M²a-Magnum™ Dual Mobility Hip System

Surgical Technique
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Preoperative Planning, Incision and Surgical Exposure

Accurate preoperative planning and templating are essential for obtaining a successful outcome. Estimate the acetabular size using the M’a-Magnum templates (Part No. 157500) along with the appropriate femoral templates in the A/P view (Figure 1). The surgical approach, head resection and acetabular exposure are left to the surgeon’s discretion. M’a-Magnum instrumentation is compatible with all routine hip exposures (Figure 2).
Acetabular Reaming and Shell Trialing

M²-a-Magnum Shell

Prepare the acetabulum using acetabular reamers, while maintaining the appropriate amount of anteversion and abduction as desired (Figure 3). Once the desired ream has been achieved, select the implant 1–2 mm larger than the final ream (e.g., ream to 54 or 55 mm for 56 mm implant).

Note: Under-reaming of the acetabulum is dependent on bone quality and should be determined by the surgeon intraoperatively as soft bone will more readily accommodate a larger press-fit than harder, sclerotic bone.

M²-a-Magnum Tri-Spike™ Shell

Prepare the acetabulum using acetabular reamers, while maintaining the appropriate amount of anteversion and abduction as desired (Figure 3). The M²-a-Magnum Tri-Spike shell should be reamed in a line-to-line fashion, under reaming by 1 mm if bone quality is insufficient. Use shell provisionals throughout the reaming process to help determine accuracy, size and position of the final prosthesis (Figure 4).

Note: Prior to final shell insertion, evaluate osteophytes for possible impingement. If necessary, remove circumferential osteophytes. This can be done by leaving the final reamer in place as a guide to the degree of resection necessary.
Shell Orientation

Once the final shell prosthesis is determined, select the corresponding locking impactor plate. Prior to securing the plate to the inserter handle, it is imperative that the ball bearings on the sleeve are fully exposed (Figure 5). Attach the plate by firmly pushing the tip of the inserter onto the impactor plate (Figure 6). A “click” is felt and heard when the impactor plate is fully engaged.

For reference in establishing correct shell positioning, the positioning guide can be attached onto the inserter handle (see page 6).
Shell Orientation (cont.)

M2a-Magnum Tri-Spike Shell

For reference in establishing correct positioning of the M2a-Magnum Tri-Spike shell, the positioning guide can be used with the inserter handle (see page 6). Place the shell straight down in the wound (Figure 7), lightly setting the top two spikes into the acetabulum.

Move the inserter handle into proper version and inclination, allowing the bottom spike to drop into position. Orient the shell so two spikes are placed superior in the ilium and one spike is placed inferiorly near the pubic ramus (Figure 8).
Positioning Guide – Lateral Position

Note: The primary guide for acetabular shell position should be based on the patient’s anatomy. These instruments rely heavily on patient position and are intended to be used only as a secondary check.

Screw the guide rods into the desired locations for inclination (40 or 45 degrees) and anteversion (15, 20, or 25 degrees). For a right hip, place the version guide rod in one of the holes on the right side of the positioner, as the handle is pointing toward the patient. For a left hip, place the version guide rod in one of the holes on the left side of the positioner, as the handle is pointing toward the patient.

When positioning the acetabular shell, the version guide rod should be aimed toward the patient’s ipsilateral shoulder and the inclination guide rod should point straight to the ceiling. If the inclination guide rod does not point to the ceiling, rotate the guide connector on the inserter handle until it does.

Positioning Guide – Anterior Supine (ASI) Position

Screw the rods into the desired locations for inclination (40 or 45 degrees) and anteversion (15, 20, or 25 degrees). For a right hip, place the version guide rod in one of the holes on the left side of the positioner, as the handle is pointing towards the patient. For the left hip, place the version guide rod in one of the holes on the right side of the positioner, as the handle is pointing toward the patient.

When positioning the acetabular shell, the version guide rod should be aimed up the patient’s spinal column, and the inclination guide rod should point straight to the ceiling. If the inclination guide rod does not point to the ceiling, rotate the guide connector on the inserter handle until it does.
Shell Insertion

M²a-Magnum and M²a-Magnum Tri-Spike Shell

Once appropriate shell positioning is achieved, remove the positioning guide.

When implanting the M²a-Magnum Tri-Spike shell, avoid catching the spikes on soft tissue, the femur or the acetabular rim. In addition, avoid placement of spikes into cystic areas and particularly thin areas of the acetabular floor and wall, if possible. Once desired position is achieved, tap the inserter handle to set the spikes into the acetabulum 2–3 mm. Ensure shell position is accurate, then fully seat the shell by impacting with a surgical mallet.

In some patients with hard bone, a two-stage insertion and impaction process is recommended. Use the locking impactor plate to obtain proper orientation and start shell impaction. Once satisfied with the shell position, stop impaction prior to seating the upper edge of the shell into the rim of the acetabulum. Remove the locking impactor plate and handle by turning the “strike plate” knob clockwise (Figure 11), then lift the plate off the face of the shell (Figure 12).

Use the appropriately sized dome-loading ball impactor for final seating of the component (Figure 13).

Note: Do not use an impactor or a metal-tipped punch on the rim of a standard M2a-Magnum shell.

If changes need to be made to the anteversion or inclination angles once the shell is impacted, use one of the optional face plates or a curved, plastic-tipped shell tamp. Tap on the plate to gradually change shell position. This will protect the inner diameter of the shell.
Bearing Trialing

The size of the bearing used is determined by the size of the M2a-Magnum shell that is implanted. The outer diameter (OD) of the bearing is always six mm less than the OD of the shell (i.e., a 60 mm shell utilizes a 54 mm bearing).

The horizontal offset in the M2a-Magnum Hip System is controlled through the 28 mm femoral head. Trialing with the M2a-Magnum head and neck provisionals helps determine the horizontal offset.

Provisional necks are available in five offsets (-6, -3, Std., +3, +6 mm). Screw the provisional neck into the provisional head then attach to the trunnion (Figure 14). Head and neck provisionals can be used in conjunction with both the shell provisionals and the final implants to determine joint stability and proper shell placement. With the shell in place, and upon completion of femoral reconstruction, a trial reduction should be performed to confirm restoration of leg length and hip stability.

Based on the provisional head component and the estimated provisional neck length, the corresponding 28 mm head must now be selected.

28 mm heads for the M2a-Magnum Hip System are available in cobalt chrome heads, one piece ceramic heads, or ceramic heads with taper adaptors.
Assembly of the Dual Mobility Bearing and Femoral Head

Select the appropriate Dual Mobility Bearing corresponding to the definitive Magnum Shell implanted.

Next, select the appropriately sized modular head corresponding to the Dual Mobility Bearing selected and the preferred head offset determined during trial reduction.

⚠️ Note: It is not recommended to utilize skirted heads.

Option 1: Back Table assembly of the Dual Mobility Bearing Construct

The Dual Mobility Head Press can be used to assemble the Dual Mobility Bearing Construct on the back table. Completely unscrew (open) the Head Press. Slide the baseplate onto the forked end of the press (Figure 15). Tighten the baseplate to the press with the knob (Figure 16).
Assembly of the Dual Mobility Bearing and Femoral Head (cont.)

Place the femoral head on the black lug of the baseplate (Figure 17). Position and hold the polyethylene bearing above the femoral head. Rotate the press handle clockwise until the head is forced into the polyethylene bearing (Figure 18) and a distinctive “pop” is heard.

Note: If using a ceramic head with a taper adaptor, insert the appropriate taper sleeve prior to placing the head on the black lug.

Note: Due to large diameter size, bearings 50mm or larger may need to be rotated around the femoral head to reach vertical alignment inside the head press.

Open the press by rotating the handle counterclockwise. Check that the femoral head rotates freely within the polyethylene bearing. If it does not rotate freely, the femoral head is not properly engaged. In this case, place the construct back on the bearing press and repeat the compression steps.

Option 2: In-Situ preparation of the Dual Mobility Bearing Construct.

Alternatively, the Dual Mobility Head Press may be used to assemble the Dual Mobility Bearing Construct with the Modular Head already assembled to the Stem Trunnion.

Position the forked end of the press around the neck of the femoral stem and hold the polyethylene bearing above the femoral head. Rotate the press handle clockwise until the head is assembled into the polyethylene bearing and a distinctive “pop” is heard.

Open the press by rotating the handle counterclockwise and check that the dual mobility bearing rotates freely on the modular head. If it does not rotate freely, the femoral head is not properly engaged. In this case, place the head press back on the bearing press and repeat the compression steps.
**Dual Mobility Construct Impaction**

With the definitive acetabular shell in place, and upon completion of femoral implantation and trial reduction, the dual mobility construct can now be implanted. After fully seating the femoral component, position the dual mobility construct onto a dry and clean trunnion. Fully seat dual mobility construct by means of firm axial impaction utilizing the Femoral Head impactor (Figure 19).

**Note:** Using a non-compatible bearing impactor could damage the Dual Mobility Bearing.

**Note:** Do not insert a damaged dual mobility bearing. Do not insert a dual mobility bearing into a damaged or improperly oriented/positioned shell.

**Note:** If using a modular ceramic head with a taper sleeve insert, it is important that the taper sleeve is new as a used taper can reduce fatigue strength of ceramic components.

**Final Reduction**

Once all final implants have been placed, perform the final reduction of the hip. Check for joint stability and range of motion, making any necessary adjustments to restore joint mechanics (Figure 20).
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