

GE Healthcare



Ilio-sacral Screw Placement for Traumatic SI Dislocation using the OEC® 9900 Elite ^{NAV}

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figure one

Solution Overview:

Ilio-sacral screw placement for traumatic posterior pelvic ring disruptions has become the standard of care in orthopaedic traumatology. The advantages to this technique over traditional forms of posterior fixation include the ability to place the screws in either the prone or supine position with open or percutaneous techniques. The technique requires exacting knowledge of the pelvic anatomy and its radiological equivalents/landmarks.

The Procedure:

The patient is positioned prone if open reduction of the posterior pelvic ring is required, supine if not. Ilio-sacral screws are used to provide immediate stability to the posterior pelvis by rigidly fixing the ilium to the sacrum. Stability is achieved by maximal compression of the screw and the topography of the SI joint, thus resisting vertical shear deformation forces.

A large bore cannulated screw (7.3mm for example) is used. Cannulated screws are desired because of the ability to safely place the guide wire, posing less risk to anatomic structures. In addition, should multiple passes be required, less bone destruction will result with a guide wire than a large diameter screw.

Placement of the screw in either the prone or supine position, or with open or percutaneous techniques still requires considerable use of fluoroscopy. The three cardinal views commonly utilized are the Pelvic Inlet, Pelvic Outlet, and Lateral projections. The inlet view ensures that the screw trajectory is aiming for the sacral promontory. The outlet view ensures that the screw trajectory is above the S1 foramen. The lateral view helps to estimate the starting point, and ensure that the trajectory is below the iliac-cortical density and the L5 nerve root.

For proper screw placement, it is necessary to continuously shift between these three projections. Because this can be laborious, time consuming, and result in considerable radiation exposure, it is hoped that the use of the GE NAV EMF image guidance for this technique will help to improve the surgeons ability to place these screws with minimal radiation exposure and decreased anesthetic time.

The Case:

A 29 year old male sustained a vertical shear pelvic injury in a motor vehicle accident. The injury consisted of complete left sacro-iliac joint dislocation posteriorly and pubic symphysis anteriorly. The patient was positioned supine on the OR table. The GE stabilizing pin for the GE reference transmitter was easily placed into the supra-acetabular bone in the region of the anterior inferior iliac spine on the side ipsilateral to the SI joint injury.

With the patient in the supine position and the GE transmitter reference device fixed to the AIIS, we proceeded with the ilio-sacral screw placement. Using the Lateral, Inlet and Outlet images obtained for the posterior pelvis we placed guide wire for the 7.3 mm cannulated screw. After re-calibration, the long navigated drill guide was used for the SI screw

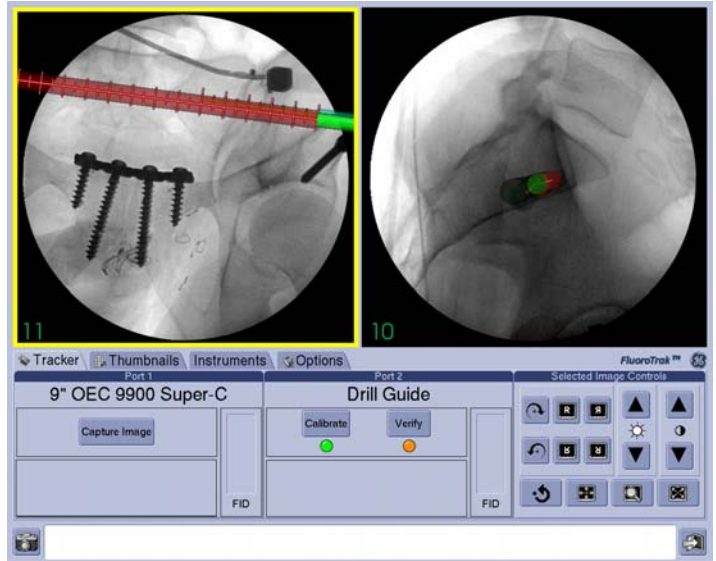


figure two

because of the depth of the gluteal soft-tissues (see figure one). The starting point was estimated using navigation on the lateral projection (see figure two). The guide wire was then passed across the SI joint into the sacrum navigating off of the inlet and outlet projections (see figure three). Intra-operative C-arm inlet and outlet were then taken to ensure accurate placement of the guide wire and screw. There was no discrepancy between the navigated trajectory and the actual placement of the guide wire as confirmed by intraoperative C-arm. Using the calibrated projection, we were able to estimate the length of screw needed.

No complications were encountered and the patient had an uneventful recovery.



figure three

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