



**Metasul® LDH®
Large
Diameter Head**

Surgical Technique



Large Diameter Metal-on-Metal

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**Metasul LDH
Large Diameter Head
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General Description of the Implant	4
Overview of Implant Sizing	5
Patient Selection	7
Preoperative Planning	8
Use of the Trial Head	9
Assembly of the Head Adapter	10
Final Reduction	12
In Situ Extraction of the Head	13
Disassembly of the Head Adapter and the Large Diameter Head	14
Implants	15
Instruments	16

General Description of the Implant

The combination of *Metasul* technology and large diameter heads make the *Metasul LDH* large diameter head concept a solution for numerous patients.

Bearing Surface

The *Metasul LDH* large diameter head with the corresponding Zimmer acetabular system utilize *Metasul* technology, which is a forged CoCr on forged CoCr metal/metal articulation. *Metasul* technology was first implanted in 1988, and has since been implanted in over 350,000 patients worldwide¹.



Overview of Implant Sizing

The inner diameter of a corresponding acetabular component mates with a corresponding *Metasul LDH* large diameter head. A letter code confirms the appropriate combination. For example, a code N cup must be used with a 48/N *Metasul LDH* large diameter head.

Note: Depending which acetabular system is being used, make sure to verify the size of the cup with the correct letter code.

The *Metasul LDH* large diameter heads may be used with a wide range of Zimmer hip stems.

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

Important Information Regarding Metasul Metal Pairings

Cup systems intended for *Metasul* pairings may only be paired with the corresponding *Metasul* ball heads provided for this purpose. The operating surgeon must always make sure that the chosen cup and ball head match each other in accordance with this requirement. *Metasul* femoral heads are designated with a groove in the area of the taper, which is evident on the X-rays.

Metasul LDH Sizing Guide

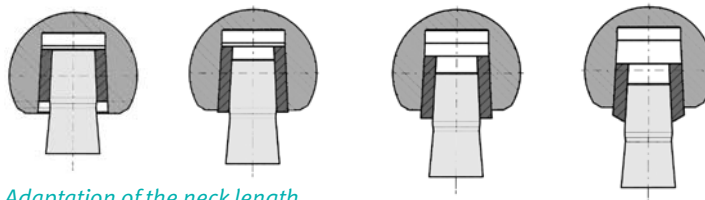


Matching Acetabular Component		Code	Matching Femoral Component	
Outer Ø	Inner Ø		Size	Outer Ø
46 mm	38 mm	D	38	38 mm
48 mm	40 mm	F	40	40 mm
50 mm	42 mm	H	42	42 mm
52 mm	44 mm	J	44	44 mm
54 mm	46 mm	L	46	46 mm
56 mm	48 mm	N	48	48 mm
58 mm	50 mm	P	50	50 mm
60 mm	52 mm	R	52	52 mm
62 mm	54 mm	T	54	54 mm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

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.

In order to optimize restoration of joint kinematics, the *Metasul LDH* large diameter head system has been developed with 4 neck lengths (S, M, L and XL) for the 12/14 taper and in 3 neck lengths (S, M and L) for 8/10* taper.

The range of heads covers 12 sizes from 38 to 60 mm. From size 38 to 48 mm, the heads are solid, while from size 50 to 60 mm, they are partially hollowed out in order to reduce the overall weight of the implant.



Adaptation of the neck length

Range of sizes

Taper	Neck length (mm)			
	S	M	L	XL
12/14	-4	0	+4	+8
8/10*	-4	0	+4	

Head size – approximate weight



Head size, mm	38	40	42	44	46	48
Approx. weight, g	146	174	206	240	276	316



Head size, mm	50	52	54	56	58	60
Approx. weight, g	254	277	299	326	351	382

* Not available in the USA

Patient Selection

The *Metasul LDH* large diameter head when used in conjunction with a corresponding acetabular component 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 childbearing age are contraindicated due to the unknown effects of elevated levels of metal ions on the fetus.

Osteoarthropathy in a 56-year-old patient



Preoperative



One month postoperative

Preoperative Planning

Templates of the corresponding acetabular component are available for preoperative planning. They are available in 115% magnification 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 stem used by making the centers of rotation correspond. The final size of the prosthesis is determined during the surgical procedure.

With the corresponding acetabular component templates, it is possible to determine the most important parameters for planning the procedure:

- the physiological center of rotation (from the opposite side)
- the optimal position of the acetabular component, in particular its depth, as well as its inclination angles
- the approximate size of the implant

Note: The acetabular component should be positioned to best fit the acetabulum to maximize bony support and fixation. Placement will generally fall within 40°–50° abduction angle and 10°–20° anteversion angle. For more specific placement information please see the appropriate acetabular cup surgical technique.



Use of the Trial Head

Use of the Trial Head with Its Head Adapter

The femoral trial head corresponding to the inner diameter of the corresponding acetabular component is selected and the appropriately sized trial head adapter is placed into the femoral head. The femoral head with trial adapter is mounted onto the femoral stem, ensuring that the latter is fully seated on the femoral stem taper (Fig. 12).

The hip is then reduced. The length of the neck, the ligament tension and the range of motion are checked. If the results are not acceptable, the same procedure must be repeated with different sizes of head adapters.

Following reduction, the circumference of the acetabular component is checked to make sure there is no entrapment of soft tissue.



Fig. 12 *Metasul LDH* trial head and trial adapters shown with stems.

Assembly of the Head Adapter

Assembly of the head adapter on the *Metasul LDH* large diameter head is performed outside the operative field after having carried out the trial reduction with the large trial head attached to the trial head adapter.

The metal base plate and its plastic assembly inlay are positioned on a stable support (Fig. 13). Make sure the inlay sits firmly within the base plate (Fig. 14).

Position the femoral head on the inlay as shown in the illustration (Fig. 15).

Place the appropriately sized head adapter into the female taper of the femoral head (Fig. 16).

Note: Properly check the position of the appropriate head adapter before final impaction into *Metasul LDH* large diameter head (Fig. 17).

All parts should be clean and dry.



Fig. 13



Fig. 14



Fig. 15



Fig. 16



Fig. 17

With the impactor handle and its 12/14 or 8/10* assembly attachment, the head adapter is impacted into the femoral head with one or two firm and strong strikes with a heavy mallet (Fig. 18 and 19).

Clean and dry the stem taper, removing any residue.

Place the selected femoral head on the stem taper and secure it by twisting firmly. With the plastic impactor attachment and a heavy mallet strike strong the *Metasul LDH* large diameter head a minimum of three times to ensure full seating of the stem taper (Fig. 20a).

A strong blow would be similar to the final impact when sitting a cementless stem into the femoral canal. Additional impacts may be delivered, but if the previous impacts have already been strong, additional impacts do not significantly add to the quality of the assembly.

Care should be taken not to risk to split the femur.

Note: The impactor should not be more than 20 degrees off the neck axis, otherwise too much of the impact force would be lost (Fig. 20b).



Fig. 18



Fig. 19

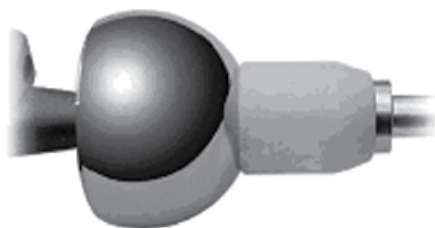


Fig. 20a

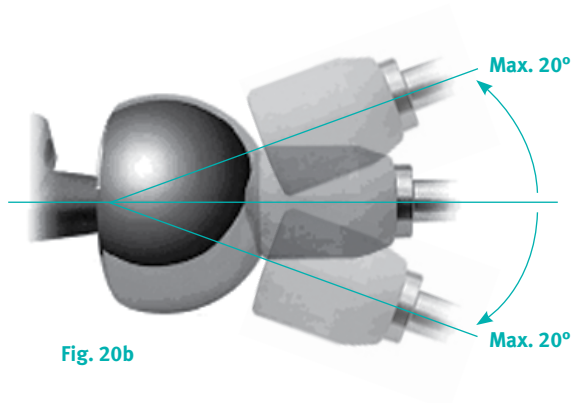


Fig. 20b

* Not available in the USA

Final Reduction

When using the posterior approach, the acetabular component is exposed by retraction of the posterior capsular flap. Reduce the *Metasul LDH* large diameter head with the femoral pusher while applying longitudinal traction and external rotation of the leg (Fig. 21). It is important to ensure that the femoral head does not make contact with the edge of the acetabular component, as this could result in scratching of the femoral head (Fig. 22).

Note: If a cemented stem is used, the femoral head should be cleaned with pulsed lavage and wet swabs.

Following reduction, the circumference of the acetabular component is checked to make sure there is no entrapment of soft tissue. The hip is then checked for range of movement, impingement, stability, and leg length.



Fig. 21 *Metasul LDH* large diameter head pushed using the femoral pusher.



Fig. 22 Reduction.

In Situ Extraction of the Head

In cases where the large diameter head must be removed, the following procedure is recommended.

Mount the head disassembly attachment on the impactor handle and position the instrument on the lower edge of the femoral head (Fig. 23 and 24).

Loosening of the head and the stem taper is done with small successive blows. The use of this device helps prevent unintended stem taper damage.

Note: To separate the head from the taper intraoperatively, use the plastic disassembly attachment. For revision cases, use the metal disassembly attachment.

In the case where the head comes off of the stem taper without the head adapter, the adapter must be removed from the stem separately. Carefully slide the adapter extractor around the neck of the stem and turn the threaded crank at the same time to pull the head adapter off of the taper. The taper should not be damaged by this procedure (Fig. 25 and 26).



Fig. 23



Fig. 24



Fig. 25

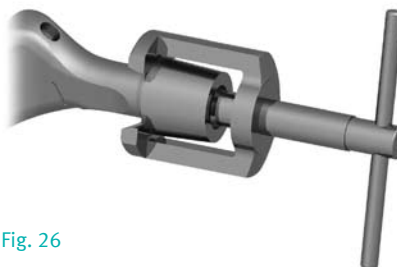


Fig. 26

Disassembly of the Head Adapter and the Large Diameter Head

In cases where the head adapter cannot be extracted and remains attached to the head, use the adapter extractor for a 12/14 taper (REF 01.00189.151) or for 8/10* (REF 01.00189.152) and proceed as follows (Fig. 27).

Slide the sleeve into the head adapter until you feel or hear that its end is completely docked (Fig. 28).

Push the handle through the sleeve and turn clockwise (Fig. 29).

After several turns, the handle reaches the bottom of the female taper of the large diameter head. You will notice an increase in resistance at that time (Fig. 30). Continue to turn and the handle will then separate the adapter from the head.

Carefully remove the head adapter to prevent the head from falling (Fig. 31).



Fig. 27



Fig. 28



Fig. 29



Fig. 30



Fig. 31

Implants



Metasul® LDH® head

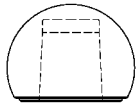


Metasul® LDH® head

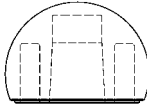


Head adapter

Protasul®-21 WF



Protasul®-21 WF



Protasul®-20

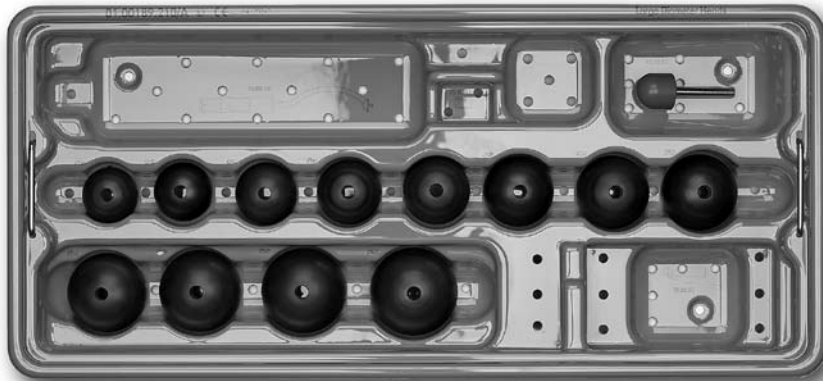


Size	Code	REF	Size	Code	REF	Size	Taper	REF
38	D	01.00181.380	50	P	01.00181.500	S	12/14	01.00185.145
40	F	01.00181.400	52	R	01.00181.520	M	12/14	01.00185.146
42	H	01.00181.420	54	T	01.00181.540	L	12/14	01.00185.147
44	J	01.00181.440	56	V	01.00181.560	XL	12/14	01.00185.148
46	L	01.00181.460	58	X	01.00181.580	S	8/10	01.00185.105*
48	N	01.00181.480	60	Z	01.00181.600	M	8/10	01.00185.106*
						L	8/10	01.00185.107*

* Not available in the USA

Instruments

Metasul LDH Set

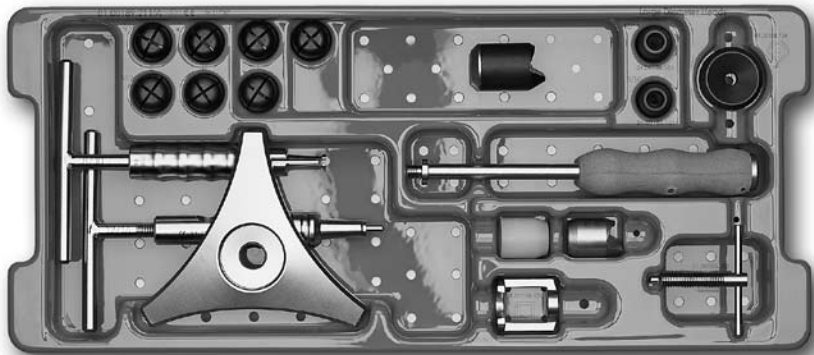


Base tray femoral component
(complete)

REF
ZS01.00189.211

Base tray femoral component
(empty)

REF
01.00189.210



Insert for tray femoral component
(empty)

REF
01.00189.211

Tray cover

REF
01.00029.031



Extractor

Taper	REF
12/14	01.00189.151
8/10*	01.00189.152



Handle reduction and impaction attachment

REF
75.11.00-02



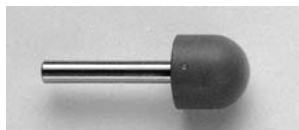
Assembly inlay

REF
01.00189.104



Large trial head

Size	REF
≥ 38 mm	01.00189.381
≥ 40 mm	01.00189.401
≥ 42 mm	01.00189.421
≥ 44 mm	01.00189.441
≥ 46 mm	01.00189.461
≥ 48 mm	01.00189.481
≥ 50 mm	01.00189.501
≥ 52 mm	01.00189.521
≥ 54 mm	01.00189.541
≥ 56 mm	01.00189.561
≥ 58 mm	01.00189.581
≥ 60 mm	01.00189.601



Insert remover pusher

REF
75.10.01



Assembly base plate

REF
01.00189.100



Adapter extractor

REF
01.00189.150



Ball-head impactor attachment

REF
78.00.38



Assembly attachment

Taper	REF
8/10*	01.00189.101
12/14	01.00189.102



Head disassembly attachment metal

REF
01.00189.103



Trial adapter

Size	Taper	REF
S	8/10	01.00189.105*
M	8/10	01.00189.106*
L	8/10	01.00189.107*
S	12/14	01.00189.145
M	12/14	01.00189.146
L	12/14	01.00189.147
XL	12/14	01.00189.148



Head disassembly attachment plastic

REF
01.00189.110

* Not available in the USA

Reference

¹ Data on file at Zimmer

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



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