

## SUBSPECIALTY PROCEDURES

## TRIPOD FIXATION OF PERIACETABULAR METASTATIC LESIONS USING THE ILLUMINOSS DEVICE

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Published outcomes of this procedure can be found at: *J Bone Joint Surg Am.* 2020 Apr 1; 102(7):592-9, and *Geriatr Orthop Surg Rehabil.* 2019 Apr 25;10:2151459318824904.

*Investigation performed at Duke University Medical Center, Durham, North Carolina*

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**Abstract**

**Background:** Percutaneous tripod fixation of periacetabular lesions is performed at our institution for patients with metastatic bone disease and a need for quick return to systemic therapy. We have begun to use the IlluminOss Photodynamic Bone Stabilization System instead of the metal implants previously described in the literature because of the success of the IlluminOss implant in fixing fragility fractures about the pelvis.

**Description:** At our institution, the procedure is performed in the interventional radiology suite in order to allow for the use of 3D radiographic imaging and vector guidance systems. The patient is positioned prone for the transcolumar PSIS-to-AIIS implant and posterior column/ischial tuberosity implant or supine for the anterior column/superior pubic ramus implant. Following a small incision, a Jamshidi needle with a trocar is utilized to enter the bone at the chosen start point. A hand drill is utilized to advance the Jamshidi needle according to the planned vector; alternatively, a curved or straight awl can be utilized. The 1.2-mm guidewire is placed and reamed. We place both the transcolumar and posterior column wires at the same time to ensure that there is no interference. The balloon catheter for the IlluminOss is assembled on the back table and inserted according to the implant technique guide. The balloon is inflated and observed on radiographs in order to ensure that the cavity is filled. Monomer is then cured, and the patient is flipped for the subsequent implant. Following placement of the 3 IlluminOss devices, adjunct treatments such as cement acetabuloplasty or cryoablation can be performed.

**Alternatives:** Alternative treatments include traditional open fixation of impending or nondisplaced acetabular fractures in the operating room, or percutaneous implant placement in the operating room. Implant placement may be performed with the patient in the supine, lateral, or prone position, depending on surgeon preference. Alternative implants include standard metal

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implants such as plates and screws, or cement augmentation either alone or with percutaneous screws. Finally, ablation alone may be an alternative option, depending on tumor histology.

**Rationale:** Open treatment of acetabular fractures is a more morbid procedure, given the larger incision, increased blood loss, longer time under anesthesia, and increased length of recovery. Percutaneous fixation may be performed in either the operating room or interventional radiology suite, depending on the specific equipment setup at an individual institution. At our institution, we prefer utilizing the interventional radiology suite as it allows for more precise implant placement through the use of an image-based vector guidance system and 3D fluoroscopy to accurately identify safe corridors. The use of percutaneous fixation allows for faster recovery and earlier return to systemic therapy. Because the IlluminOss implant is radiolucent, it allows for better evaluation of disease progression and can better accommodate nonlinear corridors or fill a lytic lesion to provide stability.

**Expected Outcomes:** Postoperatively, we expect the patient to be weight-bearing as tolerated with use of an assistive device. We expect the small incisions to fully heal within 2 weeks. Patients should be able to return to systemic therapy as indicated earlier than with an open procedure.

#### Important Tips:

- The use of a hand drill with the Jamshidi needle and trocar can help adjust a drilled pathway and allow for close adherence to a planned vector.
- Vector guidance systems can be useful to fully capture the area at risk for fracture and to provide maximal stability with the expandable implant, but they are not necessary to perform the procedure.
- Placing both posterior implants at the same time can be helpful to avoid interference. This is accomplished by drilling and placing the guidewire for both implants prior to reaming and placing the balloon implant.

#### Acronyms and Abbreviations:

- CT = Computed tomography
- PSIS = posterior superior iliac spine
- AIIS = anterior inferior iliac spine

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