Hybrid fixation is appropriate for fixation of complex proximal and distal tibial fractures, particularly those involving the joint, when soft-tissue injuries preclude open reduction and internal fixation, or the fracture pattern does not allow placement of Schanz screws for construction of a standard external fixator frame.

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Hybrid technique

Hybrid fixation technique  The hybrid external fixator is used in fractures close to a joint. It is called “hybrid” because it combines fine-wire fixation and an external half ring at the joint with pin fixation in the diaphysis (Fig 1). It requires tensioned K-wires for the ring and conventional Schanz screws for the shaft. Generally, 3/4 circumference rings are used. K-wires with an olive allow fragment reduction and some compression.

Indications  Hybrid ring fixators have mainly been used in type A and B fractures of the proximal and distal tibia, either alone or to protect an internal fixation with lag screws. It is not easy to insert a hybrid fixator correctly in an articular fracture, nor is it a quick procedure.

In polytrauma or complex articular fractures, it is recommended that hybrid fixation is planned as a delayed procedure after initial joint-bridging external fixation.

It is important to know the anatomy of the joint capsule, as intraarticular placement of the wires should be avoided in order to reduce the risk of joint infection.

Technique  With the open, 3/4 rings, tensioning of the second and/or third wire may produce a partial reduction and some compression. For this reason, sequential tensioning of the first wire (wire 1-2-1) or simultaneous tensioning with two tensioning devices is recommended. This will provide a uniform, well-balanced level of tension in all wires. An additional Schanz screw can be inserted to secure the ring if increased stability is required. However, two or three crossed wires under tension are often sufficient.

It is usually better to use a V- or A-shaped frame as this increases stability and avoids the cantilever effect that can be seen if a simple unilateral frame is applied to a ring.

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Fig 1  Hybrid fixator used on a tibial plateau fracture. It is also useful for distal tibial periarticular fractures. The V-frame provides good stability.
Case study: Hybrid fixation

Case contributor: Dankward Höntzsch

Fig 1  Proximal tibial fracture, initially treated with the less invasive stabilization system (LISS).

Fig 2  Removal of the LISS after infection and application of a hybrid external fixator.

Fig 3  Duration of treatment: 20 weeks.
   a  Application of frame.
   b  Flexion of knee joint: 0-0-100 degrees and full weight bearing after 6 weeks.
   c  Showering and bathing possible and recommended throughout treatment.

Fig 4  Removal of external fixator 20 weeks after consolidation of fracture. Full weight bearing and good function.