



VERSYS HERITAGE[®]
CDH
HIP PROSTHESIS



Surgical
Technique
for CDH Hip
Arthroplasty

SURGICAL TECHNIQUE FOR VERSYS HERITAGE CDH HIP PROSTHESIS

By:

Dennis K. Collis, M.D.
Eugene, OR

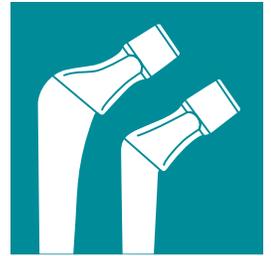
Professor José Couceiro, M.D.
Santiago de Compostela, Spain

Richard C. Johnston, M.D.
Des Moines, IA

Eduardo A. Salvati, M.D.
New York, NY

CONTENTS

ANATOMICAL CONSIDERATIONS	2
PREOPERATIVE PLANNING	4
SURGICAL TECHNIQUE	4
Approach	4
Determination of Leg Length	5
Femoral Neck Osteotomy	5
Preparation of the Femoral Canal	6
Trial Reduction	8
Distal Centralization (Optional)	9
Cement Introduction and Stem Insertion	10



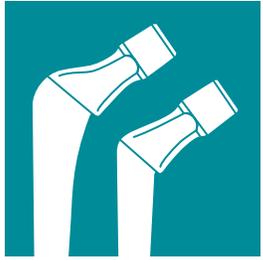


Fig. 1

ANATOMICAL CONSIDERATIONS

Developmental dysplasia and congenital dislocation of the hip present a spectrum of pathological anatomical characteristics. Mild developmental dysplasia does not require any special surgical reconstruction or specific prosthetic components. However, as the dysplasia becomes moderate to severe, the acetabular reconstruction may necessitate a high hip center or a superolateral bone graft.

As the anatomical abnormality increases, the proximal third of the femur becomes increasingly hypoplastic and the medial aspect becomes straighter. The femoral neck is anteverted and in valgus. The stem must match the resultant endosteal anatomy. Accordingly, it must be smaller, with a straighter medial side. **The VerSys Heritage CDH size 10 hip prosthesis meets these anatomical requirements (Fig. 1).**

Congenital dislocation presents the greatest of the anatomical abnormalities described above. In addition, the femoral head is dislocated in an iliac position. The acetabular component must be placed in the true acetabulum, which is hypoplastic and can only accommodate a 22mm prosthetic head. As the femur is reduced to the true acetabulum, the soft tissues are lengthened, frequently requiring shortening of the proximal femur to avoid the risk of neurovascular complications. The stem must have a straight medial border, a varus neck, and a smaller size to match these anatomical constraints. **The VerSys Heritage CDH size 9 hip prosthesis meets these anatomical requirements (Fig. 2).**

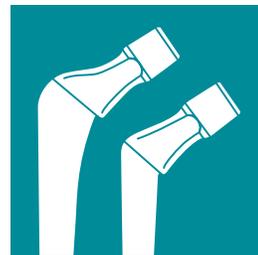
Note: Due to the design of the CDH stems, the following weight restrictions apply.

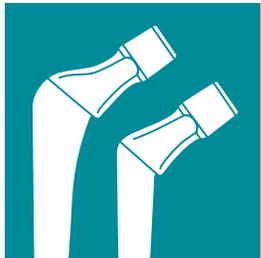
Size 9 CDH – 125 lbs

Size 10 CDH – 140 lbs



Fig. 2





PREOPERATIVE PLANNING

Careful preoperative templating is essential because the anatomical abnormalities may require the implantation of special prosthetic components, which may not be routinely available in most hospitals. Preoperative templating determines:

- 1) The anticipated stem size, which should fit within the endosteal proximal medullary canal.
- 2) The anticipated center of rotation of the prosthetic head in relation to the anticipated center of the acetabular component, taking into consideration any correction of leg length discrepancy. The plan should be made for a +0 head, which allows the freedom of going up or down in length, if necessary. When utilizing the size 9 or size 10 CDH stem, **the femoral head length of 10.5 is not to be used.** If you are planning to use a 22mm head, remember that the options only include -2, +0, and +3.
- 3) The height and angle of the femoral neck osteotomy, referenced to anatomical landmarks, which include, based on surgeon's preference, the superior border of the lesser trochanter, the inferomedial border of the femoral head, and the superior tip of the greater trochanter.

SURGICAL TECHNIQUE

Approach

Exposure can be achieved through a variety of methods. The *VerSys Heritage* CDH Implant can be inserted with equal ease using a posterolateral, anterolateral, straight lateral, or transtrochanteric approach.

Patients who are classified with Crowe Types III and IV usually will have excessive femoral anteversion. One has the option of resecting the proximal femur down to the lesser trochanter or lower, if necessary, to allow reduction of the hip after insertion of the femoral component or of osteotomizing the femur at the subtrochanteric level. Subtrochanteric osteotomy will allow derotation of the femoral anteversion, and shortening of the femur below the level of the lesser trochanter.

For any of these approaches, position the patient on the operating table in the true lateral position. This position must be accurately determined and firmly maintained. Relating to this position as well as the bony landmarks of the pelvis, facilitates the precise orientation of the acetabular component. Flex the contralateral hip and knee at approximately 45 degrees, assuring that the leg is well-padded and secured to the table.

Determination of Leg Length

After exposing the joint, establish landmarks and obtain measurements before dislocating the hip. This will allow a comparison of leg length and femoral offset after reconstruction to achieve the goals established during preoperative planning. There are several methods to measure leg length. One method is to place one pin in the iliac wing and another pin parallel to the first pin in the greater trochanter. Then measure the distance between them. This measurement is done with the leg in the neutral position, a position that can be reproduced after the new implant has been inserted.

Femoral Neck Osteotomy

Dislocate the femoral head and establish good visualization of the upper femur. Place the *VerSys Heritage* CDH Osteotomy Guide over the exposed proximal femur (Fig. 3). Position the guide based on the preoperative planning, and at the predetermined distance from the superior border of the lesser trochanter, the inferomedial border of the femoral head, and the superior tip of the greater trochanter. The longitudinal axis of the guide should be parallel to the longitudinal axis of the femur.

Note: The guide was intended to be used for the size 10 implant and not for the size 9 implant. This is due to the abnormal anatomy of cases where a size 9 implant is indicated.

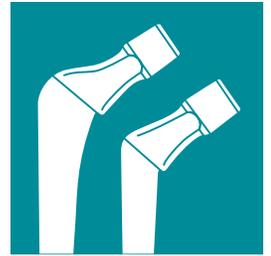
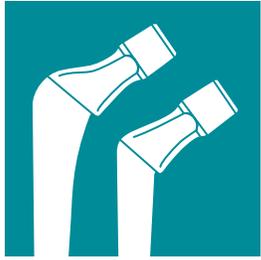


Fig. 3



Preparation of the Femoral Canal

After removing osteophytes, particularly anterior osteophytes that may limit post-operative flexion, use the Box Osteotome and/or the Trochanteric Reamer to remove the medial portion of the greater trochanter and lateral femoral neck. This will help ensure neutral axial alignment of the stem without damaging the abductor musculature. Usually, the lateral corner of the Box Osteotome is placed in the piriformis fossa (Fig. 4). After removing this cortical bone, insert the Tapered Awl to open the medullary canal (Fig. 5).



Fig. 4



Fig. 5

Find the center of the femoral canal by reaming just anterior and medial to the trochanteric fossa. Use a powered Trochanteric Reamer to ream laterally toward the greater trochanteric bone so that the rasp can be placed in a neutral varus/valgus alignment (Fig. 6).

Use the *VerSys Heritage* CDH Rasps when preparing the canal for a *VerSys Heritage* CDH Implant. In this pathology, the surgeon should advance the rasp to correct for excessive anteversion. This correction may

dictate the implantation of a smaller stem than predicted in preoperative planning. Ideally, the femoral component should not be implanted with more than 20 degrees of anteversion.

There are three rasps within the *VerSys Heritage* CDH System. Begin with the starter rasp (size 8) and proceed to the size 9 rasp. The rasp should advance easily with each moderate tap of the mallet (Fig. 7). **Rasp the femoral canal with sequentially incremental rasp sizes until adequate resistance is obtained and the cortical envelope is filled.**

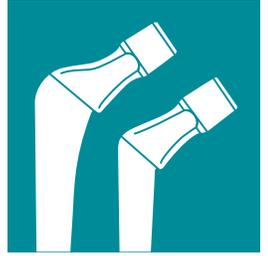
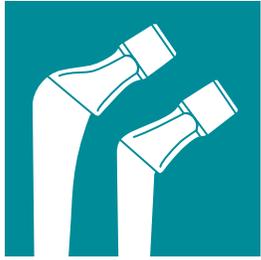


Fig. 6



Fig. 7



Trial Reduction

Select the provisional stem based on rasp size and preoperative planning. Use the VerSys® Hip System IM Sizers to determine the size of the Provisional Distal Centralizer that will pass freely into the canal (Fig. 8). If the IM Sizer is tight in the canal, choose a Provisional Distal Centralizer one size smaller than the size of the IM Sizer. Attach the Provisional Distal Centralizer to the Stem Provisional (Fig. 9). Turn the Provisional Distal Centralizer clockwise on the threads of the Stem Provisional until it will no longer turn. Then make a visual check to ensure that it is completely on.



Fig. 8

Provisional Distal Centralizers are available in 1mm increments, from 9mm to 14mm. The function of the Provisional Distal Centralizers is to help stabilize the distal tip of the implant during the trial reduction of the hip.

Important: *Insert the Stem Provisional assembly into the femoral canal (Fig. 10) to verify that the final implants will fit the femoral anatomy.*



Fig. 9

Perform a trial range of motion, particularly assessing stability in hyperflexion, internal rotation, and adduction. Assess the tension of the sciatic nerve, especially when the lower extremity has been lengthened more than 2cm.

Various methods to determine leg lengthening are available, and the surgeon should rely on whichever is most familiar (leg length caliper inserted into the iliac wing, bony marks on the proximal femur in relation to marks on the posterior acetabular column, etc.).



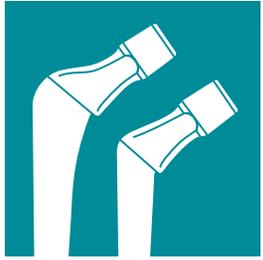
Fig. 10

Distal Centralization (Optional)

If a Distal Centralizer is to be used, select a Distal Centralizer that matches the size of the Provisional Distal Centralizer used with the provisional implant. The inner diameter of the Distal Centralizer has a slight taper through its length. Before attaching the Distal Centralizer to the stem, apply a thin layer of cement to the distal tip or fill the hole of the centralizer with cement. This will provide a good bond between the stem and Distal Centralizer. When attaching the centralizer, introduce the tip of the stem through the opening on the flat side of the centralizer (Fig. 11). Advance the centralizer on the stem tip with a minimum force until it comes to rest in its final position. **The centralizer does not need to be twisted or forced onto the stem.**



Fig. 11



The main body of the stem should be protected from the operating team's gloved hands while the centralizer is attached. It is recommended that the original plastic cover on the stem be kept on the body of the stem while the distal centralizer is applied, and until just before insertion so that the polished stem surface remains untouched until placed into the cement bed in the canal (Fig. 12).

Cement Introduction and Stem Insertion

Prepare the canal with pulsatile lavage irrigation and dry it thoroughly. Place a distal cement restrictor at a depth to allow 1.5-2cm of cement below the tip of the prosthesis. When the cement has attained a doughy consistency, inject the cement into the canal in a retrograde fashion and firmly compress it (Fig 13).



Fig. 12



Fig. 13

Check to ensure that the 12/14 neck taper is clean and dry. The femoral head is placed on the taper with a twisting motion until it locks onto the taper. Then impact it with one firm strike of the mallet. Check the security of the head by trying to remove it by hand.

During stem insertion, the stem axis should be parallel to the longitudinal axis of the femur.

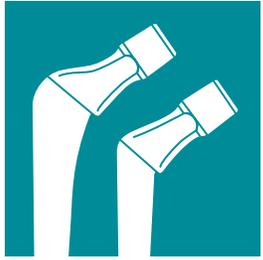
Insert the stem to within 1 cm of the neck cut (Fig. 14). Then remove excess cement to provide a clear view of the final seating. Continue seating the implant until the minimized collar duplicates the position identified and marked during trial reduction with the stem provisional (Fig. 15).



Fig. 14



Fig. 15

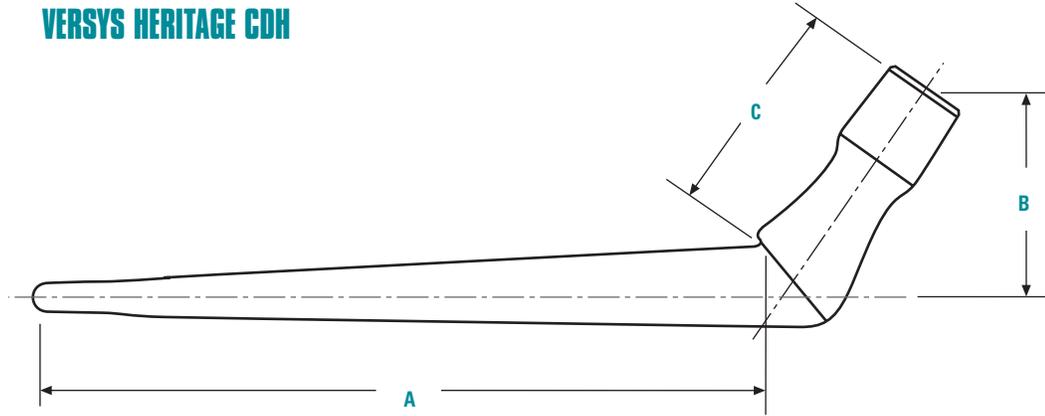


After insertion, hold the prosthesis by the neck, or use a femoral head impactor to hold the prosthesis in place. This prevents the inadvertent application of torsional forces on the prosthesis while the cement is hardening. The minimized collar often rests on part of the posterior medial cortex of the cut neck, but this is not intended to be load bearing through collar-calcaneal contact.

After the cement has completely hardened, reduce the hip. Then check range of motion, stability, leg length, and soft tissue tension. Finally, close the wound layers appropriately.

No extraction hole is necessary because the *VerSys Heritage* Hip is a polished stem, which can be disimpacted from its surrounding cement mantle by removing cement from the proximal lateral portion of the stem and striking the minimized collar in a retrograde fashion.

VERSYS HERITAGE CDH



VerSys Heritage Revision Prod. No.	Stem Size	A Stem Length (mm)	B Offset (mm) When Head/Neck Component Selected is:					C Neck Length (mm) When Head/Neck Component Selected is:					Average Cement Mantle Thickness (mm)
			-3.5	0	+3.5	+7	+10.5	-3.5	0	+3.5	+7	+10.5	
7857-09	9	110	25	28	31	34	37	28	31	35	38	42	1.0
7857-10	10	115	32	35	38	41	44	28	31	35	38	42	1.0

All sizes may not be available. Contact your Zimmer representative for additional information.