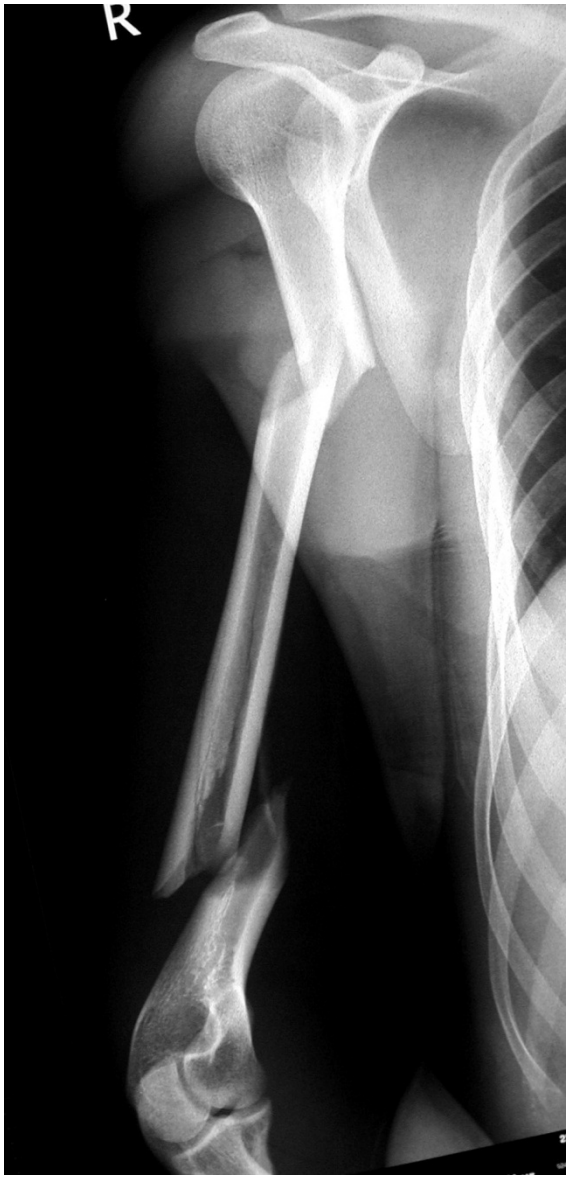
ИЛЬИНСКАЯ БОЛЬНИЦА

A. Volna

Complex humeral shaft fractures

15th – 17thApril, 2017
Tehran, Iran

How to fix this fracture?



- Absolute stability?
- Relative stability?

✓ Plating

✓ Nailing

✓ ExFix

ИЛЬИНСКАЯ БОЛЬНИЦА

Aims and Objectives

- Select fracture patterns appropriate for relative stability or absolute stability
- Identify surgical approaches
- Anticipate problems and complications

Operative vs. Conservative

*Never say **never**, but if you ever say never …*

Treatment options

*it is in **humerus shaft fractures…***

In many cases you can treat them conservatively !

ИЛЬИНСКАЯ БОЛЬНИЦА

SURGERY

absolute indications…

- polytrauma
- open fractures
- bilateral fractures
- pathologic fractures
- chain injury
- vascular lesion
- secondary radial nerve lesion
- non-union

ИЛЬИНСКАЯ БОЛЬНИЦА

SURGERY
relative indications…

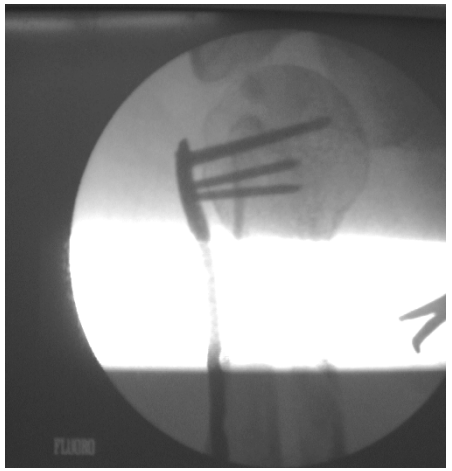
- ***unstable fractures***
- long proximal spiral fractures
- brachial plexus lesion
- <u>primary</u> radial nerve lesion
- elderly patient
- Parkinson disease
- obesity
- C_2H_5OH

ИЛЬИНСКАЯ БОЛЬНИЦА

Absolute or relative stability?

biological price of anatomical reduction with interfragmentary compression of each fragment is too high

Case, 26 yo, male polytrauma patient

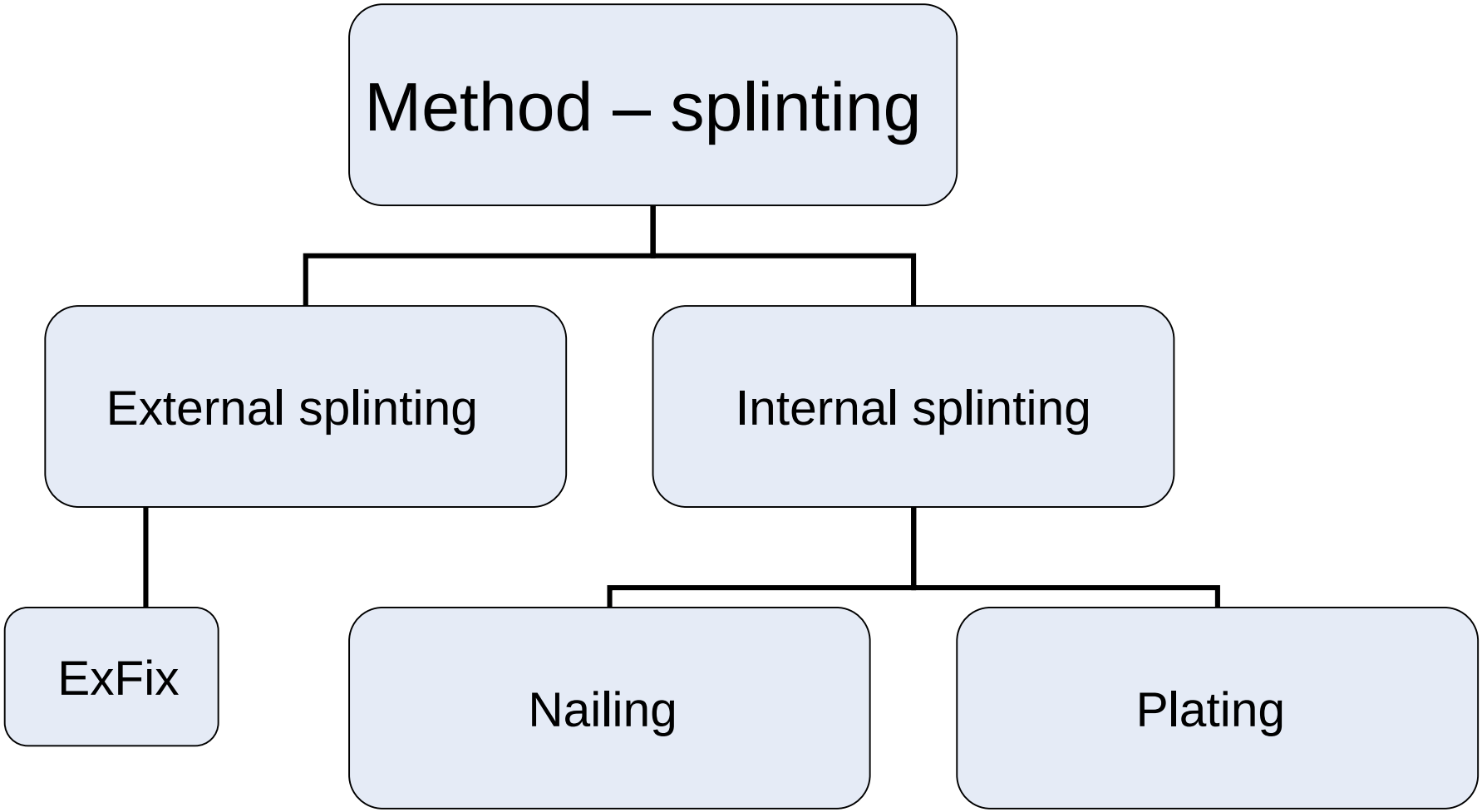


ИЛЬИНСКАЯ БОЛЬНИЦА

Case, 26 yo, male polytrauma patient

ИЛЬИНСКАЯ БОЛЬНИЦА

Relative stability



ИЛЬИНСКАЯ БОЛЬНИЦА

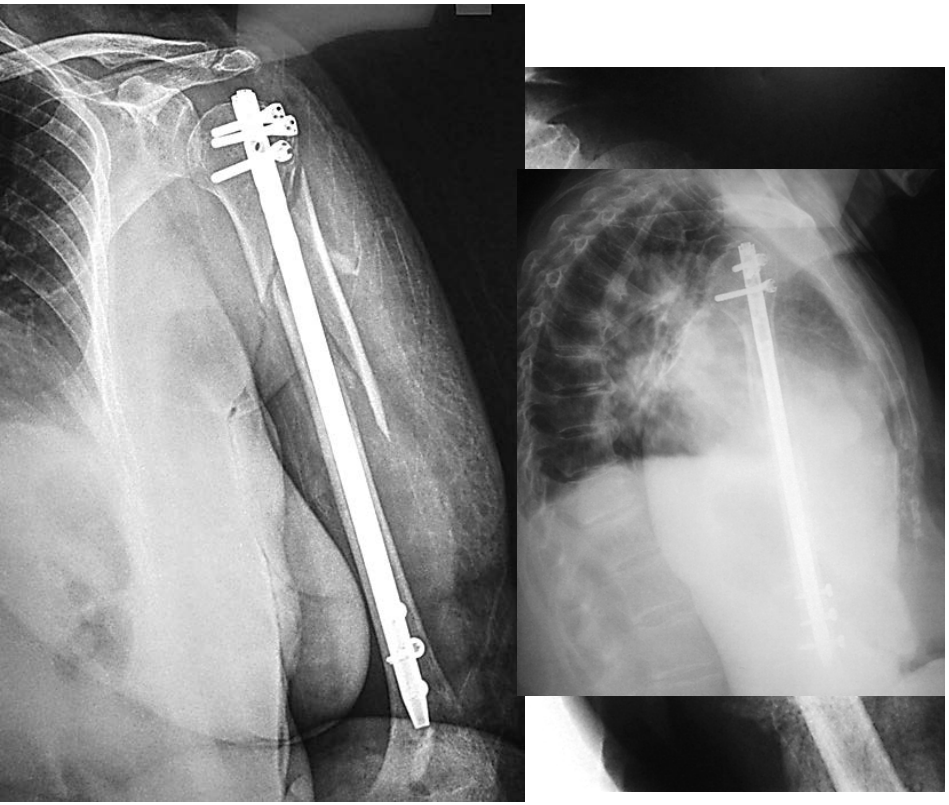
Intramedullary nailing vs plating

- 1. Bhandari M, Devereaux PJ, McKee MD, Schemitsch EH
  Compression plating versus intramedullary nailing of humeral shaft fractures--a meta-analysis Acta Orthop, 2006:(77):279-84 **No difference—ASES scores, VAS pain scores, strength/ROM, return to activity**

- 2. Chapman JR, Henley MB, Agel J, Benca PJ
  Randomized prospective study of humeral shaft fracture fixation: intramedullary nails versus plates J Orthop Trauma, 2000:(14):162-6
  Significant decrease of elbow ROM in the plate group

- 3. Flinkkila T, Hyvonen P, Siira P, Hamalainen M
  Recovery of shoulder joint function after humeral shaft fracture: a comparative study between antegrade intramedullary nailing and plate fixation
  Arch Orthop Trauma Surg, 2004:(124):537-41 **No difference in 6 ms**

Intramedullary splinting



- Antegrade approach
- There are no routine indications for retrograde approach
- Current nail generation “X-mas Tree Nails” (long version)

ИЛЬИНСКАЯ БОЛЬНИЦА

Extramedullary splinting (plating)

- Surgical approach?

- Plate function – bridging

- Plate design?

Extramedullary splinting (plating). Minimal access surgery (antero-lateral approach)

1997

ИЛЬИНСКАЯ БОЛЬНИЦА

Extramedullary splinting (plating). Minimal access surgery (antero-lateral approach)

- **Indications:**

✓ Proximal and midshaft complex fractures (proximal two-third of humerus)

- **Disadvantages:**

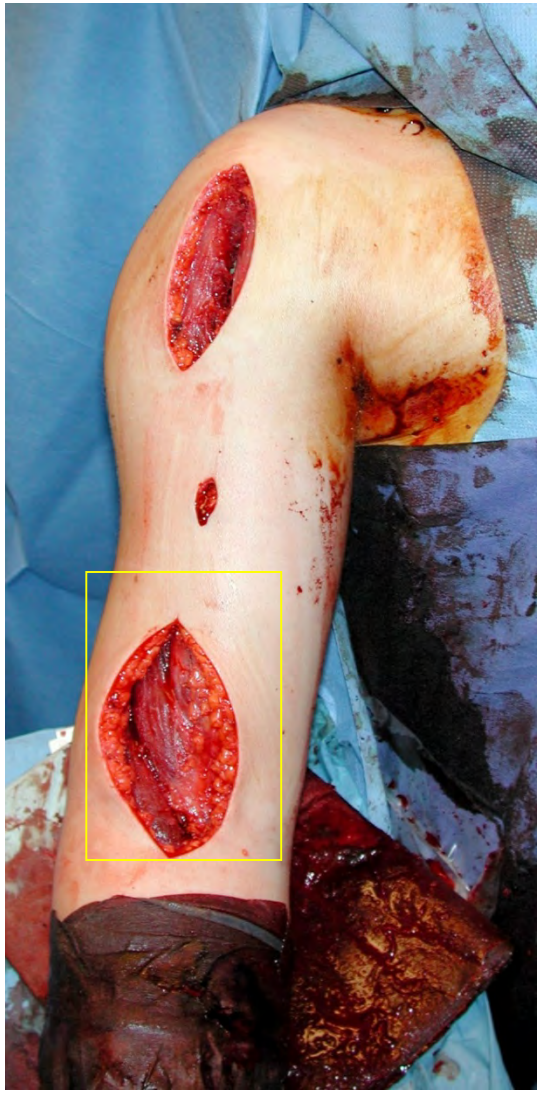
✓ Difficult plate pre-contouring

✓ Difficulties with radial nerve protection

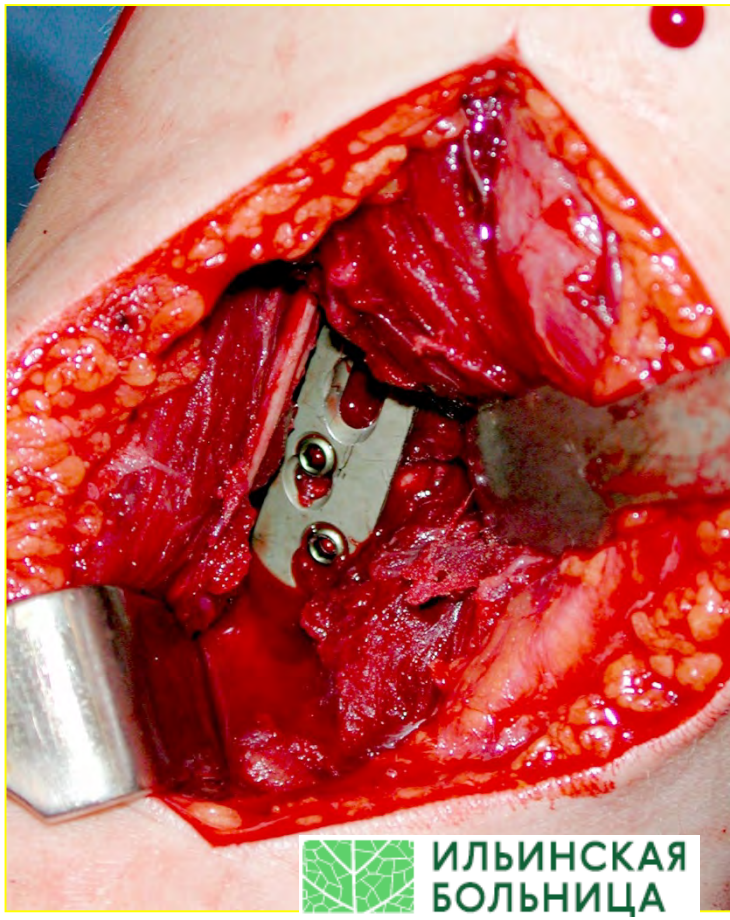
Extramedullary splinting (plating). **Minimal access surgery (anterior approach)**

ИЛЬИНСКАЯ БОЛЬНИЦА

Extramedullary splinting (plating). Minimal access surgery (anterior approach)



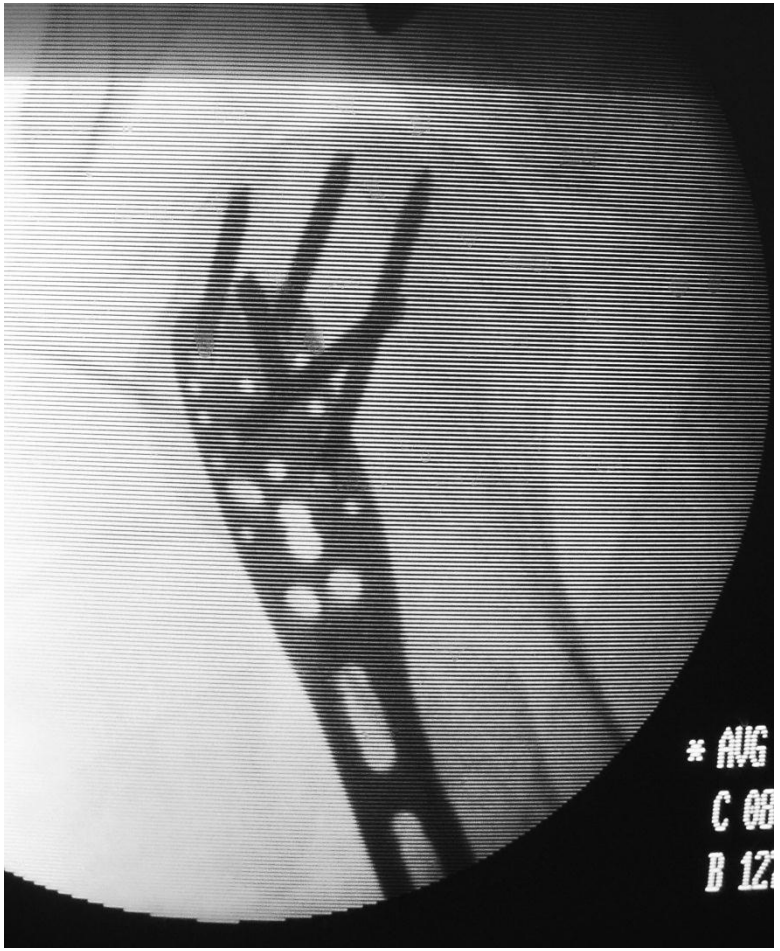
Credit M. Wagner



Extramedullary splinting (plating). **Minimal access surgery (anterior approach)**

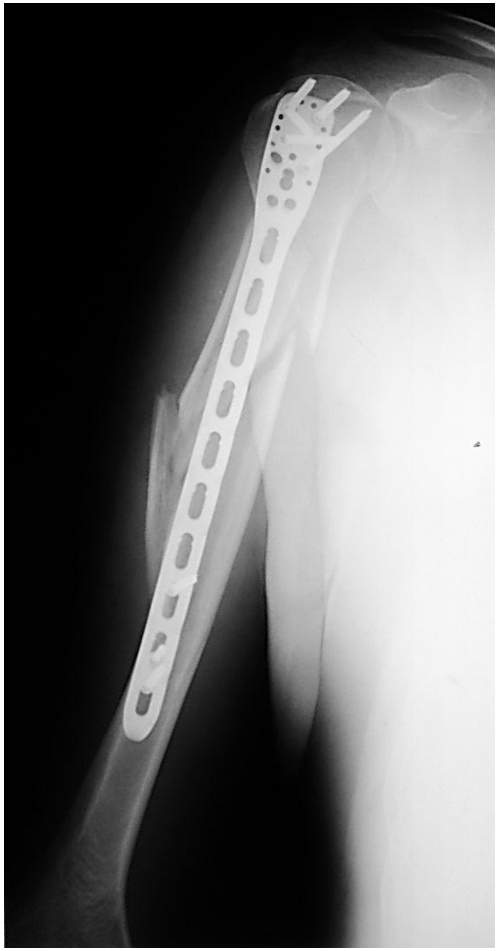
ИЛЬИНСКАЯ БОЛЬНИЦА

Extramedullary splinting (plating). Minimal access surgery (anterior approach)



ИЛЬИНСКАЯ БОЛЬНИЦА

Extramedullary splinting (plating). **Minimal access surgery (anterior approach)**



ИЛЬИНСКАЯ БОЛЬНИЦА

Extramedullary splinting (plating). **Minimal access surgery (anterior approach)**

ИЛЬИНСКАЯ БОЛЬНИЦА

Extramedullary splinting (plating). **Minimal access surgery (anterior approach)**

ИЛЬИНСКАЯ БОЛЬНИЦА

Extramedullary splinting (plating). **Minimal access surgery (anterior approach)**

ИЛЬИНСКАЯ БОЛЬНИЦА

Extramedullary splinting (plating). Minimal access surgery (anterior approach)

- **Indications:**

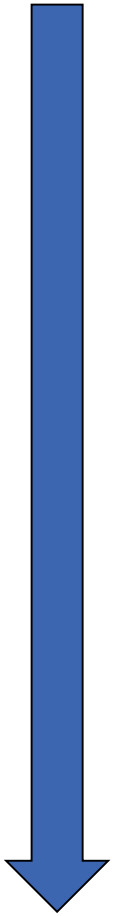
✓ Complex humeral shaft fractures

- **Disadvantages:**

✓ Difficulties with radial nerve protection

ИЛЬИНСКАЯ БОЛЬНИЦА

Extramedullary splinting (plating). Minimal access surgery (anterior approach)

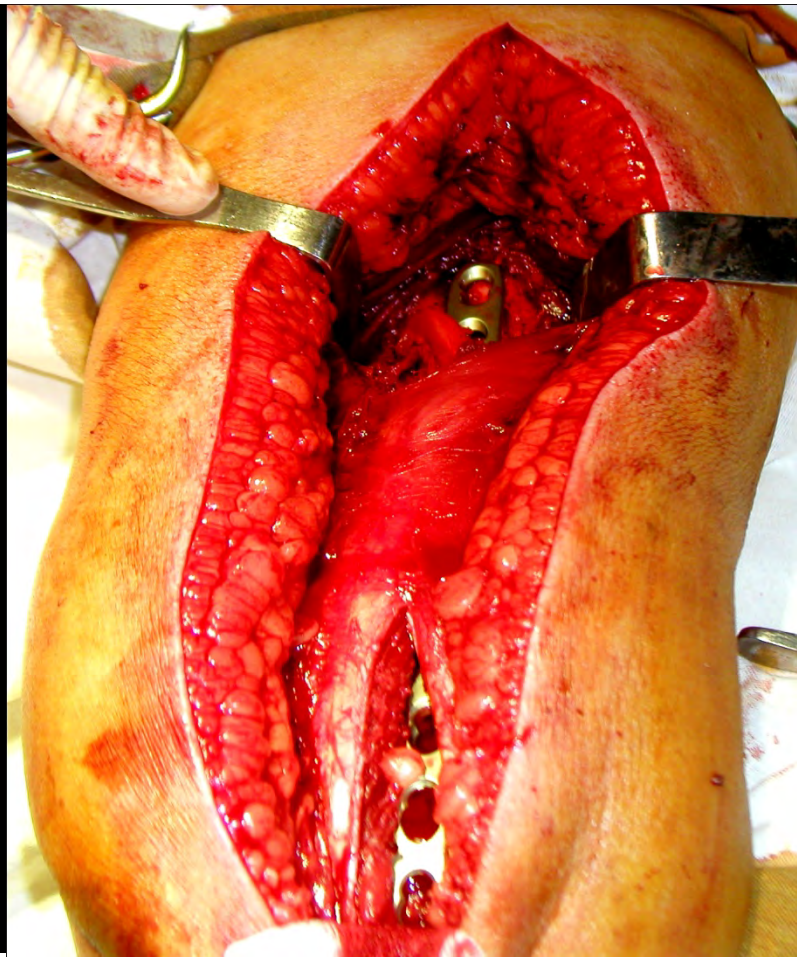


ИЛЬИНСКАЯ БОЛЬНИЦА

Posterior. Bio-logical approach

ИЛЬИНСКАЯ БОЛЬНИЦА

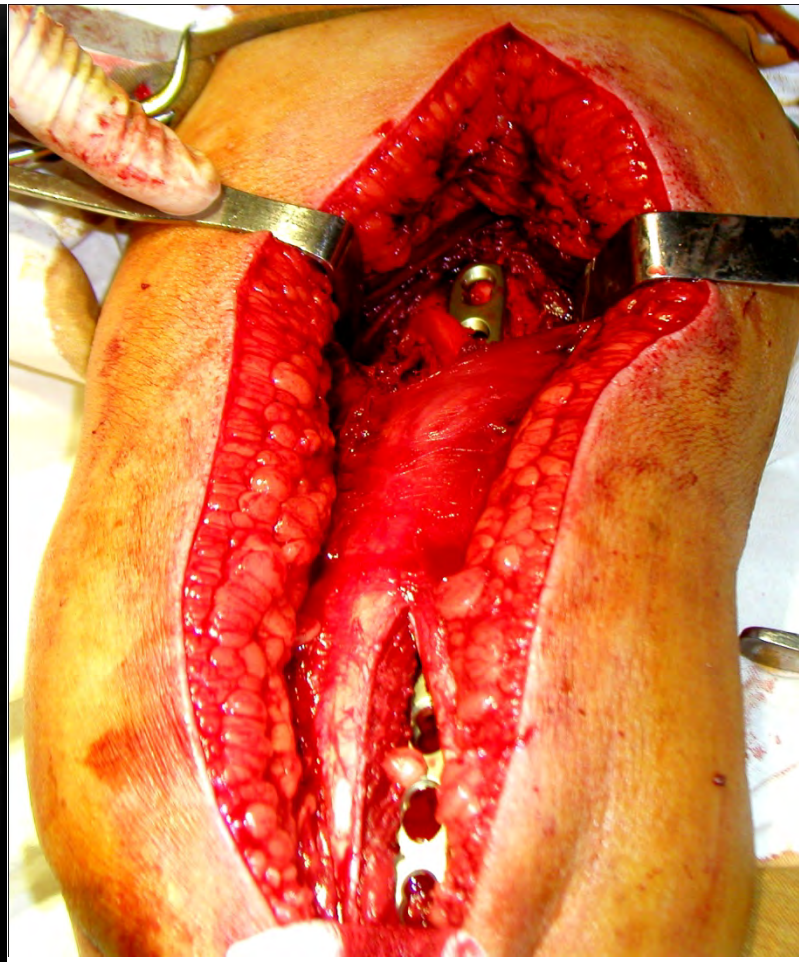
Posterior. Bio-logical approach



Deeper to lateral triceps septum between brachialis/radiobrachialis

ИЛЬИНСКАЯ БОЛЬНИЦА

Posterior. Bio-logical approach



ИЛЬИНСКАЯ БОЛЬНИЦА

Posterior. Bio-logical approach

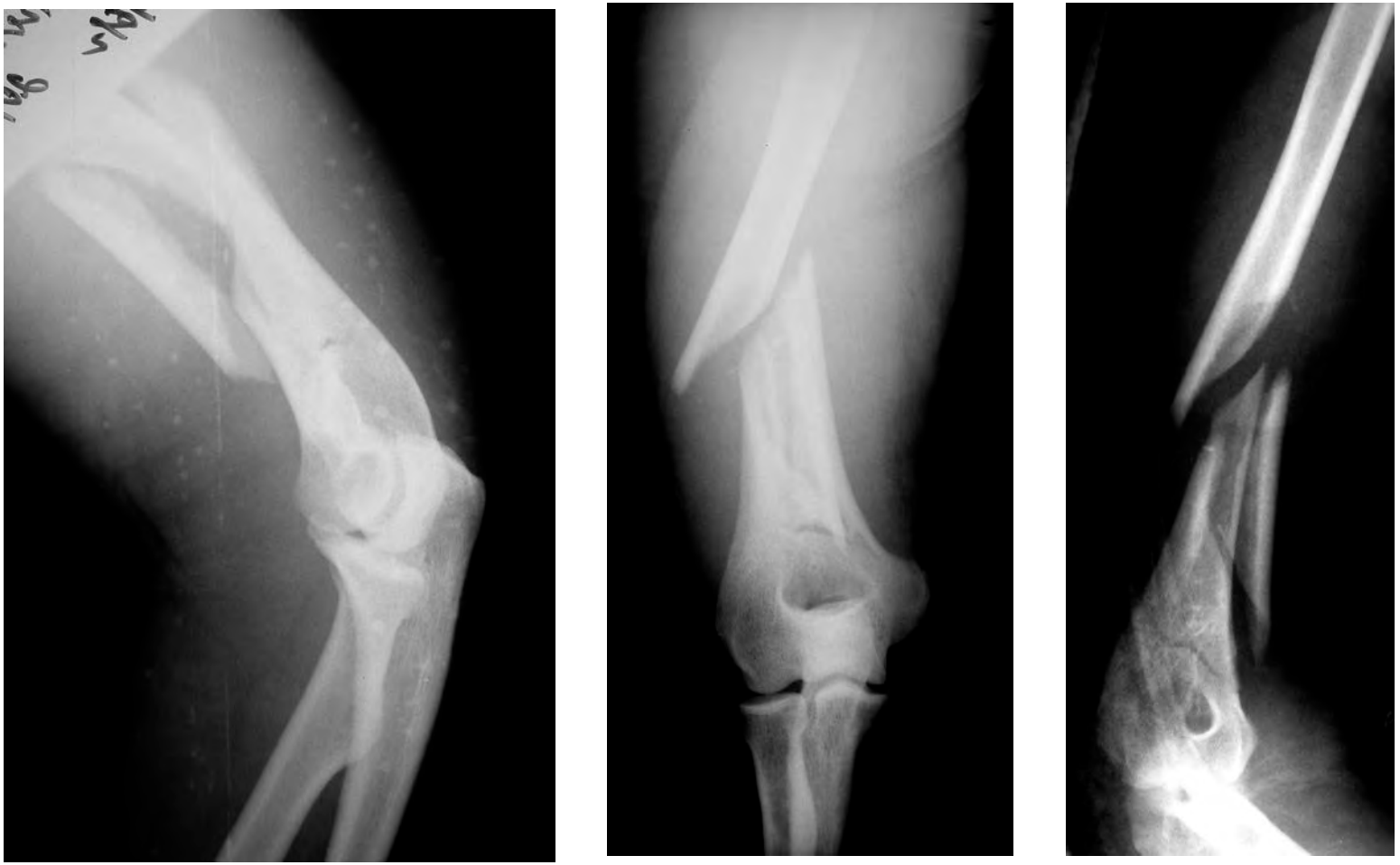
- **Indications:**

✓ Distal and midshaft complex fractures (distal half of humerus)

- **Disadvantages:**

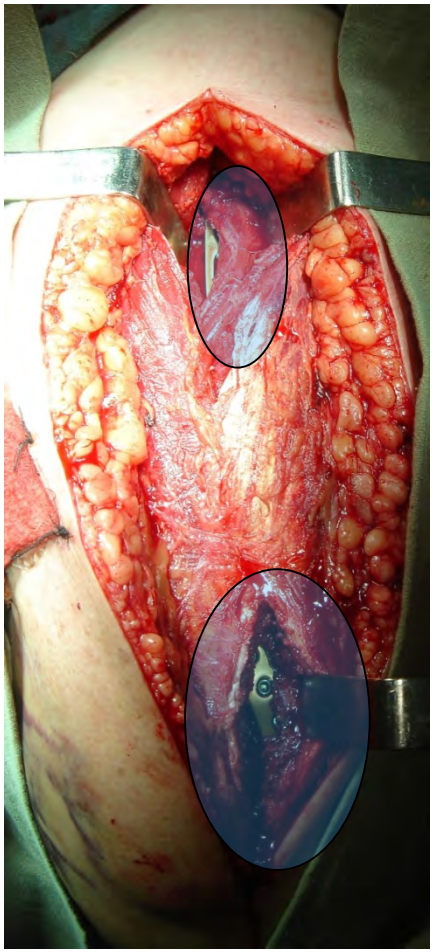
✓ Long skin incision

Posterior. Bio-logical approach



ИЛЬИНСКАЯ БОЛЬНИЦА

Posterior. Bio-logical approach



ИЛЬИНСКАЯ БОЛЬНИЦА

Posterior. Bio-logical approach

ИЛЬИНСКАЯ БОЛЬНИЦА

Hospital N31, 2010 – 2011 :

METHOD:

- **Internal splinting of complex humerus fractures (29 nailing, 18 plating – 9 anterior, 9 posterior app)**

MATERIAL:

- **47 patients, 47 fractures (11 women, 36 men)**
- **mean follow-up 24 months for 32 patients**

RESULTS:

- **5 cases of RNP after plating, spontaneus recovering**
- **NO nonunion, 11 cases of delayd union (8 IMN, 3 pl)**

CONCLUSIONS

There is no difference in long term outcomes IMN vs Plating

ИЛЬИНСКАЯ БОЛЬНИЦА

М., 21

ИЛЬИНСКАЯ БОЛЬНИЦА

М., 21

ИЛЬИНСКАЯ БОЛЬНИЦА

М., 21

ИЛЬИНСКАЯ БОЛЬНИЦА

M., 21, 1m

ИЛЬИНСКАЯ БОЛЬНИЦА

M., 21, 2ms

ИЛЬИНСКАЯ БОЛЬНИЦА

M., 21, 5ms

ИЛЬИНСКАЯ БОЛЬНИЦА

M., 21, 5ms

ИЛЬИНСКАЯ БОЛЬНИЦА

M., 21, 5ms

ИЛЬИНСКАЯ БОЛЬНИЦА

Summary

- The best way for surgical treatment of complex humerus fractures is achievement of relative stability with splinting fracture zone

- There is no difference between nailing and plating in long term outcomes in case of complex humerus fractures.

- Different surgical approaches can be used to obtain functional reduction and fixation depending on the location of the fracture.

- Mini-invasive anterior or bio-logical posterior surgical approaches are preferable for complex fractures (using plates).

Take-home message

Splinting – the best way to achieve relative stability for complex Humeral shaft fractures. It requires:

- preservation of blood supply
- acceptable reduction (Length, Rotation, Alignment)
- controlled movement