

Schanz Screws and Steinmann Pins

Surgical Technique

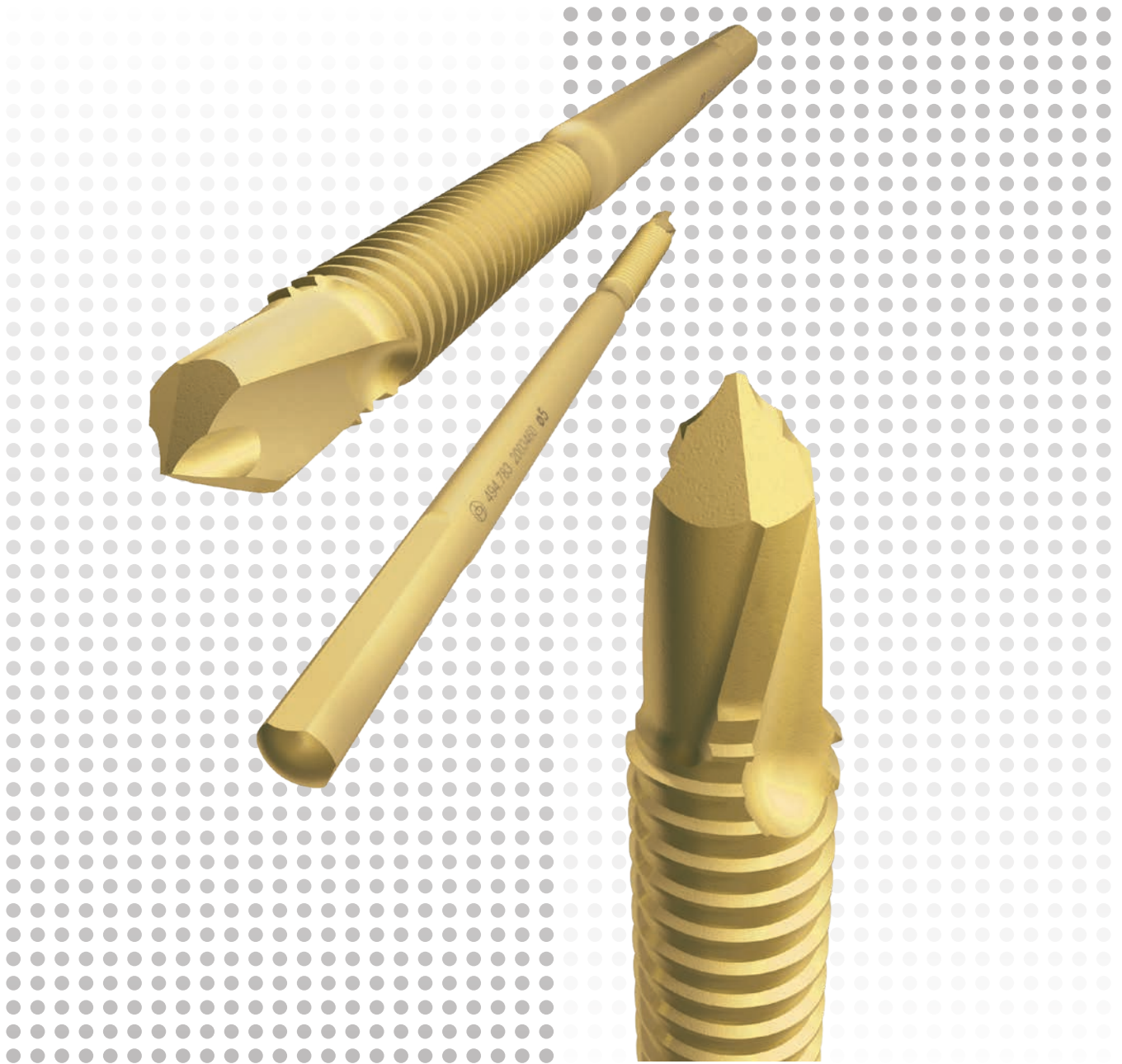


 Image intensifier control

This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

Processing, Reprocessing, Care and Maintenance

For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:

<http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance>

For general information about reprocessing, care and maintenance of DePuy Synthes reusable devices, instrument trays and cases, as well as processing of DePuy Synthes non-sterile implants, please consult the Important Information leaflet (SE_023827) or refer to:

<http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance>

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Self-tapping Schanz Screw

-
- With trocar tip
 - Diameters of 4.0 mm, 4.5 mm, 5.0 mm and 6.0 mm
 - Lengths of 60 mm, 80 mm, 100 mm, 125/130 mm, 150/160 mm 190/200 mm and 250 mm
 - Available in Stainless Steel or Titanium alloy (TAN)
 - Sterile and nonsterile-packaged



Hydroxyapatite-coated Schanz Screw

Hydroxyapatite Schanz Screw

- Self-drilling or self-tapping versions
- Diameters of 4.0 mm, 4.5 mm, 5.0 mm and 6.0 mm
- Sterile-packaged



Steinmann Pin

Steinmann Pin with trocar tip

- Available in Stainless Steel or Titanium alloy (TAN)
- Diameters of 3.0 mm/3.5 mm/4.0 mm/4.5 mm and 5.0 mm
- Lengths of 125 mm/150 mm/175 mm/200 mm/225 mm/250 mm/275 mm/300 mm
- For some diameters length of 225 mm/250 mm/275 mm/300 mm
- Sterile and nonsterile-packaged

Steinmann Pin with middle thread and trocar tip

- Available in Stainless Steel
- Diameters of 4.5 mm and 5.0 mm
- Lengths of 150 mm, 175 mm, 200 mm, 225 mm, 250 mm, 275 mm, 300 mm



Steinmann Pin with middle thread and trocar tip

- Available in Titanium alloy (TAV)
- Diameter of 5.0 mm
- Lengths of 200 mm, 250 mm



Steinmann Pin with drill tip

- Available in Stainless Steel
- Diameters of 4.5 mm and 5.0 mm
- Lengths of 125 mm, 150 mm, 175 mm, 200 mm, 225 mm, 250 mm, 275 mm, 300 mm
- Sterile and nonsterile-packaged

Warning

▲ WARNINGS:

- Synthes hydroxyapatite (HA) coated Schanz Screws are only available sterile-packed. Do not attempt to re-sterilize.
- Synthes Seldrill, Self-tapping, Hydroxyapatite-coated Schanz Screws and Steinmann Pins are not approved for screw attachment or fixation to the posterior elements (pedicles) of the cervical, thoracic, or lumbar spine.

Please refer to the corresponding Instructions for Use for specific information on Intended use, Indications, Contraindications, Warnings and Precautions, Potential Adverse Events, Undesirable Side Effect and Residual Risks. Instruction for Use are available at www.e-ifu.com and/or www.depuysynthes.com/ifu

The AO Principles of Fracture Management

Mission

The AO's mission is promoting excellence in patient care and outcomes in trauma and musculoskeletal disorders.

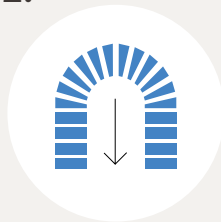
AO Principles^{1,2}

1.



Fracture reduction and fixation to restore anatomical relationships.

2.



Fracture fixation providing absolute or relative stability, as required by the “personality” of the fracture, the patient, and the injury.

3.



Preservation of the blood supply to soft-tissues and bone by gentle reduction techniques and careful handling.

4.



Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.

¹ Müller ME, Allgöwer M, Schneider R, Willenegger H. Manual of Internal Fixation. 3rd ed. Berlin, Heidelberg New York: Springer 1991.

² Buckley RE, Moran CG, Apivatthakakul T. AO Principles of Fracture Management: 3rd ed. Vol. 1: Principles, Vol. 2: Specific fractures. Thieme; 2017.

Preoperative Planning for all Schanz Screws and Steinmann Pins

All External Fixators must be affixed within the recommended zones described below.

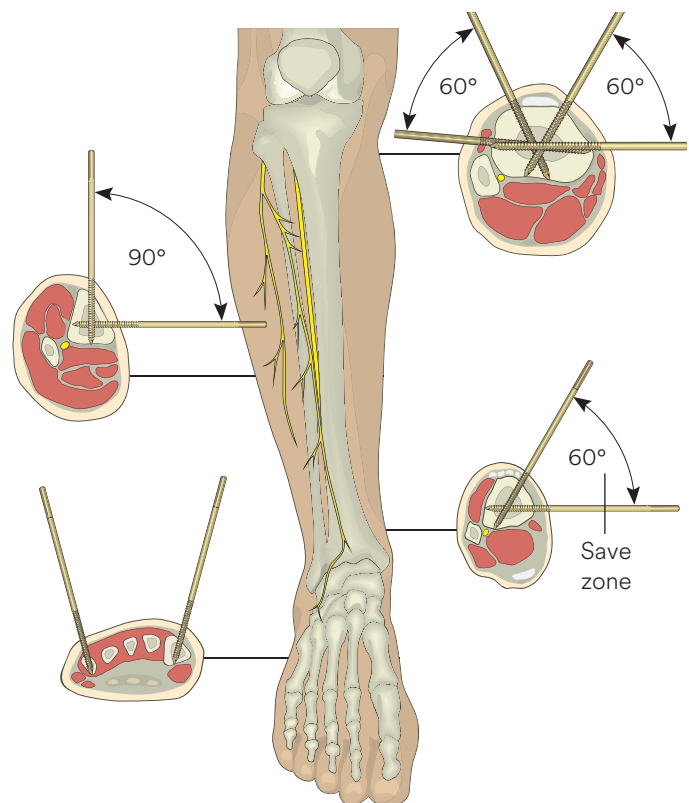
The construction may not hinder the approach for a primary wound debridement or for a secondary operation. Skin transplants, sequestrectomies, bone grafting or a later osteosynthesis must be performable without restriction.

Surgical approach to the tibia

The soft tissue zone through which Schanz Screws can be inserted without damaging important structures (vessels, nerves, muscles and tendons) is anteromedial to the tibia. The angles of this safe zone vary.

If the lateral surface of the distal third of the tibia is avoided, damage to the anterior tibial artery can be avoided.

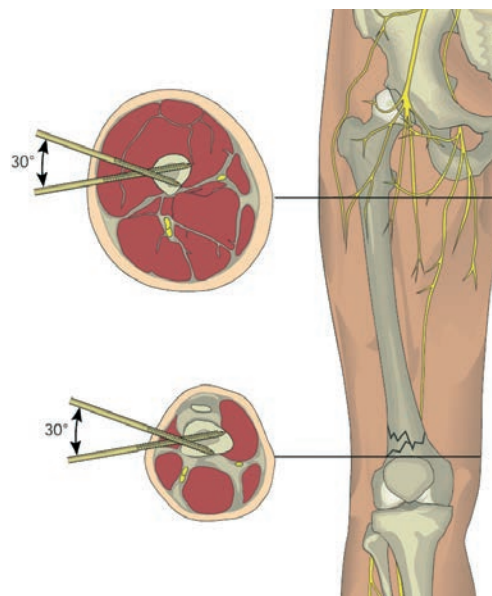
If the ventral zone of the distal tibia is avoided, interference with the tendons can also be avoided.



Zones for pin placement in tibia

Surgical approach to the femur

A lateral approach to the femur within a 30° angle is recommended. A medial approach is also possible from a distal direction.



Surgical approach to the pelvis

There are two recommended options for pin placement of the external fixation assembly in the pelvis.

Supraacetabular pin placement

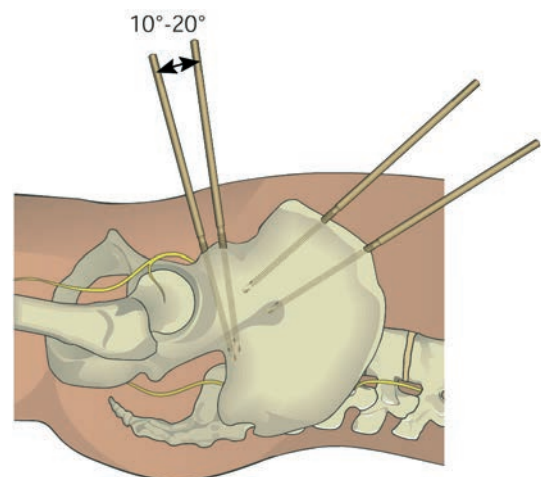
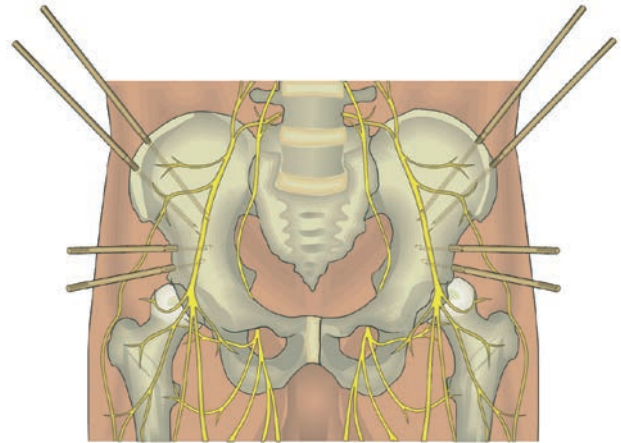
Given the pronounced bone structure, the more technically difficult supraacetabular pin placement is preferred over that of the iliac crest. Proceeding from the superior anterior crest, the site of entry is approximately 4–6 cm in a caudal direction, and 3–4 cm in a medial direction. When the patient is in a supine position, the alignment for drilling the screws is angled approximately 20° in a cranial direction and 30° inward.

Iliac crest pin placement

▲ Precaution:

To keep from damaging the femoral cutaneous nerve, avoid insertion up to 15 mm in a dorsal direction from the superior anterior iliac spine.

The orientation of the os ilium can be determined by palpation with a finger or an additional instrument. The screws are then inserted delicately between the two laminae of the os ilium.

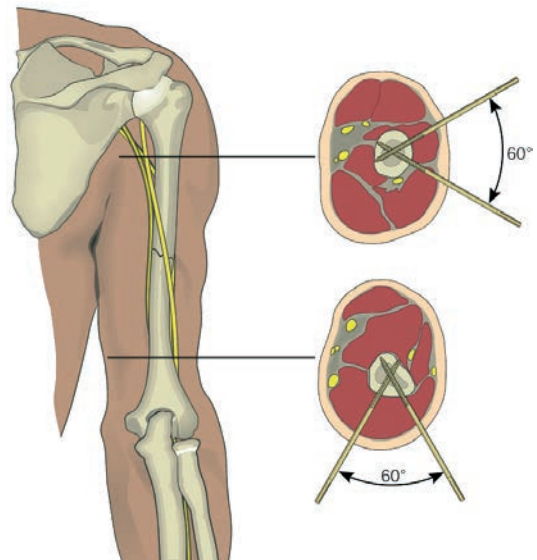


Approach to the humerus

Distally, a dorsal approach to the humerus is appropriate.

▲ Precautions:

When dealing with the humerus, primary consideration should be given to the radial and axillary nerves. Distally, a dorsal approach to the humerus is appropriate. Proximally, it is recommendable to introduce the Schanz Screws from a ventrolateral direction, caudal to the path of the axillary nerve.



Setting the Schanz Screws and Steinmann Pins

Seldrill Schanz Screw

The following steps will be explained with reference to a \varnothing 5.0 mm self-drilling, self-tapping (Seldrill) Schanz Screw, and a \varnothing 5.0 mm Schanz Screw inserted in the diaphyseal region of the tibia.

▲ Precaution:

Select the appropriate Schanz Screw (self-tapping, Seldrill, Hydroxyapatite) or Steinmann pin for the patient's bony anatomy.

Seldrill Schanz Screw

The Seldrill is a self-drilling, self-tapping Schanz Screw.

■ Note:

When the adaptors for Schanz Screws are used, the Seldrill Schanz Screws as well as all other self-drilling and all Steinmann pins do not have to be clamped in the drill chuck. The adaptors are compatible with the universal chuck and AO/ASIF Quick Coupling.



1. Set the drill sleeves on the bone

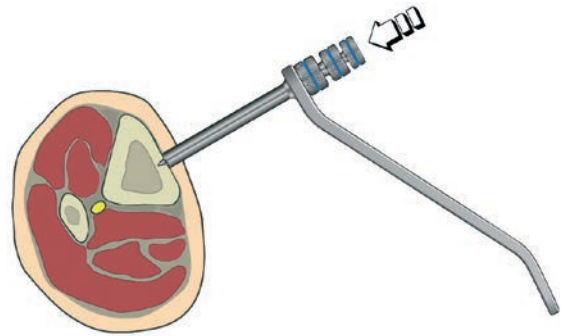
Required instruments

395.911	Handle for Drill Sleeve
395.921	Drill Sleeve 6.0/5.0 short, with thread
395.912	Drill Sleeve 5.0/3.5, short
394.181	Trocar Ø 3.5 mm, short

Insert the drill sleeve assembly through a stab incision and set it directly on the bone surface. Then remove the trocar Ø 3.5 mm and the drill sleeve 5.0/3.5.

▲ Precautions:

- Instruments and screws may have sharp edges or moving joints that may pinch or tear user's glove or skin.
- Handle devices with care and dispose worn bone cutting instruments in an approved sharps container.



2. Insert Seldrill Schanz Screws

Required instruments

X94.782–788*	Seldrill Schanz Screws Ø 5.0 mm
395.911	Handle for Drill Sleeve
395.921	Drill Sleeve 6.0/5.0 short, with thread
393.103	Adapter for Seldrill Schanz Screws Ø 5.0 mm
type-dependent	Drill with attachment for AO/ASIF Quick Coupling

Insert the Seldrill Schanz Screw in the Ø 5.0 mm adapter, and use the drill to screw it through the drill sleeve 6.0/5.0 until the drill tip is anchored in the distant cortical bone.

If it is difficult to determine whether the screw has entered the opposite side of the cortical bone, it is recommendable to check the screw's penetration depth and position with the image intensifier.

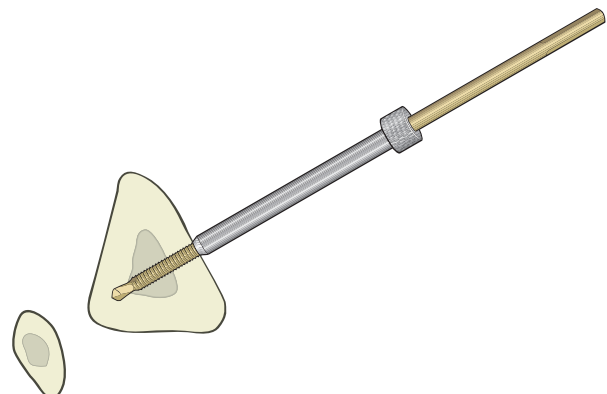
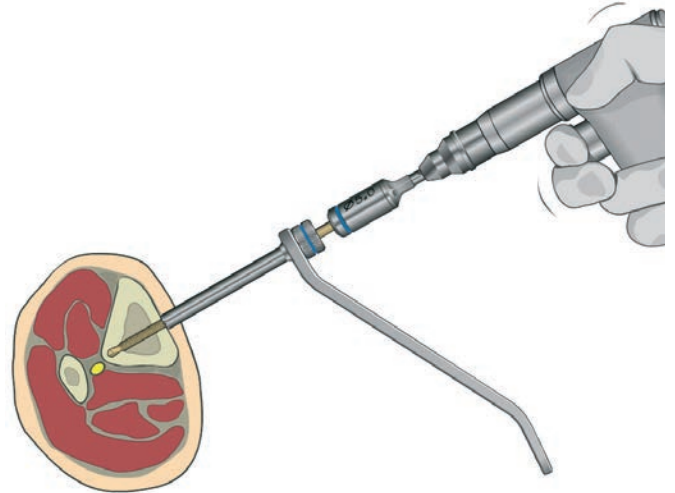
After screwing in the Seldrill Schanz Screw, remove the drill sleeve and the drill with the adapter.

▲ Precautions:

- The Seldrill Schanz Screw has been developed to minimize heat development. Nevertheless, slow insertion and additional cooling (for example with a Ringer solution) are recommended.
- The tip of the Seldrill Schanz Screw should be embedded in the far cortex to effectively resist cantilever forces and to provide sufficient stability.

■ Note:

Less experienced users are advised to use a hand drill when placing the Seldrill Schanz Screw in the far cortex.



The Seldrill Schanz Screw should be embedded in the far cortex:

* X=2 Stainless Steel
X=4 Titanium (TiCP)

Alternative technique:

Required instruments

X94.782–788*	Seldrill Schanz Screws Ø 5.0 mm
395.911	Handle for Drill Sleeve
395.921	Drill Sleeve 6.0/5.0, short, with thread
395.912	Drill Sleeve 5.0/3.5, short
394.181	Trocar Ø 3.5 mm, short
393.103	Adapter for Seldrill Schanz Screws Ø 5.0 mm
393.100	Universal Chuck with T-Handle
type-dependent	Drill with attachment for AO/ASIF Quick Coupling

Insert the Seldrill Schanz Screw Ø 5.0 mm in the adapter, and use the drill to screw it through the drill sleeve 6.0/5.0 into the near cortical bone.

Remove the drill and replace it with the universal drill chuck with the T-handle (393.100). The screw can now be delicately screwed manually into the middle of the distant cortical bone. It is not necessary to completely penetrate the distant cortical bone since anchoring the thread in the near cortical bone and sinking the drill tip in the distant cortical bone absorbs bending force.

Remove the drill sleeve and the universal chuck with T-handle.

▲ Precaution:

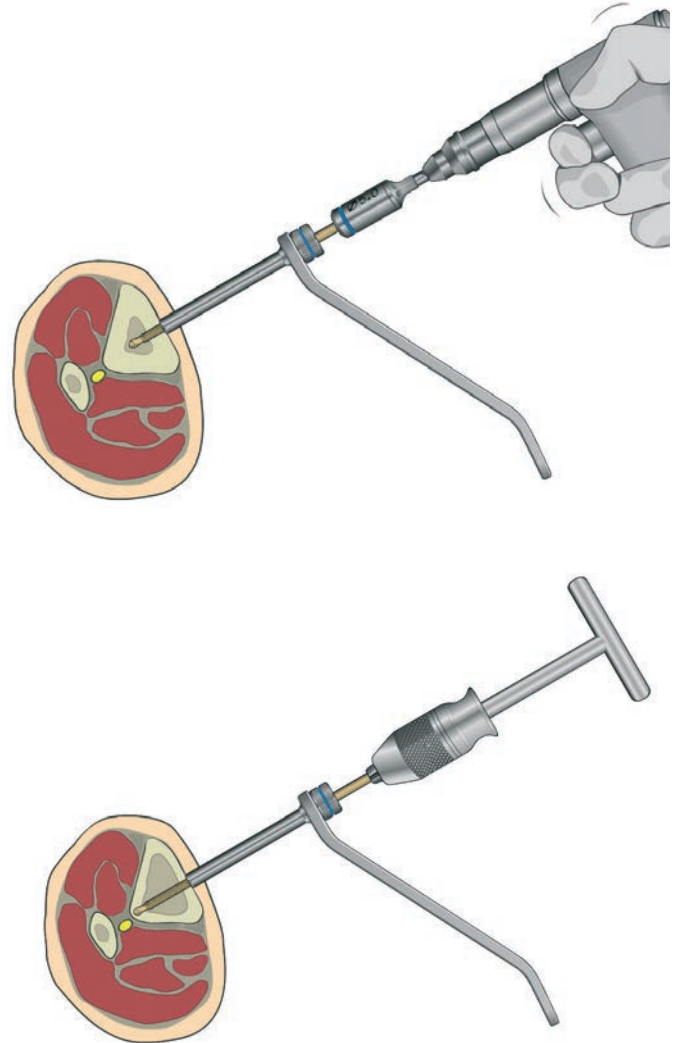
Only when bones are osteoporotic does the Seldrill Schanz Screw have to be screwed a bit further into the distant cortical bone, and it may even slightly penetrate through it since this can increase anchoring stability.

■ Note:

A Seldrill Schanz Screw can be turned back without loosening as the thread is not conical.

Use in the metaphyseal region

The individual surgical steps are the same as when the screws are used in the shaft area.



* X=2 Stainless Steel
X=4 Titanium (TiCP)

Self-tapping Schanz Screw

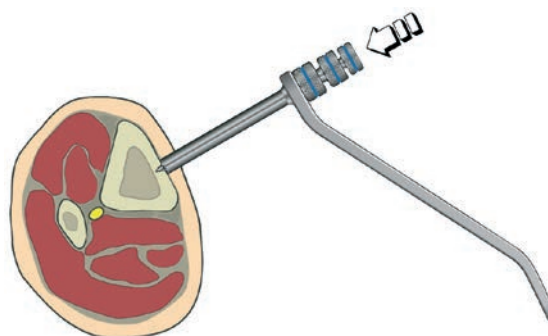
Instead of self-drilling Schanz Screws (Seldrill), self-tapping screws can also be used. In contrast to the Seldrill Schanz Screws, self-tapping screws must be predrilled.

1. Set the drill sleeve assembly on the bone

Required instruments

395.911	Handle for Drill Sleeve
395.921	Drill Sleeve 6.0/5.0 short, with thread
395.912	Drill Sleeve 5.0/3.5, short
394.181	Trocar Ø 3.5 mm, short

Insert the drill sleeve assembly through a stab incision and set it directly on the bone surface and remove the trocar Ø 3.5 mm.



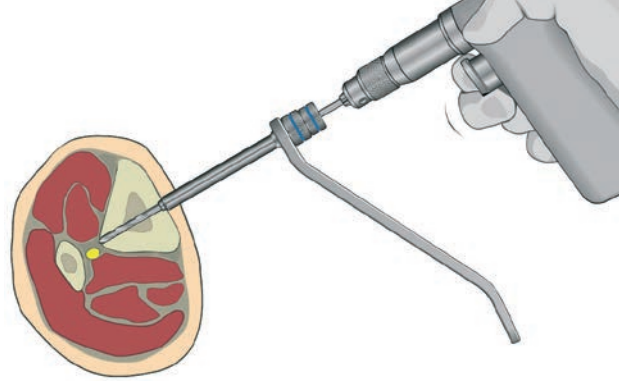
2. Predrilling

Required instruments

310.370	Drill Bit \varnothing 3.5 mm, length 195/170 mm, 2-flute, for Quick Coupling
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type-dependent	Drill with attachment for AO/ASIF Quick Coupling
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Drill through both sides of the cortical bone with the \varnothing 3.5 mm drill bit, then remove the drill sleeve 5.0/3.5.



3. Insert the self-tapping Schanz Screw

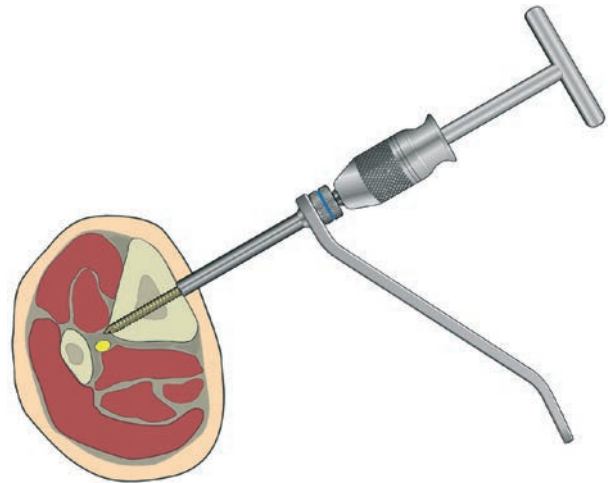
Required instruments

X94.520–570*	Self-Tapping Schanz Screw
395.911	Handle for Drill Sleeve
395.921	Drill Sleeve 6.0/5.0 short, with thread
393.100	Universal Chuck with T-Handle

The Schanz Screw can now be screwed in through the drill sleeve 6.0/5.0. The tip must be anchored in the distant cortical bone to absorb bending force.

▲ Precaution:

The tip of the Self-tapping Schanz Screw should be embedded in the far cortex to effectively resist cantilever forces and to provide sufficient stability.



* X=2 Stainless Steel
X=4 Titanium Alloy (TAN)

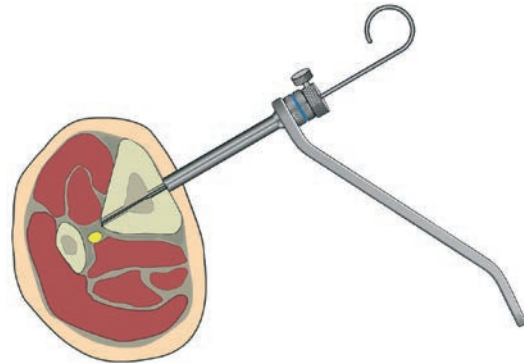
Alternative technique using the length gauge

Alternately, the length of the required Schanz Screw can also be precisely checked using the length gauge.

Required instruments

395.911	Handle for Drill Sleeve
395.921	Drill Sleeve 6.0/5.0 short, with thread
393.780	Depth Gauge for Schanz Screws
393.100	Universal Chuck with T-Handle

After predrilling as described in step 2, the length gauge is guided through the drill sleeve 6.0/5.0 and hooked in the distant cortical bone.



Then move the retaining disk to the height of the drill sleeve and lock it with the locking screw.

Remove the length gauge, and insert the tip of the Schanz Screw into the recess of the retaining disk. Slide the universal chuck over the smooth shaft of the Schanz Screw to the height of the tip of the length gauge, and tighten the chuck on the Schanz Screw. Determining the length in this manner will ensure that the screw will be firmly anchored in the distant cortical bone.

The Schanz Screw can now be screwed in through the drill sleeve 6.0/5.0 until the drill chuck stops on the drill sleeve.

■ Note:

If the Schanz Screw is screwed in beyond this point, it will strip the thread due to the resistance of the drill sleeve.



▲ Precautions:

- Implant sites should be meticulously cared to avoid pin-tract infection. Schanz Screws and Steinmann pins may be surrounded with antiseptic coated foam sponges in an effort to avoid infection. An implant-site care procedure should be reviewed with the patient.
- To minimize the risk of pin tract infection the following points should be observed:
 - a. Placement of Schanz Screws and Steinmann pins taking anatomy into consideration (ligaments, nerves, arteries).
 - b. Slow insertion and/or cooling, particularly in dense, hard bone to avoid heat necrosis.
 - c. Release of skin tension at soft tissue entry point of implant.

Steinmann Pins

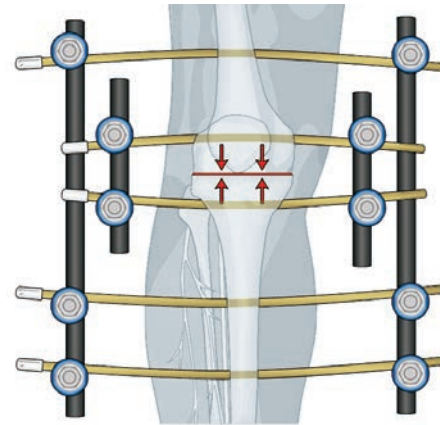
The following steps will be explained with reference to a symmetrical compression (generally required for arthrodesis and osteotomies) that is best generated using a bilateral frame construction with Steinmann pins.

Bilateral frames for arthrodesis

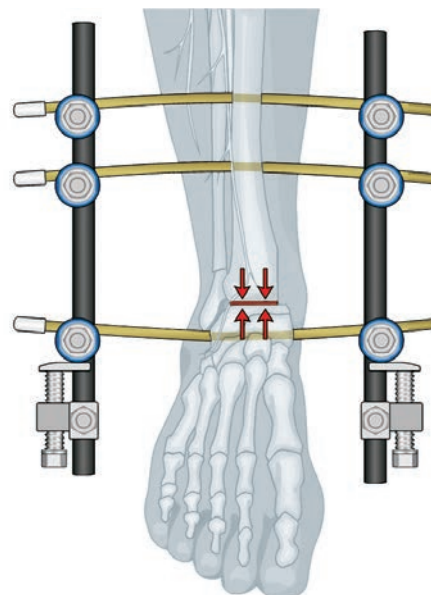
Required instruments

X93.500– X93.590*	Steinmann Pin Ø 5.0 mm with trocar tip
394.800– 394.870	Carbon Fibre Rod Ø 11.0 mm
390.008	Clamp, clip-on, self-holding
321.160	Combination Wrench Ø 11.0 mm
393.420	Protective Cap, for Schanz Screws and Steinmann Pins Ø 5.0 mm
393.760	Compressor, open
310.370	Drill Bit Ø 3.5 mm, length 195/170 mm, 2-flute, for Quick Coupling

The large external fixator enables compression by pretensioning the Steinmann pins in relation to each other. Stability is attained by first untightening the relevant clamp nuts, then generating the desired compression using the open compressor, and then retightening the nuts.



Knee arthrodesis



Ankle arthrodesis

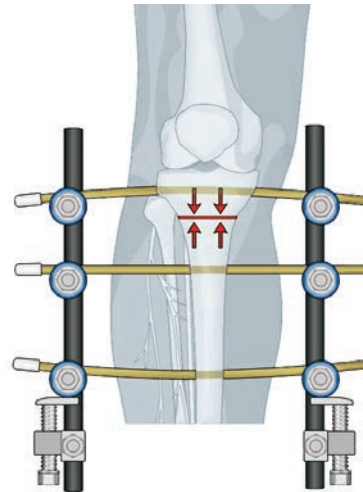
* X=2 Stainless Steel
X=4 Titanium Alloy (TAN)

Bilateral frames for Osteotomies

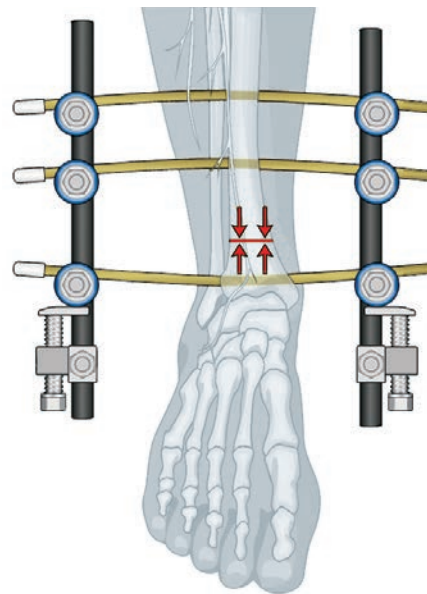
Required instruments

X93.500– X93.590*	Steinmann Pin Ø 5 mm with trocar tip
394.800– 394.870	Carbon Fibre Rod Ø 11.0 mm
390.008	Clamp, clip-on, self-holding
321.160	Combination Wrench Ø 11.0 mm
393.420	Protective Cap, for Schanz Screws and Steinmann Pins Ø 5.0 mm
393.760	Compressor, open
310.370	Drill Bit Ø 3.5 mm, length 195/170 mm, 2-flute, for Quick Coupling

In the case of osteotomies of the proximal and distal tibia, inner fixation is generally preferred if there are no associated soft-tissue problems.



Proximal tibia osteotomy



Distal tibia osteotomy

* X=2 Stainless Steel
X=4 Titanium Alloy (TAN)

Product Information

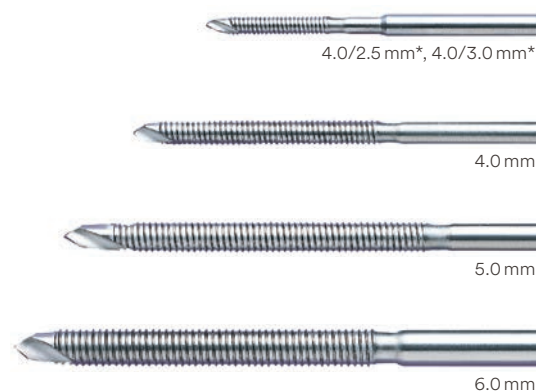
The Seldrill Schanz Screws

Item no. Titanium	Diameter (mm)	Total length (mm)	Thread length (mm)	Item no. Stainless steel
494.769	4.0/2.5*	80	20	294.769
494.771	4.0/3.0*	80	20	294.771
494.772	4.0/3.0*	100	20	294.772
494.774	4.0	60	20	294.774
494.775	4.0	80	20	294.775
494.776	4.0	100	30	294.776
494.777	4.0	125	40	294.777
494.778	4.0	150	40	294.778
494.779	4.0	175	40	294.779
494.782	5.0	100	30	294.782
494.783	5.0	125	40	294.783
494.784	5.0	150	60	294.784
494.785	5.0	175	60	294.785
494.786	5.0	200	80	294.786
494.788	5.0	250	80	294.788
494.792	6.0	100	30	294.792
494.793	6.0	125	40	294.793
494.794	6.0	150	60	294.794
494.795	6.0	175	60	294.795
494.796	6.0	200	80	294.796
494.798	6.0	250	80	294.798

Pure Titanium Seldrill Schanz Screws



Stainless Steel Seldrill Schanz Screws



* Shaft/thread diameter. Shaft and thread diameters are the same for all other sizes listed. All SELDRILL Schanz Screws are available non-sterile or sterile packed.
Add suffix "S" to article number to order sterile product.

Schanz Screw (Self-tapping)

	Ø (mm)	Length (mm)
X94.300	4.0/3.0*	80/20
X94.430	4.0	60/25
X94.440	4.0	80/25
X94.445	4.0/2.5*	80/20
X94.450	4.0	100/25
X94.460	4.0	125/25
X94.520	5.0	100/50
X94.530	5.0	125/50
X94.540	5.0	150/50
X94.550	5.0	175/50
X94.560	5.0	200/50
X94.570	5.0	250/50
X94.650	6.0	100/50
X94.660	6.0	130/50
X94.670	6.0	160/50
X94.680	6.0	190/50

* Shaft/thread diameter

Shaft and thread diameters are the same for all other sizes.

X=2 Stainless Steel

X=4 Titanium Alloy (TAN)

All Schanz Screws Self-tapping are available non-sterile or sterile packed.
Add suffix "S" to article number to order sterile product.

Hydroxyapatite-coated Schanz Screws

Self-drilling Schanz Screws, HA coating, Pure Titanium, sterile

	Ø (mm)	Length (mm)
494.784SHA	5.0	150
494.785SHA	5.0	175
494.786SHA	5.0	200



Self-drilling Schanz Screws, HA coating, Stainless Steel, sterile

	Ø (mm)	Length (mm)
294.776SHA	4.0	100
294.777SHA	4.0	125
294.778SHA	4.0	150
294.779SHA	4.0	175
294.782SHA	5.0	100
294.783SHA	5.0	125
294.784SHA	5.0	150
294.785SHA	5.0	175
294.786SHA	5.0	200
294.788SHA	5.0	250
294.796SHA	6.0	200



▲ WARNING:

DePuy Synthes Hydroxyapatite (HA) coated Schanz Screws are only available sterile packed. Do not attempt to re-sterilize.

Schanz Screws, HA coating, Stainless Steel, sterile

	Ø (mm)	Length (mm)
294.450SHA	4.0	100
294.460SHA	4.0	120
294.520SHA	5.0	100
294.530SHA	5.0	125
294.540SHA	5.0	150
294.550SHA	5.0	170
294.560SHA	5.0	200
294.570SHA	5.0	250
294.670SHA	6.0	160
294.680SHA	6.0	190
294.730SHA	4.5	125
294.740SHA	4.5	150
294.750SHA	4.5	175
294.760SHA	4.5	200
294.000.425	4.0/2.7	50/10
294.000.426	4.0/2.7	60/10
293.000.302	3.0	150



294.54SHA

▲ WARNING:

DePuy Synthes Hydroxyapatite (HA) coated Schanz Screws are only available sterile-packed. Do not attempt to re-sterilize.

Steinmann Pins

Steinmann Pin with trocar tip Stainless Steel or Titanium Alloy (TAN)

	Ø (mm)	Length (mm)
X93.350	3.5	125
X93.360	3.5	150
X93.400	4.0	150
X93.410	4.0	175
X93.420	4.0	200
X93.440	4.5	125
X93.450	4.5	150
X93.460	4.5	175
X93.470	4.5	200
X93.480	4.5	250
X93.490	4.5	225
X93.500	5.0	150
X93.510	5.0	175
X93.520	5.0	200
X93.530	5.0	250
X93.540	5.0	300
X93.580	5.0	225
X93.590	5.0	275

Steinmann Pin with middle thread (Stainless Steel)

	Ø (mm)	Length (mm)
293.640	5.0	150
293.680	4.5	175
293.690	5.0	175
293.730	4.5	200
293.740	5.0	200
293.790	5.0	225
293.840	5.0	250
293.890	5.0	275
293.940	5.0	300



X=2 Stainless Steel
X=4 Titanium Alloy (TAN)

Steinmann Pin with “middle” thread (TAV)

	Ø (mm)	Length (mm)
493.740	5.0	200
493.840	5.0	250

Steinmann Pin with drill tip (Stainless Steel)

	Ø (mm)	Length (mm)
293.130	4.5	150
293.140	4.5	175
293.150	4.5	200
293.220	5.0	125
293.230	5.0	150
293.240	5.0	175
293.250	5.0	200
293.260	5.0 </td <td>225</td>	225
293.270	5.0	250
293.280	5.0	275
293.290	5.0	300



All Steinmann pins are available nonsterile or sterile packed.
Add suffix “S” to article number to order sterile product.

MRI Information

Non-clinical testing has been performed to assess Torque, Displacement and Image Artifacts according to ASTM F 2213, ASTM F 2052 and ASTM F 2119 and Radio-Frequency-(RF-)induced heating according to ASTM F 2182.

These tests have not been done on the individual implants but on the entire external fixator construct.

Please refer to the surgical technique of the corresponding External Fixator system.

Please refer to the corresponding Instructions for Use for specific information on Intended use, Indications, Contraindications, Warnings and Precautions, Potential Adverse Events, Undesirable Side Effect and Residual Risks. Instruction for Use are available at www.e-ifu.com and/or www.depuysynthes.com/ifu

Not all products are currently available in all markets.
This publication is not intended for distribution in the USA.



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