Fig. 2-3a–b  Complex fracture. Bridging plate.
a  Gentle open reduction and internal fixation, minimal periosteal stripping.
b  Undisturbed periosteal and mainly endosteal bony union.

Fig. 2-4a–c  Complex fracture. Indirect alignment. Bridging plate.
a  Fracture bridged with plate (1967).
b  Alignment with indirect distraction, with the plate-tensioning device.
c  ‘Biological’ fracture healing after 52 weeks.
The MINIMAX principle for fracture care in adults

Fig. 2-5a–d  Bridge plating without anatomical reduction, using opposite fragments as medial buttress.

a  Multifractured osteoporotic bone.
b  Bridging plate.
c  One long opposite fragment is drawn near with a lag screw to work as medial buttress.
d  59 weeks since injury: uneventful 'biological' fracture healing.
Fig. 4.26a–f  Grade III (18-year-old patient).
Spontaneous dead skin demarcation, excised granulation cultivation, coverage with split skin mesh grafts.

abc  The fracture history in 8 months.
d  2 1/2 months after the accident: necrotic skin areas kept dry with an electric hairdrier. Necrosis is now resected. Moist and mild antiseptic local treatment (no antibiotics!).
e  3 weeks after resection of necrosis: Granulation campus ready for skingrafting.
f  8 months after injury, 6 months after skin transplant: stable skin cover.
Fig. 4.27a–m  Grade III (22-year-old patient). ‘Motorized’ Picot skin flaps.

a  Injury and primary treatment in another hospital.
b  Admission at 8 days: tibial and lateral plate (arrow) lie open in the infected wound.
c  The plate is removed and replaced by a single lag screw. Protective fixation with an anterior external fixator. The two lips of the wound are tied to one of the two threaded rods with steel wires.
d  The skin over the calf is largely split open. Split skin grafting follows when flap transport is made.
e  Cross-section view: one rod is used as a spindle onto which the steel cables are wound forward by twisting by daily 2 mm increments.
f  In 2 weeks, the flaps have migrated to achieve contact. The necrotic tibial surface was scarcely shingled away. The gap of the skin on the rear of the calf was closed with split-skin mesh. 3 weeks after start of flap migration.
5.2 Treatment of acute ankle sprain

Conservative treatment of acute ankle sprain is the treatment of choice for many doctors [30].

At our institution, acute ruptures of the fibular collateral ligaments have been sutured systematically since 1960. With the availability of clean-air operating rooms and the body-exhaust system in 1970, postoperative infection has disappeared.

Secondary reconstructions for recurrent ankle sprain are the result of conservative treatment in patients who are referred to us. Recurrent ankle sprain is absent with accurate suture [31–33].

Fig. 5-43a–b  Suture of fresh fibular ligament rupture [6, 31].

a  Less or more extended rupture of the joint capsule and ligaments.
   Watch for lateral dome damage of the talus!
b  From a standard incision, a running shoelace suture with resorbeable thread is made. Stirrup splint for 2 weeks, followed by a brace at right angle for full weightbearing for 5–6 weeks after surgery.
5.3 Treatment of recurrent ankle sprain [6, 31–33]

Our two procedures minimize surgical tissue insult to avoid prolonged swelling of the ankle region. The first procedure is provided for the deficiency of the isolated anterior fibulotalar ligament and for the rotatory instability of the talus in the ankle fork. The second procedure is for more serious instabilities after rupture of two or of all three collateral fibular ligaments, for instability of the ankle, subtralar, and occasionally also of the calcaneocuboidal joint.

The postoperative treatment is the same for both procedures:
Postoperative padded stirrup splint for 12 days. The stitches are removed and a below-knee-walking brace for full weightbearing is applied. 8 weeks after surgery, the brace is removed. Normal walking and motion of the foot are back at three months after surgery. Physiotherapy is not necessary because of the full weightbearing with the brace. Regain of normal function is prepared (CPM and CAF), and muscle wasting is minimal and compensated for automatically with unprotected physical performance.

Fig. 5-44a–c  Reconstruction for anterior fibulotalar ligament deficiency [33].
a  The plantaris muscle tendon is harvested from a small para-achillar medial incision proximal to the calcaneal tuberosity with a tendon stripper. My personal preference is a second 3 cm incision, where the posterior crest of the tibial ends at the base of the tibial head. The index finger splits the soleus and gastrocnemius muscles and easily finds the tendon next to its small muscle belly. At that stage, the distal end of the tendon is severed. The 20–25 cm long tendon is now pulled upwards with the index finger into the proximal incision and is harvested. Drillholes in the distal fibula and in the neck of the talus with 4.5 mm drill bit are made.
b  The plantaris muscle tendon is inserted through the holes (arrows) twice. The strands are tightened and finally stabilized with resorbable thread No. 0.