C7-T1 Anterior Cervical Discectomy and Fusion

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Clinical Presentation

The patient is a 45-year-old male with a 1-year history of worsening mechanical neck pain and bilateral pain and numbness in a C8 distribution. Arm pain and numbness is worse with neck extension, and better with flexion. The patient's neck pain is at the cervico-thoracic junction and spreads to the periscapular region, and is worse with neck motion. He has a history of a C4-6 Anterior Cervical Discectomy and Fusion (ACDF) six years prior, with stable pseudarthrosis at both levels. Recent C7-T1 Epidural Steroid Injection gave near complete relief of neck and arm pain for 1 week.

The patient presented with a barrel-chest shape. No signs of motor deficits in bilateral upper extremities, and sensation is intact to light touch from C4-T1 bilaterally, with subjective paresthesias in a bilateral C8 distribution. No upper motor neuron signs.

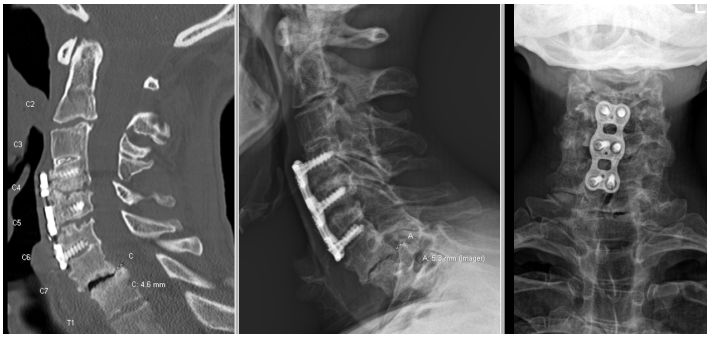

Figure 1: Pre-operative imaging: Cervical x-ray and CT scan show a C7-T1 5mm spondylolisthesis with vacuum disc phenomenon. Old C4-5 and C5-6 ACDF has a stable pseudoarthrosis, with auto-fusion at C6-7.

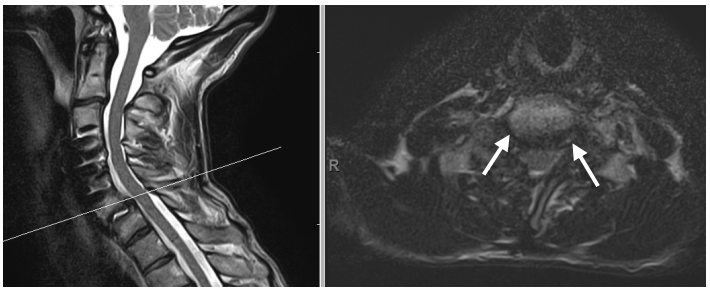

Figure 2: Pre-operative imaging: Cervical MRI shows C7-T1 spondylolisthesis with moderate central canal stenosis, and severe bilateral foraminal stenosis (arrows).

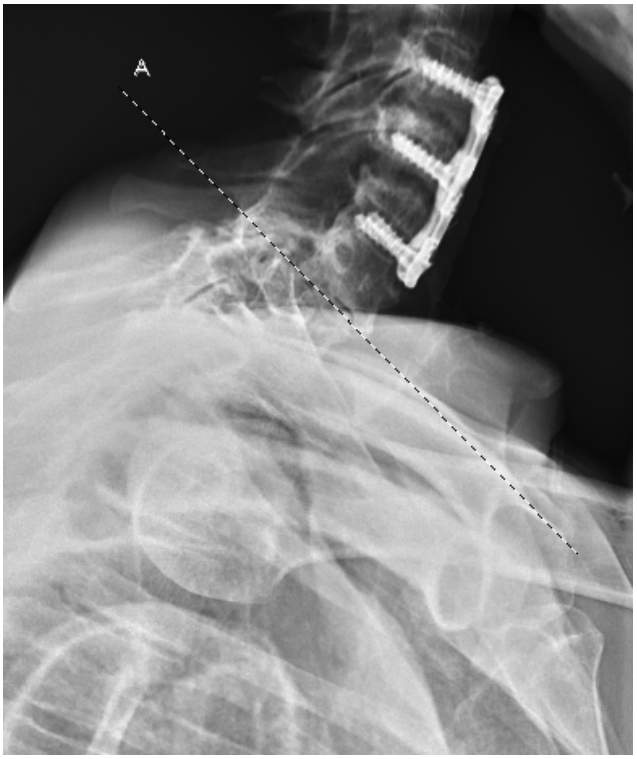

Figure 3: Pre-operative imaging: Swimmer's view x-ray to show cerivothoracic junction.

Swimmer's view lateral x-ray shows that the approach to C7-T1 is not only very steep, but due to the patient's anatomy and barrel-chest, the clavicle and manubrium are in close proximity to where the approach to the anterior cervical spine would need to be located.

Surgical Management

Modus V™ was placed at an estimated 50-60° angle from vertical, even with the patient in a slight Trendelenburg position, to optimize the view.

Due to C7-T1 spondylolisthesis and barrel-chest of the patient, this procedure would have been extremely difficult to perform even with loupes, and extremely uncomfortable and poorly ergonomic with a traditional microscope.

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Synaptive

With Modus V holding the difficult position, the case was like any other ACDF as the surgical team was standing in an upright and normal position.

Figure 4: Intra-operative room setup with Modus V highlighting the extreme lateral positioning of the optics to provide the required view of the C7-T1 surgical site without compromising the surgeon's ergonomics.

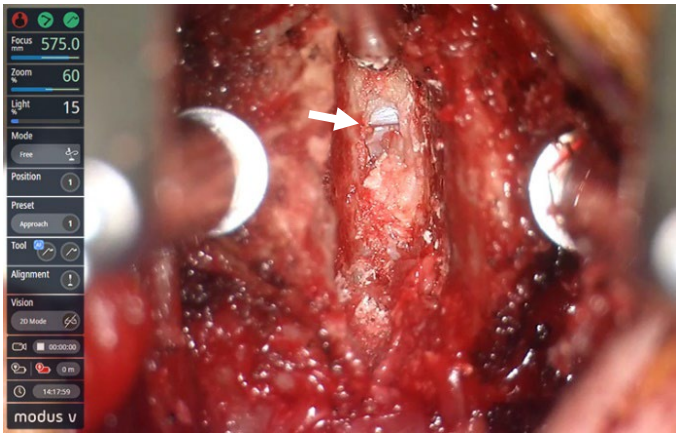

Figure 5: Example ACDF surgical image from Modus V highlighting the delineation between the dura and the Posterior Longitudinal Ligament (arrow), often not visible with loupes or a microscope.

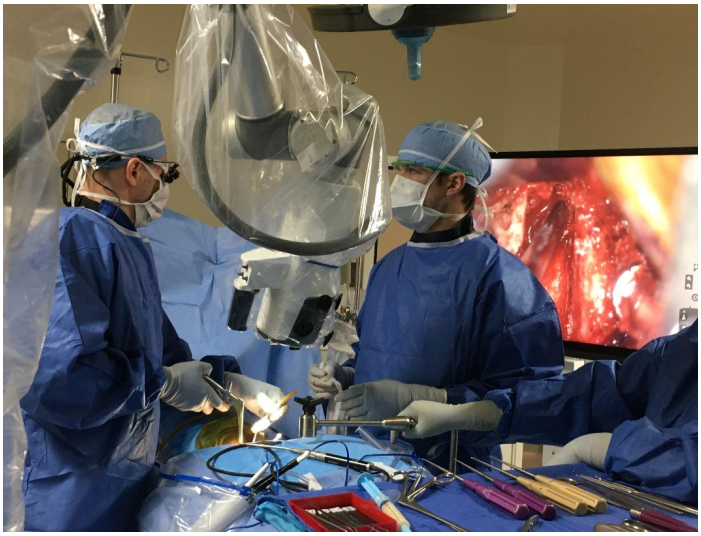

Figure 5: Intra-operative view of ACDF set-up with Synaptive, highlighting the ample working room and the OR team collaboration while working off the same surgical monitors.

Conclusion

Post-operative x-rays show C7-T1 ACDF with titanium interbody device and anterior plate and screws, below previous C4-6 ACDF construct. The patient had almost full reduction of C7-T1 spondylolisthesis, with good height restoration.

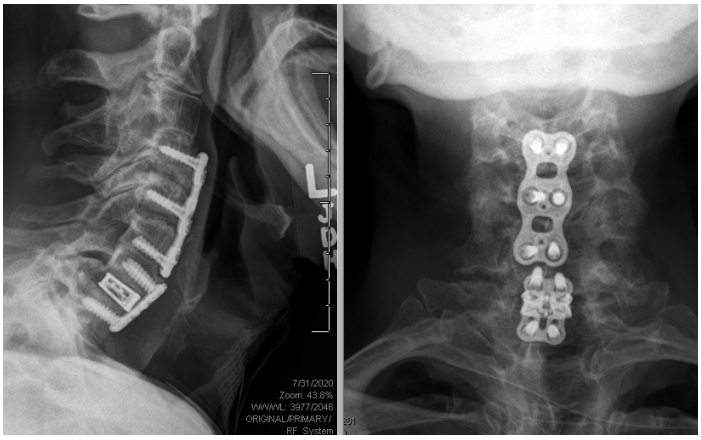

Figure 7. Post-operative imaging showing C7-T1 ACDF below previous C4-6 ACDF construct.

The patient had immediate resolution of bilateral arm pain and numbness, and near complete resolution of pain at the base of the neck.

Highlights

- Modus V enabled what would have been an extremely difficult procedure by providing the surgical visualization required, while allowing the surgical team to stand in an upright, ergonomically neutral position.
- The patient had immediate resolution of arm pain and numbness, and near complete resolution of neck pain.

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