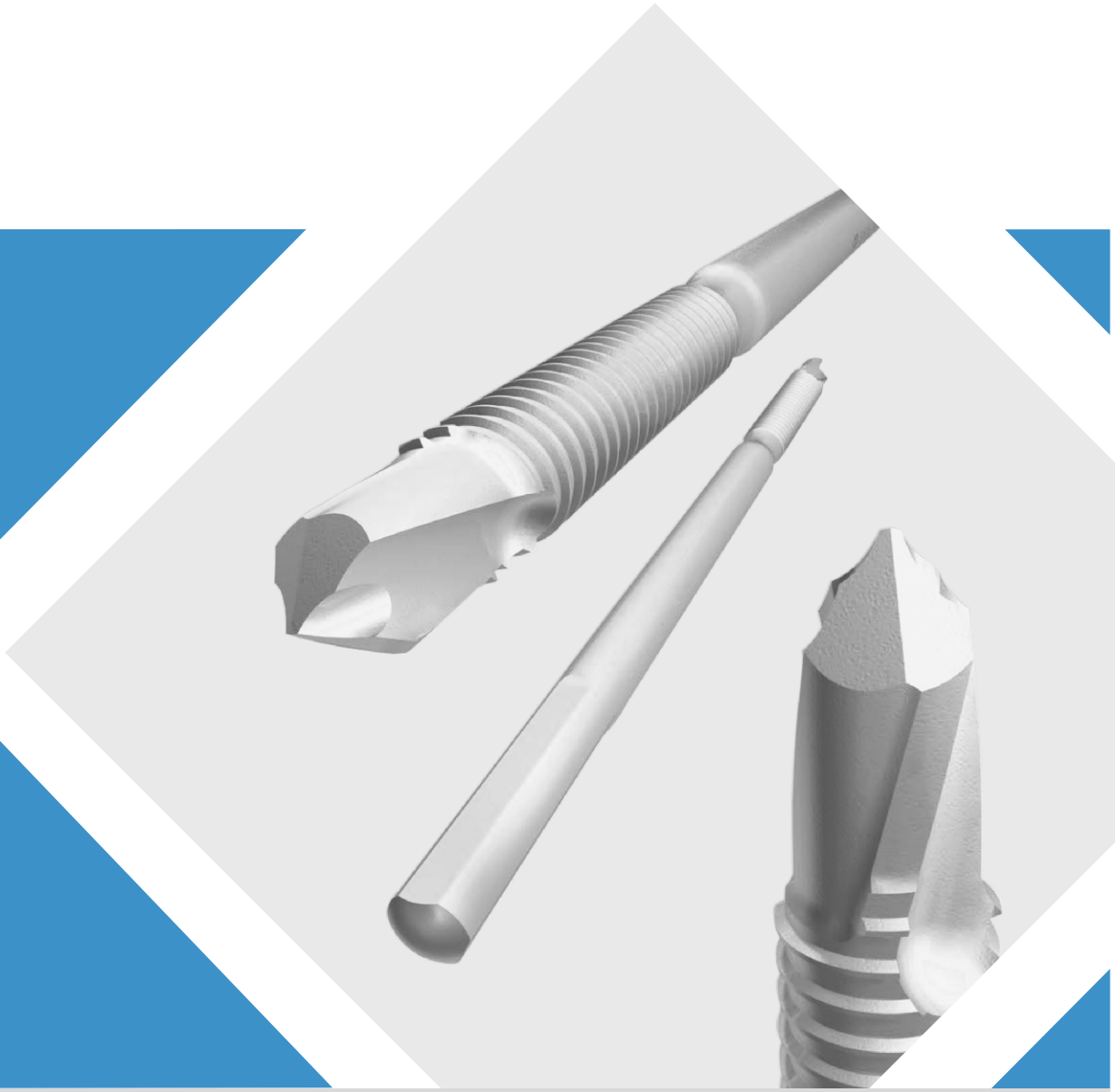
Auxein



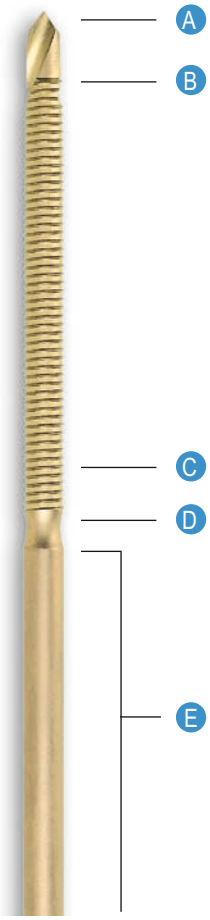
# Surgical Technique

*Front threaded pins and steinmann pins*

www.auxein.com

## A Efficient drill bit and tap

- One-step insertion
- Precise pilot hole and threads
- Reduced heat generation
- Decreased insertion torque




## B Short, 2% core taper provides optimal radial preload

- Reduces micromotion and pin-tract infections

## C Symmetrical thread profile

- Improved pullout strength in diaphyseal and metaphyseal bone
- Improved anchorage in cancellous bone due to increased thread length

## D Smooth thread/shaft transition area

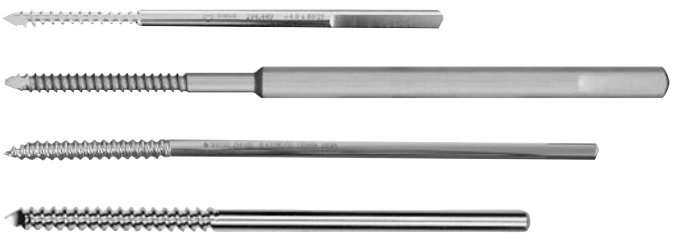
- Reduced stress riser

## E Standard shaft diameters

- Compatible with Auxein external fixators

## Self-tapping front threaded pin

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



# Hydroxyapatite-Coated front threaded pin

**Hydroxyapatite front threaded pin**

- Threads are coated with hydroxyapatite (HA) to enhance fixation at the pin-bone interface and reduce the incidence of pin loosening

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

## Steinmann Pin

**Steinmann Pin with trocar tip**

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

## Intended Use, Indications and Contraindications

**Intended Use:**

Auxein, Self-tapping, Hydroxyapatite-coated front threaded pins and Steinmann Pins are intended for use with an external fixation system.

**Indications:**

Auxein, Self-tapping, Hydroxyapatite-coated front threaded pins and Steinmann Pins are indicated for use with an external fixation system.

**Contraindications:**

No specific contraindications.

**Warnings:**

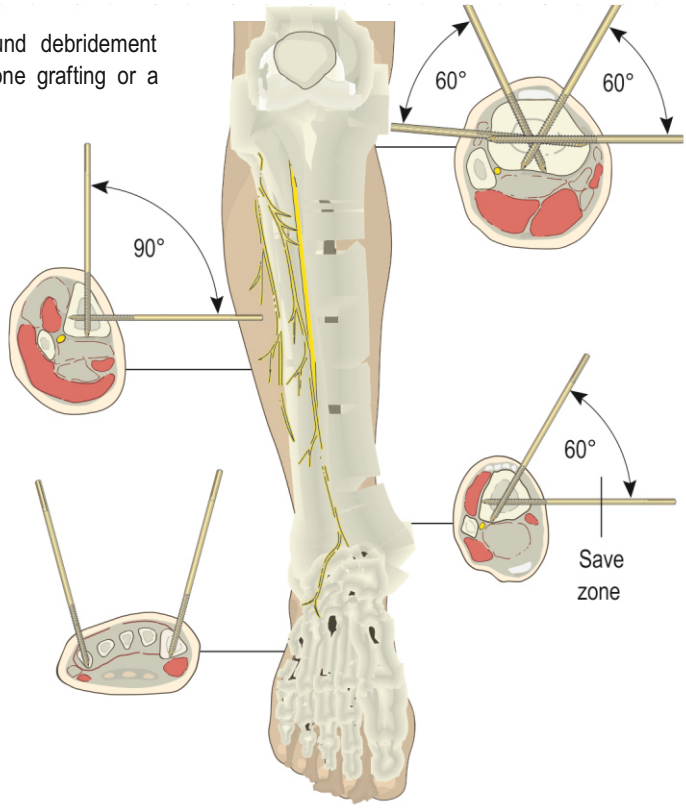
Auxein hydroxyapatite (HA) coated front threaded pins are only available sterile packed. Do not attempt to re-sterilize.

Auxein, Self-tapping, Hydroxyapatite-coated front threaded pins and Steinmann Pins are not approved for screw attachment or fixation to the posterior elements (pedicles) of the cervical, thoracic, or lumbar spine.

# 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 osteo Auxeinis must be performable without restriction.




Zones for pin placement in tibia

### Surgical approach to the tibia

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

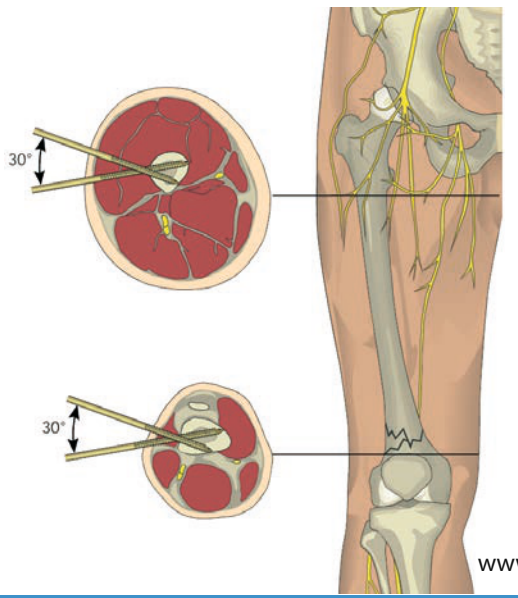
If the lateral surface of the distal third of the tibia is avoided, damage to the anterior tibial artery can be avoided.

If the ventral zone of the distal tibia is avoided, interference with the tendons can also be avoided. In addition, this mini mizes the probability of potential pin channel infection.

### Surgical approach to the femur

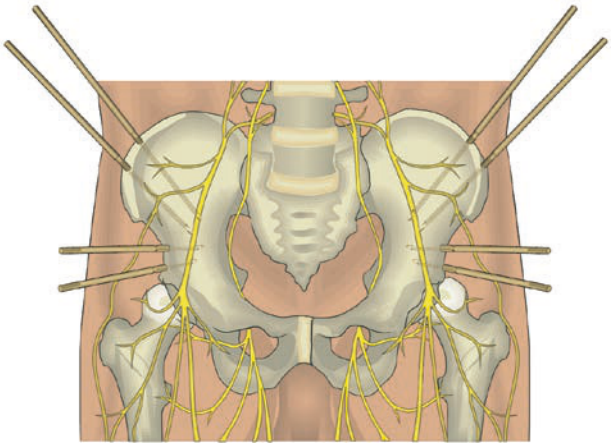
A lateral approach to the femur within a 30° angle is recommended.

A medial approach is also possible from a distal direction.



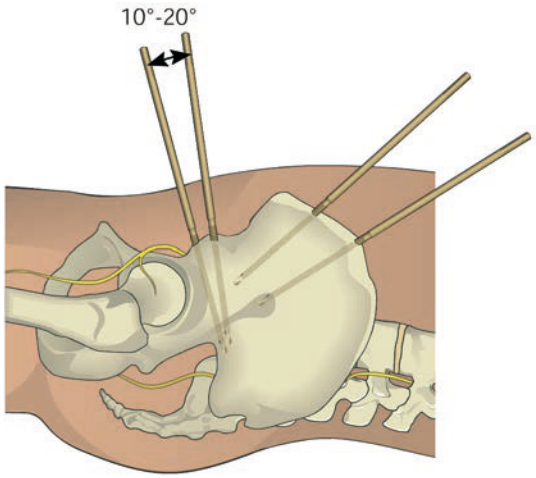
## Surgical approach to the pelvis

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 direc tion, 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° in ward.



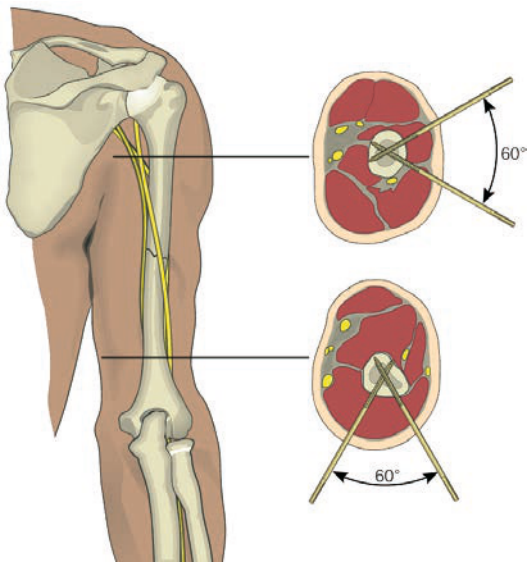

### Iliac crest pin placement

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

The orientation of the os ilium can be determined by palpa tion 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 con sideration 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 front threaded pins and Steinmann Pins front threaded pin

The following steps will be explained with reference to a 5.0 mm self-drilling, self-tapping front threaded pin, and a 5.0 mm front threaded pin inserted in the diaphyseal region of the tibia.

**Precaution:**

Select the appropriate front threaded pin (self tapping, Hydroxyapatite) or Steinmann pin for the patient's bony anatomy.

**front threaded pin:**

The is a self-drilling, self-tapping front threaded pin. The optimized radial preloading helps minimize the rate of pin infections.

**Note:**

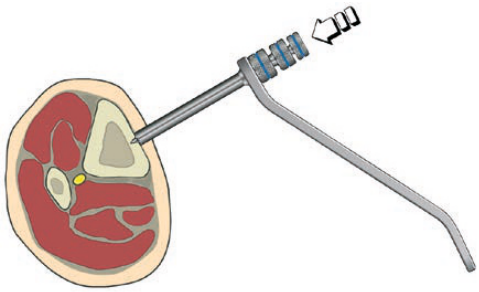
When the new adaptors for front threaded pins are used, the front threaded pins as well as all other self-drilling and all Steinmann pins do not have to be clamped in the drill chuck. The adapters are compatible with the universal chuck and AO/ASIF Quick Coupling.


**Note:**

The thread of the front threaded pins does not result in irritation of the soft tissue.

## Set the drill sleeves on the bone

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



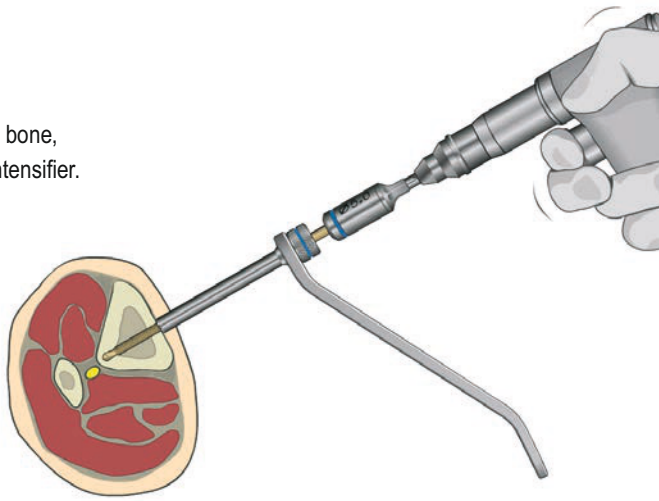
**Precautions:**

- 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.

## Insert front threaded pins

Insert the front threaded pin in the 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.



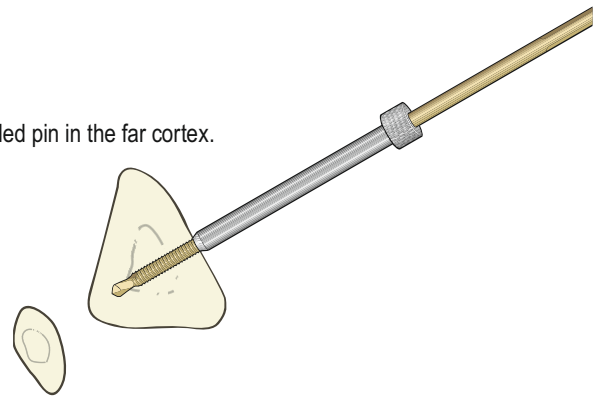
After screwing in the front threaded pin, remove the drill sleeve and the drill with the adapter.

**Precautions:**

- The front threaded pin 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 front threaded pin 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 front threaded pin in the far cortex.



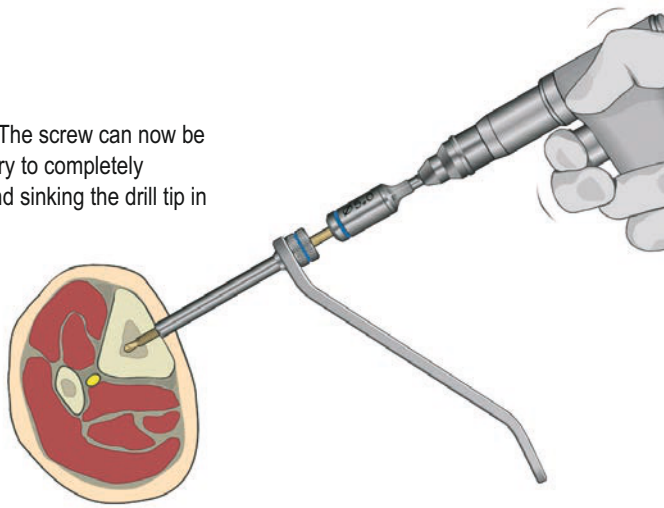
The front threaded pin should be embedded in the far cortex:

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

## Alternative technique:

Insert the front threaded pin 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.

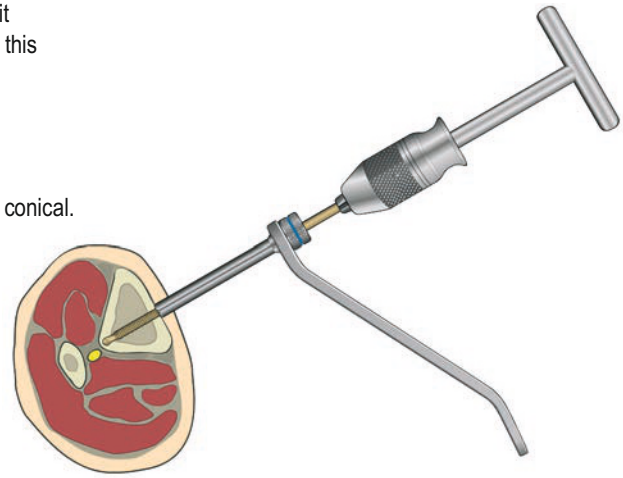
Remove the drill and replace it with the universal drill chuck with the T-handle (393.100). The screw can now be deli cately screwed manually into the middle of the distant cortical bone. It is not necessary to completely penetrate the distant cortical bone since anchoring the thread in the near cortical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



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

**Precaution:**

Only when bones are osteoporotic does the front threaded pin 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 front threaded pin can be turned back without loosening as the thread is not conical.

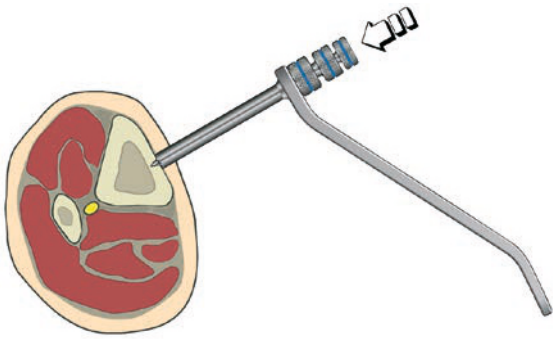
**Use in the metaphyseal region**

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 front threaded pin

Instead of self-drilling front threaded pins, self-tapping screws can also be used.
In contrast to the Schanz Screws, self-tapping screws must be predrilled.

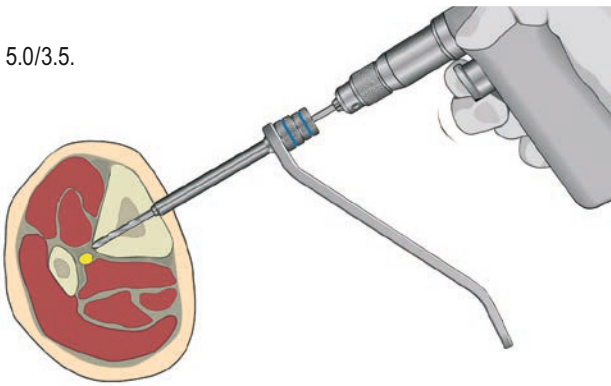


### Set the drill sleeve assembly on the bone

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

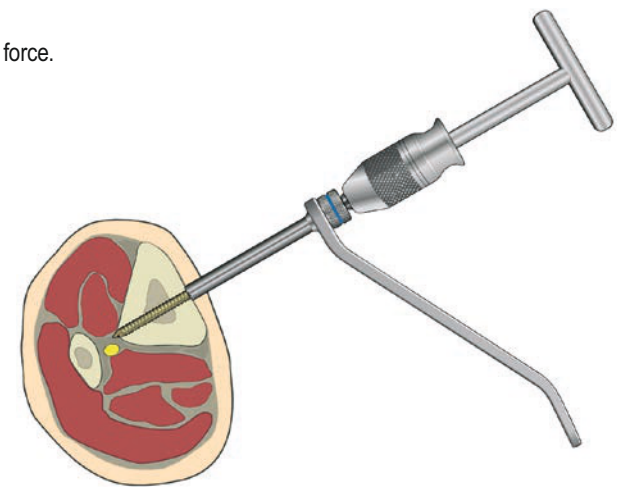
### Predrilling

Drill through both sides of the cortical bone with the 3.5 mm drill bit, then remove the drill sleeve 5.0/3.5.



### Insert the self-tapping front threaded pin

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



### Precaution:

The tip of the Self-tapping front threaded pin should be embed ded in the far cortex to effectively resist cantilever forces and to provide sufficient stability.

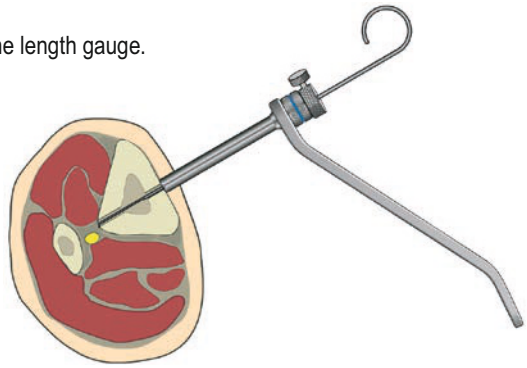
* X=2 Stainless Steel
X=4 Titanium Alloy (TAN)

## Alternative technique using the length gauge

Alternately, the length of the required front threaded pin can also be precisely checked using the length gauge.

After predrilling as described in step 2 on page 17, 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 front threaded pin to the height of the tip of the length gauge, and tighten the chuck on the front threaded pin. Determining the length in this manner will ensure that the screw will be firmly anchored in the distant cortical bone.

The front threaded pin 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 front threaded pin 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.
  front threaded pins 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.

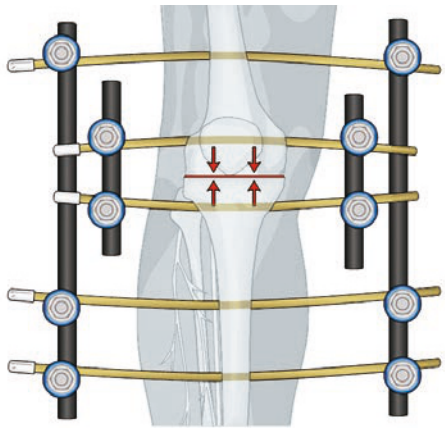
- To minimize the risk of pin track infection the following points should be observed:
  a) Placement of front threaded pins and Steinmann pins taking ies).
  b) Slow insertion and/or cooling, particularly in dense, hard bone to avoid heat necrosis.
  c) Release of skin tension at soft tissue entry point of implant.

## Steinmann Pins

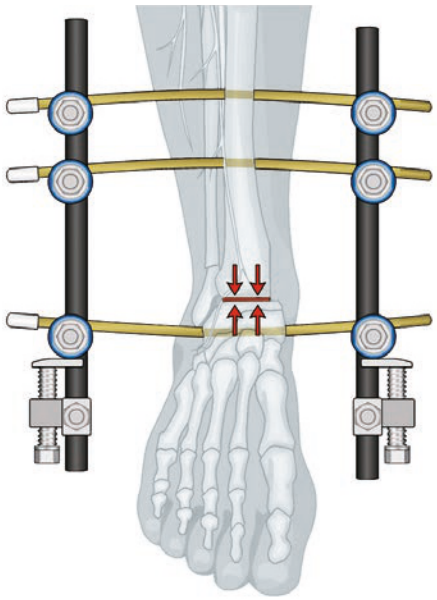
The following steps will be explained with reference to a symmetrical compression (generally required for arthrodesis and osteotomies) that is best generated using a bilateral frame construction with Steinmann pins.

## Bilateral frames for arthrodesis

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

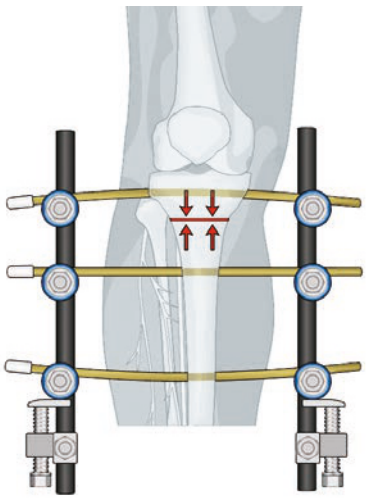


Knee arthrodesis

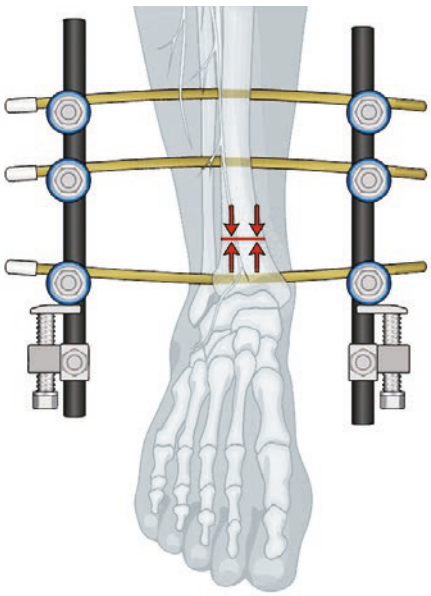


## Bilateral frames for Osteotomies

In the case of osteotomies of the proximal and distal tibia, inner fixation is generally preferred if there are no associated soft- tissue problems. Compression osteotomies with a bilateral frame construction are supportive of the metaphysis of rapid bone healing.



Proximal tibia osteotomy



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