Clinical indications for locked plating—when where and how?

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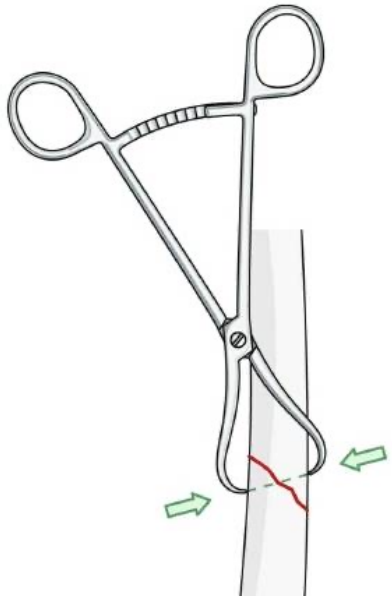
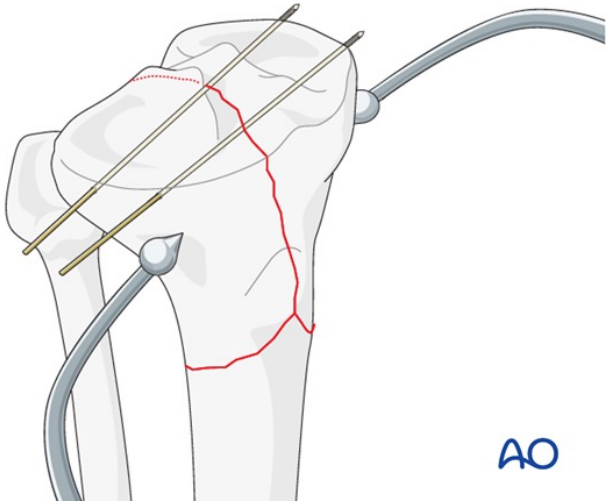
AO Trauma Advanced Principles Course

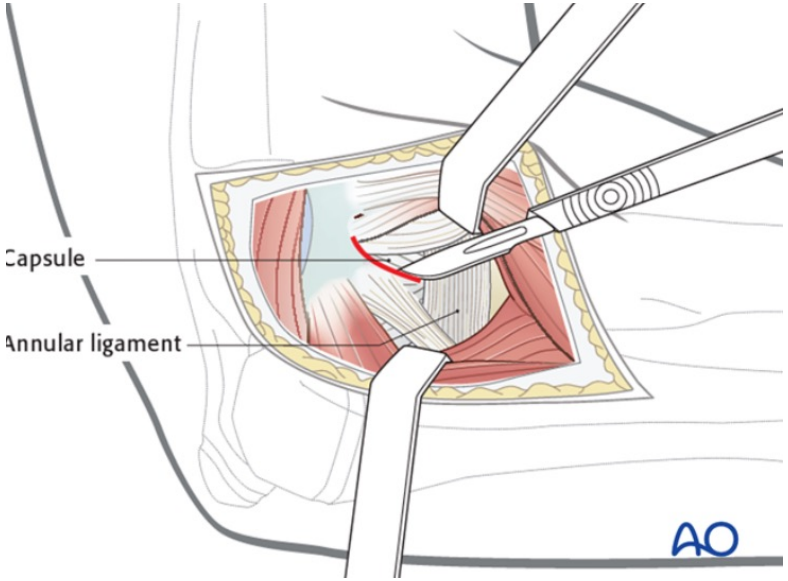
Clinical indications for locked plating

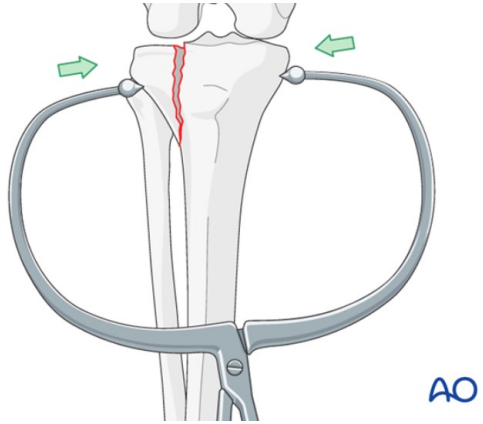
- Osteopenia/osteoporosis
- Metaphyseal comminution or short metaphyseal fragment
  - Anatomical plates
- Periprosthetic fractures
- Special circumstance
  - Early unprotected weightbearing, eg, a noncompliant patient
  - MIPO

Basic Principles still apply – reduce the fracture !!









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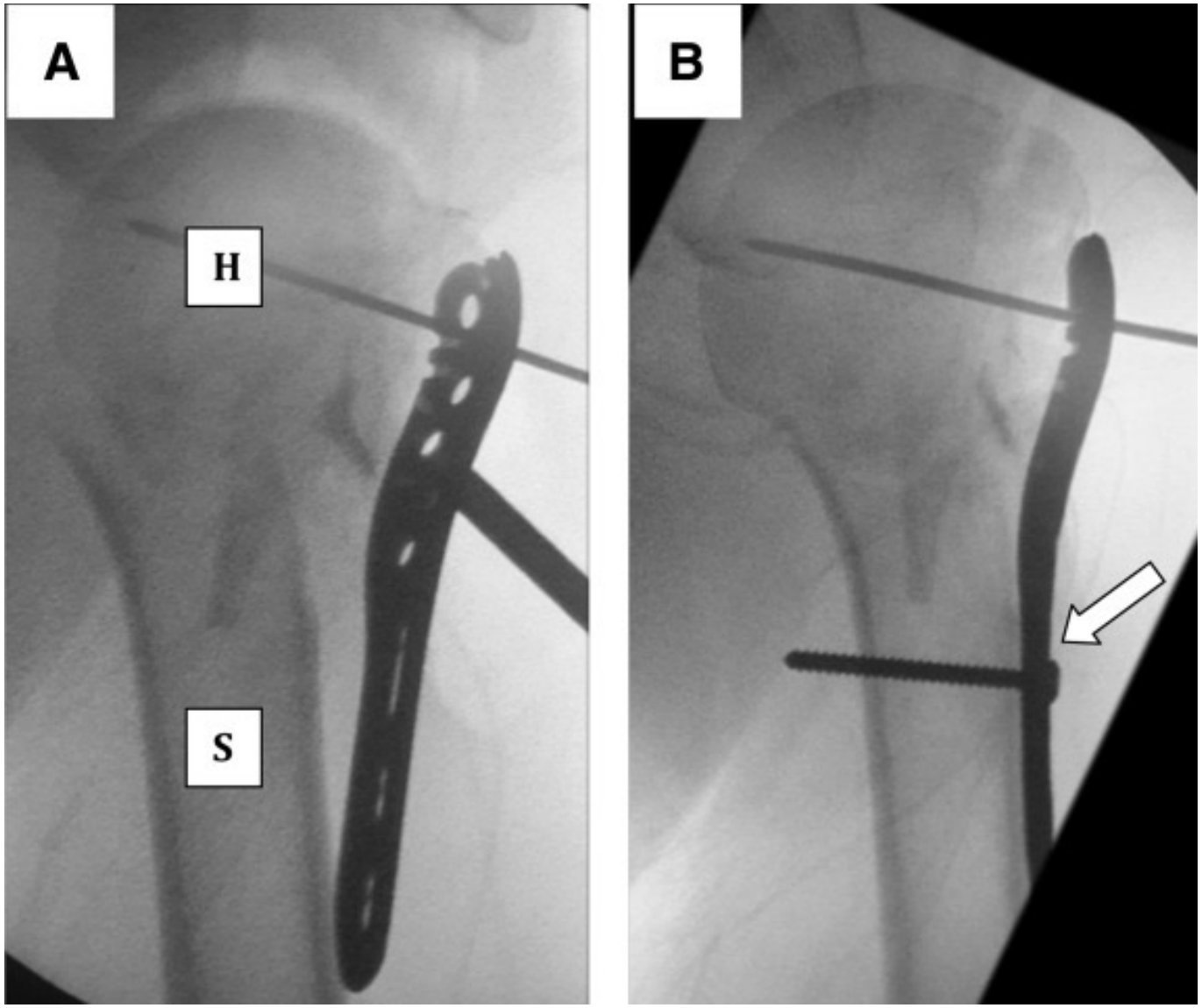
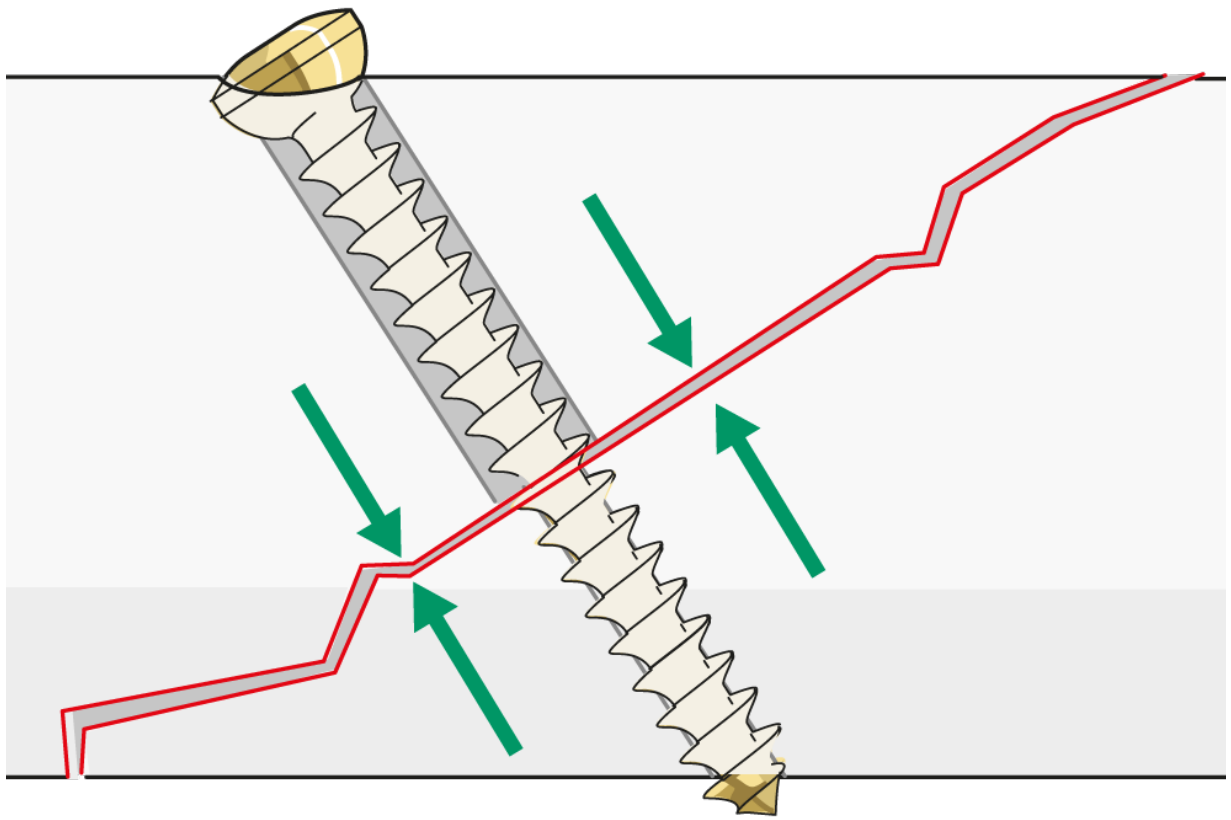
Fracture reduction with locking plate

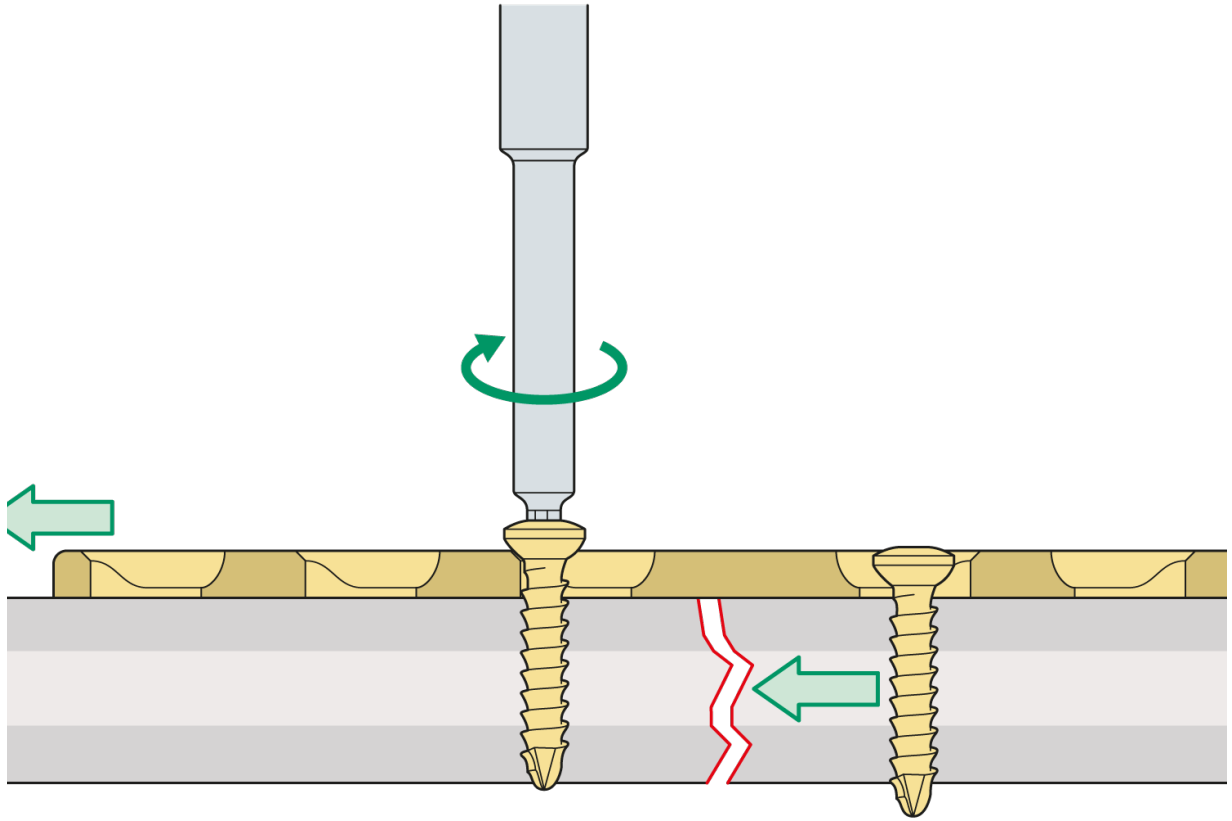


Reduction - Pull-device

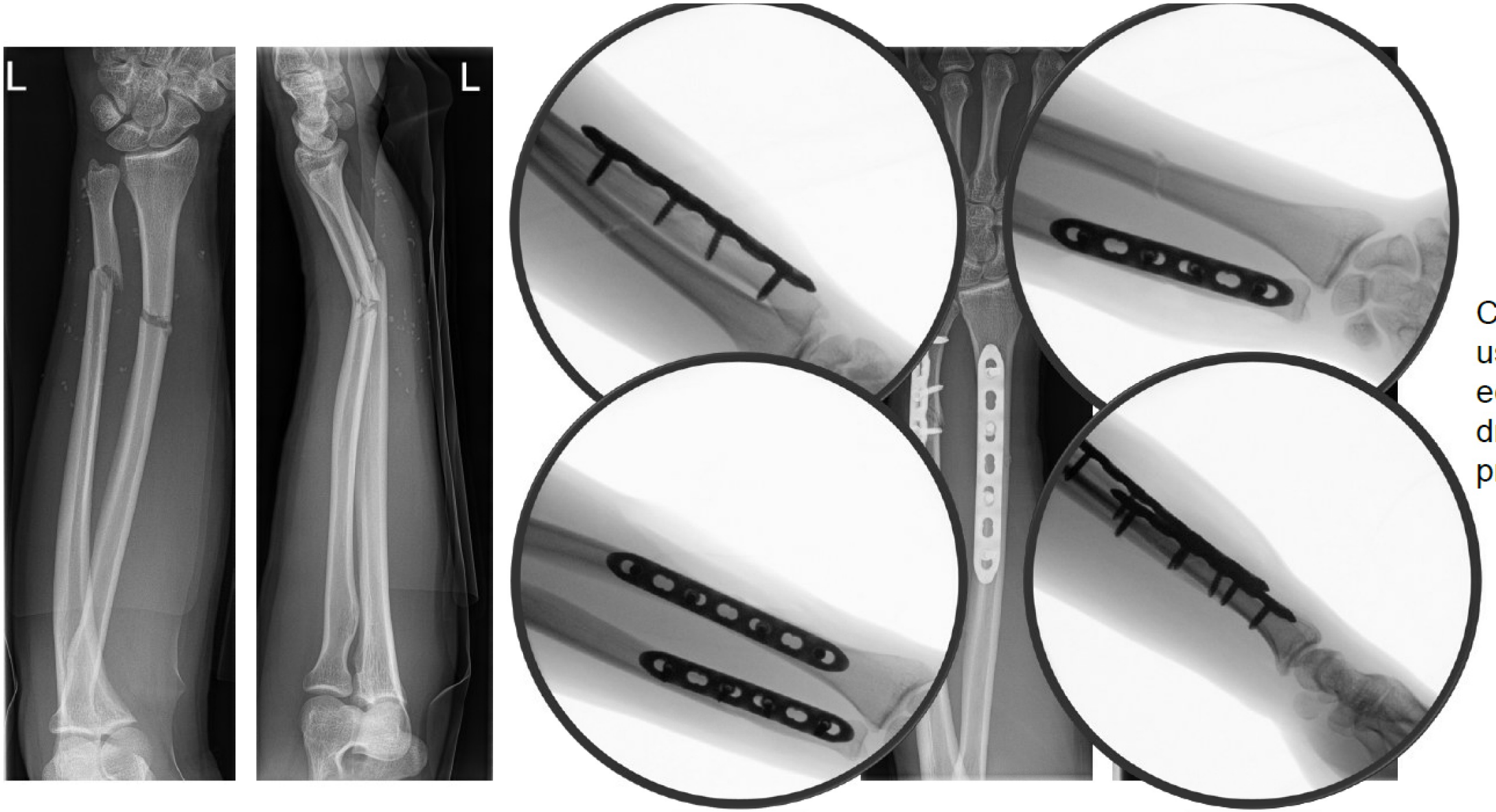
Reduction - Pull-device

Basic Principles still apply – lag before lock



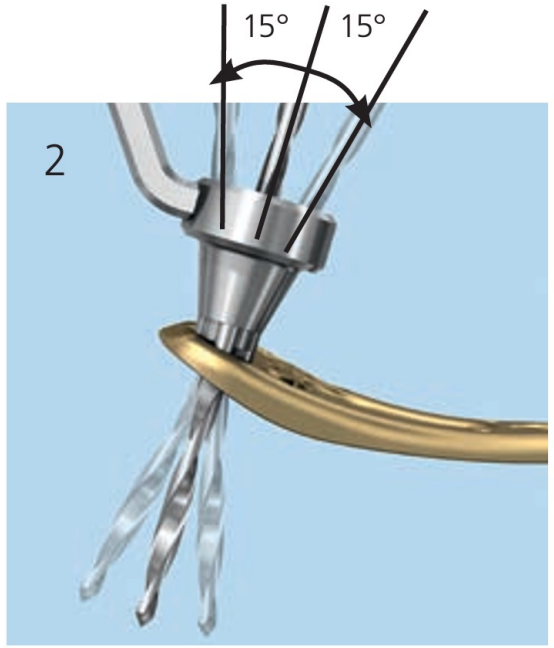


Basic Principles still apply



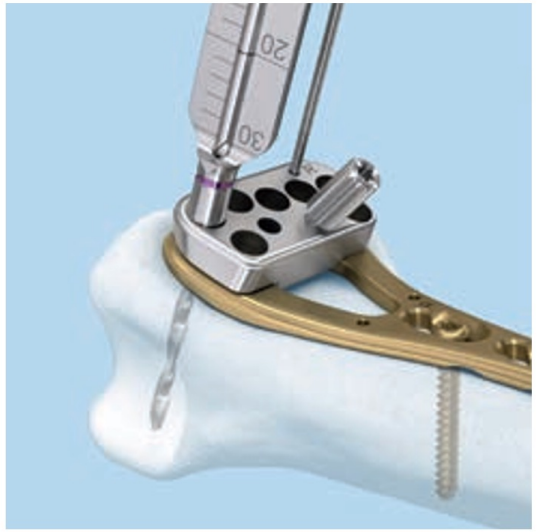
Compression using eccentric drilling and pre-bending

Fixed angle – variable angle

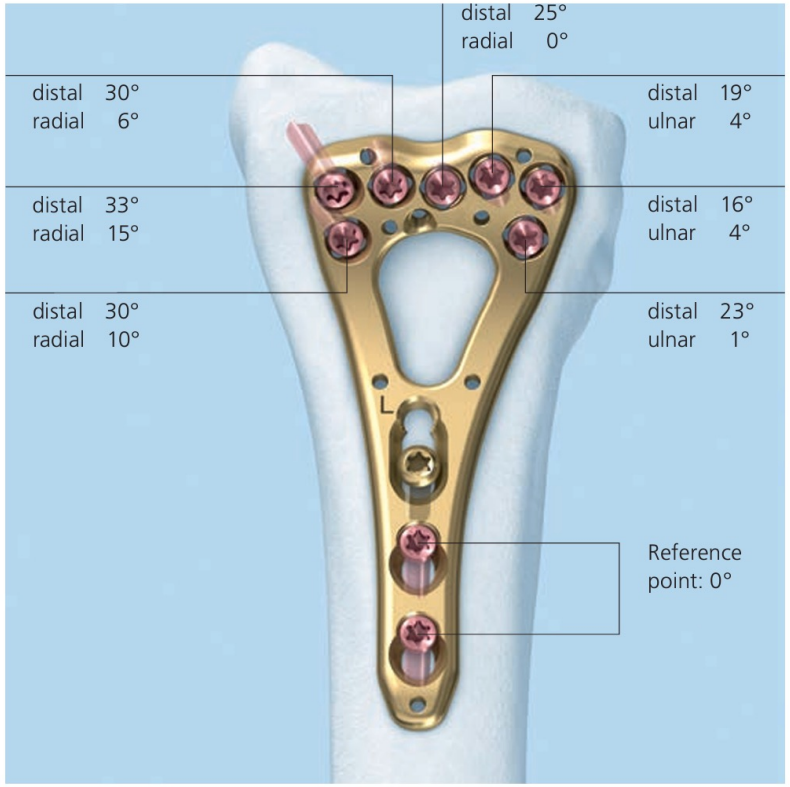


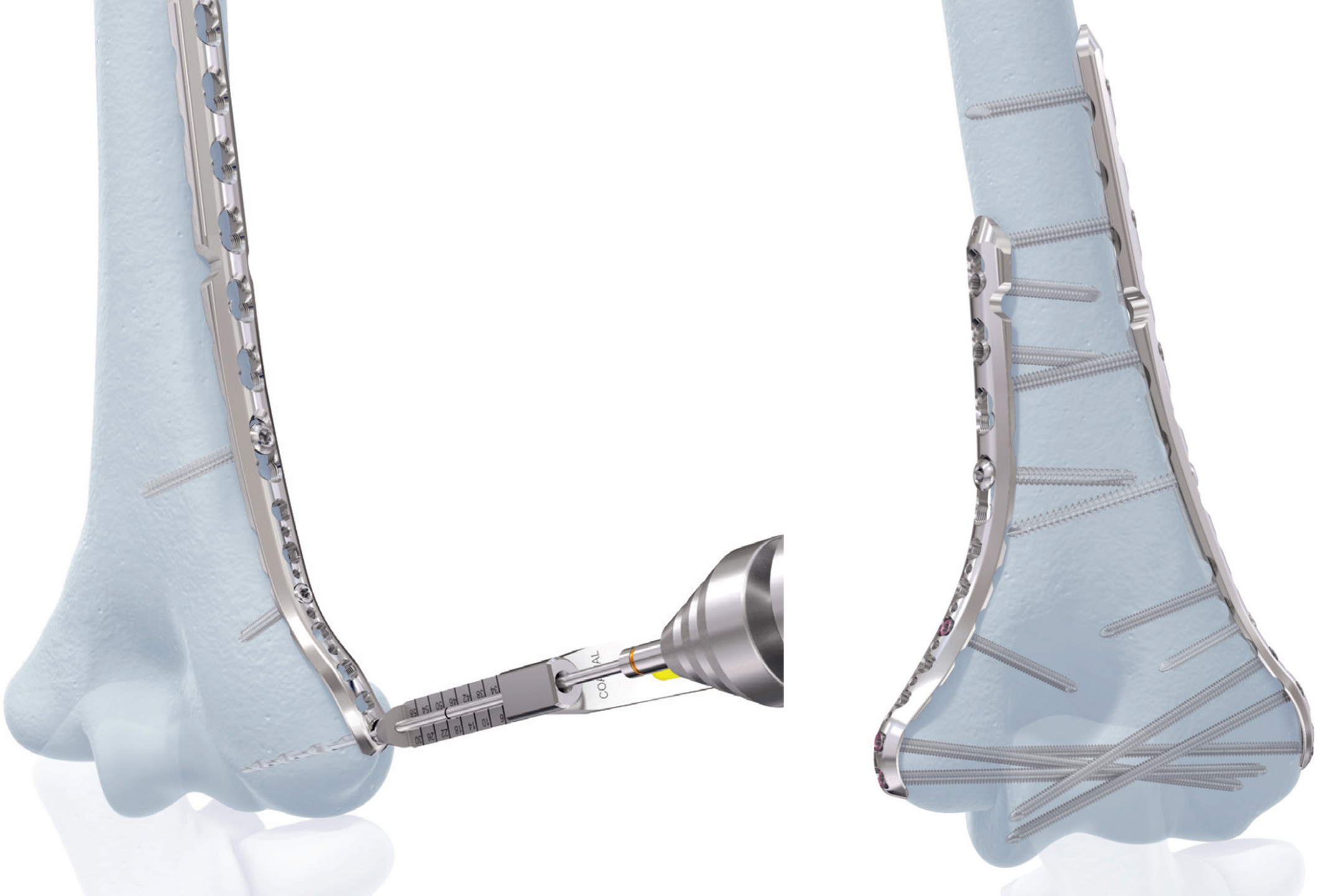
Use fixed angle/guiding block if possible

Use of fixed-angle end of VA-LCP drill sleeve

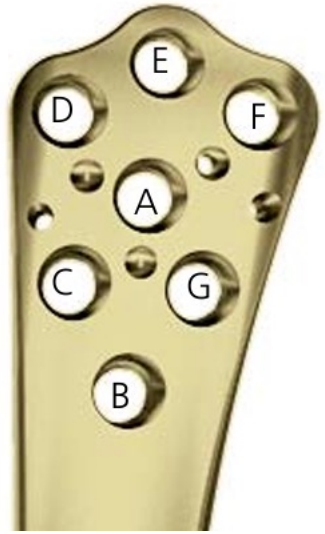


Optimal positioning of all screws





Locking screws in femur condyle LCP-DF

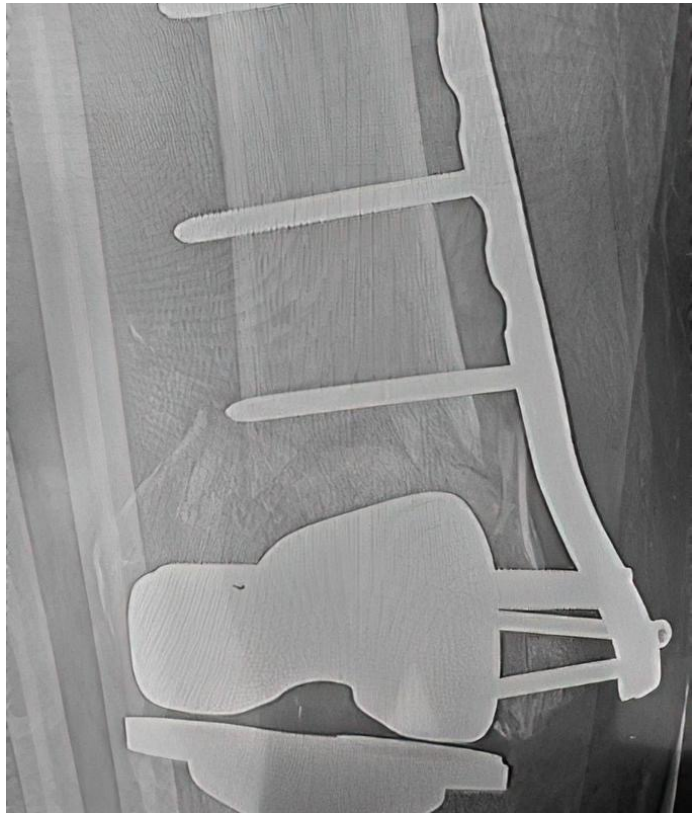


Select condylar screw lengths (A–G) from the chart below.

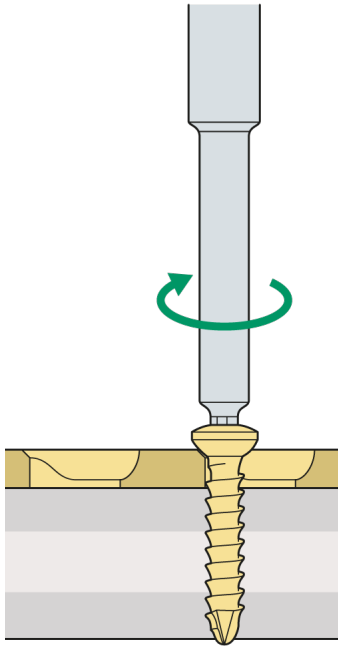
Width of condyles	**60 mm–80 mm**	**81 mm–87 mm**	**88 mm–95 mm**	**96 mm–110 mm**
Screw selection	**Screw length (mm)**			
Hole A	65	75	75	85
Hole B	40	40	55	65
Hole C	40	55	65	75
Hole D	55	65	65	75
Hole E	65	75	75	75
Hole F	65	75	75	85
Hole G	55	65	75	85

Contouring the plate

Distance between bone and plate reduce stability



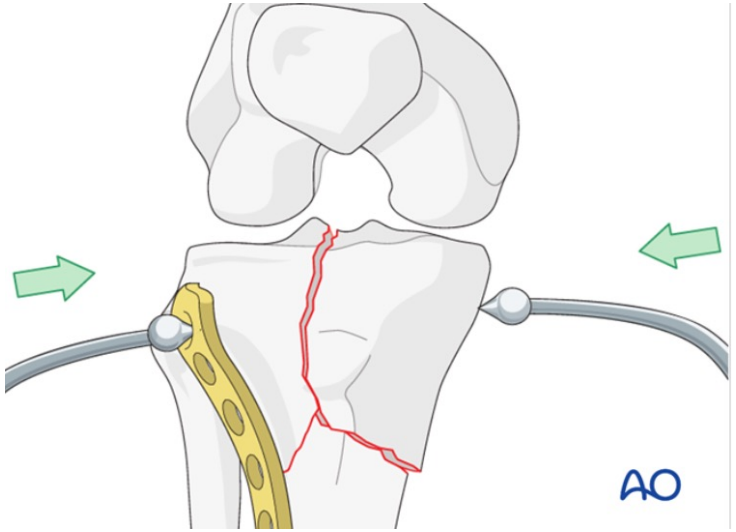
How to reduce distance between bone and plate



Cortex screw

Cable

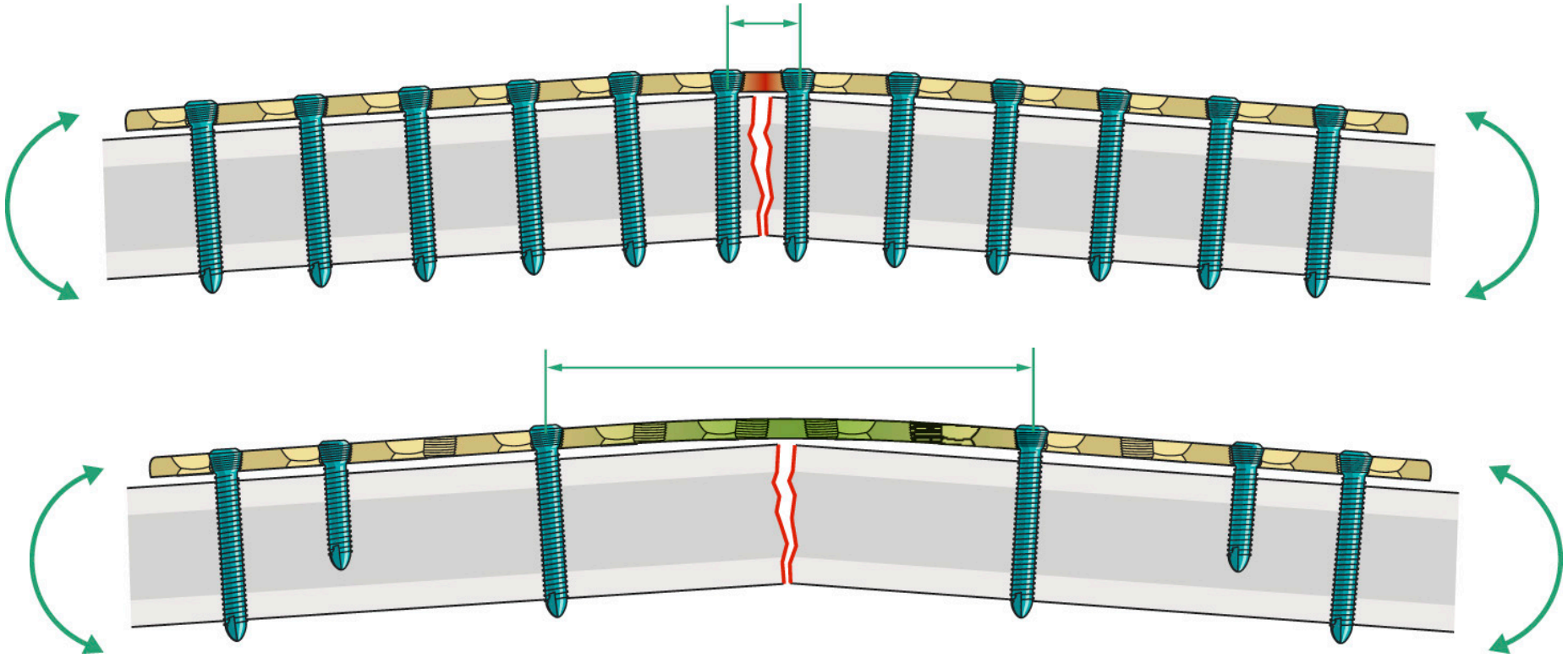
K-wire with olive



Clamp over plate

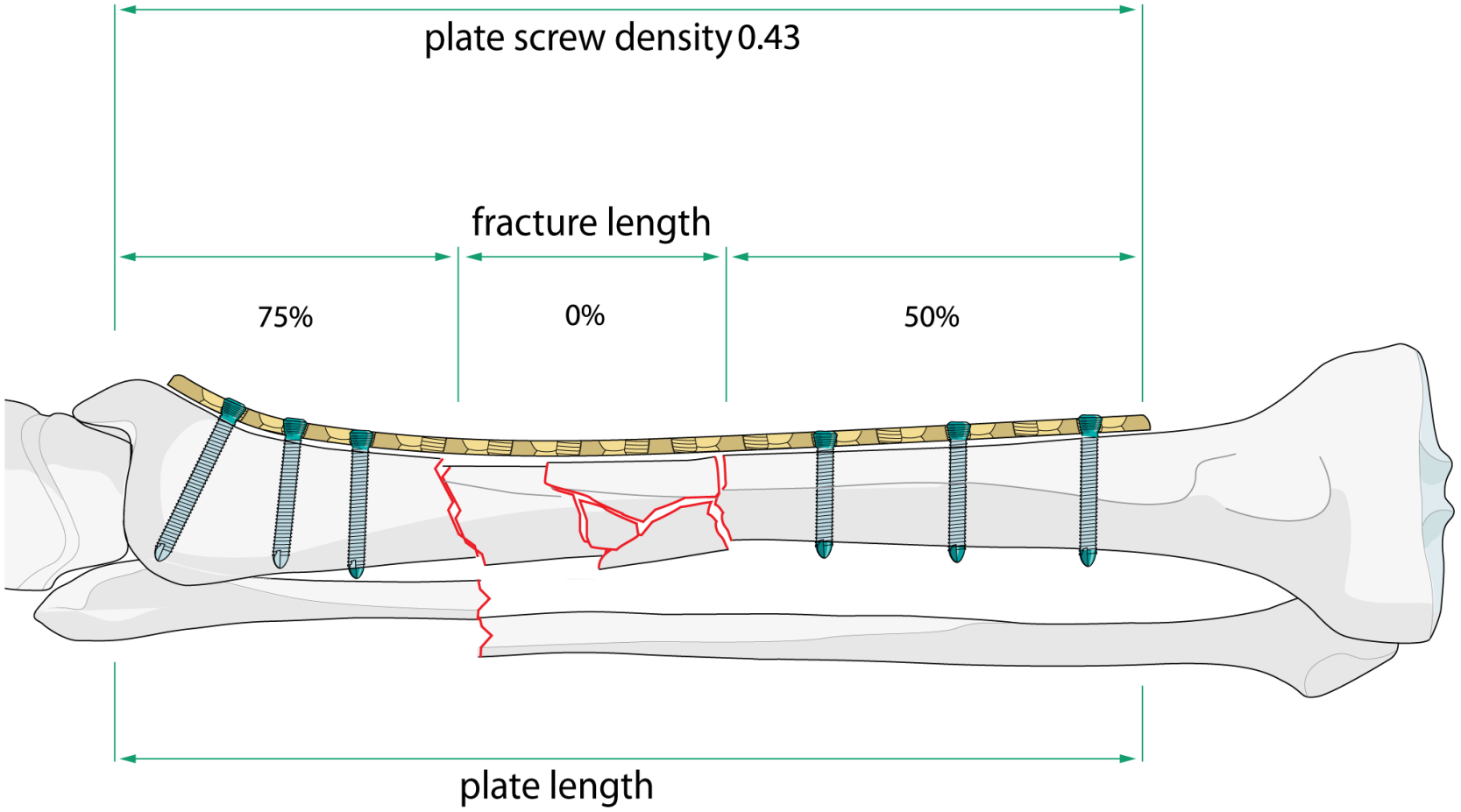
Pull-device

Avoid short “middle”



Length of LCP—relative stability

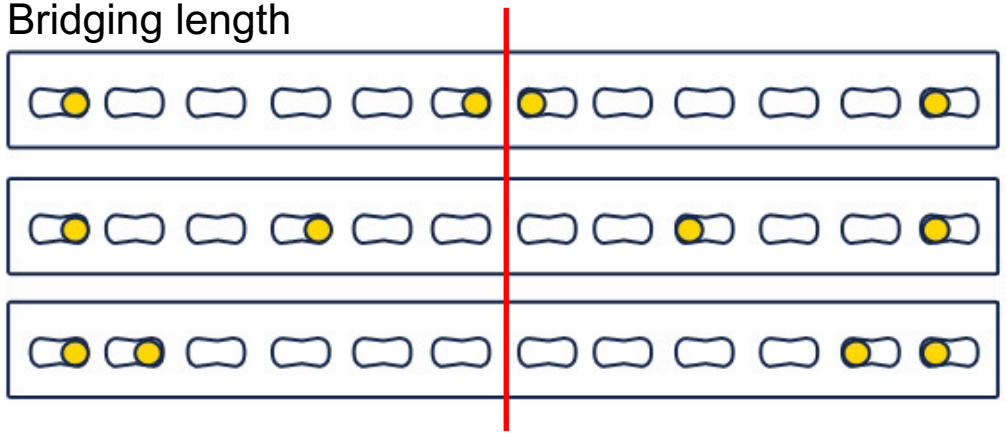
Plate length should be at least 2 or 3 times fracture length
[Gautier E, et al 2003]



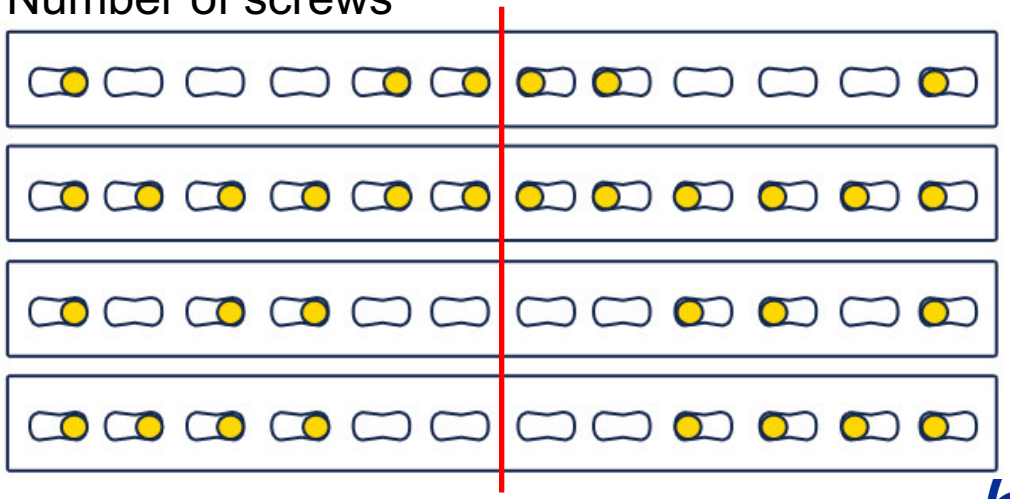
Screw placement

- Stoffel K et al (2003)
  - *Biomechanical testing of the LCP—how can stability in locked internal fixators be controlled? Injury;34(2)B11–19.*
  - Moving first screw further from fracture site:
    - Increases the working length
    - decreases axial load
    - decreases torsional rigidity
  - More screws increases axial stiffness, not torsional rigidity

Bridging length

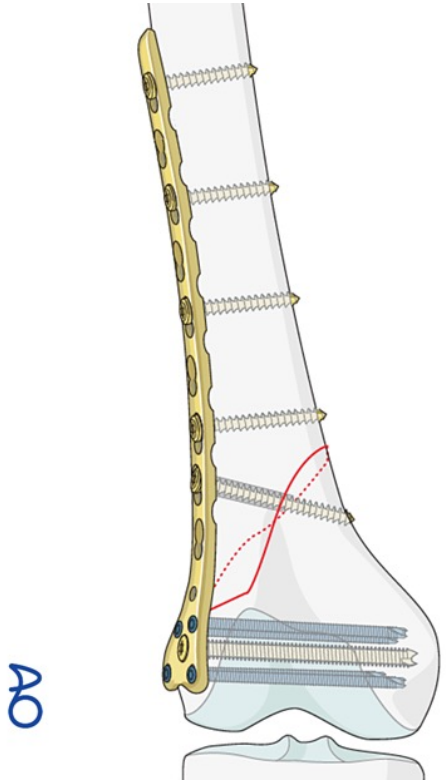


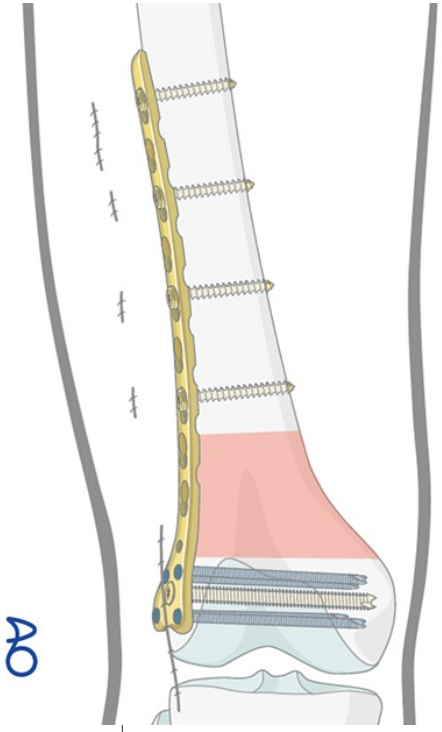
Number of screws

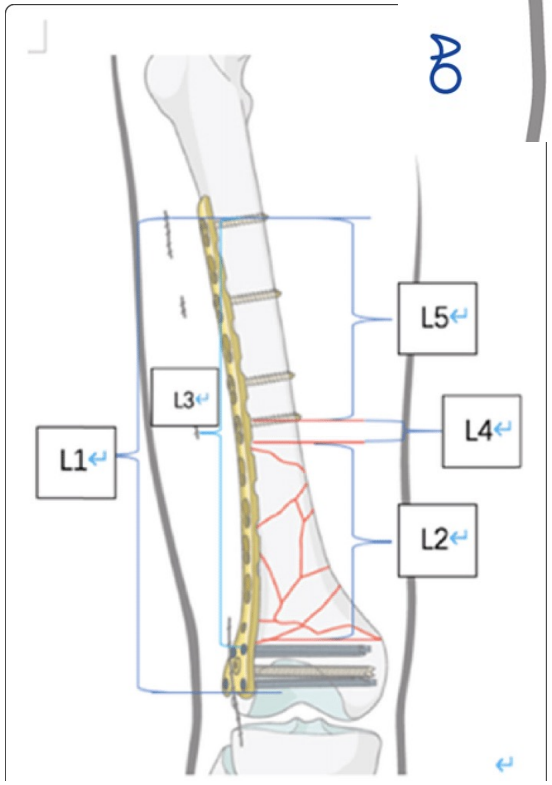


Screw placement

- Short, simple fractures
  - Absolute stability OR
  - Screws in distance from fracture
- Long segmental fractures
  - Screws close to fracture
  - Long plates







Summary

- Good reduction is important, open, closed or by plate
- Locking plates can be used to achieve absolute or relative stability
  - Remember basic principle
  - Position plates perfect
- Use longer plates and think about
  - Working length, plate screw density, axial load, stiffness