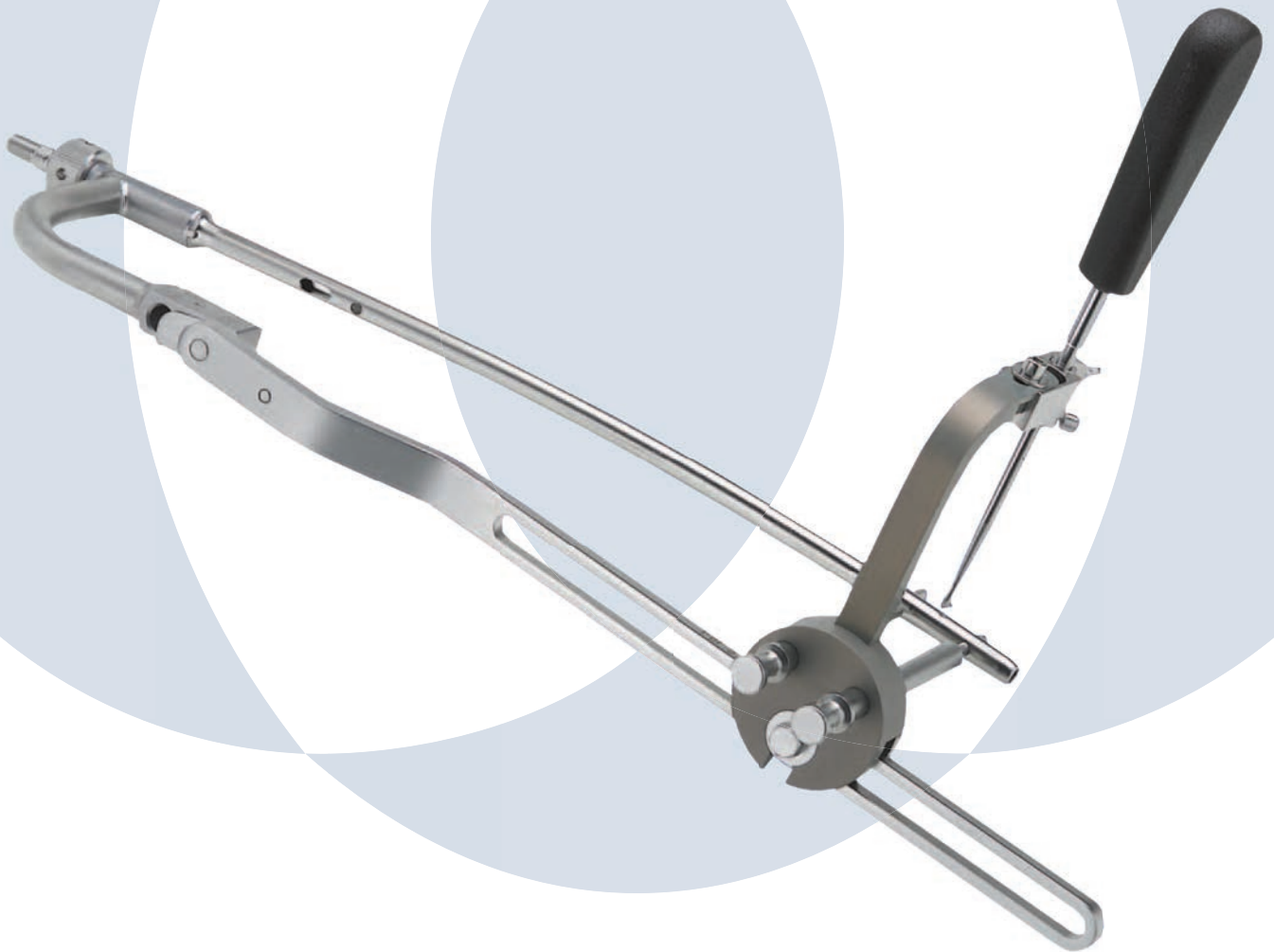


THE DISTAL AIMING DEVICE (DAD) FOR SIMPLIFIED UNIVERSAL NAILS (S.U.N.)



Instruments and implants approved by the AO Foundation.
This publication is not intended for distribution in the USA.

SURGICAL TECHNIQUE

 Image intensifier control

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

Processing, Reprocessing, Care and Maintenance

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

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

For general information about reprocessing, care and maintenance of 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.depuysynthes.com/hcp/reprocessing-care-maintenance>

TABLE OF CONTENTS

| | | |
|--------------------|--------------------------------------------------------|----|
| SURGICAL TECHNIQUE | Intra-operative calibration and preparation of the DAD | 2 |
| | Distal locking with the DAD | 9 |
| INSTRUMENTS | Instruments of the DAD for S.U.N. | 17 |
| | Instruments | 18 |

INTRA-OPERATIVE CALIBRATION AND PREPARATION OF THE DAD

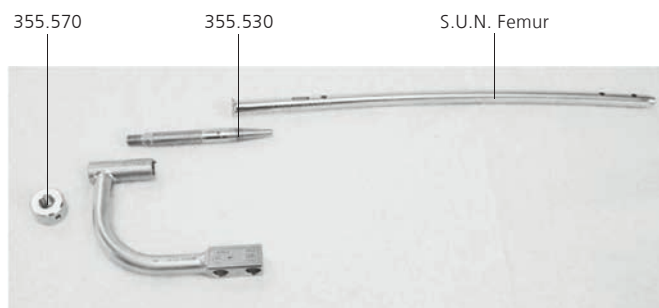
After reaming and determination of the nail length, the selected nail has to be calibrated with the DAD for S.U.N. (356.651). Both the Simplified Universal Tibial Nail as well as the Simplified Universal Femoral Nail can be locked with the DAD.

Prepare the S.U.N. for calibration.

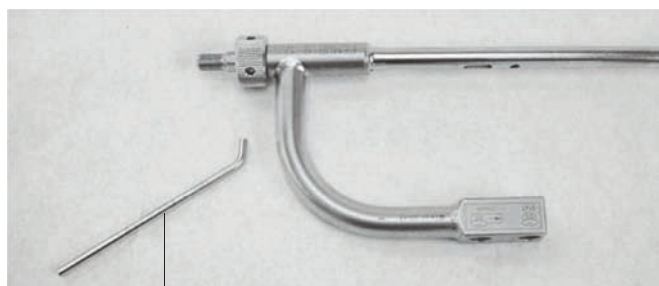
Femur

Use the knurled Nut (355.570) to mount the S.U.N. with the Threaded Conical Bolt (355.530) together with the Insertion Handle (355.490), and tighten it with the Pin Wrench (321.170) (see illustrations).

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



355.490



321.170

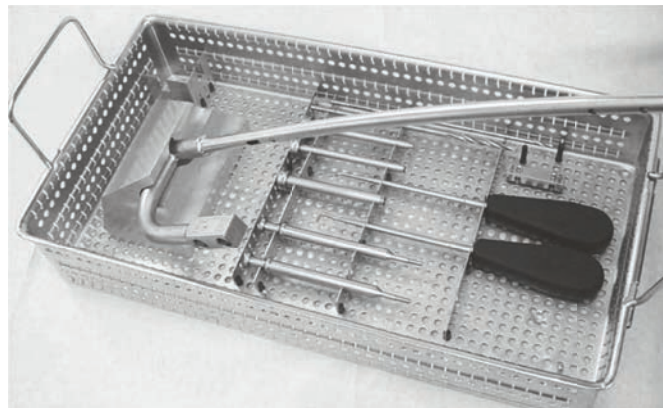
The same system can also be used for the tibia. In that case, make the preparations for an intramedullary nailing of the tibia.

Preparation for the locking of the tibia

Connect the Threaded Conical Bolt (355.440) through the Insertion Handle (355.410) with the S.U.N. Tibia, and tighten using the knurled Nut (355.470) and the Pin Wrench (321.170).

The assembly and surgical technique for an intramedullary nailing of the femur with the DAD for S.U.N. Femur are shown in the illustration.

After the assembly, push the insertion handle including the nail onto the holding block of the Sterilizing Tray (300.529).

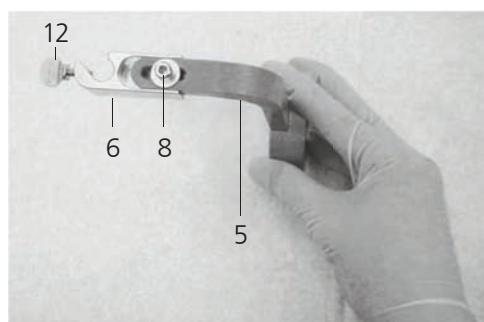
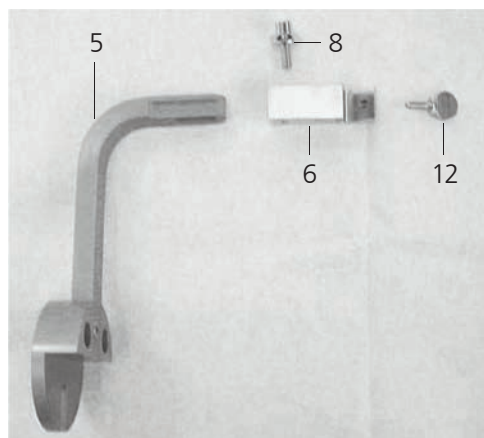


Insertion handle with S.U.N. Femur mounted on the holding block of the Sterilizing Tray for S.U.N. (300.529).

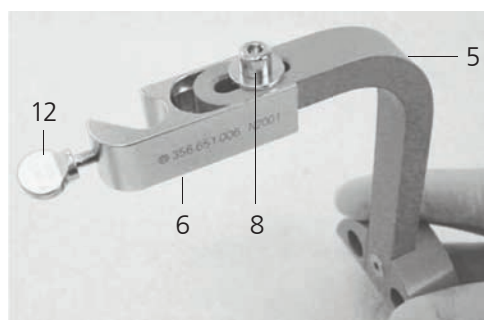
For calibration, prepare the single parts of the DAD as follows:

As a rule, assemble the following parts after washing, but before starting the sterilisation process. After surgery, it is strongly recommended to dismount them for cleaning and washing.

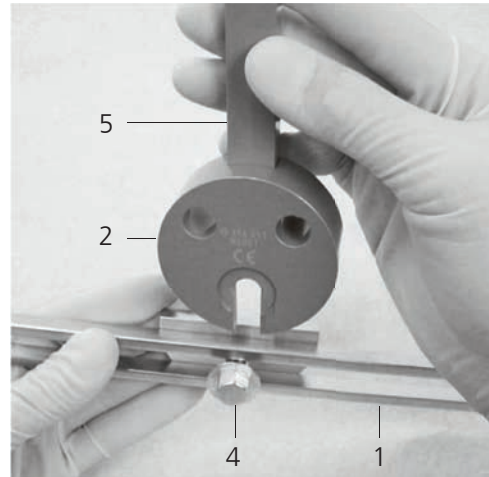
Use the adjusting screw (8) to mount the holding part (6) onto the handle (5). Thread the wing nut (12) into the holding part (6).



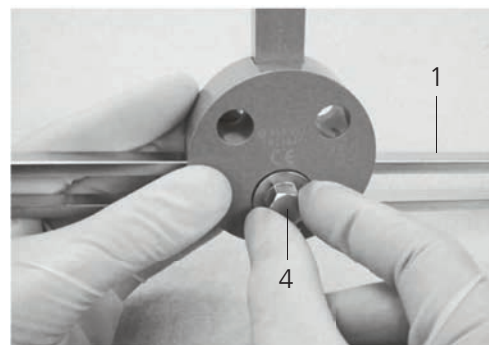
Mounted handle with holding part. To prepare for calibration, insert the adjusting screw (8) and wing nut (12) by hand and without force.



Use the locking screw (4) to mount the complete handle (5) with locking disk (2) on the arm (1).

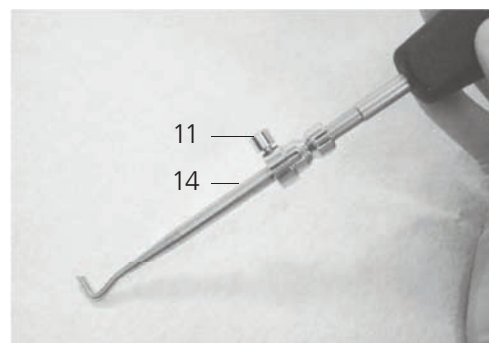


Tightening by hand of the locking screw (4) on the arm (1) is sufficient for the preparation for calibration.



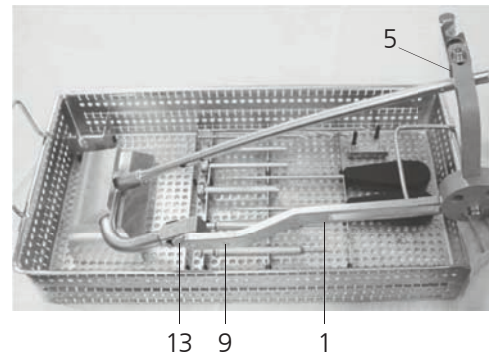
Push the set screw with holding part (11) onto the feeler hook (14) and assemble it, as shown on the illustration. Tightening by hand is sufficient prior to calibration.

Note: For easier identification, the Feeler Hook (14) (356.651.014) bears a laser mark “For calibration only” on the shaft. The feeler hook’s properties differ from those of the very similar looking extractor curettes used later. The extractor curettes are hardened and designed for the removal of cancellous bone. Never use the feeler hook instead of the extractor curette for calibration – it could bend and the calibration may be lost.



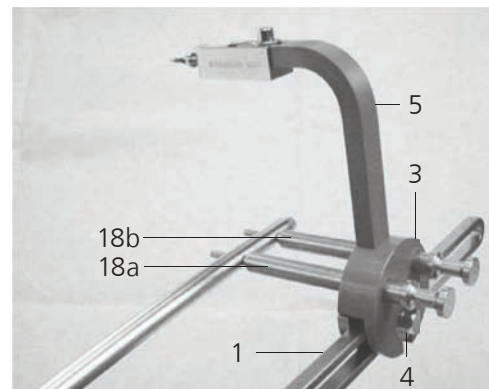
Connect the DAD and the insertion handle of the S.U.N. over the guide pin (9). Secure this connection with the safety device (13).

Depending on whether the right or the left leg has to be treated, the insertion handle and the DAD have to be appropriately placed or prepared laterally. Position the handle (5) of the DAD on the S.U.N. from the anterior side. If, by mistake, the handle is placed on the nail from the posterior side, bring the handle (5) to the distal end of the arm (1) and turn it around the end of the arm to the anterior side.



Loosen the locking screw (4) to adjust the distance to the distal locking holes, so that the handle (5) moves freely on the arm (1). Introduce the first positioning bolt (18a) through the most proximal of the two holes of the guiding part (3) into the most proximal of the two distal locking holes of the S.U.N.

Bringing the second locking hole in the correct position by swivelling the handle and the guiding part (3) allows introducing the second positioning bolt (18b).

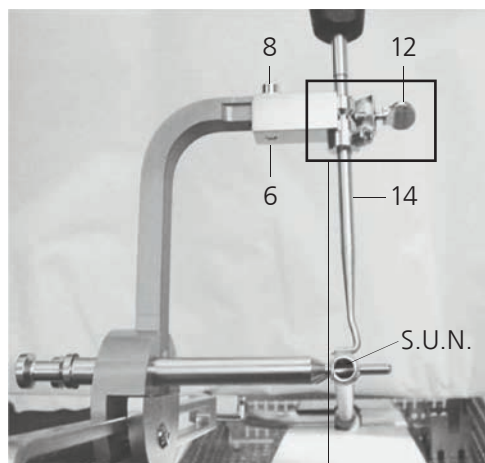


Tightening the locking screw (4) with the Combination Wrench \varnothing 11 mm (321.160) concludes the adjustment of length.



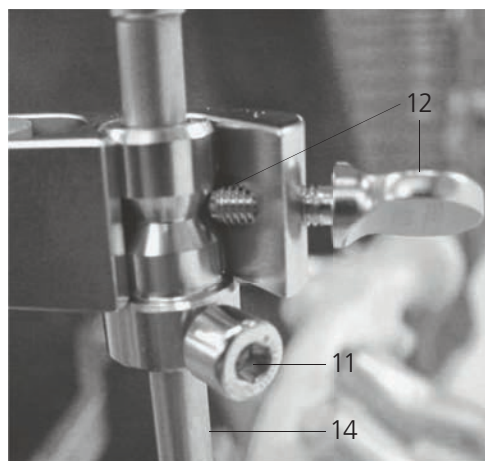
For the adjustment of height, insert the feeler hook (14) laterally or from below in the holding part (6), and fix it with the wing screw (12). Check whether the L-shaped part at the end of the feeler hook (14) is situated exactly above the nail.

If this is not the case, loosen the adjusting screw (8) to allow the holding part (6) to be moved until the feeler hook (14) is situated exactly above the nail. After this mediolateral movement, use the \varnothing 3.5 mm Hexagonal Screwdriver (314.270) to refasten the holding part (6) by tightening the adjusting screw (8).



The detailed picture of the connection between the feeler hook and the holding part of the handle clearly shows the correct position of the feeler hook's (14) wing nut (12) and set screw (11).

Use the \varnothing 3.5 mm Hexagonal Screwdriver (314.270) to tighten the set screw (11) fixing the feeler hook (14) in this position.

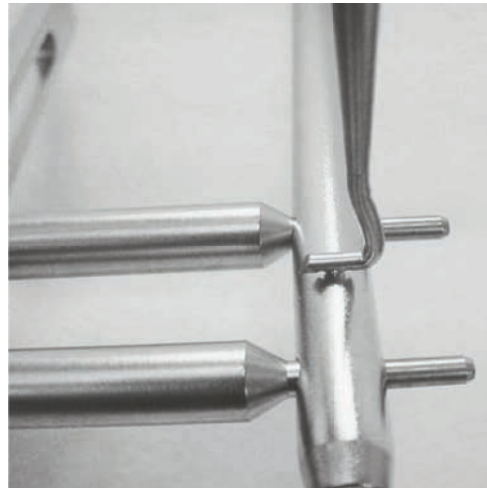


Note: If the height has been set correctly, the feeler hook (14) touches the S.U.N. in the centre of its anterior curvature.

Check again whether all screws are firmly tightened. The DAD is now calibrated and ready for use.

Loosen the wing screw (12) to remove the calibrated feeler hook (14) from the DAD. Pull the two positioning bolts (18) out of guiding part. Loosen the safety device (13), and carefully remove the DAD from the insertion handle.

Put all parts carefully aside to ensure that no maladjustment of the calibration occurs.



DISTAL LOCKING WITH THE DAD

Distal locking with the DAD is independent of proximal locking. It is recommended, however, to start with distal locking, and then to proceed with proximal locking. After distal locking, this offers the possibility to compress the fracture gap or achieve a correct fracture reduction by driving the nail further back.

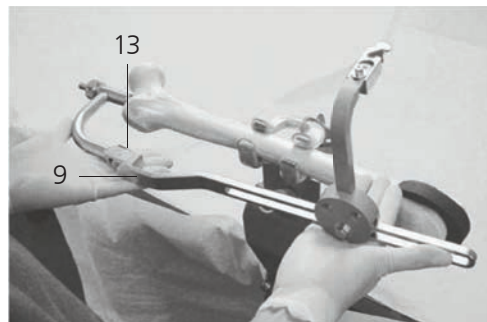
In line with the surgical technique for S.U.N., start to manually insert the intramedullary nail over the guide wire as far as possible into the reamed medullary cavity. Then thread the threaded conical bolt over the guide wire into the proximal end of the S.U.N. Push the insertion handle and the knurled nut over the guide wire, and mount them onto the threaded conical bolt or S.U.N. Use the pin wrench to tighten the knurled nut. See also the specific surgical technique for S.U.N.

Note: If the S.U.N. has not been positioned and mounted in single steps over the guide wire, as described above, but in the assembled state, as shown in the second picture on page 2, there is a risk that the S.U.N. cannot be completely pushed over the guide wire into the medullary cavity. The end of the guide wire could get stuck on the threaded conical bolt. If this occurs, remove the assembled S.U.N.-insertion handle unit, dismount it, and assemble it individually over the guide wire, as described above.



After insertion of the S.U.N. and **removal of the guide wire** use the DAD to start the distal locking.

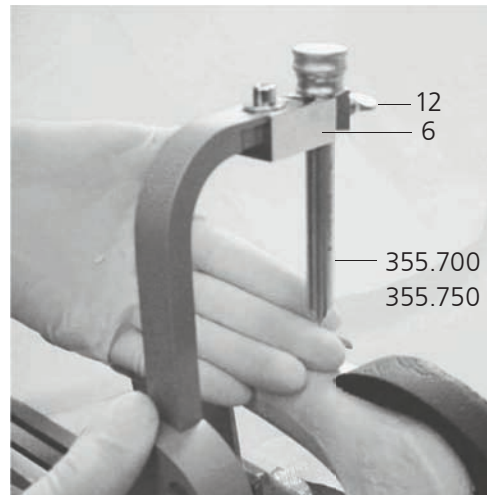
Connect the DAD again over the guide pin (9) with the insertion handle of the S.U.N. Secure this connection again with the safety device (13).



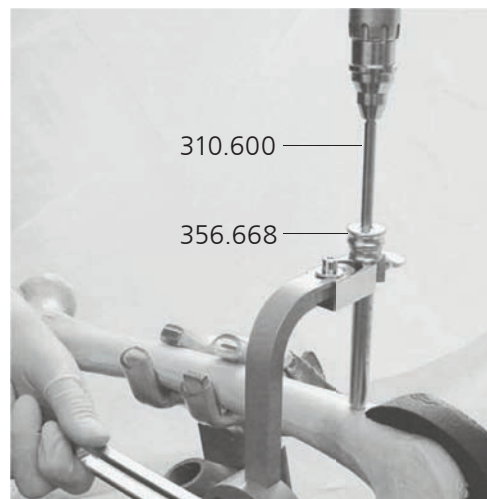
Push the Protection Sleeve 11.0/8.0 (355.700) together with the \varnothing 8.0 mm Trocar (355.750) into the holding part (6) and secure it with the wing screw (12).

Swivelling the DAD allows marking of the incision point on the skin with the tip of the trocar. Swing the DAD back to proximal, and make a stab incision at the marked point.

Return the DAD to its original position, and puncture the bone with the tip of the trocar.



Replace the trocar with the Drill Sleeve 8.0/6.0 (356.668). Use the \varnothing 6.0 mm Drill Bit (310.600) to carefully drill the cortex, without touching the nail.

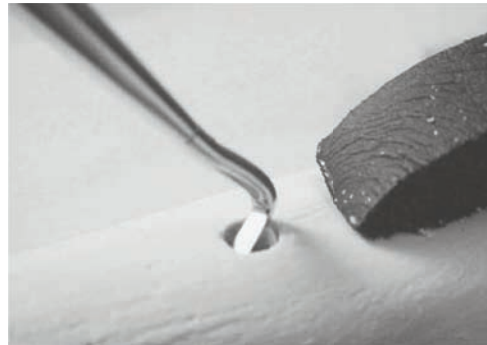


Remove the \varnothing 6.0 mm Drill Bit (310.600) and the Drill Sleeve 8.0/6.0 (356.668). Loosen the wing screw (12) and remove the Protection Sleeve 11.0/8.0 (355.700). Then swing the DAD back to proximal.

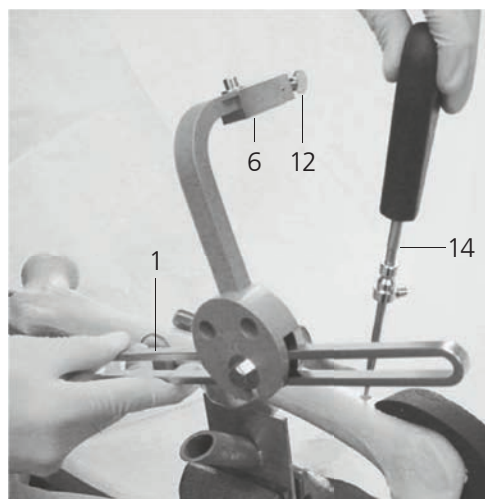
Use either the short Extractor Curette (356.651.015) or the long one (356.651.016) to clear the bone space, so that the surface of the nail can be touched.

Be careful to use only the extractor curette and not the calibrated feeler hook to clear the bone space. See note on page 5.

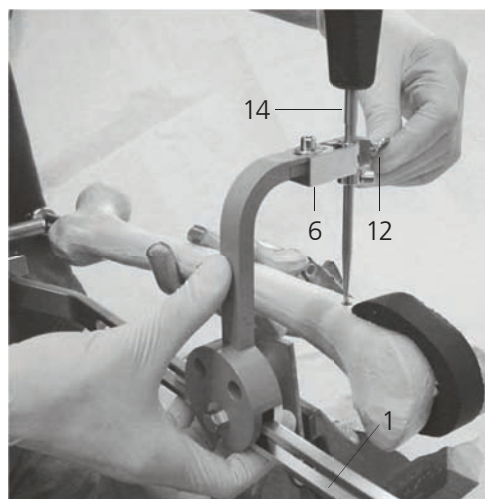
Carry out a tapping up-and-down movement with the extractor curette to check whether the nail surface can be touched. Nail contact will be recognized by a metallic sound.



Once there is contact with the S.U.N., replace the curette hook with the calibrated feeler hook (14). Instead of the extractor curette, insert the feeler hook into the bone opening.



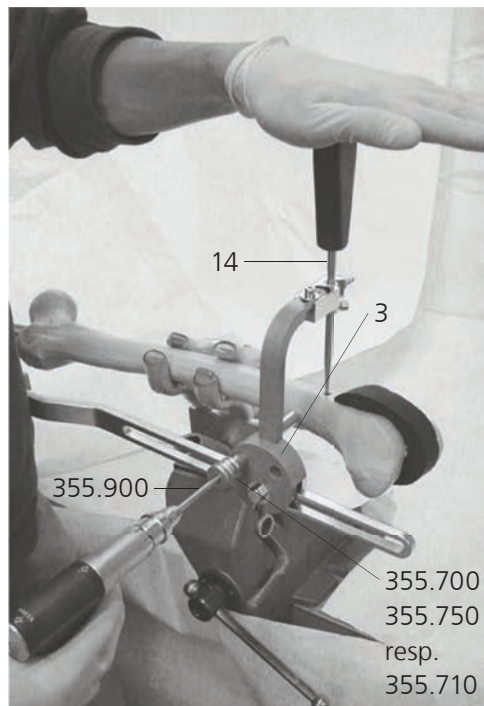
Once the nail can be touched, swing the arm (1) of the DAD toward the feeler hook (14). Insert the feeler hook in the holding part (6), and fix it with the wing screw (12).



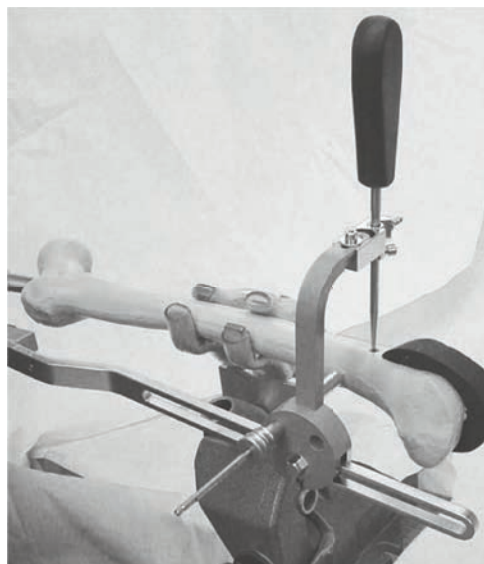
Continuous pressure on the handle of the feeler hook (14) ensures the contact with the nail during the following operations.

Push the Protection Sleeve 11.0/8.0 (355.700) together with the \varnothing 8.0 mm Trocar (355.750) into the most proximal of the two holes of the guiding part (3). Use the tip of the trocar to mark the incision point on the skin, and make a stab incision. Carefully guide the trocar through the soft tissues to the bone, and puncture the bone.

Replace the trocar with the Drill Sleeve 8.0/4.5 (355.710). To drill the first locking hole in the nail with the \varnothing 4.0/4.5 mm Drill Bit (355.900), place continuous pressure on the feeler hook.



Drill through both cortices of the bone, and leave the drill bit in the bone.



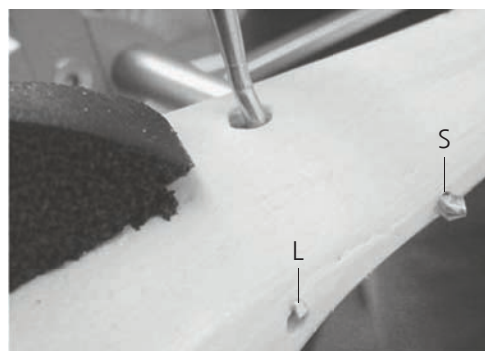
Repeat the same procedure for the second locking hole. Use again a combination consisting of protection sleeve, trocar and drill sleeve.



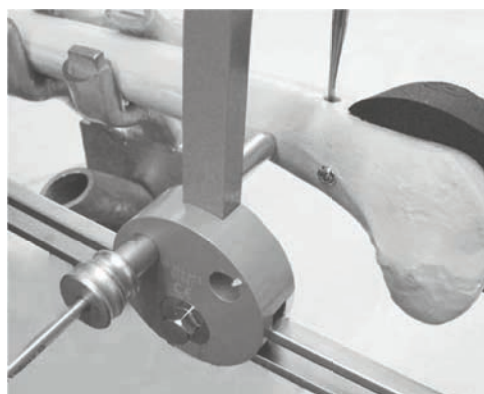
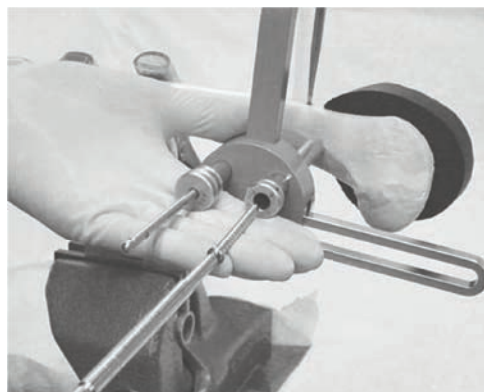
After removing the \varnothing 4.0/4.5 mm Drill Bit (355.900) and the Drill Sleeve 8.0/4.5 (355.710), determine the length of the locking bolts using the Depth Gauge for Locking Bolts (355.790). Select bolts that are 2 to 4 mm longer than the measured length of the locking hole. This ensures good engagement of the bolt's self-tapping threaded tip in the far cortex.



This picture shows the flute of the depth gauge in the far cortex (L) and the tip of the drill bit (S).



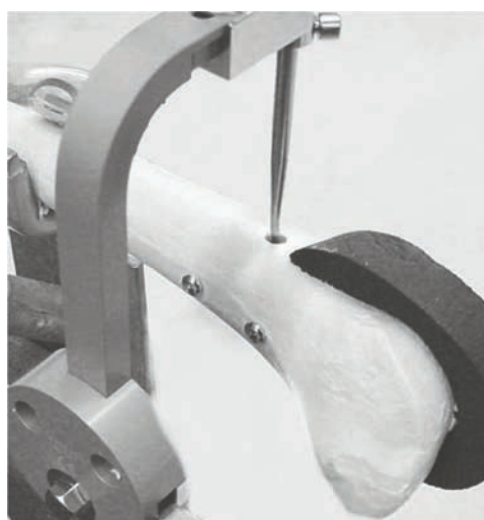
Insert the 4.9 mm locking bolt of appropriate length directly through the Protection Sleeve 11.0/8.0 (355.700).



Repeat the same procedure for the second locking hole. Remove the Protection Sleeves 11.0/8.0 (355.700).

This concludes distal locking. Dismounting of the Distal Aiming Device: loosen the wing screw (12) and remove the feeler hook (14). Swing back the DAD, loosen the safety device (13), and remove the DAD from the insertion handle.

A possible driving back of the nail for fracture reduction is followed by the proximal locking over the standard insertion handle, in line with the surgical technique for S.U.N.

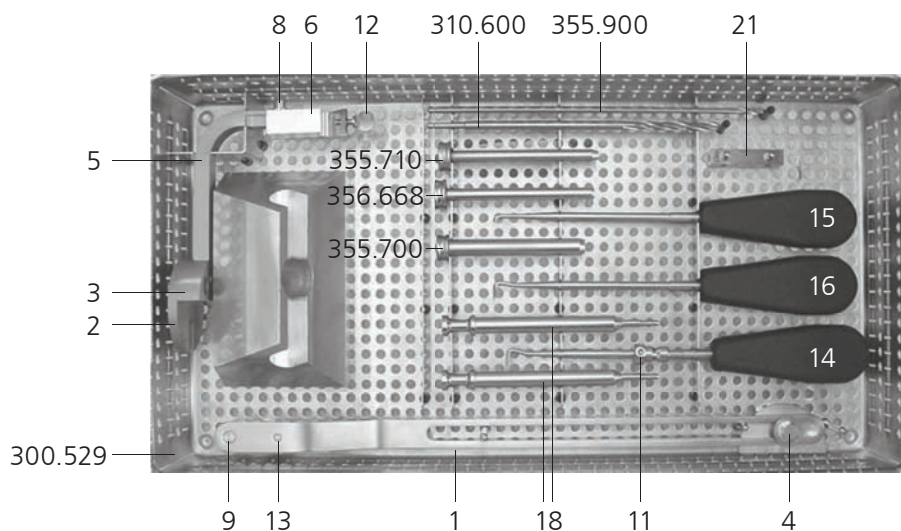


INSTRUMENTS OF THE DAD FOR S.U.N.

Distal Aiming Device for S.U.N. (356.651)

Legend

1. Arm
2. Locking disk
3. Guiding part
4. Locking screw
5. Handle
6. Holding part
7. Adjusting screw
8. Guide pin
9. Set screw with holding part
10. Wing nut
11. Safety device
12. Feeler Hook (356.651.014);
marked "For calibration only"
13. Extractor Curette, short (356.651.015)
14. Extractor Curette, long (356.651.016)
15. Positioning bolt (a and b)
16. Calibration block (to renew the
calibration lost during surgery)



INSTRUMENTS

| | |
|---------|----------------------------------------------------------------------|
| 356.651 | Distal Aiming Device for SUN |
| <hr/> | |
| 355.570 | Nut, knurled, for Femoral Medullary Nails Ø 9.0 to 12.0 mm |
| <hr/> | |
| 355.530 | Threaded Bolt, conical, for Femoral Medullary Nails Ø 9.0 to 12.0 mm |
| <hr/> | |
| 355.490 | Insertion Handle, for Femoral Medullary Nails Ø 9.0 to 12.0 mm |
| <hr/> | |
| 321.170 | Pin Wrench Ø 4.5 mm, length 120 mm |
| <hr/> | |
| 355.440 | Threaded Bolt, conical, for Tibial Medullary Nails Ø 10.0 to 14.0 mm |
| <hr/> | |
| 355.410 | Insertion Handle, for Tibial Medullary Nails Ø 10.0 to 14.0 mm |
| <hr/> | |
| 355.470 | Nut, knurled, for Tibial Medullary Nails Ø 10.0 to 14.0 mm |
| <hr/> | |
| 321.160 | Combination Wrench Ø 11.0 mm |
| <hr/> | |
| 314.270 | Screwdriver, hexagonal, large Ø 3.5 mm, with Groove, length 245 mm |
| <hr/> | |
| 355.700 | Protection Sleeve 11.0/8.0 |
| <hr/> | |
| 355.750 | Trocar Ø 8.0 mm |
| <hr/> | |
| 356.668 | Drill Sleeve 8.0/6.0 |

310.600 Drill Bit Ø 6.0 mm, length 195/170 mm,
2-flute, for Quick Coupling

355.900 Drill Bit Ø 4.0/4.5 mm,
length 225/200 mm, 2-flute,
for Quick Coupling

355.710 Drill Sleeve 8.0/4.5

355.790 Depth Gauge for Locking Bolts,
measuring range up to 90 mm

