

Surgical Technique

A2®

Short Stem Hip Prosthesis



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A2® SHORT HIP STEM

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A2® SHORT HIP STEM



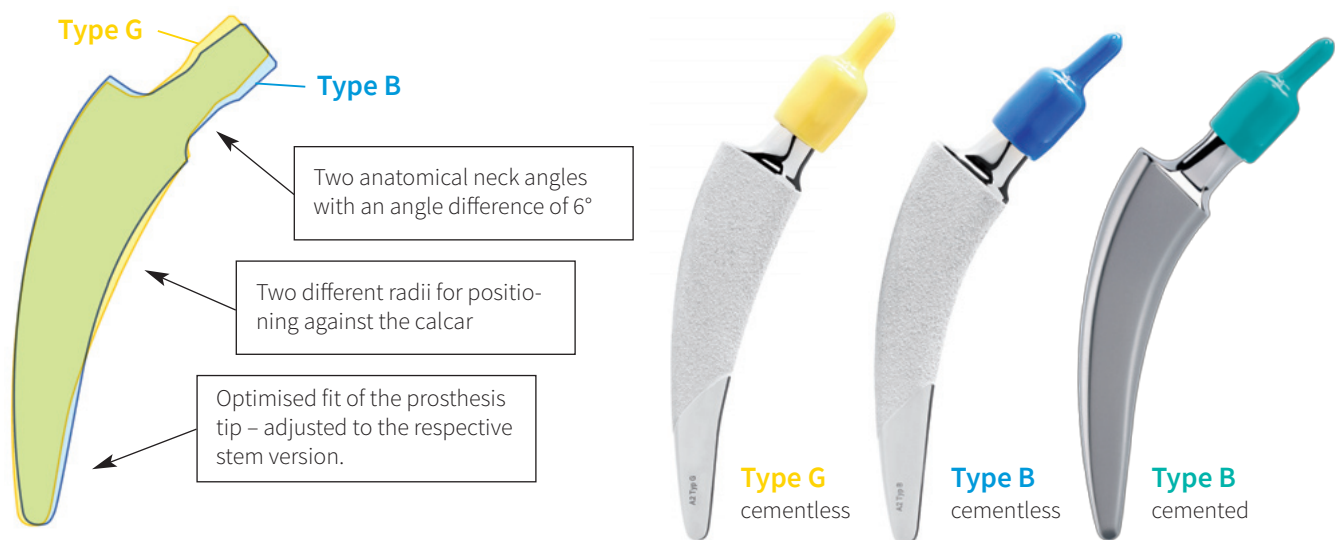
Features

- Improved anatomical adaptability
- Long-distance medial support at the calcar, “**two body philosophy**”
- Optimised in terms of reconstruction (offset, CCD angle and leg length)
- Triple conical anchorage
- Trapezoidal cross-section
- Choice of **cementless** or **cemented** anchorage
- Universal instrument set allows for intraoperative decision on type of anchoring

Design features

The A2® stem belongs to the family of short stems and is based on two different basic configurations (type G and type B), which have differences in the neck angle, in calcar support, and in the angle of the prosthesis tip. The anchorage philosophy conforms to that of established systems. Proven anchoring criteria, such as the triple taper wedge stem and the trapezoidal cross-section, have been preserved.

The advantages of short stems are found in their bone-preserving and soft tissue-friendly implantation, the possibility of anatomical reconstruction of the femoral head centre, and reduction of intra- and postoperative blood loss. Poor bone quality or osteoporosis, among other things, may restrict the indications of use. Reduced bone quality is often found in older, mostly female patients, and cannot always be clearly identified before surgery. However, since older patients in particular can benefit from a gentle surgical technique and earlier mobilisation, a cemented version has been added to the A2® hip stem system.



- The cementless A2® stem is a hip stem coated with titanium plasma (TPS) and optionally also with Bonit® (calcium phosphate), made from an already clinically-proven titanium alloy (Ti6Al4V) with a neck cone 12/14. Twelve sizes (0-11) have been designed per stem variant. In order to better distinguish both stem variants, a colour code (type G yellow, type B blue) has been defined that identifies and accompanies the system, from pre-operative planning, to the instrument set, and on to the definitive implant.
- The cemented A2® stem consists of a proven INOX steel implant, as per ISO 5832-9, with a smooth surface and allows the use of bone cement in combination with the A2® stem, for example in cases of trauma patients or older patients.

Furthermore, the cemented stem is an intraoperative backup option in the event that primary stability of the cementless version is inadequate, e.g. due to poor bone quality, and thus increases reliability of care. The cemented A2® stem is based on the type B stem and is available in 9 sizes (2 to 10). The instrument set is universally applicable and is identical for both the cemented and cementless versions.

Preoperative planning

Templating for the A2® Short Stem

Planning for the correct prosthesis size, the corresponding femoral offset, as well as femoral neck length are undertaken prior to surgery using radiographic templates. Conventional radiographic templates with a magnification factor of 1.15 : 1 and digital radiographic templates are available for the A2® Short Stem. For each size, the radiographic templates show the respective stem contour, including the ball head lengths. In order to achieve optimal reconstruction, a choice can be made between the A2® stem type G (valgus form) and the A2® stem type B (varus form).

1

Anchoring criteria / choice of size

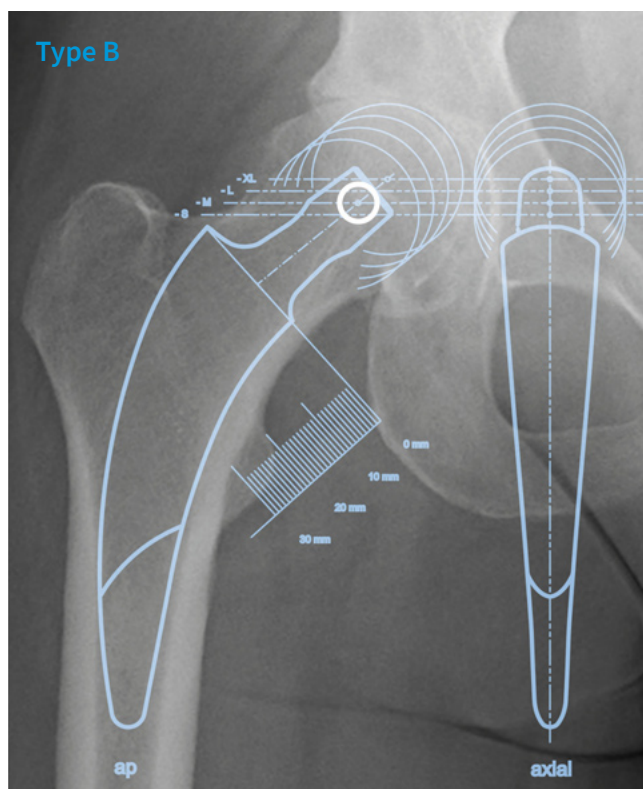
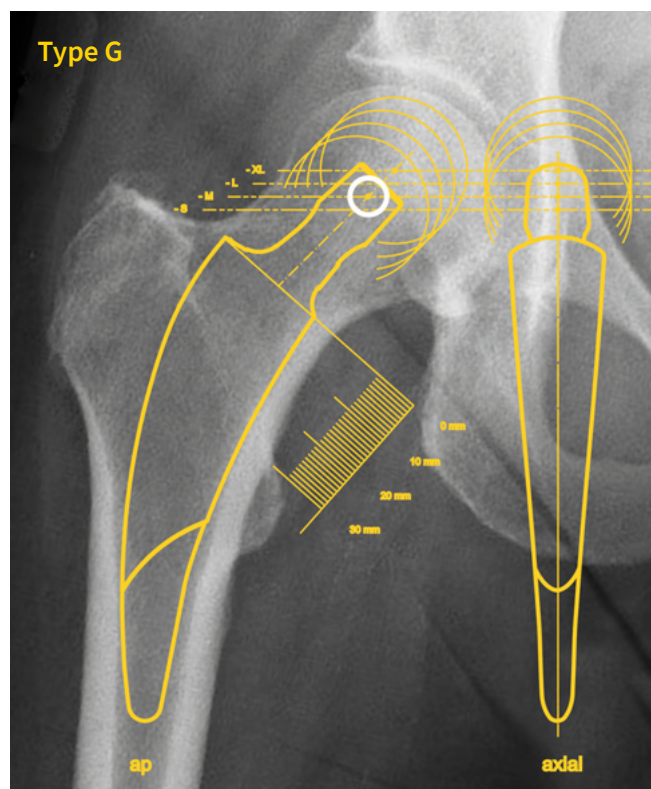
In accordance with system specifications, the objective is to achieve abutment against the femoral calcar in the AP view as well as against the lateral cortical bone in the distal implant region. A proximal tight fit anteriorly and posteriorly and support of the prosthesis tip in the area of the dorsal femoral cortical bone should be achieved in the axial plane

2

Choice of neck piece/ball head centre

The planning template shows the different ball head options in Ø 28, Ø 32 and Ø 36. The ball head-neck length that best fits the planned centre of the acetabular component is selected. Basically, there is a choice between the A2® type G and type B stem variants and four ball head lengths (S-XL).

Planning example



Indications & contraindications

Indications

- Patients with advanced wear in the hip joint due to degenerative or post-traumatic osteoarthritis or rheumatoid arthritis
- Avascular necrosis of the femoral head
- Acute traumatic fractures of the femoral head or femoral neck, provided stable anchoring of the implant is guaranteed

Contraindications

- Acute or chronic infections, local or systemic
- Severe muscular, neural, or vascular diseases that compromise the affected extremities
- Fractures involving the base of the femoral neck or also radiating into the trochanteric region or the calcar
- Absent or deficient bone mass that imperils the stable positioning of the prosthesis
- Previous operations that can no longer guarantee the required support
- Pronounced coxa valga with a femoral neck angle $> 145^\circ$
- Pronounced coxa vara with a femoral neck angle $< 120^\circ$
- Any concomitant illness that can imperil the function of the implant
- Revision with extensive bone defects

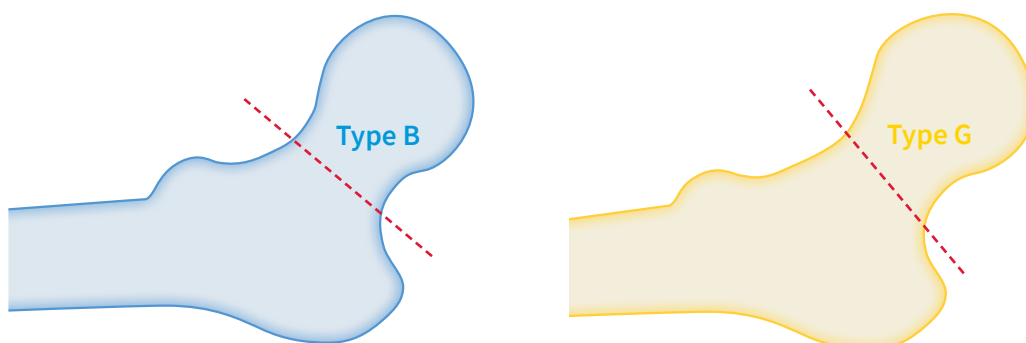
Precautions / Restrictions

- Dysplastic osteoarthritis of the hip
- Severe antetorsion of the femoral neck
- Wide femoral neck
- BMI > 30
- Ceramic components are generally resistant to abrasion, but are more likely to fracture

Implantation

Osteotomy of the femoral neck

Osteotomy of the femoral neck is performed according to the preoperative planning. During the operation, the medial distance to the lesser trochanter and laterally the distance to the junction of the greater trochanter and the femoral neck can be used as orientation. In principle, the cortical ring of the femoral neck must remain intact following resection.



NOTE:

Depending on the shape of the femoral neck, a choice can be made between type B and type G variants of the A2® Short Stem system. Please note that a flatter resection angle must be chosen with the type G variant, as compared with the type B stem variant.



Implantation of the acetabular component

Implantation is performed according to general guidelines, depending on the type of acetabular component.

Opening the femoral canal

The medullary space is first opened using a curette, and followed by a curved awl. The entry point on the resection surface is in the middle of the medial third. The awl is introduced using slight rotary movements, until the lateral cortical bone distal to the minor trochanter is reached.

NOTE:

It can be helpful to first insert the awl in slight varus, then straightening it upon reaching the lateral cortical bone, and then sliding it in a distal direction along the lateral cortical bone.

Rasping the femoral canal

NOTE :

Depending on the shape of the femoral neck and preoperative planning, a choice can be made between a varus variant (type B) and a valgus variant (type G) of the A2® Short Stem system. A rasping set is available for both variants. It is important to note that the spectrum of sizes is adapted to normal anatomical distribution, and that both variants are not available in the entire spectrum of sizes. The rasp variants are identified by colour markings to distinguish them more easily.

Product range

Size	1	2	3	4	5	6	7	8	9	10	11
A2® stem type G	●	●	●	●	●	●	●	●	●	—	—
A2® stem type B	—	●	●	●	●	●	●	●	●	SG*	SG*

* SG = special size



The femur is prepared in stages, starting with the smallest rasp size. Taking antetorsion into consideration, the rasps are introduced into the centre of the medullary cavity. The first rasp already allows for verification of the position and direction of the osteotomy.

NOTE :

When using the rasp, slight varus pressure is helpful to prevent valgisation of the instrument.

Valgisation of the rasp could result in unintended lengthening of the leg.



The rasp sizes are then gradually increased until adequate axial and rotational stability of the rasps in the femur is achieved. The teeth of the rasp should end at the resection surface. The final rasp should under no circumstances be positioned below the resection surface.

NOTE :

In principle, a change/switch between the two stem variants is possible during surgery. In such a case, the implant bed should be remodified, starting with the smaller size (-2).





Rasping the femoral canal

Preparation of the intramedullary femur is generally done manually, using a hammer and knock plate. Alternatively, preparation may also be conducted automatically using a pneumatic hammer. Different handle variants (straight or double offset), with knock plate or coupling, are available as options.

NOTE :

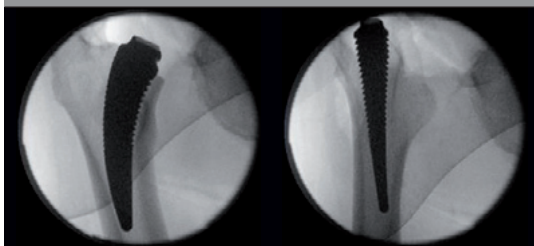
A cross bar can be clicked onto the handle to assist rotational alignment of the rasp.

Handle variants

Rasp handle	Knock plate	Coupling
Double offset 50/15	■	■
Double offset 35/30	■	□
DAA 45°	■	■
Straight 15/0	□	■

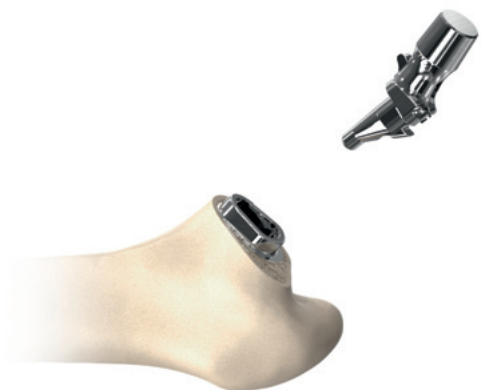


NOTE :



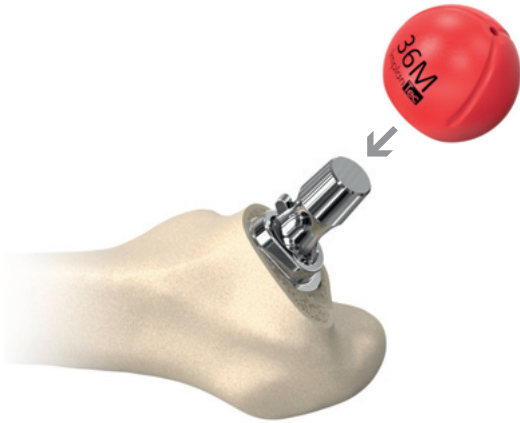
For a final check of the rasp position, we recommend verification with an image intensifier (C arm).

If the rasp is not resting against the posterior cortical bone in any plane (image in internal rotation), the position should be corrected by rasping using a larger stem rasp.



Rasp manipulation

The final stem rasp remains in place initially and is used together with the manipulation neck as a trial implant. A universal manipulation neck is available whichever version is used (stem type B or stem type G).



Placement of the trial head

If needed, trial heads (S-XL) can be exchanged until a satisfactory result is achieved. Head lengths greater than XL have not been approved for the stem system. A trial reduction is performed to evaluate any dislocation tendency, range of motion and soft tissue tension.

HL	Ø 28	Ø 32	Ø 36
S	- 3,5 mm	- 4,0 mm	- 4,0 mm
M	0 mm	0 mm	0 mm
L	+ 3,5 mm	+ 4,0 mm	+ 4,0 mm
XL	+ 7,0 mm	+ 8,0 mm	+ 8,0 mm



Cementless implantation

The definitive stem is selected in accordance with the trial implantation with the manipulation rasp. Apart from selecting the correct size, it is also important to select the correct version (stem type B or G). The stem variants are identified by colour markings on the label and on the protective cap for the taper to distinguish them more easily.



The stem is positioned manually. After that, the stem can be fixed with using the stem impactor.

NOTE :

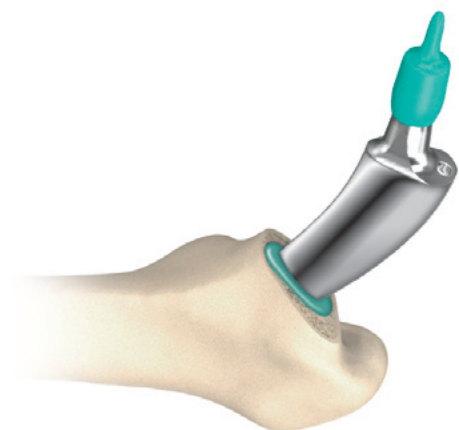
The A2® stem is manually inserted. It is important to ensure that at least 2/3 of the stem can be introduced into the femur without tension. It is also especially important to ensure rotational alignment of the stem toward the rasped bed.



Cemented implantation

The intramedullary femur is prepared using type B rasps of increasing sizes in the usual manner. The last rasp should be introduced all the way to the femoral neck resection, i.e. the teeth of the rasp should be flush with the resection level.

After rasping, the medullary space should be cleaned with a jet lavage or similar, and sealed with an autogenous bone block or a medullary plug (approx. 10-15 mm below the tip of the stem). The cement is prepared and injected in a retrograde manner into the medullary space with a cement syringe, in accordance with manufacturer's specifications and the surgeon's preferred technique.



NOTE :

The use of high viscosity bone cement (PMMA), mixed and introduced under vacuum (3rd generation cementing technique), is recommended. In order to centre the stem, it is helpful to introduce it into a stiffer cement mass (if of highly viscous quality, approx. 3 minutes after mixing).

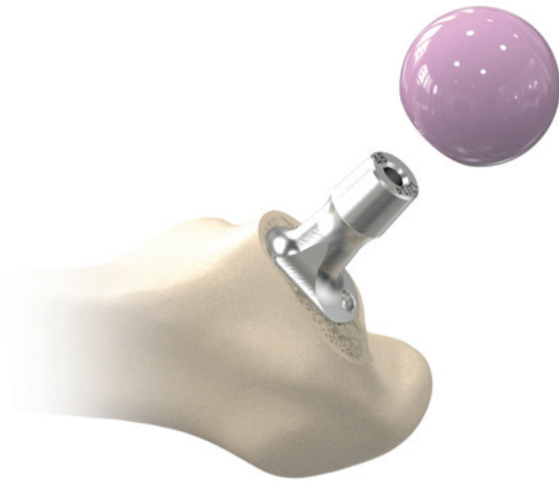
The stem is introduced manually, using slight lateral pressure. As done previously with the rasp, the body of the stem should end flush with the resection level.



NOTE :

If using the undersized technique, the stem size of the implant should be one size smaller than the size of the last rasp used, in order to achieve a 2 mm cement mantle thickness.

The surgical technique, instructions for use, and the general valid guidelines for implantation of primary cemented hip stems, are to be observed.



Implantation of the ball head

Optionally, a further trial reduction can be performed to check joint tension and mobility with the trial heads.

Next, the stem taper is carefully washed by hand, the definitive ball head is fitted with a slight turn and affixed with a plastic impactor.

NOTE :

In comparison with metal ball heads, ceramic ball heads are more resistant to abrasion but possess a higher risk of fracture. Additional information on risks to materials and bearing surfaces may be found in the enclosed insert.



Explantation of the A2® stem

An extractor screw with slide hammer coupling has been provided to remove the stem. It is screwed into the M6 thread on the surface of the 12/14 cone. In the event of revision, the ball head must be removed beforehand.

NOTE:

A slide hammer is **not** included in the tray as standard!



Postoperative management

Case 1 – **type B**Case 2 – **type G**

Postoperative management depends on the final surgical result. After minimally traumatic implantations, mobilisation can begin early. Recommendations are made by the surgeon or the hospital as regards partial or full weight-bearing, walking aids, three- or four-point gait, etc. When doing so, bone quality and condition of the patient are always taken into account. Physiotherapy is recommended during the hospital stay.

Sterilisation

Implants

All implants described in the surgical technique are supplied sterile by the manufacturer. Resterilisation is not allowed.

Instruments

The elements of the system and instruments are supplied non-sterile. Before use, these must be cleaned, disinfected, and sterilised in accordance with a validated procedure. The cleaning instructions (Lit. No. NA30-04-05) contain validated instructions on preparing a medical product for reuse. The reprocessor is responsible for ensuring that actual reprocessing with equipment, materials, and staff in the reprocessing facility achieves the desired results.

To this end, validation and routine monitoring of the procedure are usually required. Instrument manufacturers and retailers do not assume any responsibility whatsoever for the sterilisation of products by the purchaser.

Implants

A2® Stem **type B**

Cementless			Cemented
Size	TPS-Bonit®	TPS	INOX
Size 2	311102	311302**	411302
Size 3	311103	311303**	411303
Size 4	311104	311304**	411304
Size 5	311105	311305**	411305
Size 6	311106	311306**	411306
Size 7	311107	311307**	411307
Size 8	311108	311308**	411308
Size 9	311109	311309**	411309
Size 10*	311110	311310**	411310
Size 11*	311111	311311**	–

* Special sizes – not included in the product range as standard

** only available upon request

A2® Stem **type G**

Cementless		
Size	TPS-Bonit®	TPS
Size 1	311201	311401**
Size 2	311202	311402**
Size 3	311203	311403**
Size 4	311204	311404**
Size 5	311205	311405**
Size 6	311206	311406**
Size 7	311207	311407**
Size 8	311208	311408**
Size 9	311209	311409**

** only available upon request

Implant material:

Cementless – Ti6Al4V according to ISO 5832-3

Surface: Polished prosthesis tip or prosthesis neck,
coated with titanium plasma (TPS)/ BONIT® in the anchorage area

Cemented – INOX 1.4472 according to ISO 5832-9

Implants

Femoral head ELEC® plus Ceramic ISO 6474-2

Neck length	Ø 28	Ø 32	Ø 36
S	726281	726321	726361
M	726282	726322	726362
L	726283	726323	726363
XL	-----	726324	726364

Femoral head ELEC® plus Revision ISO 6474-2 | ISO 5832-2

Neck length	Ø 28	Ø 32	Ø 36
S	727281	727321	727361
M	727282	727322	727362
L	727283	727323	727363
XL	727284	727324	727364

Femoral head BIOLOX®delta Ceramic ISO 6474-2

Neck length	Ø 28	Ø 32	Ø 36
S	90601	90611	90621
M	90602	90612	90622
L	90603	90613	90623
XL	-----	90614	90624

Femoral head BIOLOX® OPTION ISO 6474-2 | ISO 5832-2

Neck length	Ø 28	Ø 32	Ø 36
S	59001	59011	59021
M	59002	59012	59022
L	59003	59013	59023
XL	59004	59014	59024

Femoral head Metal CoCrMo ISO 5832-12

Neck length	Ø 28	Ø 32	Ø 36
S	52801	53201	-----
M	52802	53202	-----
L	52803	53203	-----
XL	52804	53204	-----

Femoral head INOX Metal ISO 5832-9

Neck length	Ø 28	Ø 32	Ø 36
S	13211	13221	-----
M	13212	13222	-----
L	13213	13223	-----
XL	13214	13224	-----

Instruments

A2® Stem - instrument set

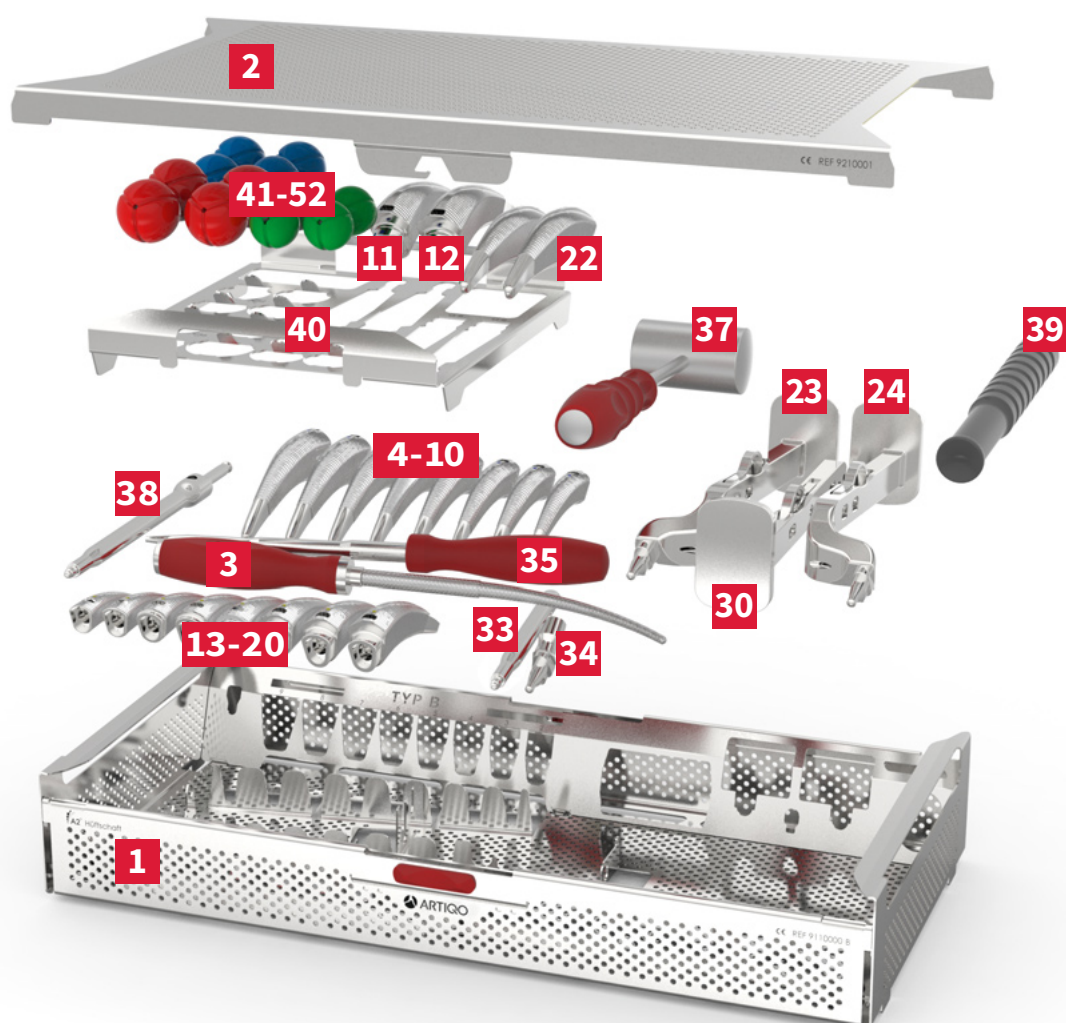
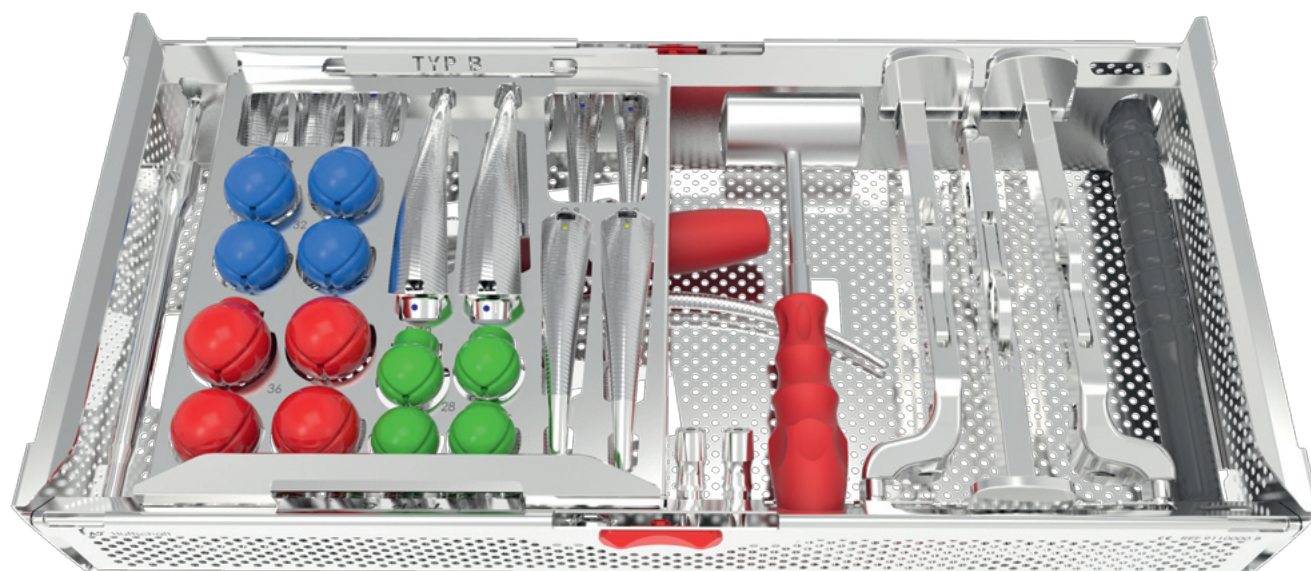
No.	Art. No.	Item
1	9110000	Stem - tray
2	9110001	Lid for tray
3	9110100	Opening rasp
4	9110201	Femoral stem rasp 1 G
5	9110202	Femoral stem rasp 2 G
6	9110203	Femoral stem rasp 3 G
7	9110204	Femoral stem rasp 4 G
8	9110205	Femoral stem rasp 5 G
9	9110206	Femoral stem rasp 6 G
10	9110207	Femoral stem rasp 7 G
11	9110208	Femoral stem rasp 8 G
12	9110209	Femoral stem rasp 9 G
13	9110302	Femoral stem rasp 2 B
14	9110303	Femoral stem rasp 3 B
15	9110304	Femoral stem rasp 4 B
16	9110305	Femoral stem rasp 5 B
17	9110306	Femoral stem rasp 6 B
18	9110307	Femoral stem rasp 7 B
19	9110308	Femoral stem rasp 8 B
20	9110309	Femoral stem rasp 9 B
21*	9110310	Femoral stem rasp 10 B
22*	9110311	Femoral stem rasp 11 B
23	9110401	Rasp handle double offset 50/15 left with knock plate
24	9110402	Rasp handle double offset 50/15 right with knock plate
25*	9110403	Rasp handle double offset 50/15 left with slide hammer coupling
26*	9110404	Rasp handle double offset 50/15 right with slide hammer coupling

* Optional

No.	Art. No.	Item
27*	9110405	DAA rasp handle 45°
28*	9110406	Rasp handle double offset 35/30 left with knock plate
29*	9110407	Rasp handle double offset 35/30 right with knock plate
30*	9110408	Rasp handle straight 15/0
31*	9110409	DAA rasp handle 45° with slide hammer coupling
32*	9110500	Knock plate
33*	9110501	Cross bar
34	9110601	Manipulation neck, rasp
35	9110701	Stem impactor
36*	9110702	Stem impactor, cone
37	9110800	Hammer for knock plate 700g
38	9110900	Extractor screw M6
39	9111000	Ball head impactor
40	9111100	Tray set for trial heads
41	9111211	Trial head 28S
42	9111212	Trial head 28M
43	9111213	Trial head 28L
44*	9111214	Trial head 28XL
45	9111221	Trial head 32S
46	9111222	Trial head 32M
47	9111223	Trial head 32L
48	9111224	Trial head 32XL
49	9111231	Trial head 36S
50	9111232	Trial head 36M
51	9111233	Trial head 36L
52	9111234	Trial head 36XL

* Optional

Instruments – storage system



Information:

You can obtain additional information regarding the auxiliary instruments or their use from your representative, your retailer, or directly from the manufacturer.



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