Surgical Technique

smith&nephew

SLR-PLUS◇

For use in US only.

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This document is only for distribution in the United States

Nota Bene

The technique description herein is made available to the healthcare professional to illustrate the authors' suggested treatment for the uncomplicated procedure. In the final analysis, the preferred treatment is that which addresses the needs of the patient.

Indications for the SLR-PLUS◇ stem

The SLR-PLUS Hip Stem is indicated for uncemented use in individuals undergoing primary and revision surgery where other treatments or devices have failed in rehabilitating hips damaged as a result of trauma, inflammatory joint disease such as rheumatoid arthritis, or noninflammatory degenerative joint disease (NIDJD) or any of its composite diagnoses such as osteoarthritis; avascular necrosis; traumatic arthritis; slipped capital epiphysis; fused hip; fracture of the pelvis; diastrophic variant; old, remote osteomyelitis with an extended drainage-free period; nonunion, femoral neck fracture and trochanteric fractures of the proximal femur with head involvement that are unmanageable using other techniques; femoral osteotomy, or Girdlestone resection; fracture dislocation of the hip; and correction of deformity. Smith & Nephew Orthopaedics AG, SLR-PLUS Hip Stems are intended for single use only.

Contraindications for the SLR-PLUS Stem

- Acute or chronic infections, local or systemic
- Severe diseases of the muscles, nerves or blood vessels that put the affected limb at risk.
- Lack of bone substance or poor bone quality which might endanger the stability of the prosthesis.
- Any concomitant condition that can interfere with the function of the implant

Preoperative Planning

The planning of the correct prosthesis size and of the appropriate offset, as well as the neck length are preoperatively established using ap and axial x-ray templates. Preoperative planning should always be carried out for orientation. X-ray templates for the SLR-PLUS standard and the SLR-PLUS lateral revision stem are available with a 15% magnification.

It should be noted, however, that X-Ray templates are not as reliable for determining implant sizing in revision cases as they are in planning for primary implantations and can therefore only provide an approximate estimate of the actual stem size required.

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Usually the cup is inspected first and, if necessary, inserts are removed or alternatively the cup implant is exchanged.

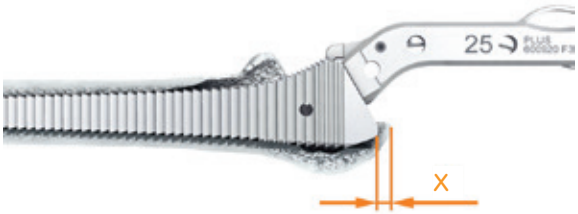
After the removal of the previous implant and of any remaining cement, the canal is prepared to receive the revision device.

It is important to ensure that all of the cement is removed; removal may require an antero-lateral window being made in the femur (Zweymüller, K., Steindl, M., Melmer, T. (2005). «Anterior Windowing of the Femur Diaphysis for Cement Removal in Revision Surgery.» Clin Orthop Rel Res 441, 227–236).

A bony console should be drilled in a closed process with an intramedullary drill so that the rasp cannot take a «false route» when inserted. This also applies to revisions of luxated cementless implants.

The smallest SLR-PLUS◇ rasp should be used to begin with. The offset adapter, which is available in different models, is connected to the appropriate rasp.

Initially, the rasping is conducted manually, using a slap hammer. Later for larger sizes, the rasping machine can be used. It is important to introduce the rasp precisely into the longitudinal axis of the femur to avoid implant positions in varus. The instrument's weight helps in finding the optimal position in the femur canal.



Step-by-step, the implant bed is rasped for the suitable prosthesis sizes using progressively larger rasp sizes.

The shoulder of the rasp corresponds to the height of the implant measured at the shoulder of the prosthesis. This should comply with the preoperatively defined distance to the greater trochanter (if still present).
In most cases, however, the existing proximal osteolysis and the laxity of scar tissue has to be taken into account. To avoid postoperative luxation, the prosthesis should be positioned so as to ensure sufficient soft tissue tension. This can also cause the shoulder of the implant to settle proximal to the original trochanter apex.

The situation may arise that the planned prosthesis size does not correspond to the intraoperatively rasped size. If there is a difference of two or more sizes, the rasp may not have reached the necessary depth due to either being inserted at the wrong angle to the longitudinal axis of the femur or due to an obstacle, such as residues of bone cement or protrusions of bone. In these cases the prosthesis would be too small and cortical anchoring would not be ensured. Residual foreign bodies or bony protrusions could fracture the bone diaphysis. If in doubt, a special x-ray examination should be carried out (image converter).

Once the optimum size and stability of the rasp and its height position are achieved, the offset adapter is removed from the positioned rasp.

Repositioning the trial

The modular neck is manually set onto the broach.

Modular necks are available as “standard” or “lateral” for rasp sizes 1–6 and 7–12.

Care should be taken that the modular neck is correctly seated on the matching surface of the detachable rasp and engages properly.

The trial ball-head is fitted onto the modular neck.

The joint is repositioned and leg length, soft-tissue tension, and range of motion are checked.

If necessary the trial ball-head and/or the modular neck (standard or lateral) are changed until the results are satisfactory. If luxation is still possible even though the lateralized modular neck is used and the rasp is securely seated, check if the next size stem should be used.
This then generally protrudes further proximally out of the femur compared to the smaller size and can therefore lead to leg lengthening. The patient should be made aware of this risk before the surgery.

The use of a retention inlay in the cup, however, can significantly reduce postoperative luxation, even if an SLR-PLUS◇ lateral stem is used. A retention inlay can be used as a matter of routine with a BICON-PLUS◇ cup. It should also be noted that because of the retaining effect of this inlay, resulting in increased luxation resistance, it may in some cases also be possible to use a shorter neck length. This can prevent unintentional leg lengthening.

The modular neck can now be removed from the rasp either manually or with a bone clamp.

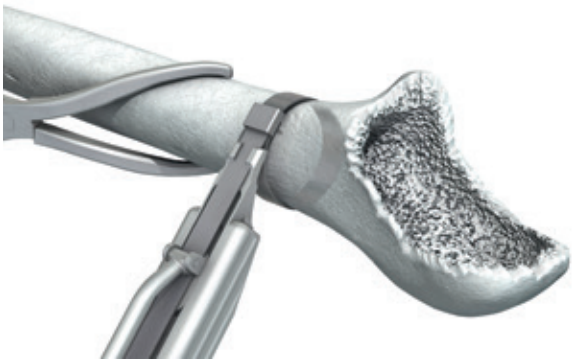
The offset adapter is connected to the rasp. The detachable rasp is removed from the canal using the slap hammer or the rasping machine.

Implantation of the stem

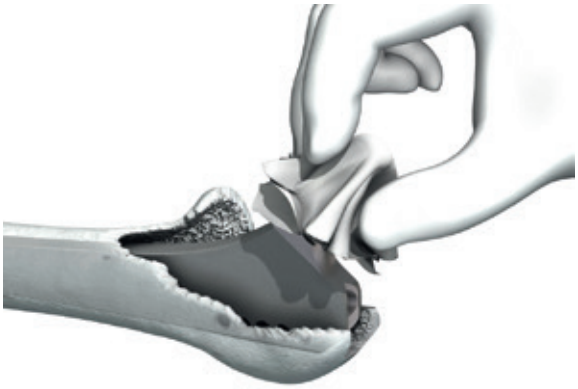
The correct size SLR-PLUS◇ revision stem is introduced manually as deep as possible into the canal, and is then seated with the impactor, using appropriately measured strokes.

During impact, the protective cover remains positioned on the cone.

It is not permitted to impact the stem past the prepared bony bed or to change the prepared rotational alignment. This would inevitably fracture the femur.

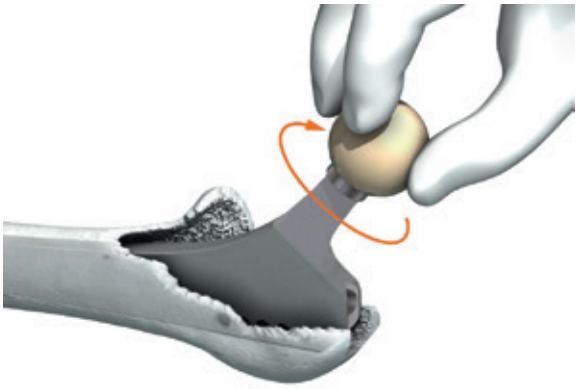


If the intraoperatively determined bone conditions indicate that the femur could fracture, the use of cables is recommended to stabilize the bone before starting the preoperative process with the rasp. This helps to considerably reduce the risk of fracture during bone preparation and when impacting the implant and should therefore, ideally, always be used.



The trial ball-head is then fitted to the cone and a trial reposition is carried out.

Before repositioning the original ball head the stem cone is carefully cleaned by hand.



The ball head is then fitted with slight rotation and finally positioned with the plastic hammer.

If using a metal hammer a plastic part needs to be placed between the ball head and the hammer.

Caution

It is not sufficient to press the stem in only manually.

Standard conus 12/14 for the accommodation of OXIMIUM®, CoCr and ceramic head from Smith & Nephew resp. Smith & Nephew Inc.

Wound Closure

Reposition and check the joint tension and flexibility from all sides. Fit the Redon drains, close the wound, position leg is slight abduction and internal rotation in a foam splint.

Postoperative Treatment

Postoperative treatment should be provided according to the standards in the particular clinic. It should, however, be noted that revision surgery requires individual postoperative treatment, depending on the degree of preoperative bone destruction and the intraoperatively achieved stability of the implant. In some cases the operated hip can be mobilized immediately and be partially load bearing, although mobilization without full load bearing is indicated for some time. During physiotherapy there is also the risk of postoperative luxation of the head out of the cup to be considered, as the stability can be considerably affected by soft tissue defects due to previous surgery.

Explantation of the SLR-PLUS◇ Revision Stem

The SLR-PLUS stem can be removed using the extraction screw M8.

If the stem cannot be removed with the extraction screw, the surgeon can also use the extraction block.

It is important to insert the extraction screw axially.

Dimensions

Specification

Size	Stem length I	Stem length II	M/L width	CCD angle Standard	CCD angle Lateral
1	170	151	30	131	123
2	175	156	32	131	123
3	181	160	33	131	123
4	186	165	34	131	123
5	191	170	35	131	123
6	197	175	37	131	123
7	203	180	38	131	123
8	208	185	40	131	123
9	215	191	42	131	123
10	221	196	44	131	123
11	227	202	45	131	123

Neck Heigth

Size	XS/–3	S/+0	M/+4	L/+8	XL/+12*	XXL/+16**
1	17	19	22	25	27	30
2	18	20	23	25	28	31
3	19	21	23	26	29	31
4	20	22	24	27	29	32
5	20	22	25	28	30	33
6	21	23	26	28	31	34
7	22	24	27	29	32	35
8	23	25	27	30	33	35
9	24	26	28	31	34	36
10	25	27	29	32	35	37
11	26	28	30	33	36	38

Offset

Standard

Size	XS/–3	S/+0	M/+4	L/+8	XL/+12*	XXL/+16**
1	30	32	35	38	41	44
2	31	33	36	39	42	45
3	32	34	37	40	43	46
4	33	35	38	41	44	47
5	34	37	40	43	46	49
6	36	38	41	44	47	50
7	37	39	42	45	48	51
8	38	41	44	47	50	53
9	40	42	45	48	51	54
10	41	43	46	49	53	56
11	43	45	48	51	54	57

Lateral

Size	XS/–3	S/+0	M/+4	L/+8	XL/+12*	XXL/+16**
1	35	37	40	44	47	50
2	36	38	42	45	48	52
3	37	40	43	46	50	53
4	39	41	44	48	51	54
5	40	43	46	49	53	56
6	42	44	47	51	54	57
7	43	46	49	52	56	59
8	45	47	51	54	57	61
9	46	49	52	56	59	62
10	48	51	54	57	61	64
11	50	52	56	59	62	66

Neck Length

Standard

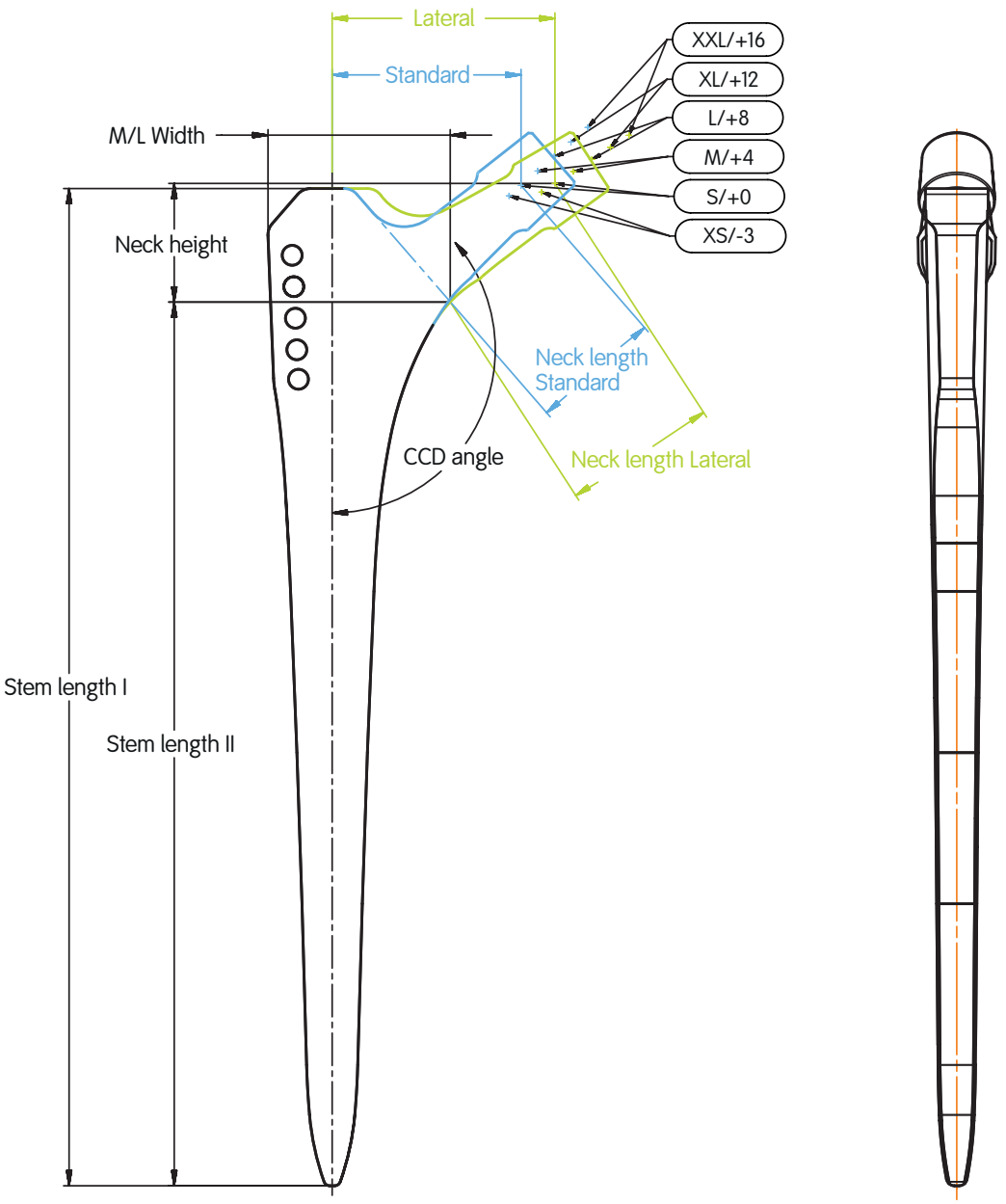
Size	XS/–3	S/+0	M/+4	L/+8	XL/+12*	XXL/+16**
1	19	22	26	30	34	38
2	20	23	27	31	35	39
3	21	23	27	31	35	39
4	22	24	28	32	36	40
5	22	25	29	33	37	41
6	23	26	30	34	38	42
7	24	27	31	35	39	43
8	25	28	32	36	40	44
9	26	29	33	37	41	45
10	27	30	34	38	42	46
11	29	31	35	39	43	47

Lateral

Size	XS/–3	S/+0	M/+4	L/+8	XL/+12*	XXL/+16**
1	22	25	29	33	37	41
2	23	26	30	34	38	42
3	24	27	31	35	39	43
4	25	28	32	36	40	44
5	26	29	33	37	41	45
6	27	30	34	38	42	46
7	28	31	35	39	43	47
8	29	32	36	40	44	48
9	31	33	37	41	45	49
10	32	35	39	43	47	51
11	33	36	40	44	48	52

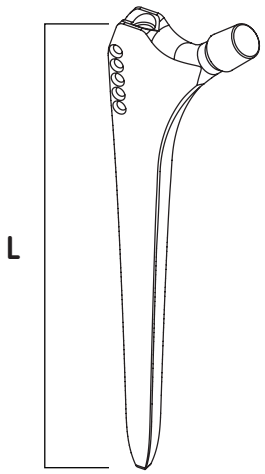
* With Ø 28 mm ball head +12 ≠ XL!

** With Ø 28 mm ball head +16 ≠ XXL!


Lateral
Standard
M/L Width
Neck height
XXL/+16
XL/+12
L/+8
M/+4
S/+0
XS/-3
Neck length
Standard
Neck length Lateral
CCD angle
Stem length I
Stem length II

Standard Implants

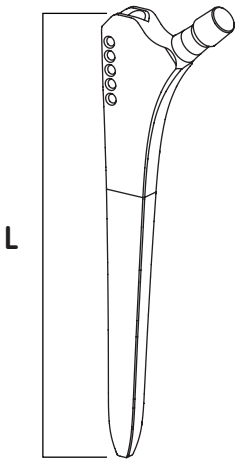
SAP No.	Art. No.	Size	Length (L)
75002794	11801	1	170 mm
75002796	11802	2	175 mm
75002798	11803	3	181 mm
75002800	11804	4	186 mm
75002802	11805	5	191 mm
75002804	11806	6	197 mm
75002806	11807	7	203 mm
75002808	11808	8	209 mm
75002810	11809	9	215 mm
75002812	11810	10	221 mm
75002814	11811	11	227 mm



Sizes 3–11 are also available with Ti/HA coating:

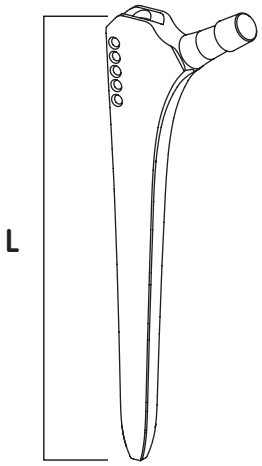
SAP No.	Art. No.	Size	Length (L)
75002816	11863	3	181 mm
75002817	11864	4	186 mm
75002818	11865	5	191 mm
75002819	11866	6	197 mm
75002820	11867	7	203 mm
75002821	11868	8	209 mm
75002822	11869	9	215 mm
75002824	11870	10	221 mm
75002825	11871	11	227 mm

(Not available in the USA and Canada)



Lateral Implants

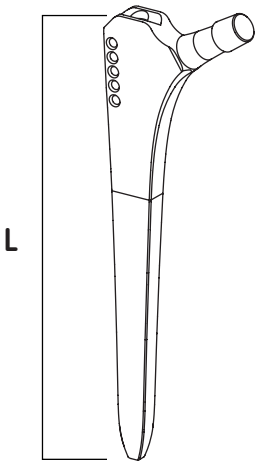
SAP No.	Art. No.	Size	Length (L)
75001926	11000151	1	170 mm
75001927	11000152	2	175 mm
75001928	11000153	3	181 mm
75001929	11000154	4	186 mm
75001930	11000155	5	191 mm
75001931	11000156	6	197 mm
75001932	11000157	7	203 mm
75001933	11000158	8	209 mm
75001934	11000159	9	215 mm
75001935	11000160	10	221 mm
75001936	11000161	11	227 mm



Sizes 3–11 are also available with Ti/HA coating:

SAP No.	Art. No.	Größe	Länge (L)
75000200	11000450	3	181 mm
75000201	11000451	4	186 mm
75000202	11000452	5	191 mm
75000203	11000453	6	197 mm
75000204	11000454	7	203 mm
75000205	11000455	8	209 mm
75000206	11000456	9	215 mm
75000207	11000457	10	221 mm
75000208	11000458	11	227 mm

(Not available in the USA and Canada)



Instrumentation

SL/SLR-PLUS® Basic Case Trial Rasp

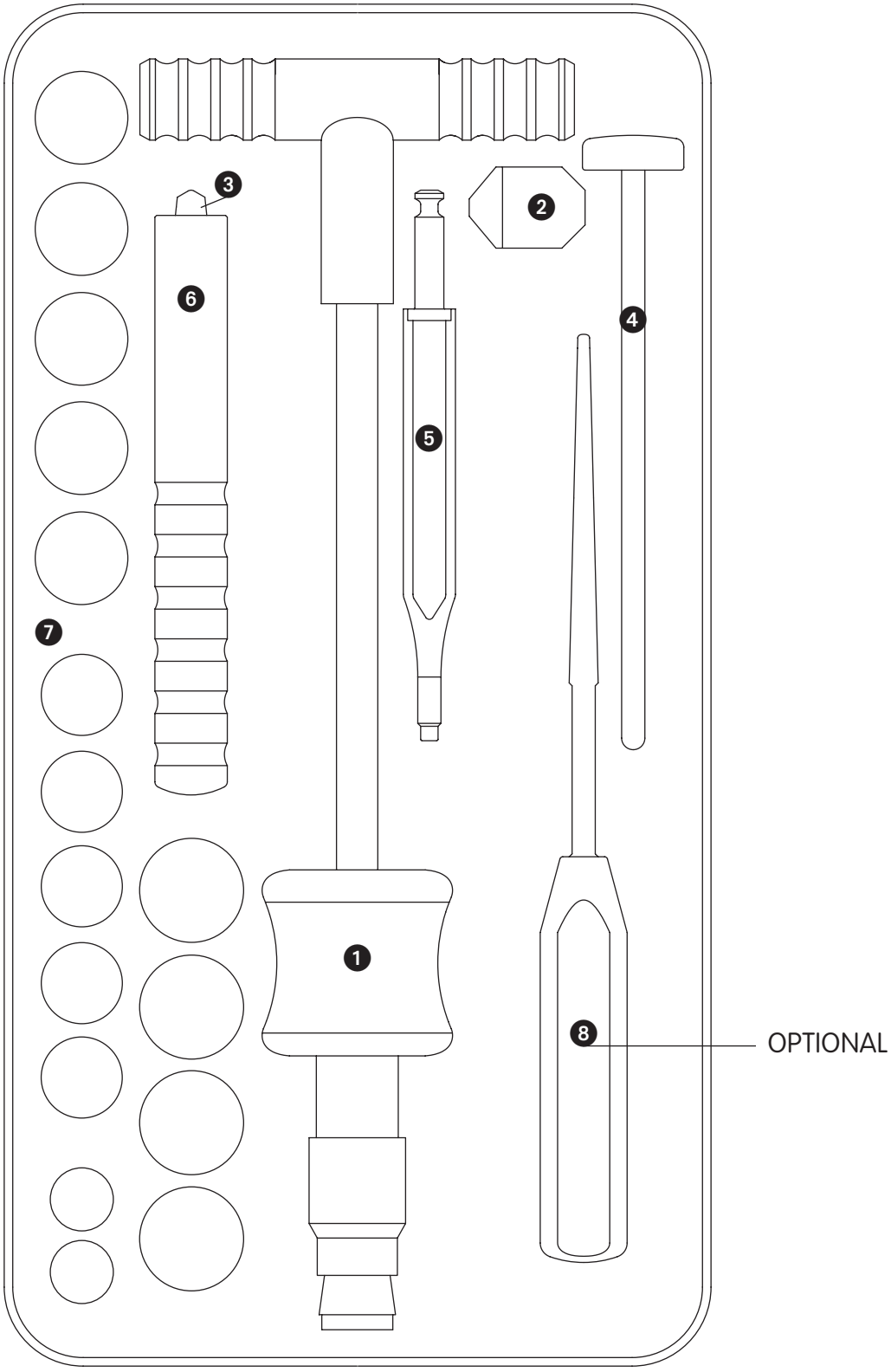
Set. No. SAP/Art. No.
75200142/0942000

	SAP No.	Art. No.	Description		
	75002198	**110450**	**Case Basic Instruments**		
	75007661	990019	Easy Tray Lid		
1	75002319	110901	Slap Hammer		
2	75002320	110902	Extraction block		
3	75002321	110903	Impactor		
4	75002322	110904	Box Chisel		
5	75002325	110911	Extraction screw M8		
6	75002160	110242	Head Impactor		
7	75100839*	75100839	Trial Femoral Head	22	S/+0
	75100840	75100840	Trial Femoral Head	22	M/+4
	75100841	75100841	Trial Femoral Head	22	L/+8
	75100842*	75100842	Trial Femoral Head	22	XL/+12
	75100843*	75100843	Trial Femoral Head	28	XS/-3
	75100844	75100844	Trial Femoral Head	28	S/+0
	75100845	75100845	Trial Femoral Head	28	M/+4
	75100846	75100846	Trial Femoral Head	28	L/+8
	75100847	75100847	Trial Femoral Head	28	XL/+12
	75100848	75100848	Trial Femoral Head	28	XXL/+16
	75100849*	75100849	Trial Femoral Head	32	XS/-3
	75100850	75100850	Trial Femoral Head	32	S/+0
	75100851	75100851	Trial Femoral Head	32	M/+4
	75100852	75100852	Trial Femoral Head	32	L/+8
	75100853	75100853	Trial Femoral Head	32	XL/+12
	75100854	75100854	Trial Femoral Head	32	XXL/+16
	75100855*	75100855	Trial Femoral Head	36	XS/-3
	75100856	75100856	Trial Femoral Head	36	S/+0
	75100857	75100857	Trial Femoral Head	36	M/+4
	75100858	75100858	Trial Femoral Head	36	L/+8
	75100859	75100859	Trial Femoral Head	36	XL/+12

* special size (optional)

Optional:

	Art. No.	SAP No.	Description	
	75210292	75210292	SET 40 mm Trial Femoral Heads	XS/-4 to L/+8
	75210293	75210293	SET 44 mm Trial Femoral Heads	XS/-4 to L/+8
8	75004495	21000138	Curved Rasp	
	75007254	600620	MIS Offset Box Chisel (instead of 110904)	


1
2
3
4
5
6
7
8
OPTIONAL

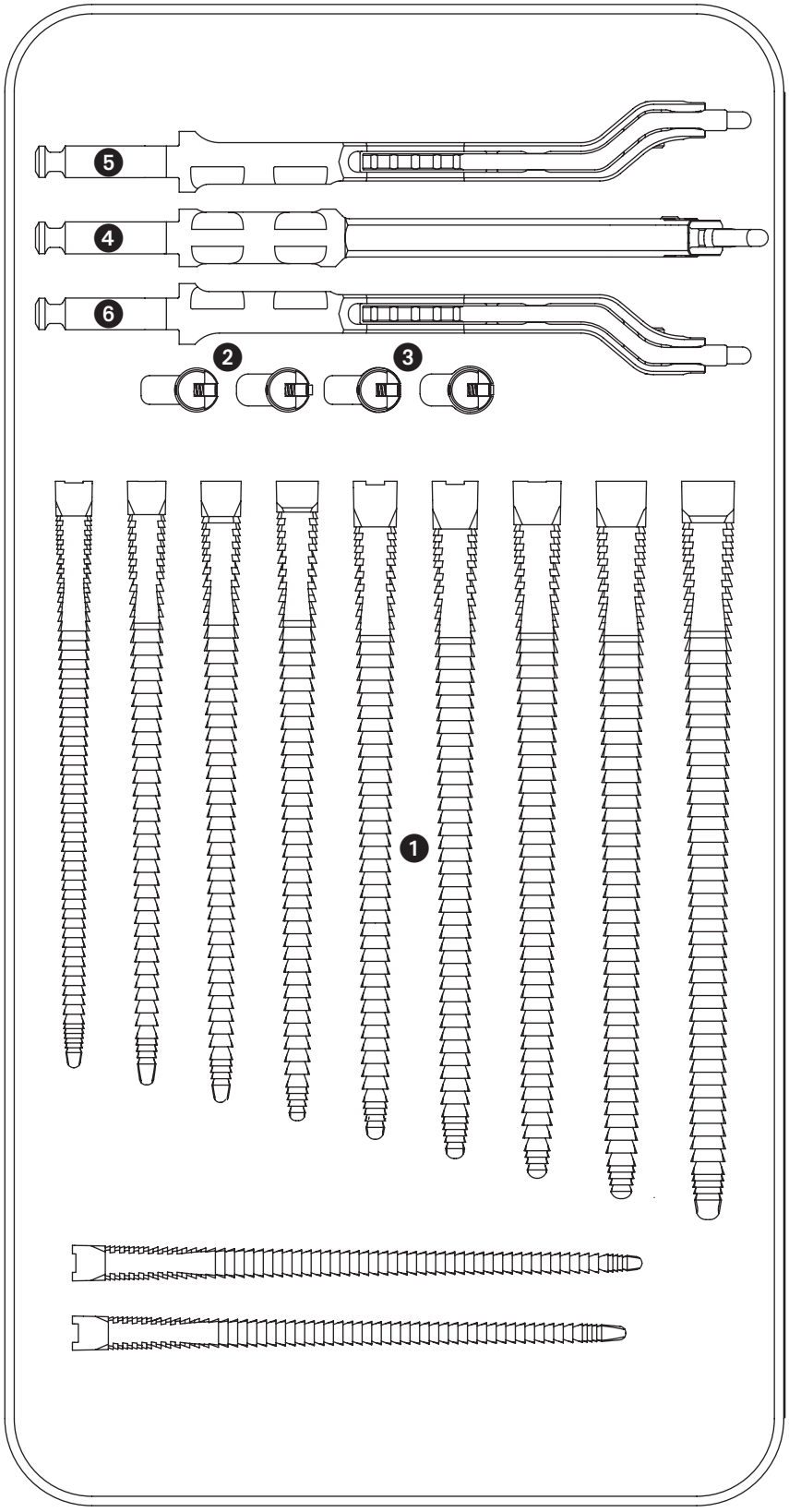
SLR-PLUS◇ Trial Broaches with Adapter 10 mm

Set. No. SAP/Art. No.
75200150/0942015

	SAP No.	Art. No.	Description
		21000569	**Case Instruments**
	75007661	990019	Easy Tray Lid
	75017269	21000558	Trial Rasp 1
❶	75017270	21000559	Trial Rasp 2
	75017271	21000560	Trial Rasp 3
	75017272	21000561	Trial Rasp 4
	75017273	21000562	Trial Rasp 5
	75017274	21000563	Trial Rasp 6
	75017275	21000564	Trial Rasp 7
	75017276	21000565	Trial Rasp 8
	75017277	21000566	Trial Rasp 9
	75017278	21000567	Trial Rasp 10
	75017279	21000568	Trial Rasp 11
❷	75004604	21000254	Modular neck Standard 1–6
	75004605	21000255	Modular neck Standard 7–12
❸	75004606	21000256	Modular neck Lateral 1–6
	75004607	21000257	Modular neck Lateral 7–12
❹	75007309	600922	Adapter 10 mm

Optional:

	SAP No.	Art. No.	Description
❺	75007310	600923	Double Offset Adapter left 17/13 mm (Set No. SAP 75200171) (Set No. 0942159)
❻	75007311	600924	Double Offset Adapter right 17/13 mm (Set No. SAP 75200171) (Set No. 0942159)
	75007307	600920	Adapter 25 mm (Set. No. SAP: 75200840) (Set. No.: 0942017)
	75007308	600921	Adapter 40 mm (Set. Nr. SAP: 75200841) (Set. No.: 0942018)


5
4
6
2
3
1

Sterilization

Implants

All the implants described in this surgical technique are supplied by the manufacturer in a sterile condition. Resterilization is not allowed.

Instruments

The system instruments are non-sterile when delivered. Before use, they must be cleaned by the usual methods in accordance with hospital regulations and sterilized in an autoclave in accordance with the national legal regulations and recommendations. (For detailed information please refer to the leaflet Lit. No. 1363.)

For correct settings, refer to the user instructions issued by the autoclave manufacturer. Instrument manufacturers and dealers do not accept any responsibility for the sterilization of products by the customer.

Manufacturer
Smith & Nephew Orthopaedics AG
Oberneuhofstrasse 10d
6340 Baar
Switzerland

Contact

Lit. No. 02085-us (1751) V1 Ed. 04/14 only for use in the US.

CE 0123