

FLASH[™] Navigation with 7D Technology

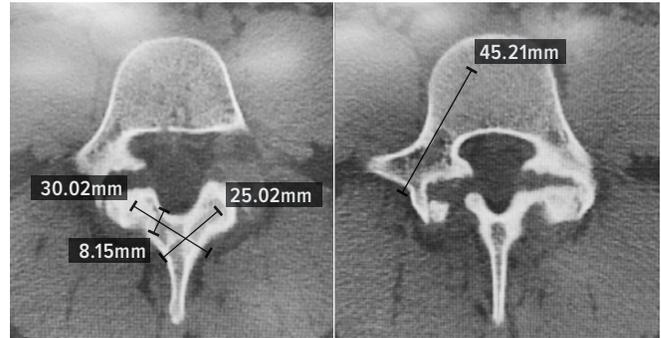
CASE STUDY—L4 Pars Fracture with Pedicle and Translaminar Screws



Surgeon Profile

SURGEON
Douglas Orndorff, MD

LOCATION
Mercy Regional
Medical Center
Durango, CO



Pre-planning done on MRI for screw length and diameter.

Case Highlights

- 4 screws guided
- Registration performed
 - Registration workflow time: 77.1 seconds
 - 7D processing time: 0.3 seconds
 - Points registered: 1,997

Clinical Presentation

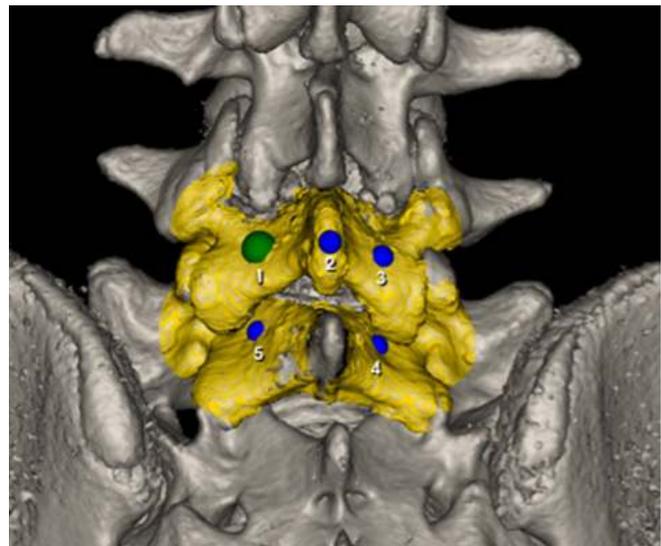
A 14-year-old male suffered a bilateral pars fracture caused by a bull-riding accident. The patient presented with lower back pain with rotation and extension-related activities. He failed greater than one year of non-operative conservative management including, physical therapy, core bracing, injections, and non-steroidal anti-inflammatory drugs (NSAIDs).



Sagittal CT of the lumbar spine demonstrating a defect at the L4 level.

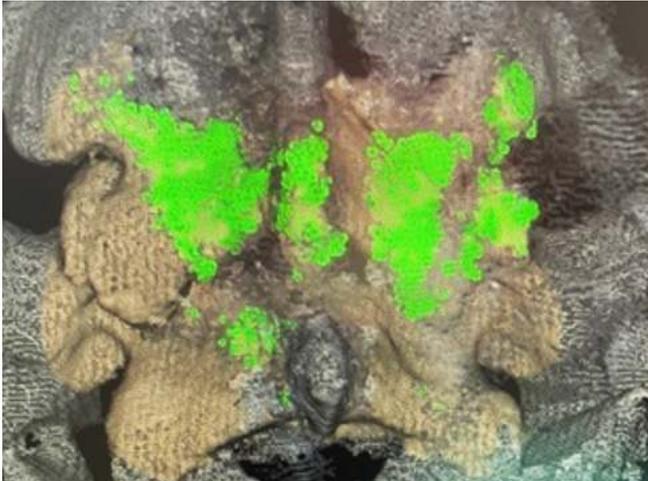
Surgical Procedure

The decision was made for the patient to undergo a lumbar posterior spinal instrumented fusion with pedicle screws and translaminar screws at L5 along with an iliac crest bone graft (ICBG). The translaminar screw fixation was thought to offer a superior atlantoaxial rotational stability, and the pedicle screws improve rigidity and facilitate pars repair healing rates. A preoperative CT was loaded into the FLASH[™] Navigation system where Dr. Orndorff selected five points across L4 and L5. After exposing the posterior elements, the FLASH Registration process was initiated by using the foot pedal from the sterile field and selected five points mirroring those on the preoperative CT.



Preoperative CT showing 5 points selected on FLASH Navigation System

Due to the unstable nature of L5, the reference clamp was placed on L4 and oriented caudally to ensure rigid fixation for navigating L4. Registration was performed and Dr. Orndorff confirmed accuracy bilaterally on L4 and L5. The overall workflow time was 77.1 seconds where the FLASH Navigation system registered a total of 1,997 points in 0.3 seconds.

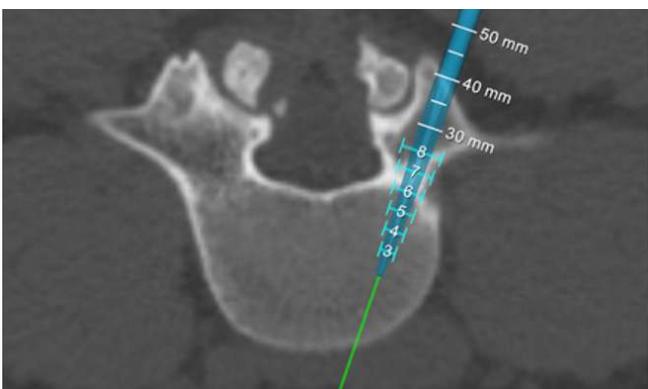


FLASH Registration showing nearly 2,000 matched points from preoperative CT.

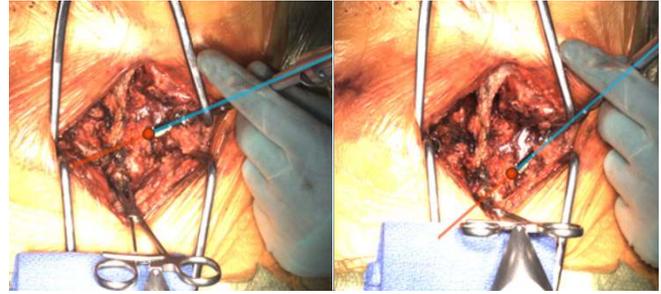
Bilateral L5 Pedicle screws were placed under electromyography guidance and navigation. Then bilateral L5 translaminal screws were placed using navigation. A rod was placed between the ipsilateral L5 translaminal screw and the L5 Pedicle screws bilaterally. The pars defect was decorticated and ICBG and Accell® Evo3® allograft were placed in the pars defect. Compression and reduction of pars fracture were achieved while maintaining adjacent level mobility. The goal of the pars repair was to achieve surgical repair of the fracture, maintain normal motion, and not subject a young patient to a fusion procedure.

FLASH Trajectory

FLASH Trajectory is a virtual k-wire created from augmented reality that was used throughout the procedure. The pedicle cannulation was navigated followed by screw placement with guidance from the FLASH Trajectory. Dr. Orndorff set a FLASH Trajectory for guidance when placing the translaminal screw in the left pars by pressing the left foot pedal. This trajectory was kept when switching to the right pars to ensure the right translaminal screw can be navigated and implanted successfully.



FLASH Trajectory displayed on axial CT view during navigation.

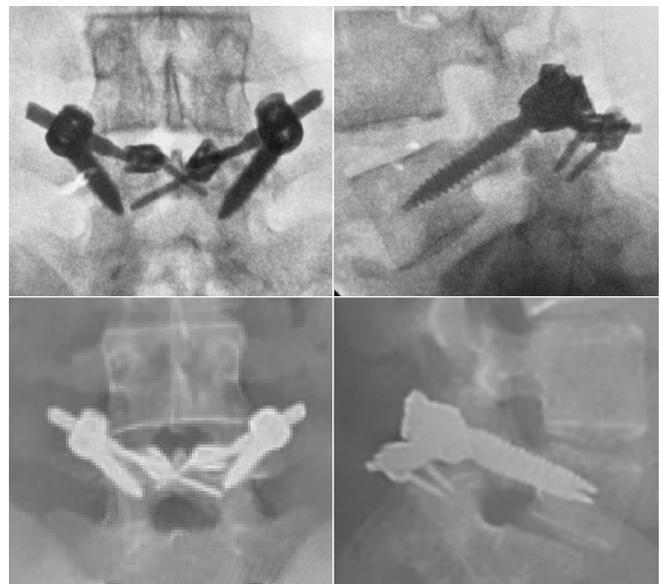


Live video images showing FLASH Trajectory

All screws were cannulated using the navigated sharp tip probe. The Universal Tracking Kit (UTK) attachment was attached to the SeaSpine NorthStar® Drill Guide. This allowed the SeaSpine NorthStar Drill Guide to be navigated during the procedure.

Clinical Outcome

At 4.5 months postoperatively, the patient is pain-free. He wore a lumbar corset brace for 3 months to limit mobility, bending, and lifting movements. He completed 6 weeks of physical therapy. This was the first time he has been pain-free in 3 years. He was released to full activity, including bull-riding.



Bilateral L4 pedicle screws and bilateral L4 translaminal screws were confirmed with fluoroscopy.

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