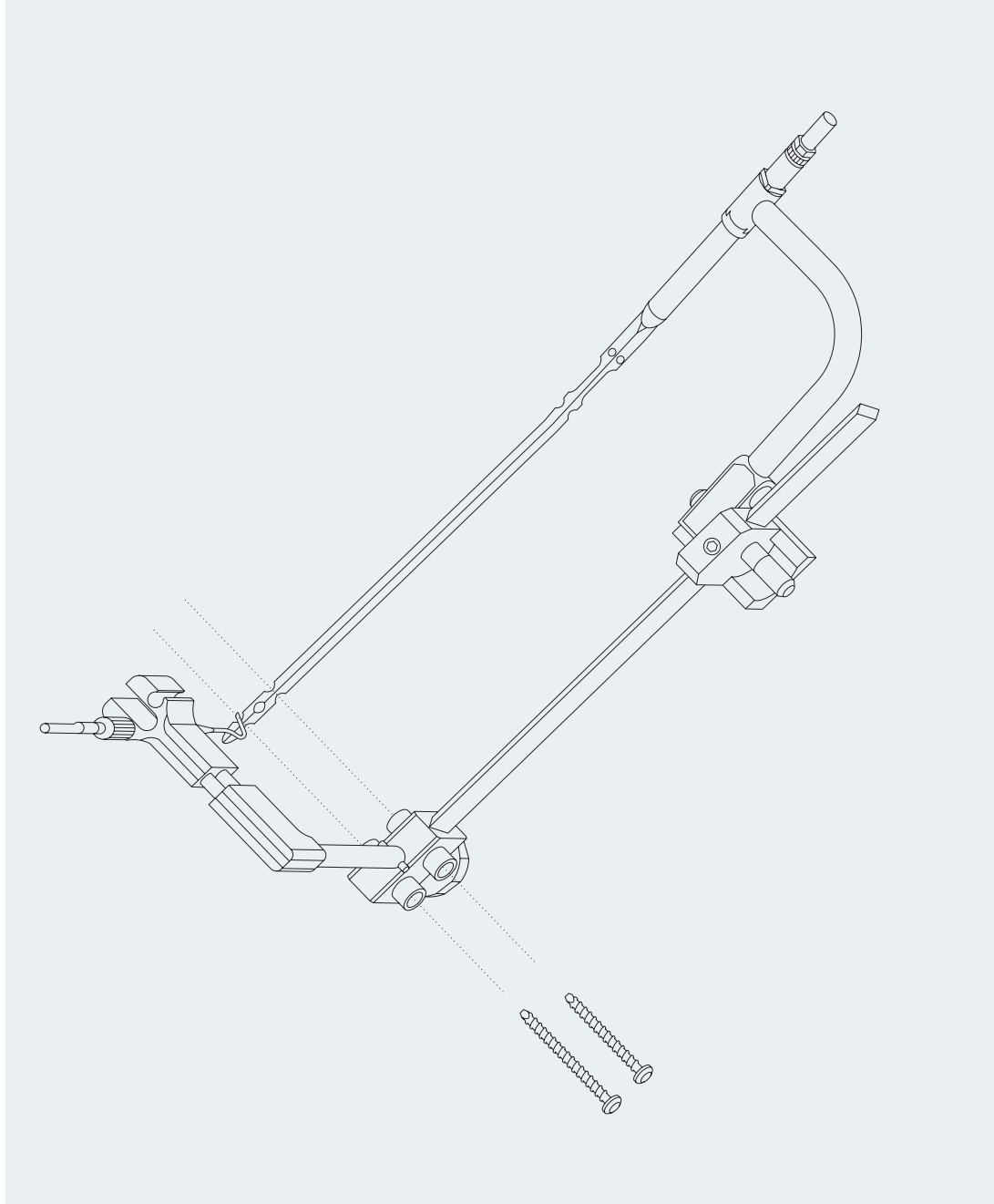


DAD – Distal Aiming Device for UTN

Surgical Technique



This publication is not intended for distribution in the USA.

Instruments and implants approved by the AO Foundation.

 Image intensifier control

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

Processing, Reprocessing, Care and Maintenance

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

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

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

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

TABLE OF CONTENTS

OVERVIEW		2
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INTRODUCTION		3
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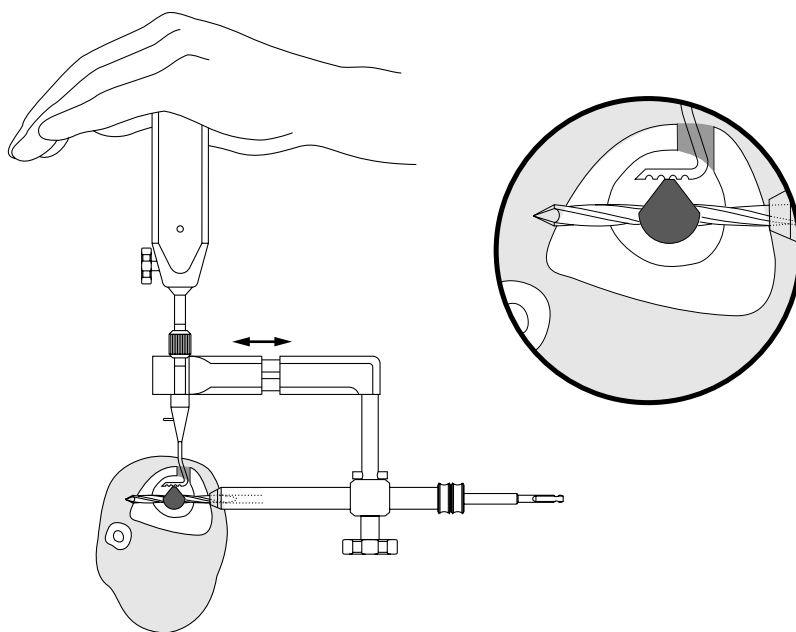
ML INTERLOCKING	1 Preoperatively: Mount the Aiming Beam and calibrate it to the length of the chosen nail	4
	2 Anterior nail contact opening	6
	3 Cleaning of the anterior nail contact opening	7
	4 Nail contact with the anterior L-Spacer	8
	5 Drilling the holes for ML interlocking	10

AP INTERLOCKING	6 Opening for medial nail contact	11
	7 Cleaning of the nail contact opening	11
	8 Mount the Aiming Arm assembly for AP interlocking	12
	9 Nail contact with the Expander Spacer	13
	10 Drilling the hole for AP interlocking	14
	11 Distal locking of the UTN	15

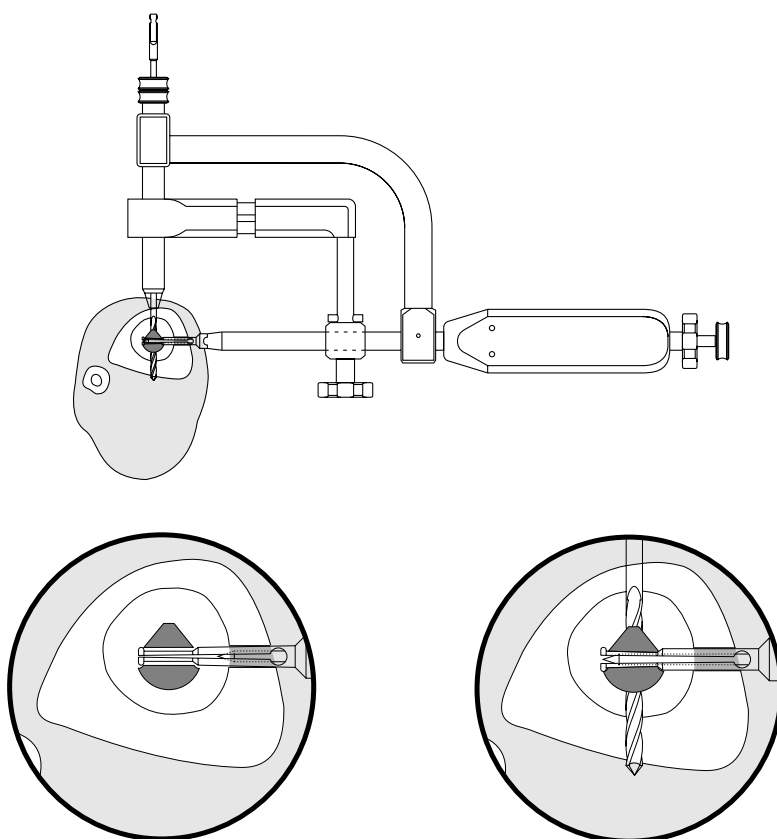
INSTRUMENTS		17
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OVERVIEW

ML interlocking



AP interlocking



INTRODUCTION

Introduction

The Distal Aiming Device DAD for the Tibial Nail represents a purely mechanical aiming support for distal interlocking of the Synthes Tibial Nail UTN.

Advantages

- When using the DAD for distal locking of a UTN no image intensifier control is required. Radiation exposure of the patient and the OR staff is significantly reduced.
- Exact placement of the drill holes and the Locking Bolts. This leads to a better stabilization of the fracture and minimizes the risk of damaging the material.

Principles of function

With a rigid aiming device, the distal locking of a medullary nail cannot be performed with the required precision due to the deformation of the nail during insertion. An analysis of this deformation shows a spread of the nail tip position of more than 19 mm in the sagittal plane and 14 mm in the frontal plane. The torsion of the solid nail is insignificant and can be ignored.

Based on the above mentioned results an aiming device for distal interlocking was developed, which is adjustable to the nail deformation in sagittal and frontal plane. The reference point for the adjustment is the nail surface at the distal end of the nail. The Spacers are specifically calibrated to the chosen nail diameter.

This surgical technique is divided into two parts: first, standard mediolateral interlocking, and second, optional anteroposterior interlocking.

ML interlocking

For mediolateral interlocking an anterior L-Spacer is used to prop the aiming beam in the sagittal plane and bring it into position. The Spacer is positioned on the anterior surface of the distal tip of the nail.

AP interlocking

For anteroposterior interlocking a medial Expander Spacer is used to position the aiming arm correctly in the frontal plane. For nail contact, the Spacer is inserted in an already drilled distal mediolateral locking hole.

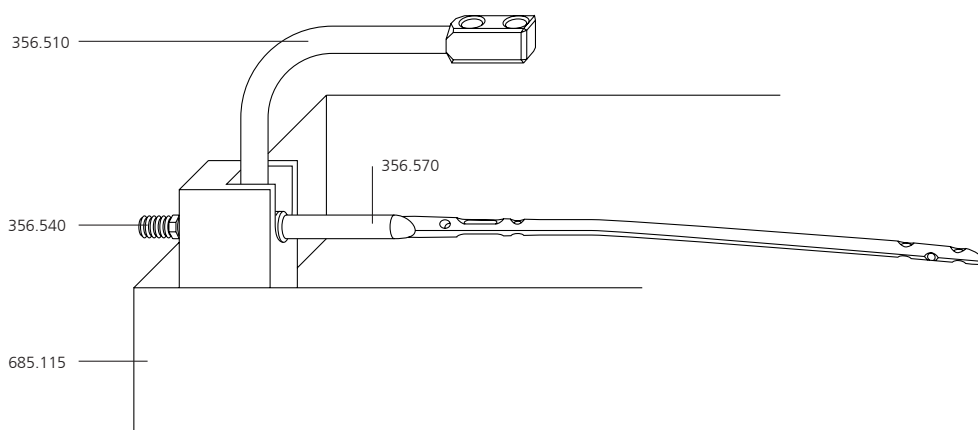
Precaution: The DAD cannot be used with the hollow, slotted Universal Nail as this nail bends and twists enormously during insertion.

ML INTERLOCKING

1a

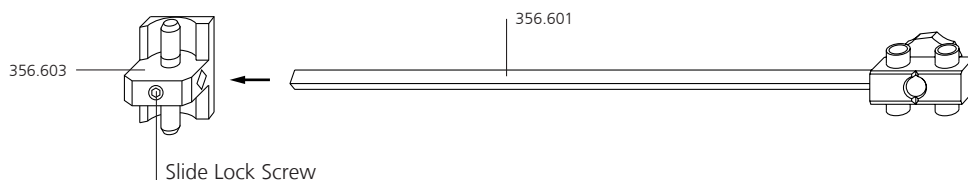
Preoperatively: mount the Aiming Beam and calibrate it to the length of the chosen nail

Couple the UTN to the Insertion Handle (356.510) and place it into the raised Assembly Support (685.118) in the tray.



1b

Place the Aiming Beam for ML Locking (356.601) in the opening of the Articulation for Aiming Beam (356.603). The Slide Lock Screw of the Articulation has to be loosened. Mount this assembly as an extension onto the proximal Insertion Handle.

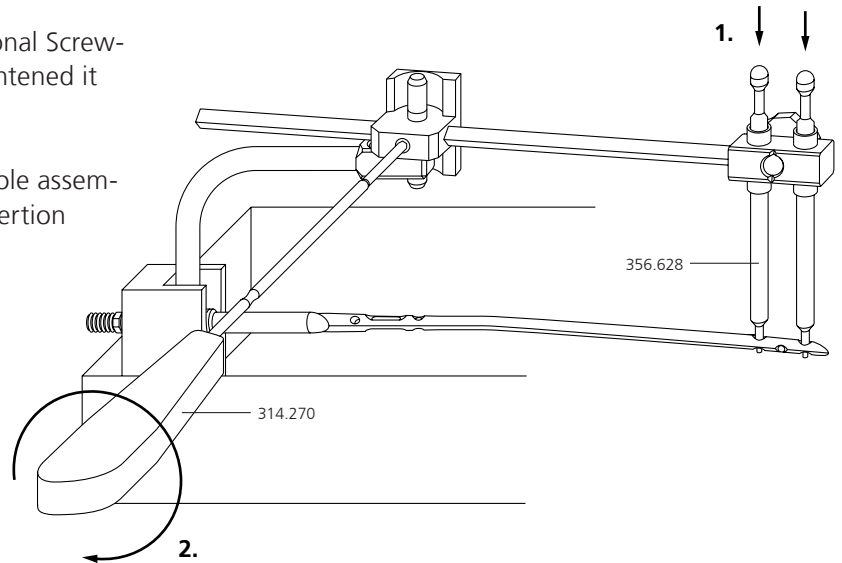


1c

With the Calibrating Pins (356.628), align the guide holes to the nail holes. Ensure free gliding of the Calibrating Pins. They must not get stuck!

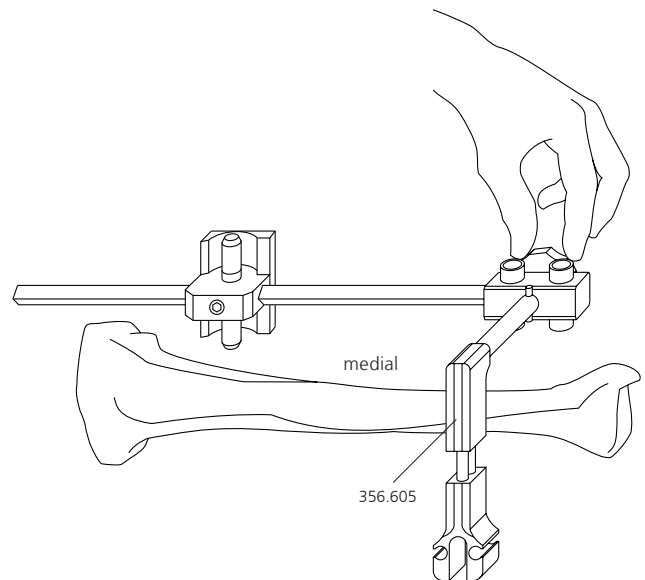
Tighten the Slide Lock Screw with the hexagonal Screwdriver (314.270). Make sure that you have tightened it firmly!

Remove the Calibrating Pins and take the whole assembly for distal interlocking off the Standard Insertion Handle.



1d

Mount the Anterior Spacer Arm with Sliding Carriage (356.605) onto the distal end of the Aiming Beam. The Spacer Arm must point towards the fractured tibia; interlocking will be performed from medial to lateral.



The next step is the insertion of the nail into the tibia. For a detailed description please refer to the surgical technique for the UTN of Synthes.

2

Anterior nail contact opening

Couple the completely assembled Aiming Beam with Articulation and Anterior Spacer Arm as an extension to the proximal Insertion Handle.

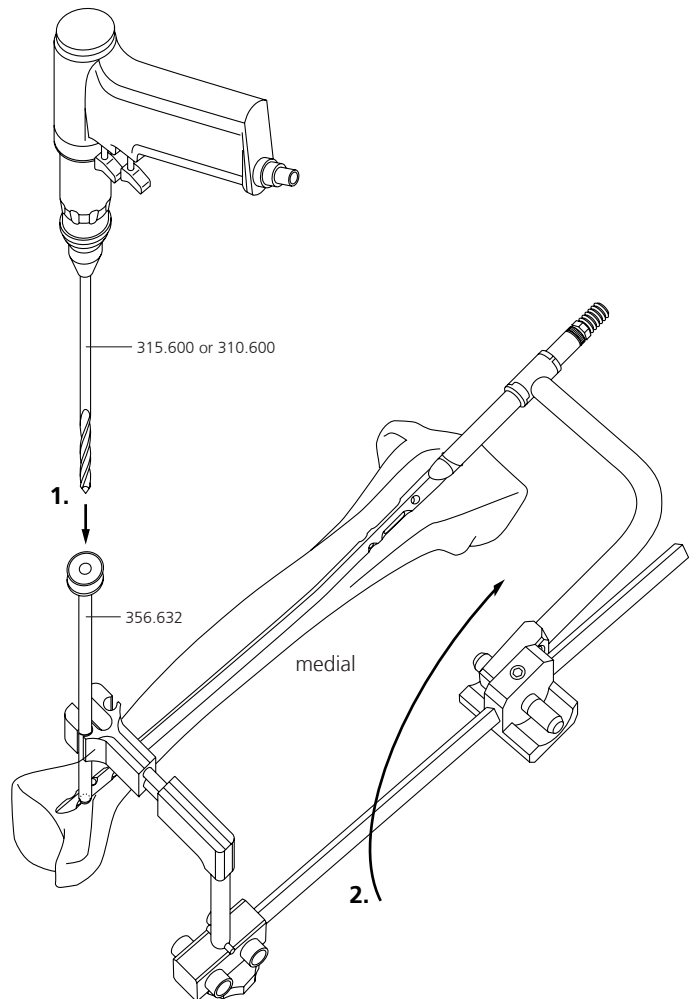
Insert the Drill Sleeve 8.0/6.0 (356.632) into the distal open guide hole in the carriage.

Drill with the 6.0 mm Drill Bit (315.600 or 310.600) until it stops.

If you have enough space, tilt the Aiming Beam assembly upward. If this is not possible, remove the distal Aiming Beam assembly momentarily.

The carriage allows for a certain sliding in a mediolateral direction, allowing for optimal placement of the nail contact opening on the anterior tibial crest. A slightly medial position is preferred as there is less soft-tissue.

We recommend insertion of the nail as deep as possible in the distal tibia. This will allow placement of the anterior nail contact opening at the distal, cancellous end of the tibia, where an additional drill hole weakens the bone only marginally.



3

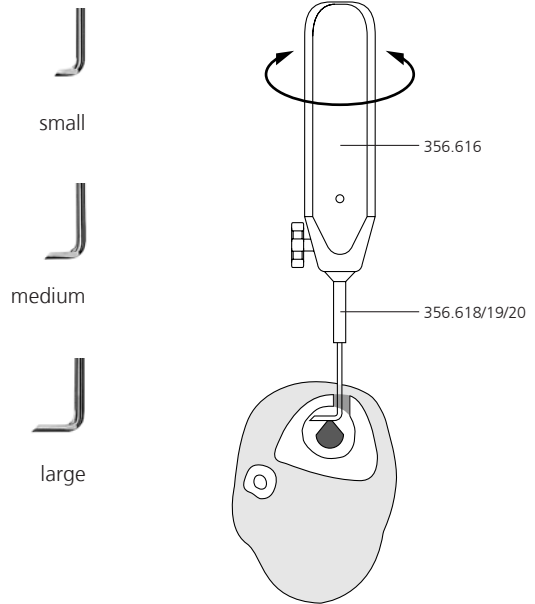
Cleaning of the anterior nail contact opening

For cleaning of the nail contact opening, choose between three sizes of L-Curettes (356.618/19/20): small, medium, large, according to the space available within the bone.

Mount the Universal Handle (356.616) onto the L-Curette and tighten the locking screw manually.

Insert the Curette in the contact opening. With rotating movements remove cancellous bone from the opening, in order to achieve a clean contact with the surface of the anterior nail edge.

The medium-sized Curette is most likely to fit. If you cannot reach the nail surface with this one, use the large Curette.



4

Nail contact with the anterior L-Spacer

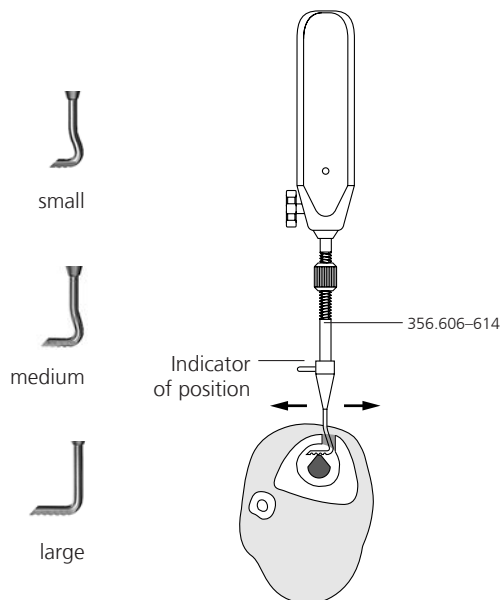
Select the anterior L-Spacers 8, 9 or 10 (356.606–14), according to the diameter of the chosen UTN.

Again, choose between three sizes of L-Spacers: small, medium, large.

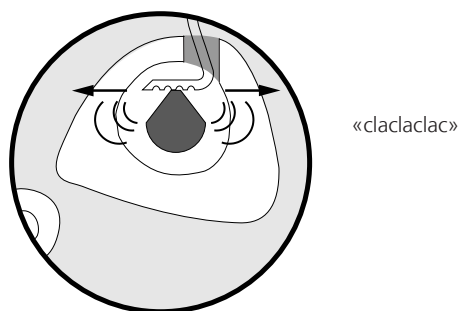
Mount the Universal Handle onto the chosen L-Spacer and tighten the locking screw manually.

Insert the L-Spacer into the nail contact opening and place the foot of the L-Spacer on the anterior edge of the nail.

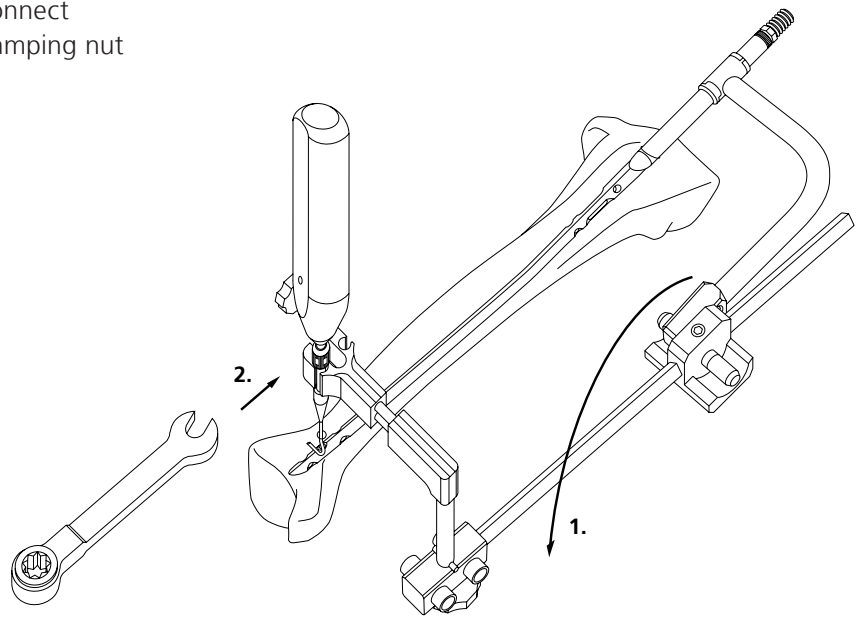
Note: The coloured indicator at the shaft of the L-Spacer is parallel to the foot of the L-Spacer providing information about its position in the bone.



If the L-Spacer is correctly placed, the notches at the foot of the L-Spacer will make a soft metallic clattery sound when gently moved across the nail to confirm nail-spacer contact.



Tilt down the Aiming Beam construct and connect the L-Spacer to this assembly. Tighten the clamping nut firmly.

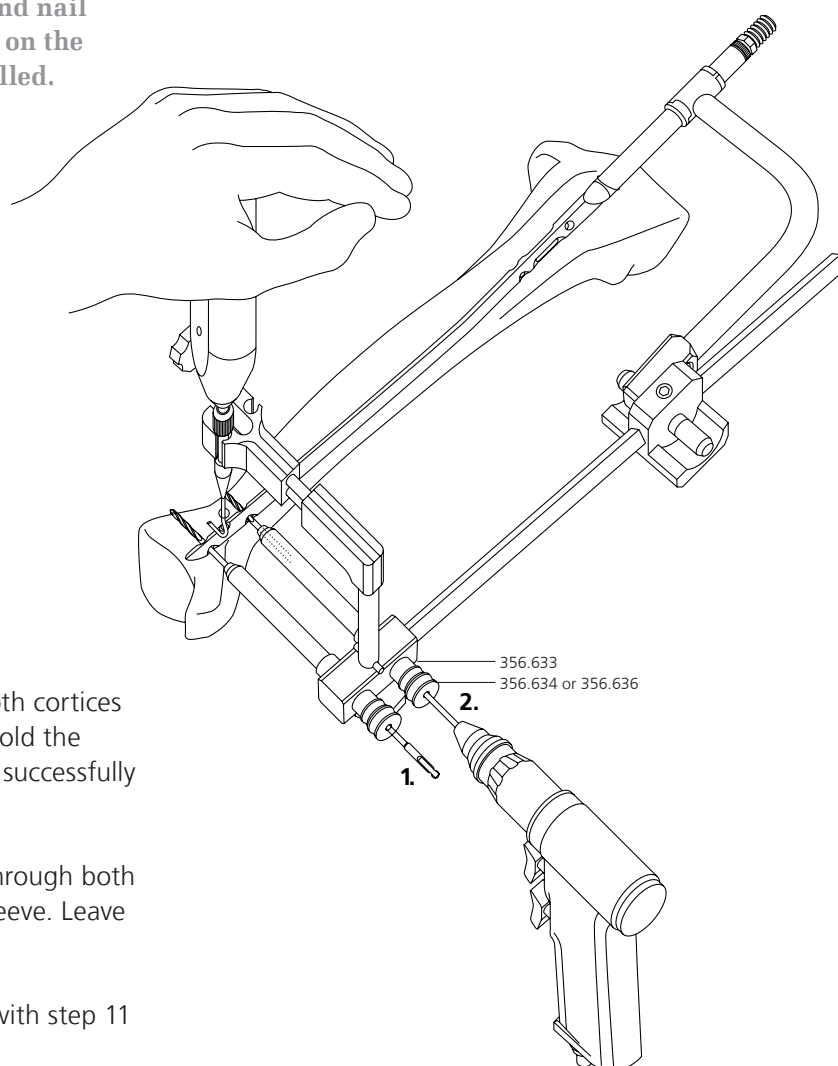


5

Drilling the holes for ML interlocking

Proceed with the 3.2 mm Drill Bit (356.635) and the appropriate blue Drill Sleeve (356.634; for 8 and 9 mm UTN) or with the 4.0 mm Drill Bit (356.637) and appropriate green Drill Sleeve (356.636; for 10 mm UTN), according to the diameter of the chosen tibial nail. Insert Drill Sleeve into Protection Sleeve (356.633).

Attention: To prevent the L-Spacer from slipping, maintain the contact between L-Spacer and nail by continuously pressing with your hand on the L-Spacer until at least the first hole is drilled.



First, drill the distal ML hole. Drill through both cortices and leave the Drill Bit in the bone. This will hold the Aiming Beam construct in place after having successfully drilled the first interlocking hole.

Then, drill the second ML hole. Again, drill through both cortices. Remove this Drill Bit and the Drill Sleeve. Leave the Protection Sleeve in place.

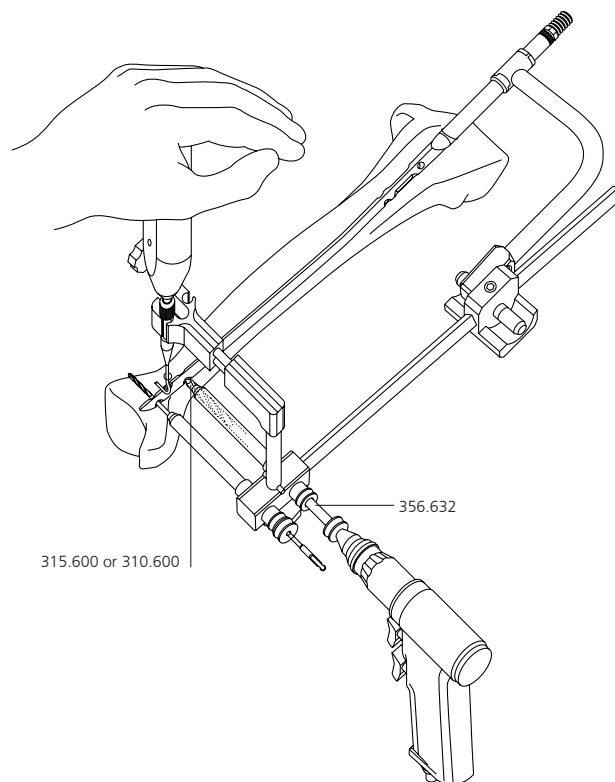
If only ML locking is planned, proceed now with step 11 on page 15.

AP INTERLOCKING

6 Opening for medial nail contact

Insert the 6.0 mm Drill Sleeve (356.632) into the 8.0 mm Protection Sleeve 11.0/8.0 (356.633). Enlarge the more proximally situated ML hole in the first cortex to 6 mm. Drill with the 6.0 mm Drill Bit (315.600 or 310.600) until it stops.

Remove Drill Bit, but leave Drill Sleeve and Protection Sleeve in place.

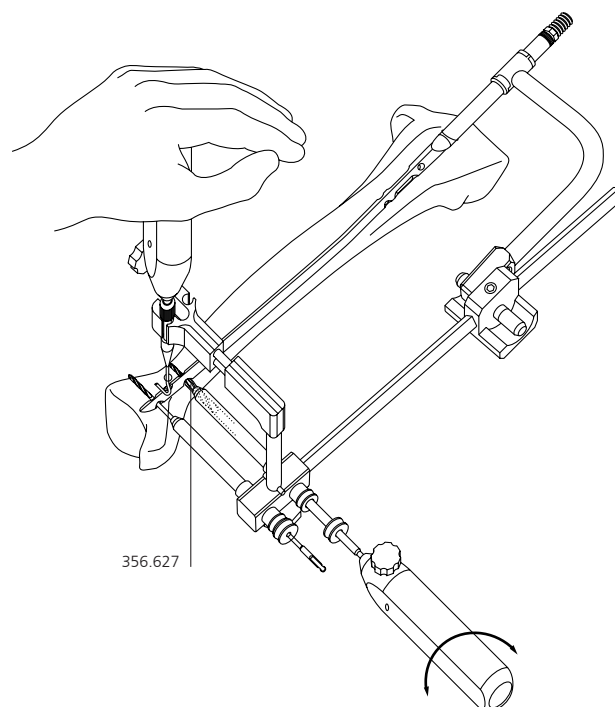
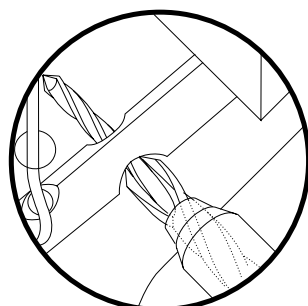


7 Cleaning of the nail contact opening

For cleaning of the nail contact opening use the 3.2/6.0 mm dual-diameter Curette (356.627). Use the Curette manually. Mount the Universal Handle onto it and tighten the locking screw.

Clean the medial nail contact opening and the locking hole in the nail manually with the Curette. Produce metallic sound.

Remove Curette, Drill Sleeve and Protection Sleeve.



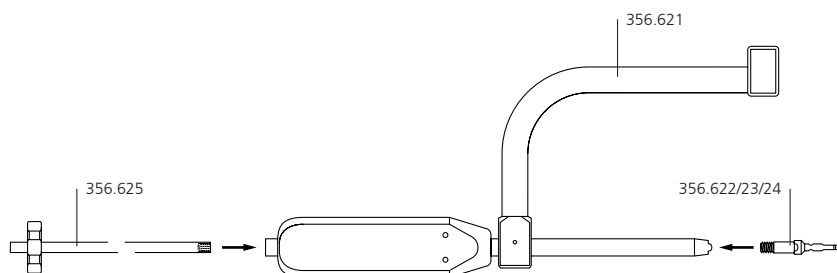
8

Mount the Aiming Arm assembly for AP interlocking

Choose the Expander Spacer (356.622/23/24) according to the diameter of the selected 8, 9 or 10 mm UTN.

Mount the Expander Spacer on the tube of the Aiming Arm for AP Locking (356.621) and secure it with the long Connecting Screw (356.625).

The assembly of the Aiming Arm for AP Locking is now complete.



In step 9, the Aiming Arm for AP Locking is connected to the nail through the ML hole by means of the Expander Wire (356.626). The Expander Wire spreads the tip of the Expander Spacer and engages it in the hole of the nail.



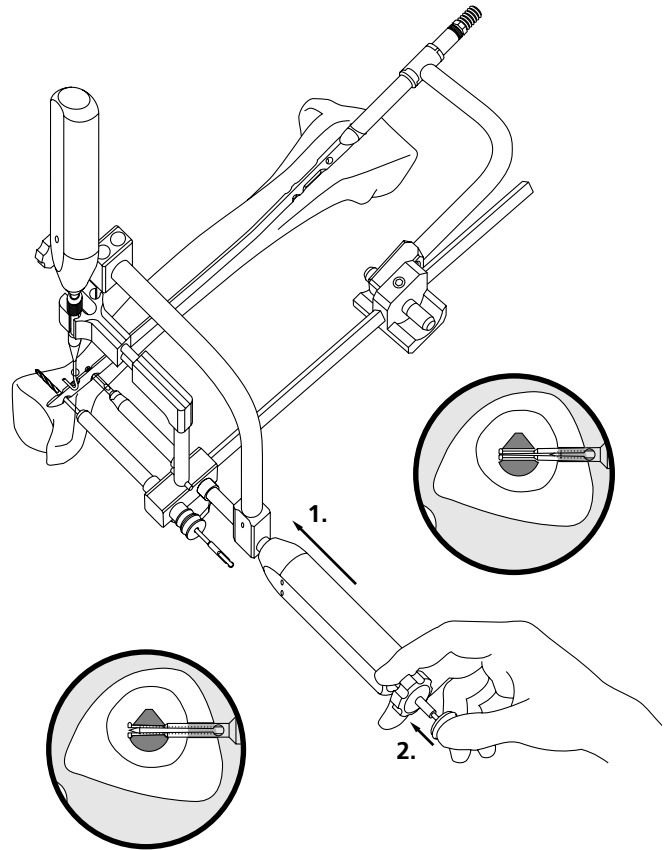
9

Nail contact with the Expander Spacer

Insert the expander tip of the AP Aiming Arm construct into the medial nail contact opening and into the locking hole of the nail. Slight turning movements are required.

Next, slide the Expander Wire in the opening at the back of the AP Aiming Arm. The Expander Wire has to be inserted fully, in order to ensure an accurate nail contact of the AP Aiming Arm. If this is not possible, repeat cleaning the medial nail contact opening (step 7).

Check the hold of the Aiming Arm construct by pulling at its handle (stress test). Correct placement is only ensured by a firm connection with the nail.



10

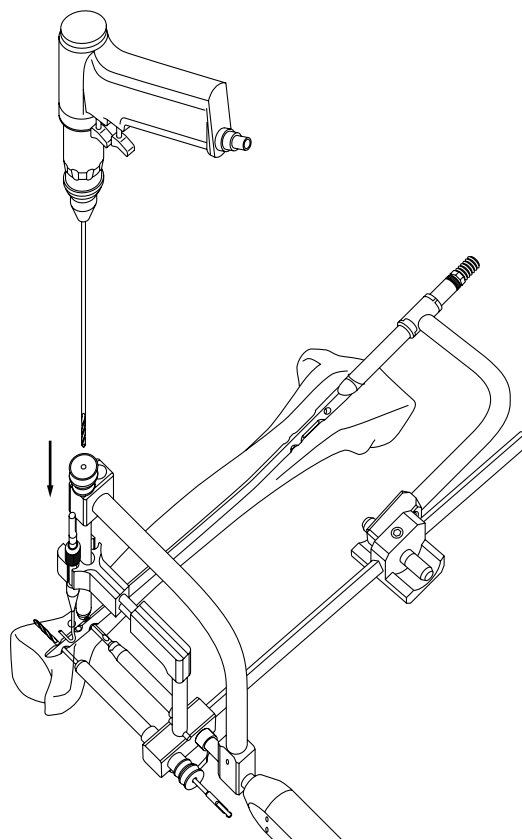
Drilling the hole for AP interlocking

Align the distal guide hole of the AP Aiming Arm with the centre slot of the carriage after removing the handle of the L-Spacer.

Insert the Protection Sleeve and the Drill Sleeve into the guide hole of the AP Aiming Arm and the centre slot of the carriage.

The AP locking hole can now accurately be drilled with the appropriate Drill Bit (\varnothing 3.2 or 4.0 mm). Drill through both cortices.

Remove Drill Bit and Drill Sleeve. Leave Protection Sleeve in place. It will guide the Locking Bolt during insertion (step 11).



11

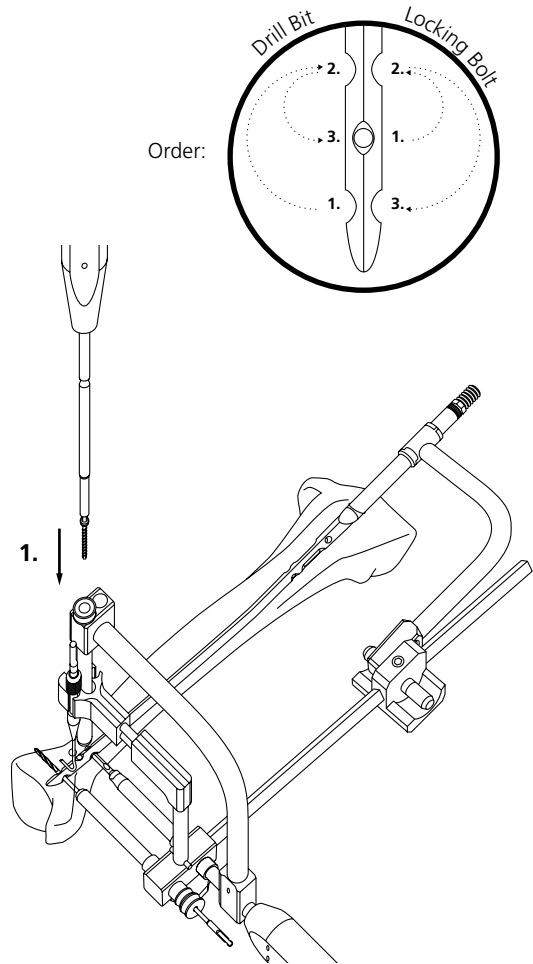
Distal locking of the UTN

Insert the Locking Bolts in reverse order of the drilling of the holes: first the AP Locking Bolt, followed by the proximal ML Locking Bolts. Last is the distal ML Bolt.

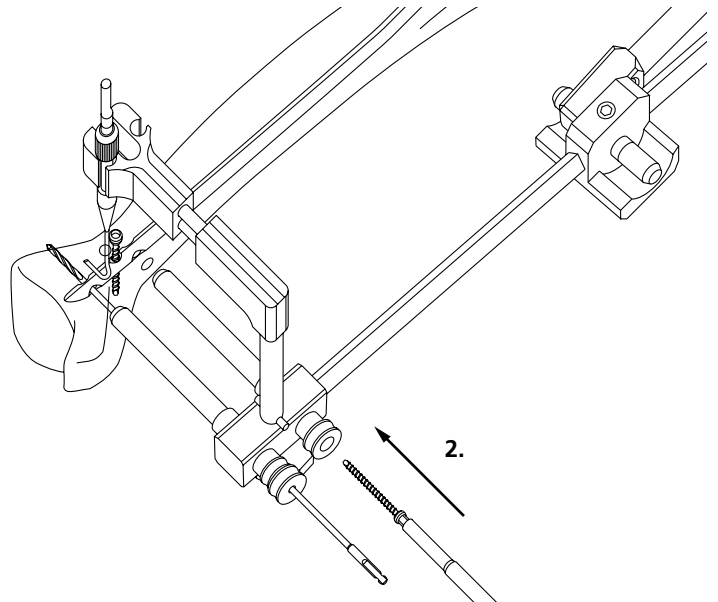
Determine the length of the Locking Bolts with the Depth Gauge for Locking Bolts. Add 2–4 mm to the length measured to ensure thread engagement of the far cortex.

Insert the AP Locking Bolt through the Protection Sleeve.

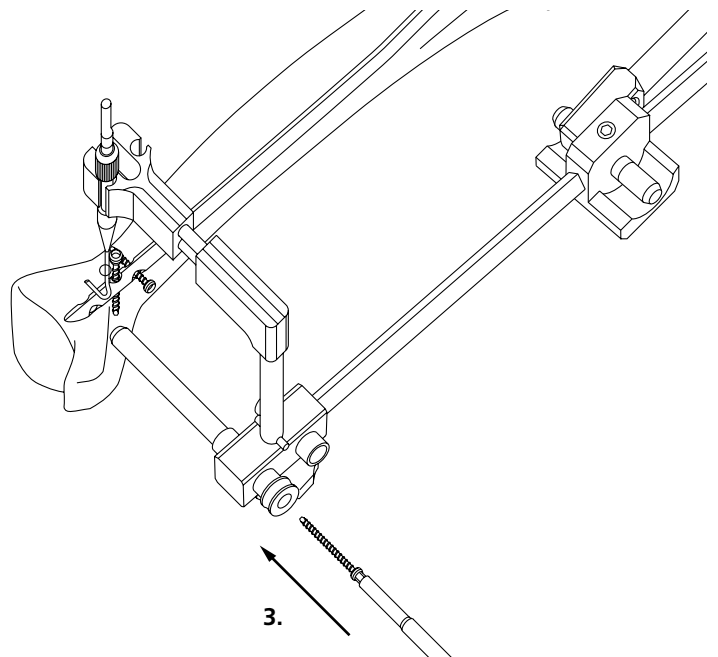
Remove the AP Aiming Arm assembly. Note: First, pull back the Protection Sleeve and the Expander Wire, then, remove the AP Aiming Arm.



Introduce the Protection Sleeve and insert the proximal ML Locking Bolt.



Remove Drill Bit and Drill Sleeve that remained in place for security reasons in step 5. Insert the distal ML Locking Bolt through the Protection Sleeve.



Take apart the Distal Aiming Device. First, remove the L-Spacer from the Aiming Beam construct by loosening the clamping nut. Then, pull back the Aiming Beam for distal interlocking from the proximal Aiming Arm.

The nail can now be locked proximally. For detailed procedure please refer to the surgical technique for the UTN of Synthes.

Subject to alteration.

INSTRUMENTS

314.270	Screwdriver, hexagonal, large, Ø 3.5 mm, with Groove, length 245 mm
315.600	Drill Bit Ø 6.0 mm, length 195/170 mm, 3-flute, for Quick Coupling
356.596	Expander Spacer for CTN Ø 11.0 to 13.0 mm, for No. 356.621
356.601	Aiming Beam for ML Locking
356.603	Articulation for Aiming Beam, for DAD
356.605	Spacer Arm, anterior, with Sliding Carriage
356.606	L-Spacer for UTN Ø 8.0 mm, small, gold
356.607	L-Spacer for UTN Ø 8.0 mm, medium, gold
356.608	L-Spacer for UTN Ø 8.0 mm, large, gold
356.609	L-Spacer for UTN Ø 9.0 mm, small, violet
356.610	L-Spacer for UTN Ø 9.0 mm, medium, violet
356.611	L-Spacer for UTN Ø 9.0 mm, large, violet
356.612	L-Spacer for UTN/CTN Ø 10.0 mm, small, green

356.613	L-Spacer for UTN/CTN Ø 10.0 mm, medium, green
356.614	L-Spacer for UTN/CTN Ø 10.0 mm, large, green
356.616	Universal Handle for DAD
356.618	L-Curette for Anterior Nail Contact Opening, small
356.619	L-Curette for Anterior Nail Contact Opening, medium
356.620	L-Curette for Anterior Nail Contact Opening, large
356.621	Aiming Arm for AP Locking, with Handle
356.622	Expander Spacer for UTN Ø 8.0 mm, for No. 356.621
356.623	Expander Spacer for UTN Ø 9.0 mm, for No. 356.621
356.624	Expander Spacer for UTN/CTN Ø 10.0 mm, for No. 356.621
356.625	Connecting Screw for Expander Spacer, for No. 356.621
356.626	Expander Wire for Expander Spacer, for No. 356.621
356.627	Curette for Medial Nail Contact Opening Ø 6.0/3.2 mm

356.628	Calibrating Pin, for DAD
356.632	Drill Sleeve 8.0/6.0, length 162 mm, for No. 310.600, for DAD
356.633	Protection Sleeve 11.0/8.0, for DAD
356.634	Drill Sleeve 8.0/3.2, for No. 356.633, for DAD, blue
356.635	Drill Bit Ø 3.2 mm, length 240/215 mm, 3-flute, for Quick Coupling
356.636	Drill Sleeve 8.0/4.0, for No. 356.633, for DAD
356.637	Drill Bit Ø 4.0 mm, length 240/215 mm, 3-flute, for Quick Coupling
356.640	L-Spacer for CTN Ø 11.0 mm, small
356.641	L-Spacer for CTN Ø 11.0 mm, medium
356.642	L-Spacer for CTN Ø 11.0 mm, large
356.643	L-Spacer for CTN Ø 12.0 mm, small
356.644	L-Spacer for CTN Ø 12.0 mm, medium
356.645	L-Spacer for CTN Ø 12.0 mm, large
356.646	L-Spacer for CTN Ø 13.0 mm, small
356.647	L-Spacer for CTN Ø 13.0 mm, medium
356.648	L-Spacer for CTN Ø 13.0 mm, large

