Surgical technique
Synthes Surgical Technique External Distal Radius Fixator

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Warning
This description is not sufficient for immediate application of the instrumentation. Instruction by a surgeon experienced in handling this instrumentation is mandatory.
Indications and contraindications

**Indications**

Unstable distal radius fractures
- Intra-articular
- Extra-articular
- Preliminary fixation before open reduction and internal fixation
- Fractures with open and closed soft tissue injury
- Multiple trauma (in terms of «damage control surgery» — injury-adapted care)

Injuries, fractures, dislocations, burns in the area of:
- Hand
- Wrist
- Forearm

Fractures in combination with
- Extensive soft tissue injuries
- Bone loss
- Vascular and/or neural involvement

Fracture dislocation
- Hand

Failed closed reduction with casting resulting in secondary dislocation
- Radial shortening
- Angulation

**Contraindications**

- Patients who are not suitable for an external fixator for social or physical reasons.
- Agitation
- Patients with bone or soft tissue diseases, which rules out the implantation of screws.
Implants and instruments

Implants

**Self-drilling Schanz screws (Seldrill™)**
- Reinforced bone anchoring due to radial preload
- Minimal temperature during insertion due to optimized drill tip geometry

<table>
<thead>
<tr>
<th>Titanium</th>
<th>Steel</th>
<th>Diameter mm</th>
<th>Length mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>494.769</td>
<td>294.769</td>
<td>4.0/2.5</td>
<td>80</td>
</tr>
<tr>
<td>494.771</td>
<td>294.771</td>
<td>4.0/3.0</td>
<td>80</td>
</tr>
<tr>
<td>494.772</td>
<td>294.772</td>
<td>4.0/3.0</td>
<td>100</td>
</tr>
<tr>
<td>494.774–779</td>
<td>294.774–779</td>
<td>4.0</td>
<td>60–175</td>
</tr>
</tbody>
</table>

**Self-tapping Schanz screws**

<table>
<thead>
<tr>
<th>Titanium</th>
<th>Steel</th>
<th>Diameter mm</th>
<th>Length mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>494.445</td>
<td>294.445</td>
<td>4.0/2.5</td>
<td>80</td>
</tr>
<tr>
<td>494.300</td>
<td>294.300</td>
<td>4.0/3.0</td>
<td>80</td>
</tr>
<tr>
<td>494.430–460</td>
<td>294.430–460</td>
<td>4.0</td>
<td>60–125</td>
</tr>
</tbody>
</table>

Fixation Components

**Clamp for the External Distal Radius Fixator**
- Magnetic resonance safe
- Freely adjustable settings can be set with the large hexagonal screwdriver
- Permits secondary length adjustment without loss of reduction
- High strength, light titanium alloy
- Suitable for Schanz screws Ø 4.0 mm, 4.0/3.0 mm and 4.0/2.5 mm.

Carbon fibre rods

<table>
<thead>
<tr>
<th>Art. No.</th>
<th>Diameter mm</th>
<th>Length mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>395.782</td>
<td>8.0</td>
<td>200</td>
</tr>
<tr>
<td>395.784</td>
<td>8.0</td>
<td>220</td>
</tr>
<tr>
<td>4395.786</td>
<td>8.0</td>
<td>240</td>
</tr>
</tbody>
</table>

**Protective cap for carbon fibre rods**

Instruments

**Hexagonal screwdriver, large, Ø 3.5 mm, with groove**

**Parallel drill guide 4.0**
Surgical Technique

1  
First reduction

At the beginning, perform a first reduction of the hand with the fractured radius using gentle ligamentotaxis to minimize soft tissue injuries due to internal pressure.

2  
Safe zones for inserting screws

Insert the Schanz screws in the shaft of the second metacarpal.

3  
Position of screws

Pay attention to the extensor tendon and the radiodorsal neurovascular bundle on the extensor and radiodorsal side.

If the screws are placed too far laterally, they will impede the function of the thumb. For this reason, an angle between 40° and 60° to the horizontal from the orthograde view has proven useful.
4

**Insert distal Schanz screws**

**Required instruments**

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel drill guide 4.0 mm</td>
<td>395.967</td>
</tr>
<tr>
<td>Schanz screws 4.0/3.0 mm, 4.0/2.5 mm</td>
<td>(cf. p. 3)</td>
</tr>
</tbody>
</table>

The first Schanz screws to be inserted as a pair can be placed first in the second metacarpal or radius.

Insert the drill guide while protecting and pushing aside the tendons, vessels, and muscles in such a way that the long shaft of the drill guide is in direct contact with the bone. Place the first Schanz screw in described position through the long drill sleeve shaft (A).

Before placing the second screw, remove the drill guide and guide the short shaft over the first Schanz screw; take care here that the long shaft is again in direct contact with the bone (B).

**Note:** Self-drilling, self-tapping Schanz screws (Seldrill™) can be inserted without predrilling.

5

**Insert Schanz screws in the radius shaft**

**Required instruments**

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel drill guide 4.0 mm</td>
<td>395.967</td>
</tr>
<tr>
<td>Schanz screws 4.0 mm, 4.0/3.0 mm</td>
<td>(cf. p. 3)</td>
</tr>
</tbody>
</table>

Insert two Schanz screws obliquely in the distal to middle radius as described in step 4. Make sure that the superficial branch of the radial nerve is not damaged.
6 Position the frame

Required instruments

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp</td>
<td>390.051</td>
</tr>
<tr>
<td>Protective cap for the carbon fibre rods</td>
<td>395.781</td>
</tr>
<tr>
<td>Carbon fibre rod</td>
<td>Cl. p. 3</td>
</tr>
</tbody>
</table>

Loosen all screws on both clamps. Guide the carbon fibre rod of suitable length through the clamps and secure both ends of the rod with the protective caps to prevent the rod from slipping out.

Guide the fixator clamps over the Schanz screws.

7 Tighten clamps to the screws

Required instruments

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hexagonal screwdriver, large, ( \Phi 3.5 \text{ mm}, \text{ with groove} )</td>
<td>314.270</td>
</tr>
</tbody>
</table>

Tighten the screw for fixing the clamp to the Schanz screws with the large hexagonal screwdriver.

8 Reduce the fracture

Due to the clamps, which permit independent fixation of the Schanz screws and the carbon fibre rod, the fracture can be optimally reduced with the two Schanz screws as a lever using the modular technique.

The reduction can also be performed by conventional traction on the first and second finger (thumb and index finger) and countertraction on the forearm. Keep the two remaining set screws open here and thus allow free play of the DRF construct.

The length can also be adjusted with the distractor (see section 11 for use of the distractor), but the clamp body screws must be closed first.
Tighten adjusting points

After reduction, fix both axis set screws (two screws per clamp, see illustration in section 10a) jointly in a single step.

10

Axis adjustment in small subsequent corrections

Minor axis corrections can be easily made after reduction if necessary.

Note: Corrections in one level can lead to loss of reduction in the other levels.

10a

Flexion and extension, as well as radial and ulnar deviations can be easily corrected by loosening the screw on the main body.

10b

The length, supination, and pronation can be easily corrected after the loosening of the fixing screws for the carbon fibre rod.

This manipulation can be performed primarily interoperatively or secondarily. The length adjustment can also be made by hand or with use of the distractor.
11

Use of the distractor

Use of the distractor for reduction is optional

Prepare the distractor

Required instruments

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hexagonal screwdriver, large, Ø 3.5 mm, with groove</td>
<td>314.270</td>
</tr>
<tr>
<td>Distractor</td>
<td>394.075</td>
</tr>
</tbody>
</table>

Close the distractor by turning the thumb wheel counter to the direction of the arrow «Distract.»

Align the thumb wheel so that a through opening forms.

Insert the distractor

Place the distractor on the carbon fibre rod, so that the conical end of the distractor is next to the clamp for the distal radius fixator.

Secure the distractor on the carbon fibre rod by tightening the screw.

Loosen the fixator clamp in contact with the distractor by turning the rod-to-clamp screw.
**Distraction by ligamentotaxis**

Distract the fracture by turning the thumb wheel in the direction of the arrow.

One turn corresponds to lengthening by one millimeter.

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**Remove the distractor**

After successful distraction, tighten the screw on the clamp (1). Remove the distractor by aligning the thumb wheel and loosening the screw on the distractor (2).