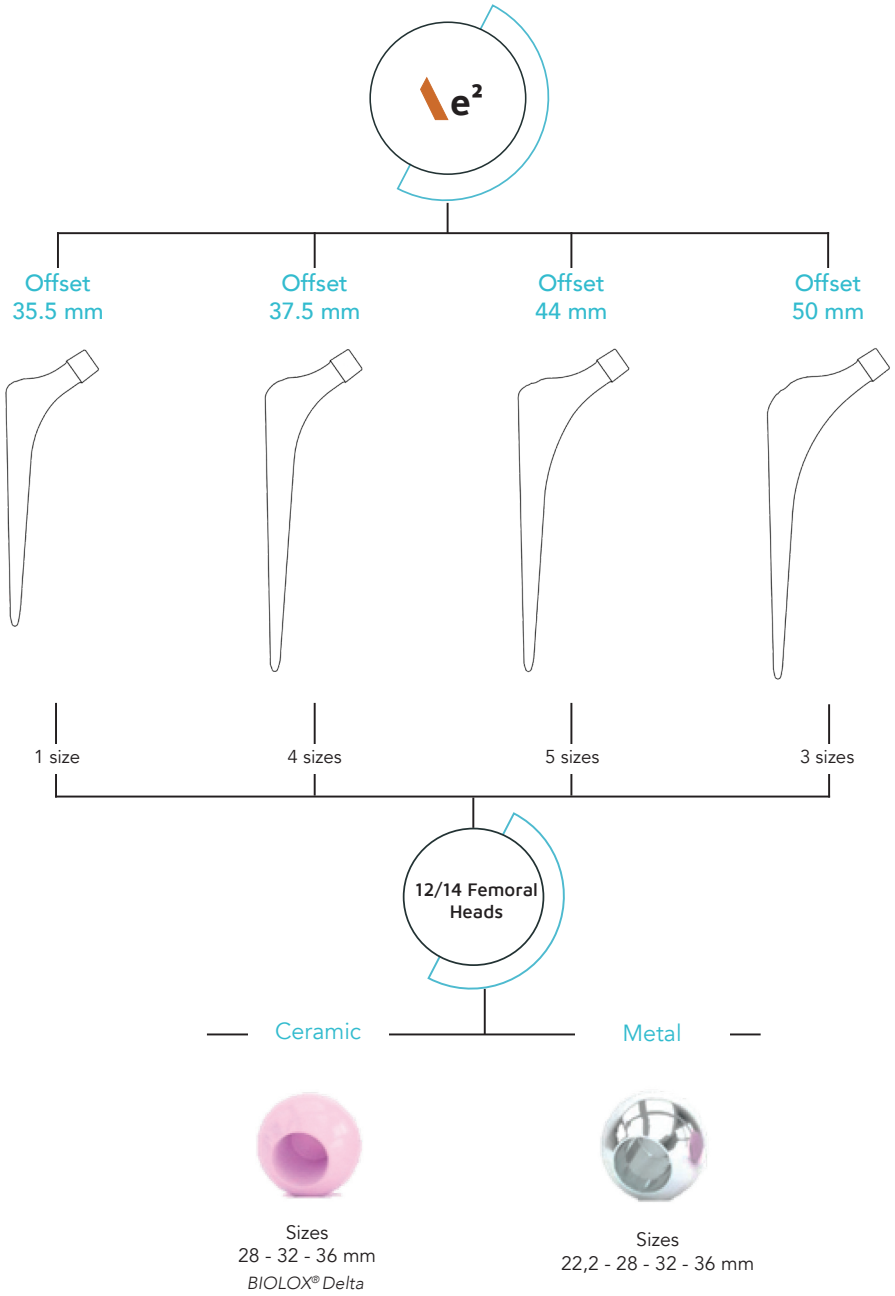
e²

amplitude

Surgical Technique

Summary

Concept and range

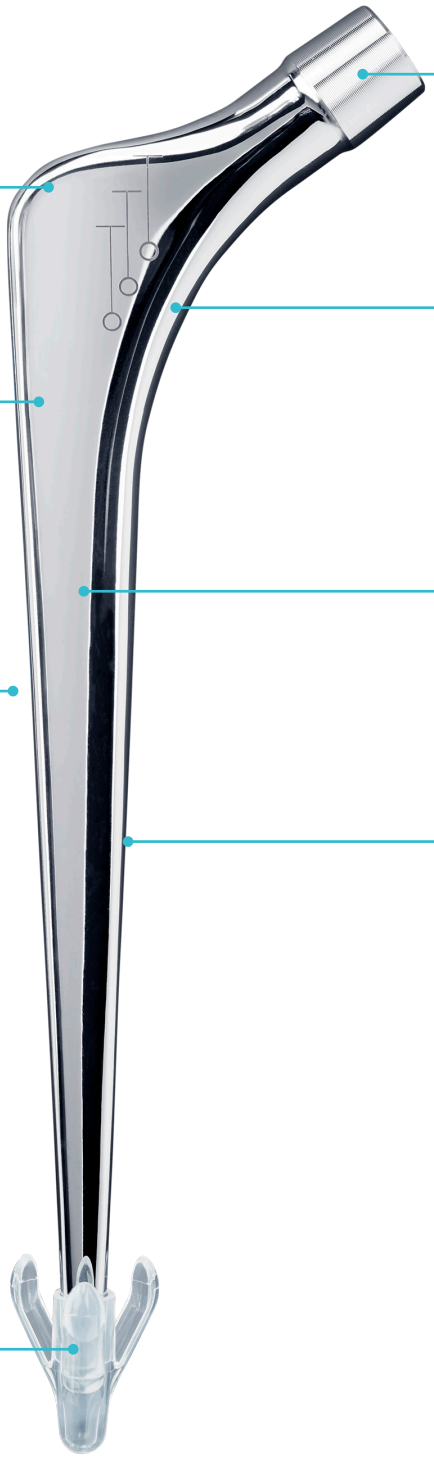


Size	0	1	2	3	4
Offset		35.5mm			
	37.5mm	37.5mm	37.5mm	37.5mm	
	44 mm	44 mm	44 mm	44 mm	44 mm
		50 mm	50 mm	50 mm	

Concept and range

Straight «taper-slip» femoral stem

UP TO 4 OFFSETS AVAILABLE
(DEPENDING ON SIZE)
35,5 mm - 50 mm



12/14 taper
with short taper

Rounded shoulder
Ease of insertion on without greater-trochanter disruption

125° CCD angle
constant throughout the range

Highly polished
Surface roughness and finish preserves the cement mantle and anchorage

Quadrangular cross-section

Cement mantle
2-3 mm

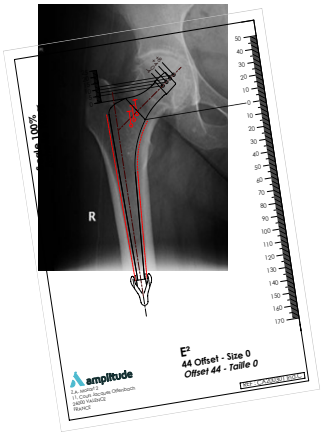
Double tapered
Uniform cement mantle loading, transforms shear stress into compressive loading

PMMA distal centralizer
Allows subsidence of the stem in the centralizer to avoid «point loading» on the cement mantle and ensure central positionning within the canal

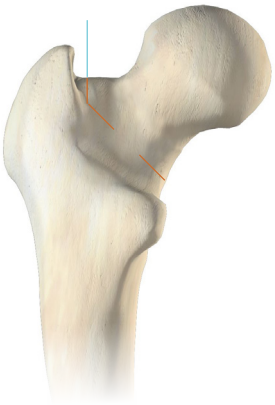
Material:
Stainless Steel (M30NW)

Surgical technique overview

1 Pre-operative planning



2 Femoral neck resection



3 Femoral canal preparation

4 Broaching

Surgical technique overview

5 Trials on broach

6 Cement restrictor insertion

7 Final stem insertion

8 Final head impaction and final reduction

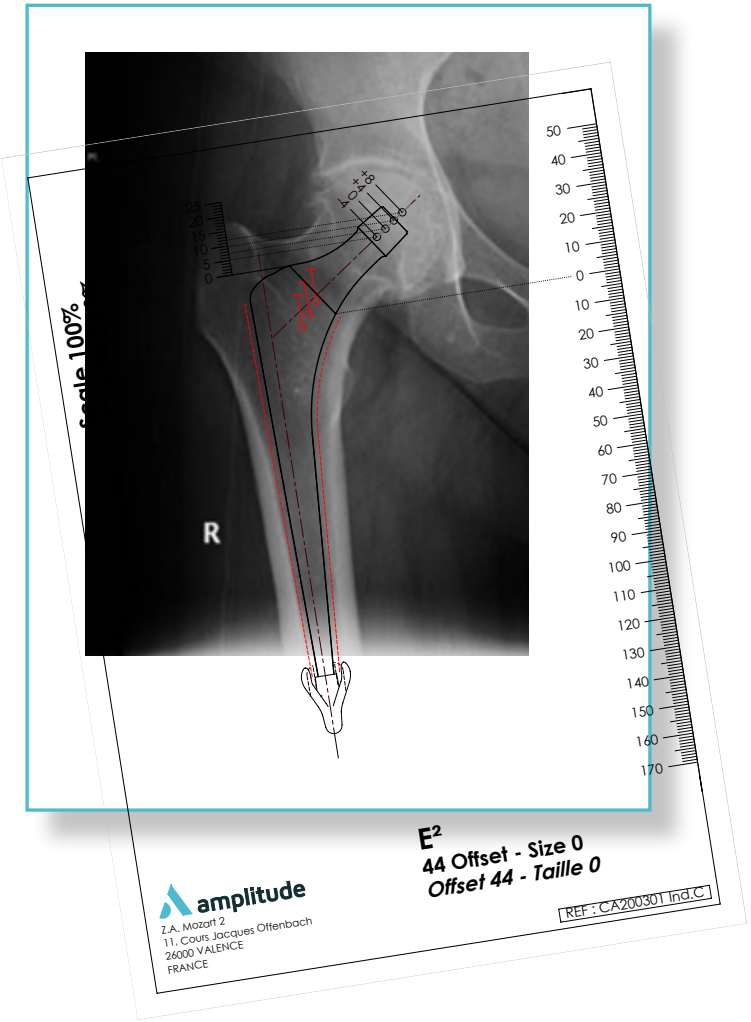
1 Pre-operative planning

The E² femoral stem range offers up to 4 offsets per size, allowing extra-medullary adjustment for preservation of leg length and femoral offset management. It is recommended to select the version that best restores patients anatomy and ensures joint stability.

Implant position: Preferably, template with a medium neck length so it can be adjusted if necessary during surgery during trials. If the operated side presents important deformity, template the opposite normal side. Stem positionning must allow the best restoration of leg length and femoral offset. Height level can be measured using a reliable bone landmark.

Size evaluation: Due to the stem cemented design, the implant size must be estimated by taking into account the minimum size of the cement mantle. This thickness is represented by a red dotted line on the template.

Femoral resection level: Due to its uncollared cemented design, the E² stem provides a large degree of liberty for the neck resection level. The three laser markings on the stem can be used as landmarks to reproduce the insertion level based on the planning, depending on the resection level. The heigth of the stem can be freely adjusted to manage the lower limb length.



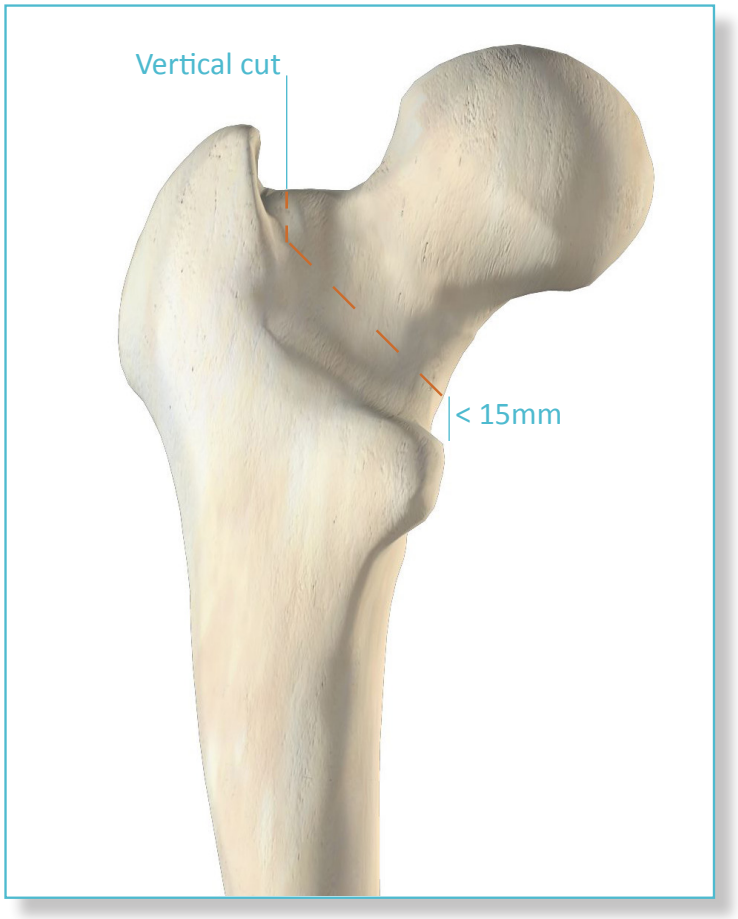
REMINDER

The purpose of this surgical technique description is to provide instructions on how to use the instrumentation properly. The surgeon is fully responsible for choosing and performing the approach and surgical technique.

NOTE

Templates are provided at 115% scale. Other magnifications and digital templates are available on request.

2 Femoral neck resection



The femoral neck resection level, as templated, is identified thanks to the anatomical landmarks (greater trochanter, lesser trochanter, trochanteric fossae).

As the implant is uncollared and cemented, the resection height and the resection angle can be performed with a degree of freedom (compared to a cementless stem design). Care must however be taken to provide enough proximal support for the implant.

Medullary canal preparation can precede or follow the acetabulum preparation step.

The neck can be cut before or after the femoral head dislocation. Start by hollowing the femoral neck from its cancellous bone.

It is advised to carefully prepare the upper-external part of the neck to avoid varus stem positionning.

3 Femoral canal preparation

Figure A

Figure B

Canal opening

In order to help ensure adequate orientation of the stem, lateral bias during implant preparation is preferred.

Retraction of the gluteus medius and removal of the lateral cortical bone at the piriformis insertion will allow true axial introduction of the instruments and implant. Use the box chisel (Figure A) to start preparing the metaphyseal area by removing cortical bone, passing close to the medial side of the greater trochanter at its junction with the neck.

Canal preparation

Reaming of the femoral canal is performed with at least the small reamer in order to determine the broaching axis.

Assemble the reamer with the T-handle. Push the assembly down into the femoral canal, staying in the femoral shaft axis (Figure B). If needed, repeat this step with the larger reamer.

A proximal reamer set is available on request.

If distal reamers (not provided) are used, it is recommended to ream with a smaller size for the distal part than for the proximal part.

4 Broaching

Assemble the smallest broach corresponding to the planned offset on the broach handle.

Insert the broaches into the femoral canal axis determined by the tapered pin reamer, by increasing size.

If introduction of the broach requires excessive force, remove the instrument and repeat reaming with the tapered pin reamer to enlarge the femoral canal.

It is primordial to avoid removing too much trabecular bone.

IMPORTANT

The broach has three holes in its proximal part, corresponding to the marks on the definitive stem. All three holes must not be left proud of the femur to ensure sufficient proximal support.

NOTE

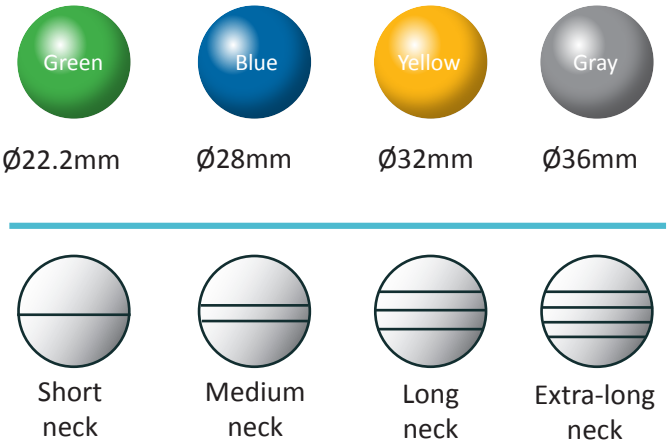
All broaches are slightly longer than the corresponding stem size, in order to accommodate placement of the stem Distal Centralizer.

5 Trials on broach

Leave the last broach used in the femur and disassemble the broach handle.

Assemble the trial femoral neck on the broach.

Select and place a trial head of desired length and diameter onto the neck:



Reduce the joint using the head impactor. Perform stability and range of motion trials, and check leg length to validate the extramedullary settings.

If range of motion or articular stability are not satisfactory, retrial with a different neck length. If trials are still unsatisfactory, consider a broach with a different offset.

In case of excessive leg length, the broach may be impacted further into the femur in order to reach proper leg length. If necessary, use a smaller broach.

In case of shortened leg length, the broach can be left a little more proud in the femur. If broach stability is no longer satisfactory, use a larger size.

Repeat the trials until the configuration that provides the best results has been validated. Mark the height of the stem with the electric scalpel on the bone to reproduce the same insertion level with the stem, with the help of the three circular marks. Remove the trial head and extract the broach from the femur with the broach handle.

6 Cement restrictor insertion

Wash and dry the intramedullar femoral cavity. Femoral canal obturation should be performed according to the surgeon's habits. The AMPLITUDE range offers the TEKSTOP®, absorbable cement restrictor, and a one-size non-absorbable UHMWPE cement restrictor.

Introduce the cement restrictor depending on the model used:

TEKSTOP®:

Based on femoral canal preparation, determine in the instrumentation the adequate trial "olive" diameter and assemble it on the handle by threading it completely 1.

Tighten the holding screw on the body of the inserter 2.

Compare the length with the validated broach by using a landmark that can be used to determine adequate insertion depth.

Insert in the femoral canal until determined depth is reached to assess the diameter. Repeat trials until diameter has been validated. Remove the trial "olive" by unthreading it.

Choose the TEKSTOP® restrictor of the same size as the validated trial "olive", assemble it on the inserter, and insert it in the femoral canal.

Unthread the holding screw 3 and pull the handle to leave the TEKSTOP® restrictor in place 4

Non-absorbable cement restrictor:

Assemble the non-absorbable restrictor on the introducer.

The graduation on the inserter indicates insertion depth. Compare with the validated broach by using a landmark that can be used to determine adequate insertion depth. Add 1cm to ensure positionning well below the centralizer.

Insert in the femoral canal until determined depth is reached.

Remove the inserter to leave the restrictor in place.

6 Final stem insertion

Prepare the cement following instructions of the manufacturer, and inject it into the femoral canal, making sure pressurization is continued throughout the process.

Assemble the inserter and the stem by pulling the trigger of the inserter and inserting its extremity into the stem's threaded hole. Release the trigger to engage the holding mechanism and ensure prehension of the stem.

Place the distal centralizer (narrow or wide) on the distal extremity of the stem and hold it (centralizer is not retentive).

Introduce the stem in the cemented medullary canal, closer to the posterior cortex than to the anterior.

While inserting the stem, occlude the anterior femoral canal to apply more pressure to the cement, limit air bubbles inclusion and assist correct alignment.

Insertion must be quick until the stem almost reaches its final position, and then slow to ensure proper positioning (align markings on the stem with the markings made with electric scalpel during broach trials).

Disassemble the stem from the inserter by pulling the trigger of the instrument and remove excess of
cement.

If necessary, trials can be done once more with trial heads on the stem taper.

7 Final head impaction

Select final femoral head that matches settings validated during trials.

Before placing the head on the femoral stem:

- Conscientiously rince and dry the stem taper,
- Carefully inspect the stem taper and the head taper, and remove any foreign body.

Manually place the head on the stem taper by gently twisting it while pushing along the taper axis, until it firmly wedges.
Secure the head on the stem taper using the head impactor to impact the head with a slight hammer blow in the taper axis.

Reduce the joint.

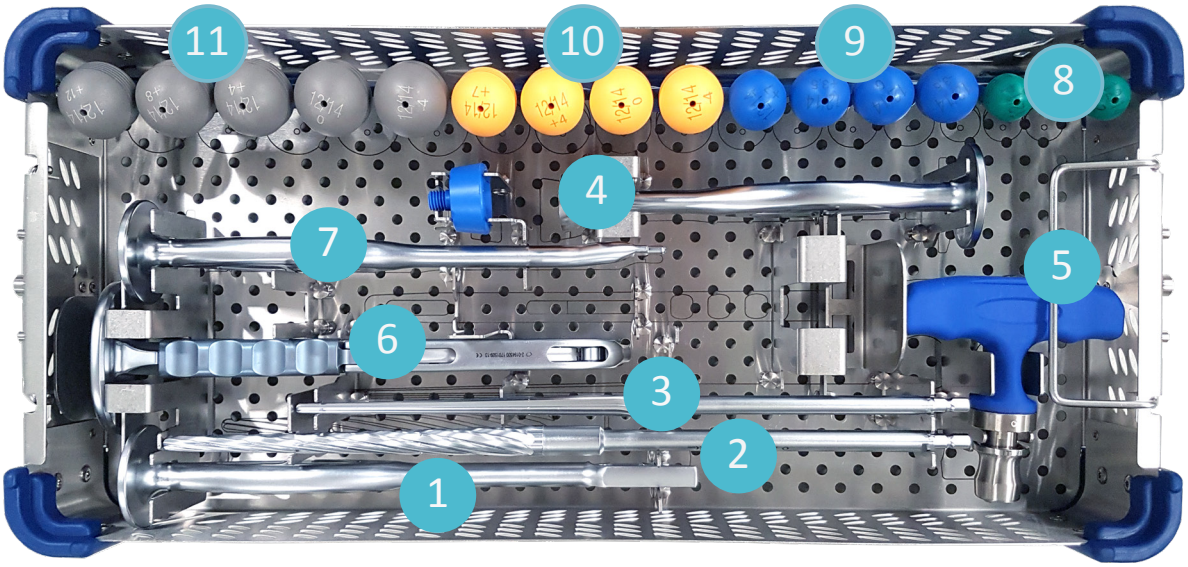
8 Implant extraction (optional)

Implant extraction can be performed with the universal stem extractor (2-0199974), available on request. Its use is described in surgical technique TO.H.022.

A cement extraction set is also available on request.

Instrumentation

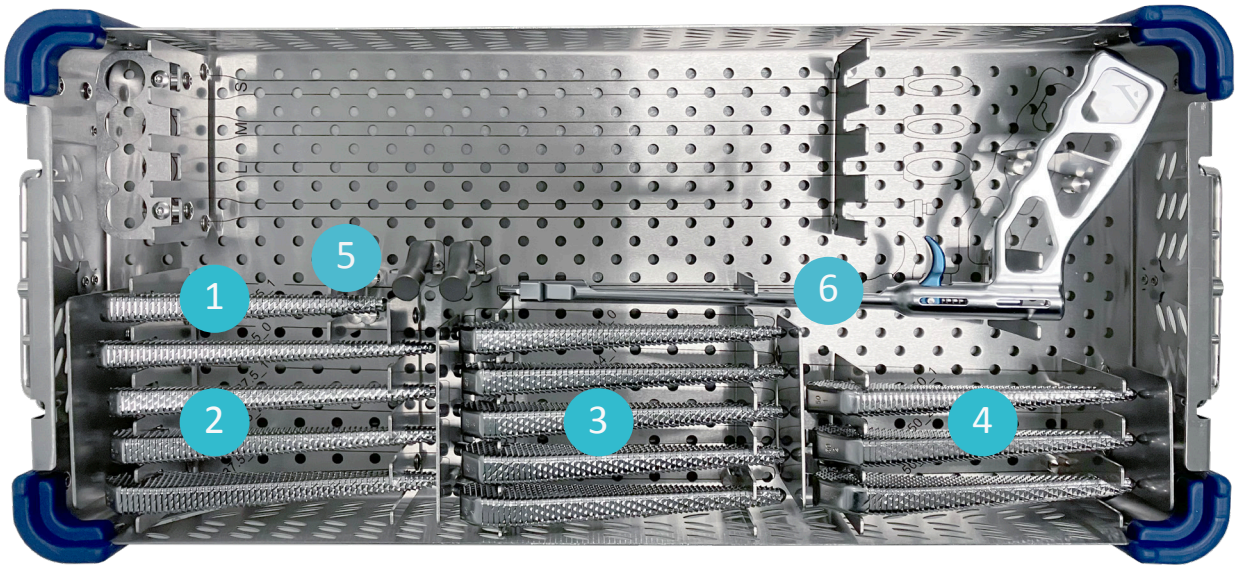
Common base



Rep	Designation	Reference	Qty
1	Box chisel Medium size	112-042-038	1
2	Tapered Pin Reamer 4/11 mm - Zimmer/Hall connection	2-0193200	1
3	Tapered Pin Reamer 7/14 mm - Zimmer/Hall connection	2-0193300	1
4	Head impactor	112-042-045	1
5	T handle - Zimmer/Hall connection	2-0192300	1
6	Straight male broach handle conventional	2-0194500	2
7	Offset Stem Impactor	2-0194200	1
8	Trial femoral head 12/14 on stem Ø22.2 Short, Medium and Long Neck	2-0196104 to 2-0196106	1 each
9	Trial femoral head 12/14 on stem Ø28 Short, Medium, Long and Extra-Long Neck	2-0196101 to 2-0196103 2-0196113	1 each
10	Trial femoral head 12/14 on stem Ø32 Short, Medium, Long and Extra-Long Neck	2-0196107 to 2-0196109 2-0196114	1 each
11	Trial femoral head 12/14 on stem Ø36 Short, Medium, Long and Extra-Long Neck	2-0196110 to 2-0196112 2-0196116	1 each

Instrumentation

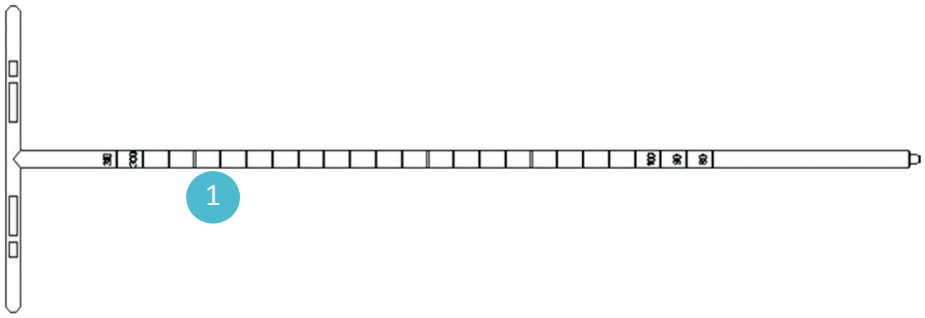
E² set



Rep	Designation	Reference	Qty
1	Male broach for E² femoral stem - Offset 35.5 mm - Size 1	2-0192001	1
2	Male broach for E² femoral stem - Offset 37.5 mm - Size 0 to 3	2-0192002 to 2-0192005	1 each
3	Male broach for E² femoral stem - Offset 44 mm - Size 0 to 4	2-0192006 to 2-0192010	1 each
4	Male broach for E² femoral stem - Offset 50 mm - Size 0 to 3	2-0192011 to 2-0192013	1 each
5	E² Trial Neck	2-0180700	2
6	Trigger Stem Inserter	2-0107900	1

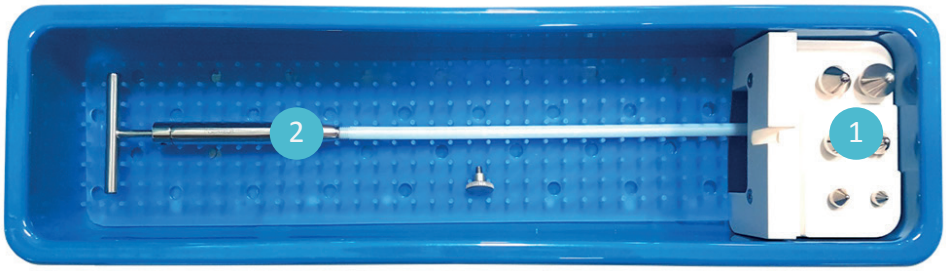
Instrumentation

Non-absorbable cement restrictor instrument set



Rep	Designation	Reference	Qty
1	Inserter for cement restrictor	2-0103400	1

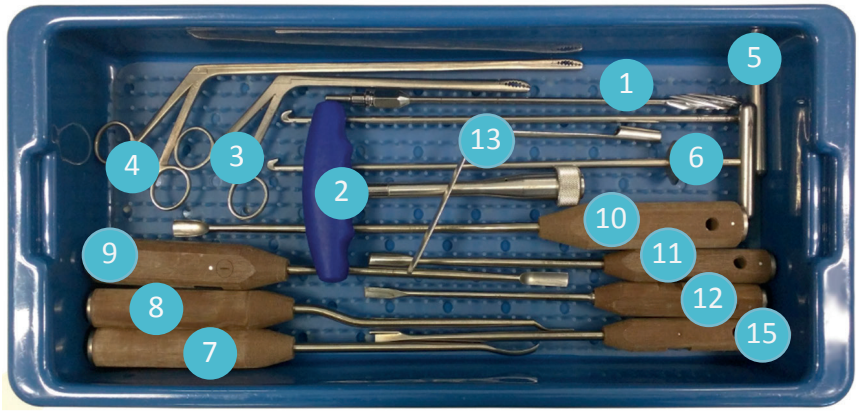
TEKSTOP® cement restrictor instrument set



Rep	Designation	Reference	Qty
1	Trial Olive - 8 mm diameter	T067702	1
1	Trial Olive - 10 mm diameter	T067703	1
1	Trial Olive - 12 mm diameter	T067704	1
1	Trial Olive - 14 mm diameter	T067705	1
1	Trial Olive - 16 mm diameter	T067706	1
1	Trial Olive - 18 mm diameter	T067707	1
2	Restrictor inserter	T067701	1

Instrumentation

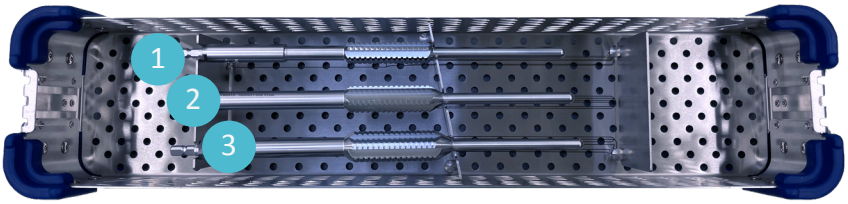
Cement extraction set



Rep	Designation	Reference	Qty
1	Manual Reamer 7 mm for Handle 3.40.550	3-40 252	1
1	Manual Reamer 8 mm for Handle 3.40.550	3-40 253	1
1	Manual Reamer 9 mm for Handle 3.40.550	3-40 254	1
1	Manual Reamer 10 mm for Handle 3.40.550	3-40 255	1
1	Manual Reamer 11 mm for Handle 3.40.550	3-40 256	1
1	Manual Reamer 12 mm for Handle 3.40.550	3-40 257	1
1	Manual Reamer 13 mm for Handle 3.40.550	3-40 258	1
1	Manual Reamer 14 mm for Handle 3.40.550	3-40 259	1
2	Quick Release Handle	58-02-4008	1
3	Cement Pincer - Short	3-30-542	1
4	Cement Pincer - Long	3-30-543	1
5	Cement Extraction Curette	3-30-318	1
6	Cement Extraction Curette - 10mm	3-30-319	1
7	Cement Extracting Chisel NEG9 mm Lg 340 mm	3-30-312	1
8	Cement Extracting Chisel NEG9mm L290mm	3-30-309	1
9	Cement Extracting Chisel POS9mm L340mm	3-30-313	1
10	Cement Extracting Chisel NEG11,5mm L400 mm	3-30-314	1
11	Lexer Chisel 8mm L280mm	3-30-304	1
12	Cup Removal Chisel 7.5 L310mm	3-30-316	1
13	Spiraled Drill Bit Guide 6 mm	3-30-131	1
14	Spiraled Drill Bit 6 mm	3-40-297	1
15	Cement Spliting Blade 5mm L280mm	3-30-307	1

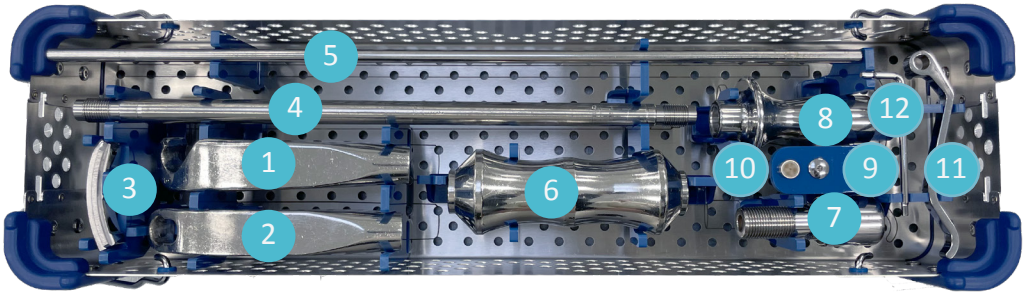
Instrumentation

Proximal reamers set (option)



Rep	Designation	Reference	Qty
1	Proximal Straight Reamer Ø15 - Zimmer/Hall connection	2-0194415	1
2	Proximal Straight Reamer Ø18 - Zimmer/Hall connection	2-0194418	1
3	Proximal Straight Reamer Ø21 - Zimmer/Hall connection	2-0194421	1

Universal stem extractor set



Rep	Designation	Reference	Qty
1	Hook for monoblock head	1001.2.5.3.AU/AU2	1
2	Hook for modular head	1001.2.6 S/S2	1
3	Sliding spacer U	1001.2.04.U	1
4	Guiding tube	1001.2.17.ST	1
5	Pressure rod	1001.2.15.ST	1
6	Striking weight	1001.2.09.N	1
7	Jamcase ST	001.2.12.2.ST	1
8	Handpiece ST	1001.2.11.1.ST	1
9	Pin screw	1001.2.13.2	1
10	Bolt with plastic input	1001.2.7	1
11	Lever	1001.2.14	1
12	H3 Wrench	2-0199400	1

NOTES

NOTES

TO.H.011/EN/A

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