



# **MINIMALLY INVASIVE STEM**

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Continuation of Tradition

Surgical technique

## ◆ Imported Raw Material

All raw material of UHMWPE inserts were manufactured in Germany, meeting the technical requirements in ISO 5834 part 2 and ASTM F648.

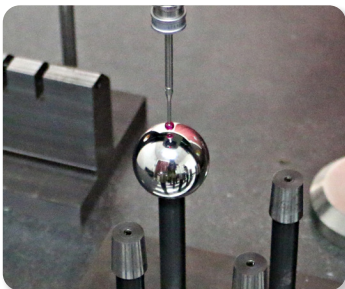


## ◆ Precise Processing



## ◆ Strict Inspection

**JUST MEDICAL** Inspection Center

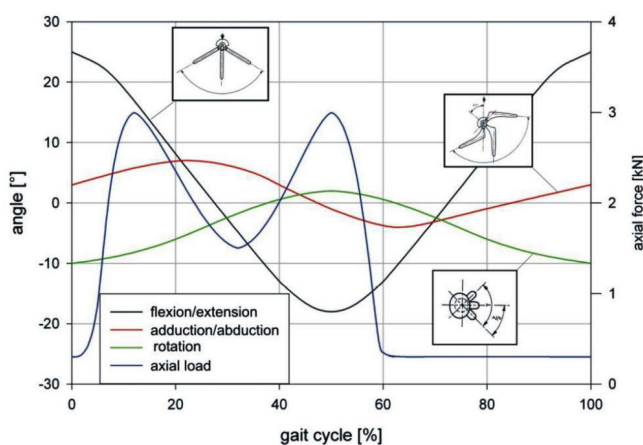
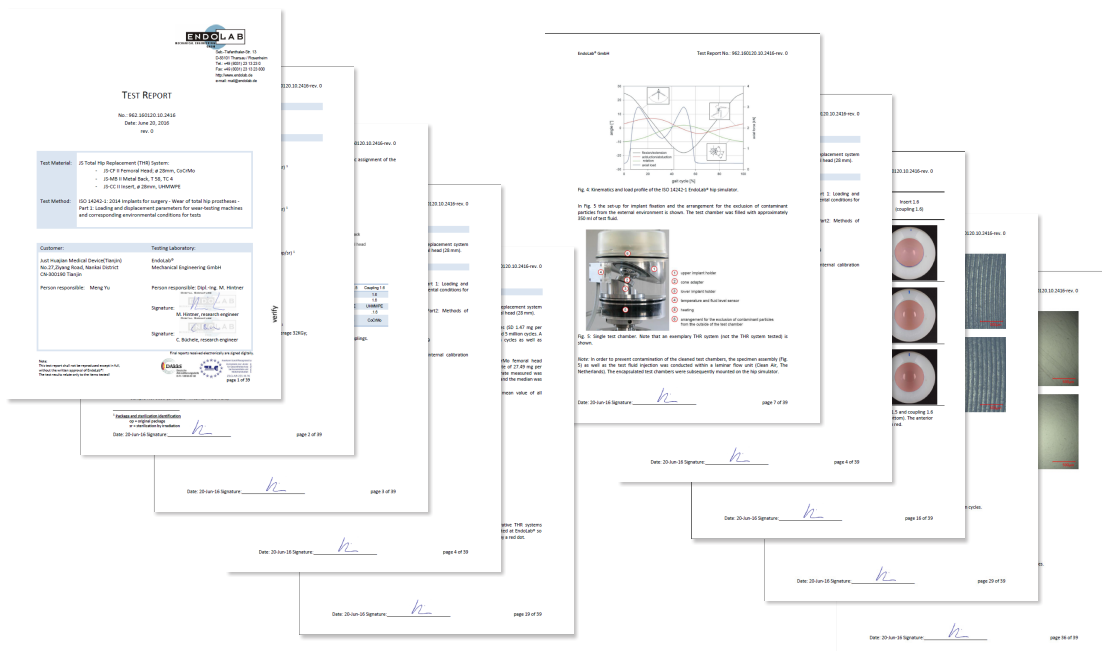


# Wear Test in EndoLab®

EndoLab® GmbH offers a variety of technological implant testingservices to develop and certify medical products.

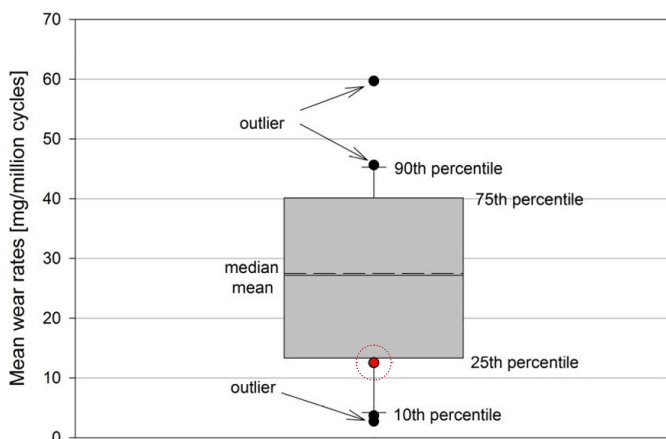
EndoLab® is an accredited (DAkKS O-PL-18838-02-00) and certified (ZLG-P-944.98.07) test laboratory according to DIN EN ISO/IEC 17025 and 93/42/EWG.

The company is a spin-off from the Technical University of Munich and is closely connected to several national and international research departments.



The experiment is to test the wear performance of JUST MED THR system (conventional UHMWPE on 28mm femoral head CoCrMo).

▲ Kinematics and load profile of the ISO 14242-1 EndoLab hip simulator



The JUST MED THR products showed a mean wear rate of 12.53 mg per million cycles. Compared with the EndoLab® database, the wear rate of JUST MED THR products is below the mean value of 27.49 mg per million cycles tested at EndoLab®, so far.

▲ JUST THR system data are marked in red.

## ◆ Patent Certificate

Patent Name: Hip joint femoral stem (minimally invasive)

Patent Number: ZL 2013 1 0530967.6

Patent Name: Minimally invasive hip canal reamer

Patent Number: ZL 2012 2 0389033.6

Patent Name: A retractor set for minimally invasive hip surgery

Patent Number: ZL 2016 2 0241789.4



# Surgical Technique

## I. Surgical Planning

The patient selected for anterior surgery should be evaluated to ascertain that the hip can be adequately reconstructed anteriorly and that there will be no need to augment the posterior acetabulum. The skin on the front of the hip must be normal in appearance without any maceration.

The radiographs should be templated to suggest the likely implant size and orientation. The level of the hip center and position of the femoral osteotomy from the tip of the greater trochanter or lesser trochanter should be determined.

Note: The Anterior Supine Intermuscular (ASI) surgical technique may be performed on a standard operating room (OR) table or special fracture table. The following technique is for use with a standard OR table.

## II. Patient Positioning

Position the patient supine (Fig.1) on a fluoroscopy capable table, with the fluoroscopy machine in the room.

- Position the Anterior Superior Iliac Spine (ASIS) at the level of the break in the table. This will permit appropriate motion of the femur as the table is extended.
- The OR table needs to be able to extend at the hip and the hip must be positioned to permit fluoroscopy views of both hips and the obturator foramen.
- Check leg lengths in the supine position and correlate with the hip radiographs for later reference.

## III. Patient Preparation

Prepare both legs and drape each free to permit crossing the operative leg underneath the nonoperative side. The entire iliac crest should be included in the operative field to permit an extensile exposure if needed. The nonoperative leg should be prepped from the toes to the groin, and then draped to permit full movement of the leg. The draping could be either with stockingette material alone or in combination with adhesive plastic draping for a more secure seal. Ipsilateral side is prepped from the midline above the ASIS to mid-thigh.

Also prepare the entire buttock on the operative side in case of the need to use a counter incision in the buttock. This is rarely required but may be needed to pass a reamer into the femoral canal.



Fig.1

#### IV. Skin Incision

The anterior supine incision is the distal portion of the Smith-Petersen approach. The incision is determined using the ASIS as a reference. Measure two finger-widths below and two finger-widths lateral to the ASIS (Fig.2). The incision is centered over the greater trochanter. The incision should be well lateral to the Tensor-Sartorius interval to stay away from fibers of the lateral femoral cutaneous nerve. The incision is over the muscle belly of the Tensor and should follow the course of the muscle distally. Therefore, the incision will be approximately 30° away from the midline of the ASIS. Longer skin incisions do not increase the amount of muscle dissection and the skin incision length should always be adequate for safe visualization of the surgical structures.

An oblique incision is made slightly lateral to the intermuscular space between the Tensor Fasciae Latae (TFL) on the lateral side and the Sartorius on the medial side (Fig.3). The incision is centered over the greater trochanter.

- The length of the incision is about 2 cm more than the estimated cup diameter. In obese patients, the incision is made more laterally.
- If need be, this incision is completely extensible to a full Smith-Petersen approach coming up and around the iliac crest or going distally across the TFL and then under the Vastus Lateralis to the knee.

#### V. Muscular Dissection

After incising the tensor muscle fascia, lift up the medial fascial edge and then, by blunt finger dissection under the fascia, develop the interval between the TFL and the Sartorius. Extend this interval down to the hip joint (Fig.4).

The intermuscular space can be easily developed by finger pressure—only in a medial direction—until the capsule can be palpated. This preparation should be completed without force in order not to damage the ascending branch of the lateral circumflex femoral artery and its accompanying vein within the operative field. The circumflex vessels are over the intertrochanteric line and run between the gluteus medius and rectus femorus. They are usually in the middle of the incision or slightly inferior. Blood loss will be greatly decreased if you identify and cauterize or ligate these vessels (Fig. 5).

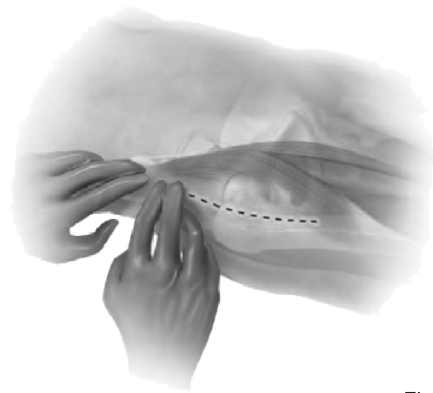


Fig.2

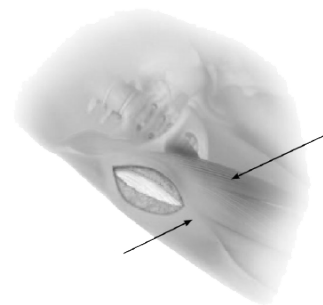


Fig.3



Fig.4

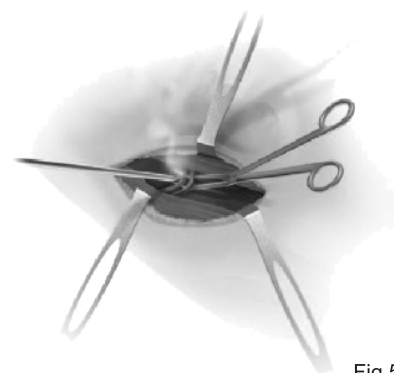


Fig.5

Utilize a Cobb elevator to dissect the fibers of the rectus from the underlying anterior hip capsule (Fig. 6).

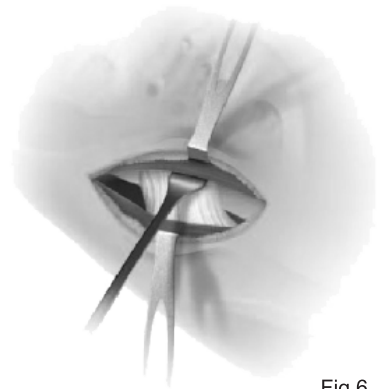


Fig.6

## VI. Exposure Through Capsule

To prepare for exposing the anterior capsule, place a DAA retractor to the lateral capsule or against the ilium to retract the abductors. Place a second DAA retractor inferior to the femoral neck.

Place third DAA retractor under the rectus tendon, but on top of the anterior acetabular rim in the upper cranial quarter directed to the opposite shoulder to avoid injury to the femoral nerve and vessels (Fig. 7). Identify the reflected head of the rectus and release to allow the long head of the rectus to retract medially. Beware of capsular bleeding at the inferior-medial capsule.

Carry out an anterior-superior capsulectomy. The capsulectomy results in excellent visualization and aids in femoral mobilization (Fig. 8).

Make sure to release the anterior-superior capsule from its insertion in the piriformis fossa in order to facilitate lifting of the femur. Place the first two DAA retractor inside the capsule for protection when the osteotomy is performed (Fig. 8).

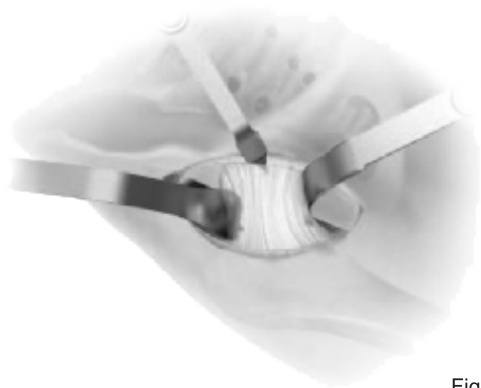


Fig.7



Fig.8

## VII. Osteotomy of the Femur

Perform an osteotomy at the cartilage/neck junction (Fig. 9).

It may be necessary to perform two separate parallel cuts to facilitate extraction of the femoral head by first removing the wafer of cut bone. The initial osteotomy should be at the head/neck junction. The second should be 5 mm to 1cm distal to the initial osteotomy.

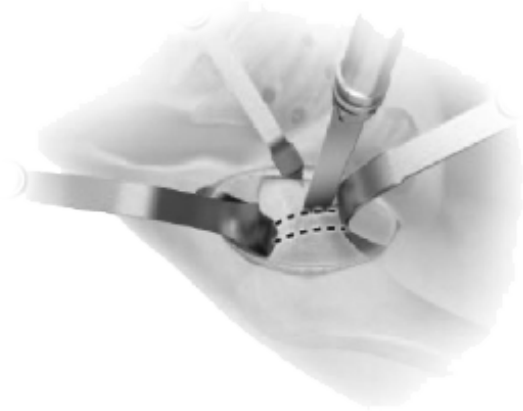


Fig.9

The C-arm can be utilized to help determine the exact level of the osteotomy as planned from preoperative templating.

Place a corkscrew through the cortical side of the femoral head and spin the head to rupture the ligamentum. This will aid with dislocation (Fig. 10). The ligamentum cutter (Fig. 10) may be used to aid in the cutting of the ligamentum.

After removing the head and neck piece, the assistant can externally rotate the leg and the surgeon can palpate the lesser trochanter to further guide the level of the final neck resection. Some anterior capsule may need to be released from the femur to facilitate this maneuver. Beware of damaging the TFL muscle when removing the neck and head.

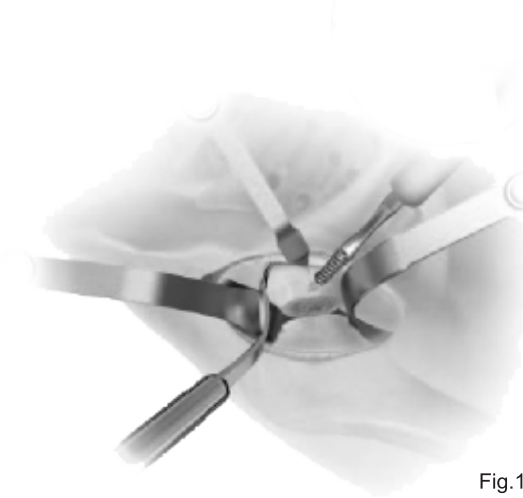


Fig.10

## VIII. Exposure of the Acetabulum

After exposing the borders of the acetabulum, place the following three DAA retractors (Fig. 11):

- 1.Place DAA retractor on the anterior aspect of the acetabulum, as shown above.
- 2.Place another DAA retractor, on the posterior border of the acetabulum. Downward pressure on this retractor should bring the femur posterior, providing excellent acetabular visualization. A small incision may need to be made in the posterior capsule.
- 3.Place a long, curved, DAA retractor on the inferior side of the acetabulum, behind the transverse acetabular ligament.



Fig.11

### IX. Reaming the Acetabulum

Remove any central osteophytes with an osteotome to help prevent small reamers from slipping anteriorly or posteriorly. The true acetabular floor is now exposed and reaming can be started. Start reaming horizontally until you reach the true floor and then go progressively to 45° lateral inclination and 15° to 20° of anteversion (Fig. 12).

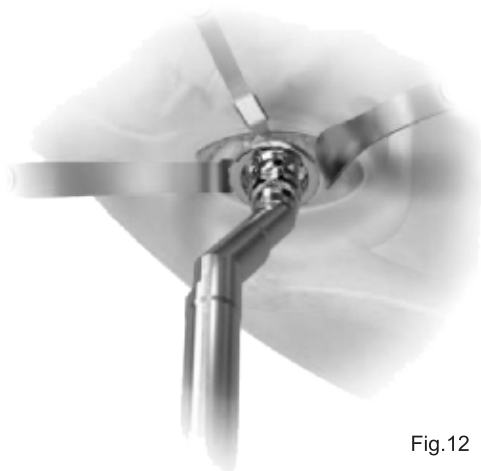


Fig.12

### X. Cup Impaction

Insert the appropriate cup using the DAA offset acetabular cup impactor and anterior version guide (Fig. 13).

Note: The cup should be placed with 10° to 15° anteversion and 40° to 45° abduction.

A C-arm may be used to verify cup position and seating if necessary,

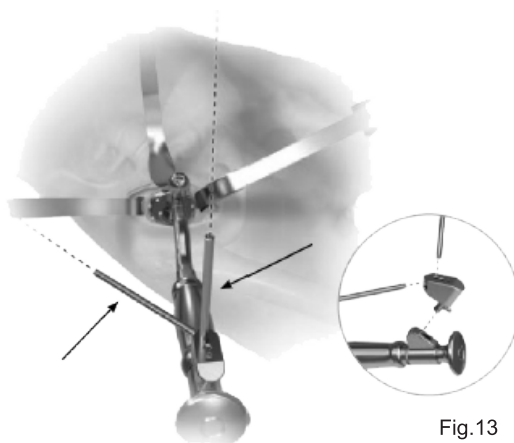


Fig.13

### XI. Femoral Exposure

Place the operative leg in a gentle figure-four position under the opposite leg and knee (Fig. 14-a/14-b). Slight adduction and 90° of external rotation are necessary, but avoid excessive flexion of the knee of the operative leg. Approximately 45° of flexion should be sufficient. Flexion beyond this can place increased tension on the rectus making femoral elevation more difficult.

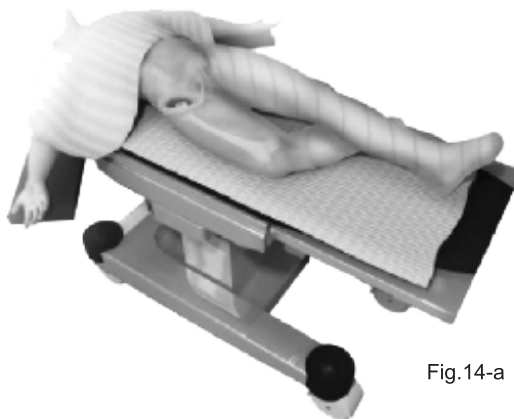


Fig.14-a

Bluntly use a finger to dissect under the TFL and locate the greater trochanter. Follow the dissecting finger around the anterior and lateral trochanter to ensure no entrapment of posterior soft tissues. Abduct and externally rotate the leg slightly and elevate the femur with a hook to assess the need for posterior soft tissue releasing. The piriformis fossa must be fully exposed, which releases the superior hip capsule. This is all the releasing that is usually required. If needed, place a curved clamp between the posterior capsule and the rotators to protect the posterior tissues as the capsule is released.

Use a suitable DAA retractor as a femoral neck elevator by placing it under the tip of the greater trochanter. Progressively lift the femur until the osteotomy plane can be reached through the skin incision. Place it between the greater trochanter and the abductor.



Fig.14-b

Place a second DAA retractor on the femur medial to the osteotomy plane. This medial retractor will move the proximal femur laterally, preventing entrapment of the trochanter on the posterior acetabulum.

Once the proximal femur and the osteotomy plane are well visualized, final soft tissue releasing from the lateral femur can be performed (Fig. 15).

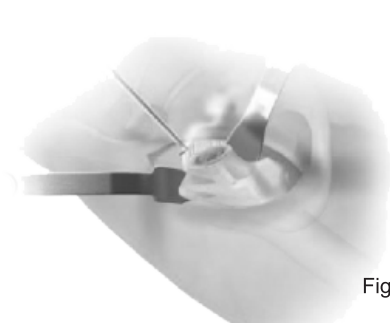


Fig.15

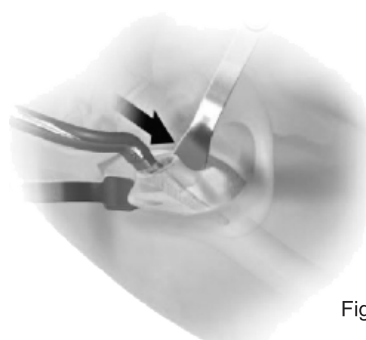


Fig.16

## XII. Femoral Canal Preparation

Open the femoral canal with an offset Intramedullary driver-extractor with Pulp opening device (Fig. 17/18). Take care to ensure appropriate alignment within the femoral canal. Impaction of a vertical broach handle (excessive varus stem position) can lead to perforation of the lateral cortex.

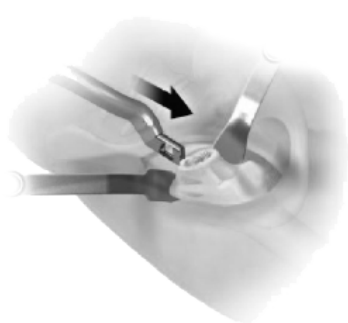


Fig.17

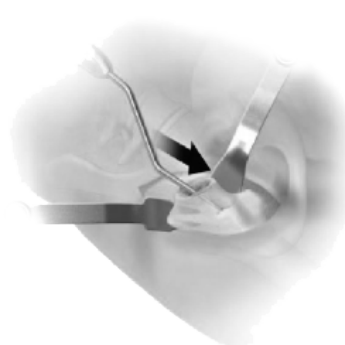


Fig.18

With the leg in full extension and externally rotated so the foot is parallel to the floor, start broaching the femoral canal with the smallest full-tooth broach, using the curved handle. And enlarge the broach in turn until a satisfied shape of femoral canal is achieved (Figure 19). This will usually permit normal anteversion of the femur, which is also partly determined by the shape of the endosteal canal. Cortical bone of the posterior femoral neck can aid in aligning appropriate version of the femoral component.

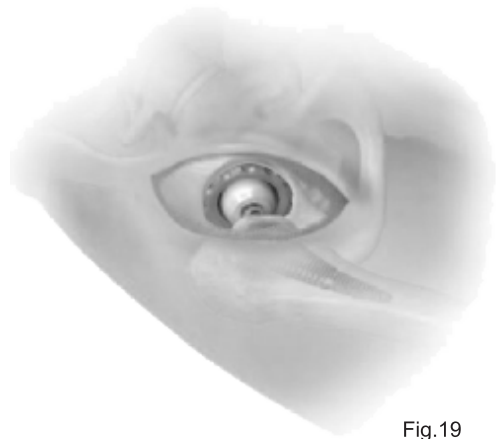


Fig.19

### **XIII. Trial Reduction**

Position the operated leg in extension and apply traction. When the femoral head is positioned over the acetabular cup, the assistant should apply gentle internal rotation until reduction is obtained. Check stability and leg length. Perform intraoperative fluoroscopic evaluation.

### **XIV. Stem Implantation**

Complete insertion of the femoral stem and perform final implant reduction (Fig. 20,21). Test stability again. Perform a fluoroscopic evaluation of final implant position, if desired.

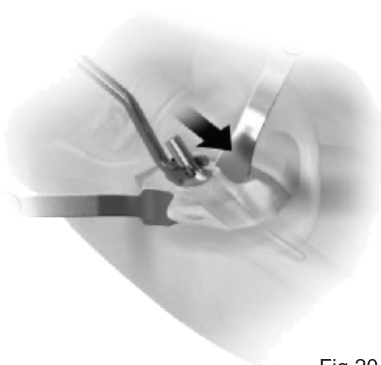


Fig.20

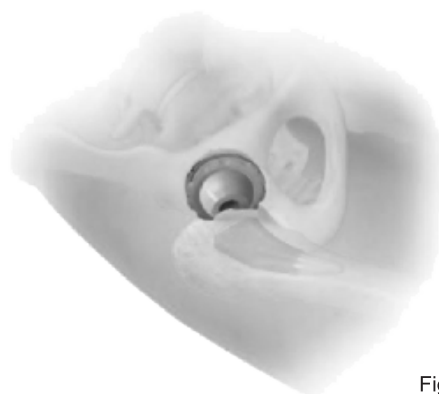


Fig.21

## Specification

### ● 3D SEE®

Trabecular Acetabular Cup  
(DDH)

REF	Specification	Outer Diameter	Liner	Femoral Head
549133	44	44	44/28	28
549134	46	46	46/28	28

### ● 3D SEE®

Trabecular Acetabular Cup  
(Standard)

REF	Specification	Outer Diameter	Liner	Femoral Head
549135	48	48	48/28	28
549136	50	50	50/28,50/32	28/32
549137	52	52	52/28,52/32,52/36	28/32/36
549138	54	54	54/28,54/32,54/36	28/32/36
549139	56	56	56/28,56/32,56/36	28/32/36
549140	58	58	58/28,58/32,58/36	28/32/36
549141	60	60	60/28,60/32,60/36	28/32/36
549142	62	62	62/28,62/32,62/36	28/32/36
549143	64	64	64/28,64/32,64/36	28/32/36
549144	66	66	66/28,66/32,66/36	28/32/36

### ● 3D

Trabecular Acetabular Cup  
(Revision JCT)

REF	Specification	Outer Diameter	Liner (Standard)	Liner (10°)	Femoral Head
858116	48	48	48/28	48/28; 48/32	28/32/36
858117	50	50	50/28; 50/32	50/28; 50/32	
858118	52	52	52/32; 52/36	52/28; 52/32	
858119	54	54	54/32; 54/36	54/28; 54/32	
858120	56	56	56/32; 56/36	56/28; 56/32	
858121	58	58	58/32; 58/36	58/28; 58/32	
858122	60	60	60/32; 60/36	60/28; 60/32	
858123	62	62	62/32; 62/36	62/28; 62/32	
858124	64	64	64/32; 64/36	64/28; 64/32	
858125	66	66	66/32; 66/36	66/28; 66/32	

### ● HAR.TI+HA® Liner (10°)

REF	Specification	REF	Specification	Material
832852	44/28	853175	48/32	Germany UHMWPE
832853	46/28	832864	50/32	
832854	48/28	832865	52/32	
832855	50/28	832866	54/32	
832856	52/28	832867	56/32	
832857	54/28	832868	58/32	
832858	56/28	832869	60/32	
832859	58/28	832870	62/32	
832860	60/28	832871	64/32	
832861	62/28	832872	66/32	
832862	64/28			
832863	66/28			

● **HAR<sub>Ti+HA</sub>**® Liner (10°)

REF	Specification	Femoral Head	Material
549152	44/28	28	Germany Highly Crosslinked PE
549153	46/28		
549154	48/28		
549155	50/28		
549176	50/32	32	
549177	52/32		
549178	54/32		
549179	56/32		
549180	58/32		
549181	60/32		
549164	52/36	36	
549165	54/36		
549166	56/36		
549167	58/36		
549168	60/36		
549169	62/36		
549170	64/36		
549171	66/36		

● Ceramic Femoral Head

REF	Model	Specification	Outer Diameter	Material
549083	CT-I	28 12/14 S	28	Ceramic
549084		28 12/14 M		
549085		28 12/14 L		
549172		32 12/14 S	32	
549173		32 12/14 M		
549174		32 12/14 L		
549175		32 12/14 XL		
549086		36 12/14 S	36	
549087		36 12/14 M		
549088		36 12/14 L		
549089		36 12/14 XL		

● **MINI**®  
Minimally Invasive Stem,  
Ti+HA (Vacuum Plasma Sprayed)

REF	Specification	Stem length	Neck Angle	Offset
548927	06	114	130°	36
548928	07	116	130°	36
548929	08	118	130°	38
548930	09	120	130°	38
548931	10	122	130°	40
548932	11	124	130°	40
548933	12	126	130°	42
548934	13	128	130°	42
548935	14	130	130°	44
548936	15	132	130°	44

## X ray



Preoperative



Postoperative

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Version: 202411-22