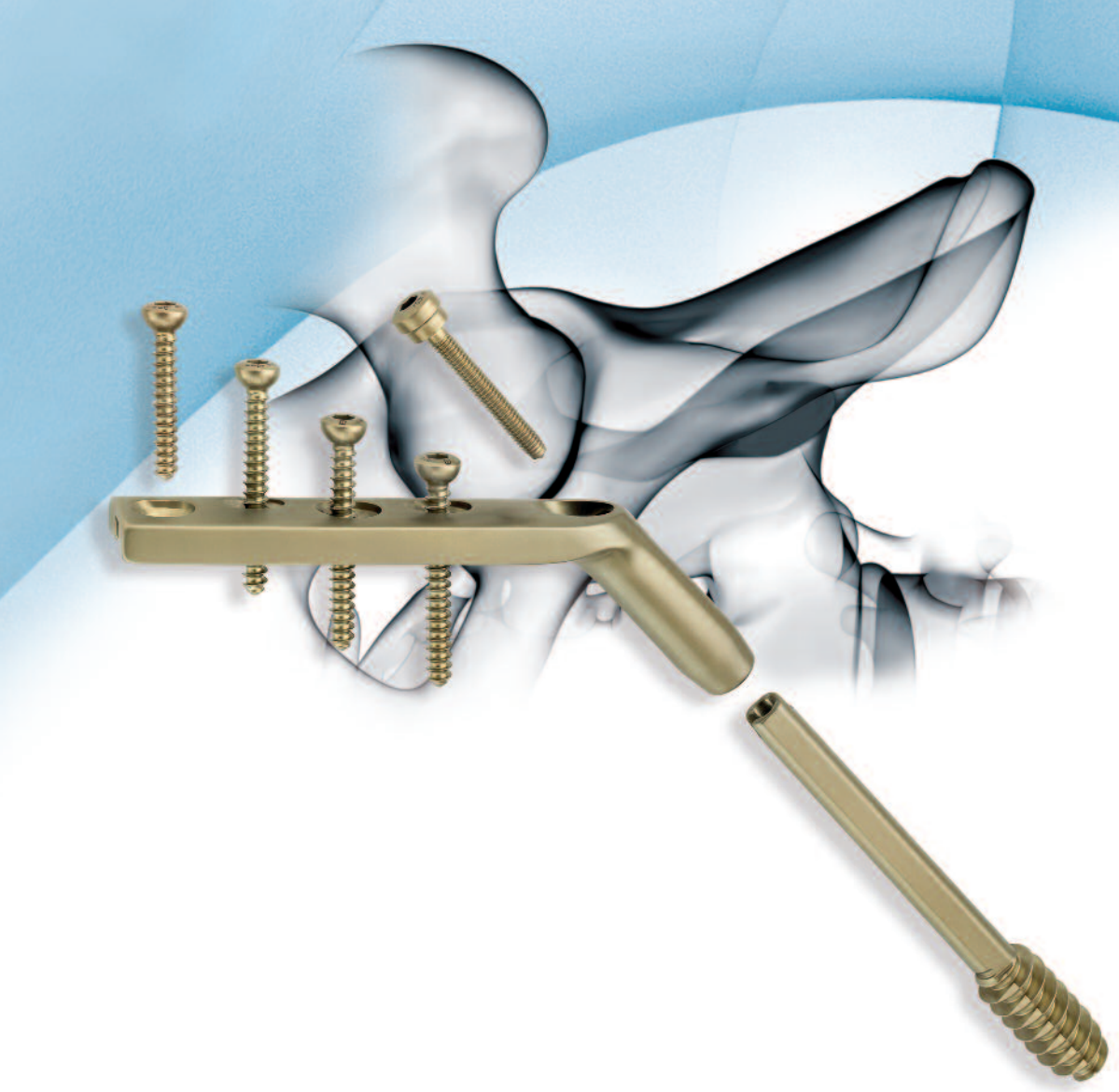

Autodynamic Plating System (APS)

- Dynamic Hip Screw / Dynamic Condylar Plate

Surgical Technique

Autodynamic Plating System (APS)

Dynamic Hip Screw / Dynamic Condylar Plate

Surgical Technique

aap Implantate AG

Contents

Disclaimer

This surgical technique is solely for the use of medical professionals, particularly physicians, and therefore cannot be regarded as a source of information for non-medical laypersons. The substance of this surgical technique does not constitute medical advice or medical recommendations nor does it convey any diagnostic or therapeutic information on individual cases. Therefore, the physician in charge is responsible for obtaining the mandatory informed consent of the patient which this surgical technique cannot supersede.
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Your choice of the dynamic hip screw system from **aap** will offer you the benefits of a proven, high-quality implant system.

For rapid and stable treatment of the most common fractures of the femoral neck the dynamic hip plate is the implant of choice.

This system ensures straightforward and safe stabilization of the bone and quick mobilization of the patient.

The surgeon is aided by the instruments which are simple, safe and logical to use.

Plate and Instrument Set

The sets comprise a standard range of APS plates with a CCD angle of 135° and an alternative CCD angle. Optionally included are self-tapping APS screws, compression screws and self-tapping ø4.5 mm cortical screws.

The instruments are clearly laid out on the tray, ready for use and sterilization.

Materials

The APS implants are manufactured from materials which have proven themselves for decades in medical technology. Both the plates and bone screws are manufactured from titanium alloy or medical quality steel for implants.

All materials employed conform to national and international standards. They stand out because of their excellent biocompatibility and low risk of allergic reactions.

Characteristics

- Rotational stability of the APS screw by congruent bevelling of the screw shaft and the barrel of the plate.
- Since the pitch of the APS screw threads is in the direction of the shaft this lessens the risk of the screw cutting out or penetrating the head.
- Self-tapping APS screws and cortical screws; therefore tapping only becomes necessary in very hard bone.
- APS compression screw for additional compression mandatory when implanting an APS condylar plate.
- Available as option: adjustable angled guide (130°-150°) for precise and variable placement of the guide pin with just one instrument.

Indications/Contraindications

Indications

APS Hip Plates (130° - 150°)

- Fractures of the trochanteric region
- Simple and multifragment pertrochanteric
- Intertrochanteric

APS Condylar Plate (95°)

- Distal and intercondylar femoral fractures

Contraindications

- Inflammation, sepsis and osteomyelitis are absolute contraindications.
  Any other applications not covered by the indications and the medical literature are also contraindicated.
  In addition, the success of the operation may also be marred by:
  · Unacceptably high risk for anesthesia
  · Inadequate soft tissue coverage
  · Acute or chronic systemic or localized infection / inflammation
  · Vascular, muscular or neurologic disorders impairing the affected limb
  · Any concomitant disorders possibly affecting implant function
  · Osteopathy with loss of bone substance, such as severe osteoporosis
  · Obesity: an obese patient may overload the implant to the point where the fixation or implant may fail
  · Whenever the implant is impairing the anatomical structures or normal physiology

Re-Processing (Sterilization & Cleaning)

Implants and instruments are supplied in one compact nonsterile set.

Before every use both implants and instruments must be processed. Please refer to the instructions for use for how to do this.

Implants which may have come into contact with potentially infectious fluids (e.g., blood) may not be resterilized and be reused again in another surgical procedure. They must be returned to the manufacturer (see the instructions for use). After the procedure always discard any guide pins used.

Dynamic Hip Screw

Positioning

The patient is positioned supine on an operating table. Femoral head and neck and the pertrochanteric region should be able to be visualized on both AP and lateral views.

Access

An approximately 14-21 cm long skin incision along the line connecting the greater trochanter, lateral femoral condyle and tibial tuberosity.

Fracture Reduction

Reduction, if at all possible closed reduction, of the fracture under fluoroscopy. In case of temporary fracture fixation with K-wires these must be positioned such that they will not interfere with the subsequent insertion of the APS screw and plate.

Surgery

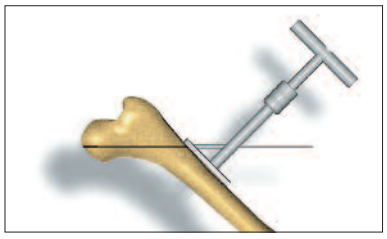
- The proximal femur is accessed laterally. An approximately 14-21 cm long skin incision is made starting about two fingers inferior to the greater trochanter.

- The iliatibial tract is split lengthwise, the vastus lateralis muscle is dissected off the intermuscular membrane posteriorly, retracted anteriorly and possibly incised somewhat at the vastus tubercle. The proximal shaft of the femur is exposed leaving the periosteum in place.

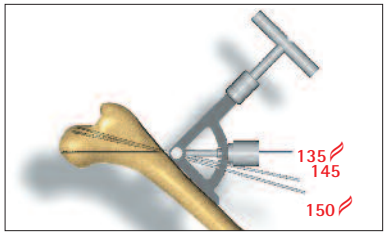
- Anteversion is achieved by sliding a K-wire through the angled guide anterior to the femoral neck and hammering it slightly into the femoral head.

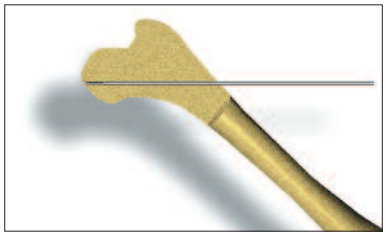
- After determining the CCD angle the appropriate angled guide is attached to the handle and under fluoroscopy the guide wire is positioned in both the AP and axial planes. It should run close to the femoral calcar* in the inferoposterior quadrant of the femoral head (= final position of the APS screw) and should be repositioned if necessary.

- The guide wire remains in this position during all subsequent steps of this operation.



alternatively





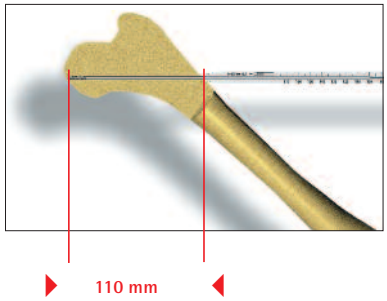
*trabecular arch bretween femoral head and lesser trochanter

◆ NOTE:

In sclerotic bone the lateral cortical bone may be opened up with a ø2.0mm drill bit (not included in the set).

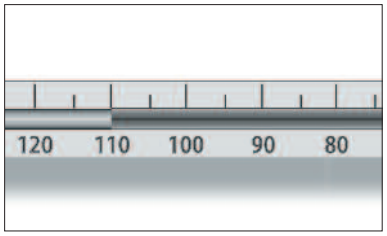
- Once the guide wire has been positioned correctly the pin guide and secondary pin (for anteversion) may be removed.

- For length measurement slip the direct measuring device on to the guide wire. The length of the wire within the bone minus 10 mm equals the depth of the hole to be drilled and also the length of the APS screw. This ensures a sufficient amount of bone up to the joint surface and prevents drilling beyond the threaded tip of the guide wire.

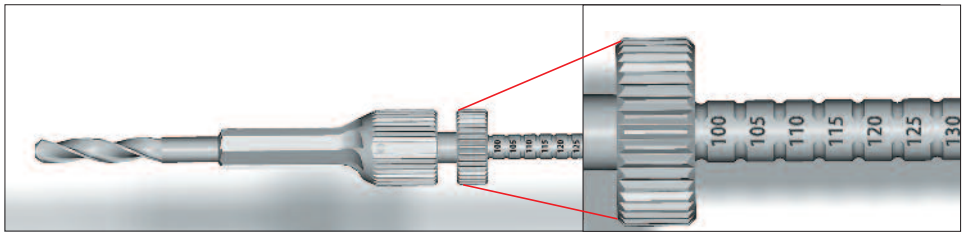


◆ EXAMPLE:

Measured length of guide wire = 110 mm
triple reamer set to 100 mm
Length of APS screw = 100 mm



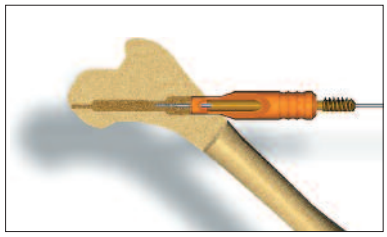
- The depth to be drilled thus determined is set on the triple reamer and locked with the locking screw. The corresponding number must be visible on the shaft of the drill bit above the locking screw.



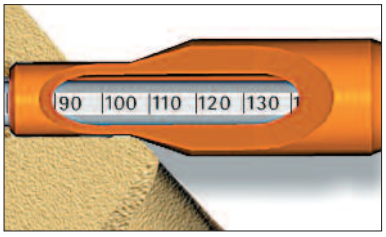
- The hole for the screw is drilled over the guide wire. Do not bend the guide wire while drilling since this might compromise correct screw placement. Working with the triple reamer will drill three different diameters in one pass:
  - for the screw,
  - for the plate barrel and
  - for the transition zone between barrel and plate.

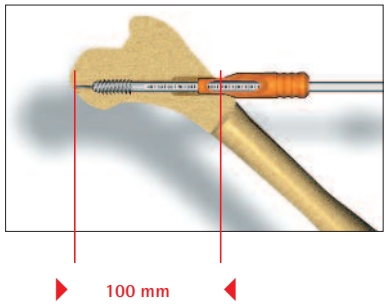
◆ NOTE:

If the guide wire slips out during drilling it must be replaced in its original position as follows: Insert short centering sleeve into the hole, place an APS screw into the centering guide shaft first and push a new pin through the screw.



- In case of hard cancellous bone use the tap attached to the T-handle and with the centering sleeve. The distance tapped corresponds with the length of the screw.

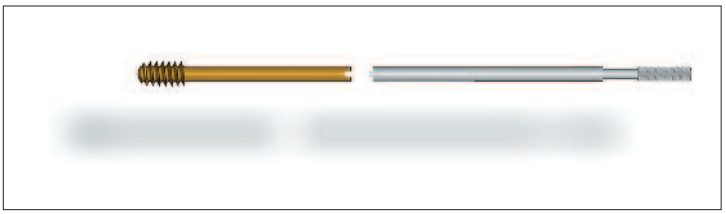




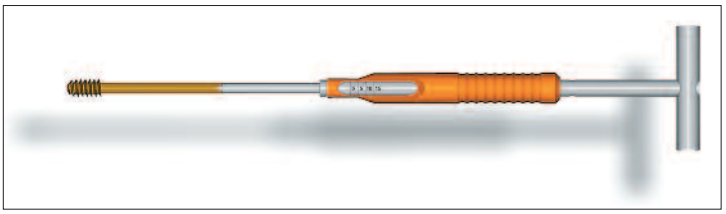
◆ **Caution:**

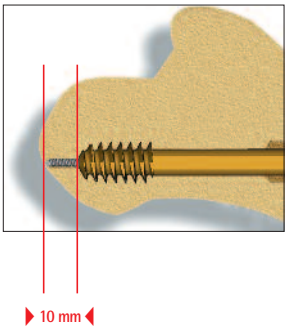
Do not tap osteoporotic bone.

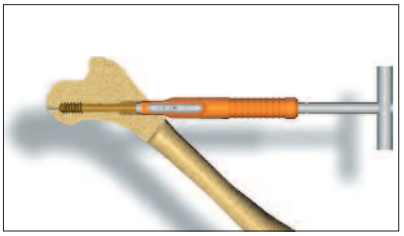
- The APS screw is inserted mounted to the insertion instruments as follows: tighten the connecting screw inside the guide rod onto the end of the APS screw and introduce this assembly into the APS wrench with its mounted long centering sleeve.

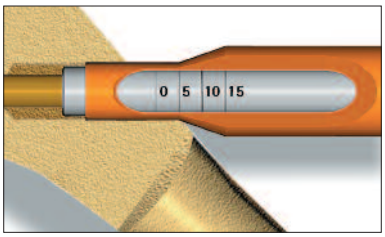


- The APS screw is advanced over the guide wire into the drilled hole and screwed in until the zero mark touches the lateral cortical bone. This corresponds with the 10 mm distance between the tip of the screw and the joint surface.





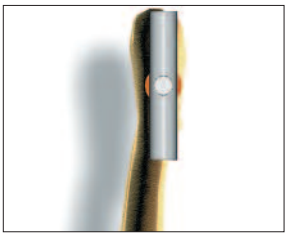


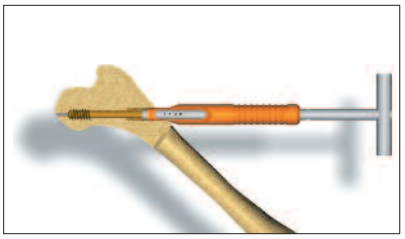


- In osteoporotic bone stability may be increased by screwing it in another 5 mm.

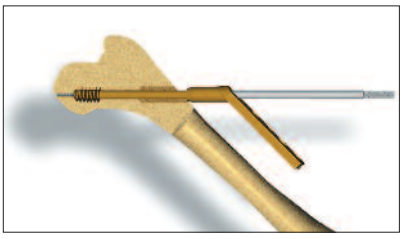
◆ **Caution:**

Correct position of the APS screw is ensured only if at the end of the insertion phase the handle of the APS wrench is horizontal to the shaft of the femur.
Only then may the centering sleeve and APS wrench be removed.





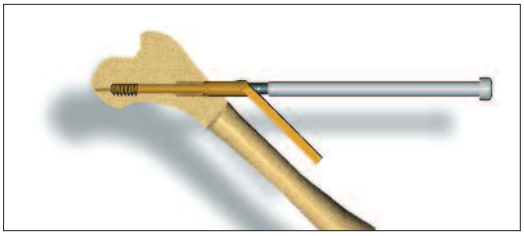
- The APS plate selected is slipped over the connecting screw and pushed onto the shaft of the femur; connecting screw and guide wire may now be removed.



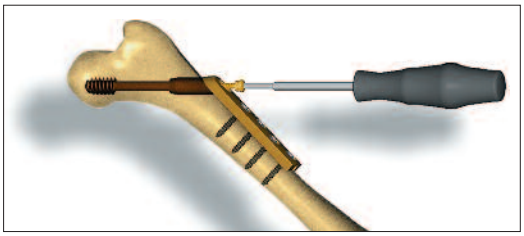
◆ **Note:**

Discard the guide wire after the operation and do not reuse it.

- Seat the APS plate in the hole with the impactor; the fracture may then be compressed by slight hammering.



- Lastly, the APS plate is fixed to the femur with ø4.5 mm cortical screws.
- Optionally a compression screw may be screwed into the APS screw for fracture compression.



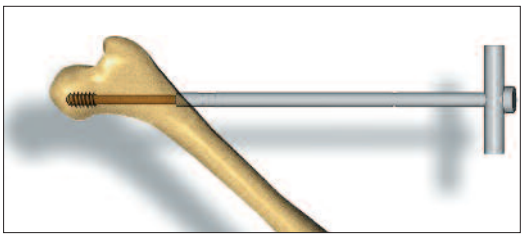
◆ CAUTION:

In osteoporotic bone the compression screw must be turned rather carefully in order not to strip the threads of the APS screw.

- Put in suction drain and wound closure.

Explantation

- Manually remove cortical screws (and, if used, the compression screw) with a hexagonal screwdriver 3.5 A/F.
- Remove the APS plate.
- Insert the long connecting screw into the APS wrench and screw into the end of the APS screw. Unscrew the APS screw under axial traction.



- Wound closure.

Dynamic Condylar Plate

Positioning

The patient is positioned supine on a radiolucent operating table. The knee must be able to be flexed 90°.

Access

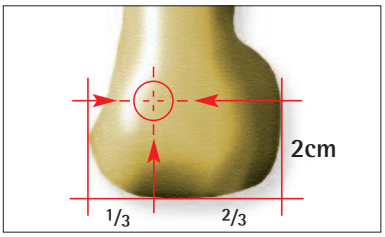
Approximately 14-21 cm long skin incision along the line connecting the greater trochanter, lateral femoral condyle and tibial tuberosity.

Reduction of the articular fracture component

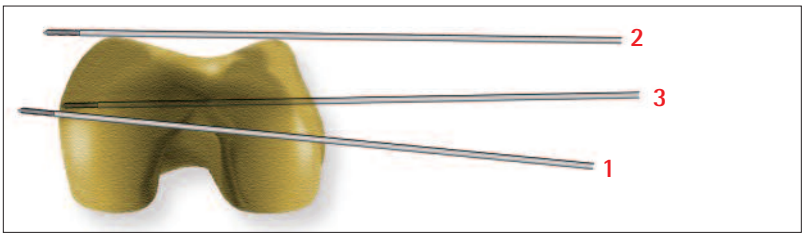
Primary fragment fixation with K-wires which may then be replaced by lag screws. These must be positioned such that they will not interfere with subsequent insertion of the APS screw.

Surgery

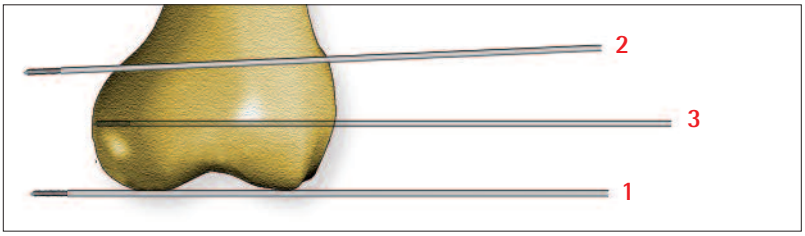
- The APS screw enters the bone in line with the shaft of the femur about 2 cm superior to the knee joint.



- The guide wire (= position of the APS screw) is positioned correctly under fluoroscopy and with the help of secondary pins:
- In the frontal plane pin (1) marks the direction of the knee joint space at the level of the femoral condyles.
- Pin (2) is inserted ventral to the lateral and medial condyles in order to visualize the slope of the patellofemoral joint surface.

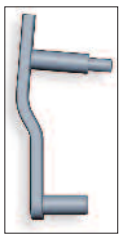


- At the point of insertion thus determined the APS ø2.5 (3) guide wire is introduced such that it parallels the secondary pins: pin (1) in the AP plane and pin (2) in the axial plane. Lateral introduction of the guide wire until it contacts the medial condyle. For this step the condylar angled guide may be used as drill guide.

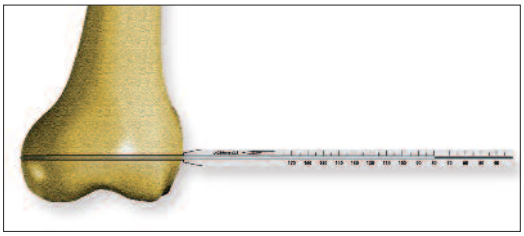


- Removal of the secondary pins.

◆ NOTE:
With simple supracondylar fractures one option would be to insert the guide wire via the 95° condylar angled guide.

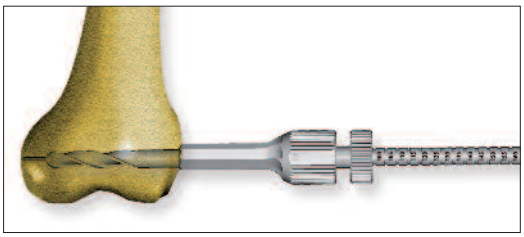


- For length measurement slip the direct measuring device on to the guide wire. For the depth of the hole to be drilled subtract 10 mm from the value measured.



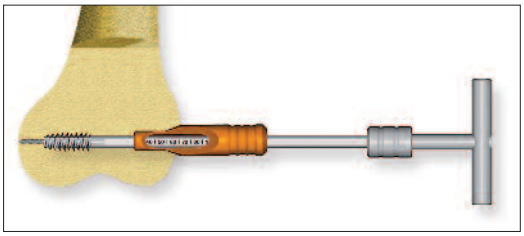
◆ EXAMPLE:
Measured length of guide pin = 80 mm
Triple reamer set to 70 mm
Length of APS screw = 65 mm

- With the locking screw the depth thus determined is set and locked on the short triple reamer fpr 95° plates (IP 0102-95 with appropriate markings on the reamer). The corresponding number must be visible on the shaft of the drill bit above the locking screw. Then drill until the reamer is fully seated.



◆ NOTE:
The corresponding APS screw selected must be 5 mm shorter than the depth drilled (see example above).

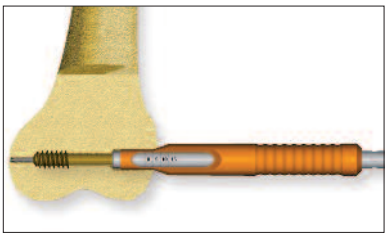
- Remove the triple reamer.
  For reinsertion of an inadvertently withdrawn guide wire see note on page 10.



◆ ALTERNATIVE:
In case of hard cancellous bone use the tap attached to the T-handle and the short centering sleeve. The depth tapped corresponds with the depth of the hole drilled (in this case 70 mm).

◆ CAUTION:
Do not tap osteoporotic bone.

- The APS screw is inserted mounted to the insertion instruments as follows: tighten the locking screw inside the guide rod onto the end of the APS screw and introduce this assembly into the APS wrench with its mounted long centering sleeve.

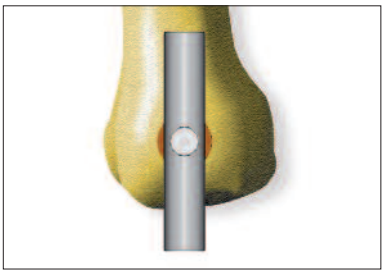


- The APS screw is advanced into the drilled hole over the guide wire and screwed in until the 5 mm mark touches the lateral cortical bone.

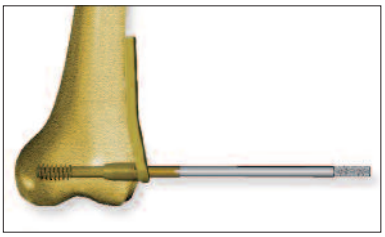
- In osteoporotic bone stability may be increased by screwing it in another 5 mm.

◆ CAUTION:

Correct position of the APS screw is ensured only if at the end of the insertion phase the handle of the APS wrench is horizontal to the shaft of the femur. Only then may the centering sleeve and APS wrench be removed.



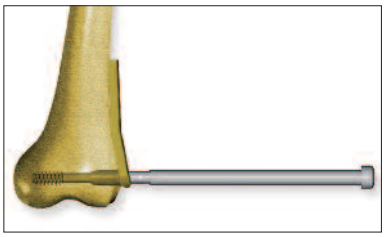
- The APS condylar plate selected is slipped over the connecting screw and pushed onto the shaft of the femur; connecting screw and guide wire may now be removed.



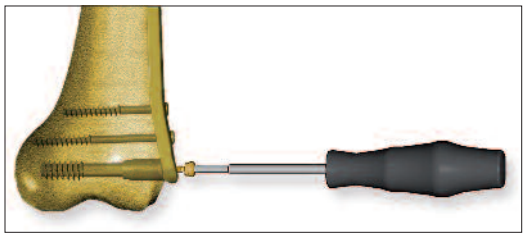
◆ NOTE:

Discard the guide wire after the surgery and do not reuse it.

- Seat the APS condylar plate in the hole with the impactor; the fracture may then be compressed by slight hammering.

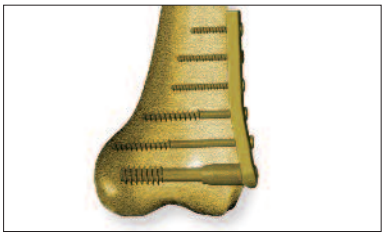


- In intercondylar (or Y)-fractures the joint fragments are secured with ø6.5 mm cancellous screws through the two distal holes in the plate. Subsequent application of the compression screw will further compress the fracture.



◆ CAUTION:

In osteoporotic bone the compression screw must be turned rather carefully in order not to strip the threads of the APS screw.



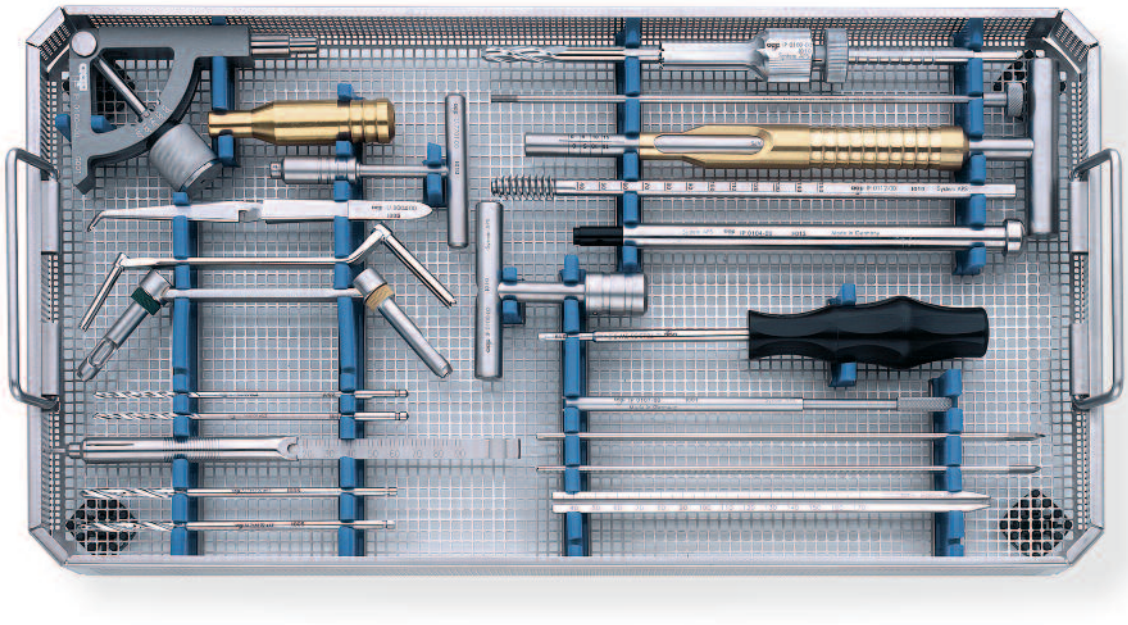
- Lastly, the APS plate is fixed to the femur with ø4.5 mm cortical screws.

Explantation

- Manually remove the cortical screws (and, if used, the compression screw) with a hexagonal screwdriver 3.5 A/F.
- Remove the APS condylar plate.
- Insert the long connecting screw into the APS wrench and screw into the end of the APS screw. Unscrew the APS screw under axial traction.
- Wound closure.

▶ SET APS INSTRUMENTS

▶ IC 6000-24

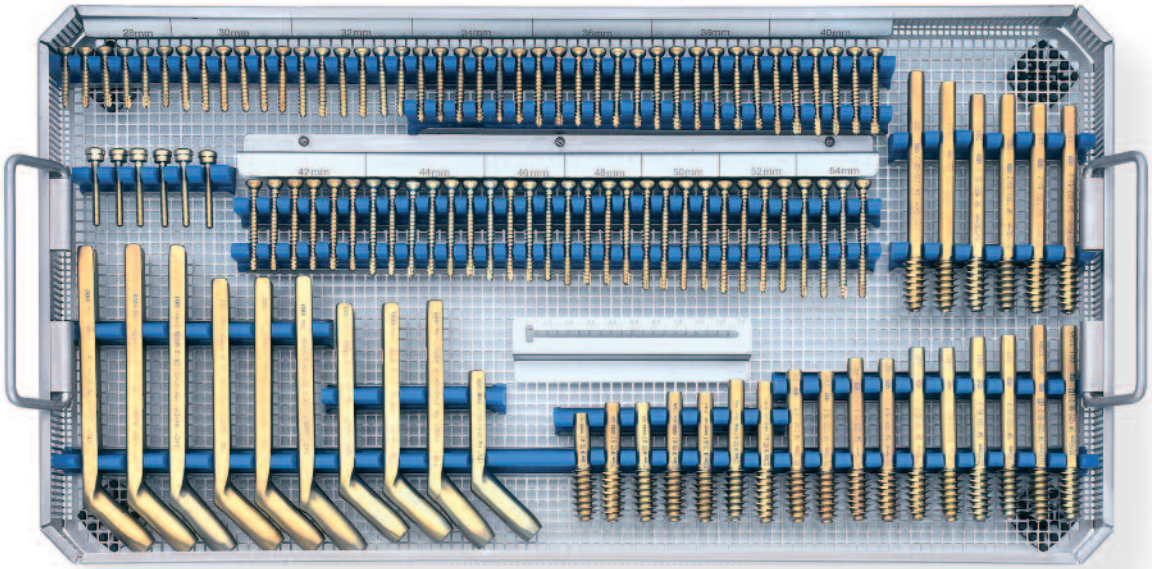


ARTICLE	QUANTITY	ART.-NO.
T-handle	1	IP 0100-00
Direct measuring device	1	IP 0101-00
Triple drill reamer complete	1	IP 0102-00
Wrench	1	IP 0103-00
Impactor	1	IP 0104-00
Connecting screw, long, explantation	1	IP 0105-00
Centering sleeve, short	1	IP 0106-00
Guide rod	1	IP 0107-00
Connecting screw	1	IP 0108-00
Centering sleeve, long	1	IP 0109-00
Tap, ø12.5mm, L 240	1	IP 0112-00
Angled guide, adjustable (130°-150°)	1	IP 0160-00
Depth gauge for screws 4.5-6.5	1	IS 7902-00
Twist drill ø3.2, L 145, coil 50, quick coupling	2	IU 7432-00
Twist drill ø4.5, L 145, coil 50, quick coupling	2	IU 7445-00
T-handle for taps	1	IU 7701-00
Tap for cortical screws ø4.5, L 125/70	1	IU 7745-00
Screwdriver, hexagonal, ø3.5	1	IU 7865-00
Screw forceps, self-holding	1	IU 8004-00
Drill guide 6.0, for neutral and load position	1	IU 8113-00
Double drill guide 3.2/4.5	1	IU 8117-00
Guide wire, ø2.5, L 230	10	NK 0127-23

INSTRUMENTS

SET APS IMPLANTS

- Steel IC 6000-25
- Titanium IC 6000-26



	ARTICLE	QUANTITY	STEEL ART.-NO.	TITANIUM ART.-NO.
APS PLATES	2-Hole 135°	1	PW 0135-02	PW 0135-02-2
	4-Hole 135°	2	PW 0135-04	PW 0135-04-2
	5-Hole 135°	2	PW 0135-05	PW 0135-05-2
	6-Hole 135°	2	PW 0135-06	PW 0135-06-2
	4-Hole 140°	1	PW 0140-04	PW 0140-04-2
	5-Hole 140°	1	PW 0140-05	PW 0140-05-2
	6-Hole 140°	1	PW 0140-06	PW 0140-06-2
	Compression screw	6	SW 0400-00	SW 0400-00-2

APS LAG SCREWS

ARTICLE	QUANTITY	STEEL ART.-NO.	TITANIUM ART.-NO.
50 mm	1	SW 1222-50	SW 1222-50-2
55 mm	2	SW 1222-55	SW 1222-55-2
60 mm	2	SW 1222-60	SW 1222-60-2
65 mm	2	SW 1222-65	SW 1222-65-2
70 mm	2	SW 1222-70	SW 1222-70-2
75 mm	2	SW 1222-75	SW 1222-75-2
80 mm	2	SW 1222-80	SW 1222-80-2
85 mm	2	SW 1222-85	SW 1222-85-2
90 mm	2	SW 1222-90	SW 1222-90-2
95 mm	2	SW 1222-95	SW 1222-95-2
100 mm	2	SW 1222-00	SW 1222-00-2
105 mm	1	SW 1222-01	SW 1222-01-2
110 mm	1	SW 1222-02	SW 1222-02-2

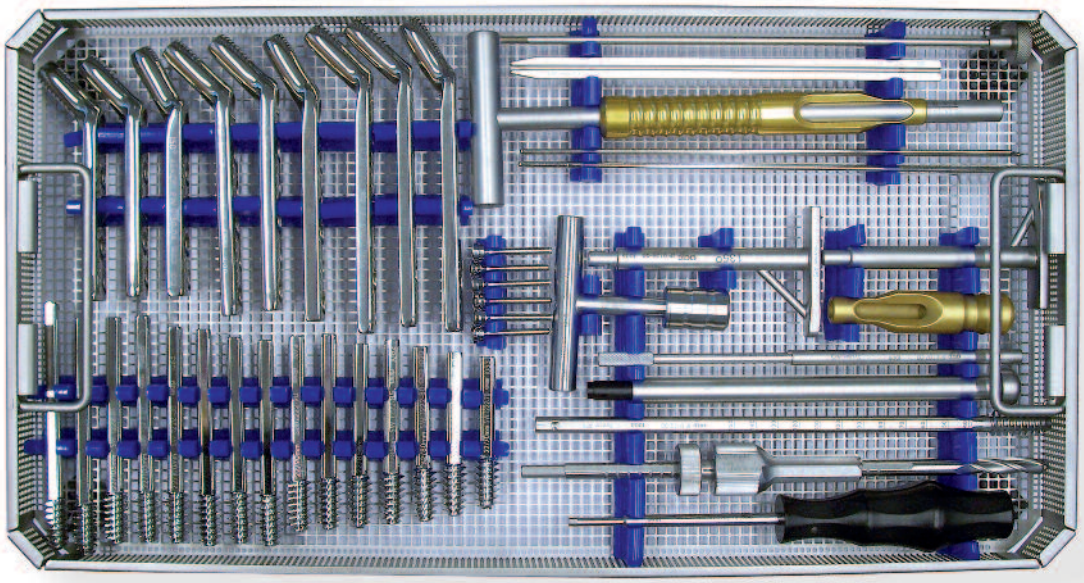
STANDARD CORTICAL SCREWS 4.5

self-tapping

ARTICLE	QUANTITY	STEEL ART.-NO.	TITANIUM ART.-NO.
28 mm	6	SK 4510-28	SK 4510-28-2
30 mm	6	SK 4510-30	SK 4510-30-2
32 mm	6	SK 4510-32	SK 4510-32-2
34 mm	6	SK 4510-34	SK 4510-34-2
36 mm	6	SK 4510-36	SK 4510-36-2
38 mm	6	SK 4510-38	SK 4510-38-2
40 mm	6	SK 4510-40	SK 4510-40-2
42 mm	6	SK 4510-42	SK 4510-42-2
44 mm	6	SK 4510-44	SK 4510-44-2
46 mm	4	SK 4510-46	SK 4510-46-2
48 mm	4	SK 4510-48	SK 4510-48-2
50 mm	4	SK 4510-50	SK 4510-50-2
52 mm	4	SK 4510-52	SK 4510-52-2
54 mm	4	SK 4510-54	SK 4510-54-2

COMPLETE SET APS IMPLANTS AND INSTRUMENTS

- Steel IC 6002-03
- Titanium IC 6002-04



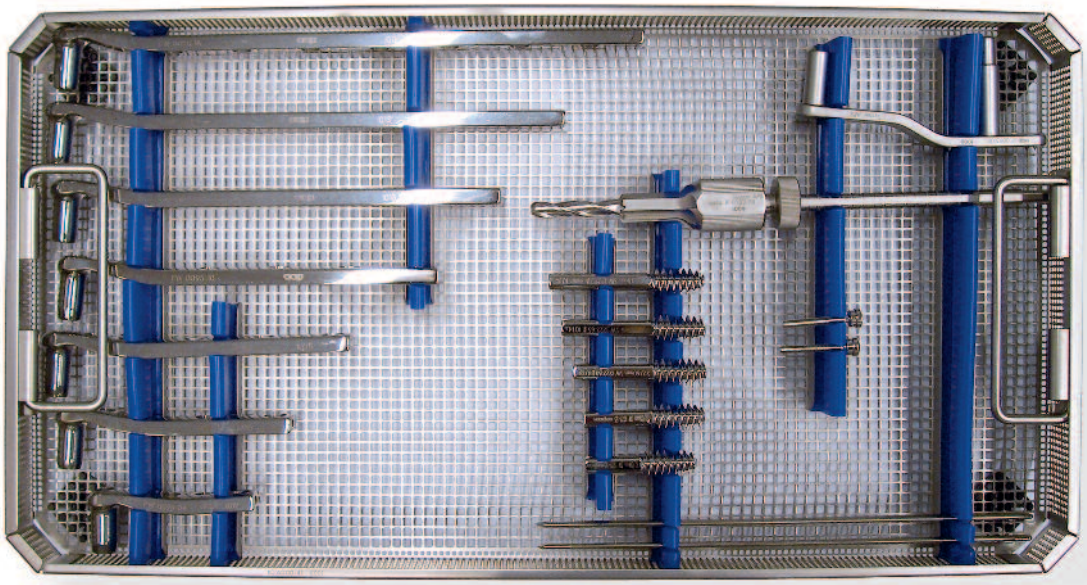
ARTICLE	ART.-NO.
Tray for APS implants and instruments, empty	IC 6002-00

			STEEL	TITANIUM
	ARTICLE	QUANTITY	ART.-NO.	ART.-NO.
IMPLANTS	Compression screw	6	SW 0400-00	SW 0400-00-2
	Lag screw, self-tapping. TL 22, L 70	1	SW 1222-70	SW 1222-70-2
	Lag screw, self-tapping. TL 22, L 75	1	SW 1222-75	SW 1222-75-2
	Lag screw, self-tapping. TL 22, L 80	1	SW 1222-80	SW 1222-80-2
	Lag screw, self-tapping. TL 22, L 85	2	SW 1222-85	SW 1222-85-2
	Lag screw, self-tapping. TL 22, L 90	2	SW 1222-90	SW 1222-90-2
	Lag screw, self-tapping. TL 22, L 95	2	SW 1222-95	SW 1222-95-2
	Lag screw, self-tapping. TL 22, L 100	2	SW 1222-00	SW 1222-00-2
	Lag screw, self-tapping. TL 22, L 105	2	SW 1222-01	SW 1222-01-2
	Lag screw, self-tapping. TL 22, L 110	1	SW 1222-02	SW 1222-02-2
	Lag screw, self-tapping. TL 22, L 115	1	SW 1222-03	SW 1222-03-2
	Plate 135°, 4-hole, L 78	2	PW 0135-04	PW 0135-04-2
	Plate 135°, 5-hole, L 94	2	PW 0135-05	PW 0135-05-2
	Plate 135°, 6-hole, L 110	2	PW 0135-06	PW 0135-06-2
	Plate 150°, 4-hole, L 78	1	PW 0150-04	PW 0150-04-2
	Plate 150°, 5-hole, L 94	1	PW 0150-05	PW 0150-05-2
	Plate 150°, 6-hole, L 110	1	PW 0150-06	PW 0150-06-2

ARTICLE	QUANTITY	ART.-NO.
T-handle	1	IP 0100-00
Direct measuring device	1	IP 0101-00
Triple drill reamer complete	1	IP 0102-00
Wrench	1	IP 0103-00
Impactor	1	IP 0104-00
Connecting screw, long, explantation	1	IP 0105-00
Centering sleeve, short	1	IP 0106-00
Guide rod	1	IP 0107-00
Connecting screw	1	IP 0108-00
Centering sleeve, long	1	IP 0109-00
Tap, ø12.5, L 240	1	IP 0112-00
Angled guide 135°	1	IP 0135-00
Angled guide 150°	1	IP 0150-00
Screwdriver, hexagonal, ø3.5	1	IU 7865-00
Auide wire, ø2.5, L 230	10	NK 0127-23

COMPLETE SET APS Condylar Plate

▶ Steel IC 6000-40
▶ Titanium *on inquiry



ARTICLE	ART.-NO.
Empty tray for condylar implants and instruments	IC 6000-41

			STEEL	TITANIUM
	ARTICLE	QUANTITY	ART.-NO.	ART.-NO.
IMPLANTS	Condylar plate 95°, 4-hole, L 71	1	PW 0095-04	PW 0095-04-2
	Condylar plate 95°, 6-hole, L 103	1	PW 0095-06	PW 0095-06-2
	Condylar plate 95°, 8-hole, L 135	1	PW 0095-08	PW 0095-08-2
	Condylar plate 95°, 10-hole, L 167	1	PW 0095-10	PW 0095-10-2
	Condylar plate 95°, 12-hole, L 195	1	PW 0095-12	PW 0095-12-2
	Condylar plate 95°, 14-hole, L 227	1	PW 0095-14	PW 0095-14-2
	Condylar plate 95°, 16-hole, L 259	1	PW 0095-16	PW 0095-16-2
	Compression screw	2	SW 0400-00	SW 0400-00-2
	Lag screw, self-tapping TL 22, L 50	1	SW 1222-50	SW 1222-50-2
	Lag screw, self-tapping TL 22, L 55	1	SW 1222-55	SW 1222-55-2
	Lag screw, self-tapping TL 22, L 60	1	SW 1222-60	SW 1222-60-2
	Lag screw, self-tapping TL 22, L 65	1	SW 1222-65	SW 1222-65-2
	Lag screw, self-tapping TL 22, L 70	1	SW 1222-70	SW 1222-70-2

	ARTICLE	QUANTITY	ART.-NO.
INSTRUMENTS	Condylar targeting instrument 95°	1	IP 0095-00
	Combination drill bit for condylar plate 95°	1	IP 0102-95
	Guide pin with threaded tip, ø2.5, L 230	5	NK 0127-23

STANDARD CORTICAL SCREW 4.5 (self-tapping)

LENGTH	STEEL ART.-NO.	TITANIUM ART.-NO.
28 mm	SK 4510-28	SK 4510-28-2
30 mm	SK 4510-30	SK 4510-30-2
32 mm	SK 4510-32	SK 4510-32-2
34 mm	SK 4510-34	SK 4510-34-2
36 mm	SK 4510-36	SK 4510-36-2
38 mm	SK 4510-38	SK 4510-38-2
40 mm	SK 4510-40	SK 4510-40-2
42 mm	SK 4510-42	SK 4510-42-2
44 mm	SK 4510-44	SK 4510-44-2
46 mm	SK 4510-46	SK 4510-46-2
48 mm	SK 4510-48	SK 4510-48-2
50 mm	SK 4510-50	SK 4510-50-2
52 mm	SK 4510-52	SK 4510-52-2
54 mm	SK 4510-54	SK 4510-54-2

STANDARD CANCELLOUS SCREW 6.5

SPECIAL ORDER (NOT INCLUDED IN THE SET)

THREAD LENGTH	STEEL ART.-NO.	TITANIUM ART.-NO.
16 mm	SP 6516-30 to SP 6516-04	SP 6516-30-2 to SP 6516-04-2
32 mm	SP 6532-45 to SP 6532-04	SP 6532-45-2 to SP 6532-04-2

* For detailed information please have a look at the catalogue Standard Osteosynthesis, pages 35/36

Notes

Subject to technical modifications, errors and misprints.

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