



Distal radius fracture

Golden standard and breaking news

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Fracture stability

The key to offer a good and correct treatment is to understand which fractures are unstable when treated with PoP



Distal radius fractures

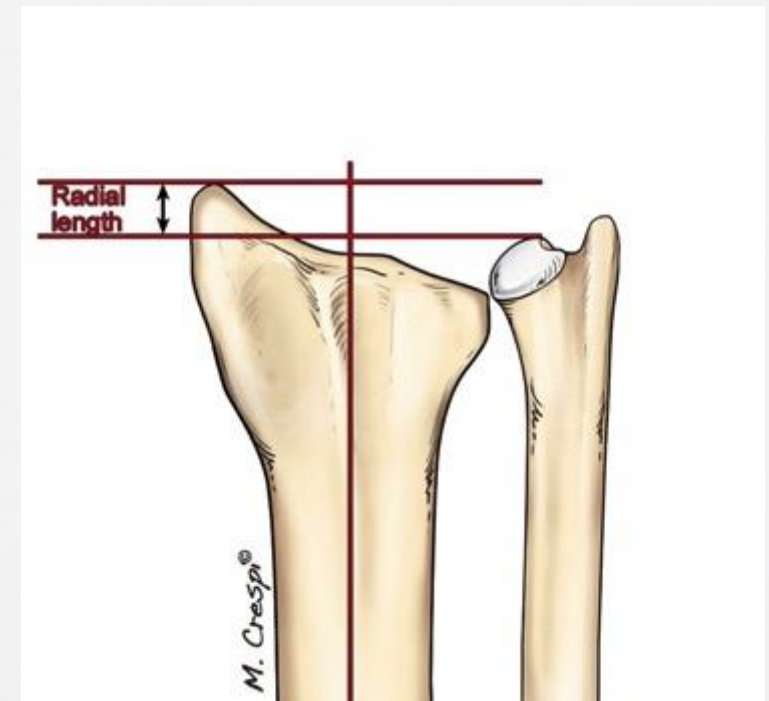
Which fractures are unstable?

$\geq 10^\circ$ Dorsal angulation

Radial shortening ≥ 2 mm

Intra-articular step ≥ 2 mm

Dorsal and/or volar comminution



Which fractures are unstable?

The more important factors to predict loss of reduction:

Old age

All types of comminution

Loss of radial length

High Energy

Loss of radial tilt (dorsal/volarly)

Unstable distal radius fractures

What is an unacceptable result?



come to the



UNIVERSITY OF
COMMON SENSE

no one knows!

BUT there is a relationship between
anatomy and function



When should surgery be considered?

Guidelines for treatment of DRF in adults



Norwegian Orthopaedic
Association

THE NORWEGIAN MEDICAL ASSOCIATION

wristfractures.no

Distal radius fractures

When should surgery be considered?

$\geq 10^\circ$ Dorsal angulation

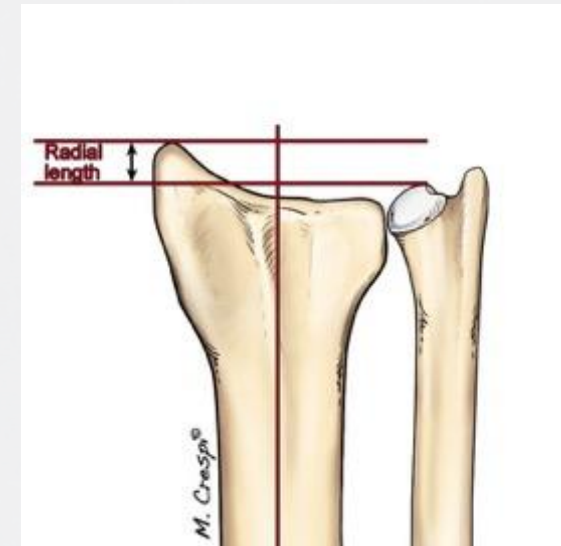
Radial shortening ≥ 2 mm

Intra-articular step ≥ 2 mm

Dorsal and/or volar comminution

Incongruence in DRUJ

High energy trauma



Conservative vs pinning

Utfall	Tiltro Til Effektestimatene	Relativ Effekt	Conservative Treatment	Percutaneous Pinning	Forskjell Med Percutaneous Pinning	Antall Inkluderte (Studier), Oppfølgingstid
Functional grading fair or poor - independent on length of follow up-period	Moderat <i>Due to risk of bias (systematic error)</i>	RR 0.31 (95% KI 0.15 - 0.64)	373 per 1000	116 per 1000	257 færre per 1000 (95% KI 317 færre - 134 færre)	135 (3 RCT)
Functional grading fair or poor after 12 months follow-up	Veldig lav <i>No blinding, no "intention to treat" analysis, lost to follow-up badly described, and the functional-grading is not a good patient important outcome measure</i>	RR 0.31 (95% KI 0.15 - 0.69)	452 per 1000	140 per 1000	312 færre per 1000 (95% KI 389 færre - 140 færre)	85 (2 RCT)
Re-dislocation needing surgical correction	Moderat <i>Risk of bias (systematic errors) and unprecise effect-estimates</i>	RR 0.09 (95% KI 0.02 - 0.37)	143 per 1000	13 per 1000	130 færre per 1000 (95% KI 140 færre - 90 færre)	269 (4 RCT)
Carpal tunnel syndrome (median nerve compression/ neuropathy/contusion)	Lav <i>Risk of bias (systematic errors) and unprecise effect-estimates</i>	RR 0.53 (95% KI 0.19 - 1.46)	54 per 1000	29 per 1000	25 færre per 1000 (95% KI 44 færre - 25 flere)	363 (5 RCT)
Complex regional pain syndrome	Lav <i>Risk of bias (systematic errors) and few participants</i>	RR 0.84 (95% KI 0.45 - 1.59)	168 per 1000	141 per 1000	27 færre per 1000 (95% KI 99 færre - 92 flere)	188 (3 RCT)

Recommendation

Operative vs conservative treatment of unstable DRF

Strong recommendation

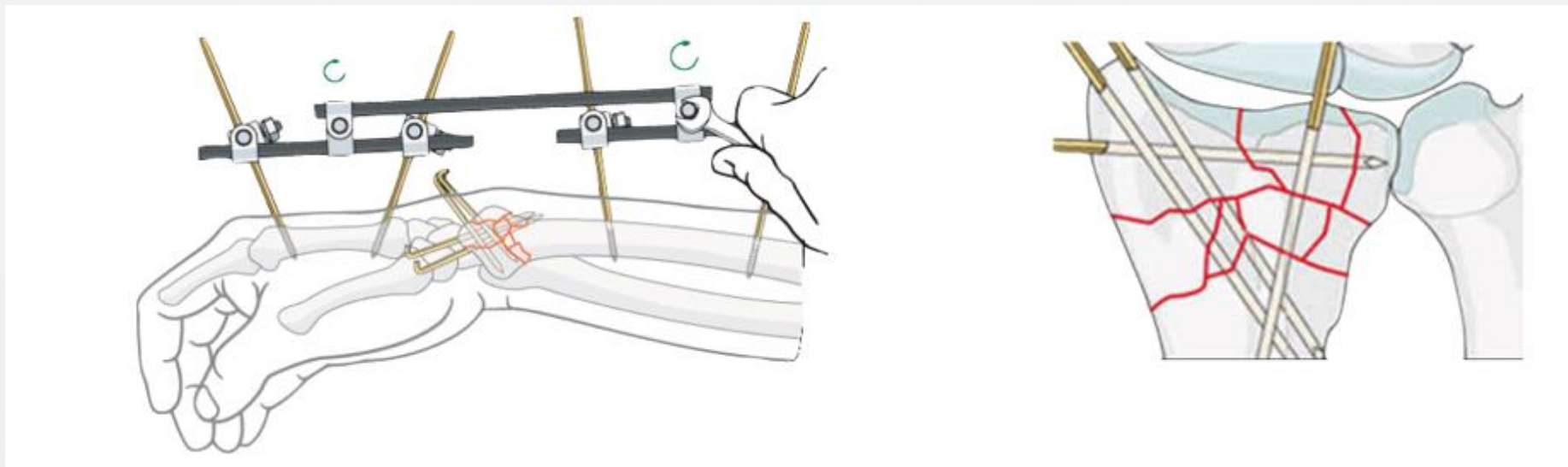
Options

Benefits clearly outweigh the drawbacks/harms.

We recommend operative treatment of patients with unstable distal radius fractures in adult patients.

Restraint should be exhibited with respect to using operative treatment for patients with a low functional level. By low functional level is meant permanent inability to deal independently with day-to-day activities.

Which surgical method?



Distal radius fractures

Ex Fix vs Volar locking plates

Utfall	Tiltro Til Effektestimatene	Relativ Effekt	External Fixation	Volar Locking Plates	Forskjell Med Volar Locking Plates	Antall Inkluderte (Studier), Oppfølgingstid
DASH after 3 months follow-up <i>Meta-analyses and GRADING performed by the guideline group/The Norwegian Knowledge Centre</i>	Moderat <i>Wide confidence intervals, no blinding, few participants</i>		mean 27.1	mean 11.8	MD 15.3 færre (95% KI 23.5 færre - 7.1 færre)	169 (3 RCT)
DASH after 6 months follow-up <i>Meta-analyses and GRADING performed by the guideline group/The Norwegian Knowledge Centre</i>	Moderat <i>Risk of bias: studies with few participants</i>		mean 19.2	mean 11.3	MD 7.9 færre (95% KI 8.9 færre - 6.8 færre)	170 (3 RCT)
DASH after 1 year follow-up <i>Meta-analyses and GRADING performed by the guideline group/The Norwegian Knowledge Centre</i>	Moderat <i>Small studies</i>		mean 19.9	mean 12.4	MD 7.5 færre (95% KI 15 færre - 7 færre)	171 (3 RCT)
Pain (VAS) at activity after 4 months follow-up <i>Meta-analyses and GRADING performed by the guideline panel/The Norwegian Knowledge Centre</i>	Lav <i>1 small study</i>		mean 21	mean 15	MD 6 færre (95% KI 14 færre - 1 flere)	104 (1 RCT)

Pinning vs Volar Locking Plates

Utfall	Tiltro Til Effektestimatene	Relativ Effekt	Percutaneous Pinning	Volar Locking Plates	Forskjell Med Volar Locking Plates	Antall Inkluderte (Studier), Oppfølgingstid
Total complications after 6 months - 1 year	Lav <i>Few participants, few events (complications)</i>	RR 0.24 (95% KI 0.05 - 1.05)	262 <i>per 1000</i>	63 <i>per 1000</i>	199 færre <i>per 1000</i> (95% KI 249 færre - 13 flere)	236 (4 RCT)
Serious complications after 6 months - 1 year	Veldig lav <i>few participants, few events (complications)</i>	RR 0.19 (95% KI 0.04 - 1.06)	108 <i>per 1000</i>	21 <i>per 1000</i>	87 færre <i>per 1000</i> (95% KI 104 færre - 6 flere)	145 (2 RCT)
Mild complications after 1 year	Lav <i>Few participants, few events (complications)</i>	RR 0.58 (95% KI 0.05 - 1.05)	124 <i>per 1000</i>	72 <i>per 1000</i>	52 færre <i>per 1000</i> (95% KI 118 færre - 6 flere)	176 (3 RCT)
Continuous Outcomes						
DASH after 3 months	Moderat <i>Small studies.</i>	DASH 0-100	mean 28.7	mean 18.9	MD 9.8 færre (95% KI 15.9 færre - 3.6 færre)	236 (4 RCT)
DASH after 6 months	Lav <i>Small studies.</i>	DASH 0-100	mean 22	mean 10	MD 12 færre (95% KI 19.1 færre - 4.9 færre)	159 (2 RCT)
DASH after 12 months	Lav <i>Only 1 study, few participants.</i>	DASH 0-100	mean 16.3	mean 13.2	MD 3.1 færre (95% KI 10 færre - 3.9 færre)	75 (2 RCT)

Volar locking plates vs Pinning

Weak recommendation

Option

Consider choosing volar locking plates rather than percutaneous pinning for adult patients irrespective of age who meet the indication for operation.

Restraint should be exhibited with respect to using surgery for patients with a low functional level. By low functional level is meant permanent inability to deal independently with day-to-day activities.

Distal radius fractures

The DRAFFT-study



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■ WRIST AND HAND

Cost effectiveness of treatment with percutaneous Kirschner wires *versus* volar locking plate for adult patients with a dorsally displaced fracture of the distal radius

ANALYSIS FROM THE DRAFFT TRIAL

We present an economic evaluation using data from the Distal Radius Acute Fracture Fixation Trial (DRAFFT) to compare the relative cost effectiveness of percutaneous Kirschner wire (K-wire) fixation and volar locking-plate fixation for patients with dorsally-displaced fractures of the distal radius.

The cost effectiveness analysis (cost per quality-adjusted life year; QALY) was derived from a multi-centre, two-arm, parallel group, assessor-blind, randomised controlled trial which took place in 18 trauma centres in the United Kingdom. Data from 460 patients were available for analysis, which includes both a National Health Service cost perspective including costs of surgery, implants and healthcare resource use over a 12-month period after surgery, and a societal perspective, which includes the cost of time off work and the need for additional private care.

There was only a small difference in QALYs gained for patients treated with locking-plate fixation over those treated with K-wires. At a mean additional cost of £714 (95% confidence interval 588 to 865) per patient, locking-plate fixation presented an incremental cost effectiveness ratio (ICER) of £89 322 per QALY within the first 12 months of treatment. Sensitivity analyses were undertaken to assess the ICER of locking-plate fixation compared with K-wires. These were greater than £30 000.

Compared with locking-plate fixation, K-wire fixation is a 'cost saving' intervention, with similar health benefits.



INCLUSION CRITERIA (STANDARDISATION?)

Aged 18 or over

Dorsally displaced fracture of the distal radius
within 3 cm of the radio-carpal joint

The treating surgeon **believed** that the patient would benefit from surgical fixation of the fracture, and the fracture can be reduced by closed reduction

DRAFFT TRIAL OUTCOME

No difference in functional outcome

K-wire fixation, however, is cheaper and quicker to perform.

BUT

Contrary to the existing literature, and against the rapidly increasing use of locking plate fixation

Achten et al; Joint J 2015;97-B:1082–9.

DRAFT TRIAL IN SMALL PRINT

Dorsally displaced distal radius fractures only

Exclusion of all significant intra-articular fractures that require an open reduction....

K wire technique and plating technique not standardised.....

Dash score

WHAT HAVE WE LEARNT FROM FROM DRAFFT???

K wires may achieve a similar outcome when:

The fracture is dorsally displaced **ONLY!**

Can be reduced with **closed** technique

Is within the 2 week timeframe

K wire technique does not matter ???

Dorsal plating of distal radius.
Is it still indicated?

Yes, it is still indicated, sometimes...
And it is best option in some cases

Dorsal Barton fractures

Dorso-ulnar corner fractures

Impacted articular fracture

Comminuted articular fractures

Unstable distal radius fractures

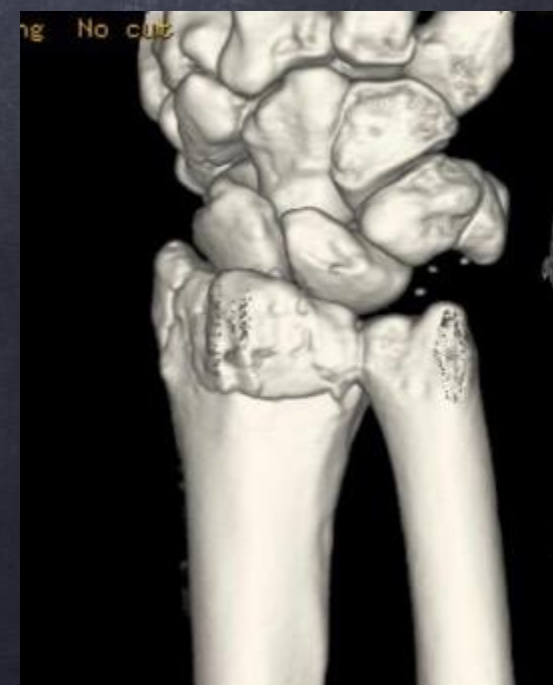
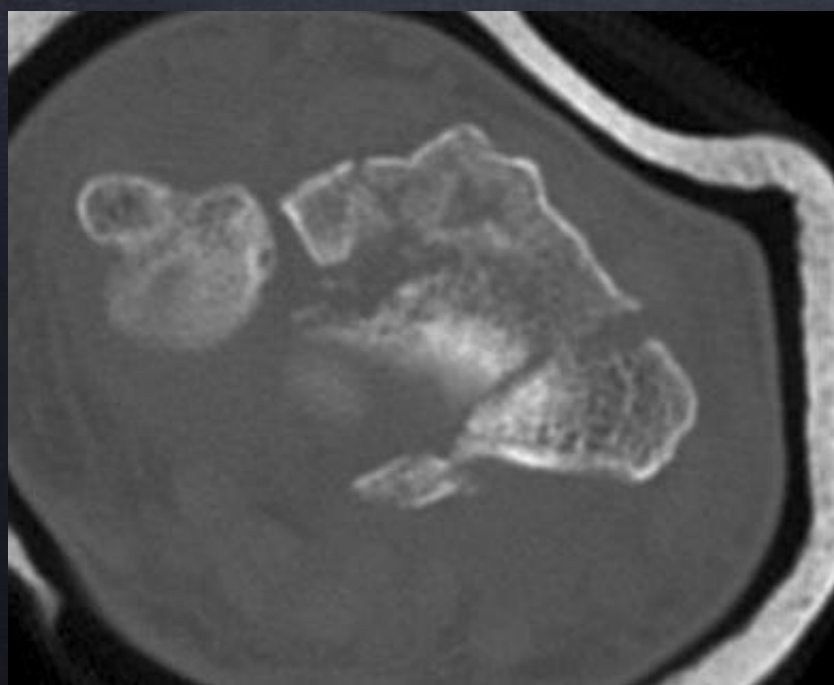
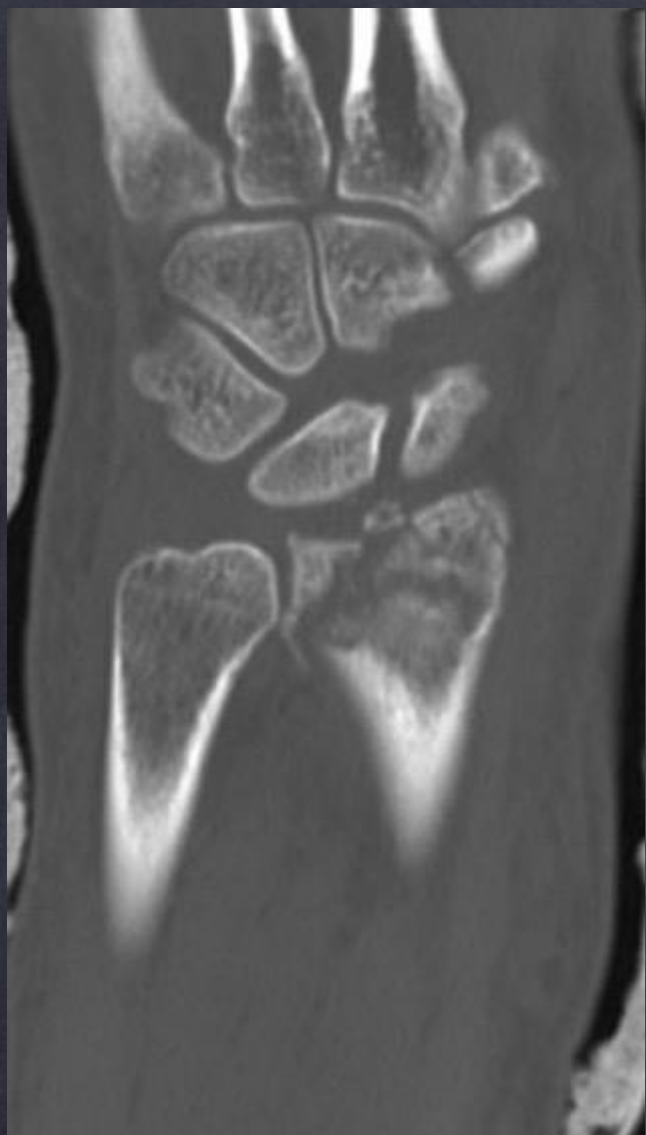
To do a good job you
need a proper approach

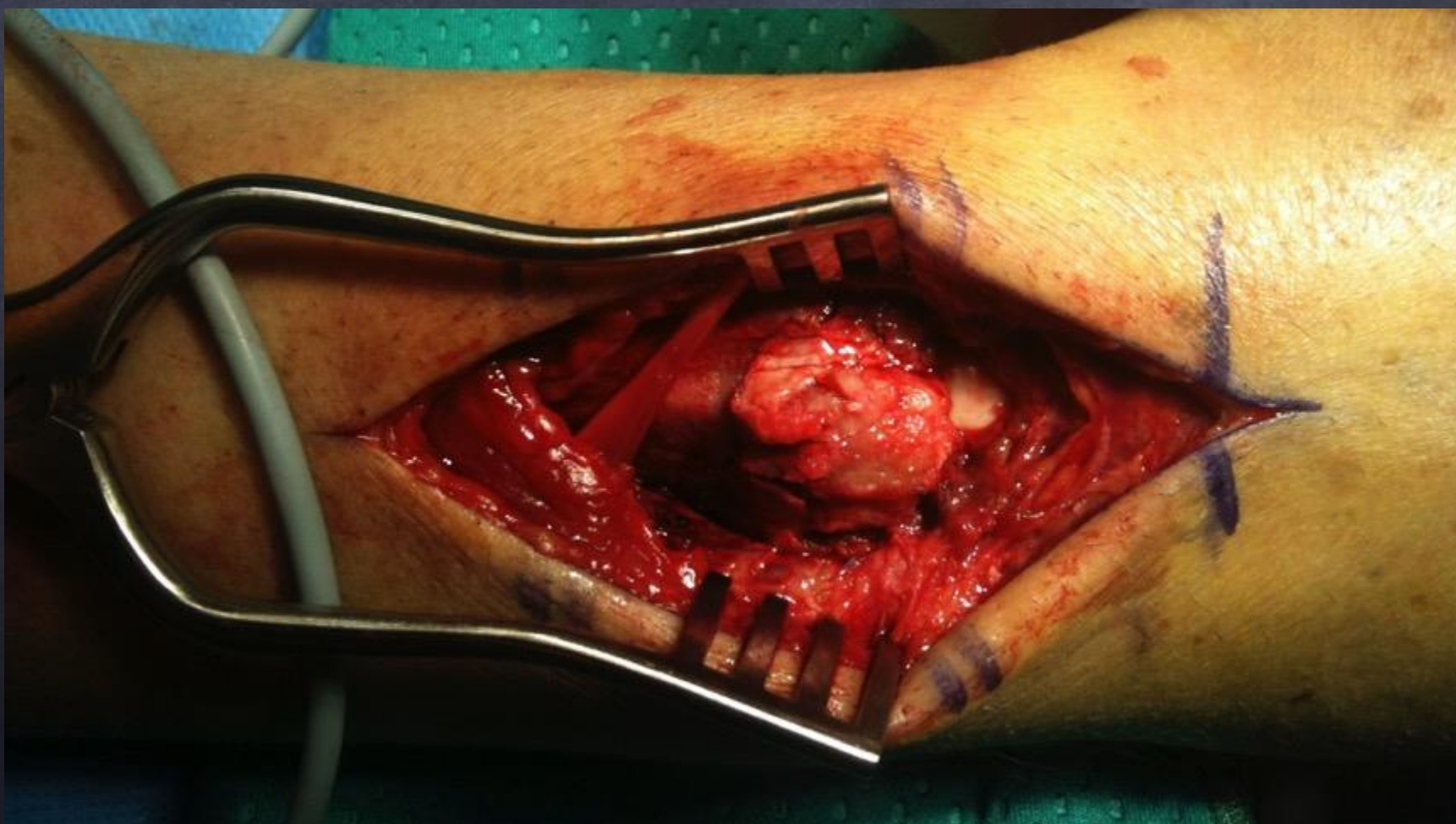
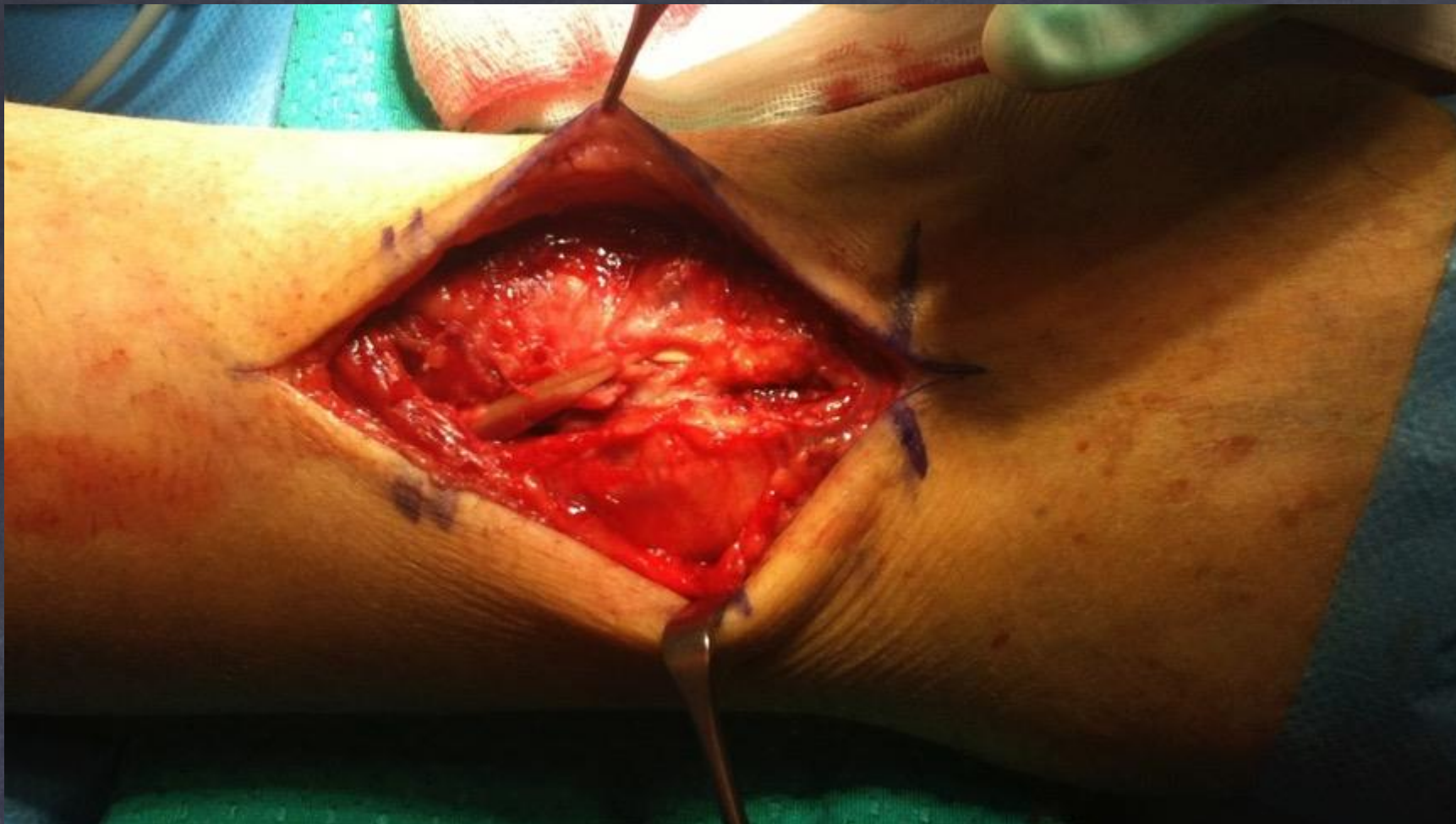


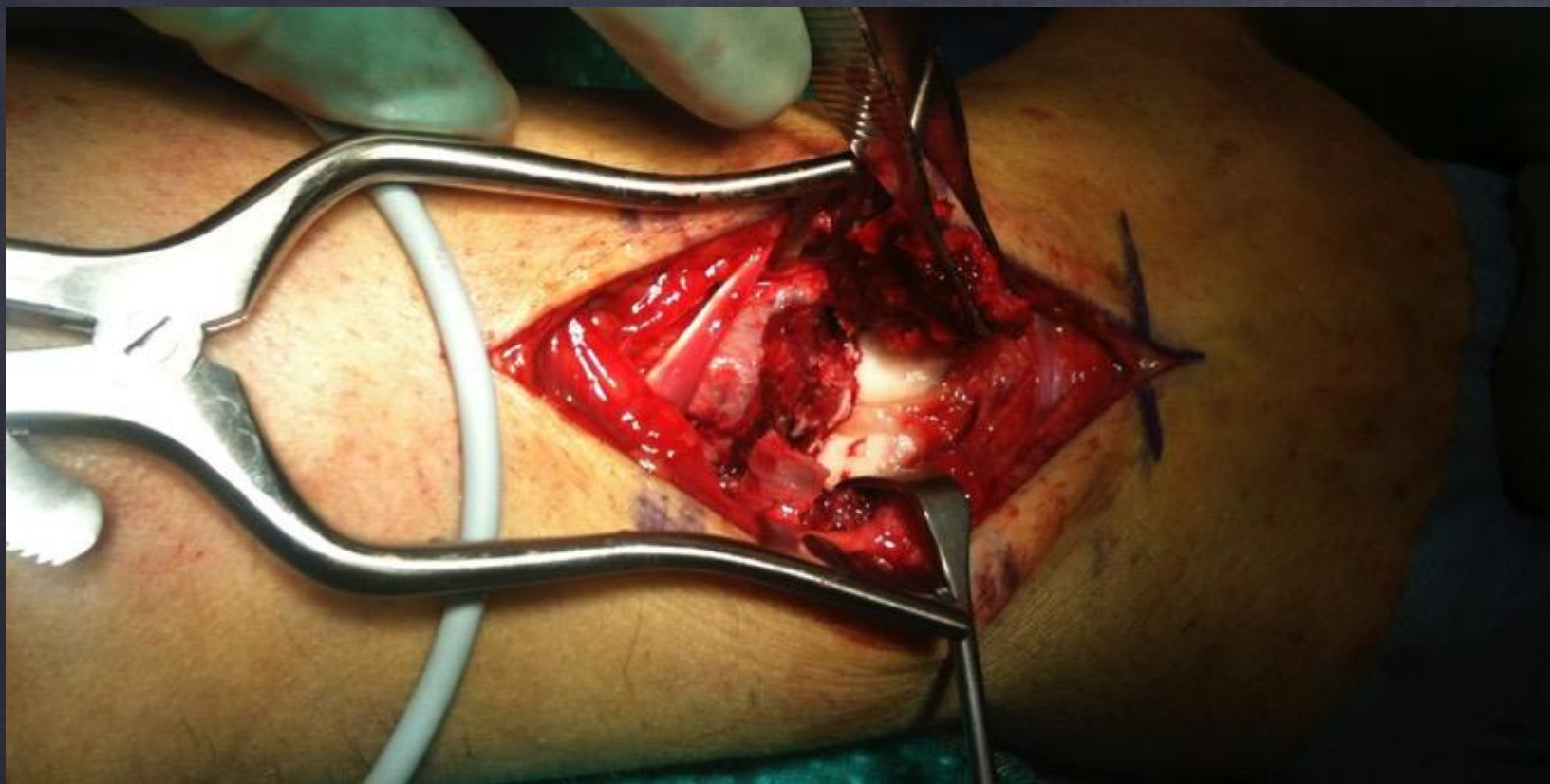
The dorsal approach

Case 1

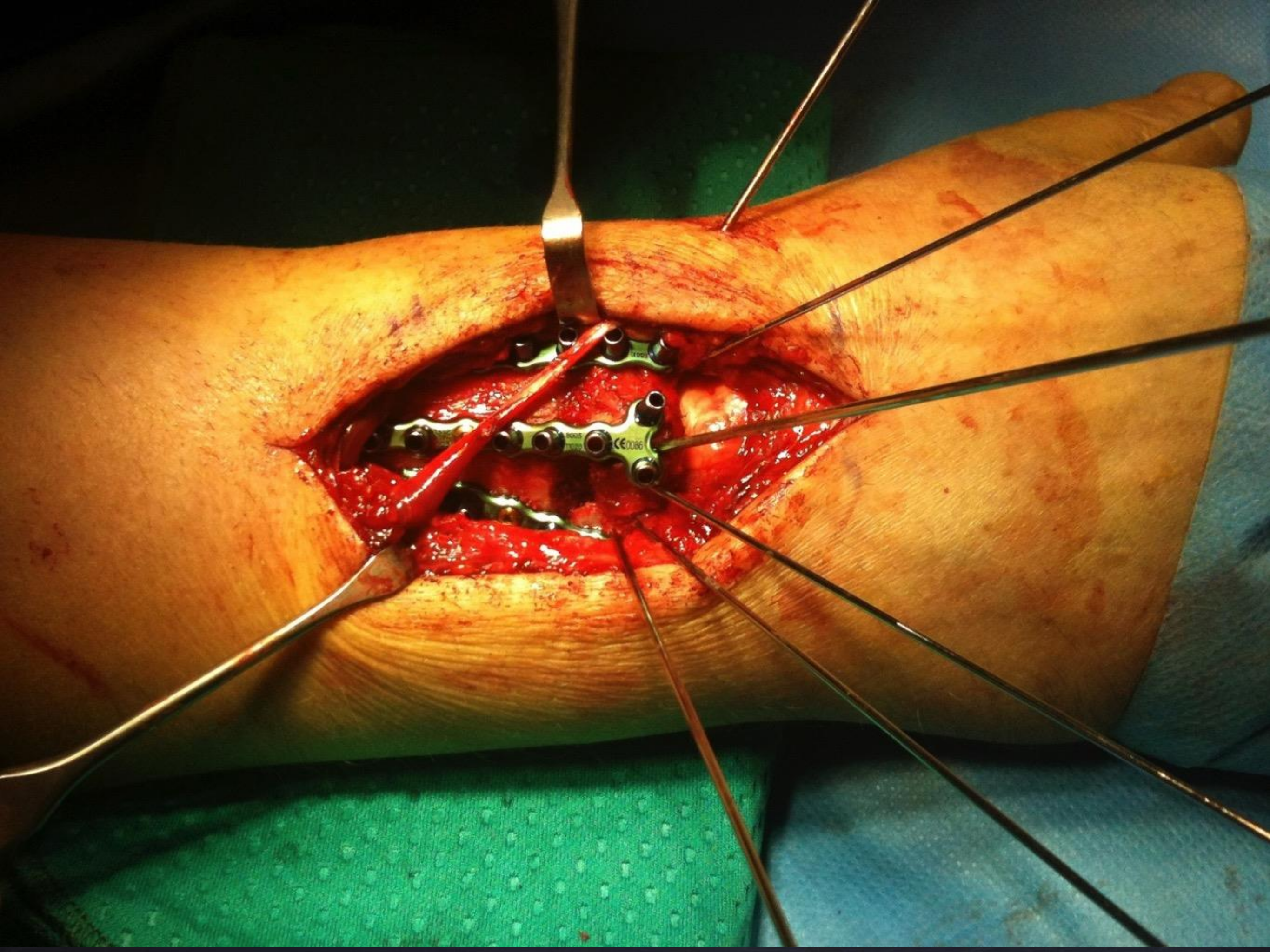
- 53 years male
- Fall 3 m from a ladder (high energy)
- Pain and deformity of right wrist, otherwise unharmed

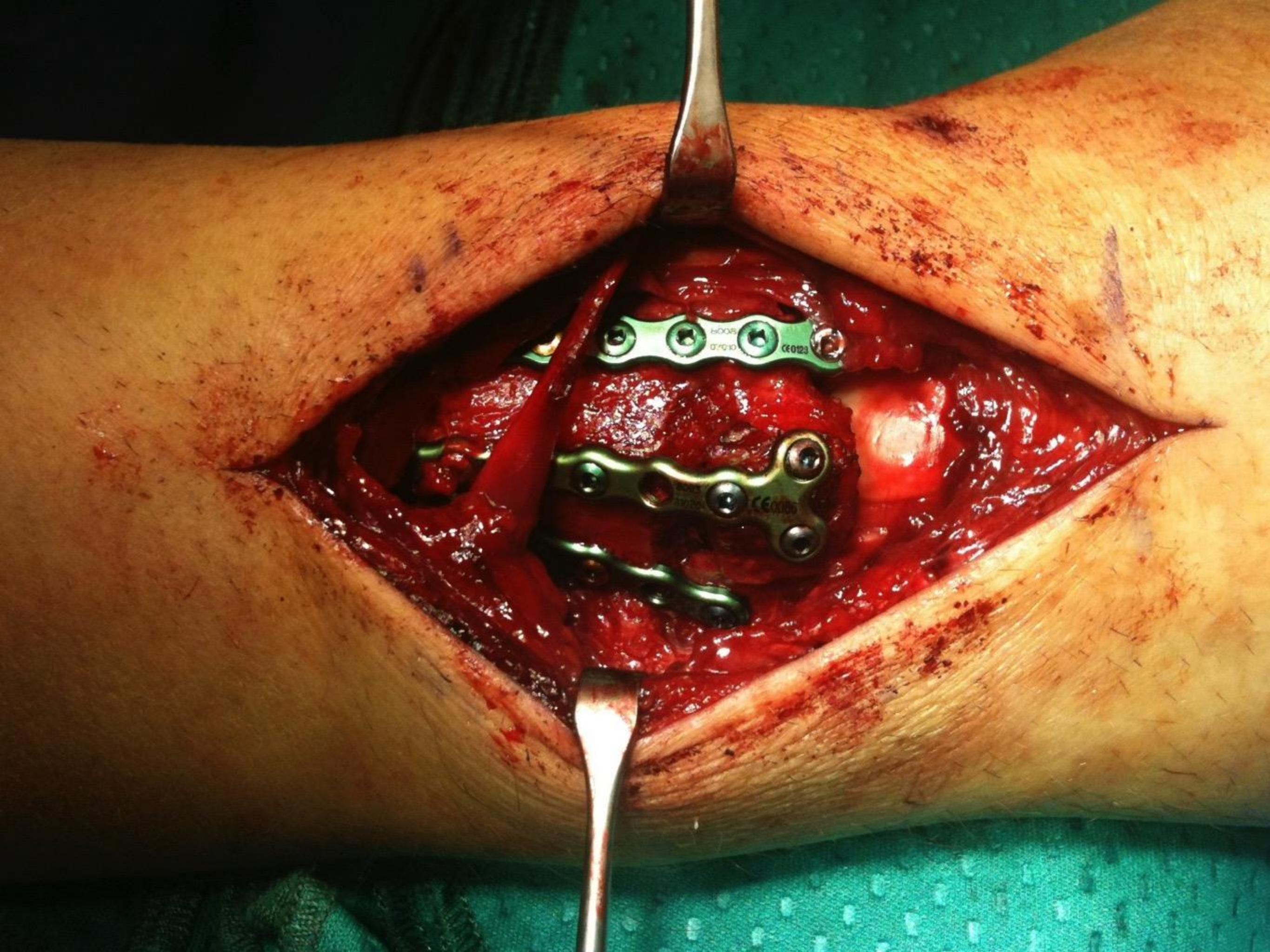


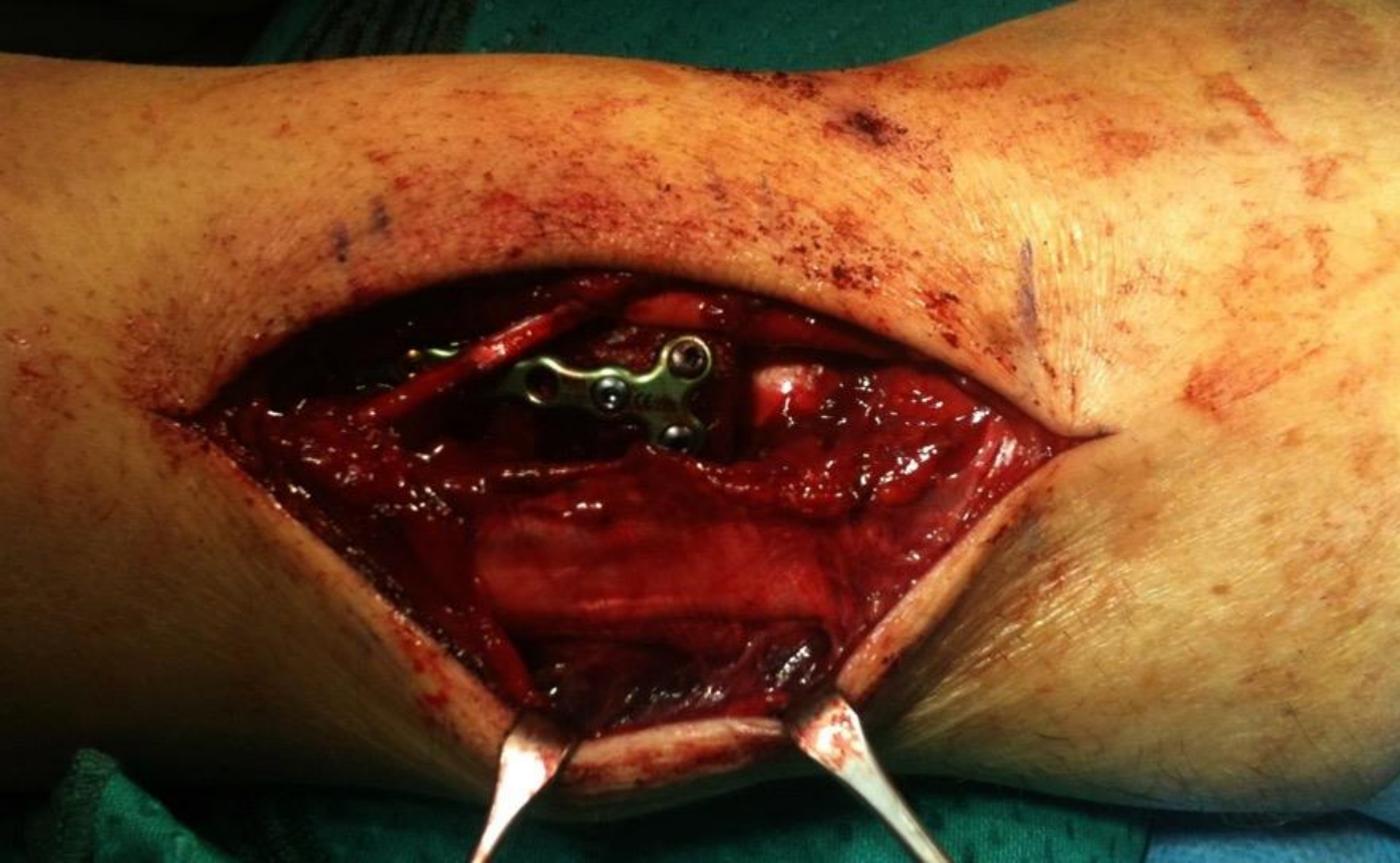












To do a good job you
need a proper approach



Combined volar and dorsal approach

Case

- 42 years male
- Fall into a hole (high energy)
- Pain and deformity of right wrist, otherwise unharmed

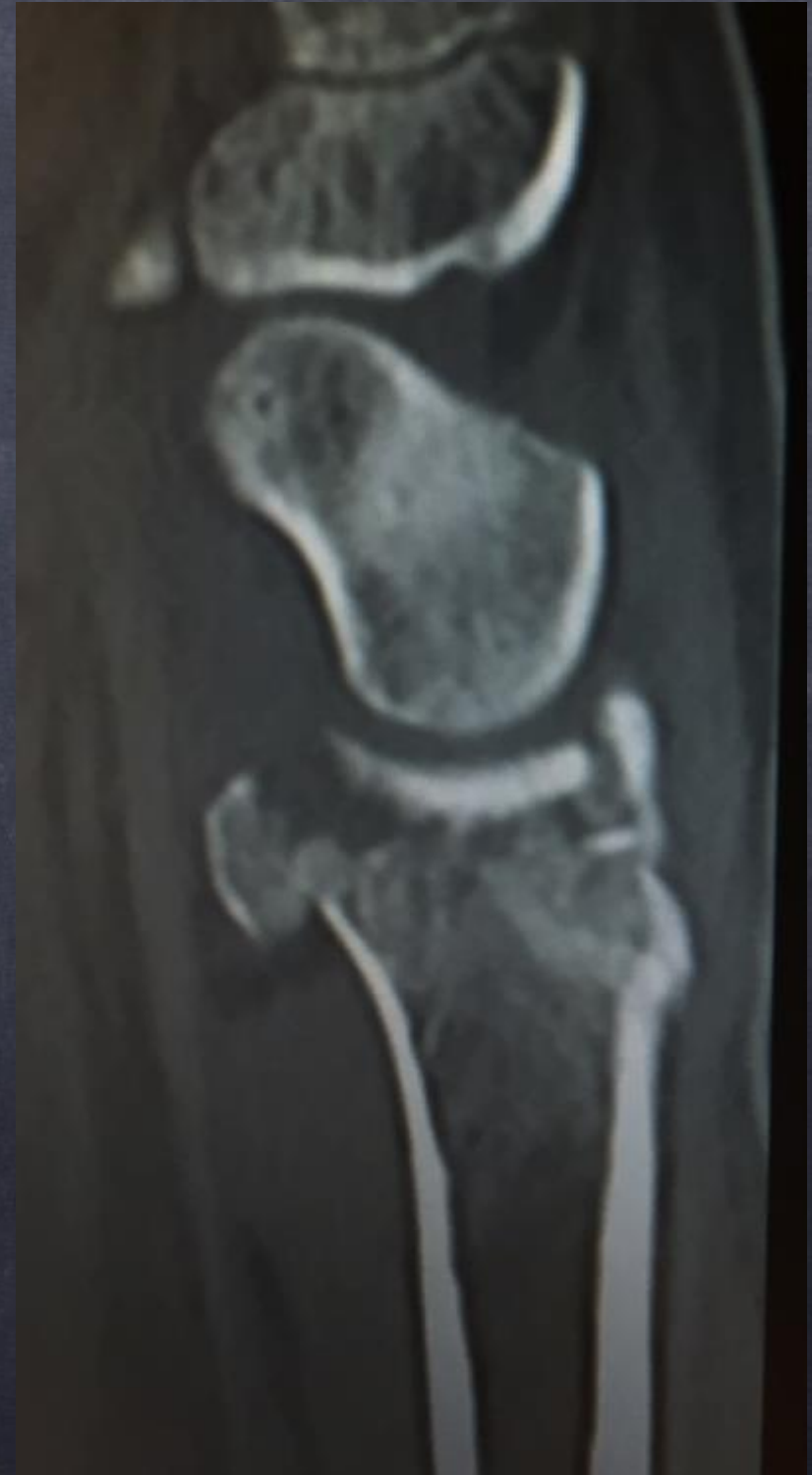
X-ray at day one



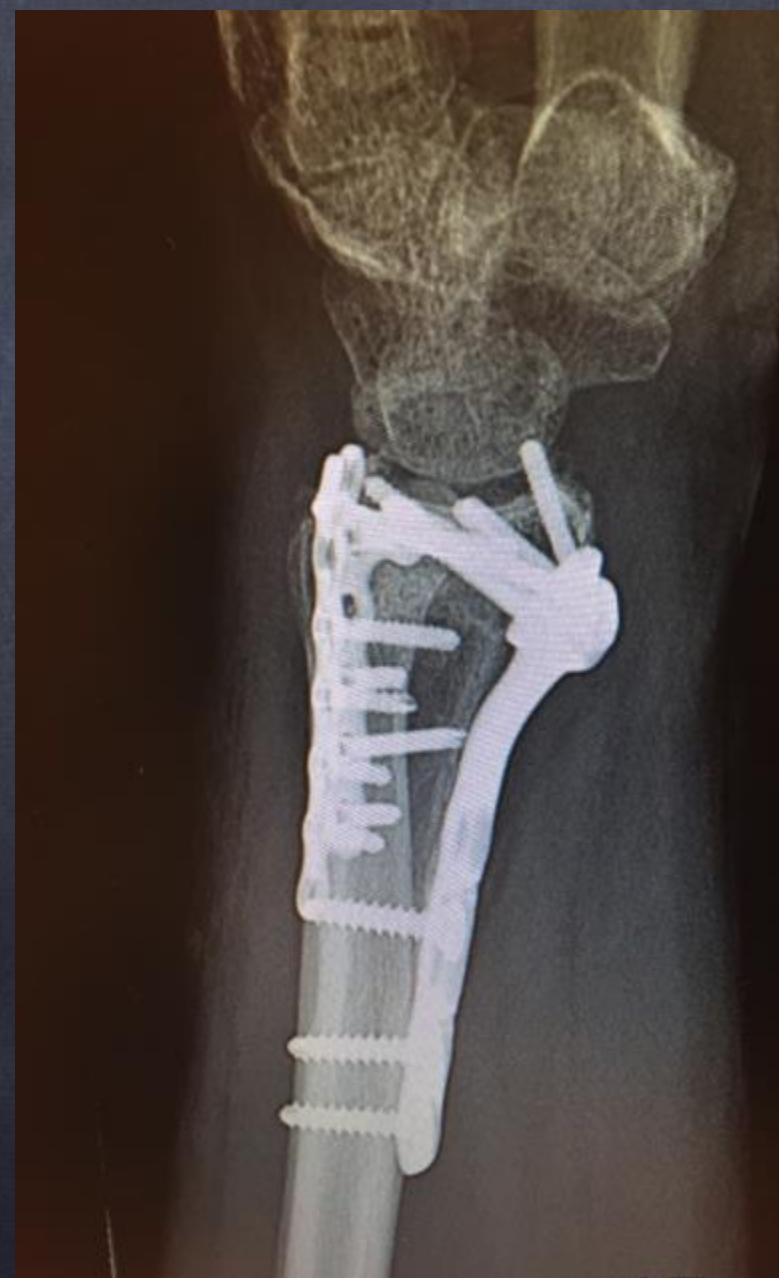
X-ray at day one



CT after reduction and PoP



12 weeks follow up



Woman born 1936, osteoporosis







Treatment of distal radius fractures



What's the evidence
for dorsal plating?



Treatment of distal radius fractures- the literature

Low profile Dorsal vs Volar plate locking

Comparable functional results

Comparable radiological results

No statistical differences in complication rate

Dorsal plate: Less tolerated?

Volar plate: more neuropathic problems?

Yu, Y.R., et al., J Hand Surg Am, 2011; Chou, Y.C., et al., J Hand Surg Am, 2011;
Matschke, S., et al., Injury, 2011. 42(4): p. 385-92.

What is ok to use , knowing the literature?

- **A fractures:** Volar anatomical fixed angle **plates**
Ex Fix and Wire and POP
- **B fractures:** **Plates**
- **C Fractures:** **C1 and C2:** Volar anatomical fixed angle **plates**
C3: Anatomical fixed angle **plates** or Ex Fix+pins

Conclusion

Both low profile volar, dorsal and fragment specific osteosyntheses give good results

All methods have complications

Probably surgeon preference and experience, and the nature of the fracture are more important than dorsal or volar approach

