

Large and Medium External Fixators

Surgical Technique

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Contents

Indications and contraindications	1
Modular frame using the rod-to-rod Technique	1
Additional treatment options using the rod-to-rod technique	4
Unilateral frame with single-rod or double-rod construction	6
Pelvic use	7
Product Information	8
Implants	8
Fixation components for large and medium external fixator	8
Instruments	10

Indications and contraindications

Indications

The Large External Fixator (rod diameter: 11 mm) is particularly suitable for treating the lower extremities. The Medium-size External Fixator (rod diameter: 8 mm) is particularly appropriate for the extremities of adults, and the upper and lower extremities of children and small adults. The most important indications for Large and Medium-size External Fixators are:

- Second and third-degree open fractures
- Infected pseudoarthrosis
- Rapid, initial immobilization of soft tissue injuries and fractures in severely injured patients
- Immobilization of closed fractures with severe soft tissue trauma (bruising of the soft tissue mantle, burns, skin diseases)
- Extensive shaft and periarticular fractures
- Transient joint-bridging immobilization in severe soft tissue and ligament injuries
- Certain injuries to the pelvic ring, and selected fractures in children
- Arthrodeses and osteotomies

Contraindications

- Patients who for social and physical reasons are not suitable for an External Fixator.
- Patients in whom no screws can be inserted due to a bone or soft tissue disease.

Modular frame using the rod-to-rod Technique

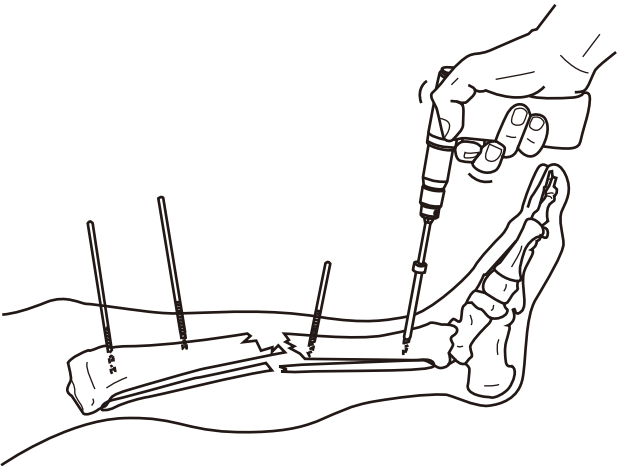
You can choose between a unilateral or modular frame construction. If a modular frame is chosen, you can freely choose how to set the Schanz screws. This method is recommended as a standard technique for fractures that require reduction. Schanz screws, clamps and carbon fibre rods are required to construct the different frames.



1

Set the Schanz screws

Set two Schanz screws per main fragment using the drill sleeve assembly. Freely select their position appropriate for the fracture, soft tissue, and anatomical situation. The greater the distance between the Schanz screws, the greater the stability of the frame.



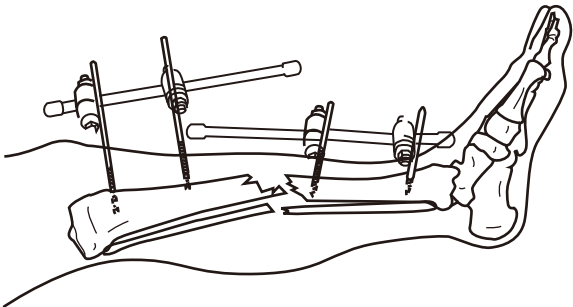
2

Connect the Schanz screws with carbon fibre rods

Required instruments

Connecting Rods Φ 11mm	521140-521210
Clamp, Clip-on, self-holding (large)	521120
Combination Wrench (SW11)	522100

The two Schanz screws per main fragment are connected with a rod. Clip-on, self-holding clamps are used. Make sure that the rods project a bit beyond the fracture zone so that sufficient length remains for the combination clamp. Tighten all the clamp nuts.



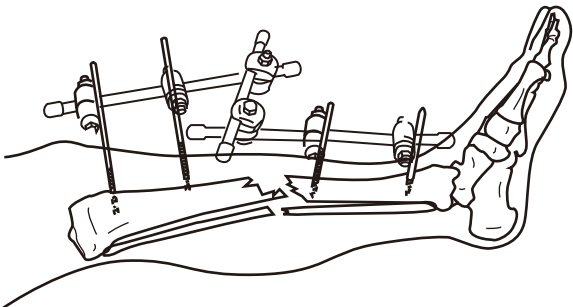
3

Connect the carbon fibre rods

Required instruments

Connecting Rods Φ 11mm	521140-521210
Rod-to-Rod Clamp (large)	521130

Connect the two ends of the rods near the fracture to a third rod using two self-holding combination clamps. Do not yet tighten the nuts for the combination clamps.

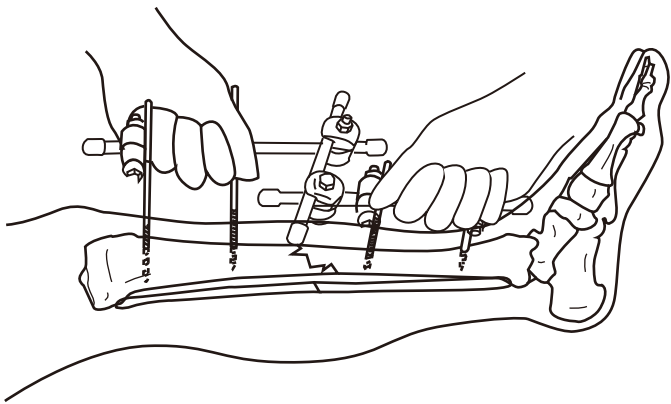




4

Reduce the fracture

Use the two partial frames as handles to reduce the fracture. After checking the reduction, alternately tighten the nuts of the combination clamps in the image intensifier while manually holding the reduction.



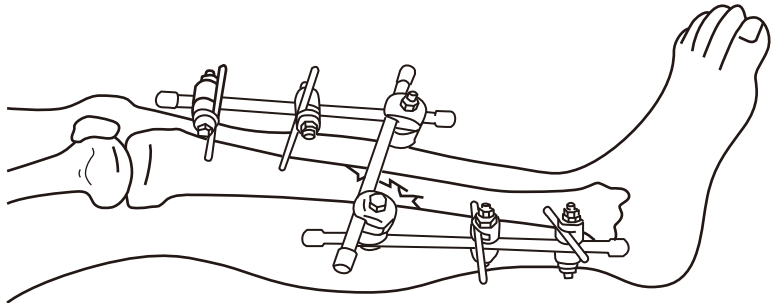
5

Tighten nuts

Required instruments

Combination Wrench (SW11)	522100
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Finally, recheck all the nuts with the wrench to ensure they are all tight. Retighten all the nuts after 24 hours.



6

Secondary reduction

A secondary correction of the reduction can be performed within the first few days after surgery. Only the two combination clamps are released. The correction can then be made using the partial frames that move relative to each other.

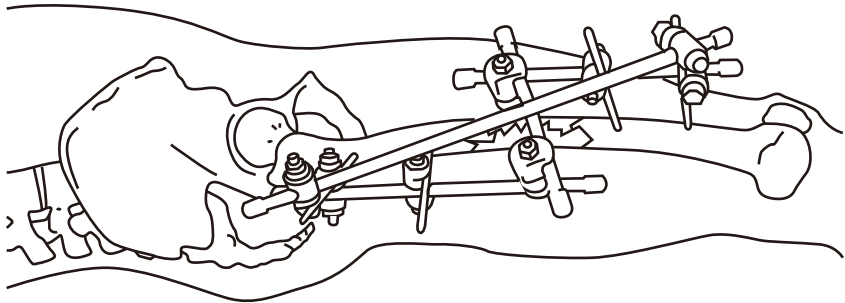
After the correction, retighten the two combination clamps.

Additional treatment options using the rod-to-rod technique

Φ11.0 mm system

Adult femur

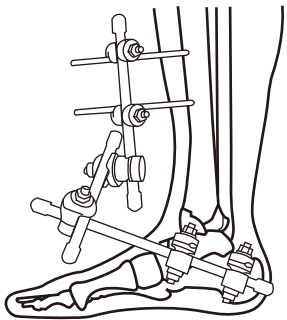
Insert 2–3 Schanz screws into the proximal and distal main fragment from a lateral direction. With adipose patients, it is recommendable to use 6.0 mm screws. The stability of the rodto-rod assembly can be increased with an additional neutralization rod.



Bridging the ankle

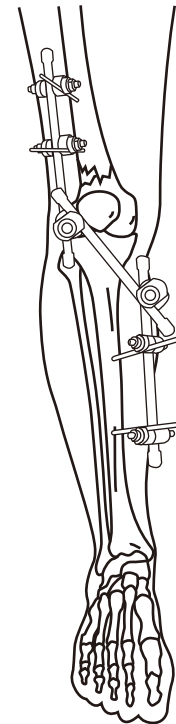
Unilateral

Insert the screws into the calcaneus and talus from a medial direction. In the tibia, set the screws at an anteromedial to medial angle, and connect them using the rod-to-rod technique.



Bridging the knee joint

Insert two Schanz screws into the distal femur from a lateral or ventral direction, and into the proximal tibia from an anteromedial direction. Connect them using the rod-to-rod technique.

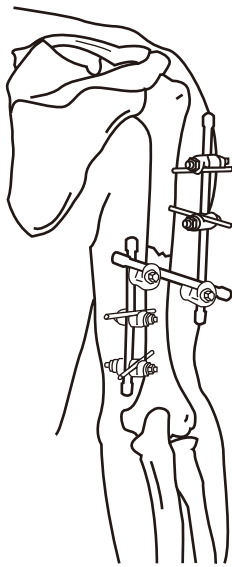




Φ 8.0 mm system

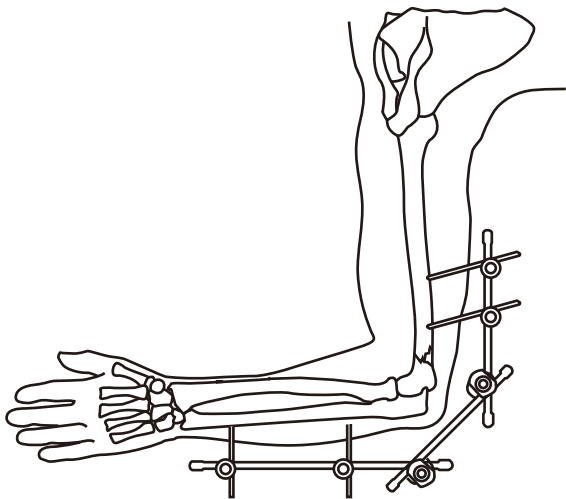
Humerus

Insert the Schanz screws in the proximal humerus from a lateral direction and into the distal humerus from a dorsal direction, avoiding injury to the radial nerve. Connect the Schanz screws using the rod-to-rod technique.



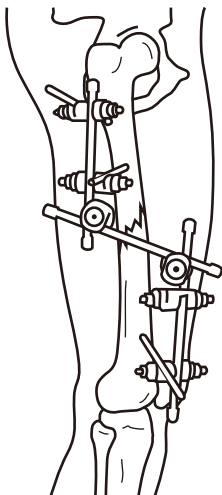
Bridging the elbow

Insert Schanz screws into the distal humerus from a dorsal direction. The screws can be introduced into the forearm from a dorsal direction into the ulna. Connect the Schanz screws using the rod-to-rod technique. It is only recommendable to insert an additional screw in the radius to stabilize the radio-ulnar joint.



Child femur

Insert 2–3 Schanz screws into the proximal and distal main fragment from a lateral direction. The stability of the rod-to-rod assembly can be increased with an additional neutralization rod.

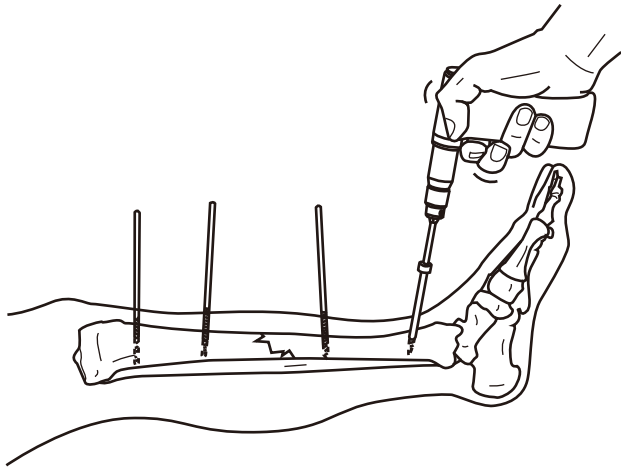


Unilateral frame with single-rod or double-rod construction

1

Provisionally reduce the fracture, and set the first Schanz screw

Provisionally reduce the fracture, and insert the first Schanz screw in a main fragment. From a ventrolateral direction, locate the first screw as distally as possible.



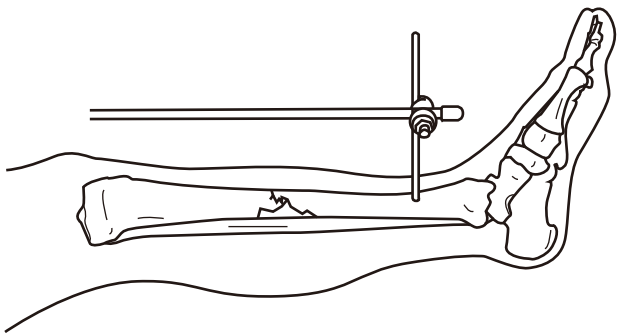
2

Mount the carbon fibre rod and clamp

Required instruments

Connecting Rods Φ11mm	521140-521210
Clamp, Clip-on, self-holding (large)	521120
Combination Wrench (SW11)	522100

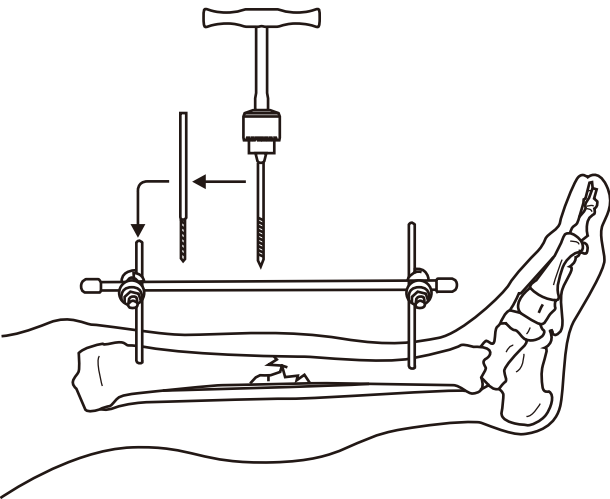
Mount the rod with the assistance of a clip-on, self-holding clamp.



3

Definitively reduce the fracture, and set the second Schanz screw

After reducing the fracture, set the second Schanz screw as proximally as possible. Secure the reduction by tightening the proximal and distal clamp, yet continue to hold the reduction until the fracture is definitively fixed (see following pages).

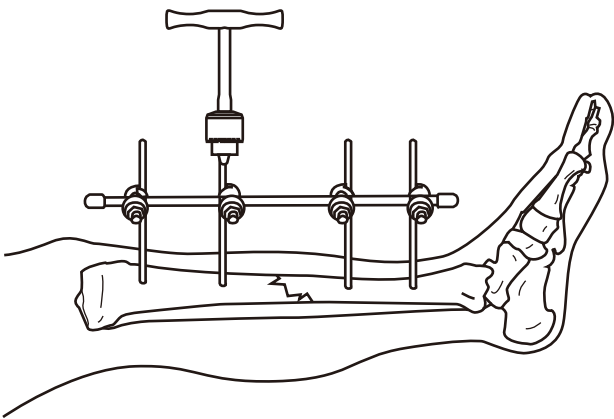




4a
Unilateral frame with single-rod construction

Required instruments	
Clamp, Clip-on, self-holding (large)	521120
Combination Wrench (SW11)	522100

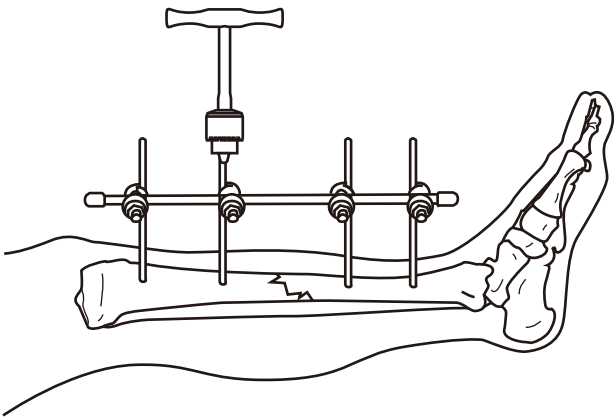
Insert the remaining Schanz screws, and place the required clipon, self-holding clamps on the rod to the side of the screws. Tighten all the clamp nuts.



4b
Unilateral frame with double-rod construction

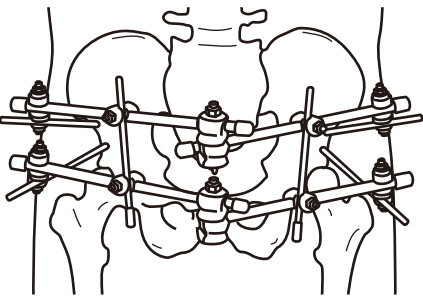
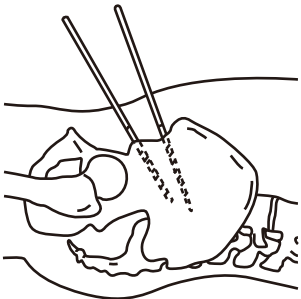
Required instruments	
Connecting Rods Φ11mm	521140-521210
Clamp, Clip-on, self-holding (large)	521120
Combination Wrench (SW11)	522100

A double-rod construction increases stability of the assembly in the case of bone defects or comminuted fractures. Use the same procedure as for single-rod construction; however, after setting the first two Schanz screws, place the second rod over the first. The double-rod construction should be standard for the femur.

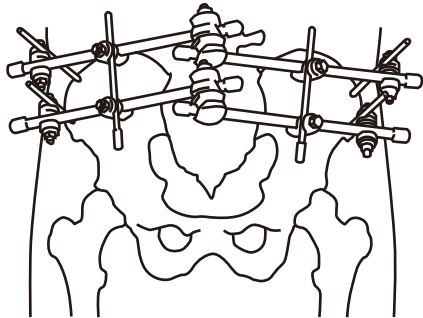
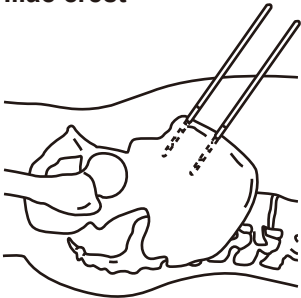


Pelvic use

Supraacetabular pin placement



Placing pins in the Iliac crest



Product Information

Implants

Code	Products Description	Size	Material
10742125	Schanz Screws, self-drilling	Φ5 × 125	SS
10742150	Schanz Screws, self-drilling	Φ5 × 150	SS
10742175	Schanz Screws, self-drilling	Φ5 × 175	SS
10742200	Schanz Screws, self-drilling	Φ5 × 200	SS



Code	Products Description	Size	Material
10744125	Schanz Screws	Φ5 × 125	SS
10744150	Schanz Screws	Φ5 × 150	SS
10744175	Schanz Screws	Φ5 × 175	SS
10744200	Schanz Screws	Φ5 × 200	SS



Code	Products Description	Size	Material
10741100	Schanz Screws, self-drilling	Φ4 × 100	SS
10741125	Schanz Screws, self-drilling	Φ4 × 125	SS
10741150	Schanz Screws, self-drilling	Φ4 × 150	SS



Code	Products Description	Size	Material
10743125	Schanz Screws	Φ4 × 125	SS
10743150	Schanz Screws	Φ4 × 150	SS



Fixation Components

Code	Products Description	Size	Material
521110	Combination Clamp, Clip-on, self-holding (large)	Φ 11	TA
521120	Clamp, Clip-on, self-holding (large)	Φ 11	TA



Code	Products Description	Size	Material
521130	Rod-to-Rod Clamp (large)	Φ 11	TA



Code	Products Description	Size	Material
521330	Combination Clamp, Clip-on, self-holding (medium)	Φ 8	TA
521320	Clamp, Clip-on, self-holding (medium)	Φ 8	TA





Code	Products Description	Size	Material
521310	Rod-to-Rod Clamp (medium)	Φ8	TA



Code	Products Description	Size	Material
521140	Connecting Rods	Φ 11 × 100mm	Carbon Fiber
521150	Connecting Rods	Φ 11 × 125mm	Carbon Fiber
521160	Connecting Rods	Φ 11 × 150mm	Carbon Fiber
521170	Connecting Rods	Φ 11 × 200mm	Carbon Fiber
521180	Connecting Rods	Φ 11 × 250mm	Carbon Fiber
521190	Connecting Rods	Φ 11 × 300mm	Carbon Fiber
521200	Connecting Rods	Φ 11 × 350mm	Carbon Fiber
521210	Connecting Rods	Φ 11 × 400mm	Carbon Fiber



Code	Products Description	Size	Material
521340	Connecting Rods	Φ 8 × 120	Carbon Fiber
521350	Connecting Rods	Φ 8 × 160	Carbon Fiber
521360	Connecting Rods	Φ 8 × 200	Carbon Fiber
521370	Connecting Rods	Φ 8 × 220	Carbon Fiber
521380	Connecting Rods	Φ 8 × 240	Carbon Fiber
521390	Connecting Rods	Φ 8 × 280	Carbon Fiber
521400	Connecting Rods	Φ 8 × 320	Carbon Fiber
521410	Connecting Rods	Φ 8 × 360	Carbon Fiber
521420	Connecting Rods	Φ 8 × 400	Carbon Fiber



Code	Products Description	Size	Material
521230	Protective Caps	Φ 11 × 27mm	Silicon
521240	Protective Caps	Φ 5 × 27mm	Silicon



External Fixator (Large) Instruments



522100
Combination Wrench, SW11



522110
Ratchet Wrench, SW11



522120
T-Wrench, SW11



522140
T-Clip



522150
Trocar Φ 3.5, short



522160
Drill Sleeve 5.0/3.5, short



522170
Drill Sleeve 6.0/5.0, threaded,short



522190
Trocar Φ 3.5, long



522200
Drill Sleeve 5.0/3.5, long



522210
Drill Sleeve 6.0/5.0, threaded,long



522220
Drill Bit, Φ 3.5mm

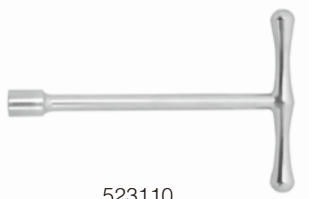


98211
Handle for Drill Sleeve

External Fixator (Medium) Instruments



523100
Combination Wrench, SW8



523110
T-Wrench, SW8



522140
T-Clip



523120
Trocár, Ø 2.5mm



523130
Drill Sleeve 4.0/2.5



523140
Drill Sleeve Ø 4.0, with Thread



523150
Drill Bit, Ø 2.0mm



522220
Drill Bit, Ø 3.5mm



98211
Handle for Drill Sleeve