

OPERATIVE TECHNIQUE

# JuniOrtho™

Plating System



# JuniOrtho™

## Plating System

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The surgical technique shown is for illustrative purposes only.

The technique(s) actually employed in each case will always depend upon the medical judgement of the surgeon exercised before and during surgery as to the best mode of treatment for each patient.

Please kindly refer to the product IFU PQJPS and to the reusable medical devices IFU PQRMD that contain Instructions for Use of the product.

## INTRODUCTION

The JuniOrtho™ Plating System (JPS) consists of 3 different plate sizes, identified as 3.0mm, 3.5mm and 5.0mm, available in different lengths according to the anatomical application. Plates have been designed to accept bone screws by means of suitable diameters.

Bone screws are available in 3 different diameters (3.0mm, 3.5mm and 5.0mm, corresponding to the plate size they can be used with) and different lengths as well as in locking and non-locking options.

Application and removal of the JPS can be performed with Orthofix general orthopedic instrumentation.

### Warnings

1. Ensure to position the plate parallel to the femoral shaft in the AP and lateral view, otherwise this may lead to variations to the desired neck-shaft angle and to undesired extension/flexion.
2. When using the image intensifier, the benefit of fluoroscopy should be weighed against the risk from radiation exposure on an individual patient basis.
3. The osteotomy must be parallel to the physis and perpendicular to the longitudinal axis of the tibia; otherwise, derotation will lead to angular deformity.

### Precautions

1. Use the image intensifier to ensure complete drilling of both cortices when inserting screws, to verify correct placement of the plate, wires and screws, and to avoid:
  - penetration of the growth plates of femoral head, proximal tibia or distal tibia;
  - screw loosening;
  - screw protrusion.
2. Make sure that the plate adheres well to the proximal fragment of the femur, as leaving too large a gap might lead to hardware or bone breakage.
3. Do not bend wires or screws during insertion especially when flexing the hip in lateral/axial view as this may result in errors in correction or wire or screw breakage.
4. Complete each locking screw insertion entirely before inserting the next screw to avoid a possible incorrect engagement of screw on the plate.
5. Screws must not be over-tightened during insertion, locking or compression, as this may cause damage of the implant, lack of compression or bone stripping. Always perform final tightening manually.
6. Use compression only where appropriate to avoid too much stress on the plate and screws.
7. Locking and non-locking screws must be used in the appropriate holes.
8. Care should be used in the handling and storage of the components. The implants should not be scratched, notched or otherwise damaged as these may reduce the functional strength of the component. Contouring or bending of an implant should be avoided.
9. It is surgeon's responsibility to select optimal type, size and position of plate and screws according to the patient characteristics, deformity pattern and resulting osteotomy characteristic. Improper positioning of plate and screws and omission to insert all the screws may result in loosening, bending, cracking, or fracture of the device or bone or both.

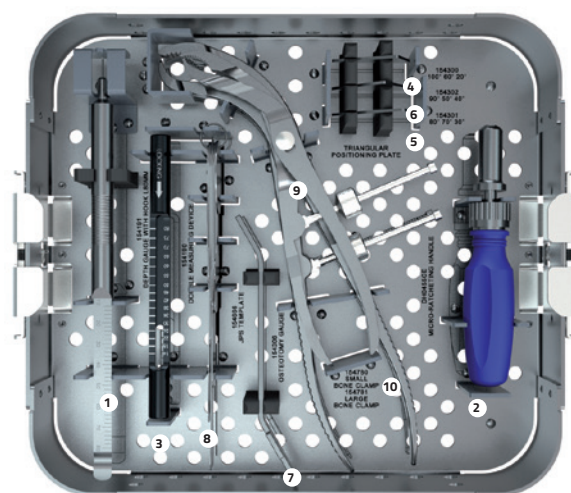
All Orthofix internal and external fixation products should be used together with their corresponding Orthofix implants, components and accessories. Their application should be performed with the specific Orthofix instrumentation, following carefully the surgical technique recommended by the manufacturer in the appropriate Operative Technique Manual.



## EQUIPMENT REQUIRED

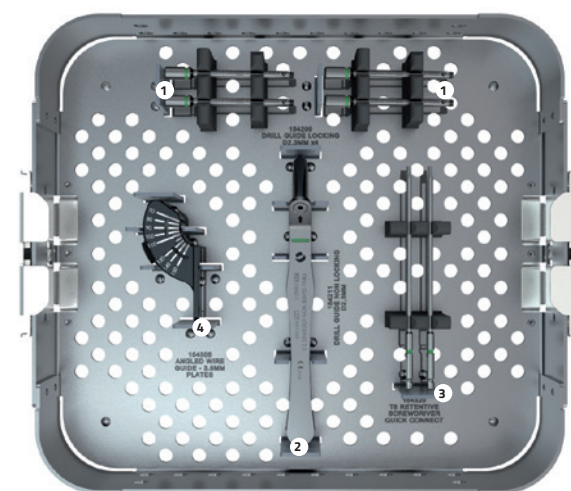
### GENERAL TRAY

Part#	Description
154191	1 JPS Depth Gauge With Hook L80MM
DH0455CE	2 Micro Ratcheting Handle with AO Connector Cannulated
154190	3 JPS Double Measuring Device
154300	4 SS Triangular Positioning Plate 60 degrees 100 degrees 20 degrees
154301	5 SS Triangular Positioning Plate 70 degrees 80 degrees 30 degrees
154302	6 SS Triangular Positioning Plate 90 degrees 50 degrees 40 degrees
154306	7 SS Osteotomy Gauge
154666	8 SS JPS Template
154780	9 SS Small Bone Clamp
154781	10 SS Large Bone Clamp
154998	JPS Modular Tray Lid
154999	JPS Modular General Instrument US (empty)



### 3.0MM TRAY

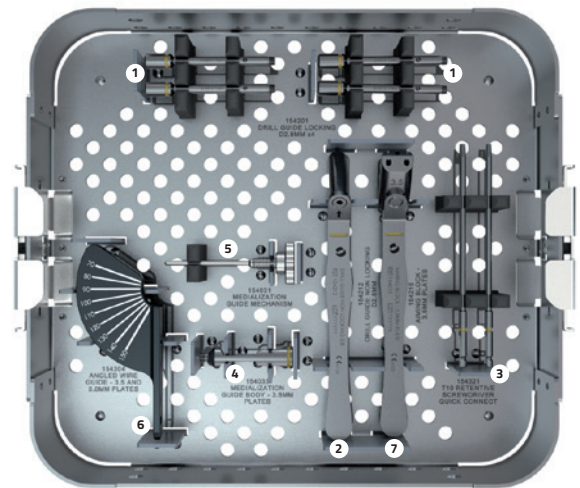
Part#	Description
154200	1 SS Drill Guide Locking D2.3mm
154211	2 SS Drill Guide Non-locking D2.3mm
154320	3 SS T8 Retentive Screwdriver Quick Connect
154305	4 AL Angled Wire Guide 3.0mm Plate
154995	JPS Modular Base 3.0mm Instrument (empty)





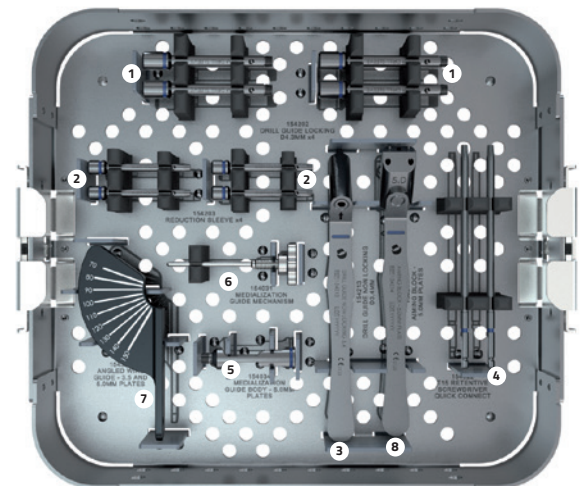
### 3.5MM TRAY

Part#	Description
154201	1 SS Drill Guide Locking D2.8mm
154212	2 SS Drill Guide Non-locking D2.8mm
154321	3 SS T10 Retentive Screwdriver Quick Connect
154033	4 SS Medialization Guide Body 3.5mm
154031	5 SS Medialization Guide Mechanism
154304	6 AL Angled Wire Guide 3.5mm and 5.0mm Plates
154215	7 SS Aiming Block - 3.5mm Plate
154996	JPS Modular Base 3.5mm Instrument (empty)



### 5.0MM TRAY

Part#	Description
154202	1 SS Drill Guide Locking D4.3mm
154203	2 SS Reduction Sleeve
154213	3 SS Drill Guide Non-locking D3.4mm
154322	4 SS T15 Retentive Screwdriver Quick Connect
154034	5 SS Medialization Guide Body 5.0mm
154031	6 SS Medialization Guide Mechanism
154304	7 AL Angled Wire Guide 3.5mm and 5.0mm Plates
154214	8 SS Aiming Block - 5.0mm Plate
154997	JPS Modular Base 5.0mm Instrument (empty)



## PROXIMAL FEMUR VARUS OSTEOTOMY WITH A 3.5MM OR 5.0MM PLATE

- Pre-operative planning
- Correction of deformities
- Plate and Screws
- Patient positioning and surgical approach
- Determination of anteversion
- Insertion of the 2.0mm positioning K-wires
- Osteotomy
- Plate positioning
- Measuring and insertion of the femoral neck proximal screws
- Reduction
- Drilling, measuring and insertion of the shaft screws
- Final fluoroscopic control
- Removal

### Pre-operative planning

#### Measuring of the correction angle

Measure the current neck-shaft angle and identify the desired neck-shaft angle.

The image in **Fig. 1a** should aid in determining correctly the various angles needed for calculating the correction angle.

Subtract the desired angle from the current neck-shaft angle to determine the required correction angle (**Fig. 1**).

*Example:*

Current neck-shaft angle:  $150^{\circ}$

Desired neck-shaft angle:  $120^{\circ}$

Correction angle:  $150^{\circ} - 120^{\circ} = 30^{\circ}$

The complimentary JPS pre-operative planning software may be useful during the planning phase, visualizing the anatomical angles and in simulating the calculation of the correction angle by overlaying the acquired digital radiological image.

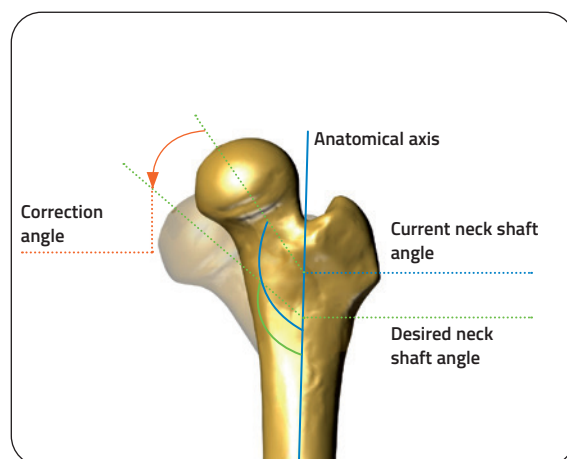
This operative technique explains the application of both the 3.5mm and 5.0mm proximal femoral plates. Most steps are identical; the steps that are different between the plates are indicated.

#### Plate selection

The angle of the plate should be close to the desired neck-shaft angle.

Desired neck-shaft angle:  $120^{\circ}$

Suggested plate angle: e.g.  $110^{\circ}$



**Fig. 1**

## Correction of deformities

### General Principles

A skeletal deformity is usually a three dimensional problem. The correction of a deformity requires an understanding of the effects of the adjustments or alterations in one plane on a three dimensional problem.

### Mechanical Axis

This is the line of force of the axial mechanical load in static weightbearing. In the tibia, it coincides with the anatomical axis. In the femur, it extends from the center of rotation of the femoral head to the center of the knee joint. For the lower limb, it extends from the center of the femoral head to the center of the tibio-talar joint, and should normally pass close to the center of the knee joint.

### Anatomical Axis

The mid diaphyseal line of a long bone is the anatomical axis. In a deformed bone, each segment of the bone will have a separate anatomical axis and they will intersect.

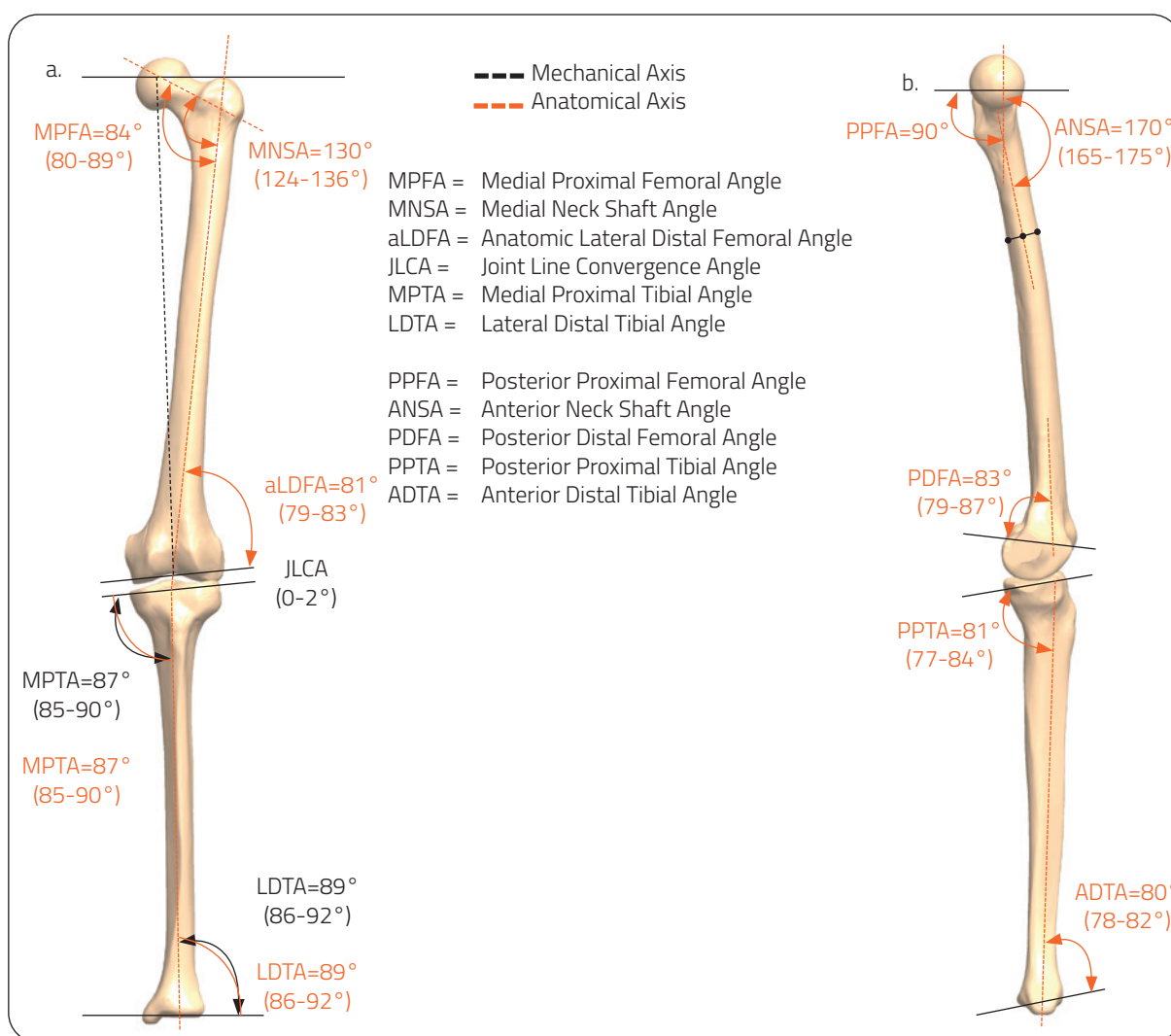


Fig. 1a

A line drawn from the center of the femoral head to the center of the tibial plafond should pass close to the center of the knee joint on a long leg view. If it does not, there is a Mechanical Axis Deviation (MAD).



## Measuring the K-wire angle

To determine the K-wire angle, add the chosen plate-screw angle to the previously calculated correction angle.

*Example:*

Chosen Plate-screw angle:  $110^{\circ}$

Required Correction angle:  $30^{\circ}$

K-wire angle:  $110^{\circ} + 30^{\circ} = 140^{\circ}$

(Fig. 2)

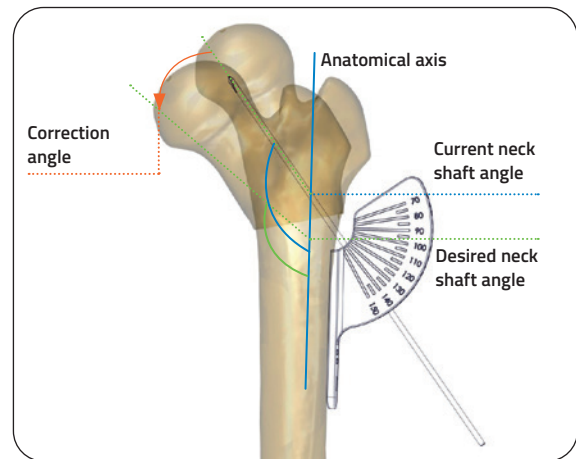


Fig. 2

## Plate and Screws

A: Femoral neck proximal screw holes

B: Femoral neck distal screw hole

C: Positioning K-wire hole

Shaft screws: shaft screw holes

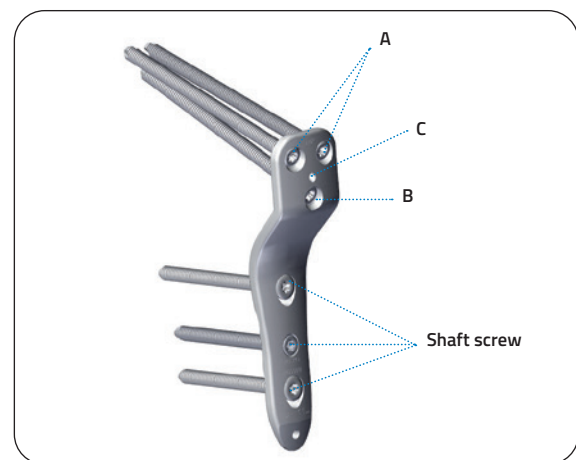
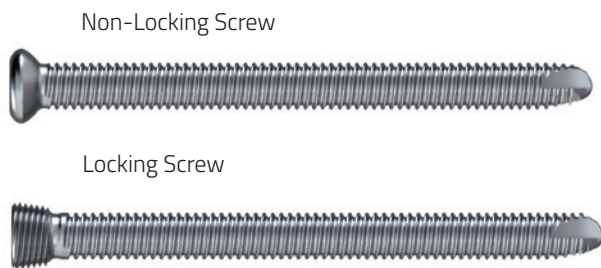


Fig. 3

Templates can be used to select the appropriate plate for the patient: the lines in Fig. 4 identify the different sizes available.

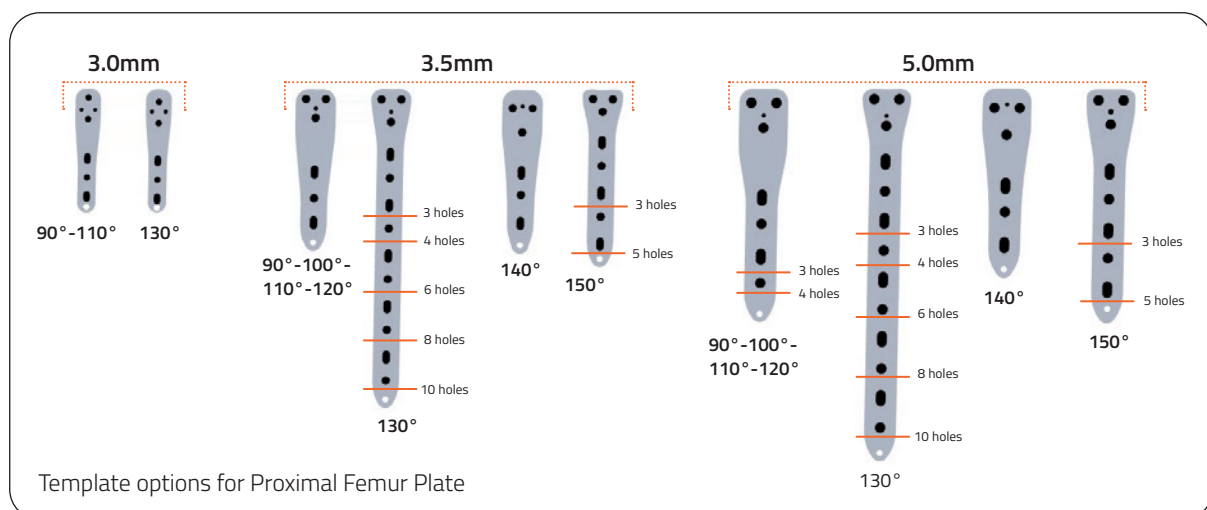


Fig. 4



**PRECAUTION:** Locking and non-locking screws must be used in the appropriate holes (Fig. 5).

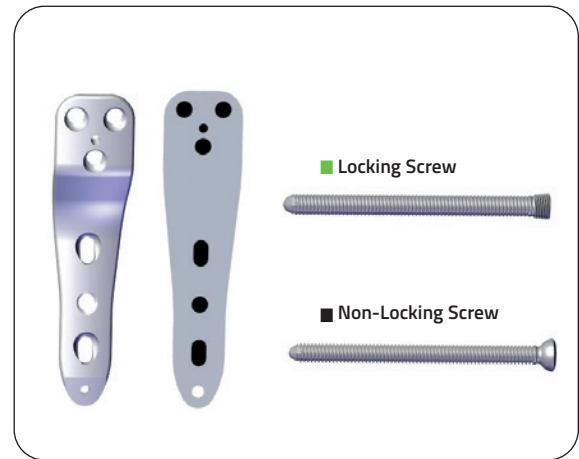


Fig. 5

### Standard and Long Drill Bits

Example of a Standard Drill Bit



Example of a Long Drill Bit



### Patient positioning and surgical approach

#### Determination of the correction angle

Place the patient in the supine position. Use a standard lateral approach to the proximal femur.

#### Determination of anteversion

Part#	Description
99-154281	SS GUIDE WIRE D2.0MM L200MM PACK OF 2 STERILE

Hold a 2.0mm K-wire anterior to the femoral neck to determine anteversion under lateral fluoroscopic control, align the K-wire parallel to the central axis of the femoral neck (Fig. 6).

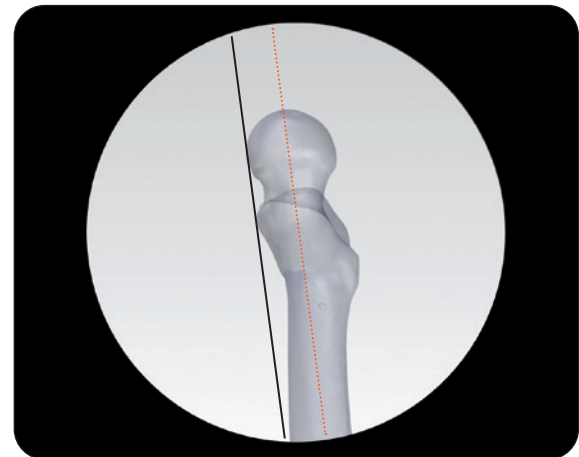


Fig. 6

## Insertion of the 2.0mm positioning K-wires

### 3.5mm Plate

Part#	Description
99-154281	SS GUIDE WIRE D2.0MM L200MM PACK OF 2 STERILE
99-154283	SS GUIDE WIRE D2.8MM L200MM PACK OF 2 STERILE
154304	AL ANGLED WIRE GUIDE 3.5MM AND 5.0MM PLATES
154215	SS AIMING BLOCK - 3.5MM PLATE
154781	SS LARGE BONE CLAMP

### 5.0mm Plate

Part#	Description
99-154281	SS GUIDE WIRE D2.0MM L200MM PACK OF 2 STERILE
99-154283	SS GUIDE WIRE D2.8MM L200MM PACK OF 2 STERILE
154304	AL ANGLED WIRE GUIDE 3.5MM AND 5.0MM PLATES
154214	SS AIMING BLOCK - 5.0MM PLATE
154781	SS LARGE BONE CLAMP

Insert the 2.0mm K-wire in the slot in the angled guide wire that corresponds to the calculated angle and place it against the femoral shaft. If angular correction is not required, the base of the angled wire guide should be parallel to the femoral shaft in the AP and lateral views (**Fig. 7**).

Secure the angled guide wire to the femur shaft with the bone clamp (**Fig. 8**).

Under fluoroscopic control (**Fig. 9a**), insert the posterior positioning K-wire parallel to the anteversion K-wire in the lateral/axial view up into the middle third of the femoral neck (**Fig. 9b**). Remove the anteversion K-wire and the angled wire guide.

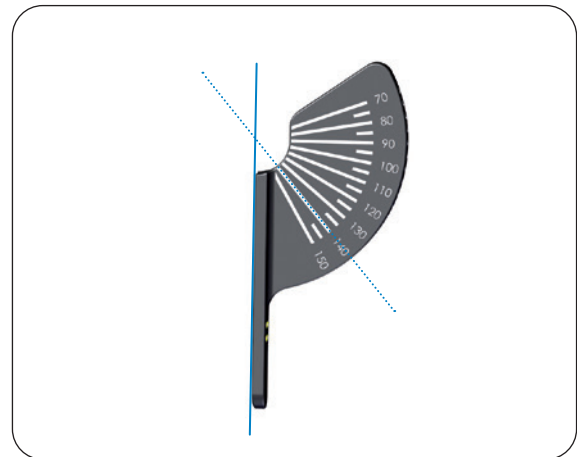


Fig. 7

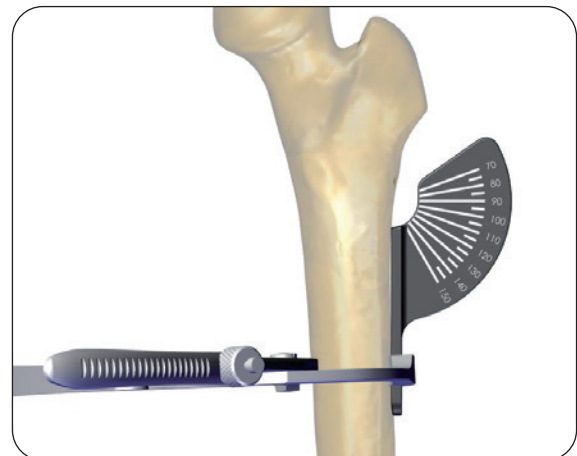


Fig. 8



Fig. 9a

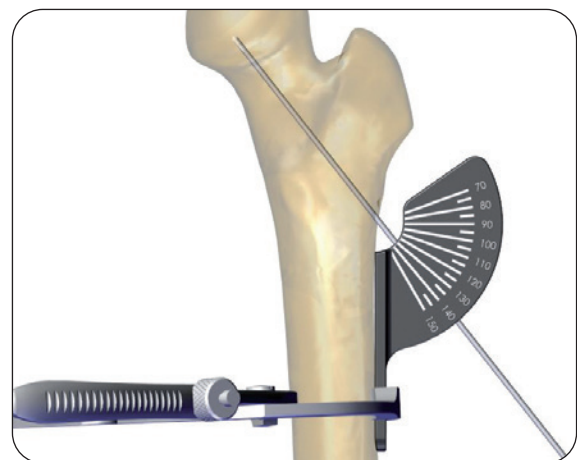


Fig. 9b



The following steps refer to the 130° and 150° plates. Please see below for the 140° plate.

Slide the aiming block over the positioning wire and insert the two 2.8mm wires to the middle third of the femoral neck (**Fig. 10**).

Under fluoroscopy (**Fig. 11**) slide the aiming block over the positioning wire and insert the two 2.8mm wires to the middle third of the femoral neck (**Fig. 10**).

When using a 140° plate, the aiming block can not be used.



**PRECAUTION:** Use the image intensifier to verify correct placement of the wires and to avoid penetration of the femoral head growth plate.



**PRECAUTION:** Do not bend wires during insertion especially when flexing the hip in lateral/axial view as this may result in errors in correction or wire breakage.

Remove the aiming block and proceed with the osteotomy.

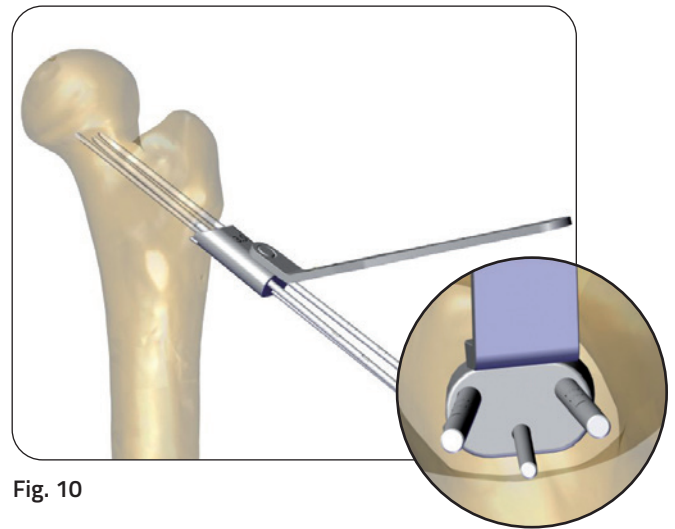


Fig. 10

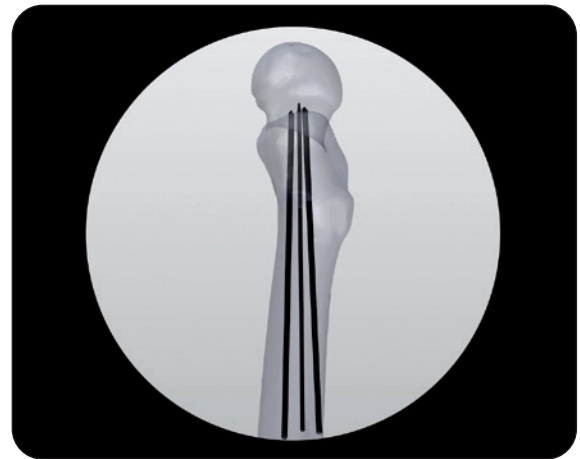


Fig. 11

### Specific steps for a 140° plate

#### Measuring of the correction angle

Measure the current neck-shaft angle and identify the desired neck-shaft angle. The image in **Fig. 12** should aid in determining correctly the various angles needed for calculating the correction angle. Subtract the current angle from the desired neckshaft angle to determine the required correction angle (**Fig. 12**).

*Example:*

Current neck-shaft angle: 100°

Desired neck-shaft angle: 130°

Correction angle:  $130^\circ - 100^\circ = 30^\circ$

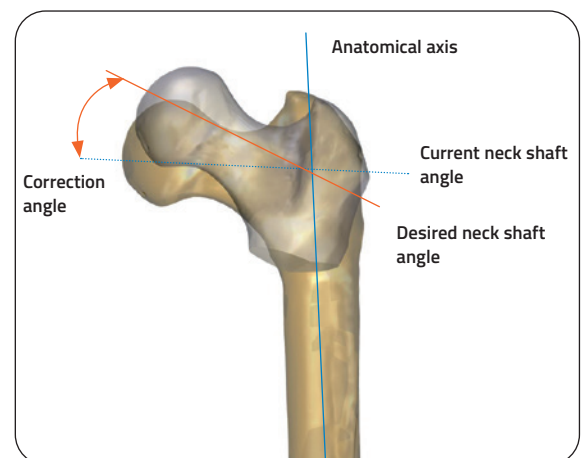


Fig. 12

The angle of the plate should be close to the desired neck-shaft angle.

Desired neck-shaft angle:  $130^{\circ}$

Suggested plate angle: e.g.  $140^{\circ}$

*Example:*

Chosen Plate-screw angle:  $140^{\circ}$

Required Correction angle:  $30^{\circ}$

K-wire angle:  $140^{\circ} - 30^{\circ} = 110^{\circ}$

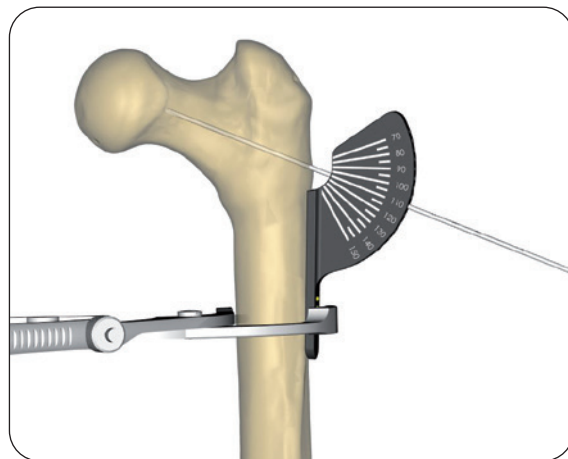


Fig. 13

Apply the appropriate guide wires to the plate (**see section "Plate positioning 3.5mm Plate"**) and slide the plate over the positioning wire (**Fig. 14**), making sure to position the plate correctly on the bone.

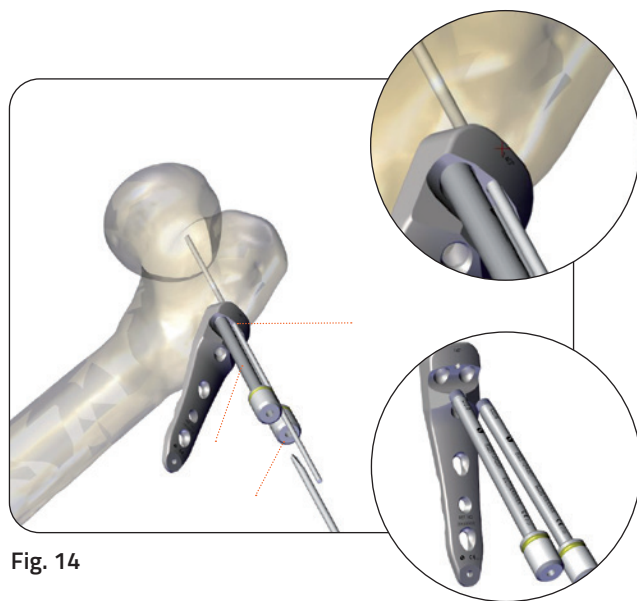


Fig. 14

Insert the two 2.8mm wires under fluoroscopy (**Fig. 15**).

Remove the plate and proceed with the osteotomy.



Fig. 15

## Osteotomy

Part#	Description
154306	SS OSTEOTOMY GAUGE
154300	SS TRIANGULAR POSITIONING PLATE 60 DEGREES 100 DEGREES 20 DEGREES
154301	SS TRIANGULAR POSITIONING PLATE 70 DEGREES 80 DEGREES 30 DEGREES
154302	SS TRIANGULAR POSITIONING PLATE 90 DEGREES 50 DEGREES 40 DEGREES

Place the appropriate side of the osteotomy gauge against the distal positioning 2.0mm K-wire (**Fig. 16**) and mark the distance with the oscillating saw or another sharp instrument onto the bone. Perform the osteotomy in one cut perpendicular to the femur shaft.

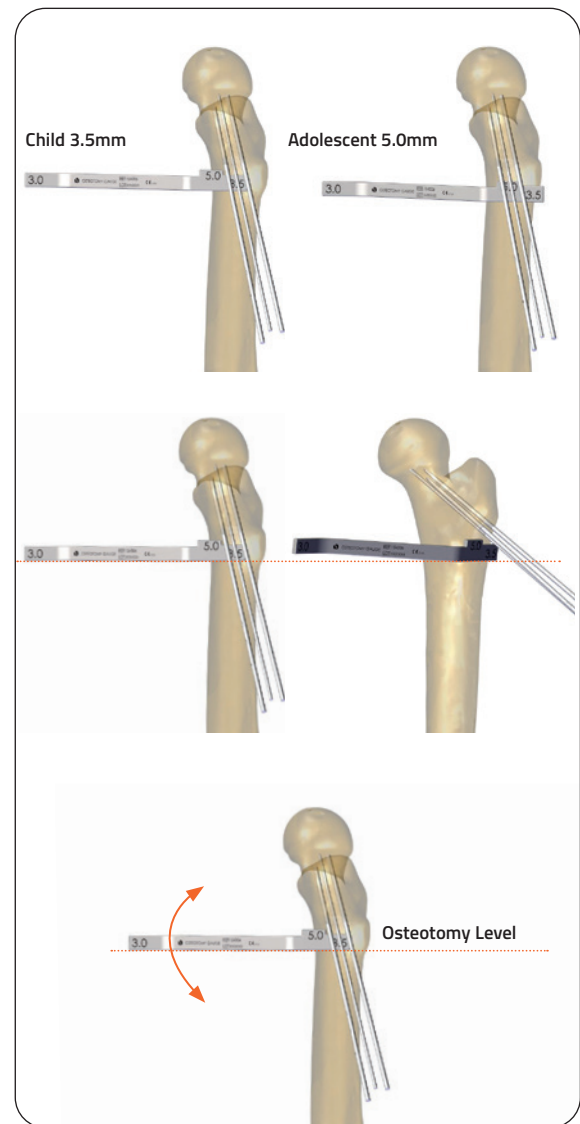


Fig. 16

If a wedge osteotomy is needed, choose the triangular positioning plate based on the calculated correction angle. Make the second cut using the triangle positioning plate (**Fig. 17**).

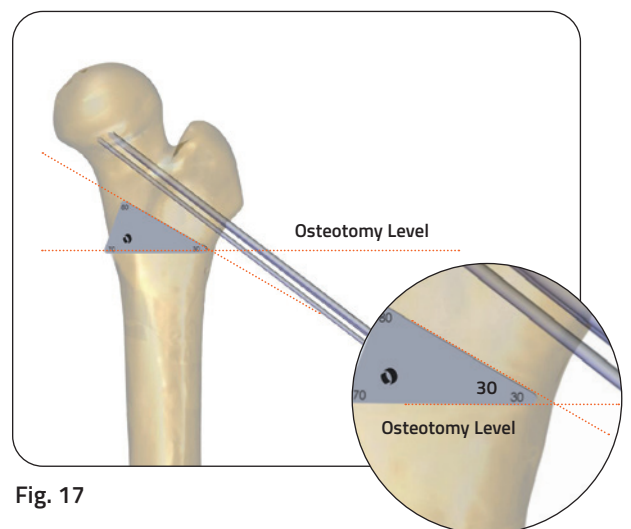


Fig. 17



### Osteotomy for a 140° plate

Use the plate as a template to determine the correct position of the osteotomy by placing the lateral edge of the plate distal of the two 2.8mm wires and mark the femur along the plate (**Fig. 18**). Perform the osteotomy in one cut perpendicular to the femur shaft.

After having performed the osteotomy, proceed with the insertion of the screws, **see section "Measuring and insertion of the femoral neck proximal screws"**.

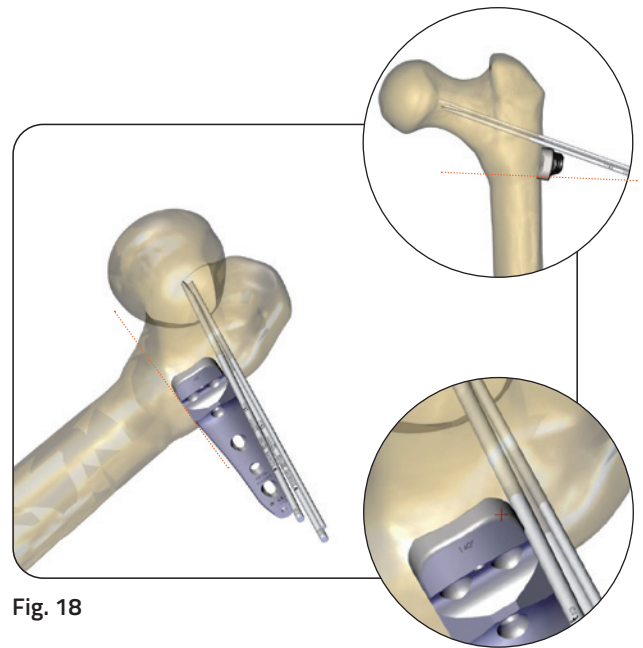


Fig. 18

In case of internal/external rotation osteotomy, insert K-wires bicortically in the great trochanter and in the distal fragment as guides to control rotation before performing the osteotomy (**Fig. 19**).

Even if no rotation is planned, insertion of two K-wires or making a mark on the bone is recommended to ensure rotational alignment is maintained.

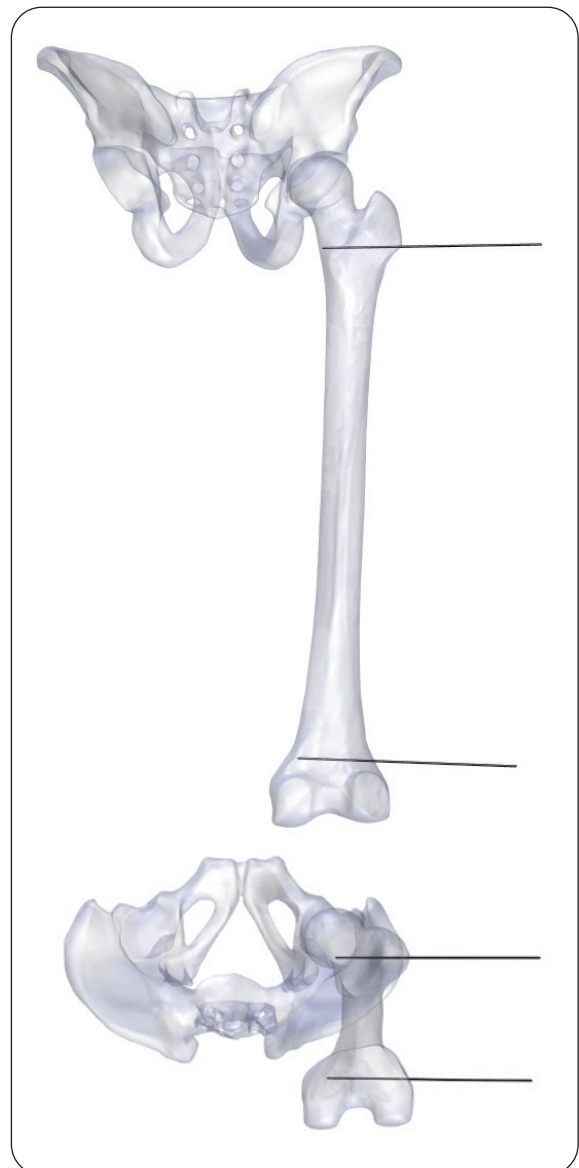


Fig. 19

## Plate positioning

### 3.5mm Plate

Part#	Description
154201	SS DRILL GUIDE LOCKING D2.8MM

### 5.0mm Plate

Part#	Description
154202	SS DRILL GUIDE LOCKING D4.3MM
154203	SS REDUCTION SLEEVE

Fixation of the proximal head/neck fragment is performed with locking screws.

### 3.5mm Plate

Tighten the drill guides locking into the femoral neck proximal screw holes and slide the plate, through the drill guides (A), over the wires (**Fig. 20**). The distal positioning K-wire (C) must be inserted in the positioning K-wire hole in the plate.

### 5.0mm Plate

Tighten the drill guide locking into the femoral neck proximal screw holes, and slide the plate, through the drill guides (A), over the wires (**Fig. 21**). The distal positioning K-wire (C) must be inserted in the positioning K-wire hole in the plate.

Insert the reduction sleeves over the wires in the upper 2 drill guides locking.

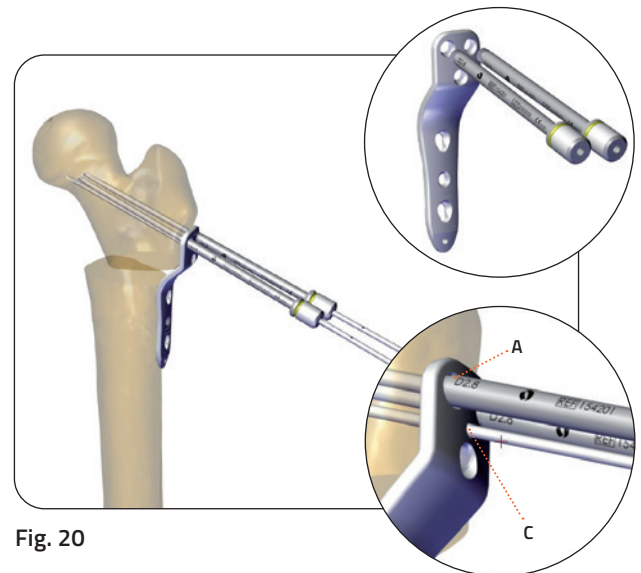


Fig. 20

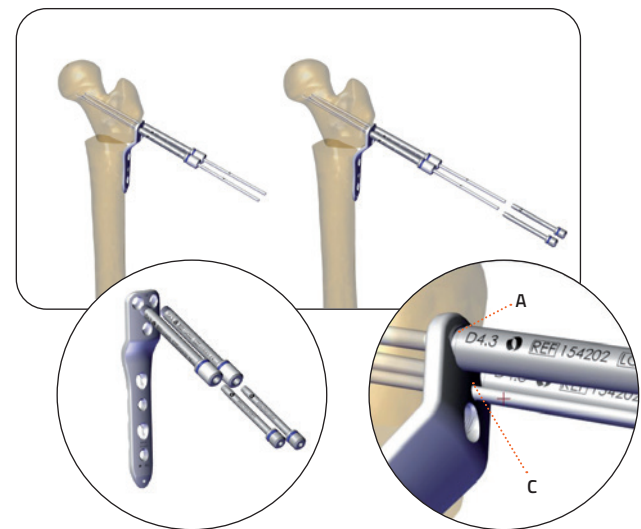


Fig. 21



**PRECAUTION:** Make sure that the plate adheres well to the proximal fragment of the femur, as leaving a too large gap might lead to hardware or bone breakage.

If the plate stands out too far, it is helpful to remove a small bone wedge from the lateral cortex at the osteotomy to optimize the position of the plate on the proximal fragment (**Fig. 22**).

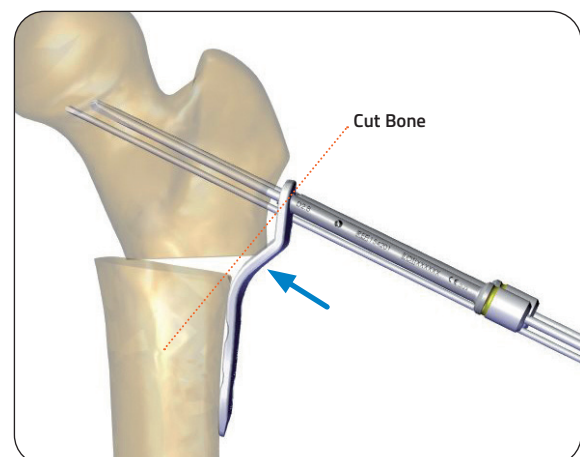


Fig. 22

## Measuring and insertion of the femoral neck proximal screws

Part#	Description
154190	JPS DOUBLE MEASURING DEVICE
DH0455CE	MICRO RATCHETING HANDLE WITH AO CONNECTOR CANNULATED

### 3.5mm Plate

Part#	Description
154321	SS T10 RETENTIVE SCREWDRIVER QUICK CONNECT

### 5.0mm Plate

Part#	Description
99-154285	SS GUIDE WIRE D4.3MM L190MM PACK OF 2 STERILE
99-154185	SS DRILL BIT D4.3MM QUICK CONNECT STERILE
154322	SS T15 RETENTIVE SCREWDRIVER QUICK CONNECT

Slide the double measuring device over the wire against the drill guide locking (3.5mm plate; **Fig. 23**) or the reduction sleeve (5.0mm plate; **Fig. 24**).

Ensure that the double measuring device is on the "Locking" side to determine the length of the femoral neck proximal screw.

### 3.5mm Plate

As the wire already prepares the hole for screw insertion, drilling with a drill bit is not necessary.

Remove the measuring device, wire and drill guide from one of the femoral neck proximal screw holes.

### 5.0mm Plate

Remove the measuring device and reduction sleeve. Remove one of the 2.8mm wires and drill the first cortex with the 4.3mm wire or drill (**Fig. 25**), then remove the drill guide locking.

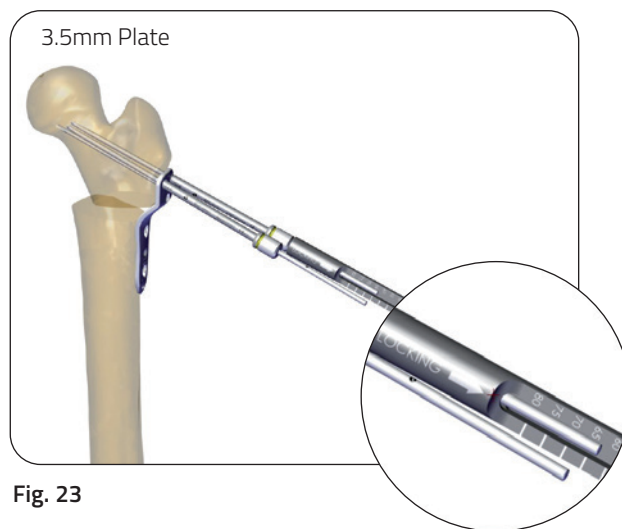


Fig. 23

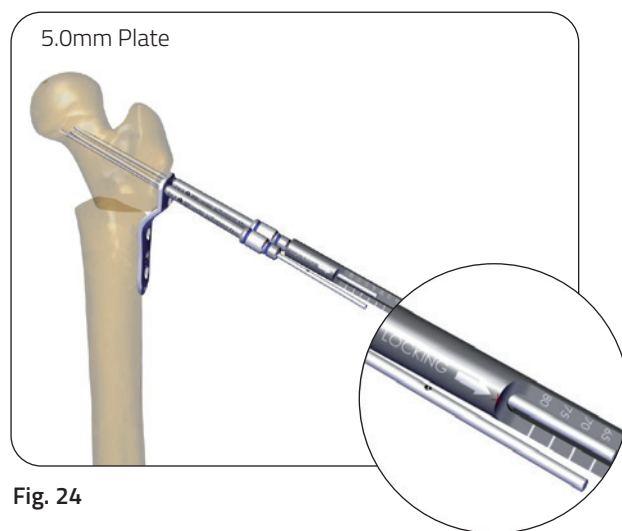


Fig. 24

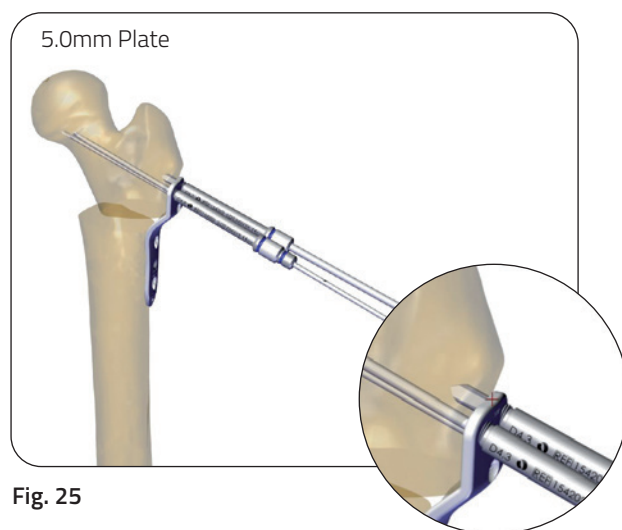


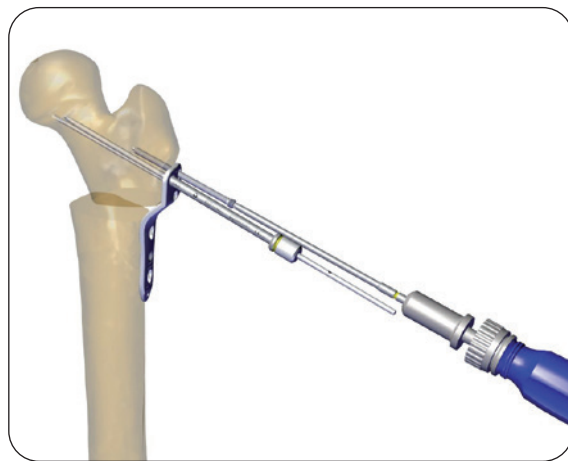
Fig. 25



Insert the selected locking screw:

*Option 1: Manual insertion*

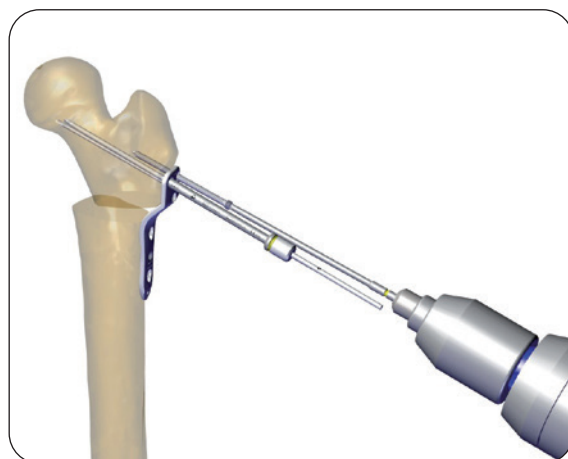
Attach the appropriate screwdriver to the ratcheting handle and insert the screw by hand (**Fig. 26**).



**Fig. 26**

*Option 2: Insertion under power*

Insert the locking screw partially under power (low speed), then complete insertion by hand (**Fig. 27**).



**Fig. 27**



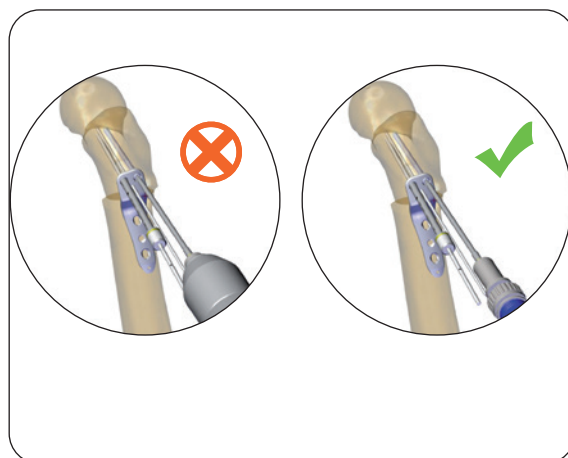
**PRECAUTION:** Screws must not be over-tightened during insertion, locking or compression, as this may cause damage to the implant, lack of compression or bone stripping. Always perform final tightening manually.



**PRECAUTION:** Use the image intensifier to verify correct placement of the plate, wires and screws and to avoid penetration of the femoral head growth plate.



**PRECAUTION:** Complete each locking screw insertion entirely before inserting the next screw to avoid a possible incorrect engagement of screw on the plate (**Fig. 28**).

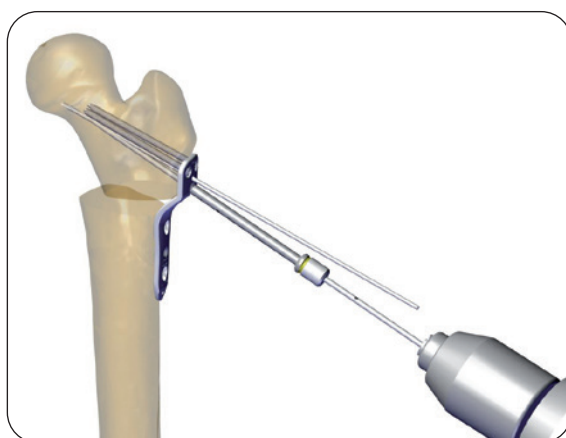


**Fig. 28**

Repeat the steps from **page 16, Fig. 23**, for the second femoral neck proximal screw (**Fig. 29**) and the femoral neck distal screw (**Fig. 30**). Remove the guide wire.



**Fig. 29**



**Fig. 30**

## Reduction

Part#	Description
154781	SS LARGE BONE CLAMP

Align the plate parallel with the femoral shaft axis in AP and lateral view and secure it with the clamp (**Fig. 31**).

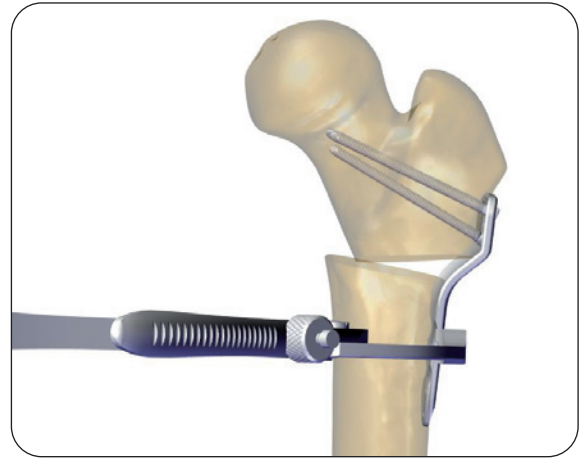


Fig. 31

In case of internal/external rotation osteotomy, rotate the distal fragment of the femur until the two rotation K-wires are parallel in axial view. These two wires should always be parallel before the shaft screws are inserted. Once the plate is fixed, they can be removed (**Fig. 32**).

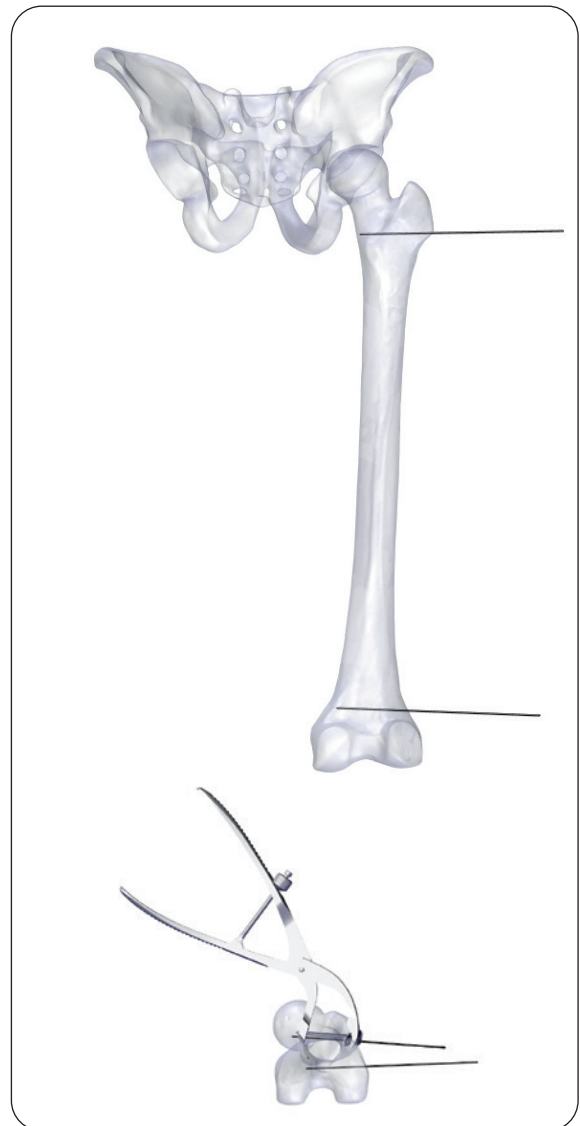


Fig. 32



**WARNING:** Ensure to position the plate parallel to the femoral shaft in the AP and lateral view, otherwise this may lead to variations to the desired neck-shaft angle and to undesired extension/flexion (Fig. 33).

## Drilling, measuring and insertion of the shaft screws

### 3.5mm Plate

Part#	Description
154201	SS DRILL GUIDE LOCKING D2.8MM
99-154283	SS GUIDE WIRE D2.8MM L200MM PACK OF 2 STERILE
154212	SS DRILL GUIDE NON-LOCKING D2.8MM
99-154183	SS DRILL BIT D2.8MM QUICK CONNECT STERILE
99-154187	JPS DRILL BIT LONG D2.8MM QC STERILE
154191	JPS DEPTH GAUGE WITH HOOK L80MM
154190	JPS DOUBLE MEASURING DEVICE
154781	SS LARGE BONE CLAMP
DH0455CE	MICRO RATCHETING HANDLE WITH AO CONNECTOR CANNULATED
154321	SS T10 RETENTIVE SCREWDRIVER QUICK CONNECT

### 5.0mm Plate

Part#	Description
154202	SS DRILL GUIDE LOCKING D4.3MM
99-154285	SS GUIDE WIRE D4.3MM L190MM PACK OF 2 STERILE
99-154185	SS DRILL BIT D4.3MM QUICK CONNECT STERILE
99-154189	JPS DRILL BIT LONG D4.3MM QC STERILE
154213	SS DRILL GUIDE NON-LOCKING D3.4MM
99-154284	SS GUIDE WIRE D3.4MM L200MM PACK OF 2 STERILE
99-154188	JPS DRILL BIT LONG D3.4MM QC STERILE
154213	SS DRILL GUIDE NON-LOCKING D3.4MM
99-154184	SS DRILL BIT D3.4MM QUICK CONNECT STERILE
154191	JPS DEPTH GAUGE WITH HOOK L80MM
154190	JPS DOUBLE MEASURING DEVICE
154781	SS LARGE BONE CLAMP
DH0455CE	MICRO RATCHETING HANDLE WITH AO CONNECTOR CANNULATED
154322	SS T15 RETENTIVE SCREWDRIVER QUICK CONNECT

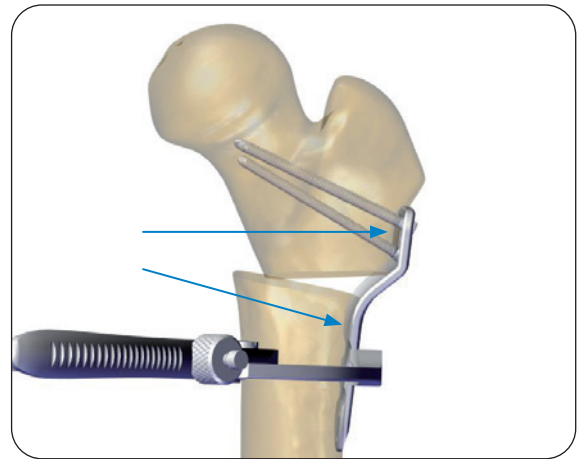


Fig. 33



Locking or non-locking screws can be used in the shaft. If compression is required, insert non-locking screws prior to any locking screw.

**Drilling, measuring and insertion of a non-locking screw in a compression hole.**

To obtain compression, place the drill guide in the selected compression hole with the arrow oriented towards the osteotomy line (**Fig. 34**).

In case of compression it is advisable to start with proximal non-locking screw.

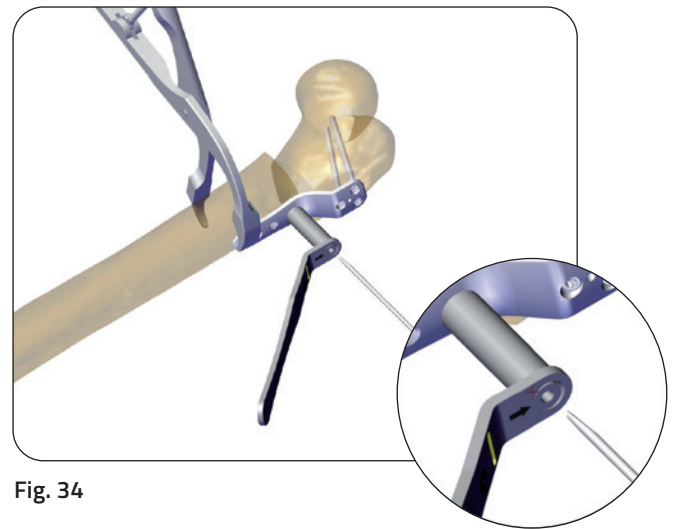


Fig. 34

If compression is not required, place the drill guide non-locking in the selected compression hole with the arrow on the opposite side of the osteotomy line (**Fig. 35**).

In both cases the non-locking screws must be positioned first, prior to the locking screw insertion.

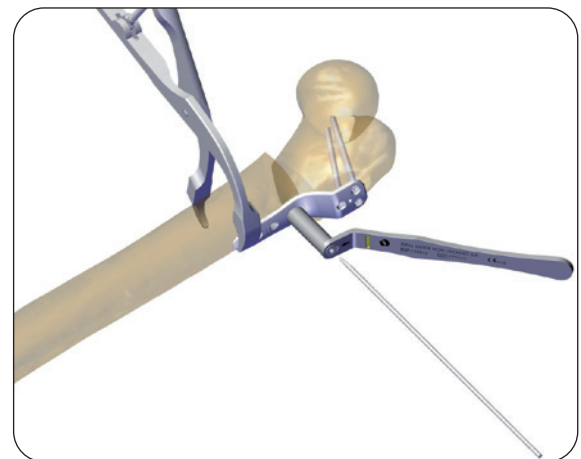


Fig. 35

**Drilling and measuring**

*Option 1*

Insert the appropriate drill bit in the drill guide non-locking and ensure complete drilling of both cortices (**Fig. 36**).

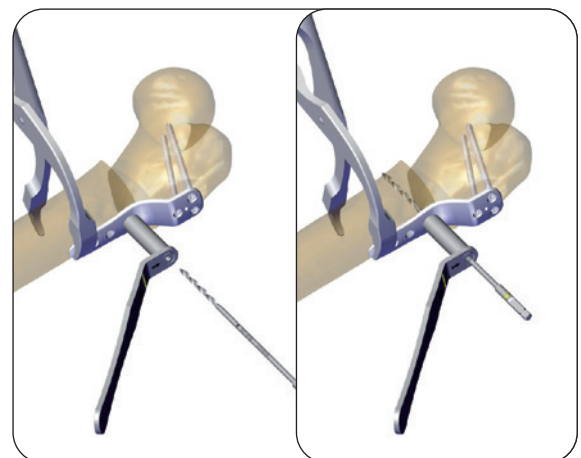
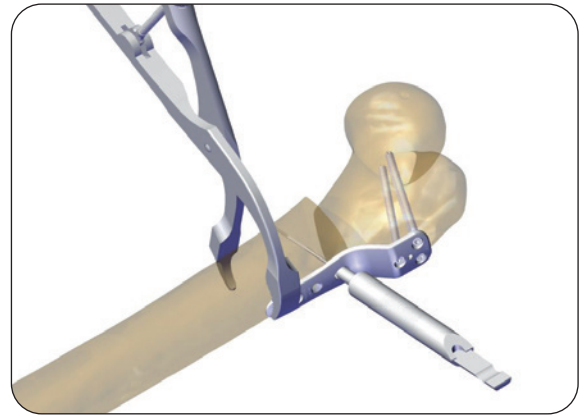


Fig. 36

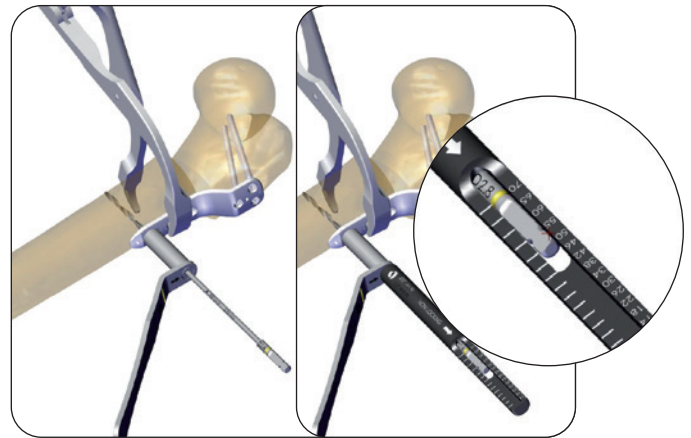
Remove the drill guide non-locking. Use the depth gauge with hook to measure screw length (**Fig. 37a**).



**Fig. 37a**

*Option 2*

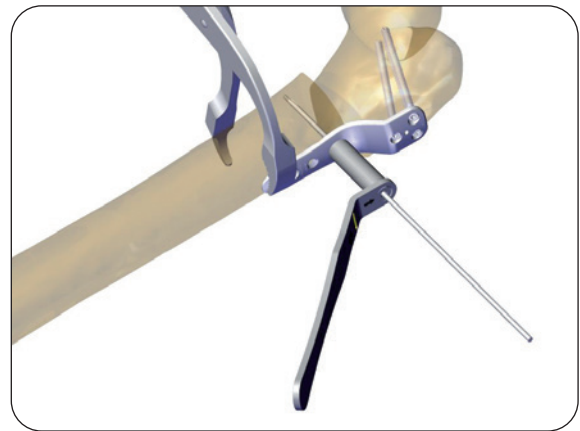
Insert the appropriate long drill bit in the drill guide and ensure complete drilling of both cortices. Slide the double measuring device over the long drill bit against the drill guide non-locking. Ensure that the double measuring device is on the "Non locking" side to determine the length of the screw (**Fig. 37b**).



**Fig. 37b**

*Option 3*

Insert the appropriate wire in the drill guide non-locking and ensure complete drilling of both cortices (**Fig. 38**).



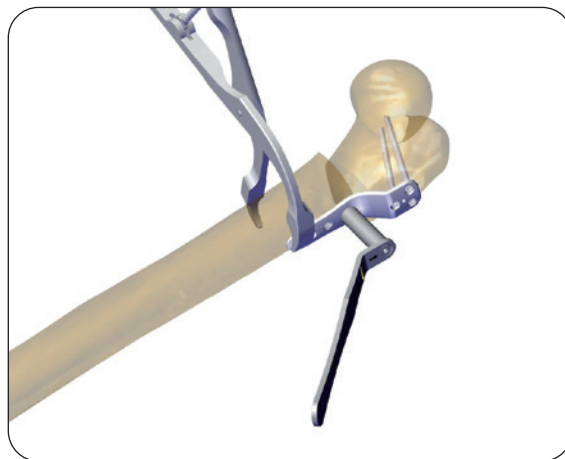
**Fig. 38**

Slide the double measuring device over the wire against the drill guide non-locking. Ensure that the double measuring device is on the "Non locking" side to determine the length of the screw (**Fig. 39**).



**Fig. 39**

Remove the double measuring device and the wire (**Fig. 40**).



**Fig. 40**

### **Screw insertion**

If compression is desired, partially insert the selected non-locking screw into the plate. Attach the screwdriver to the ratcheting handle and insert the non-locking screw into place manually.

Unlock the bone clamp to allow compression and then complete screw insertion manually (**Fig. 41**).

Insert the second screw as described above until its head begins to engage the plate. When engagement is being felt, slightly loosen the first screw just enough (approx. half a turn) to allow the plate to slide further along the femoral shaft. Fully seat the second screw and then re-tighten the first screw.



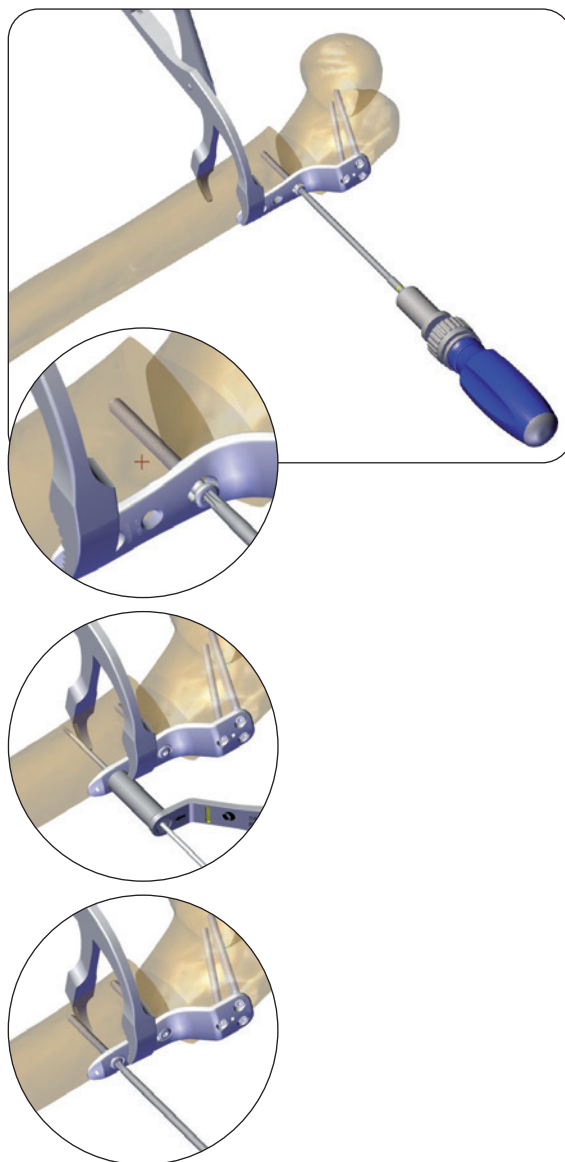
If compression is not desired, insert the selected non-locking screw as described here below.

#### *Option 1: Manual insertion*

Attach the screwdriver to the ratcheting handle and insert the non-locking screw into place manually.

#### *Option 2: Insertion under power*

Insert the non-locking screw partially under power (low speed), then complete insertion manually.



**Fig. 41**

### Drilling and measuring and insertion locking screw

Attach the drill guide locking on the locking hole.

#### Option 1

Using the appropriate drill bit, ensure complete drilling of both cortices (**Fig. 42a**). Remove the drill guide locking.

Use the depth gauge with hook to measure screw length.

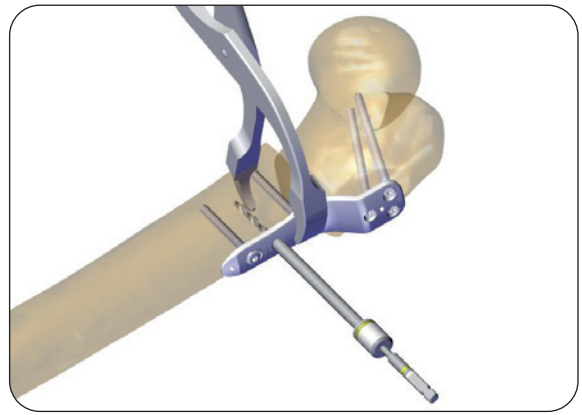


Fig. 42a

#### Option 2

Insert the appropriate long drill bit in the drill guide and ensure complete drilling of both cortices. Slide the double measuring device over the long drill bit against the drill guide locking. Ensure that the "Locking" side of the double measuring device is visible to determine the screw length (**Fig. 42b**).

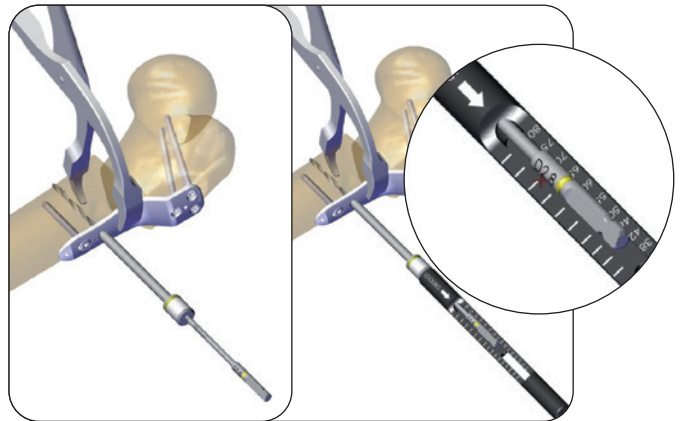


Fig. 42b

#### Option 3

Insert the appropriate wire in the drill guide locking and ensure complete drilling of both cortices (**Fig. 43**). Slide the double measuring device over wire against the drill guide locking. Ensure that the "Locking" side of the double measuring device is visible to determine the screw length (**Fig. 44**).

Remove the measuring device, the wire and the drill guide locking.

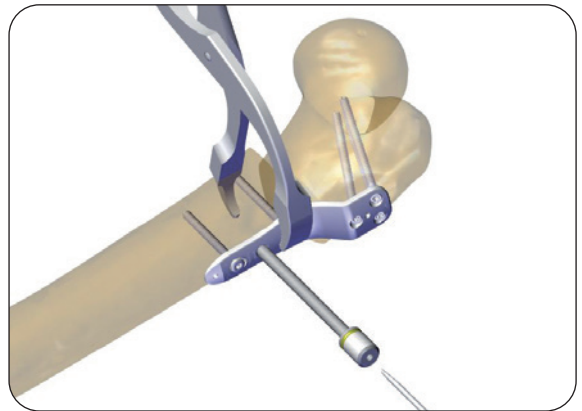


Fig. 43

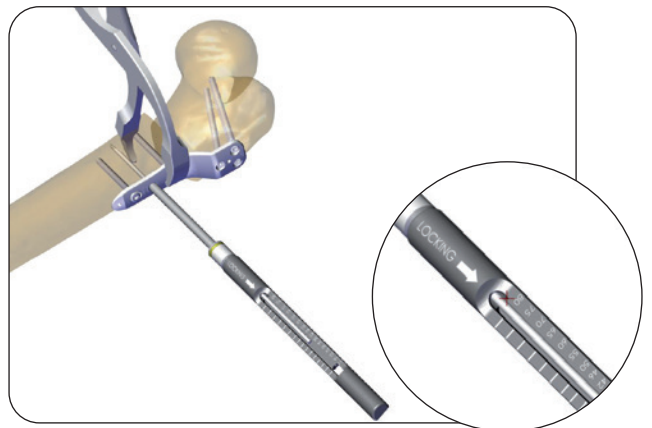


Fig. 44



## Screw insertion

Insert the selected locking screw:

### Option 1: Manual insertion

Attach the screwdriver to the ratcheting handle and insert the locking screw manually with a two finger technique.

### Option 2: Insertion under power

Insert the locking screw partially under power (low speed), then complete insertion manually, again with a two finger technique.

Drill, measure and insert the other shaft screws as described (Fig. 45).



**PRECAUTION:** Screws must not be over-tightened during insertion, locking or compression, as this may cause damage to the implant, lack of compression or bone stripping. Always perform final tightening manually.



**PRECAUTION:** Complete each locking screw insertion entirely before inserting the next screw to avoid a possible incorrect engagement of screw on the plate.

## Final fluoroscopic control



**WARNING:** Use the image intensifier to ensure correct plate and screw placement and to confirm planned correction (Fig. 46).

## Removal

### 3.5mm Plate

Part#	Description
99-154341	SS T10 EXTRACTION SCREWDRIVER STERILE
99-154338	SS T10-T15 CONICAL EXTRACTOR STERILE

### 5.0mm Plate

Part#	Description
99-154342	SS T15 EXTRACTION SCREWDRIVER STERILE
99-154338	SS T10-T15 CONICAL EXTRACTOR STERILE

Once the treatment with the plate is complete, implant must be removed. Premature removal should be considered in case of adverse events. Remove all screws prior to removing the plate.

The conical extractor has a left-handed thread and should be used if the extraction screwdriver cannot engage the head of the screw. The conical extractor should be inserted and turned anti-clockwise until the screw is extracted (Fig. 47).

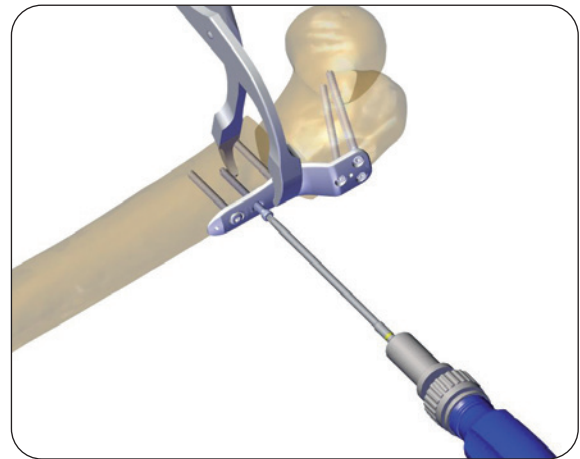


Fig. 45



Fig. 46

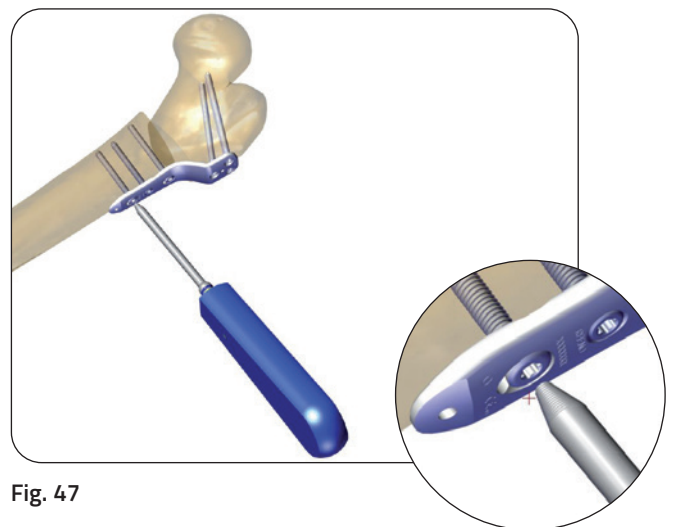


Fig. 47

## PROXIMAL FEMUR VARUS OSTEOTOMY WITH A 3.0MM PLATE

- Pre-operative planning
- Patient positioning and surgical approach
- Measurement of anteversion
- Insertion of the 2.3mm wire for femoral neck proximal screw
- Insertion of the 1.5mm wire for femoral neck proximal screw
- Osteotomy
- Plate positioning
- Measuring and insertion of the femoral neck proximal screw
- Reduction
- Drilling, measuring and insertion of the shaft screws
- Final fluoroscopic control
- Removal

### Pre-operative planning

#### Determination of the correction angle

Measure the current neck-shaft angle and identify the desired neck-shaft angle.

Subtract the desired angle from the current neck-shaft angle to determine the required correction angle (**Fig. 1**).

*Example:*

Current neck-shaft angle:  $150^{\circ}$

Desired neck-shaft angle:  $120^{\circ}$

Correction angle:  $150^{\circ} - 120^{\circ} = 30^{\circ}$

The complimentary JPS pre-operative planning software could be useful during the planning phase, visualizing the anatomical angles and in simulating the calculation of the correction angle by overlaying the acquired digital radiological image with the most appropriate JPS plate image shapes.

#### Plate selection

The angle of the plate should be close to the desired neck-shaft angle.

Desired neck-shaft angle:  $120^{\circ}$

Suggested plate angle: e.g.  $110^{\circ}$

#### Measuring of the positioning K-wire angle

To determine the K-wire angle, add the chosen plate-screw angle to the previously calculated correction angle.

*Example:*

Chosen Plate-screw angle:  $110^{\circ}$

Required Correction angle:  $30^{\circ}$

K-wire angle:  $110^{\circ} + 30^{\circ} = 140^{\circ}$

(**Fig. 2**)

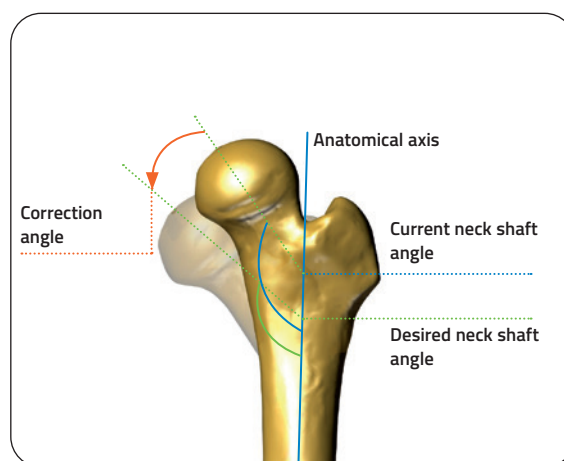


Fig. 1

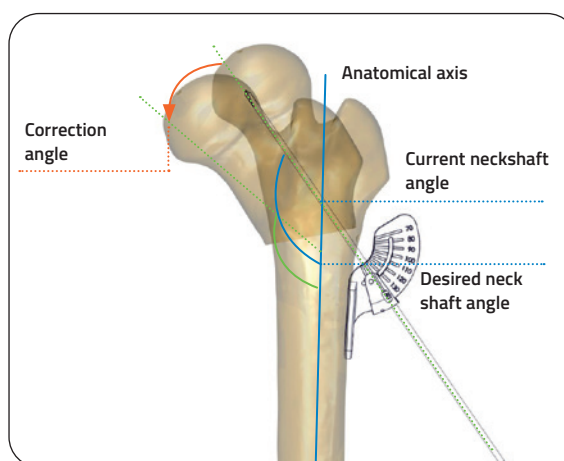


Fig. 2

## Patient positioning and surgical approach

### Determination of the correction angle

Position the patient supine; use a standard lateral approach to the proximal femur.

### Measurement of anteversion

Part#	Description
001-A-1502P	GUIDE WIRE 1.5MM, 4.0/5.5MM BITE COMPRESSION SCREW (KIT OF 2)

Position a 1.5mm K-wire on the anterior aspect of the neck of the femur to determine anteversion. Under fluoroscopic control, align the K-wire with the central axis of the femoral neck (**Fig. 3**).

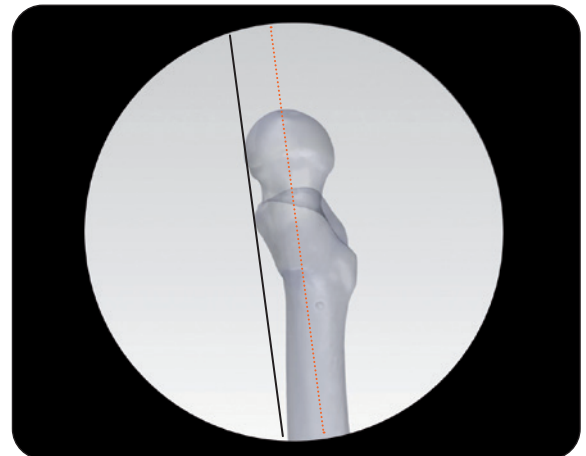


Fig. 3

## Insertion of the 2.3mm wire for femoral neck proximal screw

Part#	Description
99-154282	SS GUIDE WIRE D2.3MM L200MM PACK OF 2 STERILE
154305	AL ANGLED WIRE GUIDE 3.0MM PLATE
154780	SS SMALL BONE CLAMP

Set the adjustable angle of the angled wire guide to the previously calculated K-wire angle (**Fig. 4**). Secure the angled wire guide to the femoral shaft with the clamp (**Fig. 5**).

Under fluoroscopic control, insert the posterior positioning K-wire parallel to the anteversion K-wire in the lateral/axial view up to the middle third of the femoral neck (**Fig. 6**).

Under fluoroscopic control, insert the 2.3mm wire for the proximal screw in the femoral neck up to within 5.0mm of the femoral head growth plate (**Fig. 7**).

If flexion or extension is not required, the angled wire guide must be parallel to the femoral shaft in the AP and lateral views.

If extension or flexion is required, remove the clamp and rotate the angled wire guide accordingly before inserting the second positioning K-wire (**Fig. 8**).

Re-secure the angled wire guide to the femur shaft with the clamp.

Remove the anteversion K-wire.

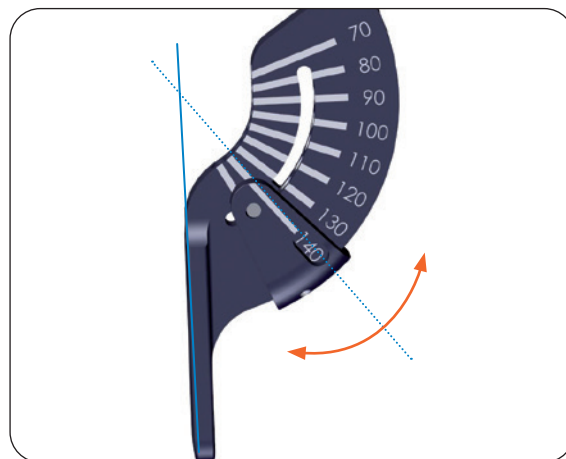


Fig. 4



Fig. 5



Fig. 6

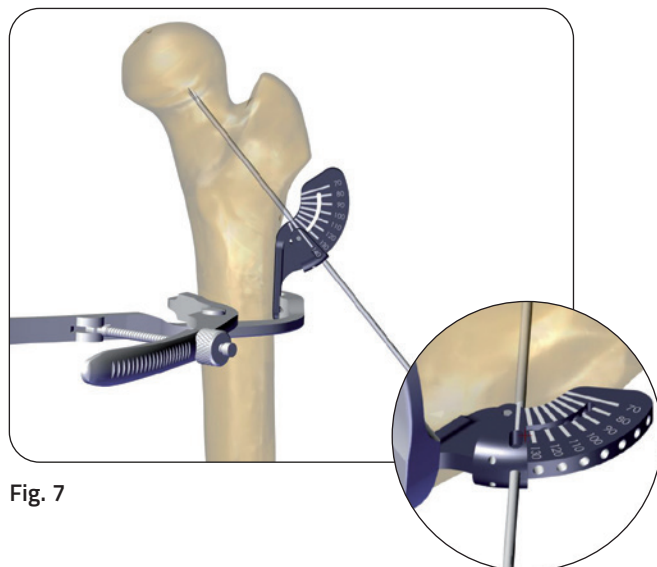


Fig. 7



## Insertion of the 1.5mm wires for femoral neck proximal screw

Part#	Description
001-A-1502P	GUIDE WIRE 1.5MM, 4.0/5.5MM BITE COMPRESSION SCREW (KIT OF 2)

Insert the 1.5mm K-wires in the angled wire guide (**Fig. 8**).

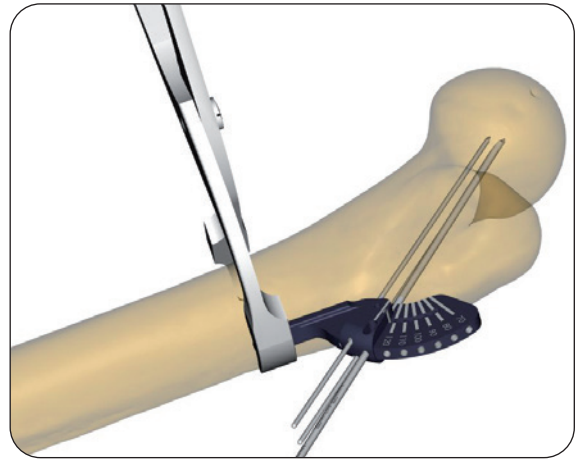


Fig. 8

Insert the positioning K-wires up to the middle third of the femoral neck (**Fig. 9**).



**PRECAUTION:** Use the image intensifier to verify correct placement of the wire and to avoid penetration of the femoral head growth plate.



**PRECAUTION:** Do not bend wires during insertion especially when flexing the hip in lateral/axial view as this may result in errors in correction or wire breakage.

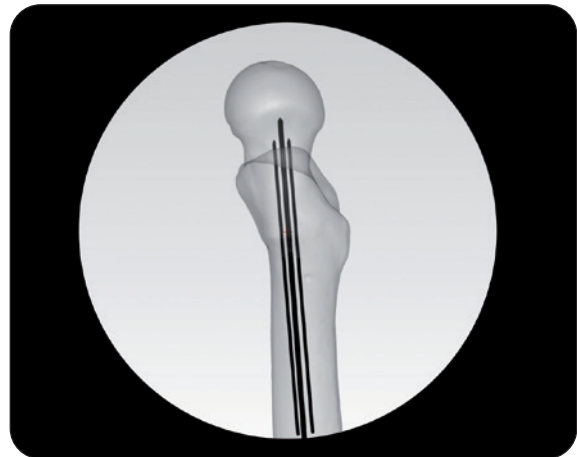


Fig. 9

Remove the angled wire guide (**Fig. 10**).



Fig. 10

## Osteotomy

Part#	Description
154306	SS OSTEOTOMY GAUGE

Place the appropriate side of the osteotomy gauge against both the positioning K-wires (**Fig. 11**) and mark the distance with the oscillating saw or another sharp instrument onto the bone.

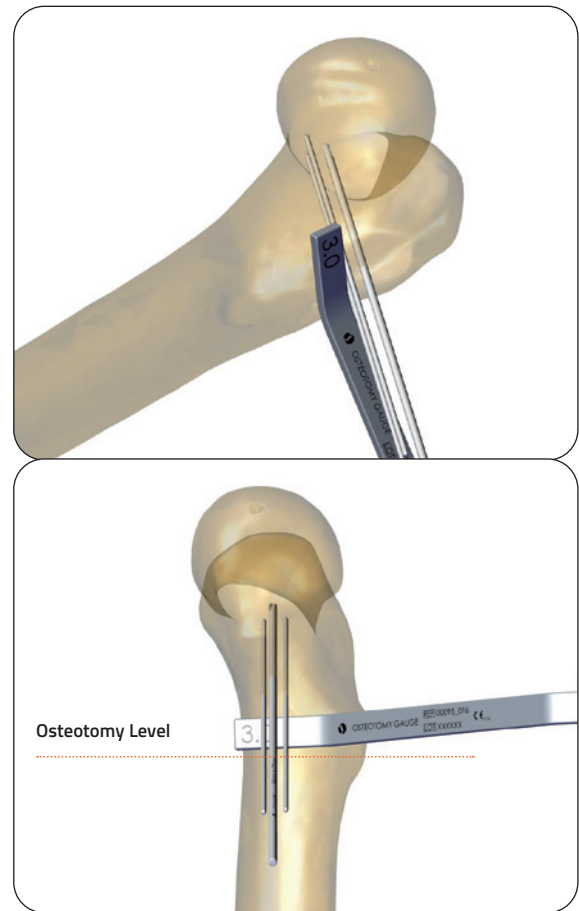


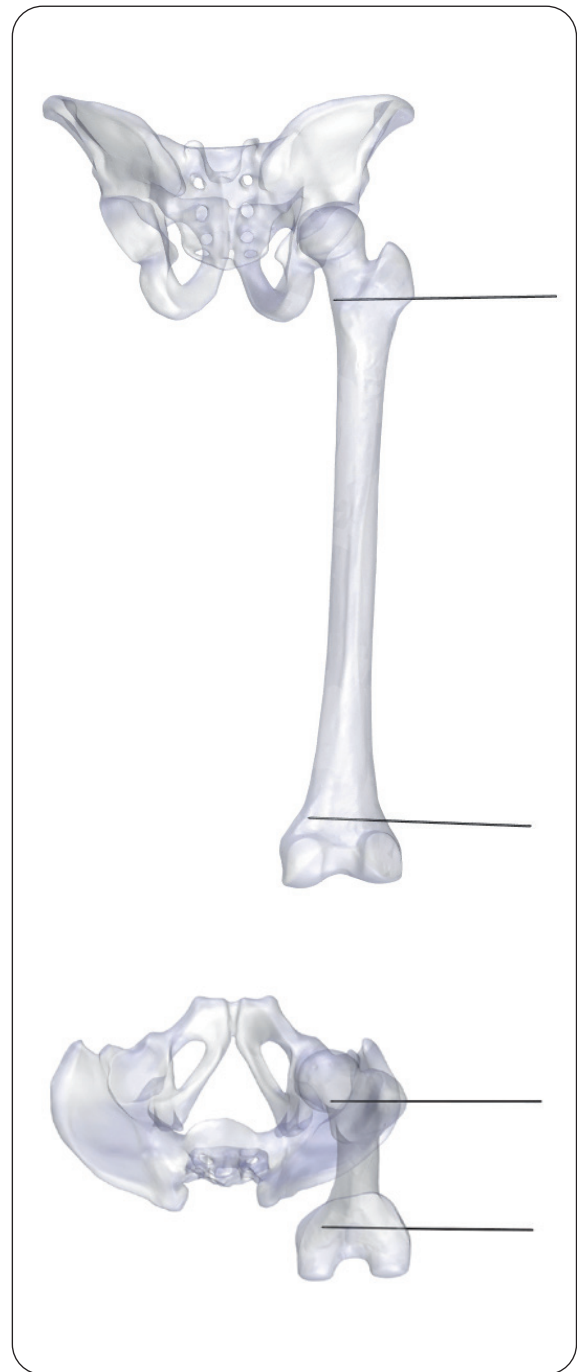
Fig. 11

In case of internal/external rotation osteotomy, insert K-wires bicortically in the greater trochanter and in the lateral condyle as guides to control rotation before performing the osteotomy (**Fig. 12**).

Even if no rotation is planned, insertion of two K-wires is recommended to ensure rotational alignment is maintained.

Perform the osteotomy in one cut perpendicular to the femoral shaft.

If a wedge osteotomy is needed, perform the second cut parallel to the 2.3mm wire.



**Fig. 12**

## Plate positioning

Part#	Description
154200	SS DRILL GUIDE LOCKING D2.3MM

Fixation of the proximal head/neck fragment is performed with locking screws.

Tighten the drill guide locking into the femoral neck screw holes (see section “Plate positioning 3.5mm Plate”) and slide the plate over the wires (Fig. 13).

If the plate stands out too far, it is helpful to remove a small bone wedge from the lateral cortex at the osteotomy to optimize the position of the plate on the proximal fragment (see warning in “Reduction” section).

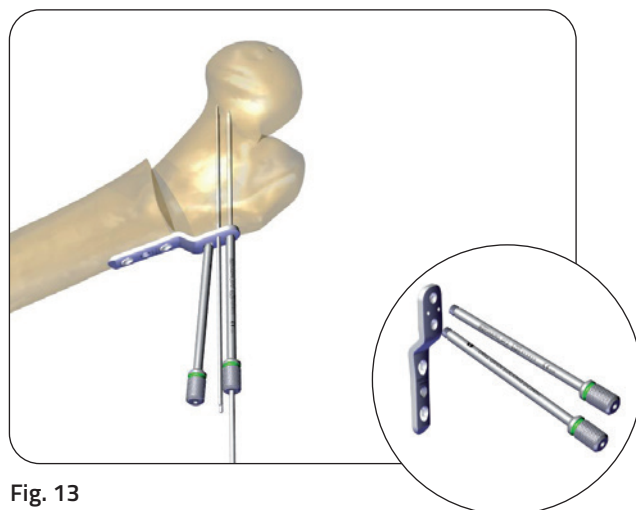


Fig. 13

## Measuring and insertion of the femoral neck proximal screw

Part#	Description
154190	JPS DOUBLE MEASURING DEVICE
DH0455CE	MICRO RATCHETING HANDLE WITH AO CONNECTOR CANNULATED
154320	SS T8 RETENTIVE SCREWDRIVER QUICK CONNECT

As the 2.3mm wire already prepares the hole for screw insertion, drilling with a drill bit is not necessary.

Slide the double measuring device over the 2.3mm wire against the drill guide locking. Ensure that the measuring scale is on the “Locking” side to determine the length of the femoral neck proximal screw (Fig. 14).

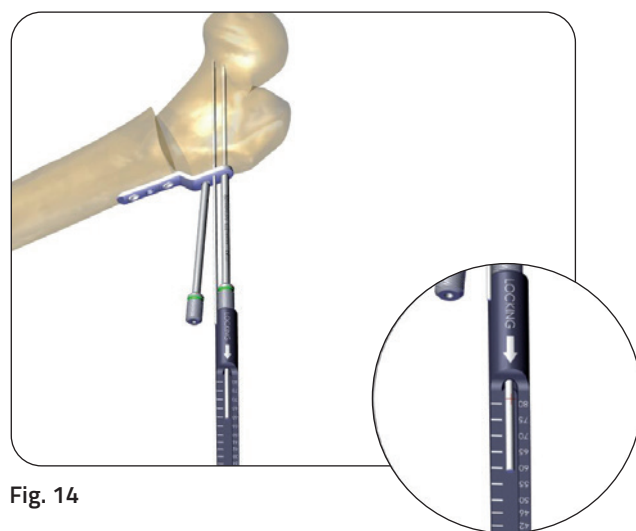


Fig. 14

Remove the measuring device, 2.3mm wire and drill guide locking from the femoral neck proximal screw hole. Insert the selected locking screw.

### Option 1: Manual insertion

Attach the screwdriver to the ratcheting handle and insert the screw by hand with a two-finger technique (Fig. 15).

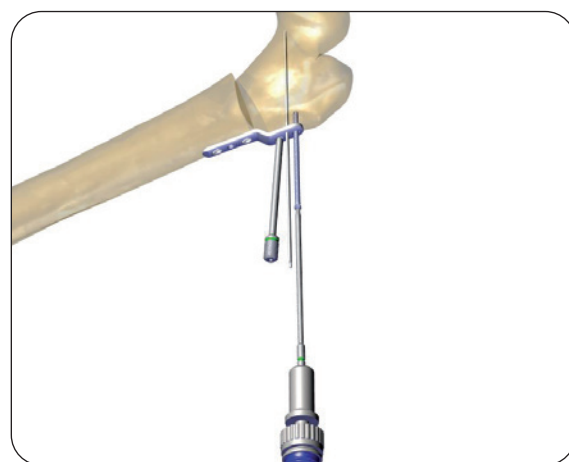


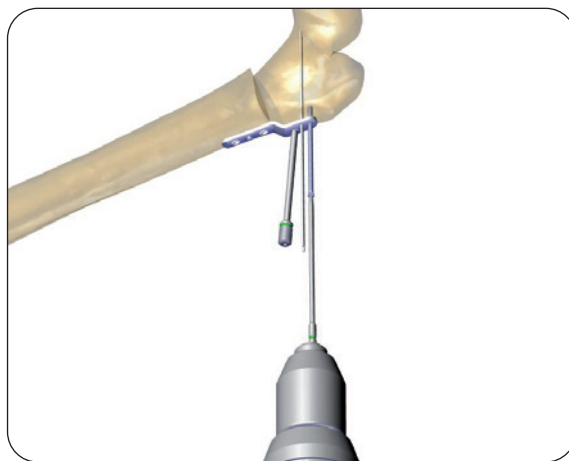
Fig. 15



*Option 2: Insertion under power*

Partially insert the locking screw under power (low speed), then complete insertion manually with a two finger technique (**Fig. 16**).

Insert the second locking screw, repeating the steps from **page 32**.



**Fig. 16**



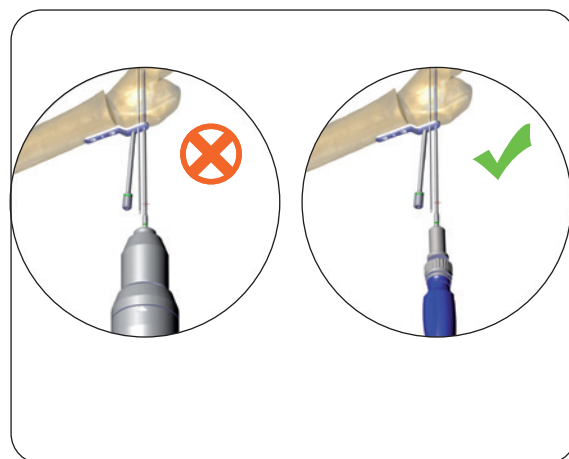
**PRECAUTION:** Screws must not be over-tightened during insertion, locking or compression, as this may cause damage to the implant, lack of compression or bone stripping. Always perform final tightening manually.



**PRECAUTION:** Use the image intensifier to verify correct placement of the plate, wires and screws and to avoid penetration of the femoral head growth plate.



**PRECAUTION:** Complete each locking screw insertion entirely before inserting the next screw to avoid a possible incorrect engagement of screw on the plate (**Fig. 17**).



**Fig. 17**

## Reduction

Part#	Description
154780	SS SMALL BONE CLAMP

Align the plate parallel with the femoral shaft axis in AP and lateral view and secure it with a clamp (**Fig. 18**).

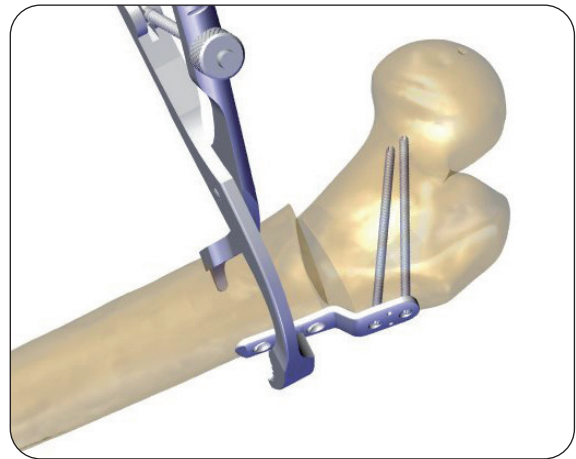


Fig. 18

In case of internal/external rotation osteotomy, rotate the distal fragment of the femur until the two rotation K-wires are parallel in axial view. Remove the two rotation K-wires only after shaft screws are inserted (**Fig. 19**).



**WARNING:** Ensure to position the plate parallel to the femoral shaft in the AP and lateral view, otherwise this may lead to variations to the desired neck-shaft angle and to undesired extension/flexion. (**Fig. 20**)

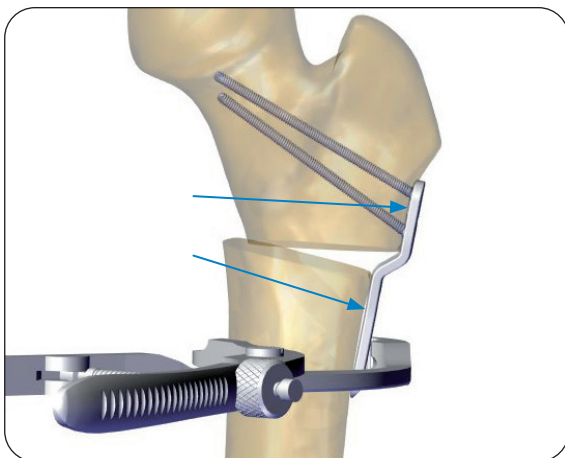


Fig. 20

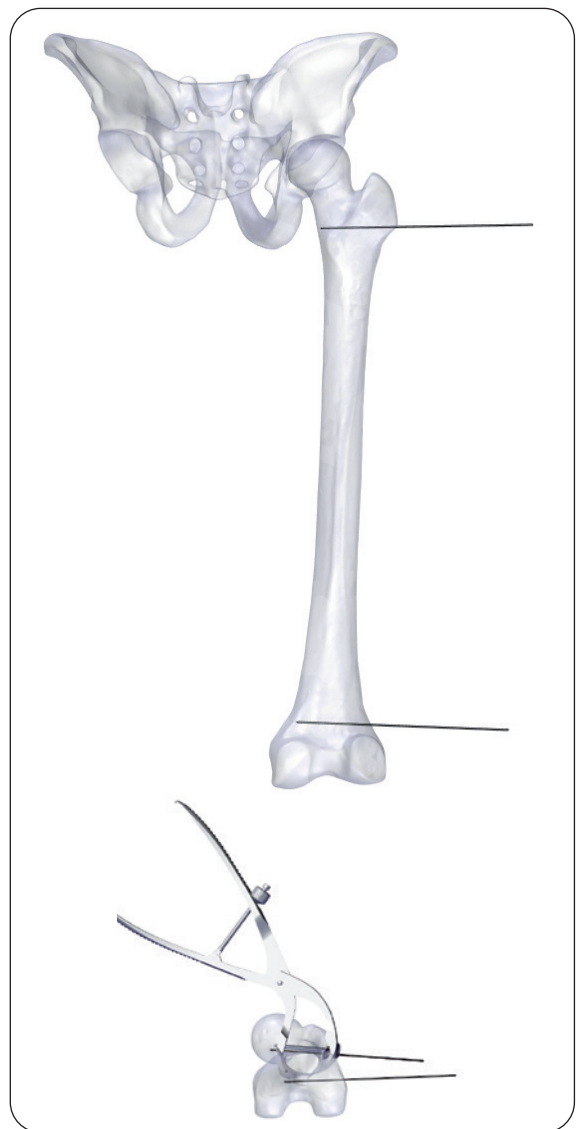


Fig. 19

## Drilling, measuring and insertion of the shaft screws

Part#	Description
154200	SS DRILL GUIDE LOCKING D2.3MM
99-154282	SS GUIDE WIRE D2.3MM L200MM PACK OF 2 STERILE
154211	SS DRILL GUIDE NON-LOCKING D2.3MM
99-154182	SS DRILL BIT D2.3MM QUICK CONNECT STERILE
99-154186	JPS DRILL BIT LONG D2.3MM QC STERILE
002-A-00009	DEPTH GAUGE WITH HOOK
154190	JPS DOUBLE MEASURING DEVICE
154780	SS SMALL BONE CLAMP
DH0455CE	MICRO RATCHETING HANDLE WITH AO CONNECTOR CANNULATED
154320	SS T8 RETENTIVE SCREWDRIVER QUICK CONNECT

Locking or non-locking screws can be used in the shaft. If compression is required, insert non-locking screws prior to any locking screw.

### Drilling, measuring and insertion of a non-locking screw in a compression hole

To obtain compression, place the drill guide non-locking in the selected compression hole with the arrow oriented towards the osteotomy line (**Fig. 21**).

If compression is not required, place the drill guide non-locking in the selected compression hole with the arrow on the opposite side of the osteotomy line (**Fig. 22**).

### Drilling and measuring

#### Option 1

Insert the 2.3mm drill bit in the drill guide and ensure complete drilling of both cortices (**Fig. 23**). Remove the drill guide non-locking. Measure screw length (**Fig. 24**) with the depth gauge.

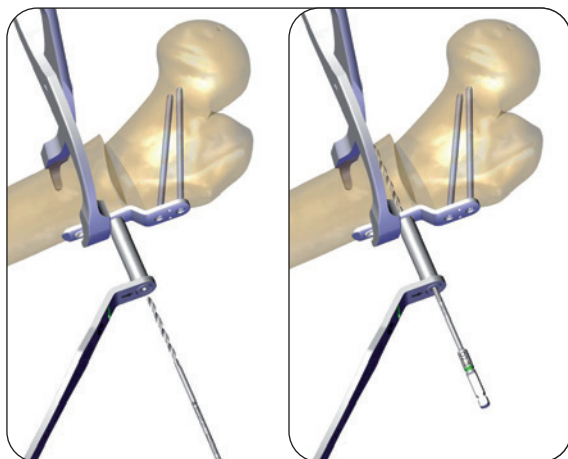


Fig. 23

#### Option 2

Insert the 2.3mm long drill bit in the drill guide and ensure complete drilling of both cortices. Slide the double measuring device over the long drill bit against the drill guide non-locking. Ensure that the double measuring device is on the "Non locking" side to determine the length of the screw (see Option 2 at page 22).

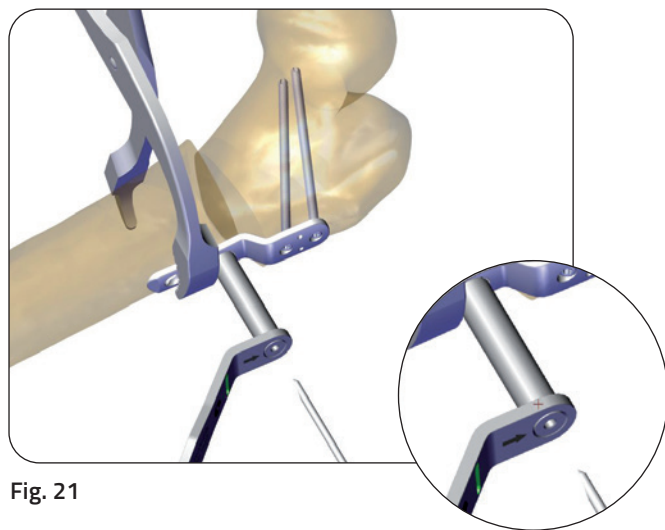


Fig. 21

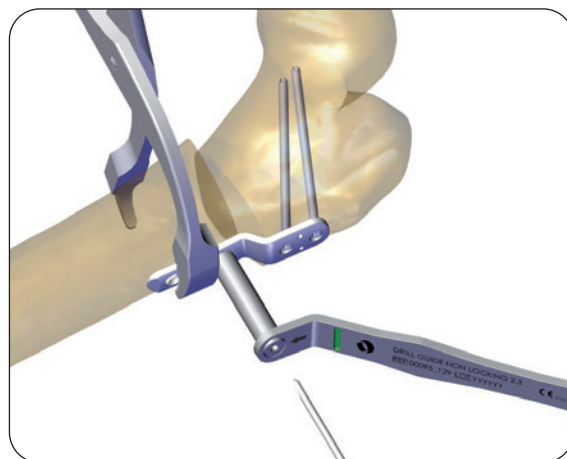


Fig. 22

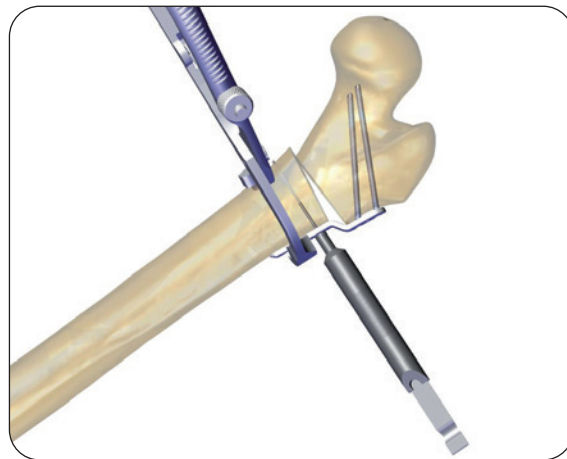
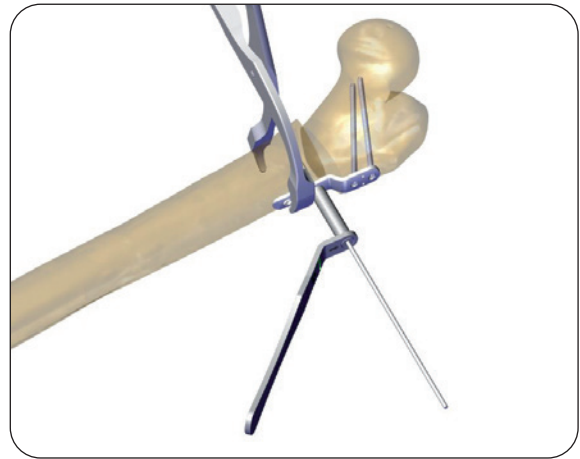


Fig. 24

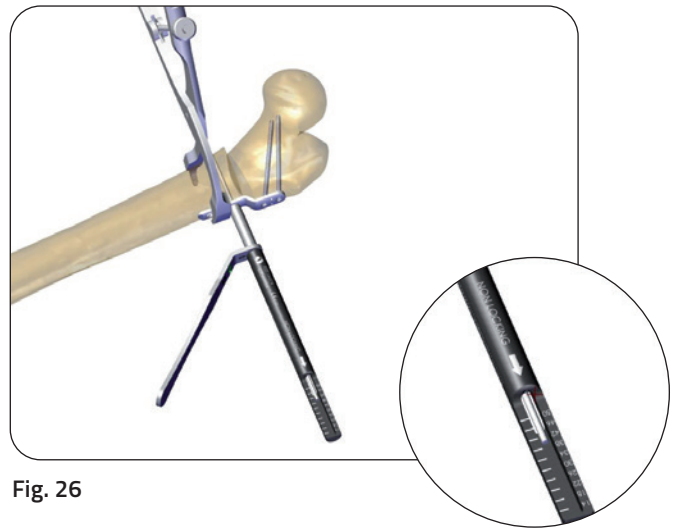
*Option 3*

Insert a 2.3mm wire in the drill guide and ensure complete drilling of both cortices (**Fig. 25**).



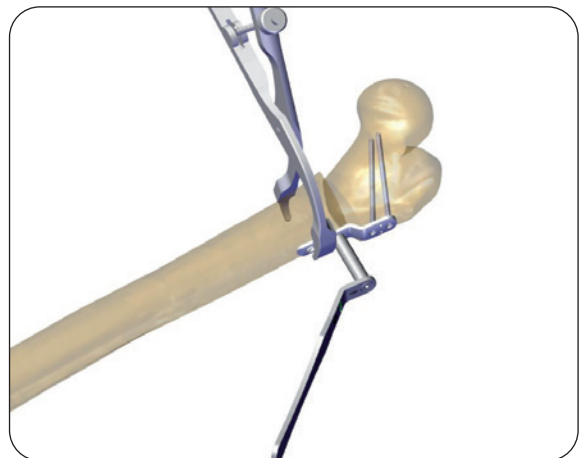
**Fig. 25**

Measure screw length with the double measuring device using the side labelled "non-locking" to determine the length of the screw (**Fig. 26**).



**Fig. 26**

Remove the double measuring device, the drill guide and the wire prior to inserting the screw (**Fig. 27**).



**Fig. 27**

### Screw insertion

If compression is desired, partially insert the selected non-locking screw into the plate, remove the bone clamp in order to allow compression and then complete screw insertion manually with the two-finger technique (**Fig. 28**).

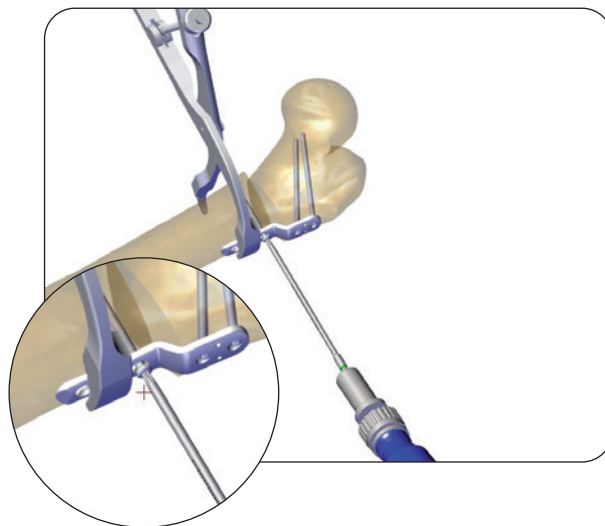


Fig. 28

If compression is not desired, insert the selected non-locking screw as described here below:

#### *Option 1: Manual insertion*

Insert the screw by hand with the ratcheting handle, using the two finger technique.

#### *Option 2: Insertion under power*

Partially insert the non-locking screw under power (low speed), then complete insertion manually with the two finger technique.

### Drilling and measuring for locking screws

Attach the drill guide locking to the locking hole.

#### *Option 1*

Drill and measure the screw hole as before (**Fig. 29**) with the depth gauge.

#### *Option 2*

Drill and measure the screw hole with the long drill bit and the measuring device as described before (**see Option 2 at page 24**).

#### *Option 3*

Insert a 2.3mm wire in the drill guide and ensure complete drilling of both cortices (**Fig. 30**).

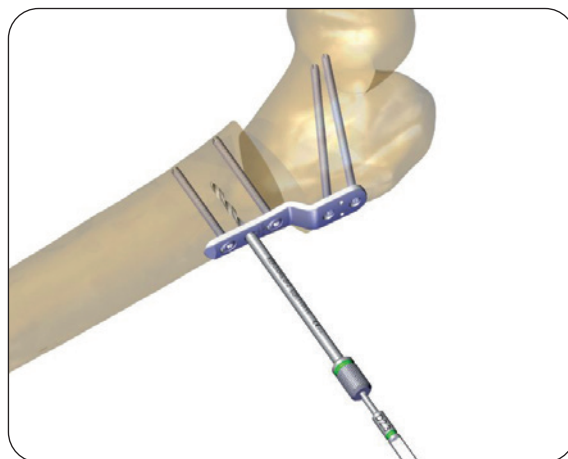


Fig. 29

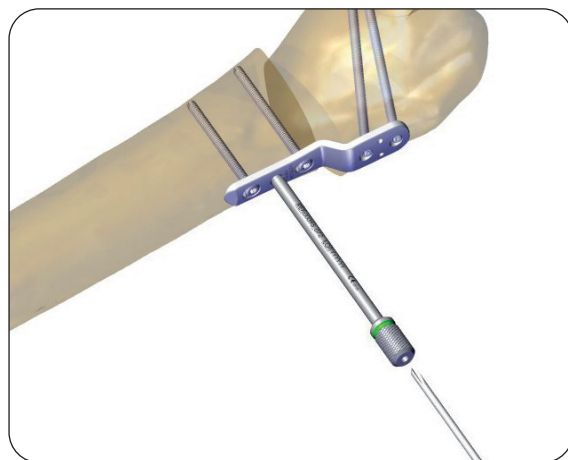
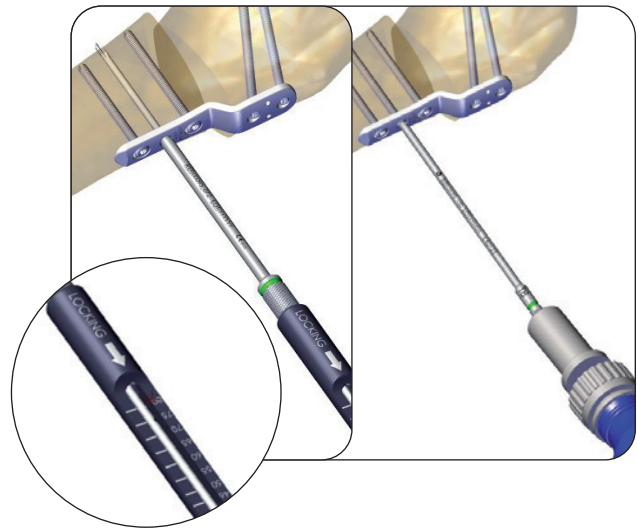


Fig. 30



Measure screw length with the double measuring device on the "Locking" side (**Fig. 31**).

Remove the measuring device, wire and drill guide locking.



**Fig. 31**

### **Locking screw insertion**

Insert the selected locking screw as described here below

#### *Option 1: Manual insertion*

Attach the screwdriver to the ratcheting handle and insert the locking screw manually with a two finger technique.

#### *Option 2: Insertion under power*

Partially insert the locking screw under power (low speed), then complete insertion manually with a two finger technique.

Drill, measure and insert the other shaft screws as just described.



**PRECAUTION:** Screws must not be over-tightened during insertion, locking or compression, as this may cause damage to the implant, lack of compression or bone stripping. Always perform final tightening manually.



**PRECAUTION:** Use the image intensifier to ensure complete drilling of both cortices when inserting non-locking screws; to verify correct placement of the plate, wires and screws and to avoid penetration of the femoral head growth plate.



**PRECAUTION:** Complete each locking screw insertion entirely before inserting the next screw to avoid a possible incorrect engagement of screw on the plate.

## Final fluoroscopic control

Use image intensifier to ensure correct plate and screw placement and to confirm planned correction (**Fig. 32**).

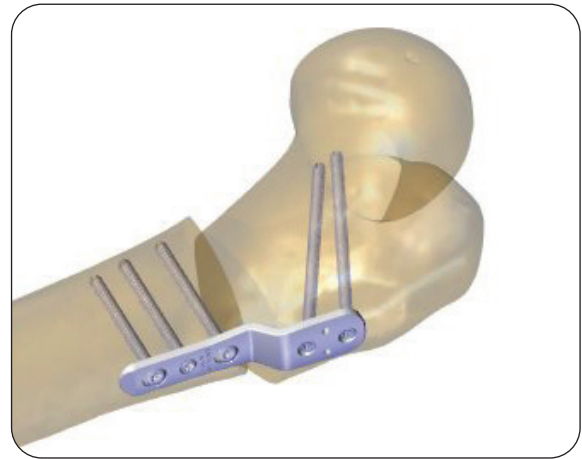


Fig. 32

## Removal

Part#	Description
99-154340	SS T8 EXTRACTION SCREWDRIVER STERILE
99-154337	SS T8 CONICAL EXTRACTOR STERILE

Once the treatment with the plate is complete, implant must be removed. Premature removal should be considered in case of adverse events.

Remove all screws prior to removing the plate. The conical extractor has a left-handed thread and should be used if the extraction screwdriver will not engage the head of the screw. The conical extractor should be inserted and turned anti-clockwise until the screw is extracted (**Fig. 33**).

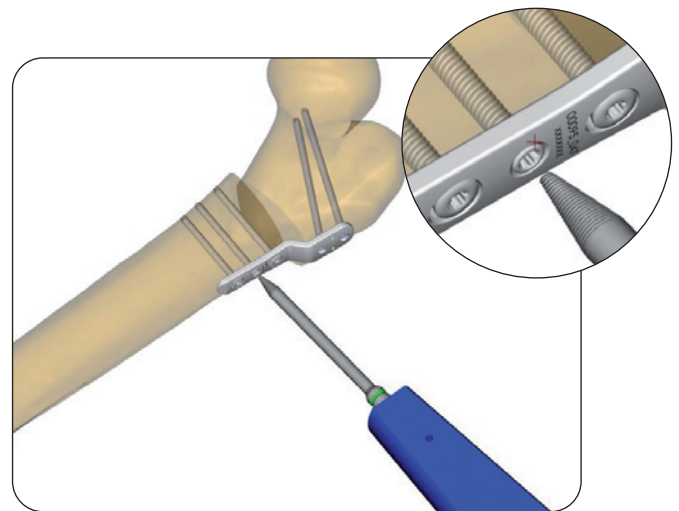


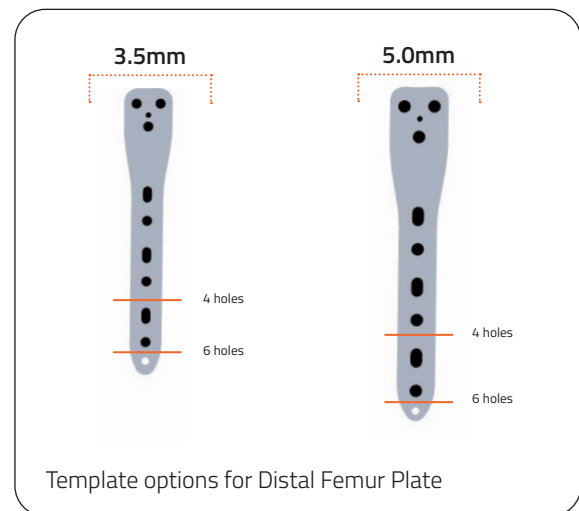
Fig. 33

## DISTAL FEMUR 5.0MM PLATE AND 3.5MM PLATE

- Pre-operative planning
- Patient positioning and surgical approach
- Insertion of the 2.0mm K-wire
- Insertion of the 2.8mm wires
- Osteotomy
- Plate positioning
- Drilling, measuring and insertion of distal screws
- Reduction
- Drilling, measuring and insertion of proximal screws
- Final fluoroscopic control
- Removal

### Pre-operative planning

The complimentary JPS pre-operative planning software could be useful during the planning phase, visualizing the anatomical angles and in simulating the calculation of the correction angle by overlaying the acquired digital radiological image with the most appropriate JPS plate image shapes.



### Patient positioning and surgical approach

Place the patient in supine position. Use a standard lateral approach to the distal femur reflecting the vastus lateralis anteriorly.

## Insertion of the 2.0mm K-wire

Part#	Description
99-154281	SS GUIDE WIRE D2.0MM L200MM PACK OF 2 STERILE

Rotate the leg under image intensifier control until the patella is perfectly anterior and in the midline (**Fig. 1**). After sub-periosteal preparation of the distal femur, place a 2.0mm K-wire extra-periosteally across the front of the femur in the frontal plane, 1cm proximal to growth plate. Check K-wire alignment with the Image Intensifier (**Fig. 2**).

Calculate the correction angle to achieve the desired mechanical axis (**Fig. 3**) See section "Correction of deformities".

*Example:*

Current Distal femur angle: 75°

Desired Distal femur angle: 81°

Correction angle:  $81^\circ - 75^\circ = 6^\circ$

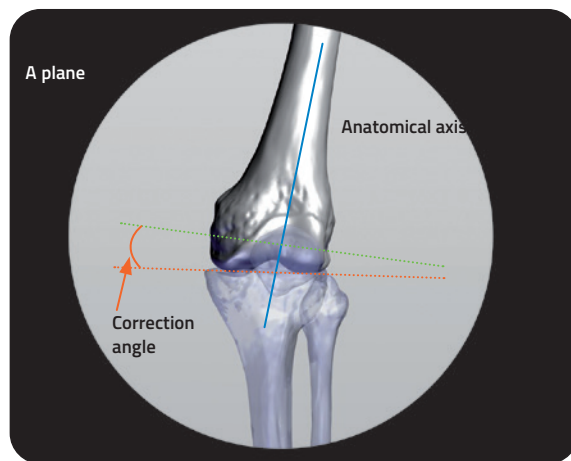


Fig. 1

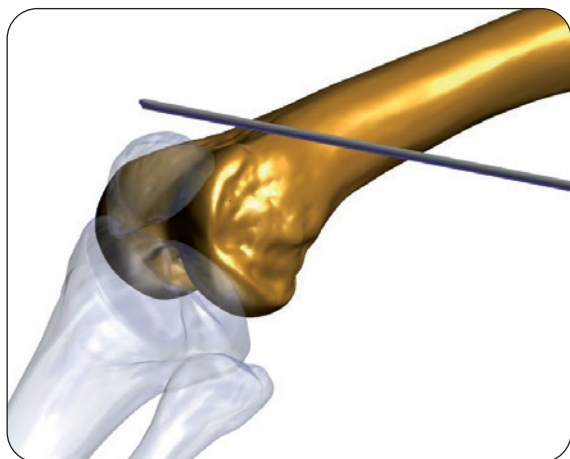


Fig. 2

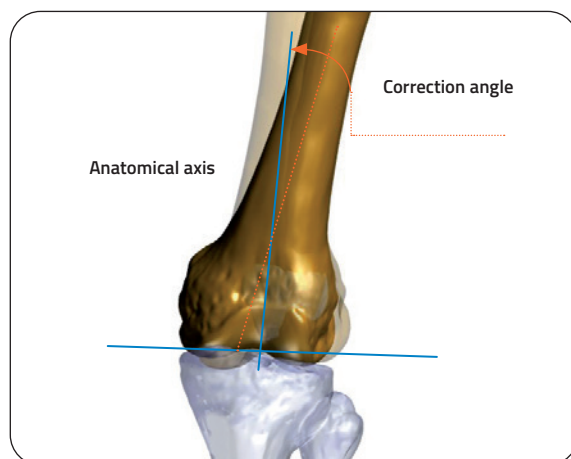


Fig. 3

## Insertion of the 2.8mm wires

### 3.5mm Plate

Part#	Description
99-154281	SS GUIDE WIRE D2.0MM L200MM PACK OF 2 STERILE
99-154283	SS GUIDE WIRE D2.8MM L200MM PACK OF 2 STERILE
154304	AL ANGLED WIRE GUIDE 3.5MM AND 5.0MM PLATES
154215	SS AIMING BLOCK - 3.5MM PLATE
154781	SS LARGE BONE CLAMP

### 5.0mm Plate

Part#	Description
99-154281	SS GUIDE WIRE D2.0MM L200MM PACK OF 2 STERILE
99-154283	SS GUIDE WIRE D2.8MM L200MM PACK OF 2 STERILE
154304	AL ANGLED WIRE GUIDE 3.5MM AND 5.0MM PLATES
154214	SS AIMING BLOCK - 5.0MM PLATE
154781	SS LARGE BONE CLAMP

The angle of the plate should be close to the desired neck-shaft angle.

Desired neck-shaft angle:  $81^{\circ}$

Suggested plate angle: e.g.  $90^{\circ}$

*Example:*

Chosen Plate-screw angle:  $90^{\circ}$ s

Required Correction angle:  $6^{\circ}$

K-wire angle:  $90^{\circ} + 6^{\circ} = 96^{\circ}$  (insertion angle  $95^{\circ}$ )

Insert the 2.0mm K-wire in the slot in the angled wire guide that corresponds to the calculated angle, place it in contact with the femoral shaft and secure the wire guide with the clamp. If flexion or extension is not required, the base of the wire guide must be parallel to the femoral shaft in the AP and lateral views. Under fluoroscopic control, insert the K-wire (**Fig. 4**).

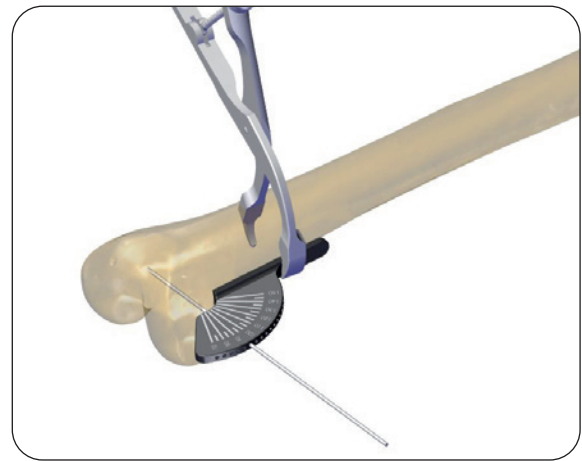


Fig. 4

Remove the anterior positioning K-wire, bone clamp and angled wire guide. Slide the appropriate aiming block over the positioning K-wire and insert the two 2.8mm wires (**Fig. 5-6**) using fluoroscopy.

Remove the aiming block.

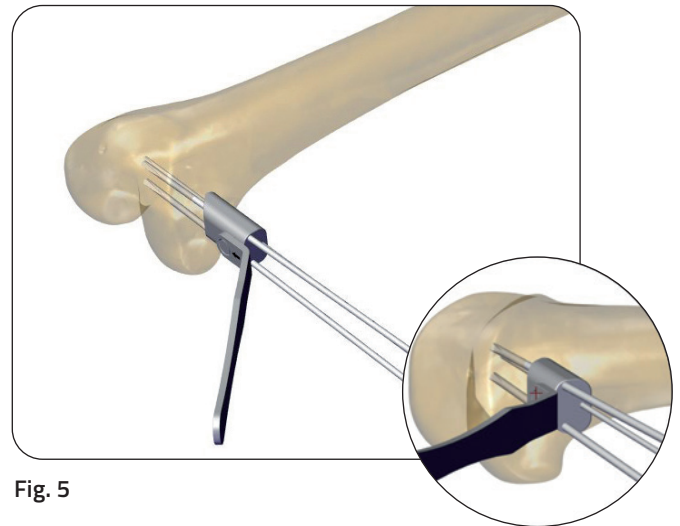


Fig. 5

## Osteotomy

Perform the osteotomy as explained on **page 40**.

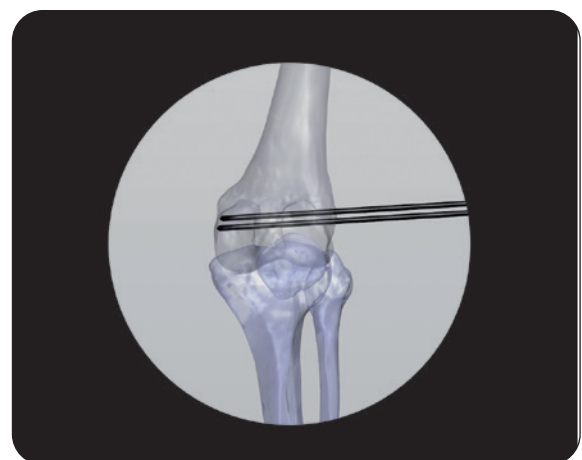


Fig. 6

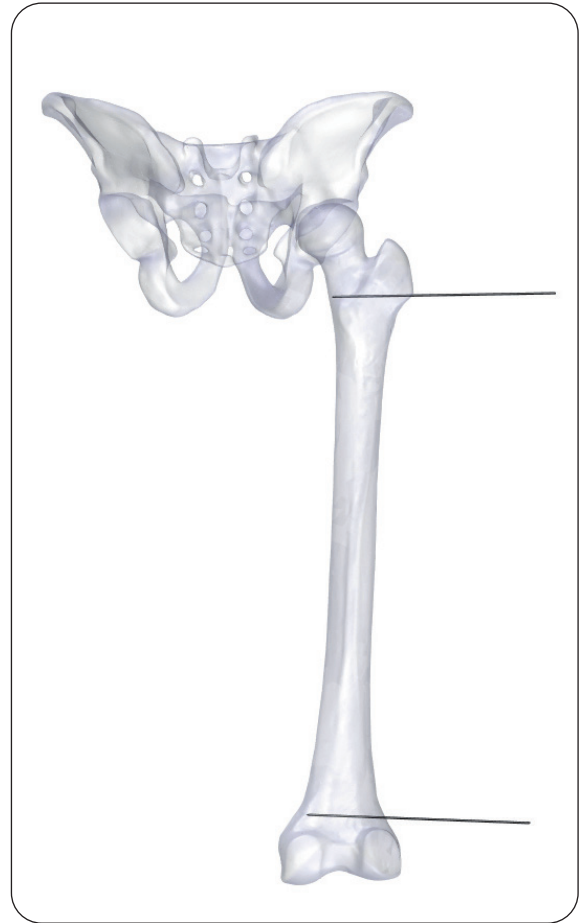


In case of internal/external rotation osteotomy, insert K-wires bicortically in the greater trochanter and lateral condyle as guides to control rotation before performing the osteotomy (**Fig. 7**).

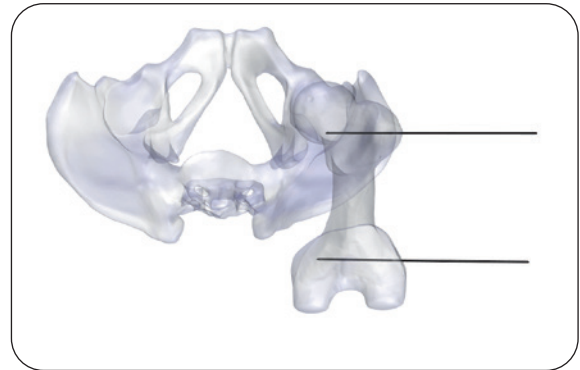
Even if no rotation is planned, insertion of two K-wires or making a marking on the bone is recommended to ensure rotational alignment is maintained.

Perform the osteotomy in one cut parallel to the wires.

After the osteotomy these wires will be made parallel to correct the rotational deformity (**Fig. 8**).



**Fig. 7**



**Fig. 8**

## Plate positioning

### 3.5mm Plate

Part#	Description
154201	SS DRILL GUIDE LOCKING D2.8MM

### 5.0mm Plate

Part#	Description
154202	SS DRILL GUIDE LOCKING D4.3MM
154203	SS REDUCTION SLEEVE

### 3.5mm Plate

Tighten the drill guide locking into the two distal screw holes (Fig. 9) and slide the plate over the wires.

### 5.0mm Plate

Tighten the drill guide locking into the two distal screw holes and slide the plate over the wires. Insert the reduction sleeves in the upper 2 drill guide locking (Fig. 10).

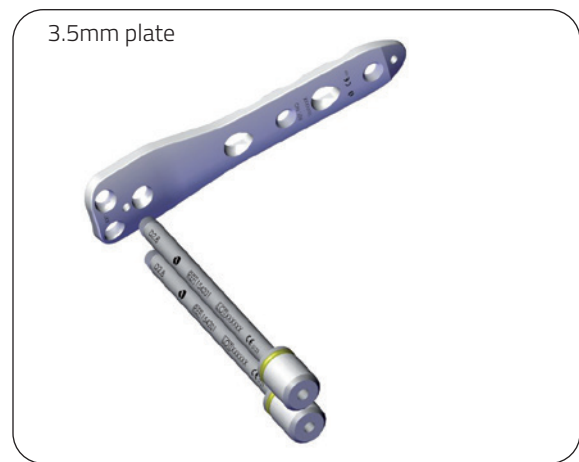


Fig. 9

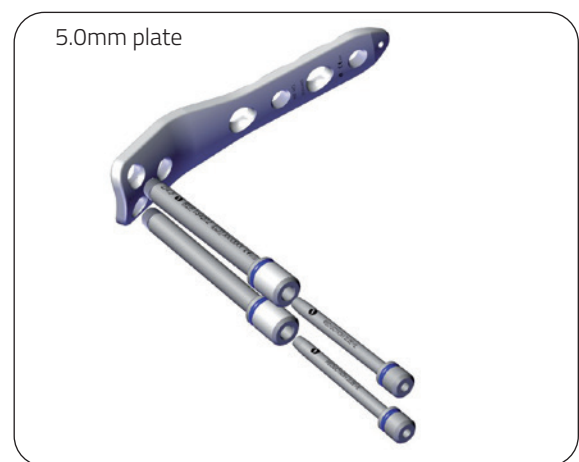


Fig. 10

## Drilling, measuring and insertion of distal screws

### Instruments for 3.5mm plate

Part#	Description
99-154283	SS GUIDE WIRE D2.8MM L200MM PACK OF 2 STERILE
154201	SS DRILL GUIDE LOCKING D2.8MM
99-154187	JPS DRILL BIT LONG D2.8MM QC STERILE
154190	JPS DOUBLE MEASURING DEVICE
154321	SS T10 RETENTIVE SCREWDRIVER QUICK CONNECT
DH0455CE	MICRO RATCHETING HANDLE WITH AO CONNECTOR CANNULATED

### Instruments for 5.0mm plate

Part#	Description
99-154283	SS GUIDE WIRE D2.8MM L200MM PACK OF 2 STERILE
99-154285	SS GUIDE WIRE D4.3MM L190MM PACK OF 2 STERILE
154202	SS DRILL GUIDE LOCKING D4.3MM
154203	SS REDUCTION SLEEVE
154190	JPS DOUBLE MEASURING DEVICE
99-154184	SS DRILL BIT D3.4MM QUICK CONNECT STERILE
99-154185	SS DRILL BIT D4.3MM QUICK CONNECT STERILE
99-154188	JPS DRILL BIT LONG D3.4MM QC STERILE
99-154189	JPS DRILL BIT LONG D4.3MM QC STERILE
154322	SS T15 RETENTIVE SCREWDRIVER QUICK CONNECT
DH0455CE	MICRO RATCHETING HANDLE WITH AO CONNECTOR CANNULATED

Secure the distal fragment by placing locking screws in the distal aspect of the plate.

Using the appropriate instruments, follow the steps as described at **page 16** of Proximal Femur application, "Measuring and insertion of the femoral neck proximal screw". If long drill bits are used, follow the steps as described at pag. 26 Option 2. Repeat the same steps for the other distal holes (**Fig. 11**).



**PRECAUTION:** Screws must not be over-tightened during insertion, locking as this may cause damage of the implant or bone stripping. Always perform final tightening manually.



**PRECAUTION:** Use the image intensifier to verify correct placement of the plate, wires and screws.



**PRECAUTION:** Complete each screw insertion entirely before inserting to the next screw to avoid a possible incorrect engagement of screw on the plate.

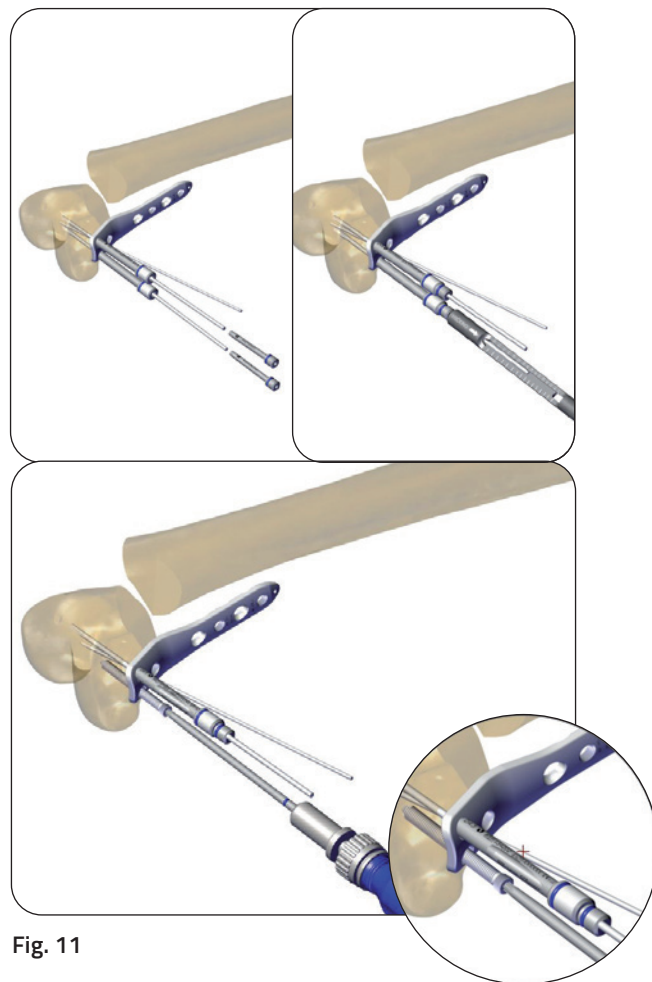


Fig. 11

## Reduction

### Instruments for 3.5mm plate

Part#	Description
154780	SS SMALL BONE CLAMP
154033	SS MEDIALIZATION GUIDE BODY 3.5MM
154031	SS MEDIALIZATION GUIDE MECHANISM

### Instruments for 5.0mm plate

Part#	Description
154781	SS LARGE BONE CLAMP
154034	SS MEDIALIZATION GUIDE BODY 5.0MM
154031	SS MEDIALIZATION GUIDE MECHANISM

Align the plate parallel with the femoral shaft axis in AP and lateral view and secure it with the clamp (**Fig. 12**).

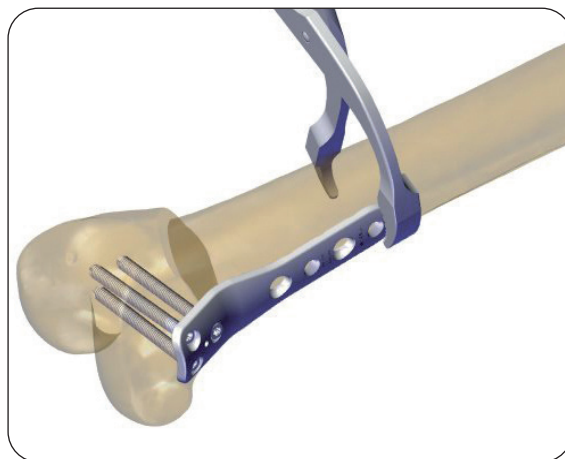


Fig. 12

Medialization can be performed prior to locking the proximal part of the plate to the bone.

Insert the SS Medialization Guide Mechanism into the SS Medialization Guide Body 3.5mm (for the 3.5mm plate) or the SS Medialization Guide Body 5.0mm (for the 5.0mm plate) and screw the medialization guide into the distal locking screw hole. (**Fig. 13**).

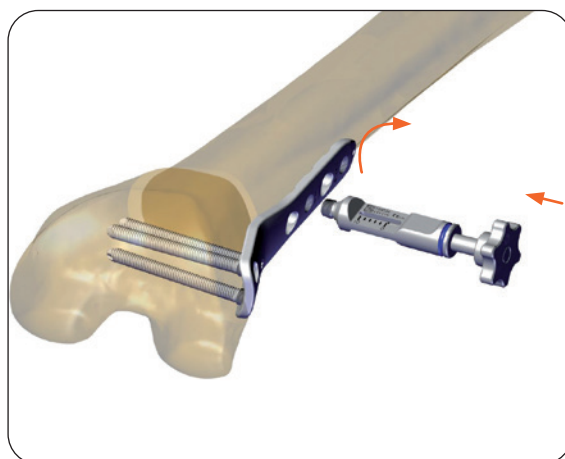


Fig. 13

Turn the knob clockwise until the desired amount of medialization is achieved (**Fig 14-15**).

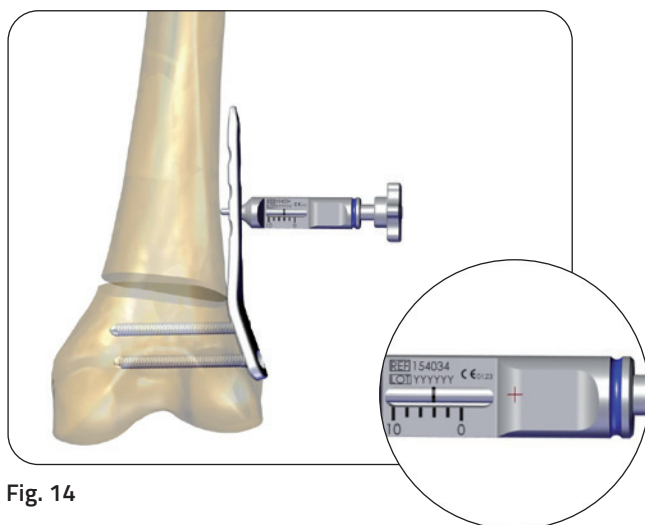


Fig. 14

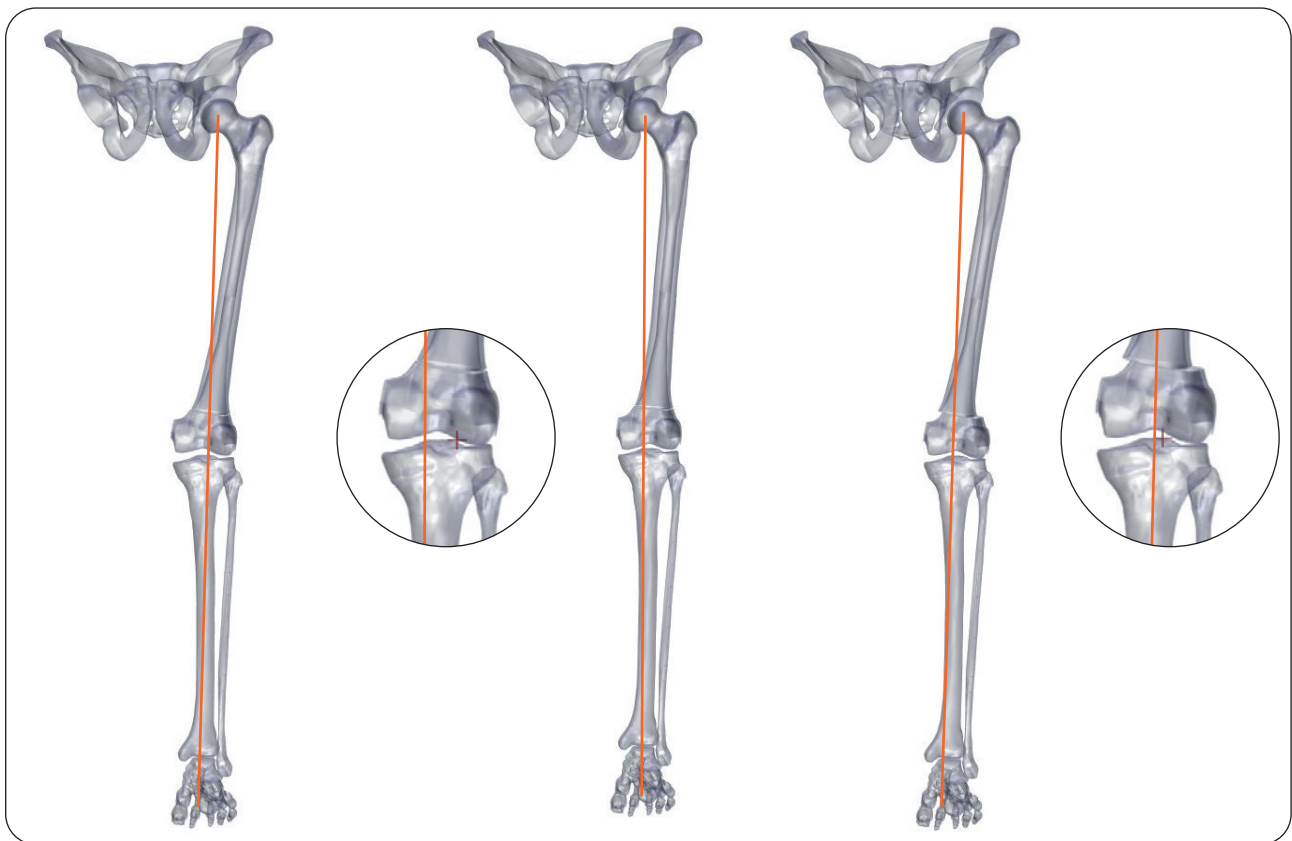


Fig. 15

## Drilling, measuring and insertion of proximal screws

### 3.5mm plate

Part#	Description
154201	SS DRILL GUIDE LOCKING D2.8MM
99-154283	SS GUIDE WIRE D2.8MM L200MM PACK OF 2 STERILE
154212	SS DRILL GUIDE NON-LOCKING D2.8MM
99-154183	SS DRILL BIT D2.8MM QUICK CONNECT STERILE
99-154187	JPS DRILL BIT LONG D2.8MM QC STERILE
154191	JPS DEPTH GAUGE WITH HOOK L80MM
154190	JPS DOUBLE MEASURING DEVICE
154780	SS SMALL BONE CLAMP
DH0455CE	MICRO RATCHETING HANDLE WITH AO CONNECTOR CANNULATED
154321	SS T10 RETENTIVE SCREWDRIVER QUICK CONNECT

### 5.0mm plate

Part#	Description
154202	SS DRILL GUIDE LOCKING D4.3MM
99-154284	SS GUIDE WIRE D3.4MM L200MM PACK OF 2 STERILE
154213	SS DRILL GUIDE NON-LOCKING D3.4MM
99-154184	SS DRILL BIT D3.4MM QUICK CONNECT STERILE
99-154188	JPS DRILL BIT LONG D3.4MM QC STERILE
154191	JPS DEPTH GAUGE WITH HOOK L80MM
154190	JPS DOUBLE MEASURING DEVICE
154781	SS LARGE BONE CLAMP
DH0455CE	MICRO RATCHETING HANDLE WITH AO CONNECTOR CANNULATED
154322	SS T15 RETENTIVE SCREWDRIVER QUICK CONNECT

Secure the proximal fragment by placing locking or non-locking screws in the proximal fragment. If compression is required, insert non-locking screws prior to any locking screw.

Using the appropriate instrument drill, measure and insert proximal screw as described on **page 20** of the Proximal Femur application (Drilling, measuring and insertion of the shaft screws).



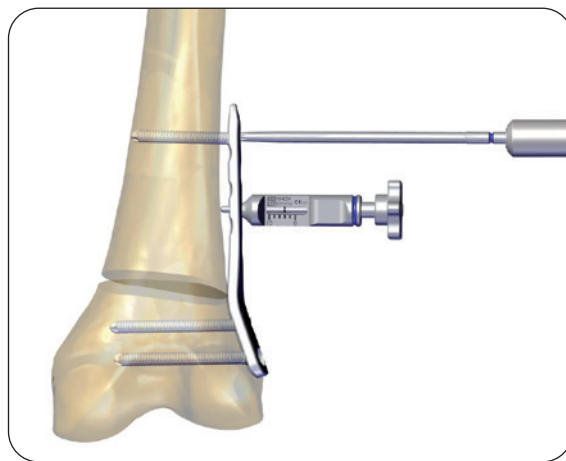
**PRECAUTION:** Screws must not be over-tightened during insertion, locking or compression, as this may cause damage to the implant, lack of compression or bone stripping. Always perform final tightening manually.



**PRECAUTION:** Use the image intensifier to ensure complete drilling of both cortices when inserting non-locking screws to verify correct placement of the plate, wires and screws.

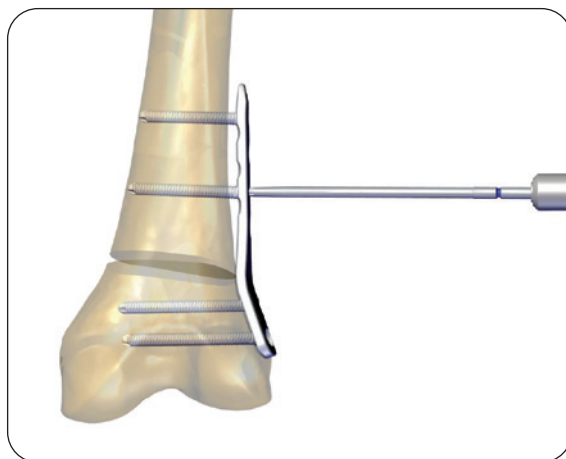


Insert a locking screw in the most proximal screw hole as previously described on **page 35 (Fig. 16)**.



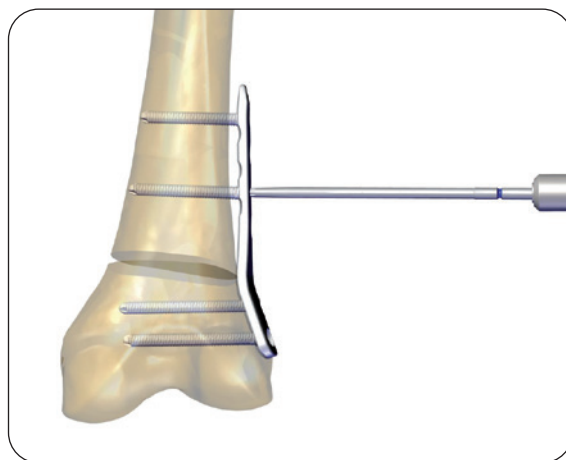
**Fig. 16**

Remove the medialization guide and insert a locking screw in its place (**Fig. 17**).



**Fig. 17**

Insert all other locking screws as previously described (**Fig. 18**).



**Fig. 18**

## Final fluoroscopic control

Use image intensifier to ensure correct plate and screw placement and to confirm planned correction (**Fig. 19**).



Fig. 19

## Removal

### 3.5mm Plate

Part#	Description
99-154341	SS T10 EXTRACTION SCREWDRIVER STERILE
99-154338	SS T10-T15 CONICAL EXTRACTOR STERILE

### 5.0mm Plate

Part#	Description
99-154342	SS T15 EXTRACTION SCREWDRIVER STERILE
99-154338	SS T10-T15 CONICAL EXTRACTOR STERILE

Once the treatment with the plate is complete, implant must be removed. Premature removal should be considered in case of adverse events. Remove all screws prior to removing the plate.

The conical extractor has a left-handed thread and should be used if the extraction screwdriver cannot engage the head of the screw. The conical extractor should be inserted and turned anti-clockwise until the screw is extracted (**Fig. 20**).

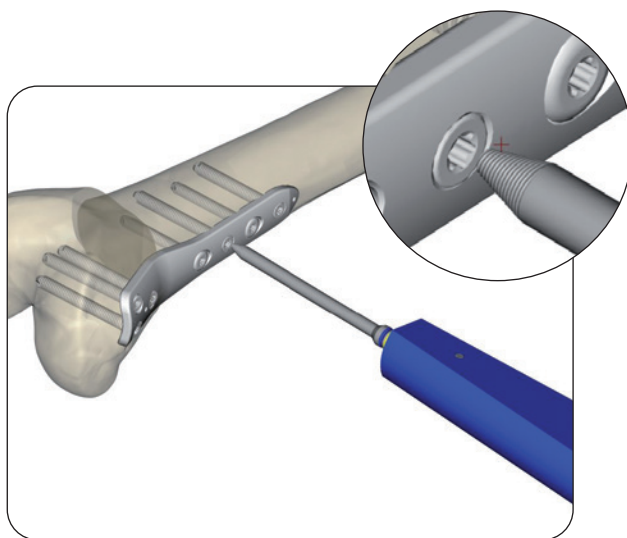


Fig. 20

## DISTAL TIBIA ROTATION OSTEOTOMY WITH A 3.5MM PLATE

- Patient positioning and surgical approach
- Plate selection
- Placement of derotation pins and osteotomy
- Drilling, measuring and insertion of distal screws
- Drilling, measuring and insertion of proximal screws
- Final Fluoroscopic control
- Removal

### Patient positioning and surgical approach

Place the patient in supine position.

#### *Option 1*

Identify and locate the distal tibial physis using fluoroscopy and mark the location of the incision. Make a longitudinal incision anteromedially, with the distal end of the incision at the level of the physis. Alternatively, a transverse incision can be made at the level of the preplanned osteotomy. Identify and protect the saphenous vein. Make a longitudinal incision in the periosteum. Begin 1.5cm proximal to the physis and proceed as far proximal as the incision allows. Complete subperiosteal dissection.

#### *Option 2*

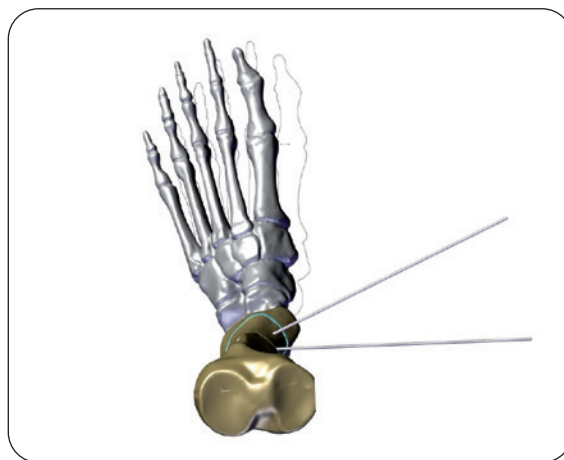
Make a transverse incision at the level of the pre-planned osteotomy. Incise the periosteum longitudinally, beginning 1.5cm proximal to the physis and proceeding as far proximal as the incision allows. Complete subperiosteal dissection. When making the incisions, identify and protect the saphenous vein.

### Plate selection

The complimentary JPS pre-operative planning software may be useful during the planning phase, visualizing the anatomical angles and in simulating the calculation of the correction angle by overlaying the acquired digital radiological image with the most appropriate JPS plate image shapes.

### Placement of derotation pins and osteotomy

Place derotation K-wires proximal and distal to the planned osteotomy to identify rotation deformity. Both wires should be orthogonal to the tibial axis and parallel to the ankle joint (**Fig. 1**).



**Fig. 1**

Perform the osteotomy 1cm proximal to the physis. A diaphyseal fibular osteotomy is recommended to assist the derotation when the correction angle is greater than 20°. Derotate the distal fragment by aligning the derotation pins in the same plane (**Fig. 2**).



**WARNING:** The osteotomy must be parallel to the physis and perpendicular to the longitudinal axis of the tibia; otherwise, derotation will lead to angular deformity.

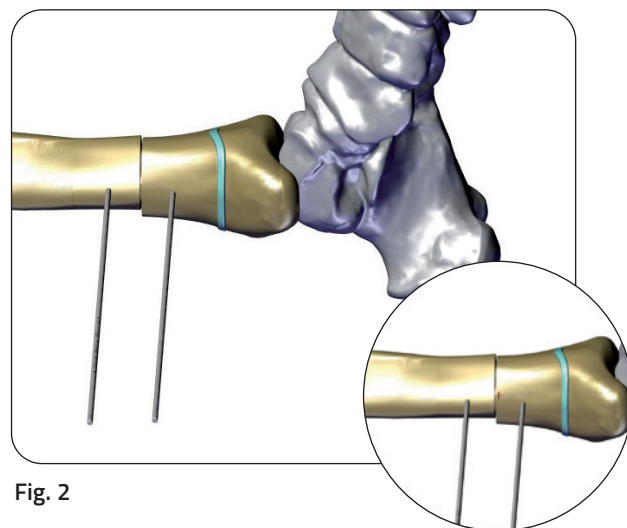


Fig. 2

### Drilling, measuring and insertion of distal screws

Part#	Description
001-A-1502P	SS GUIDE WIRE 1.5MM, 4.0/5.5MM BITE
	COMPRESSION SCREW (KIT OF 2)
154191	JPS DEPTH GAUGE WITH HOOK L80MM
154201	SS DRILL GUIDE LOCKING D2.8MM
99-154183	SS DRILL BIT D2.8MM QUICK CONNECT
	STERILE
99-154187	JPS DRILL BIT LONG D2.8MM QC STERILE
99-154283	SS GUIDE WIRE D2.8MM L200MM PACK OF 2
	STERILE
154190	JPS DOUBLE MEASURING DEVICE
DH0455CE	MICRO RATCHETING HANDLE
	WITH AO CONNECTOR CANNULATED
154321	SS T10 RETENTIVE SCREWDRIVER
	QUICK CONNECT

Insert 1.5mm wires in the dedicated holes to temporarily place the plate in the desired position. Secure the distal fragment by placing locking screws in the distal aspect of the plate. Attach the drill guide locking to the locking hole. Use the appropriate instruments and following the steps described **page 24** of the proximal femur 3.5mm plate application (drilling, measuring and insertion locking screw) to insert the locking screws (**Fig. 3**).



**PRECAUTION:** Screws must not be over-tightened during insertion or locking, as this may cause damage to the implant or bone stripping. Always perform final tightening manually.



**PRECAUTION:** Use the image intensifier to verify correct placement of the plate, wires and screws and to avoid penetration of the distal tibia growth plate.



**PRECAUTION:** Complete each locking screw insertion entirely before inserting the next screw to avoid a possible incorrect engagement of screw on the plate.

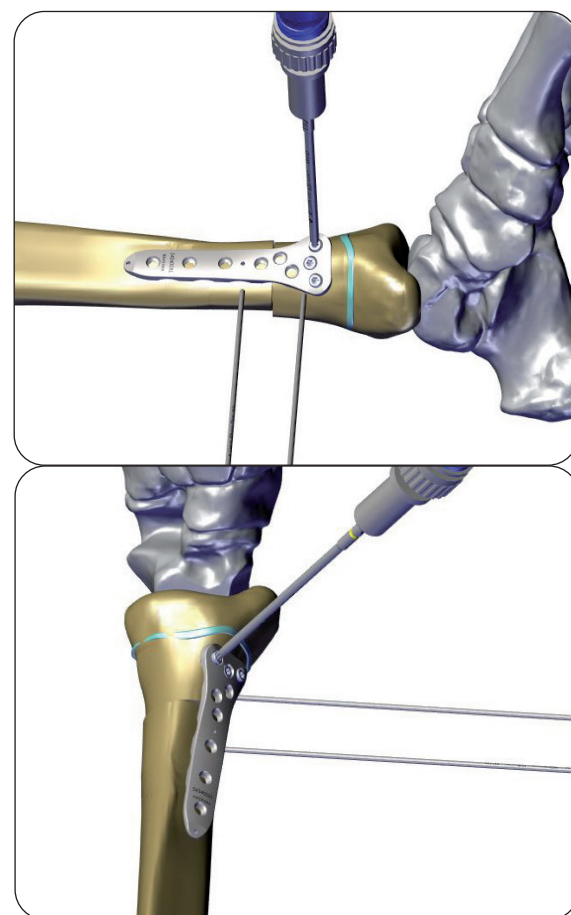


Fig. 3

## Drilling, measuring and insertion of proximal screws

Part#	Description
154191	JPS DEPTH GAUGE WITH HOOK L80MM
154190	JPS DOUBLE MEASURING DEVICE
154201	SS DRILL GUIDE LOCKING D2.8MM
99-154283	SS GUIDE WIRE D2.8MM L200MM PACK OF 2 STERILE
DH0455CE	MICRO RATCHETING HANDLE WITH AO CONNECTOR CANNULATED
154321	SS T10 RETENTIVE SCREWDRIVER QUICK CONNECT

Using the appropriate instrument drill, measure and insert proximal screws as described **page 24** "Drilling, measuring and insertion of a locking screw in a locking hole" of the proximal femur application (**Fig. 4**).



**PRECAUTION:** Screws must not be over-tightened during insertion, as this may cause damage to the implant or bone stripping. Always perform final tightening manually.



**PRECAUTION:** Use the image intensifier to ensure complete drilling of both cortices when inserting locking screws, to verify correct placement of the plate, wires and screws and to avoid penetration of the distal tibia growth plate.



**PRECAUTION:** Complete each locking screw insertion entirely before inserting the next screw to avoid a possible incorrect engagement of screw on the plate.

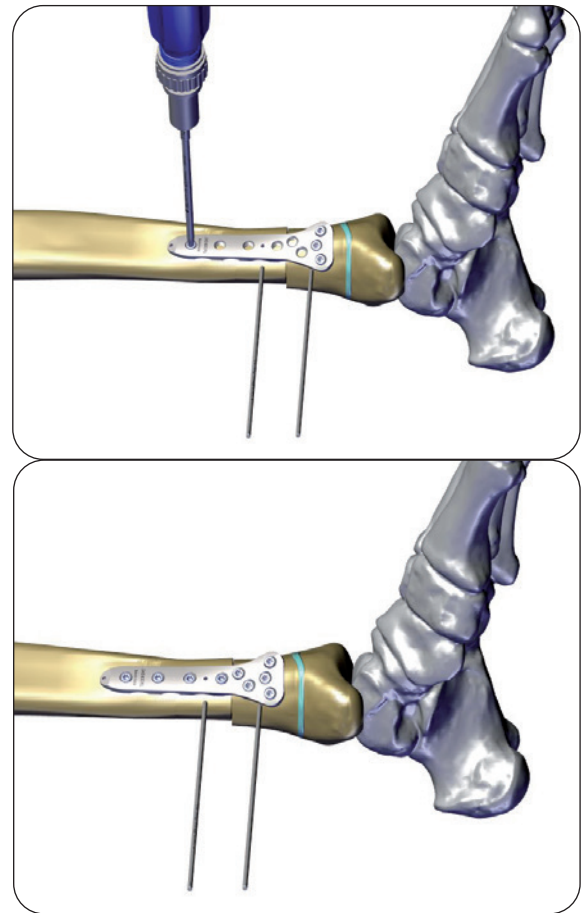


Fig. 4



## Final fluoroscopic control

Use image intensifier to ensure correct plate and screw placement and to confirm planned correction (**Fig. 5**)

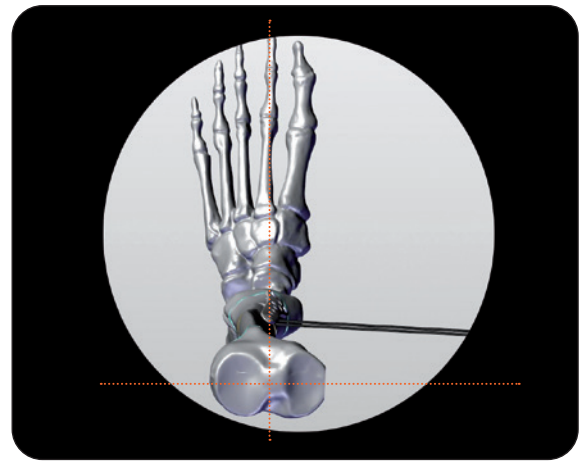


Fig. 5

## Removal

### 3.5mm Plate

Part#	Description
99-154341	SS T10 EXTRACTION SCREWDRIVER STERILE
99-154338	SS T10-T15 CONICAL EXTRACTOR STERILE

### 5.0mm Plate

Part#	Description
99-154342	SS T15 EXTRACTION SCREWDRIVER STERILE
99-154338	SS T10-T15 CONICAL EXTRACTOR STERILE

Once the treatment with the plate is complete, implant must be removed. Premature removal should be considered in case of adverse events. Remove all screws prior to removing the plate.

The conical extractor has a left-handed thread and should be used if the extraction screwdriver cannot engage the head of the screw. The conical extractor should be inserted and turned anti-clockwise until the screw is extracted (**Fig. 6**).

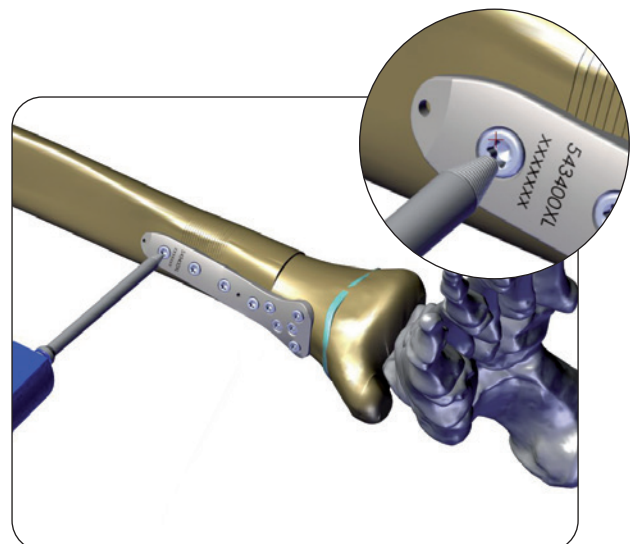



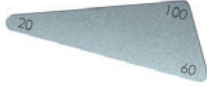
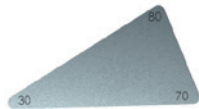
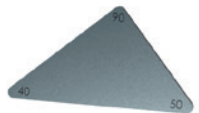






Fig. 6


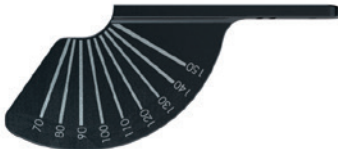
GENERAL TRAY







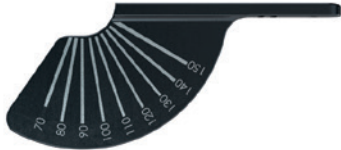

Part#	Description	
154191	JPS Depth Gauge with Hook L80MM	
DH0455CE	Micro Ratcheting Handle with AO Connector Cannulated	
154190	JPS Double Measuring Device	
154300	SS Triangular Positioning Plate 60 degrees 100 degrees 20 degrees	
154301	SS Triangular Positioning Plate 70 degrees 80 degrees 30 degrees	
154302	SS Triangular Positioning Plate 90 degrees 50 degrees 40 degrees	
154306	SS Osteotomy Gauge	
154666	SS JPS Template	
154780	SS Small Bone Clamp	
154781	SS Large Bone Clamp	

### 3.0MM TRAY

Part#	Description	
154200	SS Drill Guide Locking D2.3mm	
154211	SS Drill Guide Non-locking D2.3mm	
154320	SS T8 Retentive Screwdriver Quick Connect	
154305	AL Angled Wire Guide 3.0mm Plate	

### 3.5MM TRAY

Part#	Description	
154201	SS Drill Guide Locking D2.8mm	
154212	SS Drill Guide Non-locking D2.8mm	
154321	SS T10 Retentive Screwdriver Quick Connect	
154033	SS Medialization Guide Body 3.5mm	
154031	SS Medialization Guide Mechanism	
154304	AL Angled Wire Guide 3.5mm and 5.0mm Plates	
154215	SS Aiming Block - 3.5mm Plate	

5.0MM TRAY		
Part#	Description	
154202	SS Drill Guide Locking D4.3mm	
154203	SS Reduction Sleeve	
154213	SS Drill Guide Non-locking D3.4mm	
154322	SS T15 Retentive Screwdriver Quick Connect	
154034	SS Medialization Guide Body 5.0mm	
154031	SS Medialization Guide Mechanism	
154304	AL Angled Wire Guide 3.5mm and 5.0mm Plates	
154214	SS Aiming Block - 5.0mm Plate	

#### JPS STERILE CONSUMABLES

Reference#	Description
99-154182	SS DRILL BIT D2.3MM QUICK CONNECT STERILE
99-154183	SS DRILL BIT D2.8MM QUICK CONNECT STERILE
99-154184	SS DRILL BIT D3.4MM QUICK CONNECT STERILE
99-154185	SS DRILL BIT D4.3MM QUICK CONNECT STERILE
99-154186	JPS DRILL BIT LONG D2.3MM QC STERILE
99-154187	JPS DRILL BIT LONG D2.8MM QC STERILE
99-154188	JPS DRILL BIT LONG D3.4MM QC STERILE
99-154189	JPS DRILL BIT LONG D4.3MM QC STERILE
001-A-1502P	GUIDE WIRE 1.5MM, 4.0/5.5MM BITE COMPRESSION SCREW (KIT OF 2)
99-154281	SS GUIDE WIRE D2.0 L200MM PACK OF 2 STERILE
99-154282	SS GUIDE WIRE D2.3 L200MM PACK OF 2 STERILE
99-154283	SS GUIDE WIRE D2.8MM L200MM PACK OF 2 STERILE
99-154284	SS GUIDE WIRE D3.4MM L200MM PACK OF 2 STERILE
99-154285	SS GUIDE WIRE D4.3 L190MM PACK OF 2 STERILE

#### JPS STERILE EXTRACTION SET

Reference#	Description
99-154340	SS T8 EXTRACTION SCREWDRIVER STERILE
99-154341	SS T10 EXTRACTION SCREWDRIVER STERILE
99-154342	SS T15 EXTRACTION SCREWDRIVER STERILE
99-154337	SS T8 CONICAL EXTRACTOR STERILE
99-154338	SS T10-T15 CONICAL EXTRACTOR STERILE

## PLATES

### JPS 3.0MM PROXIMAL FEMUR PLATE

Reference#	Description
99-5431001	90 DEGREES - 3 HOLES 6MM OFFSET STERILE
99-5431002	110 DEGREES - 3 HOLES 6MM OFFSET STERILE
99-5431003	130 DEGREES - 3 HOLES STERILE

### JPS 3.5MM PROXIMAL FEMUR PLATE

Reference#	Description
99-5431004	90 DEGREES - 3 HOLES 6MM OFFSET STERILE
99-5431005	90 DEGREES - 3 HOLES 12MM OFFSET STERILE
99-5431006	100 DEGREES - 3 HOLES 6MM OFFSET STERILE
99-5431007	100 DEGREES - 3 HOLES 12MM OFFSET STERILE
99-5431008	110 DEGREES - 3 HOLES 6MM OFFSET STERILE
99-5431009	110 DEGREES - 3 HOLES 12MM OFFSET STERILE
99-5431010	120 DEGREES - 3 HOLES 6MM OFFSET STERILE
99-5431011	120 DEGREES - 3 HOLES 12MM OFFSET STERILE
99-5431012	130 DEGREES - 3 HOLES STERILE
99-5431013	130 DEGREES - 4 HOLES STERILE
99-5431014	130 DEGREES - 6 HOLES STERILE
99-5431015	130 DEGREES - 8 HOLES STERILE
99-5431016	130 DEGREES - 10 HOLES STERILE
99-5431017	140 DEGREES - 3 HOLES STERILE
99-5431018	150 DEGREES - 3 HOLES STERILE
99-5431019	150 DEGREES - 5 HOLES STERILE

### JPS 5.0MM PROXIMAL FEMUR PLATE

Reference#	Description
99-5431020	90 DEGREES - 4 HOLES 6MM OFFSET STERILE
99-5431021	90 DEGREES - 4 HOLES 14MM OFFSET STERILE
99-5431022	90 DEGREES - 3 HOLES 6MM OFFSET STERILE
99-5431023	90 DEGREES - 3 HOLES 14MM OFFSET STERILE
99-5431024	100 DEGREES - 4 HOLES 6MM OFFSET STERILE
99-5431025	100 DEGREES - 4 HOLES 14MM OFFSET STERILE
99-5431026	110 DEGREES - 4 HOLES 6MM OFFSET STERILE
99-5431027	110 DEGREES - 4 HOLES 14MM OFFSET STERILE
99-5431028	120 DEGREES - 4 HOLES 6MM OFFSET STERILE
99-5431029	120 DEGREES - 4 HOLES 14MM OFFSET STERILE
99-5431030	130 DEGREES - 3 HOLES STERILE
99-5431031	130 DEGREES - 4 HOLES STERILE
99-5431032	130 DEGREES - 6 HOLES STERILE
99-5431033	130 DEGREES - 8 HOLES STERILE
99-5431034	130 DEGREES - 10 HOLES STERILE
99-5431035	140 DEGREES - 3 HOLES STERILE
99-5431036	150 DEGREES - 3 HOLES STERILE
99-5431037	150 DEGREES - 5 HOLES STERILE

### JPS 3.5MM DISTAL FEMUR PLATE

Reference#	Description
99-5433005	80 DEGREES - 4 HOLES 5 DEGREES FLARE STERILE
99-5433006	80 DEGREES - 6 HOLES 5 DEGREES FLARE STERILE
99-5433001	90 DEGREES - 4 HOLES 18 DEGREES FLARE STERILE
99-5433002	90 DEGREES - 6 HOLES 18 DEGREES FLARE STERILE
99-5433003	90 DEGREES - 4 HOLES 5 DEGREES FLARE STERILE
99-5433004	90 DEGREES - 6 HOLES 5 DEGREES FLARE STERILE

### JPS 5.0MM DISTAL FEMUR PLATE

Reference#	Description
99-5433011	80 DEGREES - 4 HOLES 5 DEGREES FLARE STERILE
99-5433012	80 DEGREES - 6 HOLES 5 DEGREES FLARE STERILE
99-5433007	90 DEGREES - 4 HOLES 18 DEGREES FLARE STERILE
99-5433008	90 DEGREES - 6 HOLES 18 DEGREES FLARE STERILE
99-5433009	90 DEGREES - 4 HOLES 5 DEGREES FLARE STERILE
99-5433010	90 DEGREES - 6 HOLES 5 DEGREES FLARE STERILE

### JPS 3.5MM WIDE MEDIAL TIBIA PLATE

Reference#	Description
99-5434001L	LEFT - 2 HOLES STERILE
99-5434002L	LEFT - 3 HOLES STERILE
99-5434003L	LEFT - 4 HOLES STERILE
99-5434004L	LEFT - 5 HOLES STERILE
99-5434001R	RIGHT - 2 HOLES STERILE
99-5434002R	RIGHT - 3 HOLES STERILE
99-5434003R	RIGHT - 4 HOLES STERILE
99-5434004R	RIGHT - 5 HOLES STERILE

### JPS 3.5MM NARROW MEDIAL TIBIA PLATE

Reference#	Description
99-5434005L	LEFT - 2 HOLES STERILE
99-5434006L	LEFT - 3 HOLES STERILE
99-5434007L	LEFT - 4 HOLES STERILE
99-5434008L	LEFT - 5 HOLES STERILE
99-5434005R	RIGHT - 2 HOLES STERILE
99-5434006R	RIGHT - 3 HOLES STERILE
99-5434007R	RIGHT - 4 HOLES STERILE
99-5434008R	RIGHT - 5 HOLES STERILE

### JPS 3.5MM ANTEROLATERAL TIBIA PLATE

Reference#	Description
99-5434009L	LEFT - 2 HOLES STERILE
99-5434010L	LEFT - 3 HOLES STERILE
99-5434011L	LEFT - 4 HOLES STERILE
99-5434009R	RIGHT - 2 HOLES STERILE
99-5434010R	RIGHT - 3 HOLES STERILE
99-5434011R	RIGHT - 4 HOLES STERILE



## SCREWS

JPS 3.0MM NON-LOCKING SCREW DOUBLE START THREAD	
Reference#	Description
99-5443010	L10MM STERILE
99-5443012	L12MM STERILE
99-5443014	L14MM STERILE
99-5443016	L16MM STERILE
99-5443018	L18MM STERILE
99-5443020	L20MM STERILE
99-5443022	L22MM STERILE
99-5443024	L24MM STERILE
99-5443026	L26MM STERILE
99-5443028	L28MM STERILE
99-5443030	L30MM STERILE
99-5443032	L32MM STERILE
99-5443034	L34MM STERILE
99-5443036	L36MM STERILE
99-5443038	L38MM STERILE
99-5443040	L40MM STERILE

JPS 3.5MM NON-LOCKING SCREW DOUBLE START THREAD	
Reference#	Description
99-5443510	L10MM STERILE
99-5443512	L12MM STERILE
99-5443514	L14MM STERILE
99-5443516	L16MM STERILE
99-5443518	L18MM STERILE
99-5443520	L20MM STERILE
99-5443522	L22MM STERILE
99-5443524	L24MM STERILE
99-5443526	L26MM STERILE
99-5443528	L28MM STERILE
99-5443530	L30MM STERILE
99-5443532	L32MM STERILE
99-5443534	L34MM STERILE
99-5443536	L36MM STERILE
99-5443538	L38MM STERILE
99-5443540	L40MM STERILE
99-5443542	L42MM STERILE
99-5443544	L44MM STERILE
99-5443546	L46MM STERILE
99-5443548	L48MM STERILE
99-5443550	L50MM STERILE
99-5443555	L55MM STERILE
99-5443560	L60MM STERILE
99-5443565	L65MM STERILE
99-5443570	L70MM STERILE

JPS 4.5MM NON-LOCKING SCREW DOUBLE START THREAD	
Reference#	Description
99-5444514	L14MM STERILE
99-5444516	L16MM STERILE
99-5444518	L18MM STERILE
99-5444520	L20MM STERILE
99-5444522	L22MM STERILE
99-5444524	L24MM STERILE
99-5444526	L26MM STERILE
99-5444528	L28MM STERILE
99-5444530	L30MM STERILE
99-5444532	L32MM STERILE
99-5444534	L34MM STERILE
99-5444536	L36MM STERILE
99-5444538	L38MM STERILE
99-5444540	L40MM STERILE
99-5444542	L42MM STERILE
99-5444544	L44MM STERILE
99-5444546	L46MM STERILE
99-5444548	L48MM STERILE
99-5444550	L50MM STERILE
99-5444555	L55MM STERILE
99-5444560	L60MM STERILE
99-5444565	L65MM STERILE
99-5444570	L70MM STERILE
99-5444575	L75MM STERILE
99-5444580	L80MM STERILE

JPS 3.0MM LOCKING SCREW DOUBLE START THREAD	
Reference#	Description
99-5453010	L10MM STERILE
99-5453012	L12MM STERILE
99-5453014	L14MM STERILE
99-5453016	L16MM STERILE
99-5453018	L18MM STERILE
99-5453020	L20MM STERILE
99-5453022	L22MM STERILE
99-5453024	L24MM STERILE
99-5453026	L26MM STERILE
99-5453028	L28MM STERILE
99-5453030	L30MM STERILE
99-5453032	L32MM STERILE
99-5453034	L34MM STERILE
99-5453036	L36MM STERILE
99-5453038	L38MM STERILE
99-5453040	L40MM STERILE
99-5453042	L42MM STERILE
99-5453044	L44MM STERILE
99-5453046	L46MM STERILE
99-5453048	L48MM STERILE
99-5453050	L50MM STERILE
99-5453055	L55MM STERILE
99-5453060	L60MM STERILE

JPS 3.5MM LOCKING SCREW DOUBLE START THREAD	
Reference#	Description
99-5453510	L10MM STERILE
99-5453512	L12MM STERILE
99-5453514	L14MM STERILE
99-5453516	L16MM STERILE
99-5453518	L18MM STERILE
99-5453520	L20MM STERILE
99-5453522	L22MM STERILE
99-5453524	L24MM STERILE
99-5453526	L26MM STERILE
99-5453528	L28MM STERILE
99-5453530	L30MM STERILE
99-5453532	L32MM STERILE
99-5453534	L34MM STERILE
99-5453536	L36MM STERILE
99-5453538	L38MM STERILE
99-5453540	L40MM STERILE
99-5453542	L42MM STERILE
99-5453544	L44MM STERILE
99-5453546	L46MM STERILE
99-5453548	L48MM STERILE
99-5453550	L50MM STERILE
99-5453555	L55MM STERILE
99-5453560	L60MM STERILE
99-5453565	L65MM STERILE
99-5453570	L70MM STERILE

JPS 5.0MM LOCKING SCREW DOUBLE START THREAD	
Reference#	Description
99-5455014	L14MM STERILE
99-5455016	L16MM STERILE
99-5455018	L18MM STERILE
99-5455020	L20MM STERILE
99-5455022	L22MM STERILE
99-5455024	L24MM STERILE
99-5455026	L26MM STERILE
99-5455028	L28MM STERILE
99-5455030	L30MM STERILE
99-5455032	L32MM STERILE
99-5455034	L34MM STERILE
99-5455036	L36MM STERILE
99-5455038	L38MM STERILE
99-5455040	L40MM STERILE
99-5455042	L42MM STERILE
99-5455044	L44MM STERILE
99-5455046	L46MM STERILE
99-5455048	L48MM STERILE
99-5455050	L50MM STERILE
99-5455055	L55MM STERILE
99-5455060	L60MM STERILE
99-5455065	L65MM STERILE
99-5455070	L70MM STERILE
99-5455075	L75MM STERILE
99-5455080	L80MM STERILE

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