



AK
MEDICAL



AK-ML

Surgical Technique

Preoperative Planning

Preoperative planning enables the surgeon to prepare for the case and anticipate situations that may arise during surgery. A thorough preoperative plan incorporates elements from the patient's history, physical examination and radiographic analysis.

Preoperative Planning Goals

1. Determine preoperative leg length discrepancy
2. Assess acetabular component size and placement
3. Determine femoral component size, position and fit
4. Assess femoral offset

Radiographs

The first step in accurate templating is obtaining high-quality radiographs using a standardized protocol with known magnification markers attached to the patient's leg at the level of the greater trochanter to verify magnification.

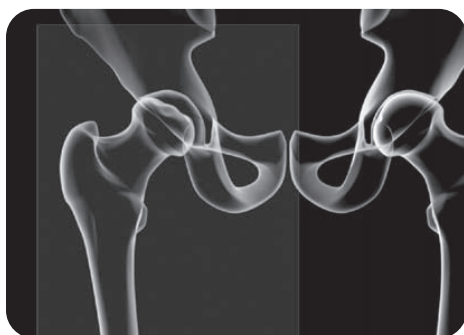


Obtain an anterior/posterior (A/P) view of the pelvis with both extremities in 15 degrees of internal rotation to position the head and neck parallel to the coronal plane. A direct lateral radiograph should also be obtained and used to determine three-point femoral fixation.

Acetabular Cup Size and Position

Most sizing predictions are made on the A/P radiograph of the hip. Determine the optimal position for the acetabular component and predict the size using template overlays. The acetabular teardrop can be referenced as the inferior margin of the acetabular reconstruction.

The goal in cementless acetabular fixation is to maximize bone contact. Once this is determined, mark the intended center of rotation of the bearing surface on the radiograph.



Determination of Leg Length Discrepancy

To determine existing preoperative leg length, perform a clinical evaluation in conjunction with a radiographic analysis. Use both to determine intraoperative leg length management.

As an estimate of leg length discrepancy radiographically, draw a reference line through the bottom of the obturator foramina. Measure the distance from the lesser trochanter landmark to the reference line on each side. The difference between the two is the radiographic leg length discrepancy. The tip of the greater trochanter may be used as an alternative reference mark in conjunction with the lines through the obturator foramina.

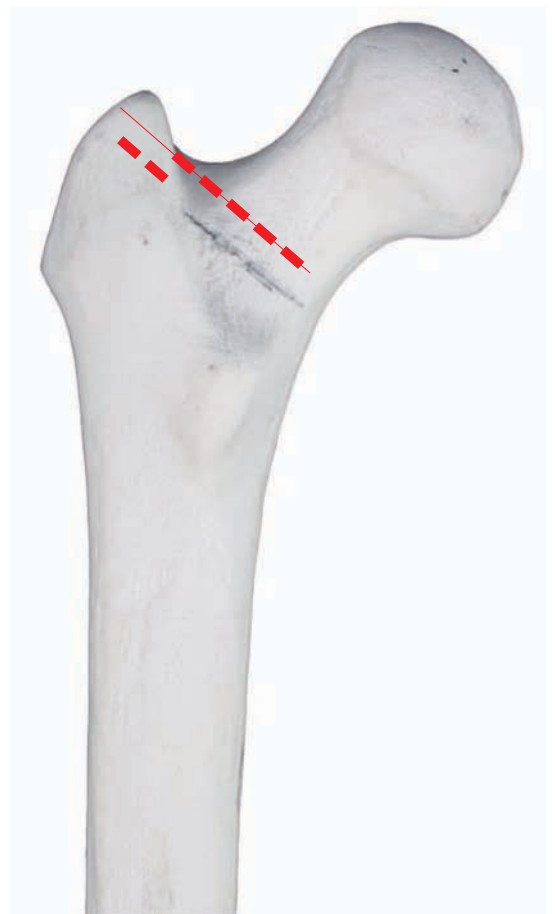
Cementless Femoral Component Selection

Select the femoral component template size that will fit the proximal femur and equalize leg lengths. The tapered geometry of the ML Cementless Femoral Stem does not require distal canal fill.

The femoral template should be in line with the long axis of the femur and the neck resection line drawn at the point where the selected stem provides the desired amount of leg length.

The vertical distance between the planned center of rotation of the acetabular component and the center of rotation of the femoral head constitutes the distance the leg length will be adjusted.

The level of neck osteotomy depends on the stem size and the desired leg length, with the goal of using a non-skirted modular head to increase range of motion prior to prosthetic impingement. To help properly position the template on the lateral radiograph, estimate the distance between the tip of the greater trochanter and the lateral shoulder of the prosthesis using the A/P radiograph.



Femoral Medullary Canal Opening

Keep the resection plane parallel to the long axis of the oblong shape created by the neck resection when opening the resection plan by offset osteotome. Make sure to remove the lateral cortical bone at the piriform fossa. Canal drill can be used to determine the orientation of medullary.

(Advantage: intra-medullary reaming process by canal drill is not needed.)



Ream the medullary canal step by step by an increment of one size until the cortex is felt. Pay attention that the depth of reaming should reference the reference line on the reamer.

To achieve proper alignment of the reamer along the long axis of the femur is important to ensure correct component positioning. Sequential reaming beginning two or three sizes below the preoperatively templated size is recommended. Resistance and chatter from cortical engagement may be used as a signal to cease tapered reaming.



Preparing the Femoral Canal

The Medullary canal rasp must move lateral bias along the canal when the entering medullary canal. Sequentially increase the size until the proper size is achieved.



Standard of the final size:

- A: Changing pitch of sound
- B: Increased resistance to forward advancement
- C: The torsion testing is negative

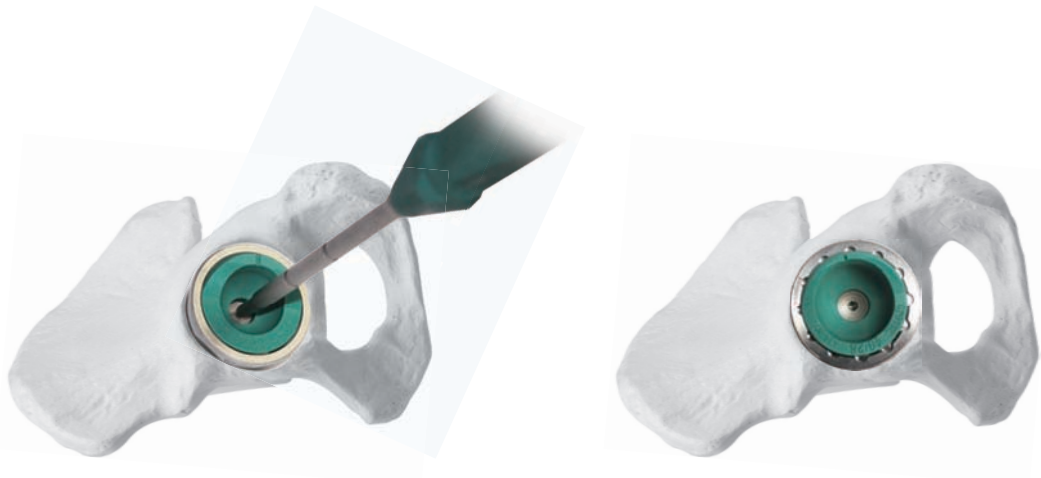
The depth of the final size must be same with the designed resection height of femoral neck; Reconfirm the resection height and leg length if they are different.



- A: The final size sinks below the level of the neck resection and the leg length is short, advance to the next larger size;
- B: The bone will be over-length if the final size sinks the level of neck resection while the leg length is suitable. So remove the calcar femoral with the greater trochanter rasp. Pull out the trial and perform new neck resection to make proper calcar femoral is also alternative.
- C: The final size is equal to or high than the level of neck resection, change a rasp with long head. Alternatively, a large size should be considered.
- D: Do not change the size if the final size is equal to or high than the level of neck resection and the leg length is suitable.
- E: The level of neck resection must be too high if the final size is high than the level of neck resection and the limb length is longer than the opposite side. Change the level of neck resection and advance a smaller size. The size can be used if it can be a perfect and stable match. If the size is not a stable match, turn to the previous size and try to make forward advancement. The limb length can be adjusted by adjusting the femoral length.

Install the Neck Trial for Restoration

Choose the stem with appropriate offset according to pre-operation design. Start with a standard offset(132°) neck angle. If the length are equal, but soft tissues are lax, move to the high offset 127° neck angle.



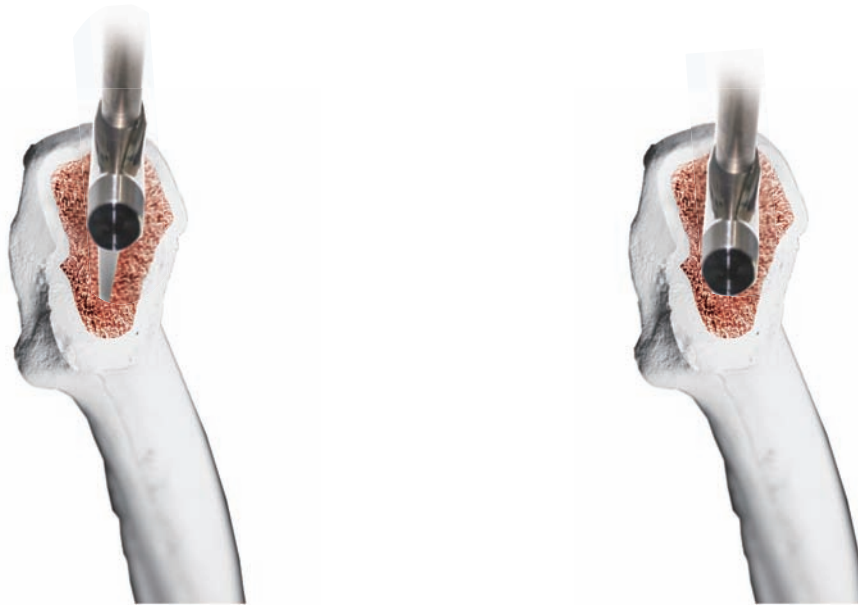
Ensure appropriate leg length and proper tension without dislocation after restoration. If there is conflicts between the leg length and tension, stability is the most important so that proper tension without dislocation should be chosen prior to the leg length. (forced to prolong the length)



Implant Insertion

After the final acetabular shell is in place, introduce the hip stem to the medullary canal. Rotate the stem into its proper orientation and advance the stem into the canal using hand pressure. The implant should meet resistance 10-15 mm above the desired final seating position. Advance the stem into position with moderate blows from the mallet. The implant is fully seated when the top of the titanium plasma spray coating is at the resection level the implant is stable.

If the stem stops moving with moderate mallet blows and is greater than 2 mm above the desired seating position, remove the implant and repeat the reaming and broaching steps. Excessive force should not be needed to seat the stem.



Insert Implantation

Gently introduce the polyethylene insert making sure that the insert flange scallops are aligned with the slot at the rim of the shell. Once the insert is seated at the initial position, slowly turn and drop the insert into the final pre-locking position.



Femoral Head Implantation

Select head trial with proper size and then place the head trial onto the stem neck taper. Check the position of prosthesis and the tension of joints. If there are any unfit, change the size of head trial followed by a second time restoration and check according to specific conditions.

Finally confirm the size of head trial before dislocate the joints. Wipe clean the neck of stem trial before placing the femoral head and then lightly impact the prosthesis until it has been firmly located.

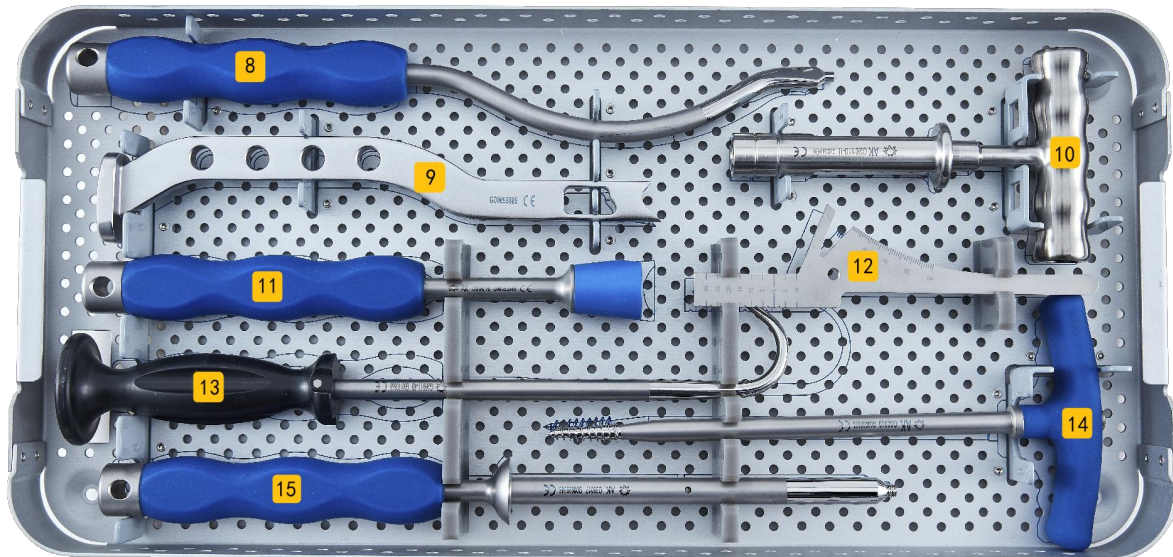
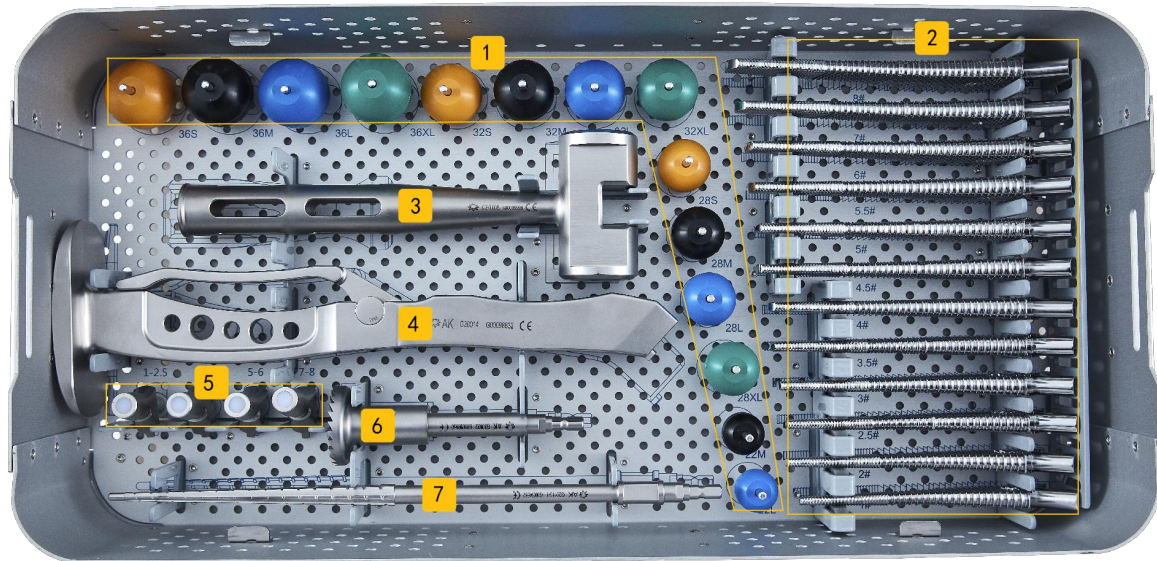


Restoration Examination

Restoration the hip system again, check the proper tension and leg length.



Instruments Set



Reference No.	Name	Specification
1	G20111-II	Femoral Head Trial x2
	G20111-II	Femoral Head Trial x4
	G20111-II	Femoral Head Trial x4
	G20111-II	Femoral Head Trial x4
2	G20102	Femoral Canal Rasp x12
3	G20105	Y-Hammer
4	G30014	Femoral Canal Rasp Handle-II
5	G20112B-II	Neck Trial 132° x4
6	G30022	Calcar Planer
7	G20113-II	Canal Drill
8	G30021	Offset Stem Impactor
9	G20103-II	Offset Box Osteotome
10	G20110-II	T-Handle
11	G30016	Femoral Head Impactor
12	G30018	Resection Template
13	G20911-40	Hook
14	G30019	Femoral Head Extractor
15	G30017	Stem Inserter/ Extractor