Biomet® Compression Hip Screw System
This brochure is presented to demonstrate the surgical technique utilized by Frank R. Ebert, M.D., Baltimore, Maryland. Biomet, as the manufacturer of this device, does not practice medicine and does not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any implant procedure is responsible for determining and utilizing the appropriate techniques for implanting the prosthesis in each individual patient. Biomet is not responsible for selection of the appropriate surgical technique to be utilized for an individual patient.
**Step 1**

Perform a closed reduction of the fracture, on the selected fracture table, check the fracture under the image intensifier in the A/P and lateral views to ensure adequate reduction and to identify areas of comminution, particularly seen posteriorly.

**Step 1a**

Operatively expose the fracture and make any appropriate modifications to the fracture reduction. Place a guide pin along the anterior portion of the femoral neck to determine anteversion of the femoral head and neck. This will act as a guide for the placement of the guide pin for lag screw fixation.
Step 1b (optional)

It is also helpful to predrill the lateral cortex with the 3/8" diameter Crowe point perforation twist drill. This facilitates a starting point and minimizes the migration of the guide pin on the lateral aspect of the femur.

Step 2

Determine the appropriate lag screw angle with the barrel plate selections being 130, 135, 140, 145, and 150 degrees. Utilize the adjustable angle guide, placed on the appropriate barrel plate angle, insert a 1/8" by 9" (3.2 x 230mm) threaded tip guide pin into the femoral head and neck in the bull’s eye position at a point 2cm distal to the vastus tubercle on the lateral aspect of the femoral shaft. It is important to select a point which is in the midline of the shaft, and the guide pin should be angled appropriately to achieve the correct anteversion. The guide pin, placed along the anterior neck, is a helpful key visually and allows for determination of anteversion in placement of the guide pin within the head and neck.
**Step 3**

Inspect the placement of the threaded tip guide pin by image intensification to ensure that it is in the bull’s eye position. This should be visualized on the A/P and the lateral views. If it is not in the appropriate position, then a 3.5mm, 5mm, and 7mm offset guide can be used to achieve the bull’s eye placement which is keyed off of the original guide pin placement.

**Step 4**

Utilize the depth gauge to determine the appropriate length of the lag screw.
**Step 5**

With the guide pin placed to subchondral bone but not through, calculate the reaming depth, tapping depth and lag screw length by subtracting 5mm from the reading of the depth gauge.

*Note: Reamer seating must be 5mm less than the reading from depth gauge.*

**Step 6**

A stabilizing pin placed 1-2cm proximal to the central guide pin can be inserted prior to reaming and is effective in preventing rotation of the head and neck while using the adjustable combination reamer. It should be considered in situations where the fracture is at the base of the femoral neck or a high inter-trochanteric fracture.
**Step 7**

Assemble the adjusted combination reamer. Set the reamer 5mm less than the guide pin/depth gauge reading. In most situations this will be the standard reamer, although a short barrel reamer is also available. The short barrel reamer is principally used for displacement osteotomies or in situations where the lag screw measures 70-75mm in length. When reaming the femoral head and neck, observe the location of the step reamer to ensure that the reamer is tracking along the guide pin. Also, in situations where dense bone is present, irrigate the opening with a solution to prevent thermal necrosis. It is sometimes useful to withdraw the reamer and clean its channels to improve the cutting capabilities. Once the reaming is complete and taken to the subchondral area of the femoral head, the reamer is then removed.

**Step 8**

If the guide pin is removed, the pin relocator is available to reinsert the guide pin in an appropriate position.
**Step 9**

A tap is used in situations where the cancellous bone is particularly firm; this is seen in younger individuals and in patients who appear to have dense bone. In osteoporotic bone, 1-2cm less than full tapping allows the screw to engage firmly in the subarticular bone.

**Note:** Set the tap 5mm less than the guide pin/depth gauge reading.

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**Step 10**

Also, in severely osteoporotic bone, one may consider using the super lag screw (15mm diameter) for which a cannulated 15mm reamer is available to open the lateral cortex.
Step 11

A trial provisional barrel plate is available for determination of the appropriate angle barrel plate.

Step 12

Once the side plate is applied, the locking compression screw may be inserted into the lag screw, thereby locking the lag screw within the barrel plate.

Note: Flats on the lag screw shaft must be in line with flats on the inserter.
**Step 13**

Once the side plate is applied, the locking compression screw may be inserted into the lag screw, thereby locking the lag screw within the barrel plate.

**Step 14**

A lag screw alignment guide IS available to align the flats on the lag screw with the lag screw inserter.
**Step 15**

The barrel/side plate is now placed over the lag screw, using the lag screw inserter as a guide. The plate is seated against the femur using the sliding hammer over the lag screw inserter. A barrel/plate impactor is also available as an option (shown below).

**Step 16**

The side plate is clamped to the lateral shaft of the femur with the bone clamp and fixed with self-tapping 4.5mm cortical screws.
Step 16a

If the surgeon selects to load the screws, an available load eccentric guide is provided with the holes having dynamic compression capability. (Load equals gold; neutral equals green.) Prior to fixation of the plate to the lateral aspect of the femur, release of the traction about the leg will allow impaction of the fracture fragments and ensure that the fracture has not been over distracted, thus lengthening the leg.

Step 16b (optional)

A 4.5mm cortical tap is available to tap hard cortical bone if indicated.
Step 17

A screw depth gauge is used to measure for correct 4.5mm screw length.

IMPORTANT NOTE:
When selecting the screw length using the screw depth gauge, remember to allow for plate thickness and distal protrusion as you read the length (mm) on the calibrated scale (average add-on, 5-8mm).

EXAMPLE:
If your scale reads 38mm, you may elect to use a 44 or 46mm screw.

Step 18

The screw are applied to the side plate and may be inserted utilizing the hex handle screw driver, or the power screw driver.
Step 18a

NOTE: Through the proximal screw hole, a 6.5mm cancellous screw can be inserted at an angle for purchase in comminuted fractures. If desired, a 4.5mm cortical screw can also be used.

Step 19 (optional)

Once the side plate is applied with all screws inserted and tightened, all traction can be released and compression carried out by means of the compressing screw. The short screw (25-196090) is usually used. The longer screw (25-196092) should be used if deeper seating of the lag screw was used for more compression. The Compressing Screw exerts a powerful force that must be correlated with the quality of the bone. If the surgeon feels that the fixation of the lag screw in the head is not secure, as in extremely osteoporotic bone, only finger pressure should be used to prevent stripping of the screw out of the bone. Some controversy exists whether to leave the compressing screw in situ or remove if after compression. If a short
Step 20

The reduction is checked under image intensification in the A/P and lateral views to ensure that the lag screw is in the appropriate position and the side plate is appropriately applied to the lateral aspect of the femur. Once accomplished, the patient then has closure of the soft tissue in a standard manner.

Removal of the Hip Screw

The most important step in removal of the hip screw is determination of the manufacturer who produced that particular implant. Although hip screws of different manufacture may look similar, most instruments for insertion and removal are not interchangeable.

Lag screw removal is accomplished by first removing the side plate. The trephine is placed over the lag screw inserter and the hex drive is engaged into the lag screw end. Advance the trephine turning clockwise. Remove inserter and trephine. Thread the removal stabilizer into the lag screw approximately 1/2".  (Fig. A below)
Removal of the Hip Screw cont.

Place the lag screw inserter over the stabilizer and secure with the knurled knob. The lag screw can now be removed by turning counterclockwise.

Reduce the fracture with provisional fixation ensuring that the provisional fixation does not obstruct the application of the screw and side plate. It is important that these pins do not interfere and that a point for lag screw insertion is selected along the lateral femur approximately 2cm proximal to the joint line and in line with the shaft of the femur. (Fig. B below)