Plates and screws
An evolution NOT a revolution
Evolution of plates

LCP: evolution and not revolution
Dynamic Compression Plating (DCP)
**Clinical problems and handling DCP**

- Disturbed blood irrigation
- Lack of biocompatibility
- Contouring of plate
- Limited angulation
- Centre of plate

**Solutions with LC-DCP**

- Undercuts
- Titanium and Sst.
- Undercuts
- LC-DCP hole
- Symmetric hole

**Damage of soft tissues**

- Loss of reduction
- Loosening of screws
- Purchase in osteoporotic bone
Limited Contact-Dynamic Compression Plate
Compression can be achieved in either longitudinal direction. A lag screw can be inserted at greater inclination.
Bending
Implant Removal

U-shaped ossification around a standard plate

Trapezoidal ossification around an LC-DCP® Plate

Bone cross-section after removal of a standard plate.

Bone cross-section after removal of an LC-DCP® Plate.
# Clinical problems

- Disturbed blood irrigation
- Lack of biocompatibility
- Contouring of plate
- Limited angulation
- Centre of plate
- **Damage of soft tissues**
- Loss of reduction
- Loosening of screws
- Purchase in osteoporotic bone

### Solutions

- Undercuts
- Titanium and steel
- Undercuts
- LC-DCP hole
- MIPPO flattened tip (straight plates)
- Locking screws
- Locking screws
- Locking screws
Distal Radius Plate

1.8mm locking butress pin
LISS

• Less Invasive technique

Locking Screws

b.AO
Clinical Wish
The Combination in one Implant

LC-DCP

LISS / PC-FIX

Solution

LCP
Uses of locking plates

– Neutralisation
– Compression
– Buttress
– Indirect reduction tool
Uses of Locking plates

- pre or intra-operative choice

- Used as a traditional plate with cortical and cancellous screws
  
  OR

- Fixed angular stability through locking screws
  
  OR

- A combination of the two
The concept of Fixed angle Stability?

Stability through Plate/bone friction

Angular stability through LHS screws/plate construct
Stability Plate-Screws

Contact / Friction
Angular stability through locked screws
Problem – Poor quality bone

- The holding power depends directly on bone quality and thread Geometry
- Screw angulations is possible
- Screws angulations NOT possible
- Stability does not depend on plate/bone friction nor thread geometry, BUT Implants' rigidity
- For angulations to happen much larger portion of bone to be stripped (higher load needed)!
Primary loss of reduction
Reduced primary loss of reduction

Without Angular Stability

With Angular Stability
No compression of plate onto bone is required
Reduced secondary loss of reduction

Without  

With
Without angular stability

- Secondary loss of reduction
- Pull-out of screws
Different use of LCP

Only standard screws

Combination

Only locking screws
Function of plates

Protection or neutralization

Support

Compression

Tension band

Bridge
Guidelines for the Surgical application of LCP
Emanuel Gautier (Fribourg) and Christoph Summer (Chur)