



Zimmer MMC™ Cup

Surgical Technique



Large Diameter Metal-on-Metal



Disclaimer

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**Surgical Technique
Zimmer MMC Cup**

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General Description of the Implant

The *Zimmer MMC Cup* (Fig. 1) is a monoblock acetabular solution that is intended to be used in conjunction with *Metasul® LDH®* Large Diameter Heads. The acetabular component is intended to be used without bone cement. Primary fixation is achieved by under-reaming the acetabulum to achieve a press fit. The external surfaces of the cup include paired fins which provide supplemental fixation and a titanium vacuum plasma spray coating (Ti-VPS) to create a scratch fit. The combination of technology and design features makes the *Zimmer MMC Cup* in combination with *Metasul LDH* Large Diameter Head a solution for numerous patients.



Fig. 1 *Zimmer MMC Cup*

Overview of Implant Sizing

The true external diameter (including the coating) (Fig. 2) of the *Zimmer MMC* Cup component corresponds directly to the labeled size. Surgical judgment is required to assess appropriate reaming, in order to achieve an optimal press-fit. Optimal press-fit will be achieved by meticulous acetabular bone preparation and accurate implant placement.

Note: The *Zimmer MMC* Cup is a full hemisphere, and adequate bone stock is necessary for a press-fit application.

Note: The cups are labeled with their actual diameter, i.e. a cup size 56mm/48mm Code N has an outside dimension of 56mm (Fig. 3). An implant sized 2mm over the reamed preparation (size of last reamer used) will thus provide a true 2mm press-fit. A 1mm press-fit may be desired with hard bone.

The height of the trial cups corresponds to the appropriate implant, i.e.: 54mm and 55mm trials are of the same height as the 56mm implant. This allows the surgeon to accurately assess the depth and orientation of the final implant based on the trial position. We recommend careful trial placement to assess for adequate bone preparation. When inserting the actual implant, the previous position of the trial provides important visual cues to the surgeon that the final implant is fully seated in the desired position.

The inner diameter of the *Zimmer MMC* Cup component corresponds to the appropriate femoral component. A letter code allows confirmation of the appropriate combination. For example, a 56mm/48mm Code N *Zimmer MMC* Cup must be used with a 48N *Metasul* Large Diameter Head.

For further combination options please refer to www.productcompatibility.zimmer.com.

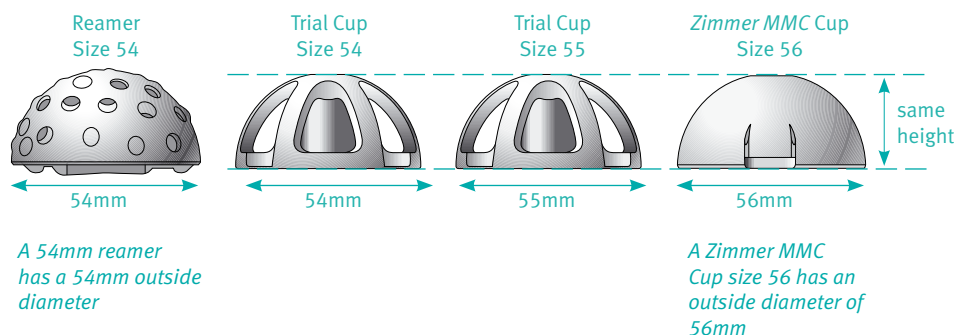


Fig. 2 Overview of reamer, trial and cup

Zimmer MMC Cup and Matching Femoral Component Sizing Guide



Zimmer MMC Cup			Code	Matching Femoral Component	
Size	Outer Ø	Inner Ø		Size	Outer Ø
46	46mm	38mm	D	38	38mm
48	48mm	40mm	F	40	40mm
50	50mm	42mm	H	42	42mm
52	52mm	44mm	J	44	44mm
54	54mm	46mm	L	46	46mm
56	56mm	48mm	N	48	48mm
58	58mm	50mm	P	50	50mm
60	60mm	52mm	R	52	52mm
62	62mm	54mm	T	54	54mm
64	64mm	56mm	V	56	56mm
66	66mm	58mm	X	58	58mm
68	68mm	60mm	Z	60	60mm

Each size pair is designated with a suffix letter which is also marked on all the instrumentation and implant packaging for safety and ease of use.

Fig. 3 Sizing guide matrix

Important Information Regarding *Metasul* Metal Pairings

Cup systems intended for *Metasul* pairings may only be paired with the corresponding *Metasul* Heads provided for this purpose. The operating surgeon

must always make sure that the chosen cup and head match each other in accordance with this requirement.

Patient Selection

The *Zimmer MMC* Cup may be used for a wide variety of indications and is most appropriate for patients with good bone quality and adequate acetabular bone stock.

Indications for Use

- Noninflammatory degenerative joint disease (NIDJD), e.g., avascular necrosis, osteoarthritis, and inflammatory joint disease (IJD), e.g., rheumatoid arthritis.
- Failed previous surgery where pain, deformity, or dysfunction persists.
- Revision of previously failed hip arthroplasty.
- Total hip replacements may be considered for younger patients if any unequivocal indication outweighs the risks associated with the age of the patient and modified demands regarding activity and hip joint loading are assured. This includes severely handicapped patients with multiple joint involvement, for whom an immediate need of hip mobility leads to an expectation of significant improvement in the quality of their lives.

Contraindications

- Patient's physical conditions that would eliminate or tend to eliminate adequate implant support or prevent the use of an appropriately sized implant, e.g., previous surgery, insufficient quality or quantity of bone resulting from conditions such as cancer or congenital dislocation, metabolic bone disease of the upper femur or pelvis, femoral osteotomy revision, girdlestone revision, osteoporosis, osteomyelitis, neuromuscular compromise or vascular deficiency in the affected limb in sufficient degree to render the procedure unjustifiable (e.g., absence of musculoligamentous supporting structures, joint neuropathy) or other conditions that may lead to inadequate skeletal fixation.
- Active infection of the hip, old or remote infection. This may be an absolute or relative contraindication.
- Allergy to the implanted material, above all to metal (e.g., cobalt, chromium, nickel, etc.).
- Kidney insufficiency: In spite of the fact that there is no currently known causal relationship with increased serum cobalt and serum chromium levels, it is not possible to exclude completely any impairments of health due to low long-term additional loading. In the presence of chronic kidney insufficiency, however, a *Metasul* Metal-on-Metal Articulation should not be used or should only be used subject to close monitoring of progress (serum cobalt, serum chromium, serum creatine, BUN, echocardiography) in order to avoid increased serum cobalt and serum chromium levels and after carefully weighing the therapeutic benefits against the risks.
- Local bone tumors and/or cysts.
- Females who are pregnant or of child-bearing age are contraindicated due to the unknown effects of elevated levels of metal ions on the fetus.

Preoperative Planning

Accurate preoperative planning and acetabular templating are essential.

Templates of the *Zimmer MMC* Cup component are available for preoperative planning. They are available in 115% and 120% magnification for conventional radiographs and 100% magnification for digital X-rays.

Magnification is greater in heavier patients and less in thinner patients. It is necessary to combine these templates with that of the chosen stem by making the centers of rotation correspond. The final size of the prosthesis is determined during the surgical procedure.

When templating, it is important to establish the planned optimal position of the acetabular component, center of rotation, size of the implant, depth, and final component position. Achieving an abduction angle of **40 to a maximum of 45 degrees** is recommended in most cases.



Planning Templates

Zimmer MMC Acetabular Component

1.15:1	Lit. No. 06.01674.000 (not available in the USA)
1:1	Lit. No. 06.01680.000
1.20:1	Lit. No. 06.01681.000

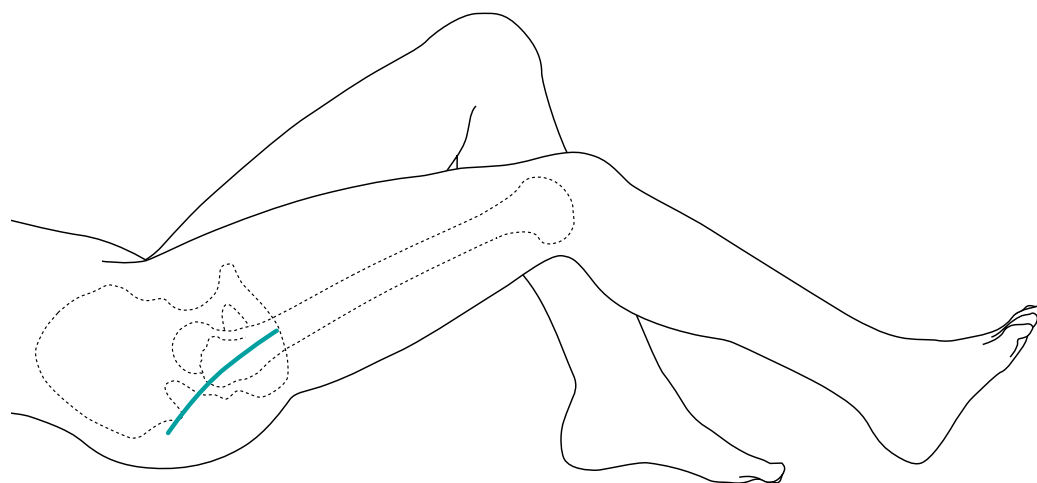
Important Parameters for Planning the Procedure

- planned optimal position of the acetabular component
- center of rotation
- size of the implant
- depth
- final component position
- achieving the recommended abduction angle

Surgical Approach

The *Zimmer MMC Cup* may be implanted using a variety of surgical approaches. The specific approach depends on the surgeon's preference and therefore may differ from the procedure shown.

Note: Surgeon approach may vary. However, the approach must provide adequate exposure to visualize the entire acetabular rim.



Acetabular Preparation

1. Acetabular Preparation

The acetabular labrum is completely excised, and any large peripheral osteophytes are removed. The ligamentum teres is excised, and the true floor of the acetabulum is identified (Fig. 4).

Technique Tip: It is important to visualize the entire bony rim of the acetabulum (Fig. 5). This will help when using trial cups to assess the depth reamed. It will also reduce the likelihood of soft tissue entrapment which may prevent the cup from seating during insertion.

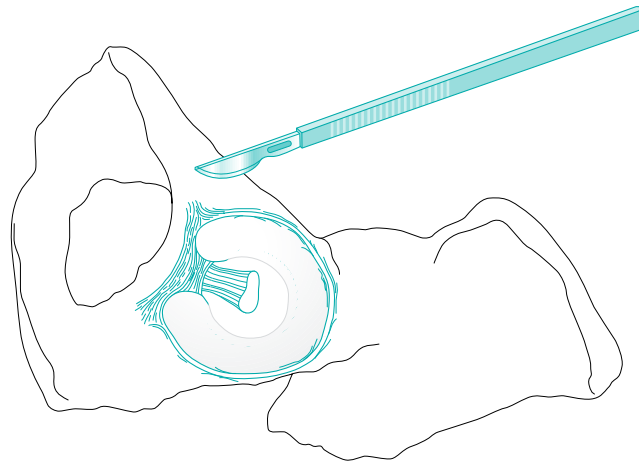


Fig. 4 Labrum excision

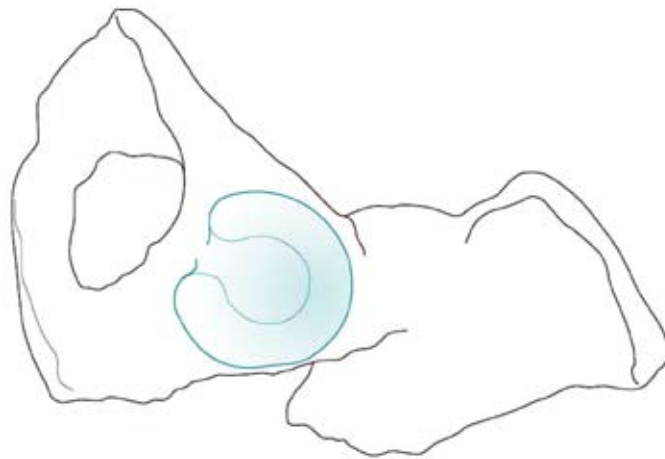


Fig. 5 Entire bony rim is visualized

2. Reaming

The Zimmer MMC Cup is a full 180° hemisphere. This technique demonstrates the use of 180° hemispherical reamers to prepare the acetabulum. If using reamers other than 180° hemispherical reamers, visual cues to assess reaming should be adjusted (Fig. 6). Trial provisionals should be used to determine depth of reaming.

Acetabular reaming must progress slowly, in 1–2mm increments with frequent assessment of the following: depth and orientation of the prepared acetabular bone, coverage and rim integrity (Fig. 7). The goal is to achieve adequate implant primary stability, mainly by anterior and posterior contact. It should be noted that to achieve the appropriate abduction angle some of the posterior-superior portion of the implant may be uncovered. This is acceptable assuming adequate initial press-fit is achieved.

Sequential reaming should be carried out until adequate acetabular preparation has been achieved. This must be assessed by careful use of the acetabular trials. Hold the reamer steady and apply pressure in the same direction that the prosthesis will be implanted. Start with a reamer at least 2–4mm smaller than the templated implant size. Care should be taken not to over-medialize. Regular use of trials as reaming progresses is highly recommended.

Technique Tip: In hard bone it is advisable to use reamers in 1mm increments when approaching the definitive acetabular size.

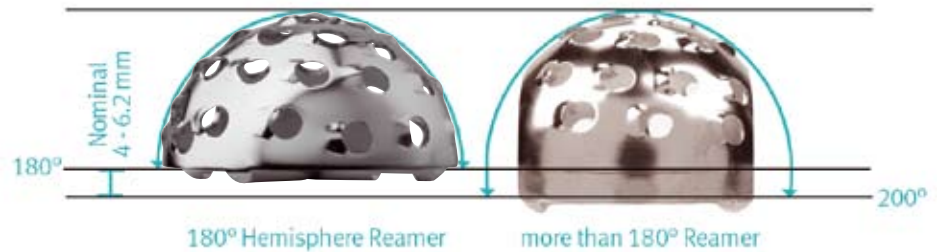


Fig. 6 180° hemispherical reamer versus a reamer that extends beyond 180°

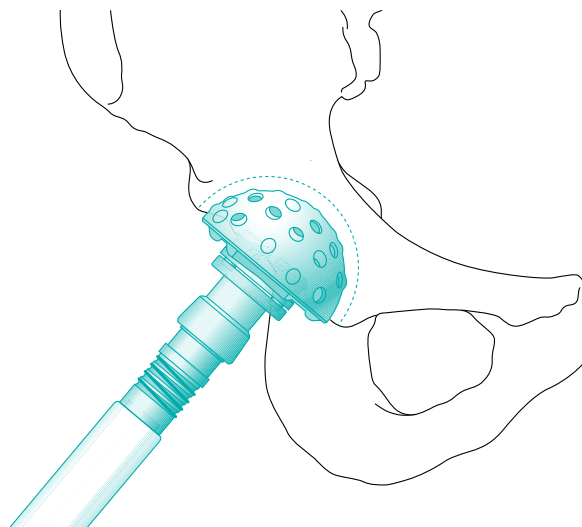


Fig. 7 Reaming procedure

3. The Use of the Acetabular Trial

Note: This monoblock metal-on-metal acetabular implant does not allow the option of cup repositioning after final implantation. The success of acetabular implantation and subsequent fixation is therefore largely dependent on achieving adequate primary stability. It is for this reason that acetabular trials of 1mm increments are provided, so as to allow meticulous assessment of the acetabulum as preparation progresses. It is highly recommended that the surgeon uses 1mm increments in trial sizing to ensure optimal press-fit (either 1 or 2mm) for the conditions present at the time of implantation (Fig. 8).

The accuracy of reaming and the optimal position of the implant are assessed using an acetabular trial the same size as the last reamer used (Fig. 9). The line-to-line acetabular trial is not used to test stability, but instead to assess acetabular depth, coverage, orientation and sphericity. This trial has the same external diameter as the last reamer used, and it should seat completely within the prepared acetabulum, i.e.: ream to 54mm and initially use a 54mm trial (Fig. 10a and b).

For optimal function of the trial the fixation screw should be tightened securely using the ball hex screwdriver.

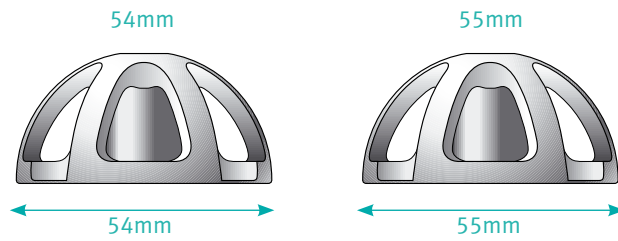
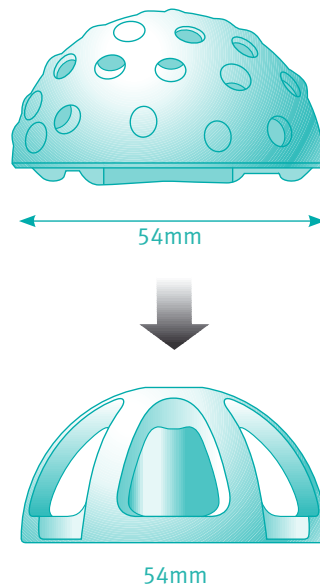


Fig. 8 Trials in 1mm increments



- Check for
- acetabular depth
- coverage
- orientation
- sphericity

Fig. 9 Last reamer used determines first trial

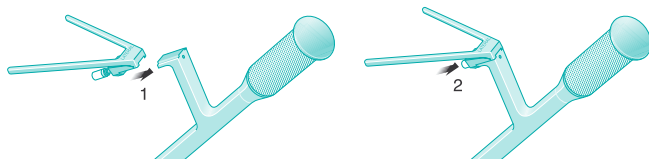


Fig. 10a Assembly of the alignment guide

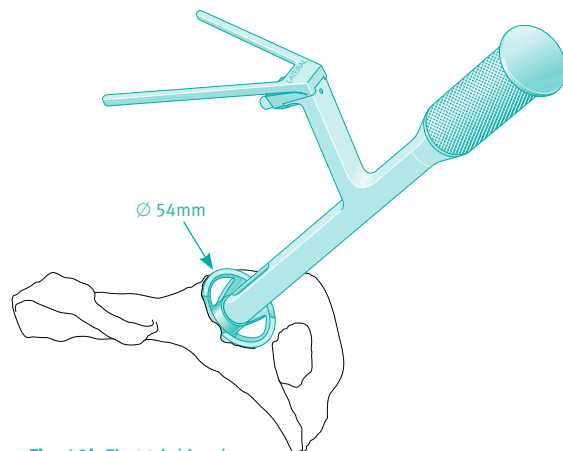


Fig. 10b First trial in place

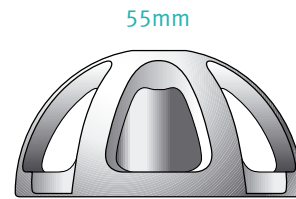
Zimmer MMC Cup acetabular trials should be used throughout the reaming process to help determine the accuracy of the reaming process and the diameter of the final prosthesis. The acetabular trials will also assist in judging the final position of the implant relative to the peripheral rim. The integrity of the anterior and posterior wall of the acetabulum is critical. Care should be taken to optimize bone preparation in order to achieve a satisfactory press-fit and initial implant stability.

Once the initial assessment with the line-to-line trial suggests that the acetabular preparation is correct and complete, a 1mm press-fit trial (i.e. ream to 54mm, and use a 55mm trial) may be used to assess bone quality, interference fit, and projected implant stability (Fig. 11).

The trial shell is placed in a range of **40 to a maximum of 45 degrees** inclination (abduction) and appropriate anteversion based on bony landmarks (Fig. 12). The aim should be to be within this range of inclination (abduction) in most cases.

Note: Instruments are available to support the aforementioned alignment. For further information please refer to the alignment device explanation at the end of the surgical technique.

Note: It is important at this point to remove any rim osteophytes that may block the full insertion of the definitive implant or alter the optimal position of the final implant.



- Check for
- bone quality
 - interference fit
 - projected implant stability

Fig. 11 Trial with 1mm press-fit

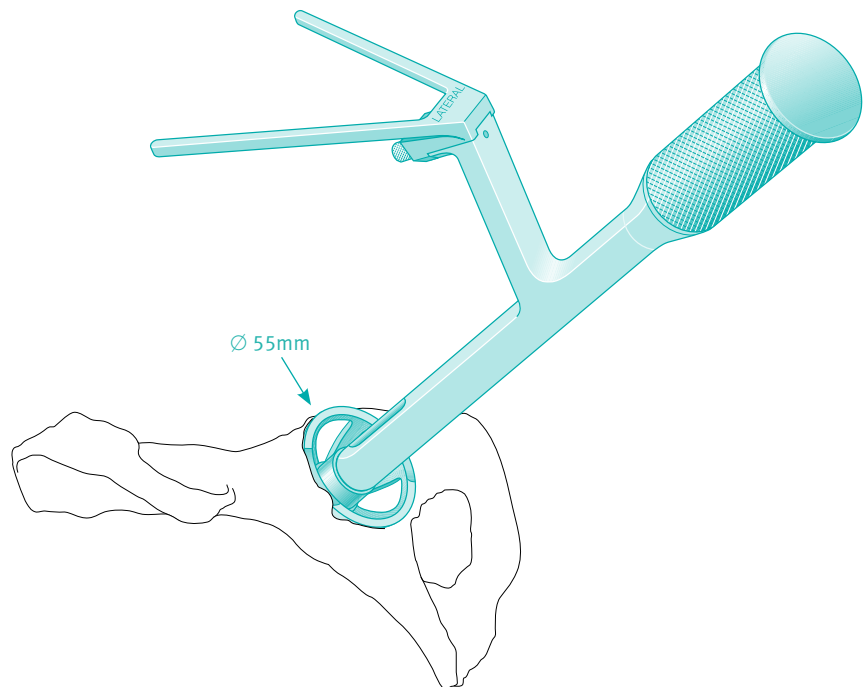


Fig. 12 Trial with 1mm press-fit in place

Following the removal of rim osteophytes it should be possible to reinsert the line-to-line acetabular trial in the desired position with gentle tapping, i.e. ream to 54mm, use 54mm trial. If there is still resistance to fully seating and removing the acetabular trial, this indicates that the rim is too tight and that it will be difficult to insert the corresponding acetabular component.

In this case the surgeon may decide to remain with a 2mm press-fit, or to use a reamer 1mm larger (in this example, a 55mm reamer would be used to prepare for a 56mm cup) to achieve a 1mm press-fit. Careful surgical judgment is required at this stage.

The rim of the acetabular trial indicates the position of the rim of the acetabular component after final impaction when it is fully seated.

Note: If adequate implant stability is not achieved with a press-fit using the *Zimmer MMC Cup* design, a switch to a modular press-fit cup offering supplementary fixation options is suggested at this stage of surgery.

Technique Tip: When final press-fit and cup position are determined with the trial cup, it is important to note landmarks of cup depth, abduction angle and anteversion. At this point, it is helpful to leave the trial cup in final position until the *Zimmer MMC Cup* component impaction is imminent for a visual reference to cup placement (Fig. 13).

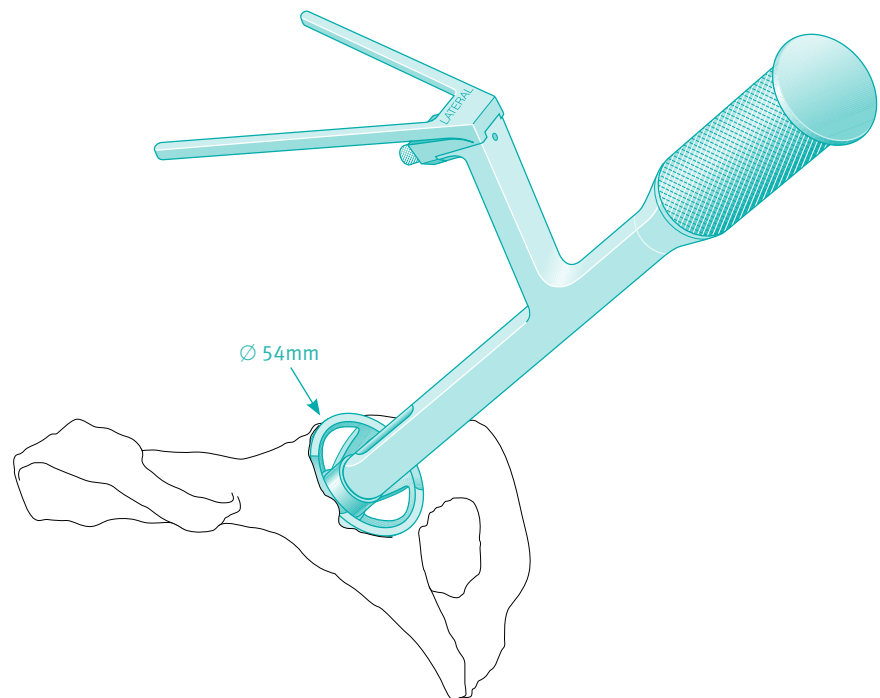


Fig. 13 Keep line-to-line trial in bone until implantation of cup

Acetabular Implantation

1. Mounting of the Acetabular Component

The definitive acetabular component is placed on the disposable cup holder, which is provided within the packaging (Fig. 14). The appropriately sized cup inserter is then mounted on to the acetabular component. The fixation screw is tightened securely with the ball hex screwdriver (Fig. 15.)

Care should be taken to avoid contamination from blood, fluids, etc. before inserting the cup.

2. Insertion of the Acetabular Component

Any remaining soft tissue which may prevent the acetabular component from seating during insertion should be excised.

Note: Instruments are available to support the aforementioned alignment. For further information please refer to the alignment device explanation at the end of the surgical technique.

The acetabular component is impacted into the prepared acetabulum. It is important to note that the CoCr is a stiffer material than titanium, and more force may be required to fully seat the acetabular component during final cup impaction. A heavy mallet may be used to ensure complete seating of the cup (Fig. 16). Surgical judgment is required to achieve full seating and avoid complication.

The optimal position of the component is dictated by the orientation and preparation of the true bony acetabulum. The surgeon should aim for a range of **40 to a maximum of 45 degrees** abduction angle, and an anteversion angle which may depend on the surgical approach and the available bone. The surgeon may choose to evaluate the femoral anteversion and make adjustments as necessary, to achieve the optimal net anteversion of the acetabular and femoral components.

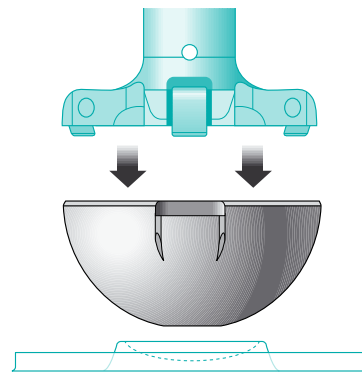


Fig. 14 Zimmer MMC Cup on disposable cup holder

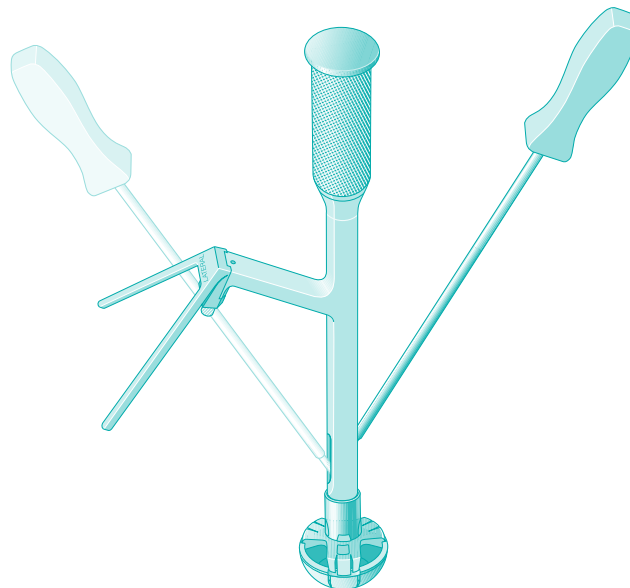


Fig. 15 Tightening of fixation screw

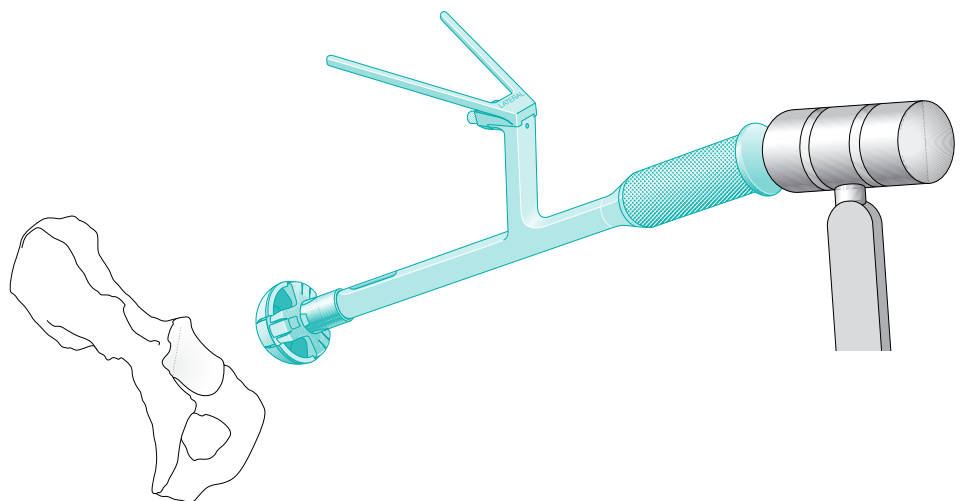


Fig. 16 Cup impaction

Note: Ideally the *Zimmer MMC* Cup will fully engage in the anterior and posterior walls, not only to maximize primary stability, but also to reduce the risk of soft tissue irritation. In many cases, in order to obtain optimal acetabular abduction, there will be a small area of cup left exposed superolaterally. This is acceptable assuming adequate press-fit is achieved. The edge of the cup has been rounded to minimize soft tissue abrasion. In some anatomical variants obtaining adequate press-fit and cup coverage may be more challenging. Surgical judgment is required in the use of the *Zimmer MMC* Cup in these instances.

3. Final Impaction of the Acetabular Component

When the acetabular component is seated and stable, the cup inserter is removed by unscrewing the fixation screw. It is important that the appropriately sized cup impactor be used to complete the insertion of the acetabular component. After mounting the impactor on the handle, the fixation screw is tightened securely with the ball hex screwdriver. The cup impactor must be fully seated and should sit flush on the implant. If rim osteophytes prevent full seating, then these should be removed with care. Avoid over-resection of the rim, which may disrupt the integrity of initial press-fit. The key to final implant placement is to fully seat the cup to the level previously identified using the trial (Fig. 17a and b).

Note: Only the designated and appropriately sized cup impactor should be used for final impaction of the acetabular component.

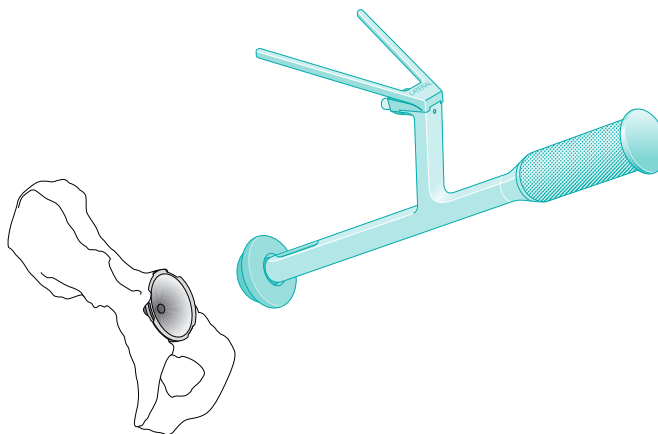


Fig. 17a Final impaction of cup

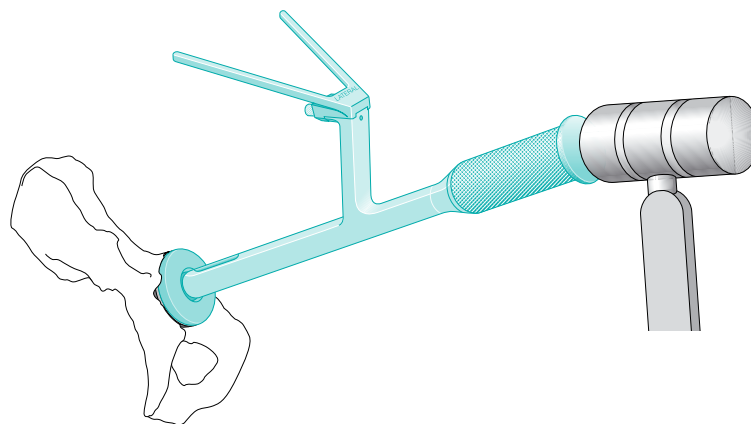


Fig. 17b Final impaction of cup

Warning: The *Zimmer MMC* Cup must not be adjusted in the acetabulum after impaction. Any attempt to move the cup will reduce the primary stability of the prosthesis which may lead to early loosening of the acetabular component.



Carefully inspect the surgical field to ensure that all surgical debris has been removed. After the cup is fully seated, irrigate with USP purified water or sterile saline solution before relocation of the femoral component, to avoid third body wear.

4. Reduction



It is important to avoid contact of the femoral component with the rim of the acetabular component, as this could result in scratching. Following reduction, the circumference of the acetabular component should be checked to make sure that there is no entrapment of soft tissue. The hip is then checked for range of movement, impingement, stability and leg length.



Alignment Guides

Alignment Frame “A-Frame”

Anteversion	Position	
	Supine	Lateral
		
10°	not available	not available
20°	00-7807-015-01	00-7807-015-02

Positioning Guide “Gunsight”

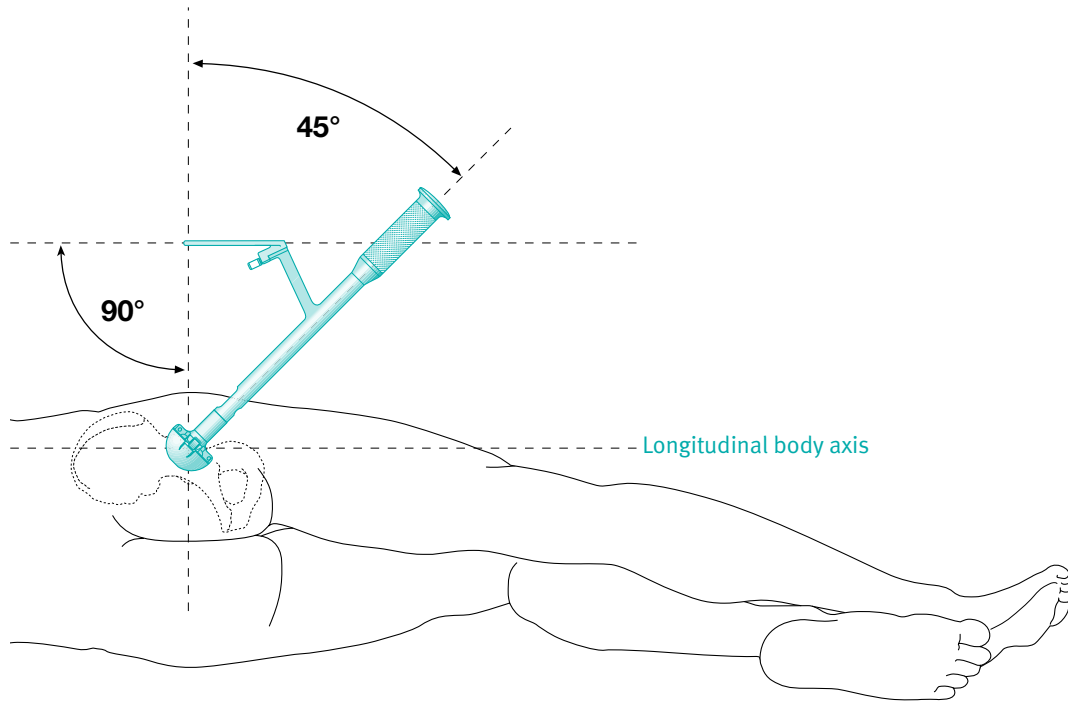
Anteversion	Position	
	Supine	Lateral
		
10°	01.00639.735 *	01.00639.715 *
20°	01.00639.745	01.00639.725

Positioning Guide Spoke

01.00639.705
Positioning Guide Spoke long

01.00639.755 *

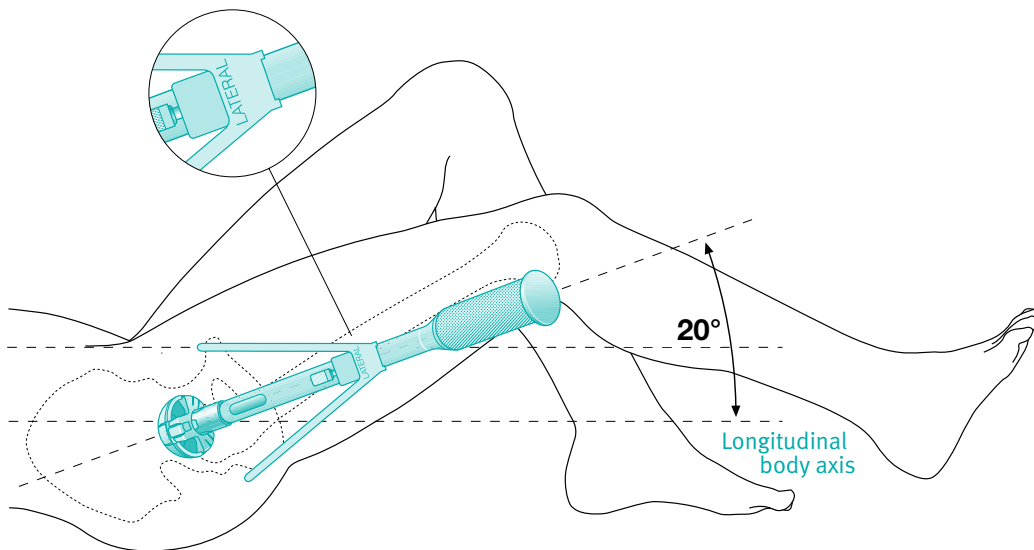
* Not available in the USA.

Alignment Device Explanation

Example: Lateral Patient Positioning “A-Frame”



A/P view

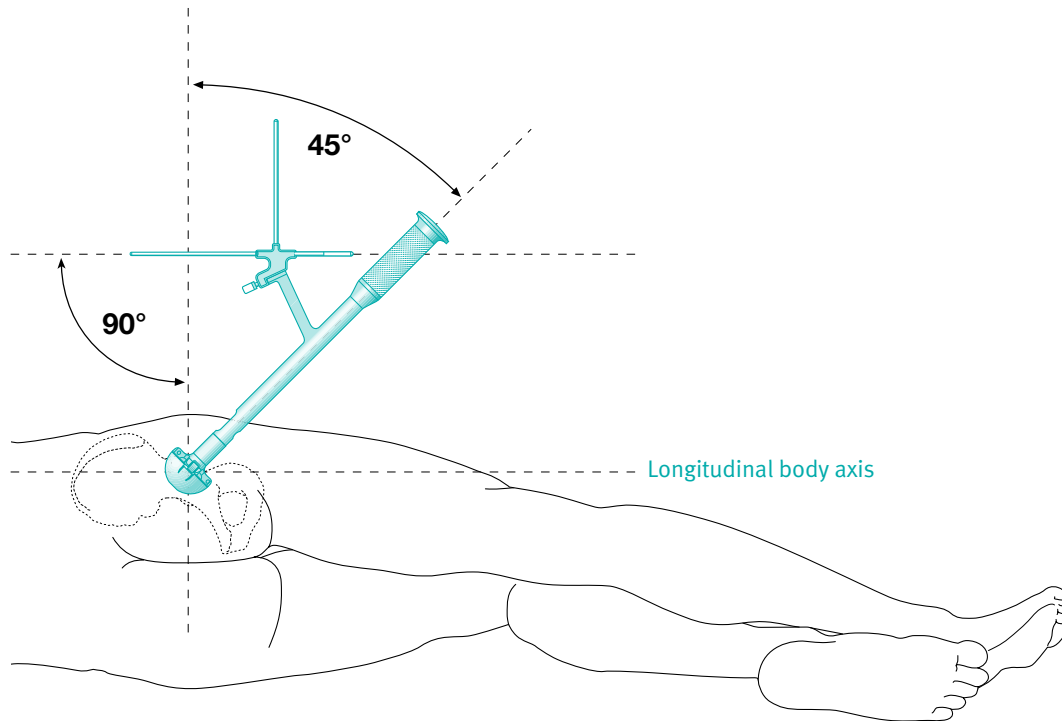


Top view

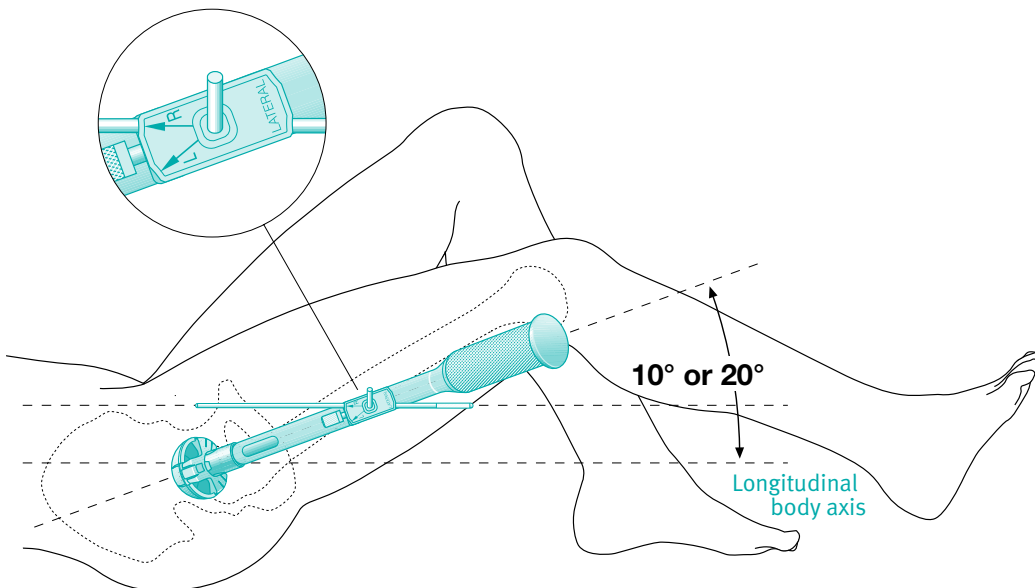
The “A-Frame” alignment extension needs to be parallel with the longitudinal body axis to achieve a 45° inclination (abduction) and 20° anteversion.

Alignment Device Explanation

Example: Lateral Patient Positioning “Gunsight”



A/P view

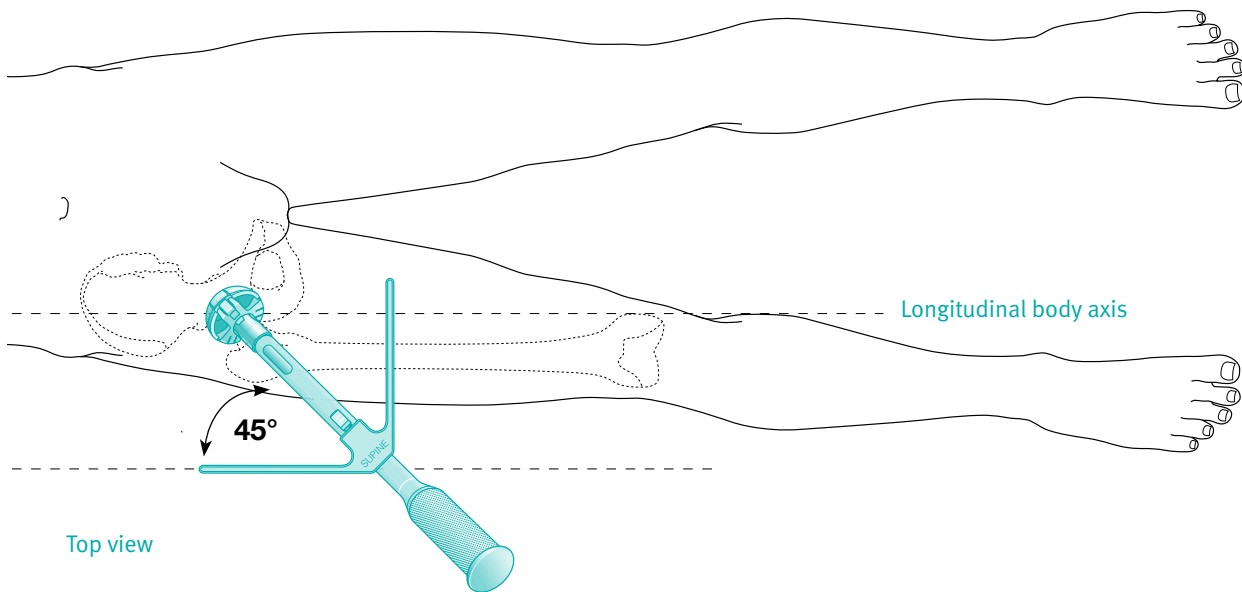
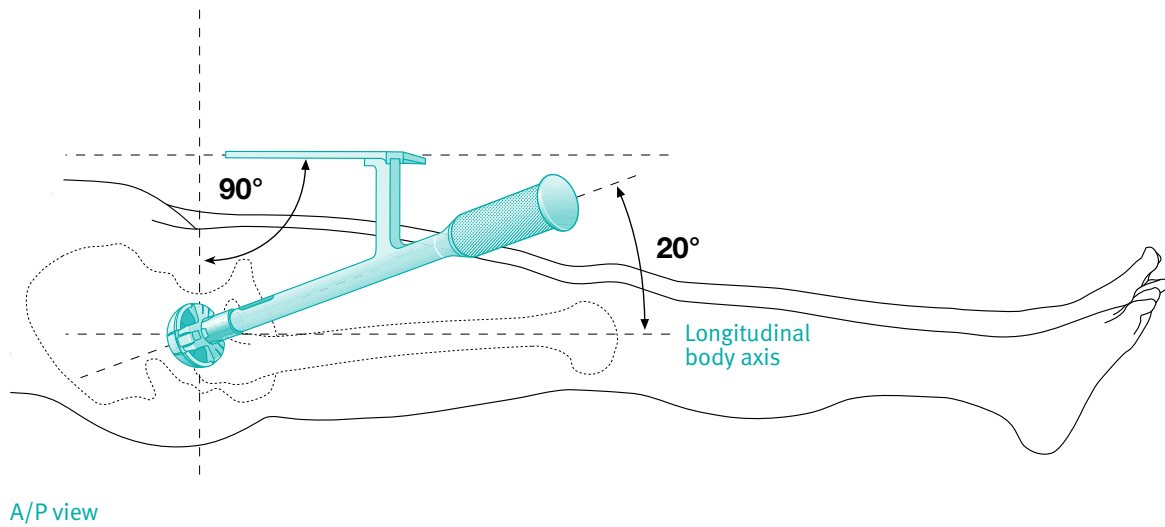


Top view

The “Gunsight” alignment extension needs to be parallel with the longitudinal body axis to achieve a 45° inclination (abduction). A 10° or 20° anteversion can be achieved depending on the type of alignment guide chosen by the surgeon.

Alignment Device Explanation

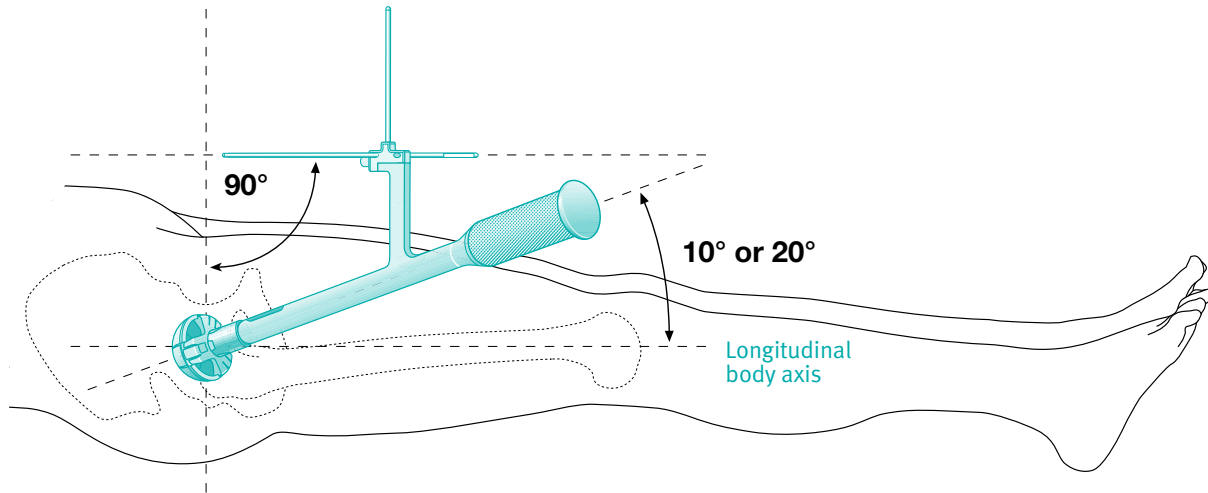
Example: Supine Patient Positioning “A-Frame”



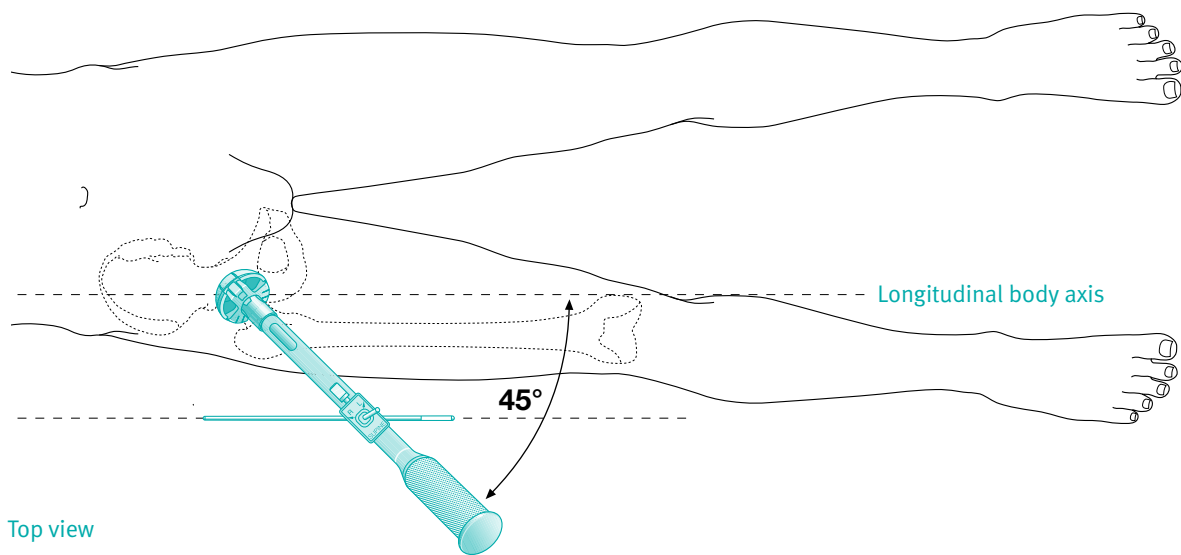
The “A-Frame” alignment extension needs to be parallel with the longitudinal body axis to achieve a 45° inclination (abduction) and 20° anteversion.

Alignment Device Explanation

Example: Supine Patient Positioning “Gunsight”



A/P view



Top view

The “Gunsight” alignment extension needs to be parallel with the longitudinal body axis to achieve a 45° inclination (abduction). A 10° or 20° anteversion can be achieved depending on the type of alignment guide chosen by the surgeon.

Implants



Zimmer MMC™ Cup

Size [mm]	Code	REF
Ø 46/38	D	01.00634.046
Ø 48/40	F	01.00634.048
Ø 50/42	H	01.00634.050
Ø 52/44	J	01.00634.052
Ø 54/46	L	01.00634.054
Ø 56/48	N	01.00634.056
Ø 58/50	P	01.00634.058
Ø 60/52	R	01.00634.060
Ø 62/54	T	01.00634.062
Ø 64/56	V	01.00634.064
Ø 66/58	X	01.00634.066
Ø 68/60	Z	01.00634.068

Instruments



Monoblock Metal-on-Metal Cup
Trial Cups

REF
ZS01.00639.100

Tray

REF
00-7804-000-20

Tray Cover

REF
00-5900-099-00

Instrument Kit for US

REF
KT-0639-100-00

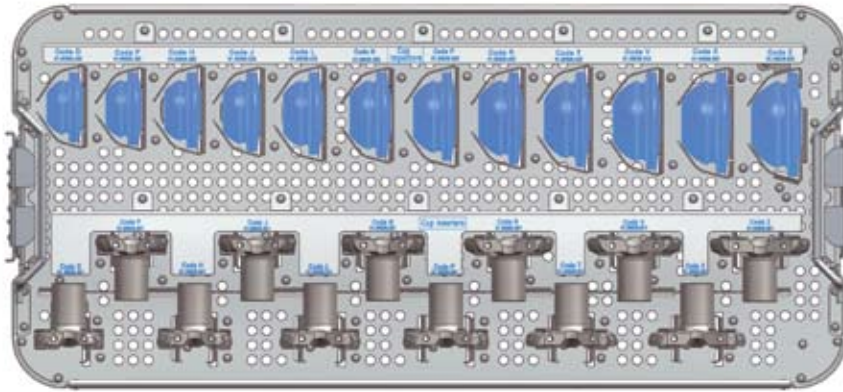


Trial Cups

Size [mm]	REF
Ø 44	01.00639.443
Ø 46	01.00639.463
Ø 48	01.00639.483
Ø 50	01.00639.503
Ø 52	01.00639.523
Ø 54	01.00639.543
Ø 56	01.00639.563
Ø 58	01.00639.583
Ø 60	01.00639.603
Ø 62	01.00639.623
Ø 64	01.00639.643
Ø 66	01.00639.663

ODD Trial Cups

Size [mm]	REF
Ø 45	01.00639.453
Ø 47	01.00639.473
Ø 49	01.00639.493
Ø 51	01.00639.513
Ø 53	01.00639.533
Ø 55	01.00639.553
Ø 57	01.00639.573
Ø 59	01.00639.593
Ø 61	01.00639.613
Ø 63	01.00639.633
Ø 65	01.00639.653
Ø 67	01.00639.673



Monoblock Metal-on-Metal Cup
Inserters and Impactors

REF
ZS01.00639.125

Tray

REF
00-7804-000-19

Tray Cover

REF
00-5900-099-00

Instrument Kit for US

REF
KT-0639-125-00

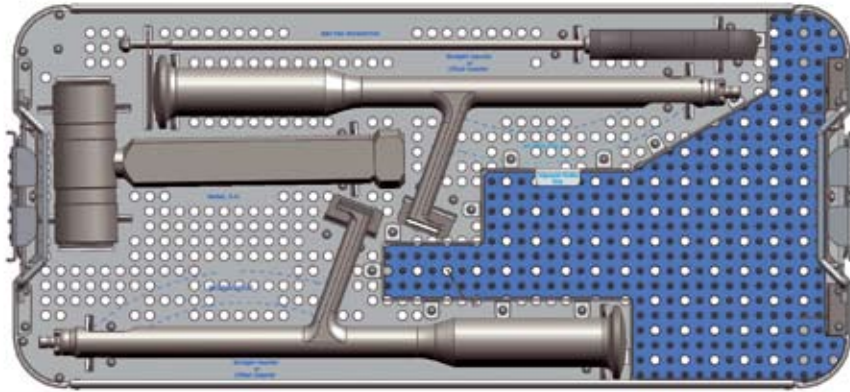


Cup Inserters

C code	REF
D	01.00639.461
F	01.00639.481
H	01.00639.501
J	01.00639.521
L	01.00639.541
N	01.00639.561
P	01.00639.581
R	01.00639.601
T	01.00639.621
V	01.00639.641
X	01.00639.661
Z	01.00639.681

Cup Impactors

C code	REF
D	01.00639.462
F	01.00639.482
H	01.00639.502
J	01.00639.522
L	01.00639.542
N	01.00639.562
P	01.00639.582
R	01.00639.602
T	01.00639.622
V	01.00639.642
X	01.00639.662
Z	01.00639.682



Monoblock Metal-on-Metal Cup
General Instrument Set Straight

REF
ZS01.00639.150

Tray

REF
00-7804-000-30

Tray Cover

REF
00-5900-099-00

Instrument Kit for US

REF
KT-0639-150-00



Straight Inserter (2 included in set)
REF
00-7804-015-20
(USA: 1 included in set)



Ball Hex Screwdriver
REF
9375-00-032

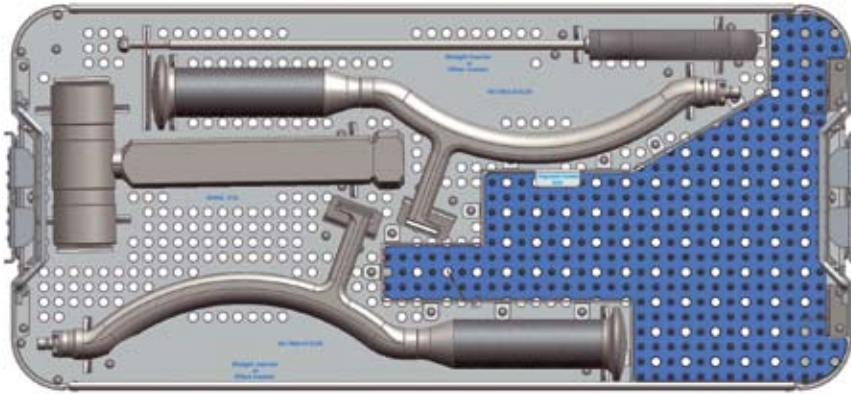


Mallet, 3-lb
REF
00-2237-005-00



Lateral Positioning Guide 20°
REF
01.00639.725

Positioning Guide Spoke
REF
01.00639.705



- Monoblock Metal-on-Metal Cup
General Instrument Set Offset
REF
ZS01.00639.175
- Tray
REF
00-7804-000-30
- Tray Cover
REF
00-5900-099-00
- Instrument Kit for US
REF
KT-0639-175-00



Offset Inserter (2 included in set)
REF
00-7804-025-20
(USA: 1 included in set)



Ball Hex Screwdriver
REF
9375-00-032



Mallet, 3-lb
REF
00-2237-005-00



Lateral Positioning Guide 20°
REF
01.00639.725

Positioning Guide Spoke
REF
01.00639.705

On Request: Alignment Guides



Lateral Alignment Frame

REF
00-7807-015-02



Supine Alignment Frame

REF
00-7807-015-01



Lateral Positioning Guide 10°

REF
01.00639.715 *

Positioning Guide Spoke

REF
01.00639.705



Supine Positioning Guide 10°

REF
01.00639.735 *

Positioning Guide Spoke long

REF
01.00639.755 *



Supine Positioning Guide 20°

REF
01.00639.745

Positioning Guide Spoke long

REF
01.00639.755 *

Contact your Zimmer representative or visit us at www.zimmer.com

