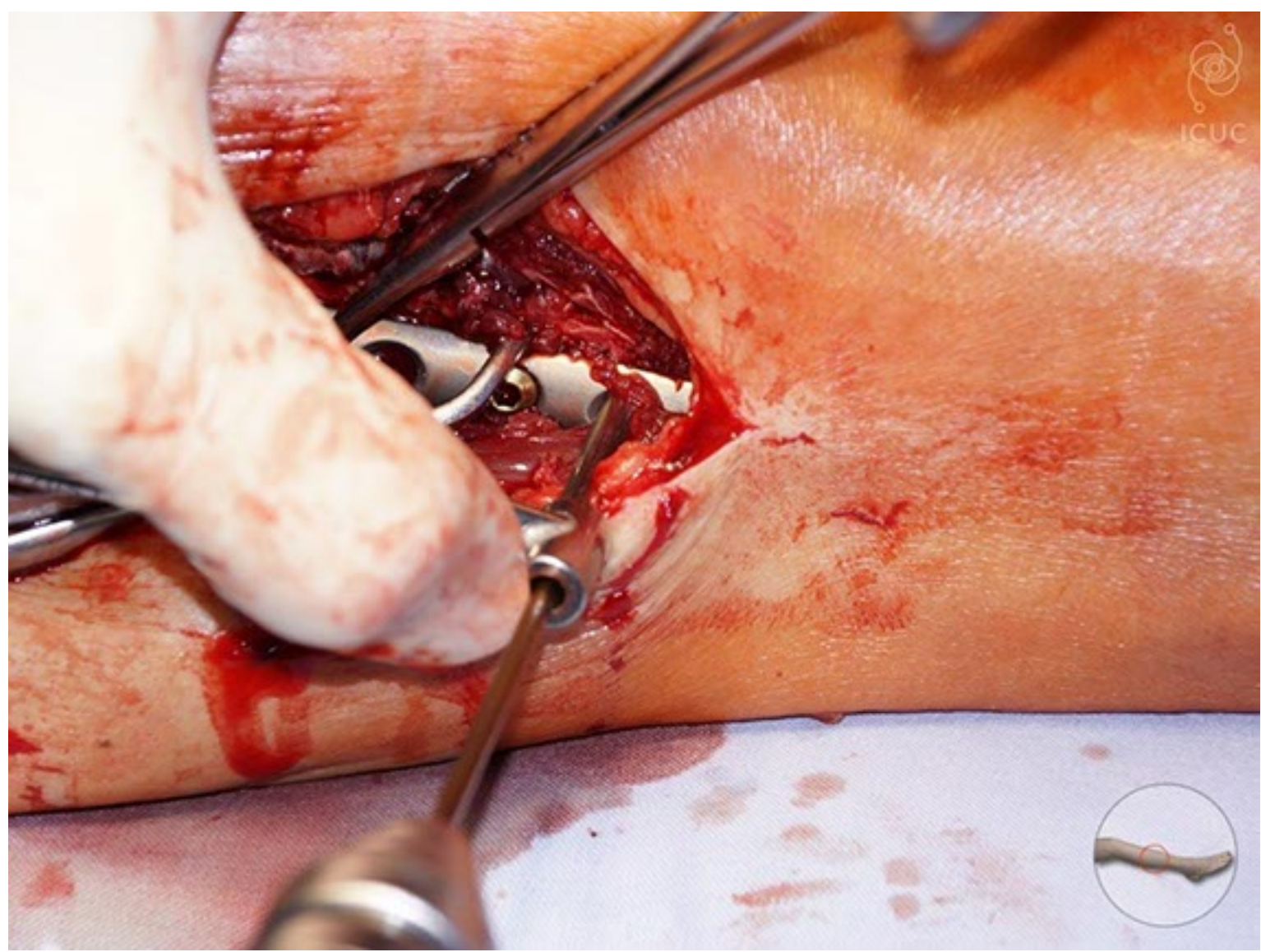


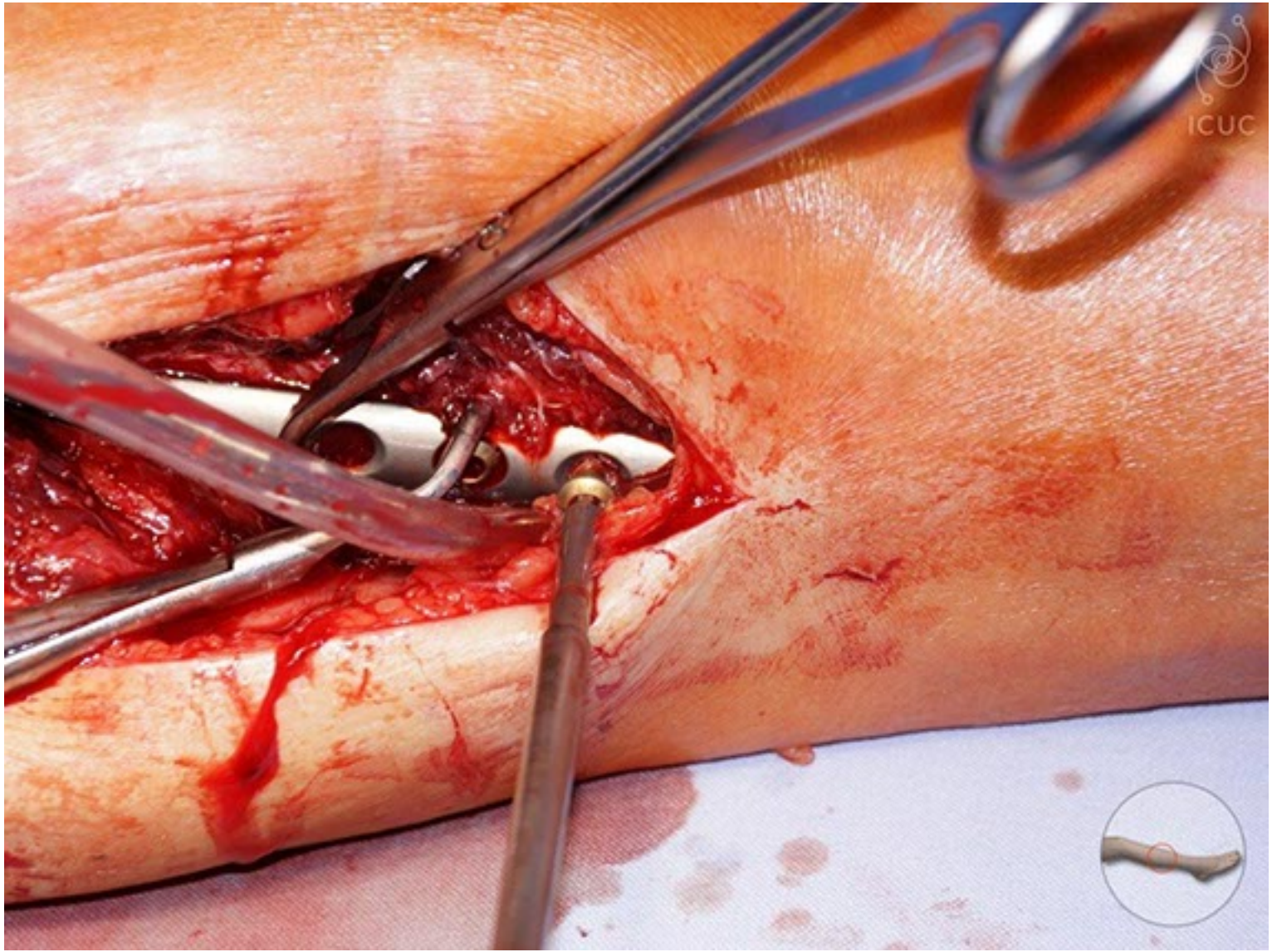
This looks like quite a good reduction. Perhaps slightly open on the medial side.

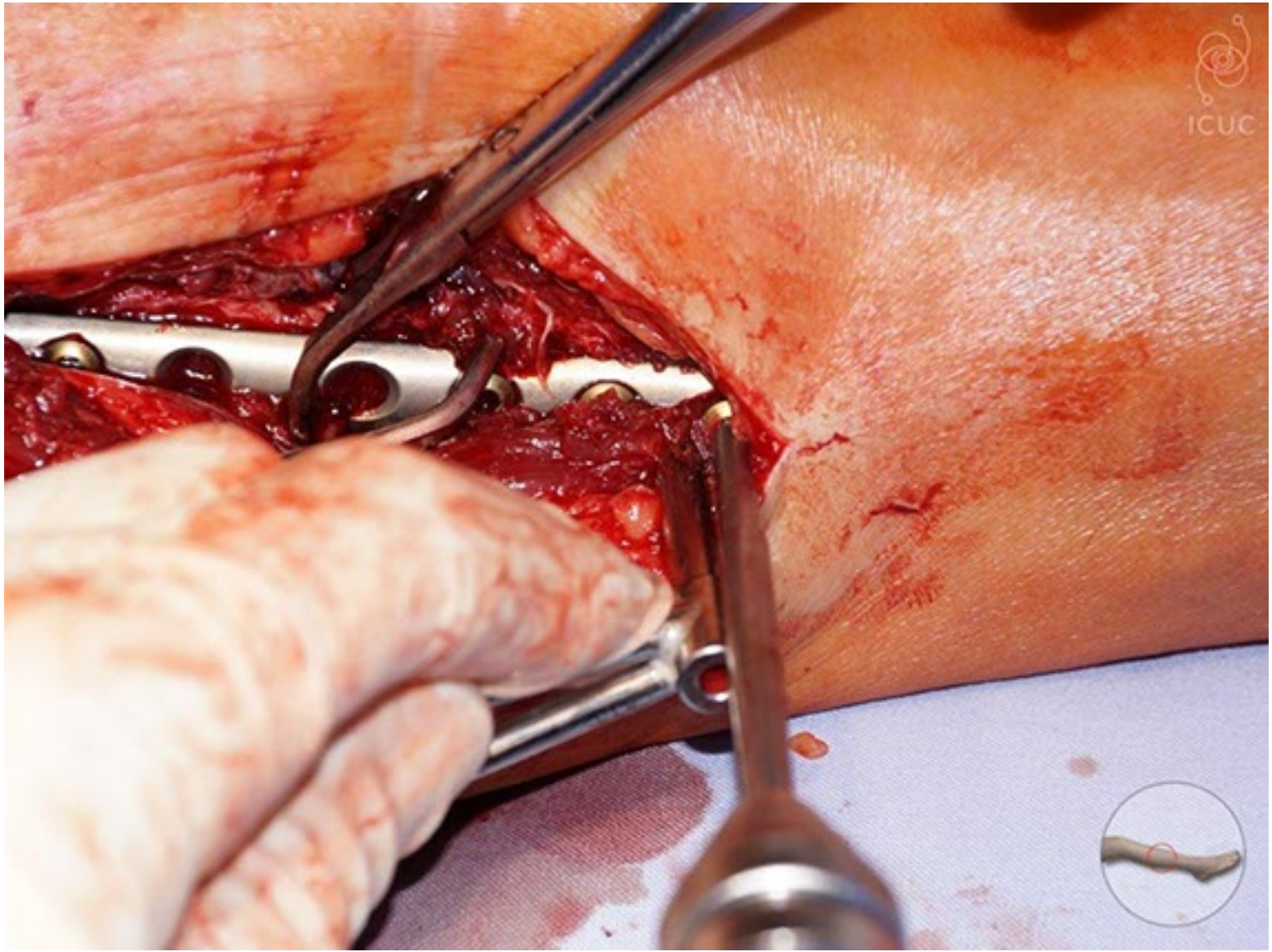


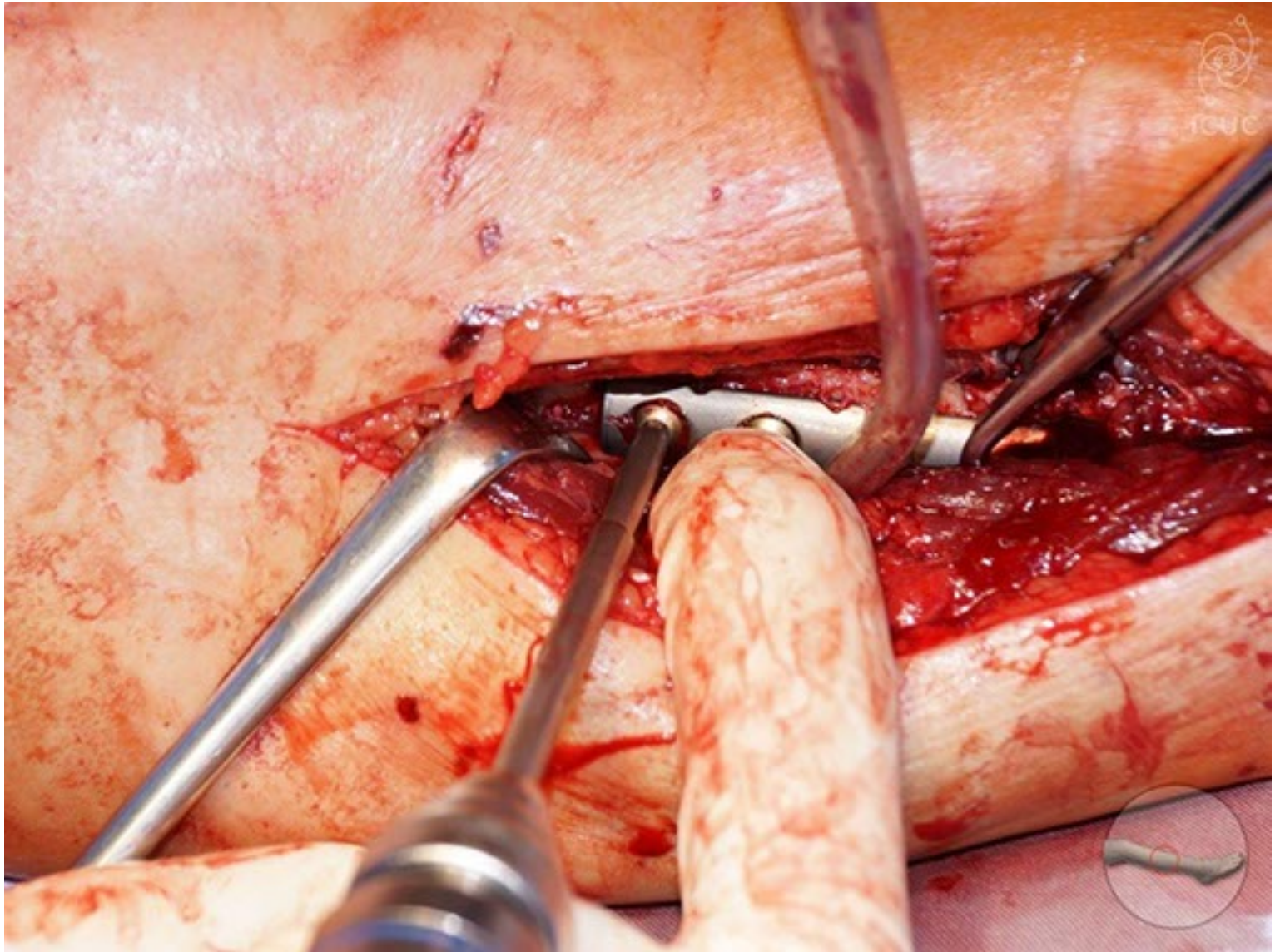
A Spaniard clamp is used to bring the fracture fragments close to the plate. If the plate had been pre-bent, it might have had the same effect.

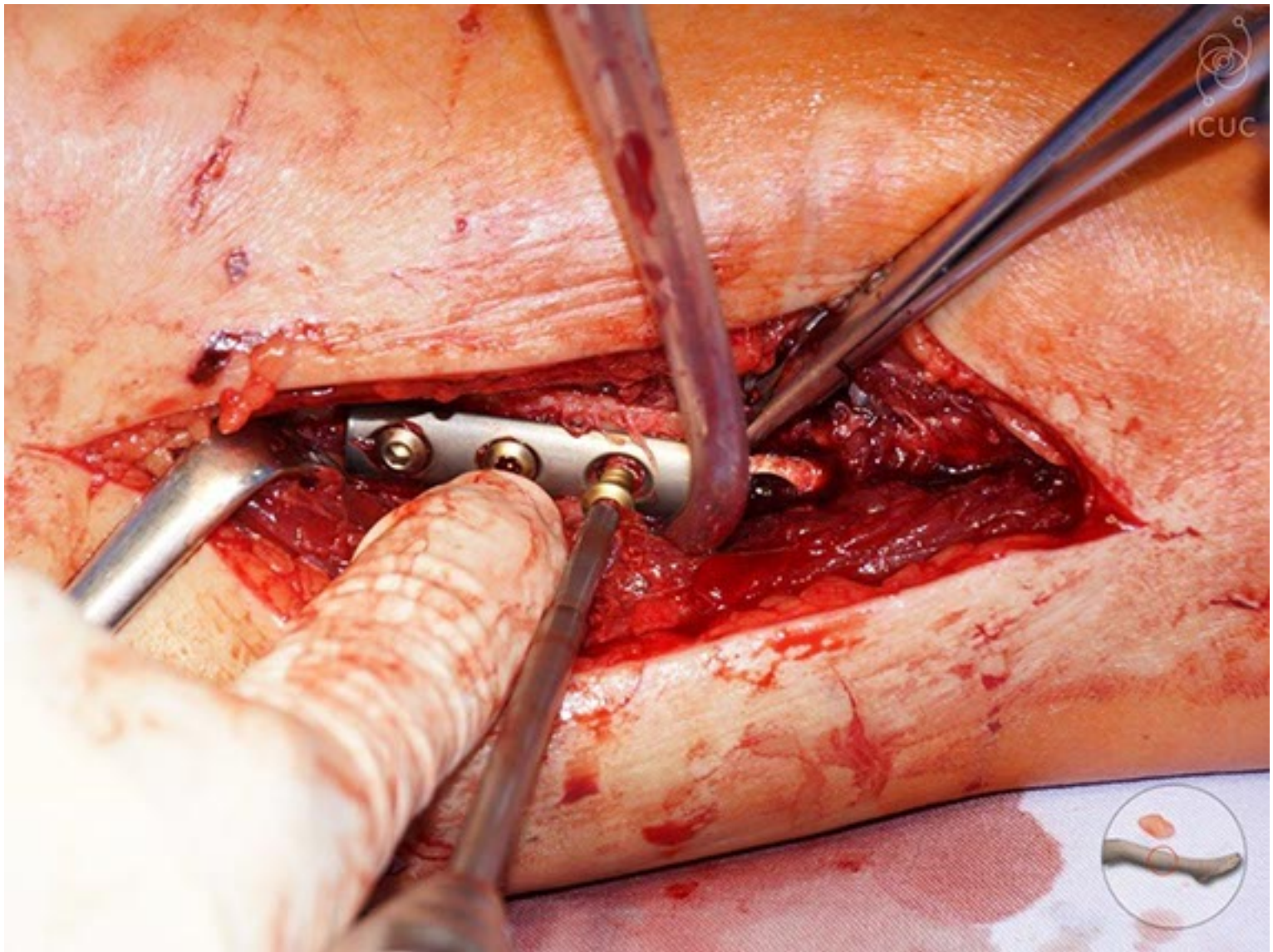


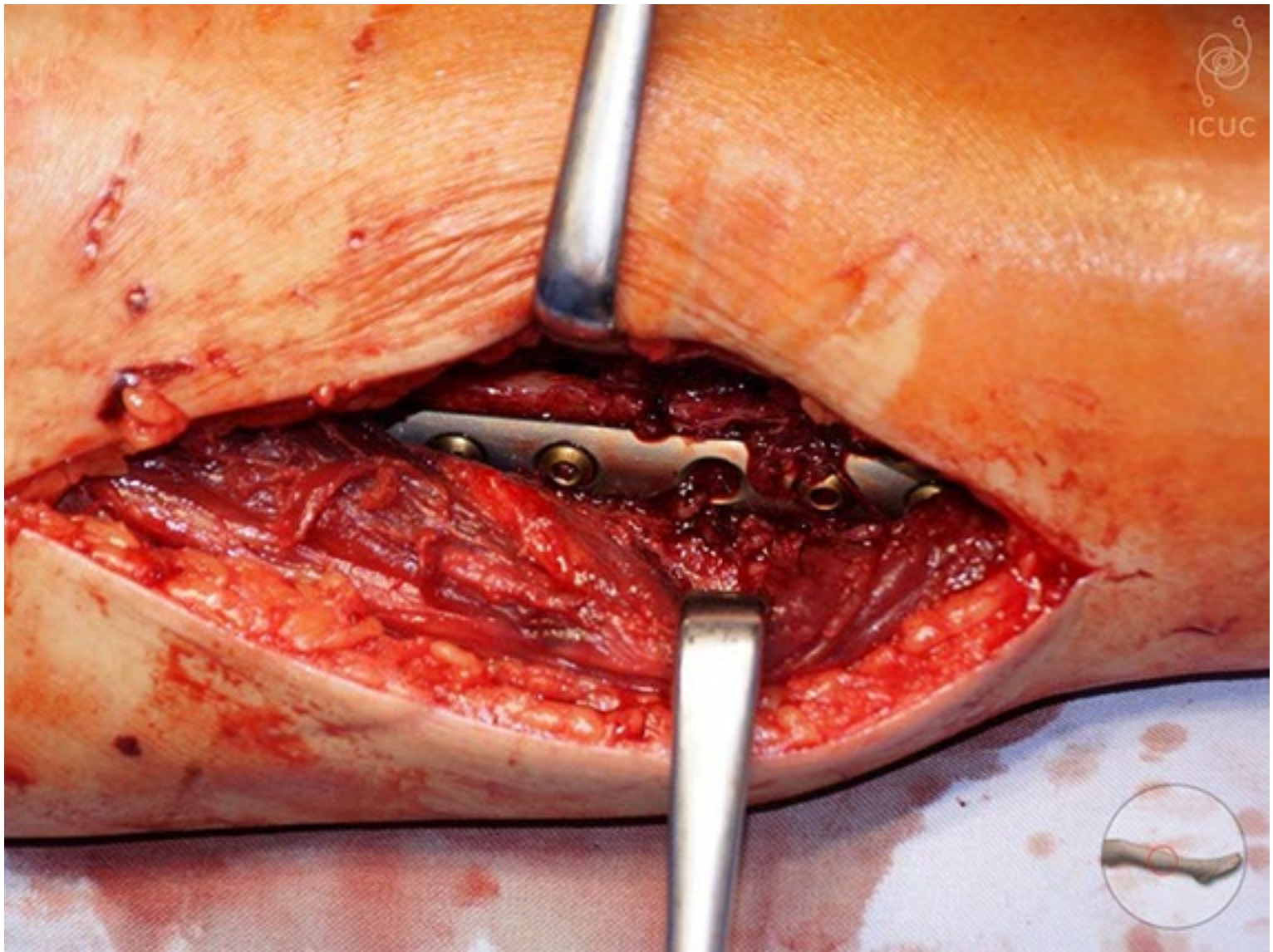














Fracture fixation is completed by insertion of three screws distally and three screws proximally. That is quite nice.

This reduction leaves a slight opening on the medial side.

The fracture is not absolutely reduced. I do not know whether this is due to distraction at the level of the external fixator, or whether it is slightly in valgus.





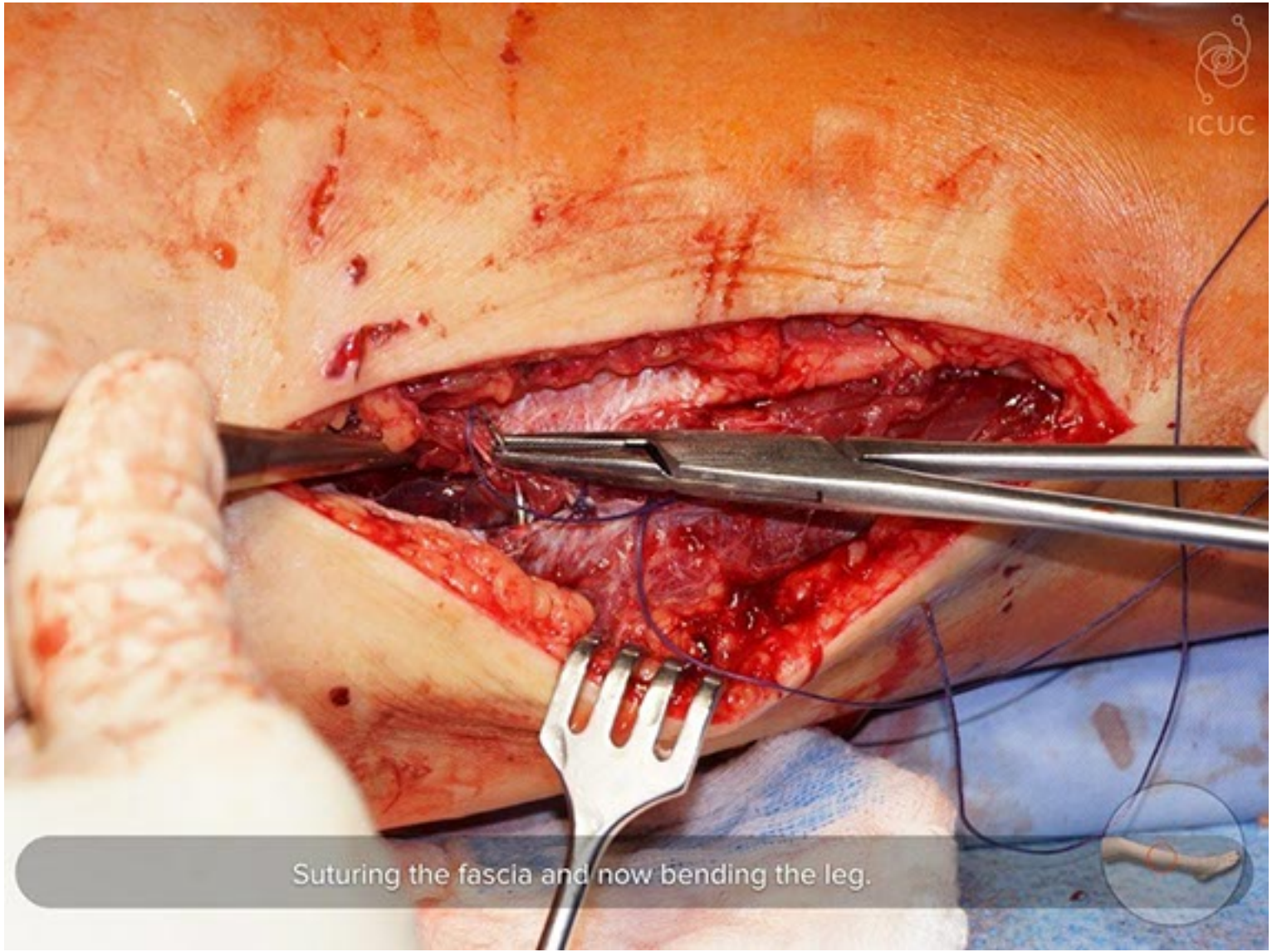
On the lateral side this looks good; there is a slight step off but the length is okay.



Planning nail insertion.







Suturing the fascia and now bending the leg.



The external fixator still remains in place.








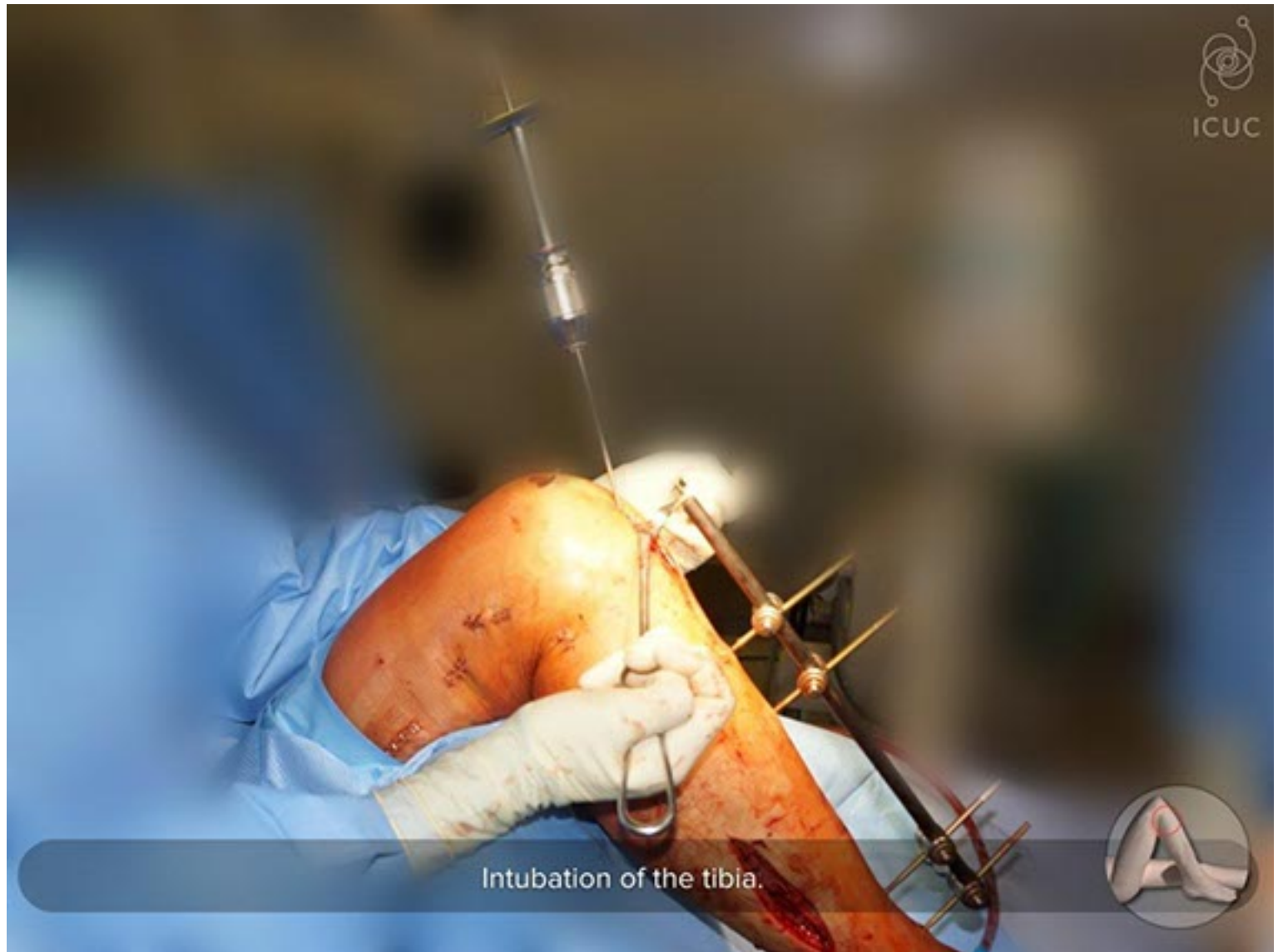
The patellar ligament is shown.



A close-up photograph of a knee surgery. The skin is incised, and surgical instruments are visible. A hand is holding a pair of forceps, and another instrument is being used to manipulate tissue. The scene is brightly lit, showing the red of the incision and the metallic of the tools.

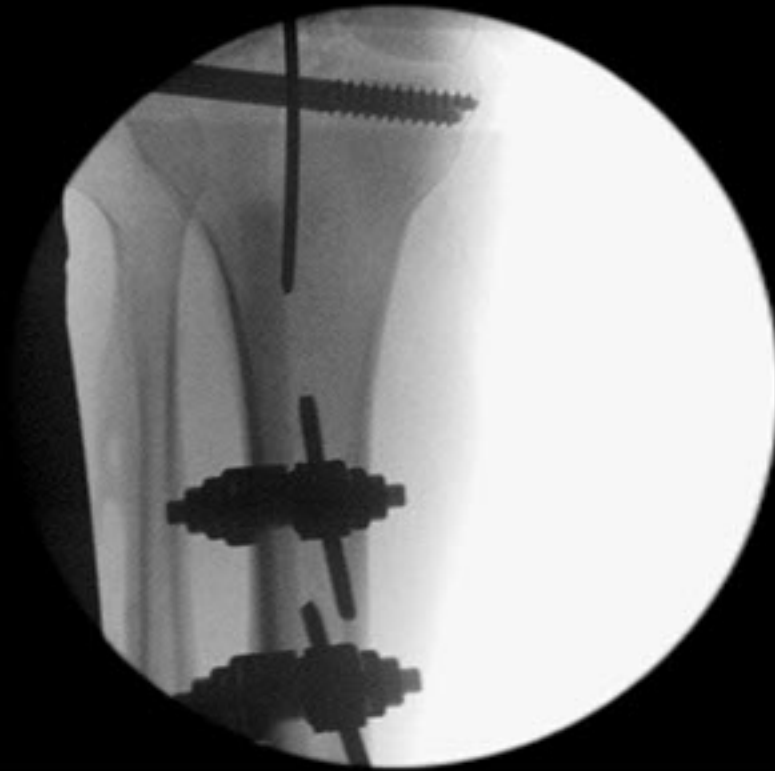
I usually perform a medial parapatellar approach. But if you go through the patellar tendon, the incision can be smaller because it is a more direct approach. There is no evidence to say which approach is better. They go through the patellar tendon.





Intubation of the tibia.





AP view. This X-ray shows that there are already two screws.
We do not see the knee joint in this patient. For the case to be self-explanatory,
we should also see the proximal part of the tibia on the X-ray.
This would have been important because later on avulsion of the biceps tendon occurs.
There is a very proximal fracture as well, which is not visible on the X-ray.
X-ray imaging is not complete.
This case is not completely clear; there is insufficient documentation.





Hitting the posterior cortex with the guide pin is a very frequent problem, especially if you cannot bend the knee enough. Therefore, we normally use an external fixator frame to get a better bend. But the use of the arthroscopic leg holder is also a good option. The problem then is that you cannot compare with the other side. Usually when we nail, we drape both legs free, so that we can compare the rotation intraoperatively, especially when we do MIPO.



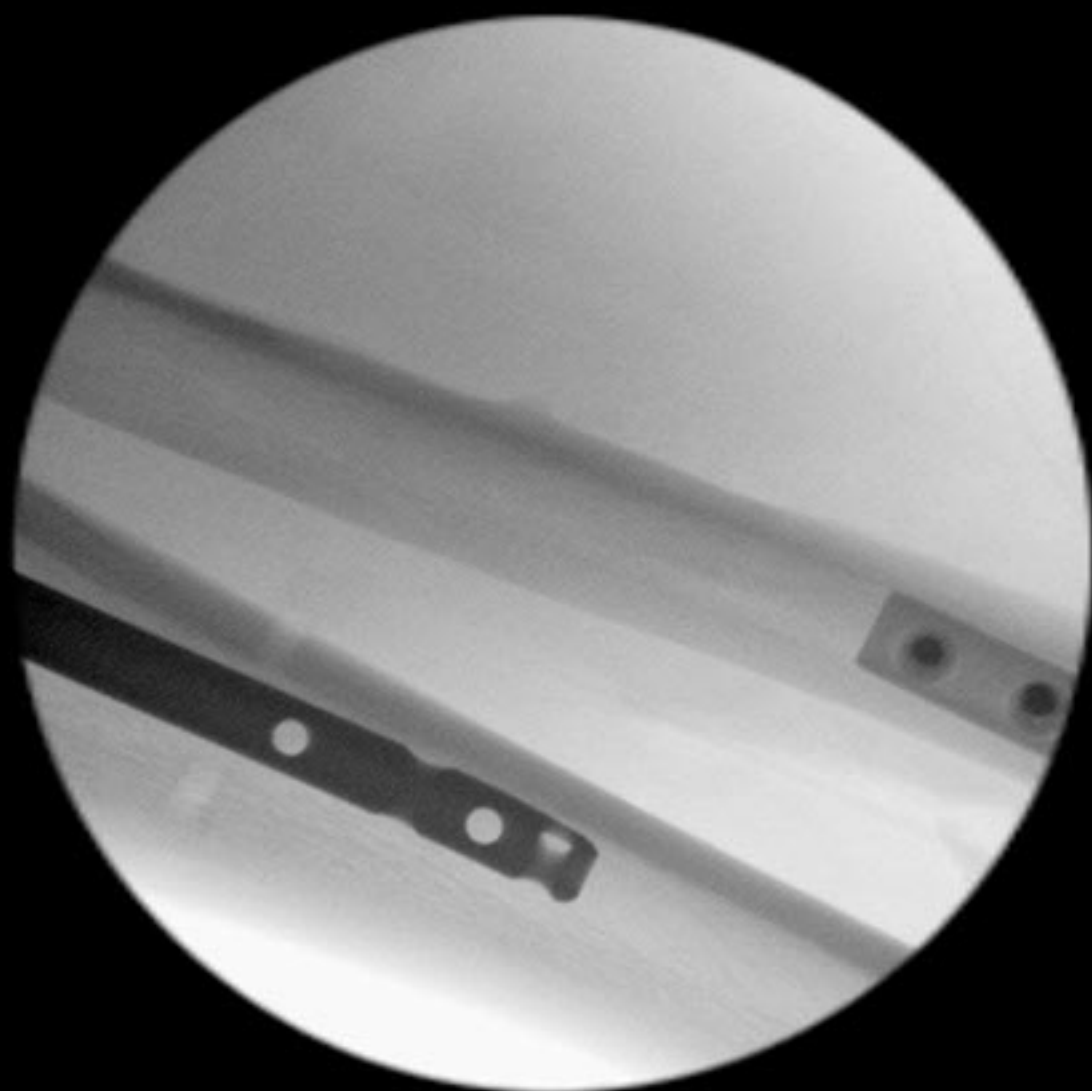
It is often a problem with this approach that, if you think you are good at it, you can become over confident. In these case, they even tried to open the entry portal with the cheese cutter. I would always try to insert the Schanz screw or guiding pin correctly so that it goes into the medullary canal. I would not apply the cheese cutter in the wrong direction. I think this cannot be a reference case.



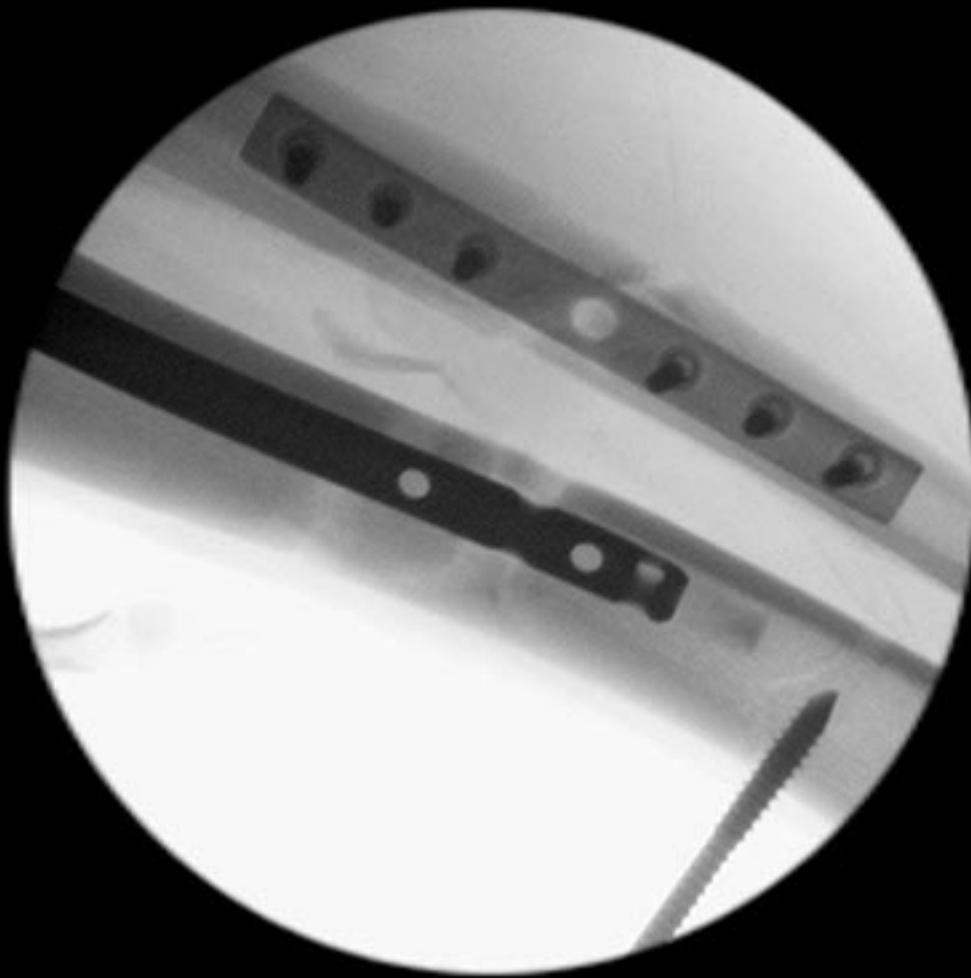
This is often a problem with this approach. Even when you think you are okay, you are not flat enough. They were, even though, happy trying to open it with the cheese cutter. I usually try to bring the guiding pin in a correct way, so that it goes into the medullary canal. I do not use the cheese cutter in the wrong direction.



They have already introduced the nail and now they remove the Schanz screws.







The nail is advancing very smoothly, very nicely, using one pin for reduction.



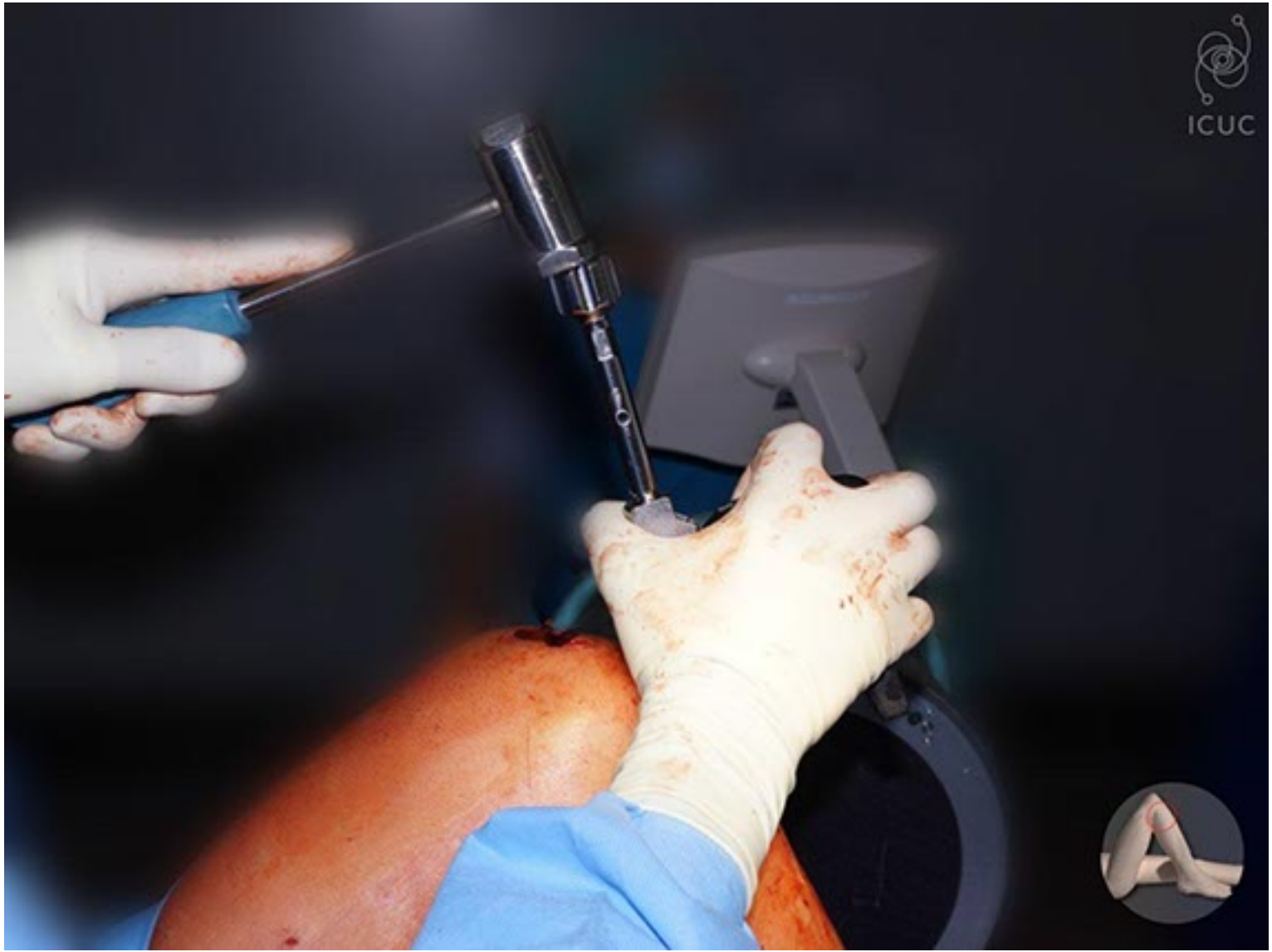


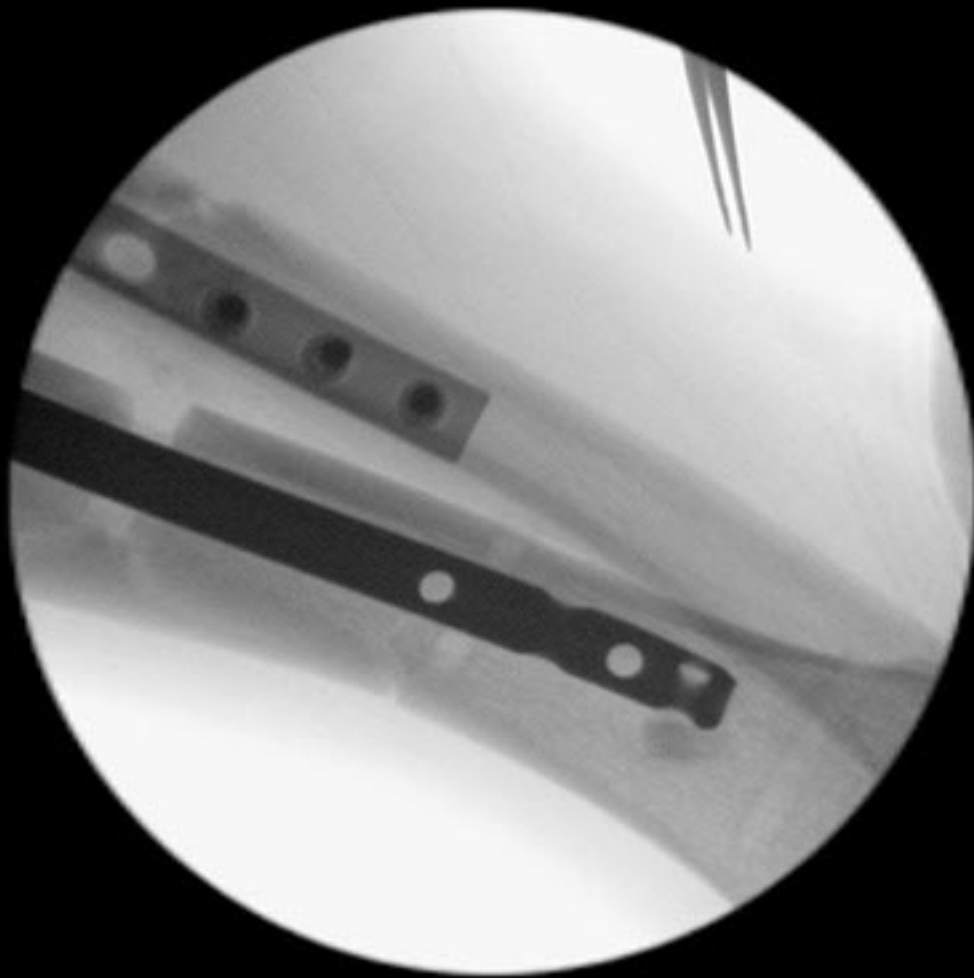


Removal of the pin and driving the nail home.





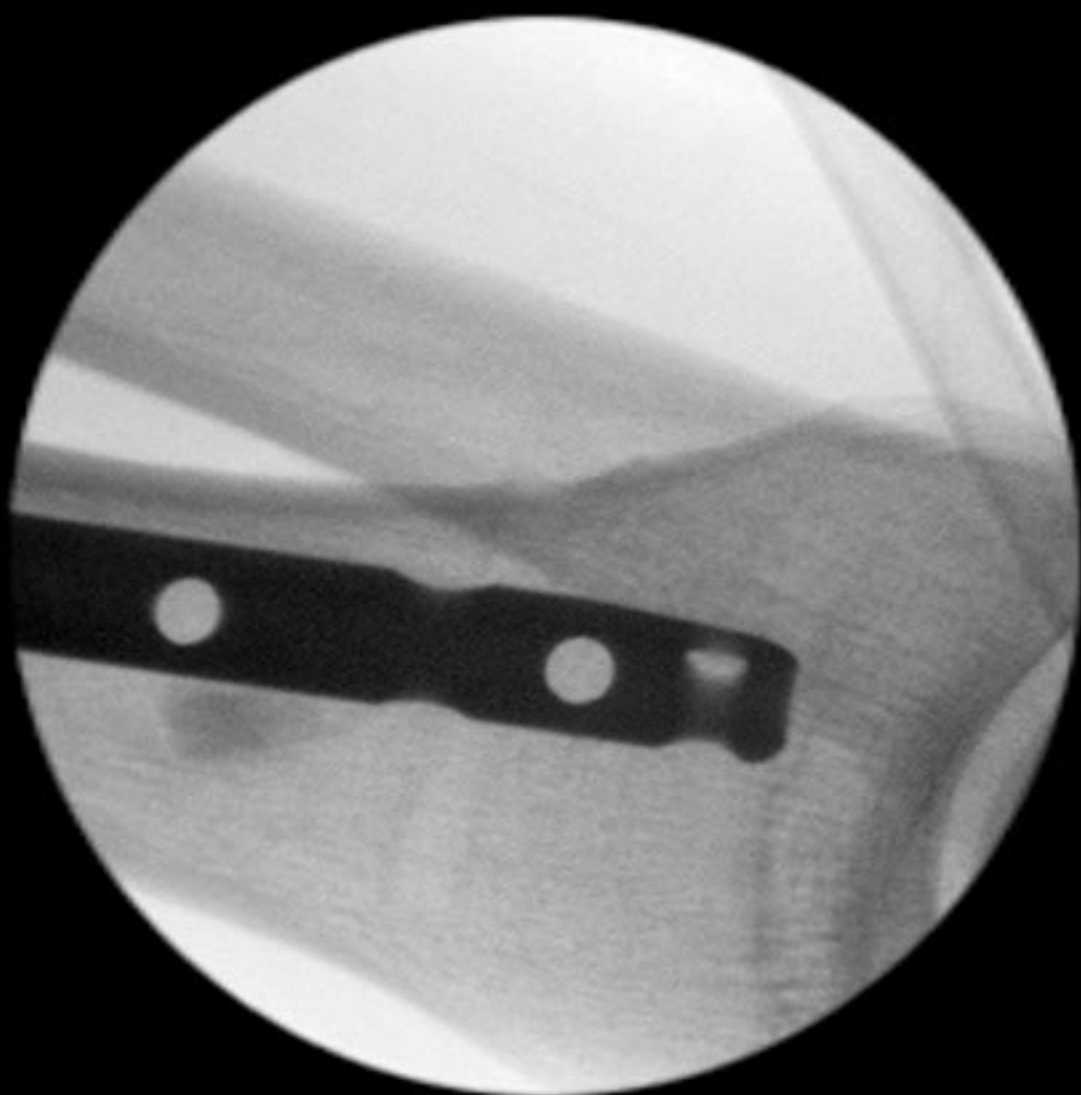




It looks quite good. Then, checking on the lateral view.









Drilling with the radiolucent drill...



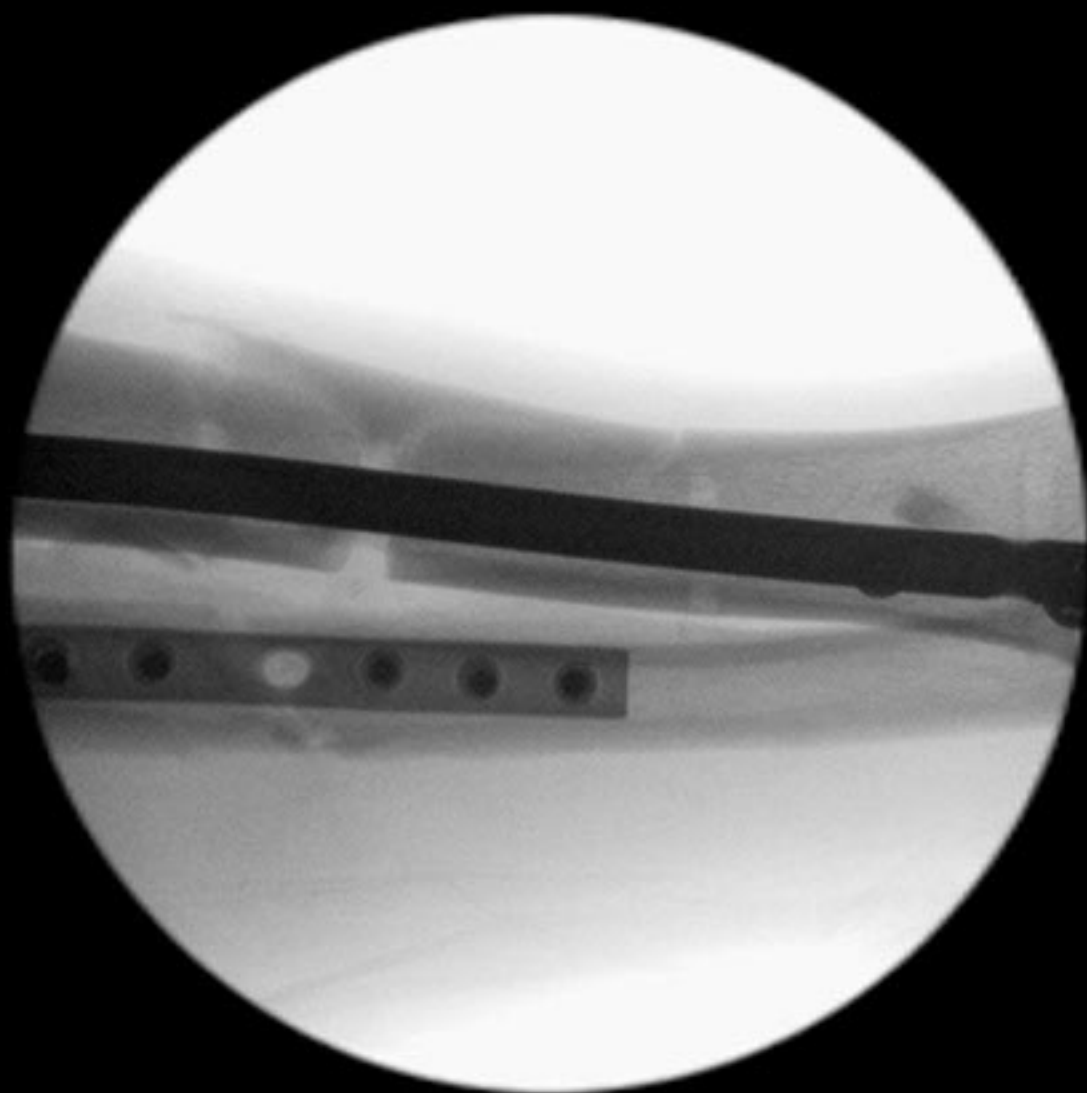







... and insertion of the distal screw.







The problem is when you need to pull the nail back ("backslap technique") because we have still some kind of distraction. We could pull the nail back but we have the problem of the fibula plate on the other side.

One option could be, for instance, to nail the fibula, so you can make the backslap much better. Another option would be not to do any fixation in the fibula.



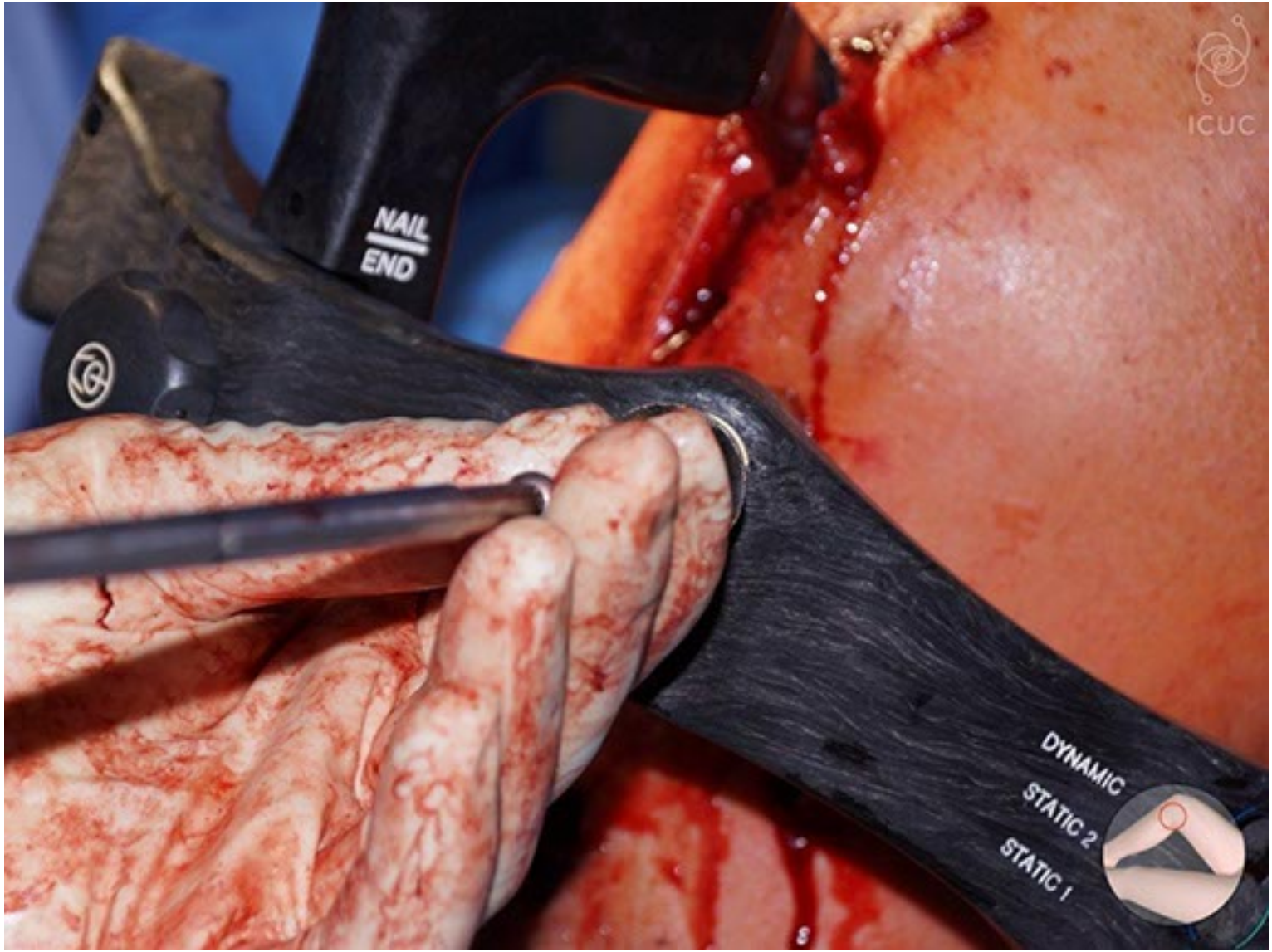


Mounting the aiming device. Cross fixation proximally.









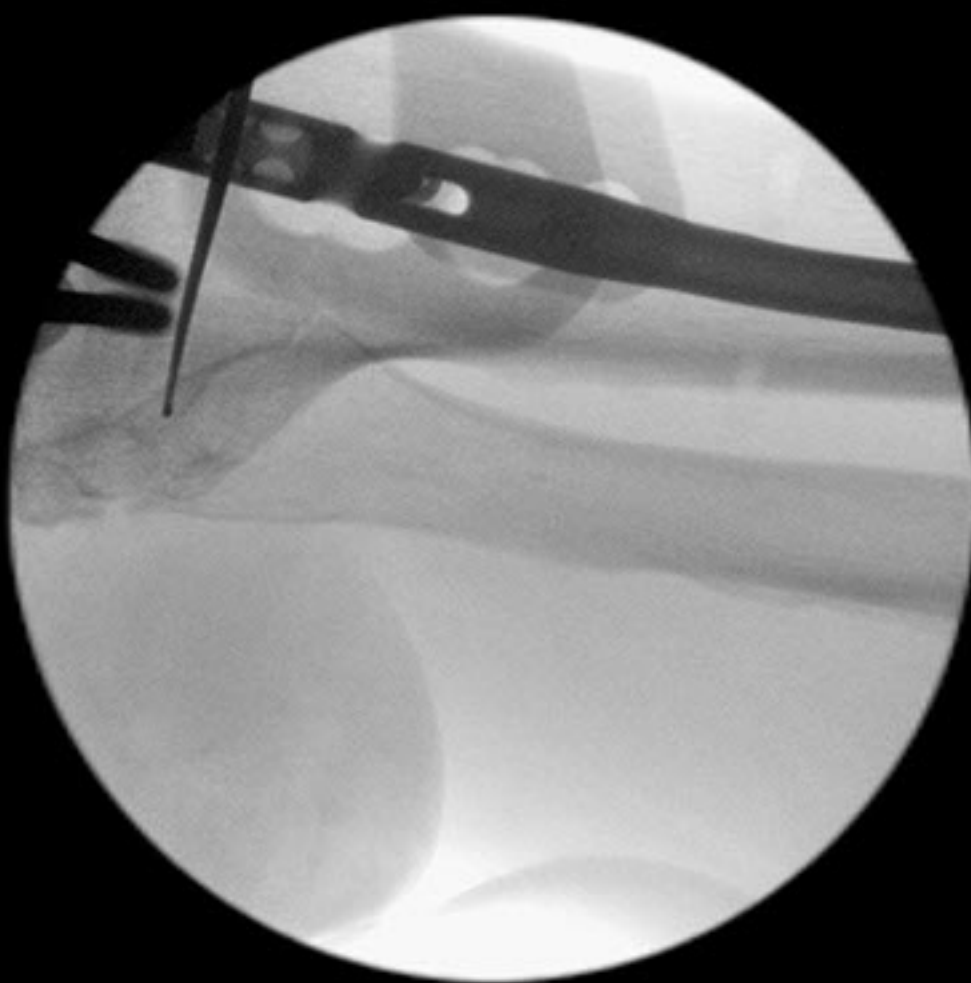






Measuring.





The lateral view is not bad.

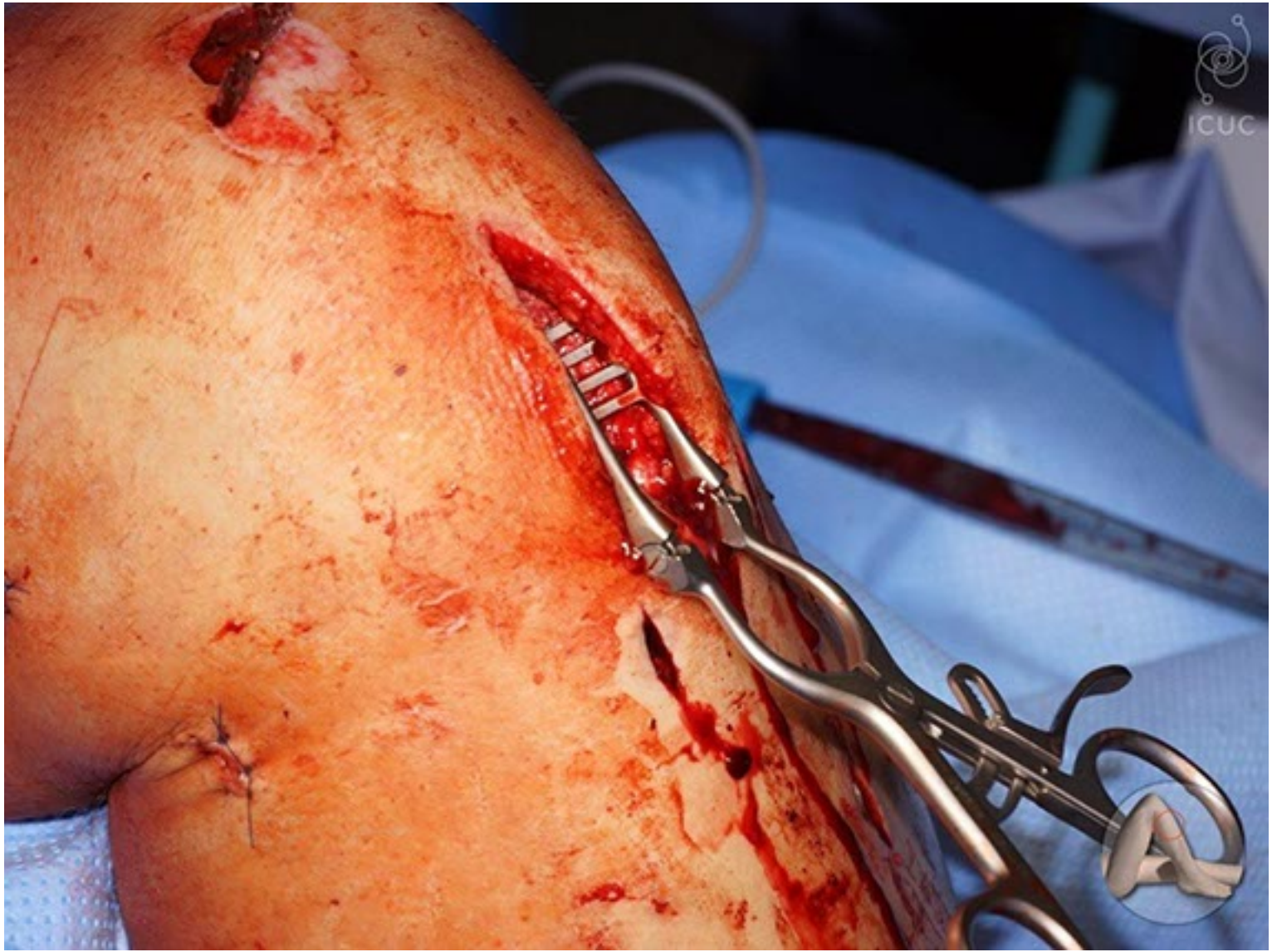










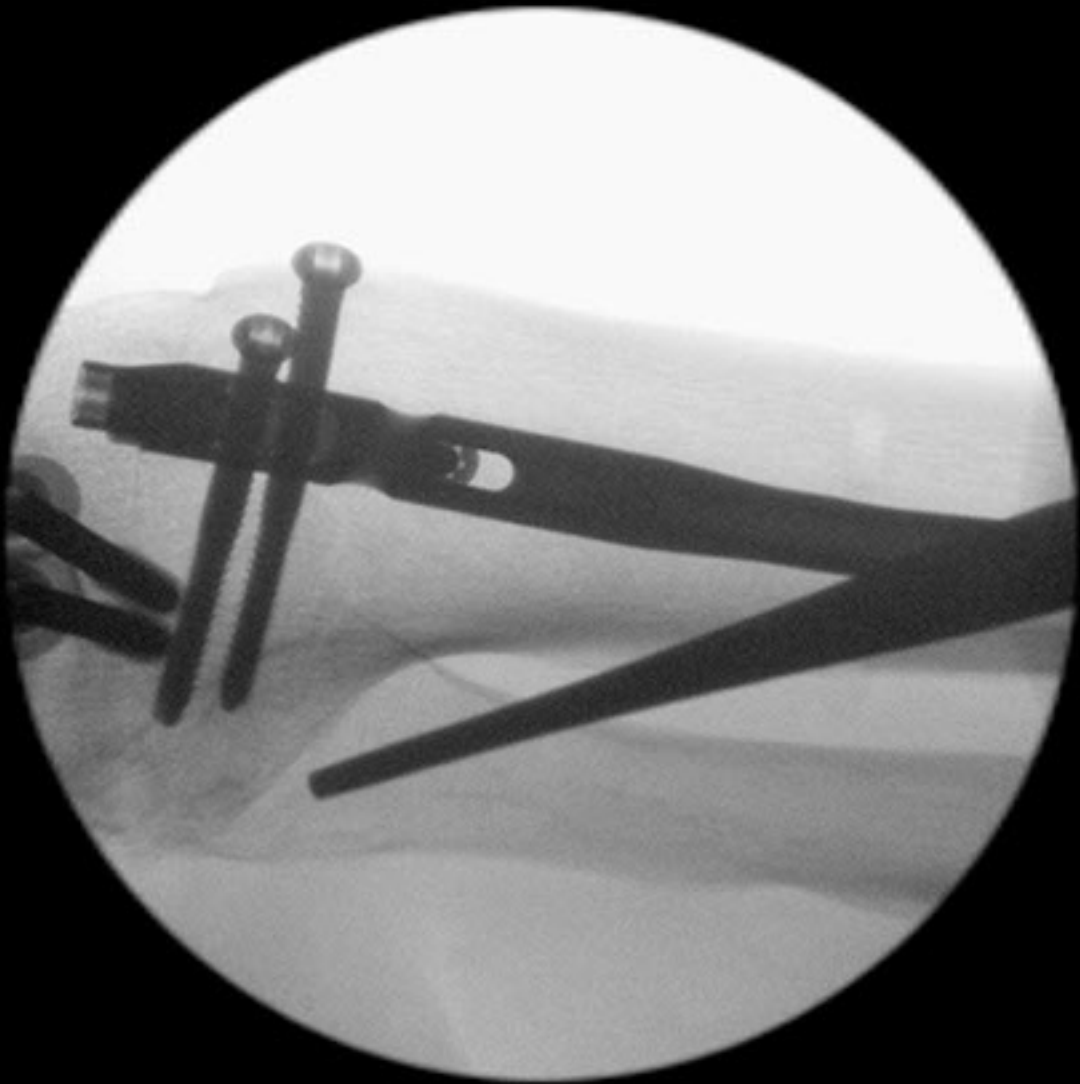












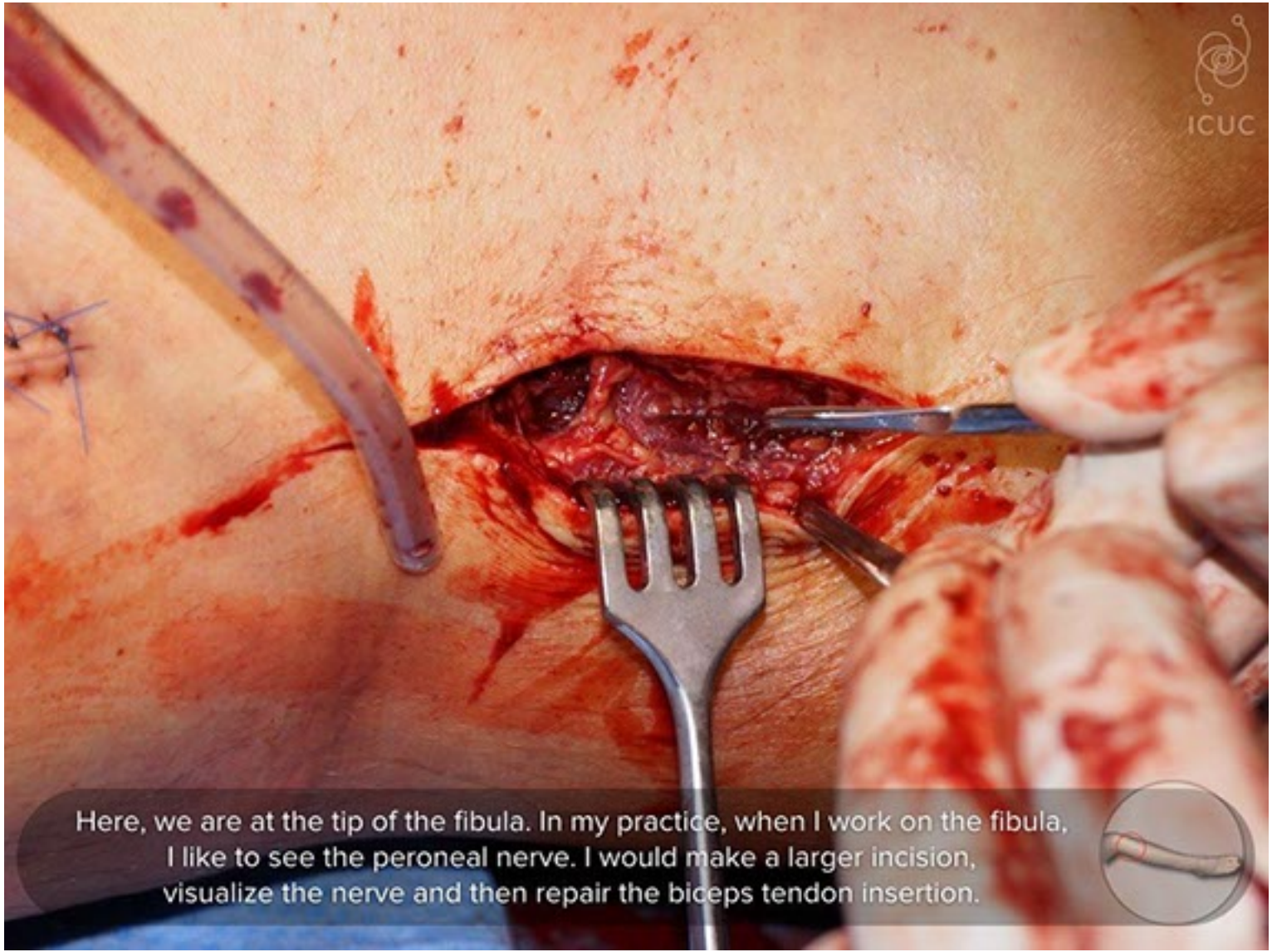




Incision at the level of the fibula.







Here, we are at the tip of the fibula. In my practice, when I work on the fibula, I like to see the peroneal nerve. I would make a larger incision, visualize the nerve and then repair the biceps tendon insertion.



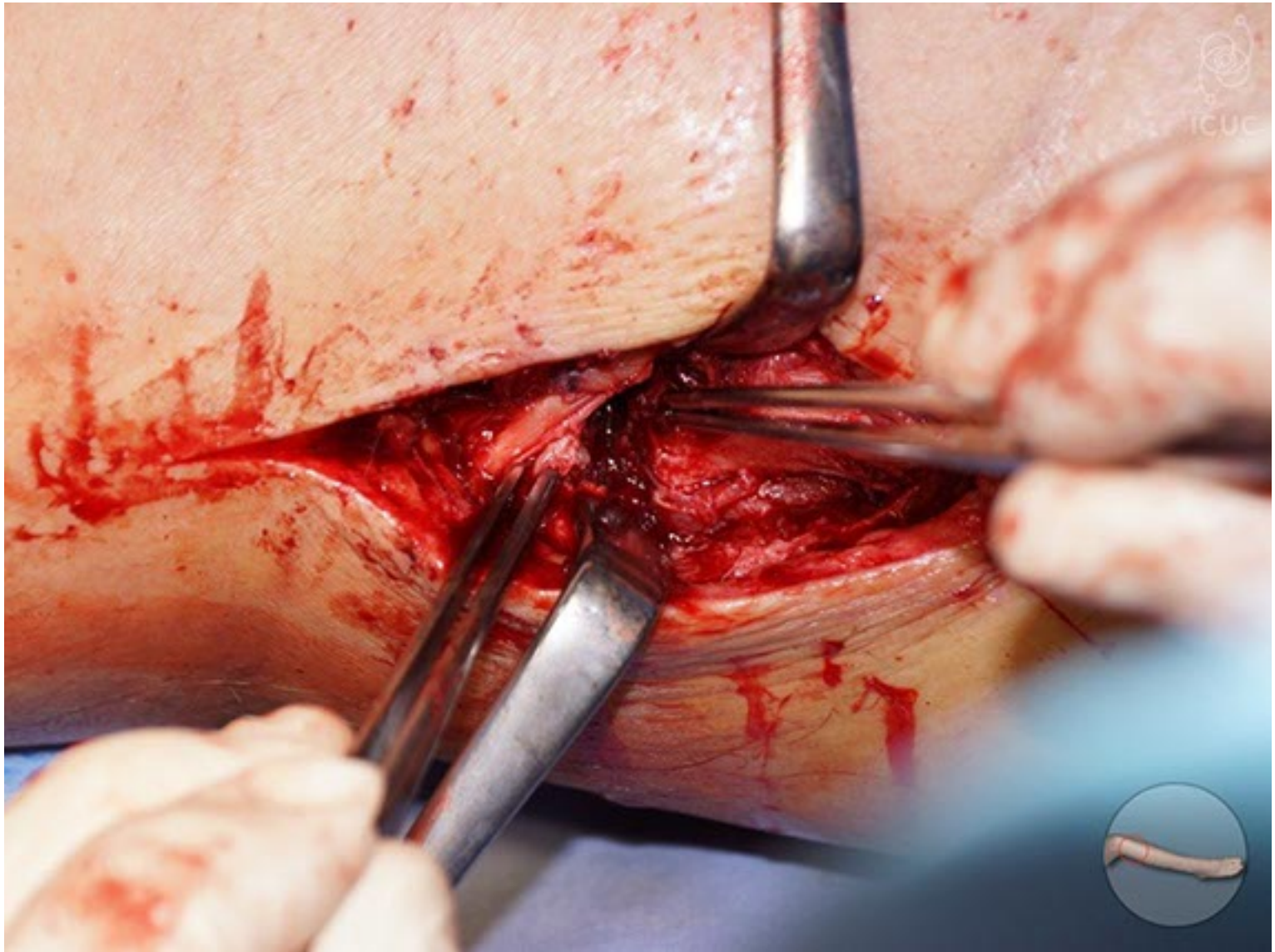


Now, we finally see on this X-ray that the biceps is avulsed.



In my practice, when I go and work at the fibula, I like to see the peroneal nerve. I would make a bigger incision, look for the nerve, visualize the nerve, and then repair the biceps tendon insertion.







Look at the clamp. I make the incision higher up so that I can see the posterior part of the biceps tendon and the nerve, especially if I am using a clamp in the distal part. It is very risky; so, I prefer to see the enemy.

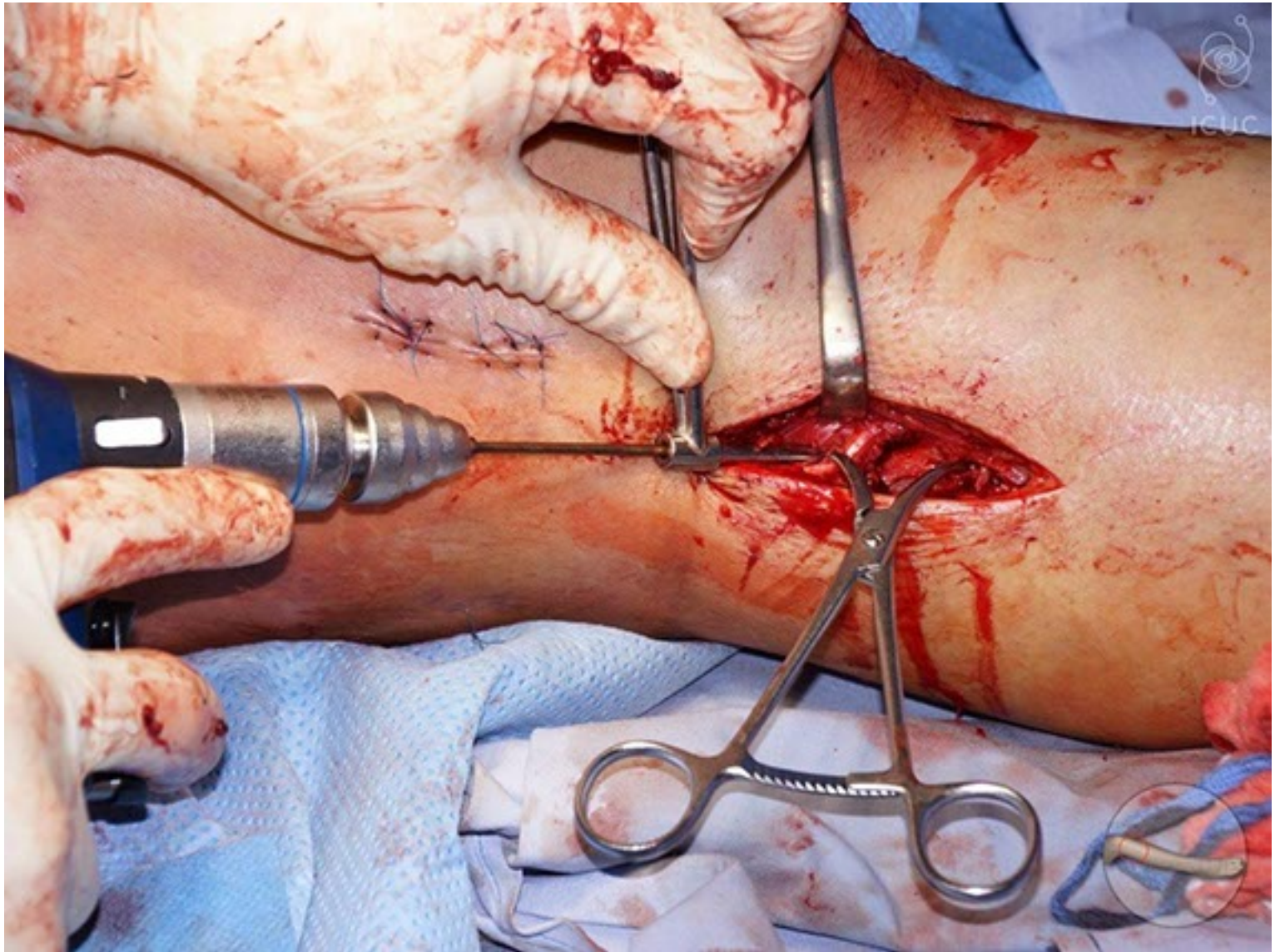


The clamp does not look so dangerous when you see it on the X-ray.
It may be away from the nerve.

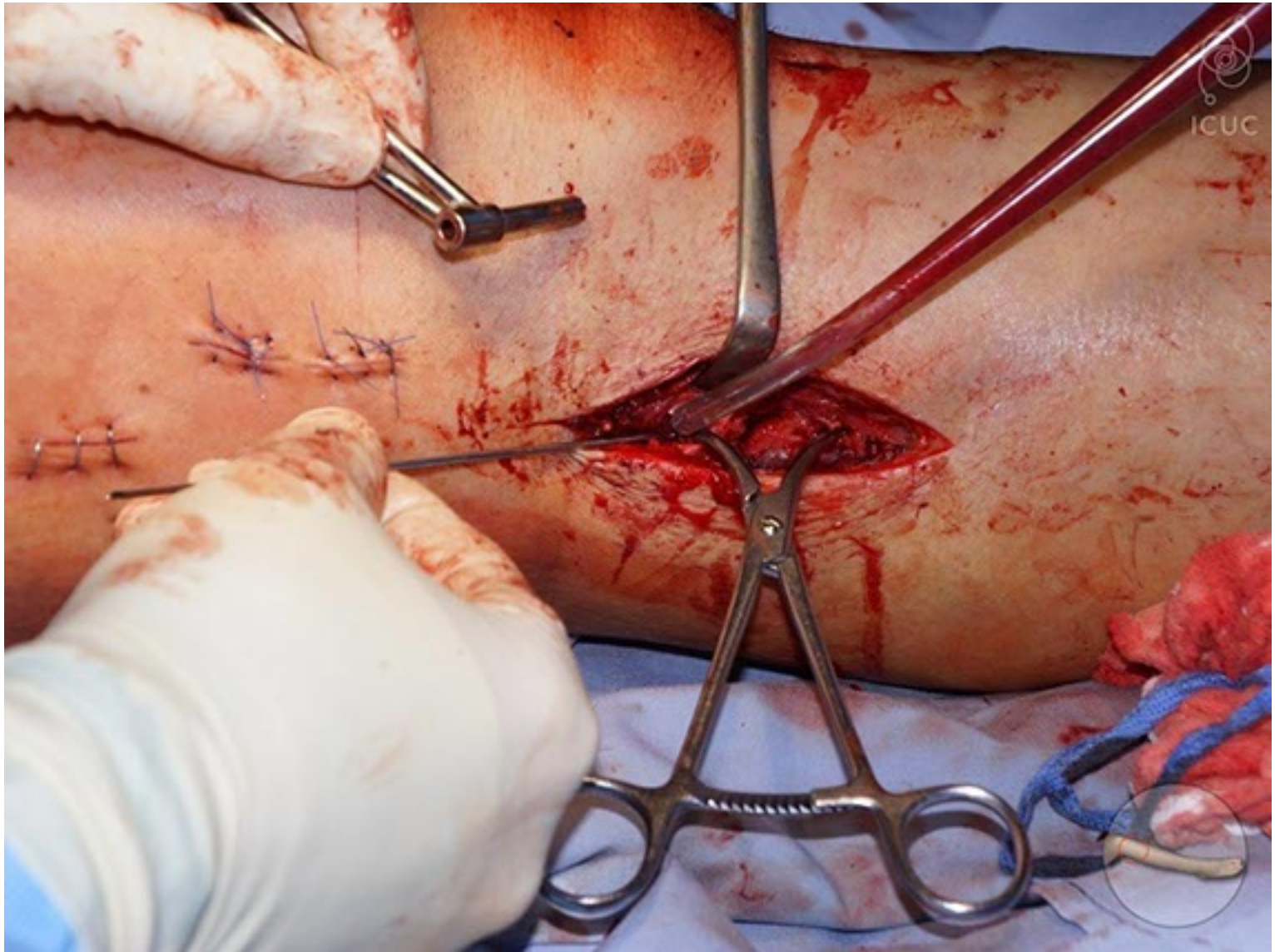


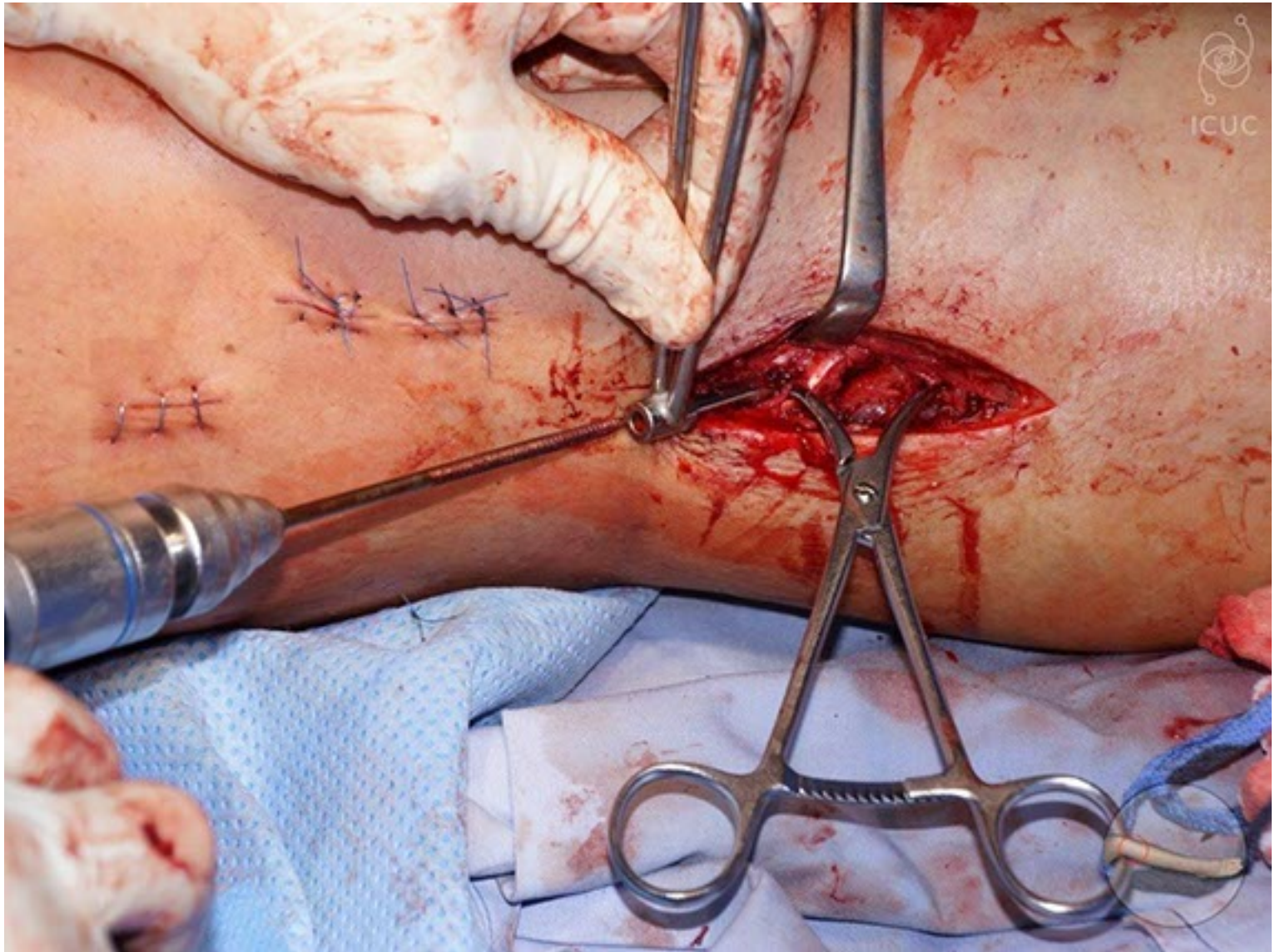


The clamp looks not so dangerous when you see it on the X-ray.
You are away from the nerve.







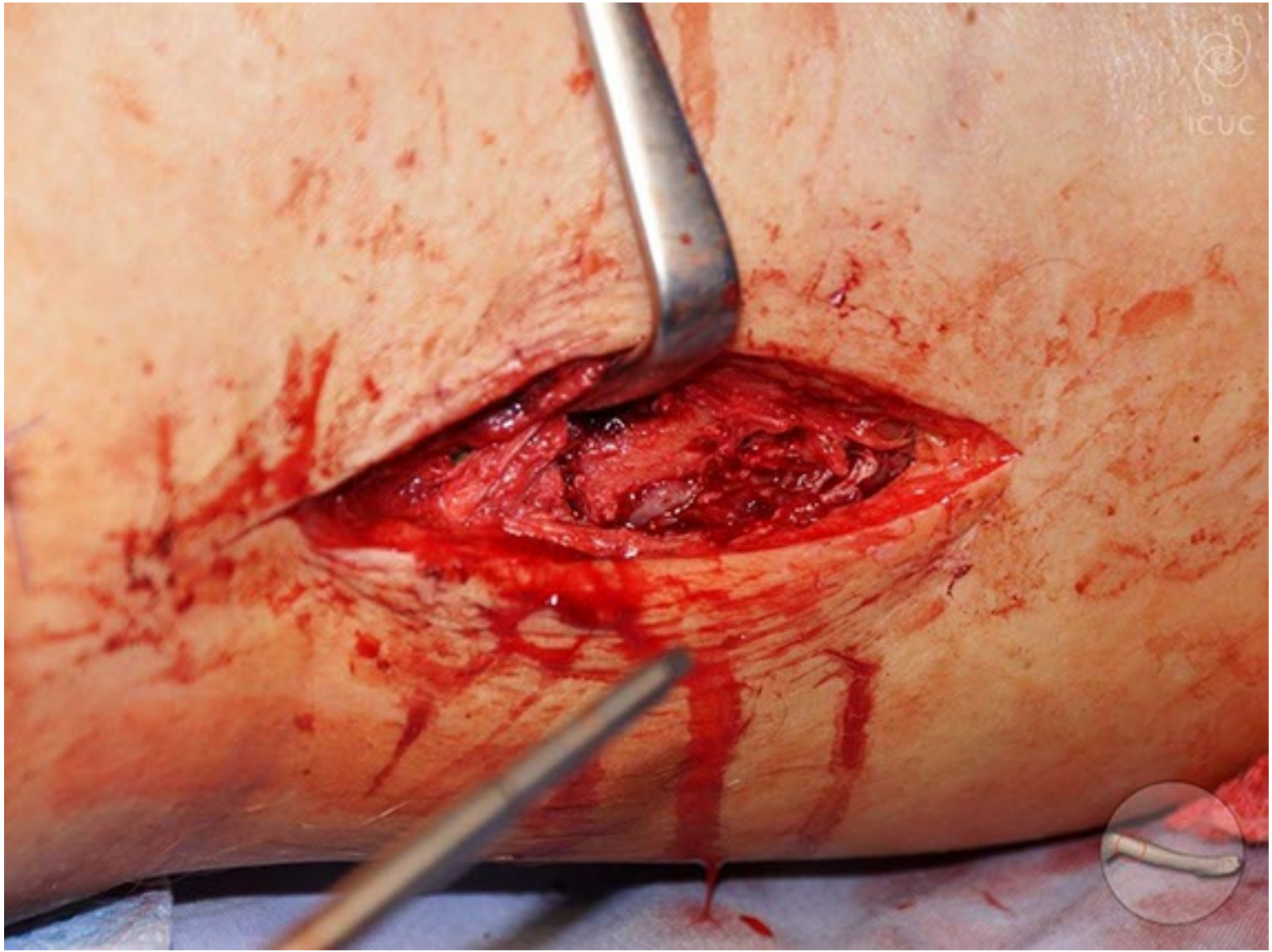




Insertion of the screw with a washer. It is not tightened enough.





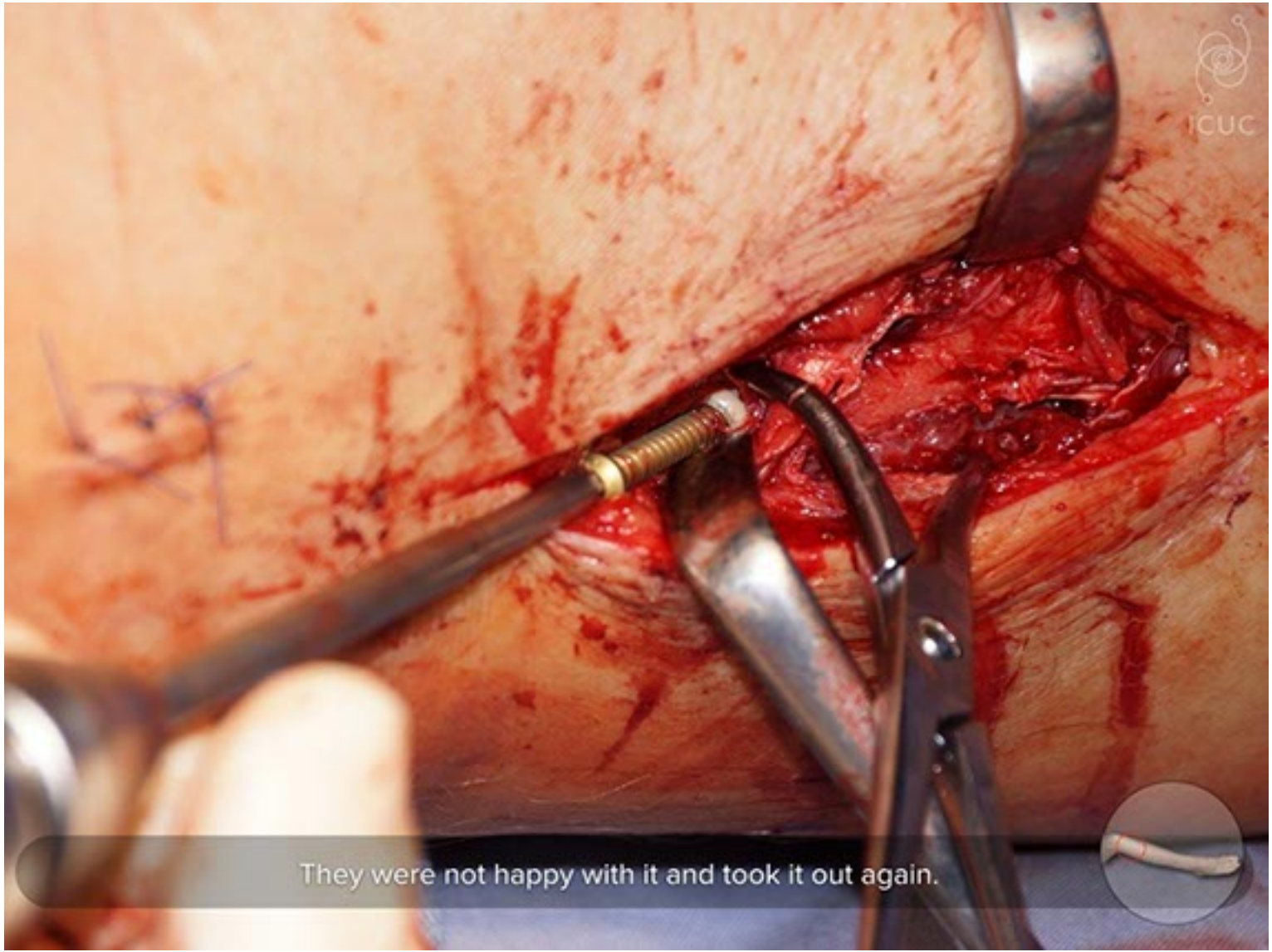








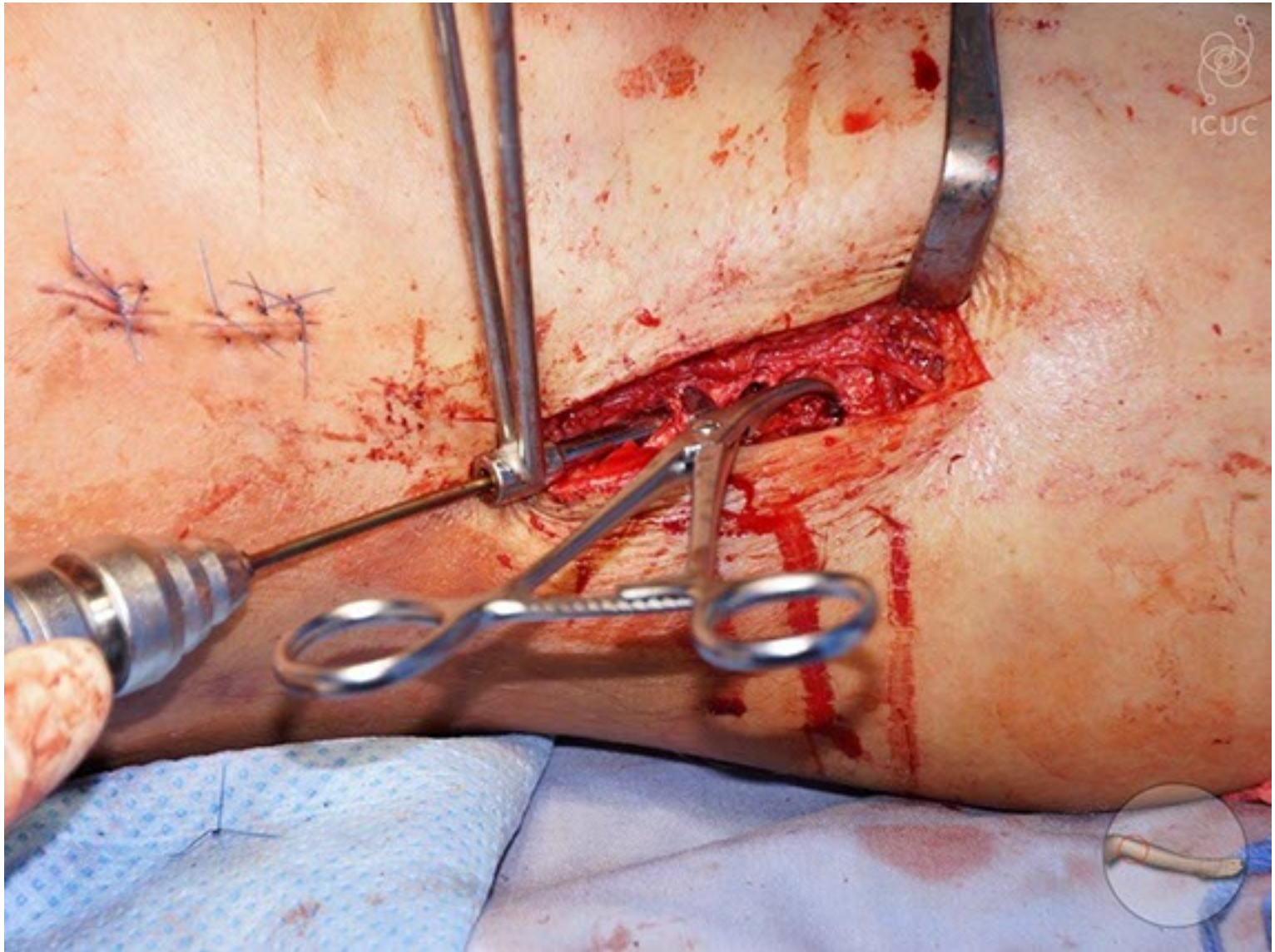
ICUC

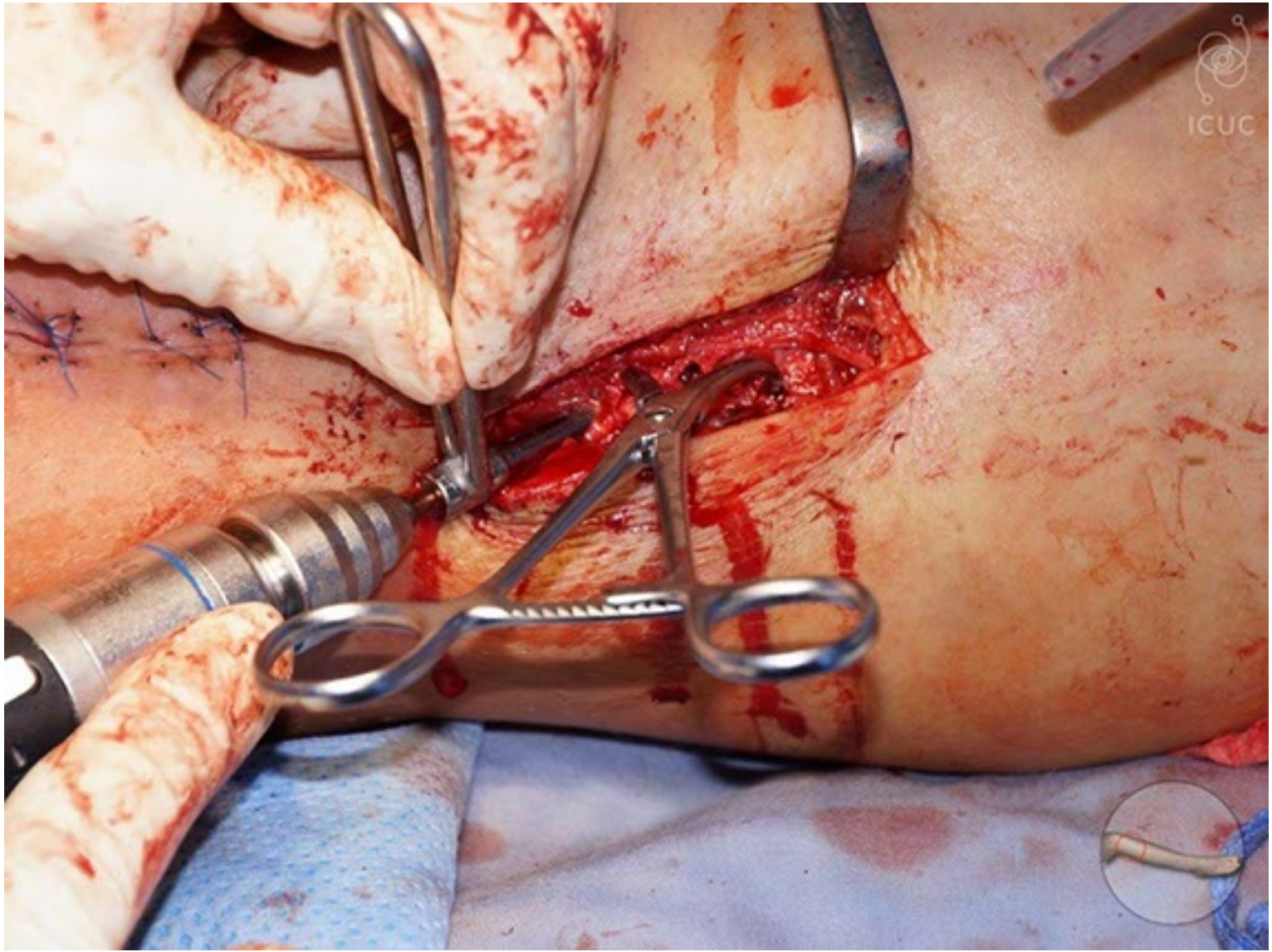


They were not happy with it and took it out again.



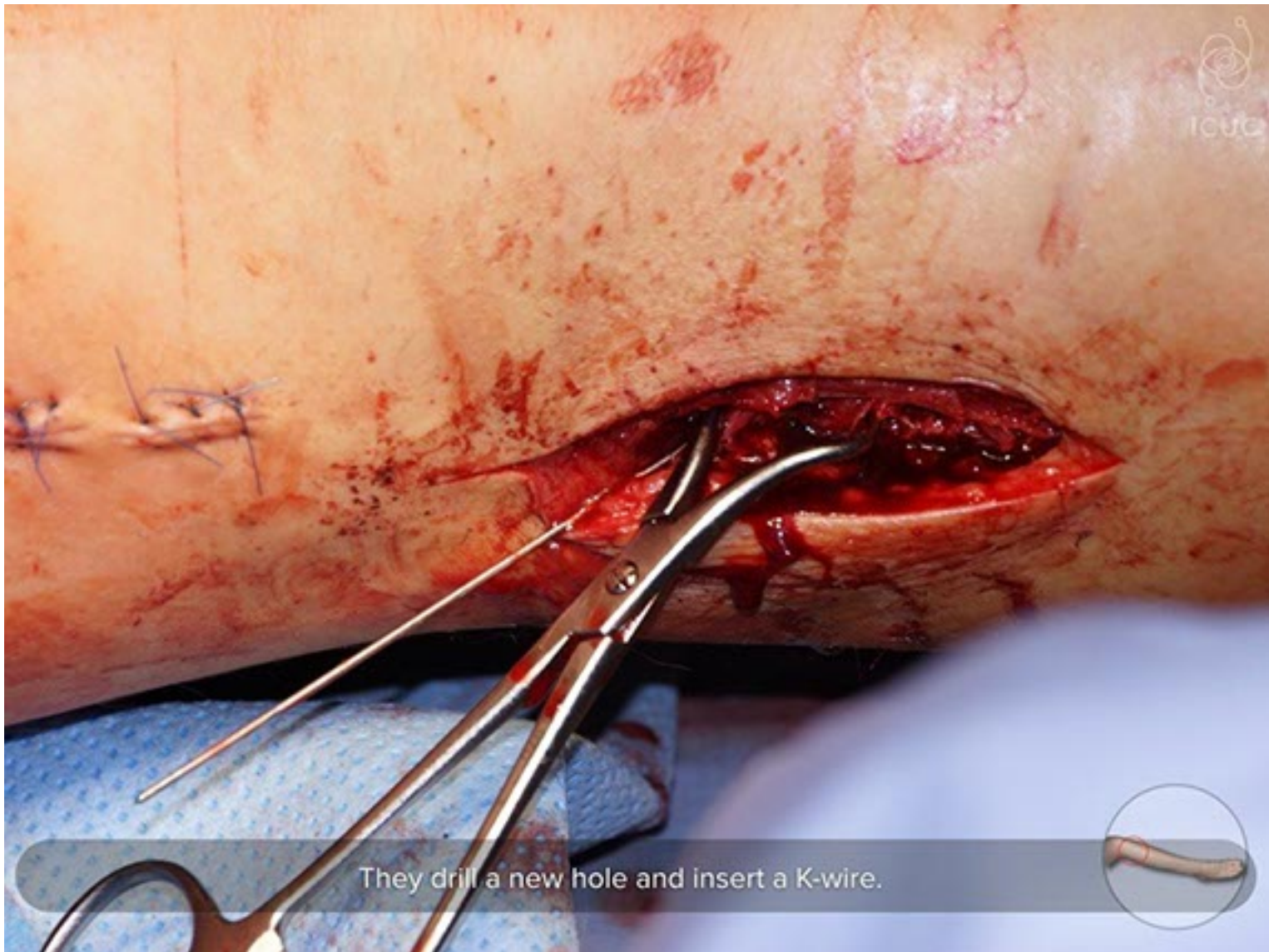






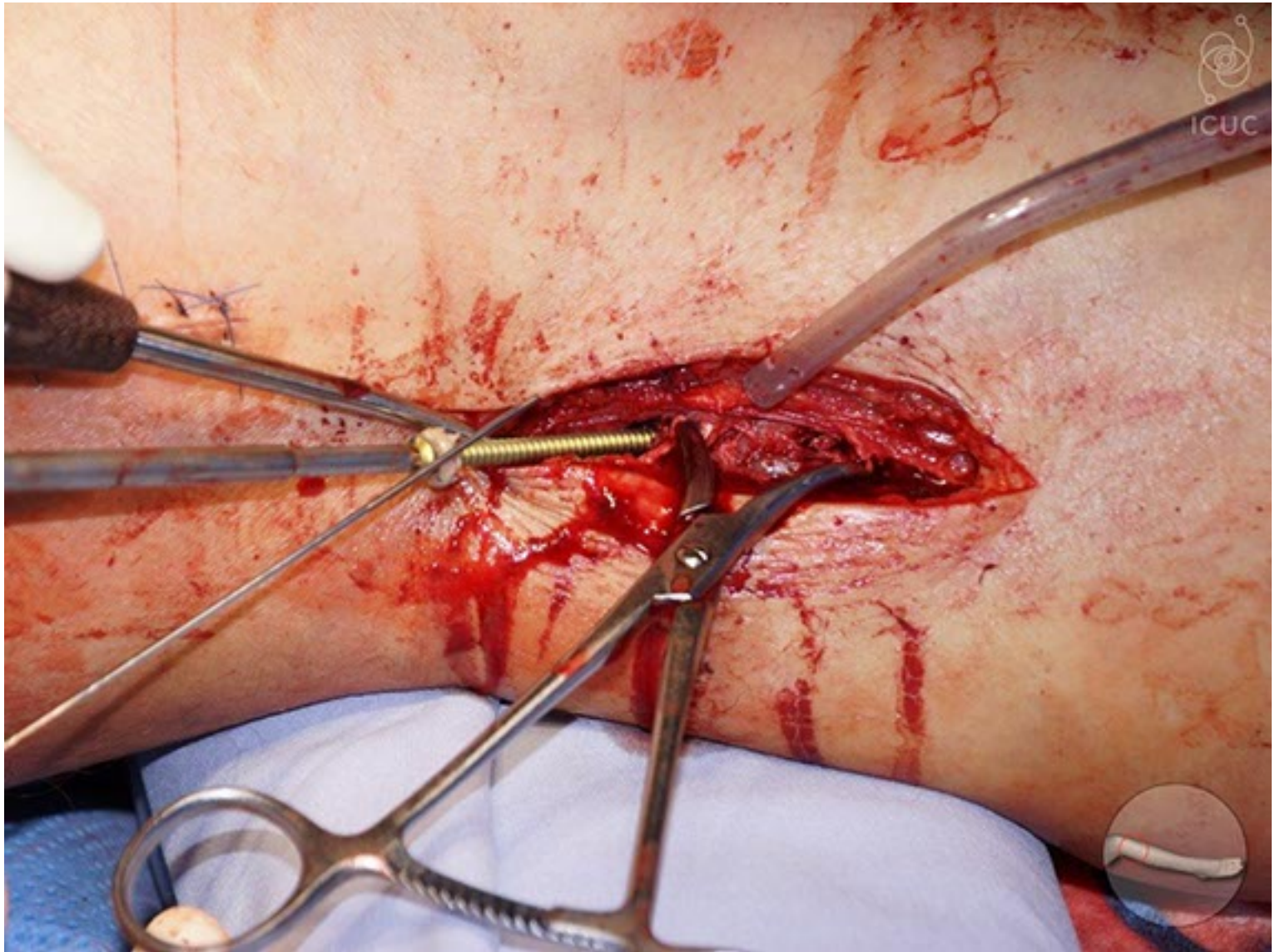






They drill a new hole and insert a K-wire.













They put in an anchor.



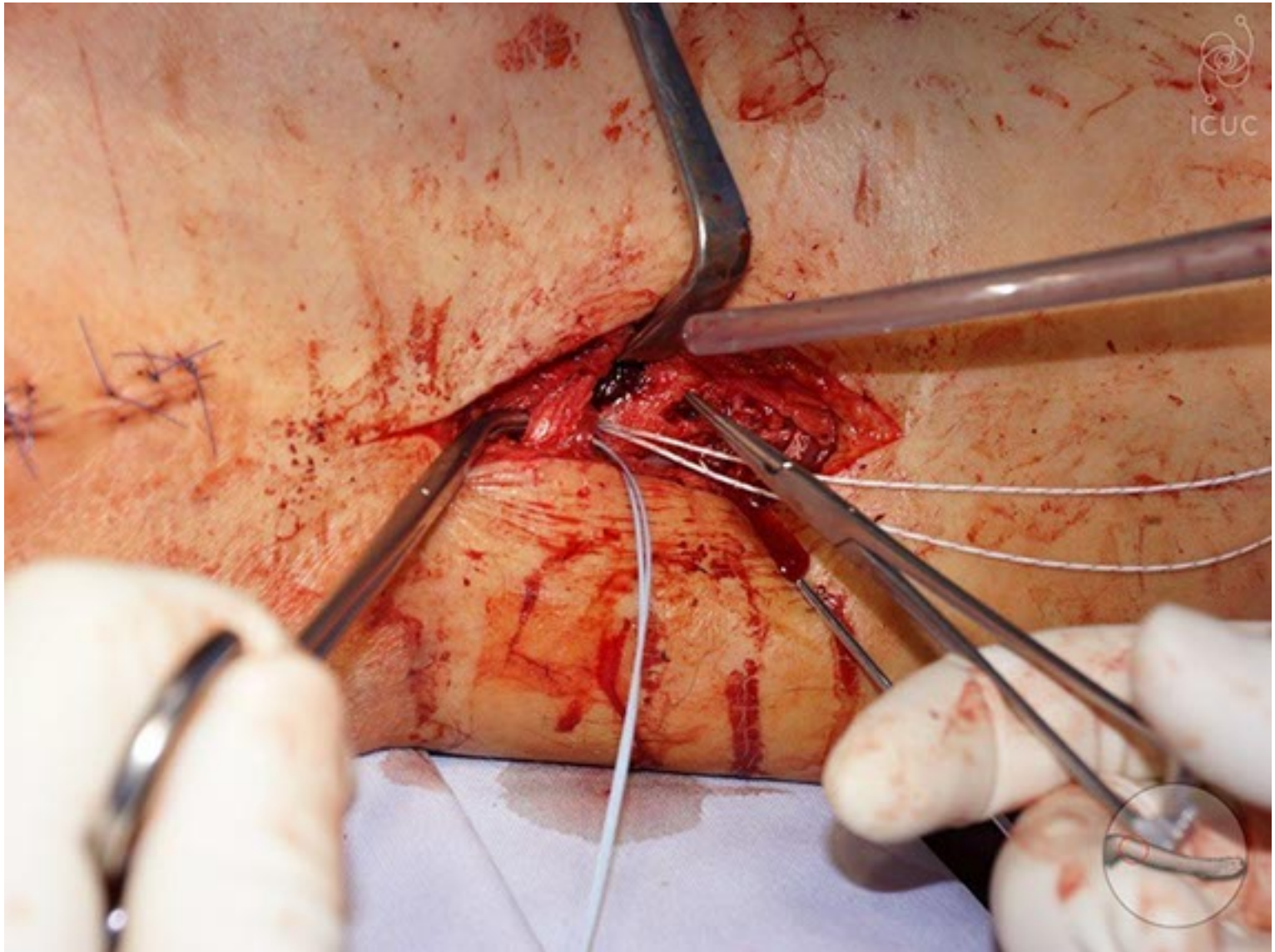


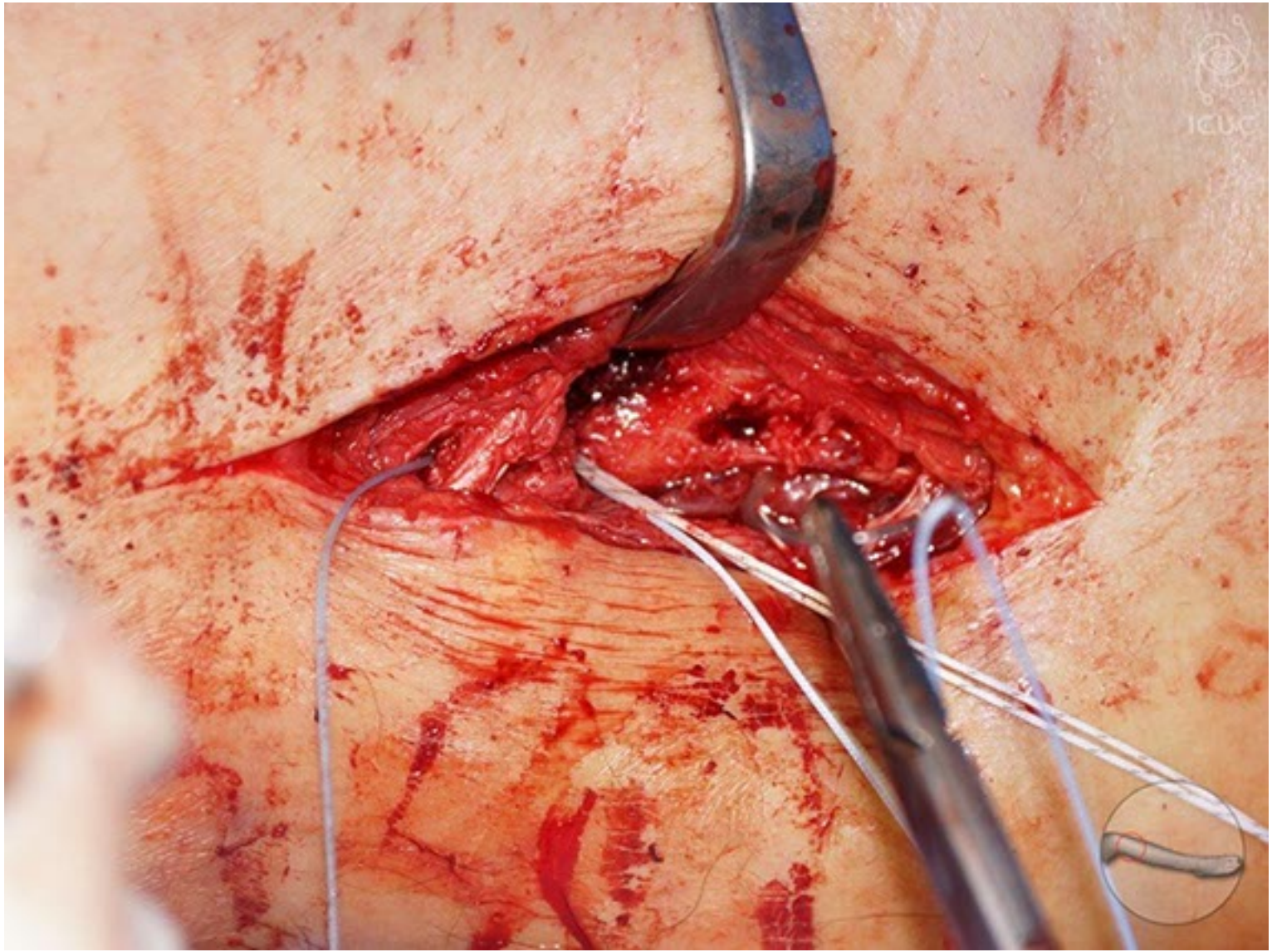


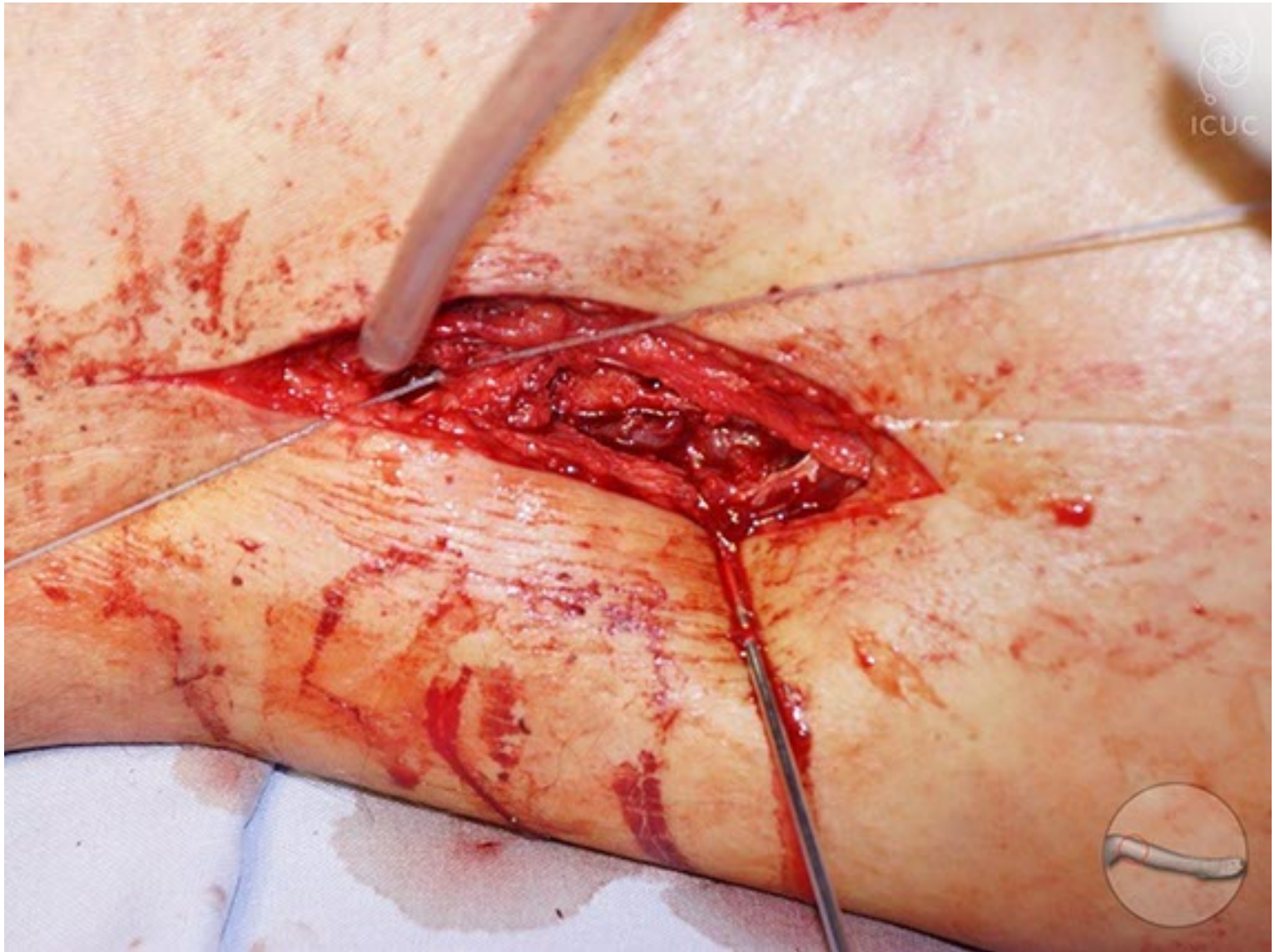
Now, they perform osteosuture.







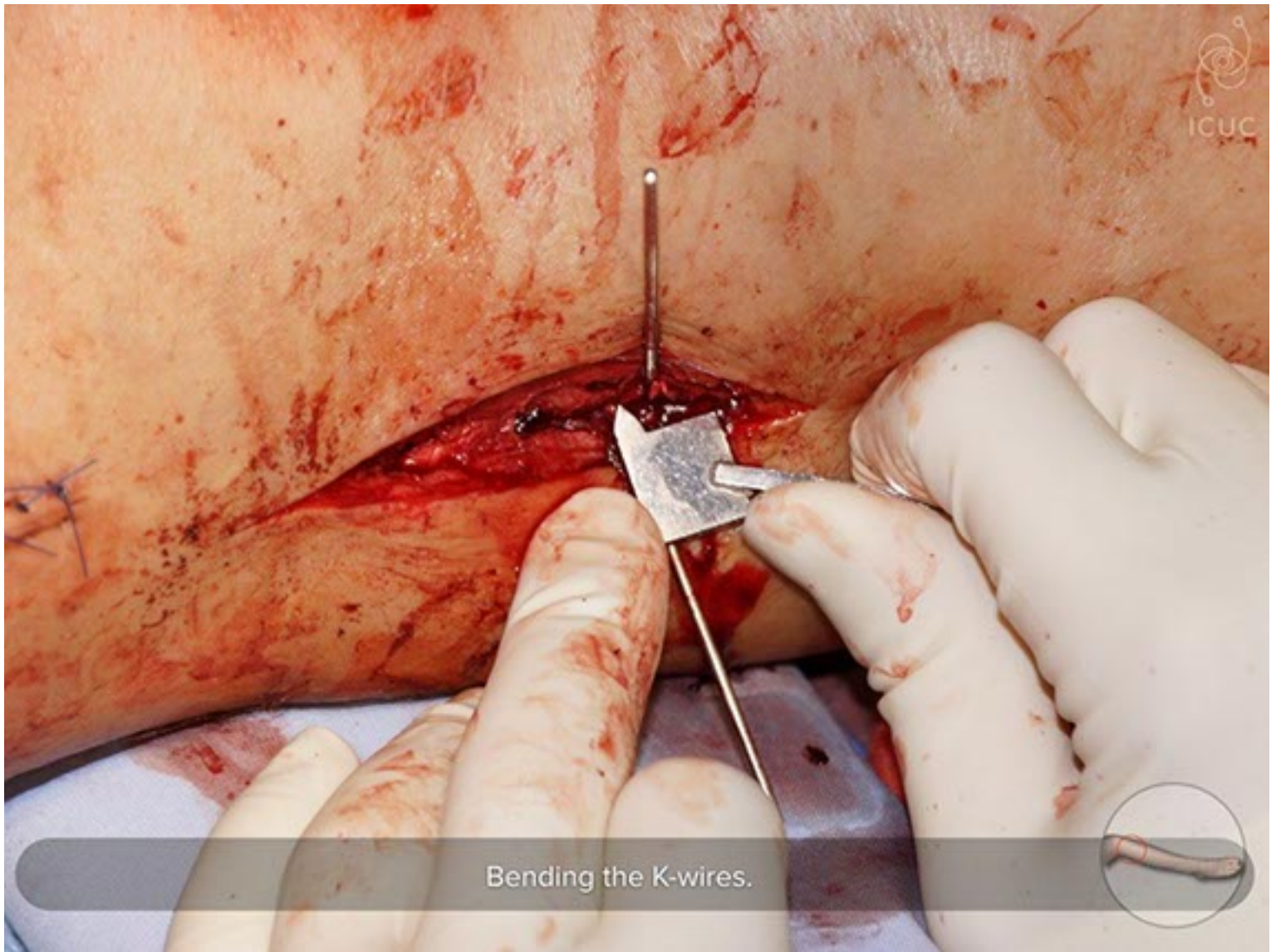




We have two K-wires, probably to maintain the fibula, because we have a disruption of the tibiofibular joint.

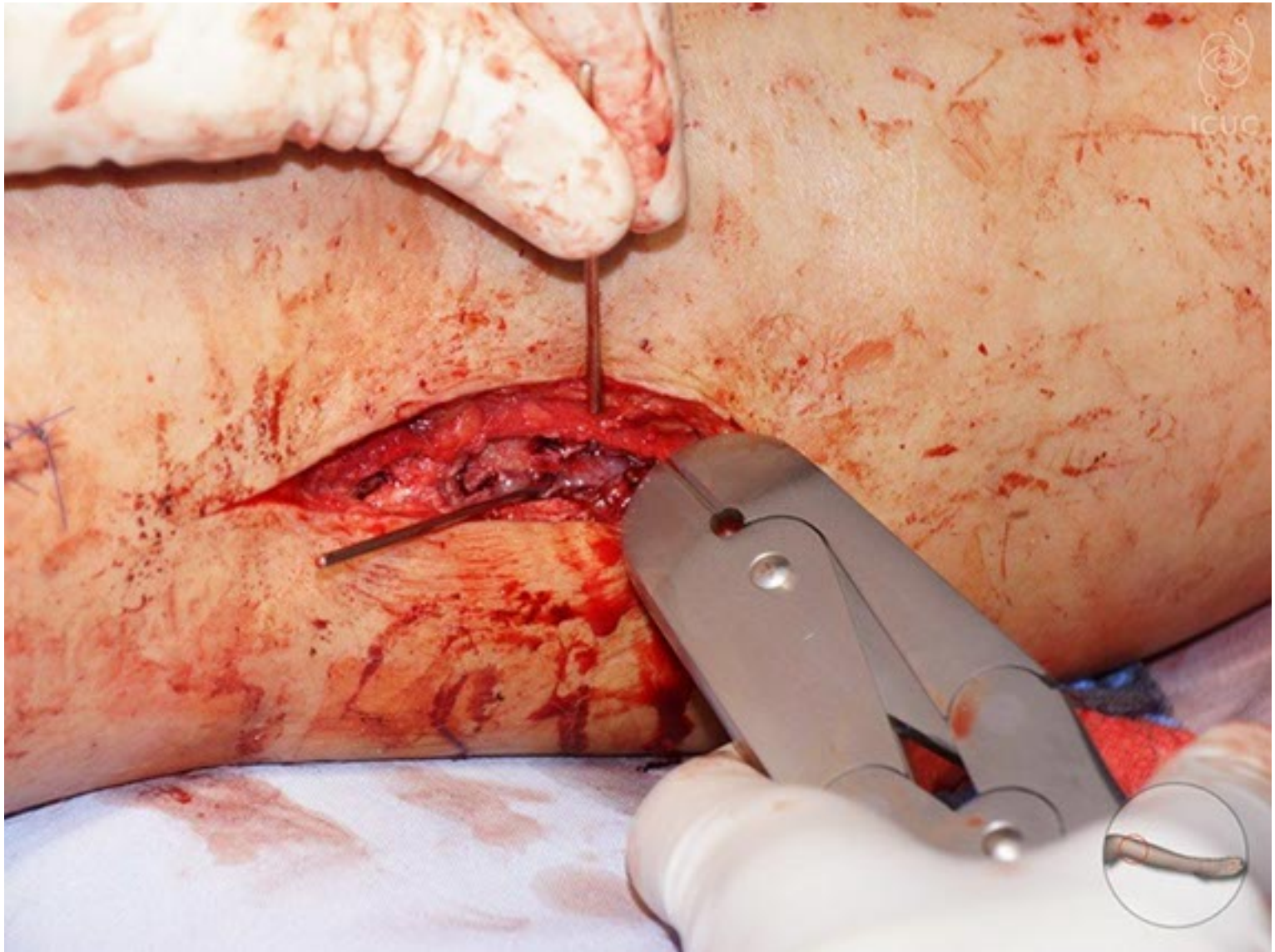


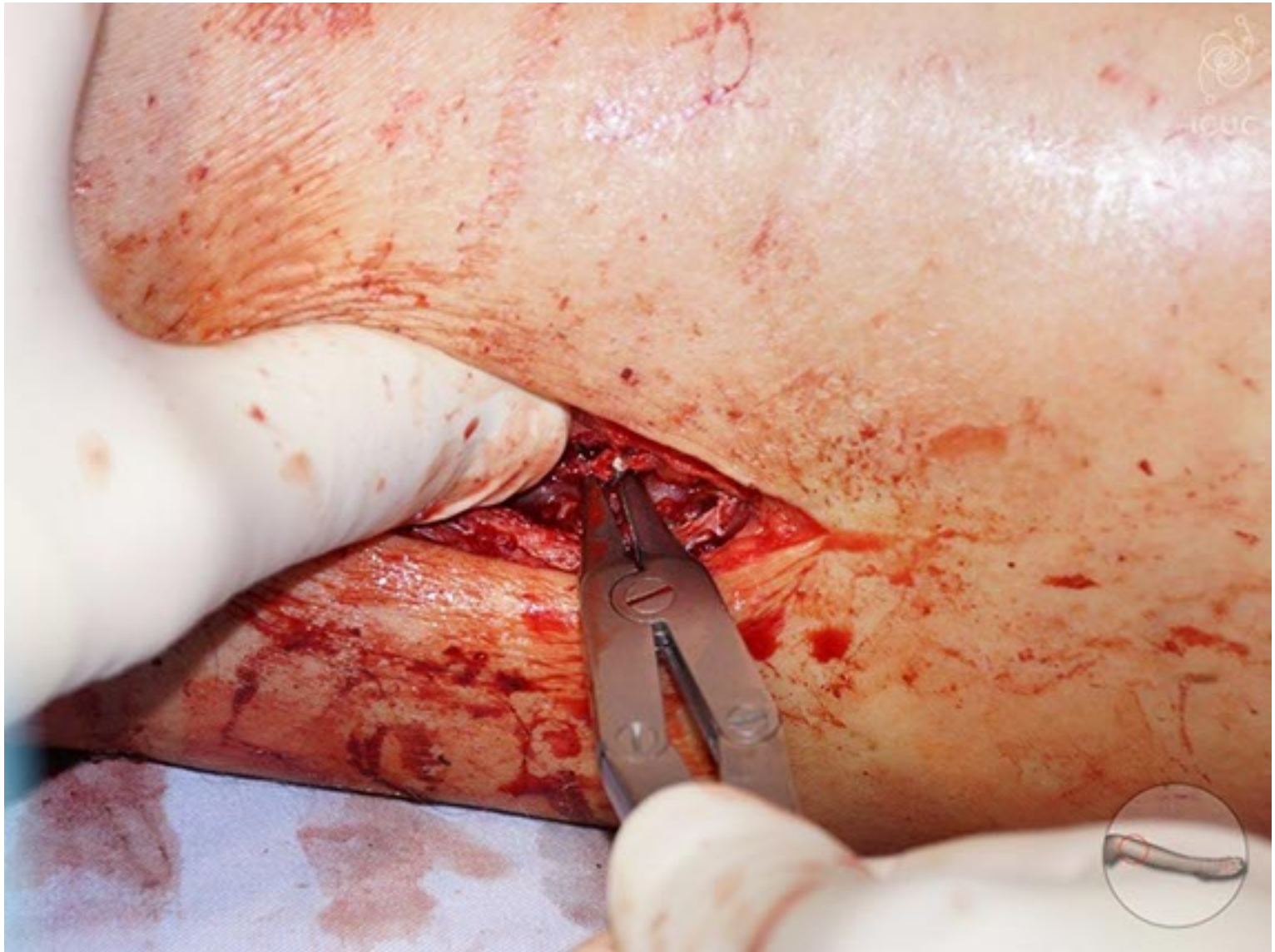


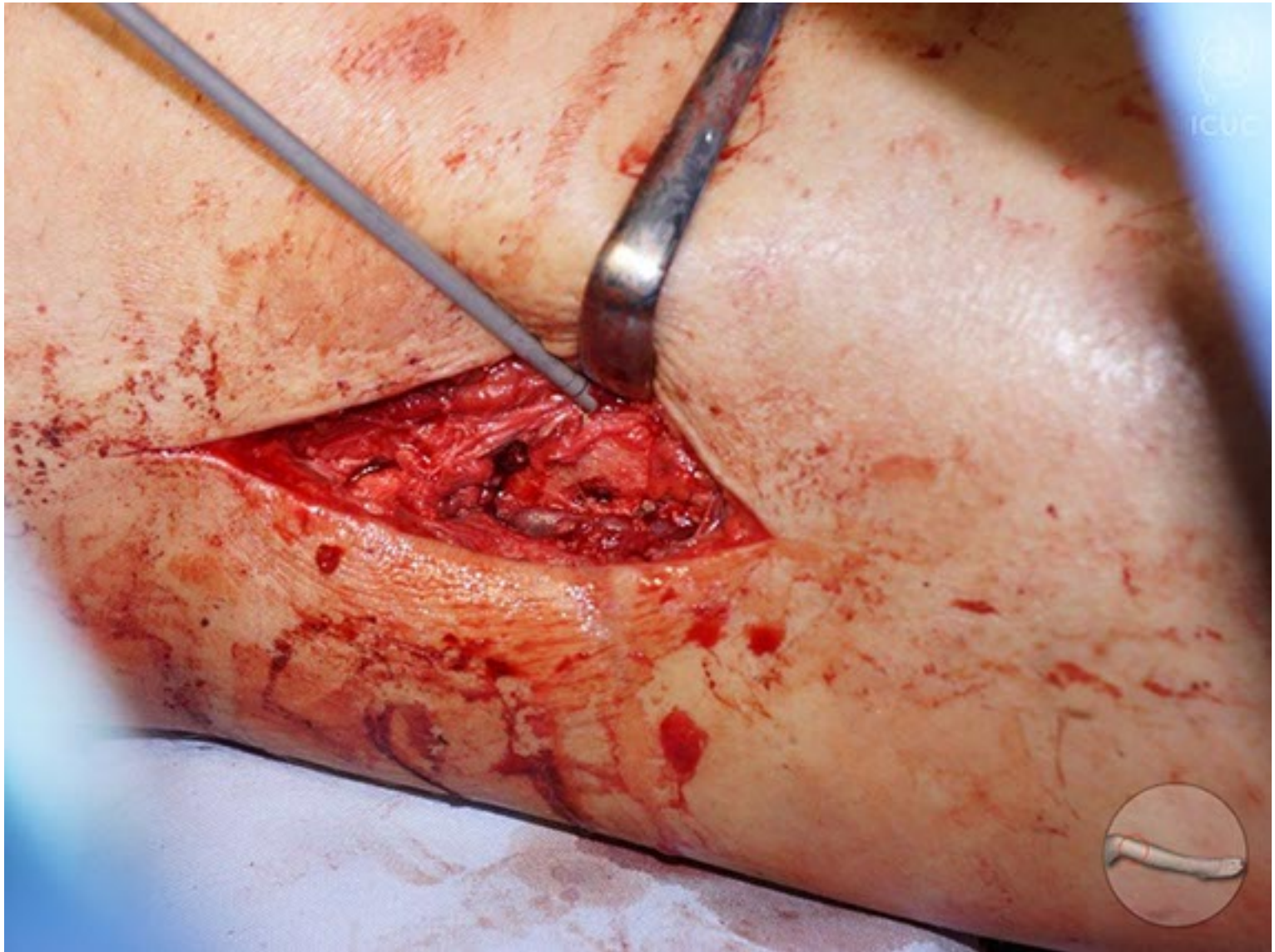


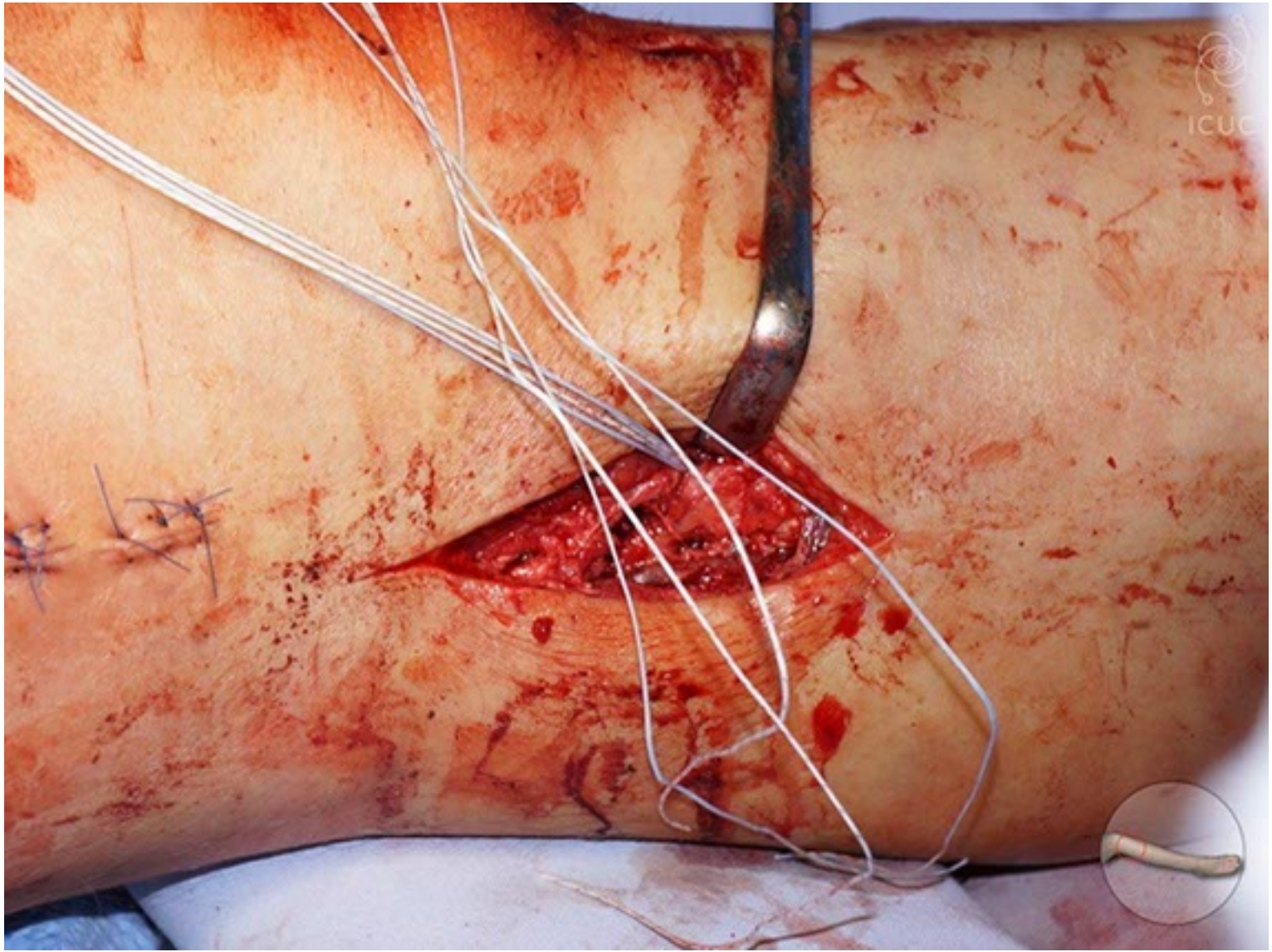
Bending the K-wires.

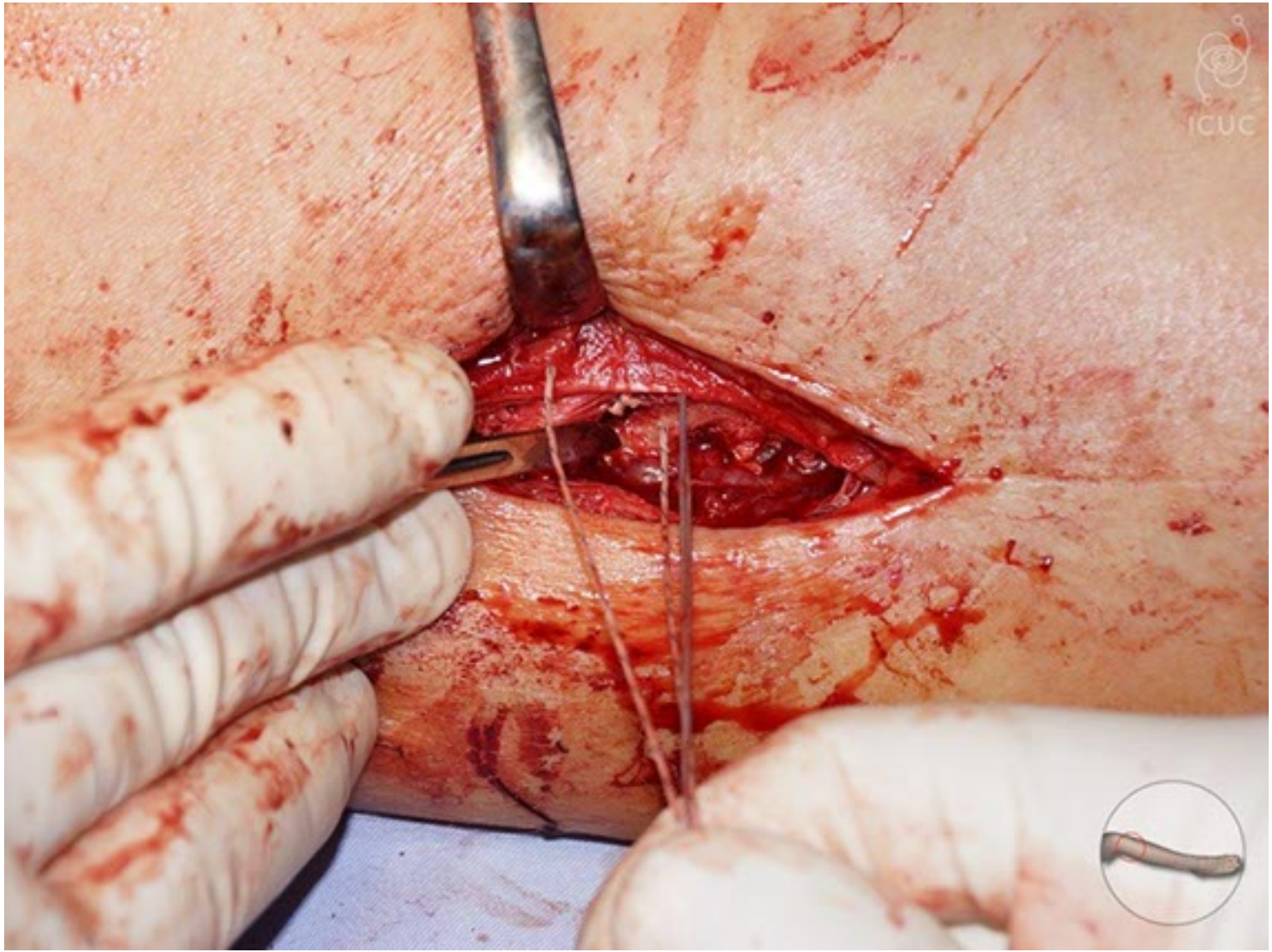


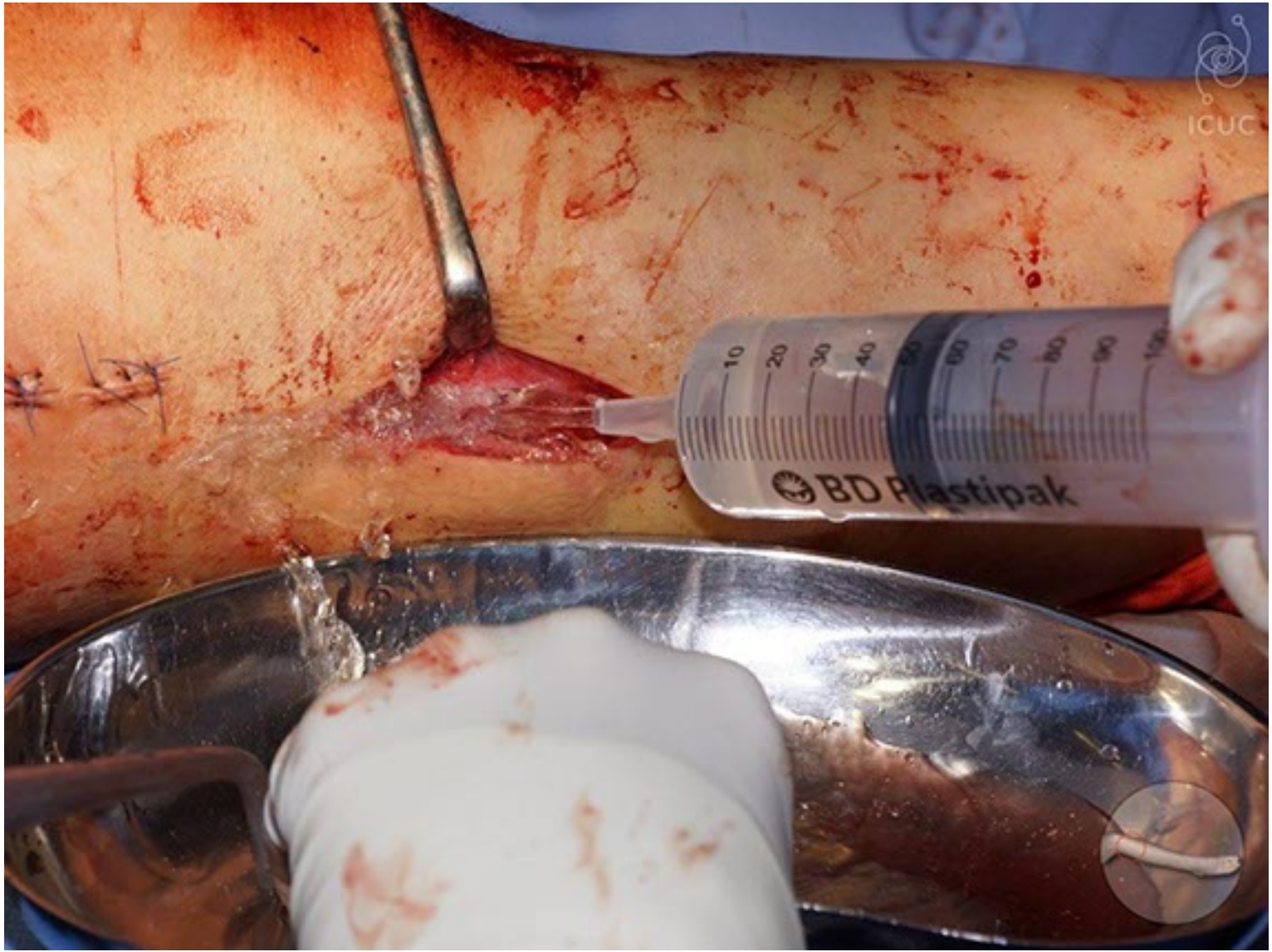




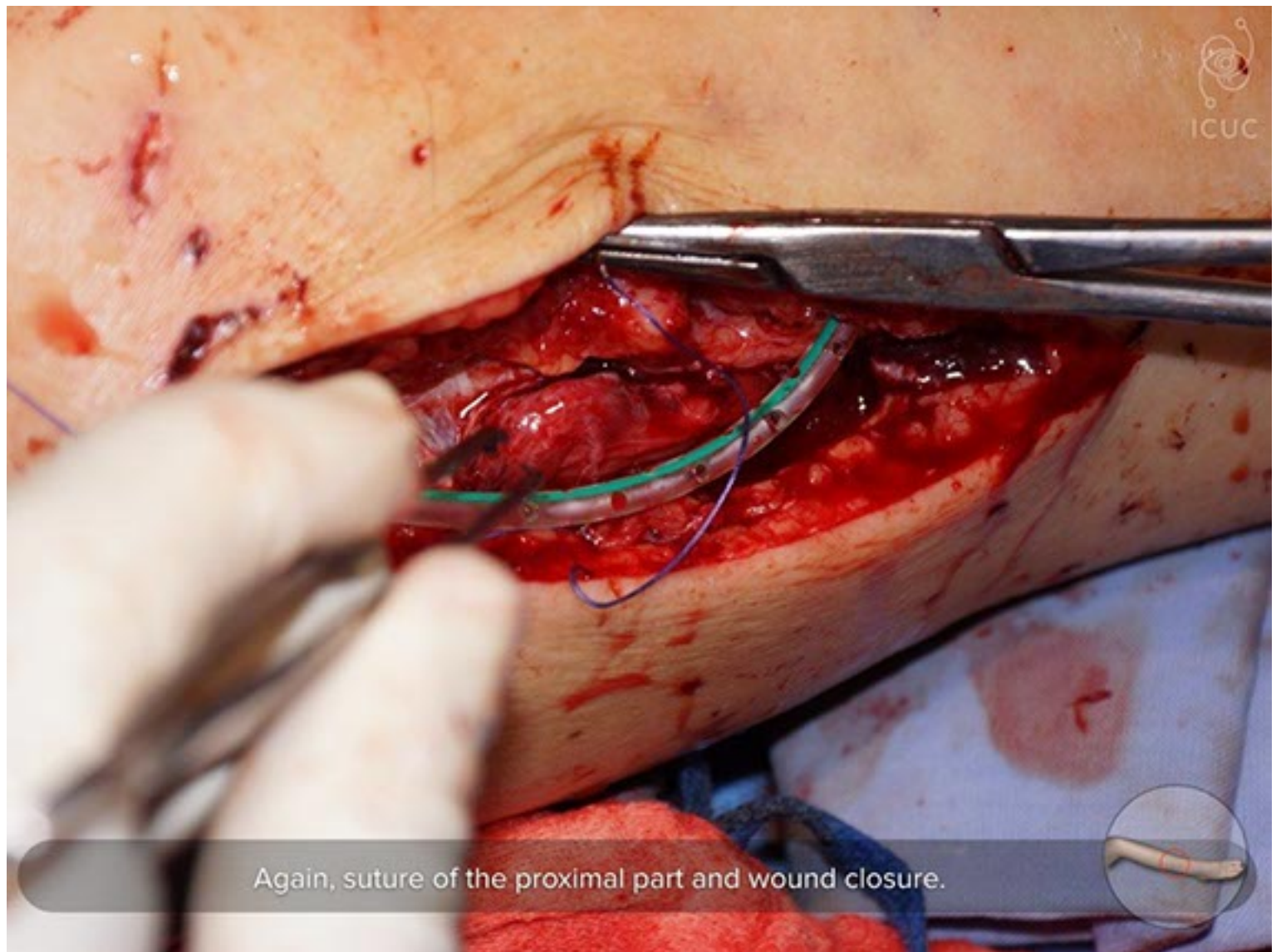






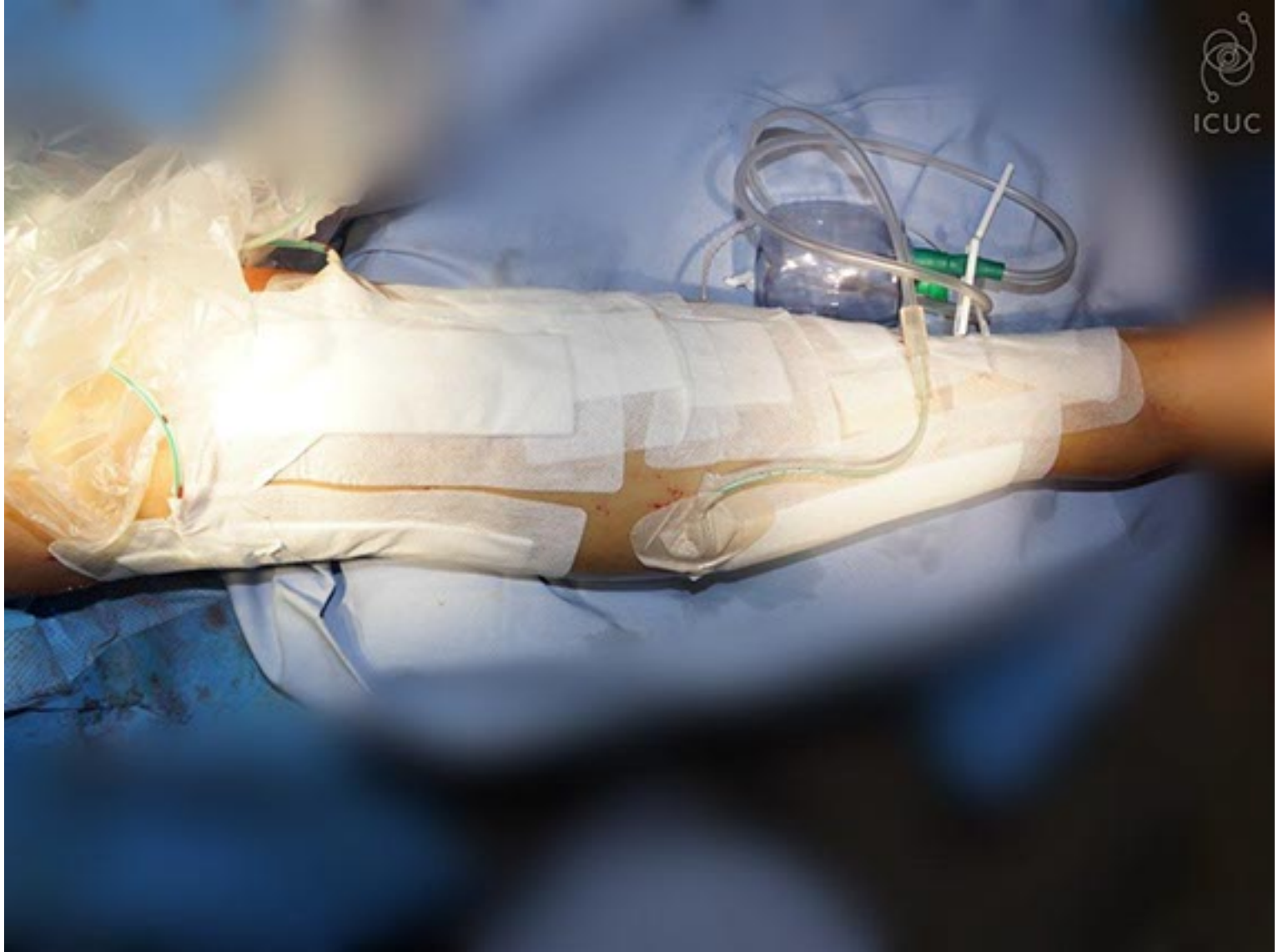


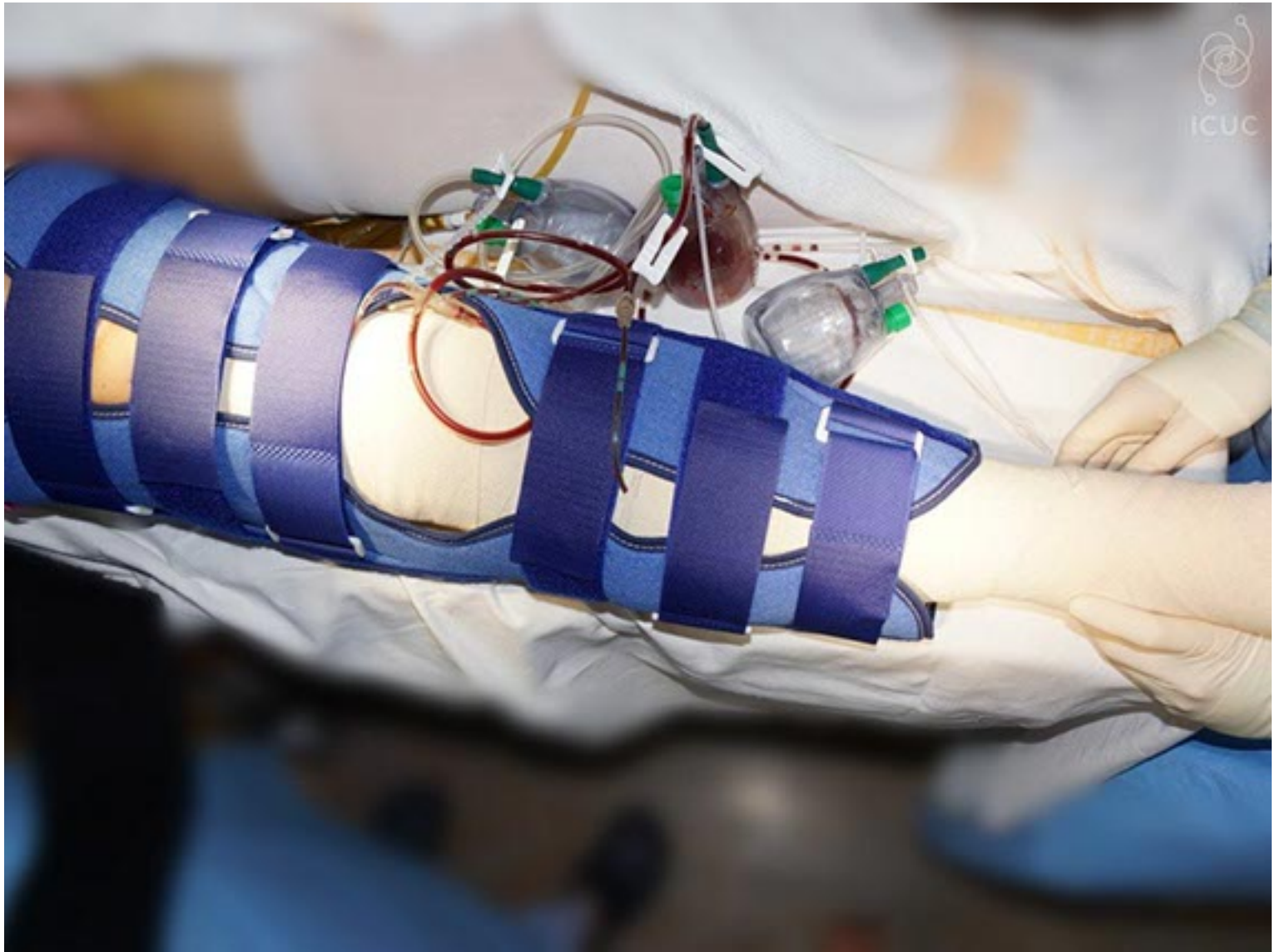




Again, suture of the proximal part and wound closure.







0w after 3rd surgery | 1w after 1st surgery



It has healed well in moderate valgus misalignment. The fracture appears quite nicely aligned. There might be slight valgus in the distal part. But these are not very good X-rays. We see a slight extension of the fibula. One of the problems here is the distraction at the level of the fracture. So, it looks as if the whole thing is in a slightly valgus position.



About the gap...

I think the valgus is not very prominent but it could have been prevented if the fibula had not been fixed in slight valgus.

We have distraction at the level of the fracture. Therefore, in this fracture, if you are using a nail, it is not necessary to plate the fibula. But, if you use a plate, the stabilized fibula will help you achieve reduction. In this case, fibula plating is not absolutely necessary.

When plating the fibula, extension is often a problem.

I think this indication is good for a nail.

I do not think fixation of the fibula is indicated if nailing is the procedure of choice.

The technical implementation of nailing is fine but I would not have used a cheese cutter before I had had the aiming wire properly inserted into the medullary canal.

In the end, we have slight valgus so reduction is not perfect.



15w after 3rd surgery | 16w after 1st surgery



20w after 3rd surgery | 21w after 1st surgery



30w after 3rd surgery | 31w after 1st surgery





80w after 3rd surgery | 81w after 1st surgery



103w after 3rd surgery | 104w after 1st surgery