

FIREFLY[®] Case Study

Scoliosis

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Patient History:

- 12 year old / Female
- Primary Diagnosis:
 - VATER Syndrome
- Secondary Diagnosis
 - Congenital Scoliosis
 - Type D Pedicles
- Previous cardiac surgery

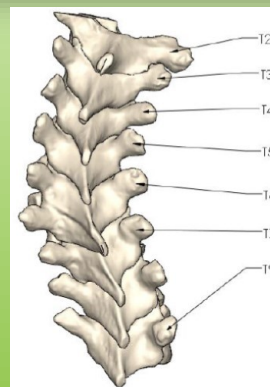
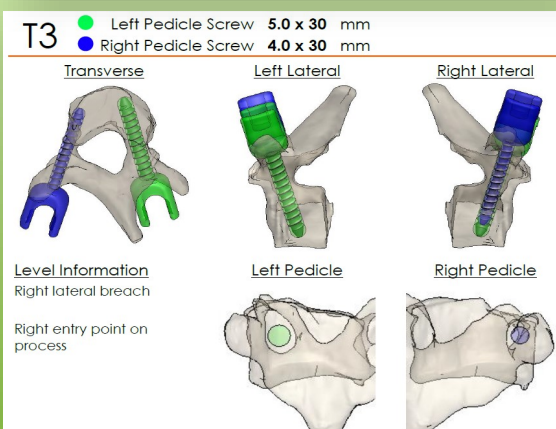
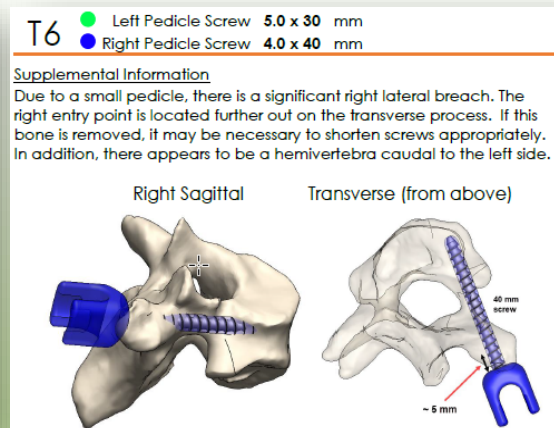
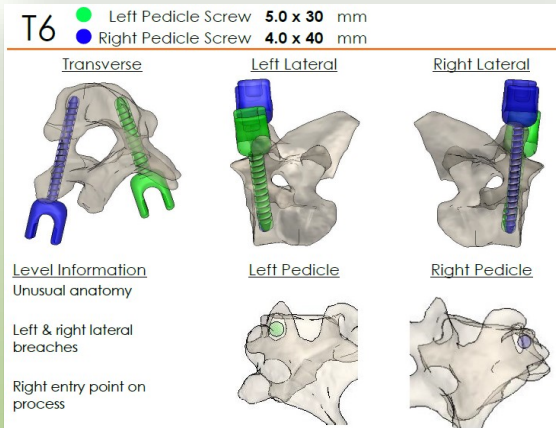
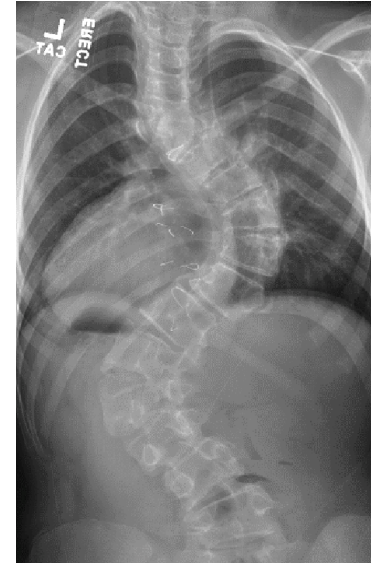
Treatment Plan:

- FIREFLY Utilization at:
 - T2, T3, T4, T5, T6, T7, T9
 - T8 not instrumented
- Resect T6 Hemivertebrae

Concierge Pre-Surgical Planning:

This is a case of a 12 year old female with a history of congenital scoliosis with a T6 hemivertebrae secondary to VATER syndrome. FIREFLY 3D printed guides were elected to be used in this case for three reasons:

1. Her abnormal anatomy could be instrumented more accurately with navigation.
2. A CT scan was being obtained for pre-operative planning, so 3D printed guides could be made from that CT without exposing her again to radiation intraoperatively.
3. The bone model provided detailed accurate information to help plan her hemivertebrectomy.



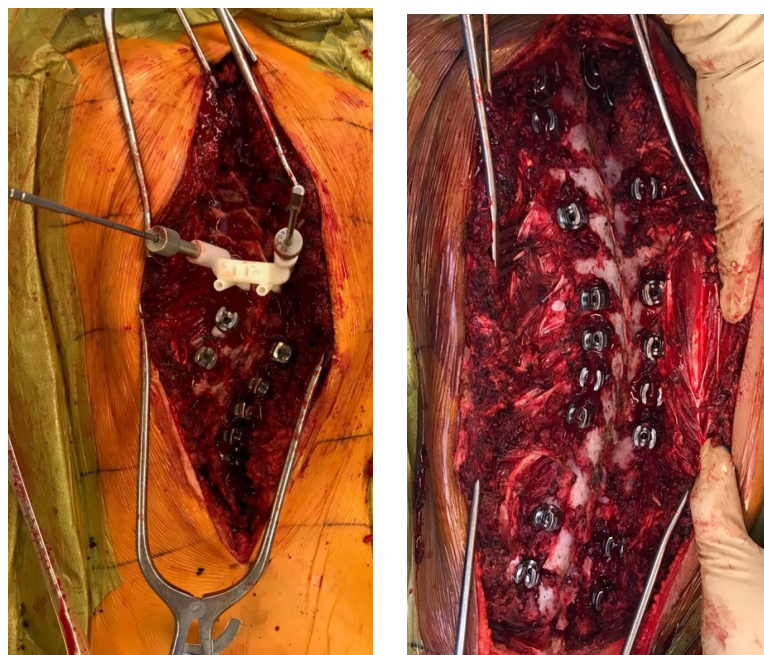
3D Printed Bone Model w/Trajectories

Intra-Operative:

Following a thorough soft tissue dissection, guides were checked against the model then applied to the corresponding vertebral level. FIREFLY provided manual guidance for a drill bit to traverse the precise center of each pedicle. The length of each screw was calculated preoperatively, so we stopped within the vertebral body short of the anterior wall each time.

Markers were used in the drill paths, then the next most cranial level was instrumented in the same manner. Once all markers were placed, facetectomies were performed, then markers were replaced with the predetermined pedicle screws.

A temporary rod was placed opposite the hemivertebrae while it was resected. Rods were measured, cut, contoured, and placed. Compression, distraction, and derotation maneuvers were performed in standard fashion.

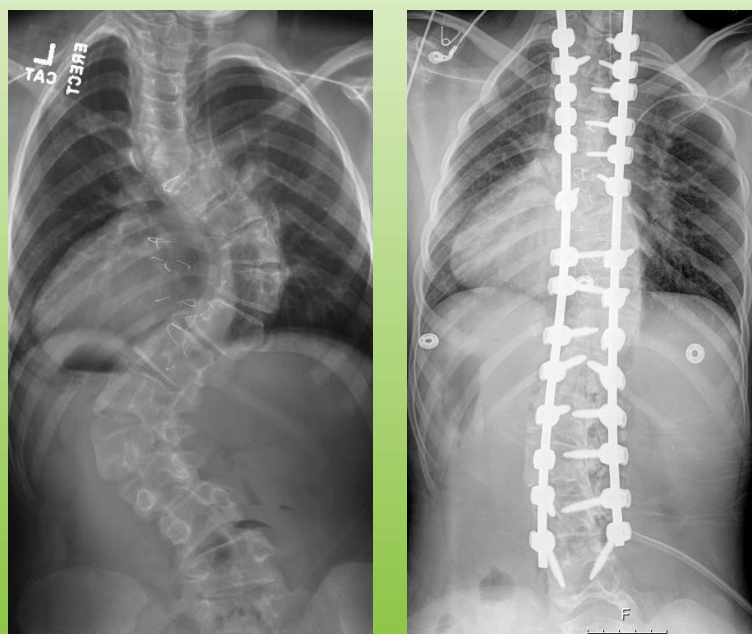


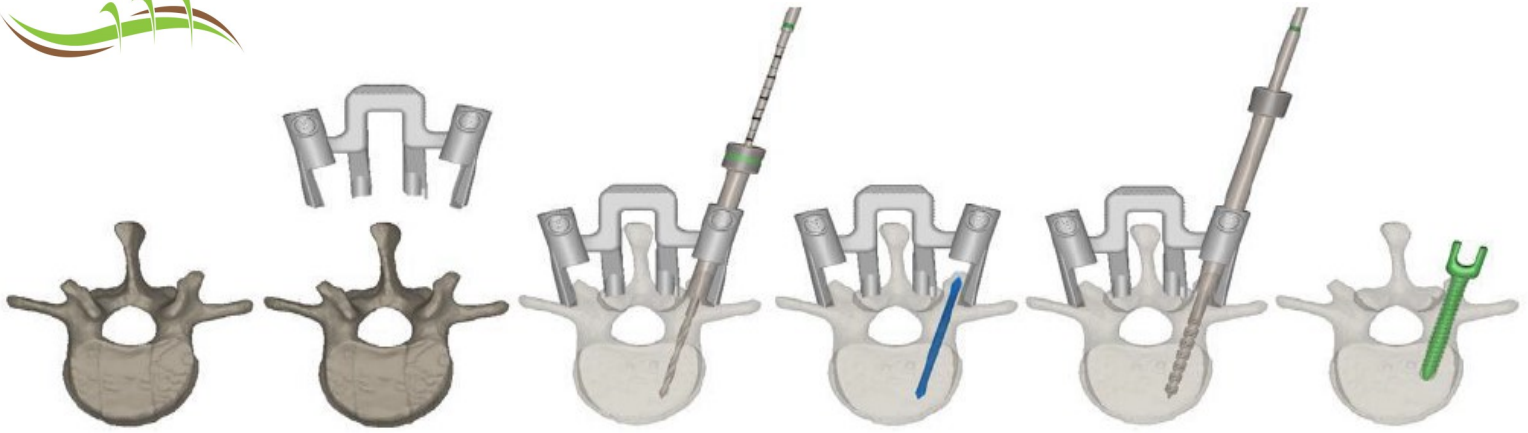
Results:

The patient's rigid 83 degree curve was reduced to 33 degrees. There were no perioperative complications.

Thoracic screws were placed in very small, sclerotic pedicles with no fluoroscopy and using less than two minutes to insert each screw. Without FIREFLY guides, screw placement would have required significant fluoroscopy and would likely have been difficult to confirm the correct trajectory. It would have been difficult to tactically feel and create a path, trust the path created despite a lateral breach, then bypass the breach and still safely position the screw into the vertebral body.

Having two screws at each level in the thoracic spine provided three column fixation and allowed for better correction and control of the coronal and sagittal plane deformities, but notably allowed for better axial derotation than could be achieved with less robust fixation or instrumentation that only reached the posterior column.





What is FIREFLY?

FIREFLY Guides are FDA-cleared and enable optimal screw placement by incorporating planned screw diameter, trajectory, length, and entry point into the Guide design.

A preoperative CT is used to make a 3D virtual model of the patient's spine, which is then used to create a detailed presurgical plan. The Guides are then designed around the surgeon's approved trajectories. This makes each Guide not only patient-specific, but level-specific as well.

A 3D printed, anatomically exact bone model of the patient's spine is also provided for intraoperative use and patient education.

- ◆ **FDA cleared and CE marked for use in adult and pediatrics**
- ◆ **Cleared for use without intraoperative fluoroscopy**
- ◆ **Predetermined screw sizes and mechanical constraint contribute to faster screw placement**
- ◆ **Validated to 99.7% accuracy¹**
- ◆ **No capital expenditure cost**

Navigate. Don't Complicate.™

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