

Cervical Spine Fusion After Osteomyelitis Using Vascularized Free Fibula Autograft

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Case Report

Our patient is a 61-year-old woman with a past medical history of Raynaud's, osteoporosis and Barrett's esophagus who presented initially with cervical stenosis with myelopathy. Six months prior at an outside facility, she underwent a C4 corpectomy and anterior C3-C5 discectomy and fusion followed by C2-T2 posterior fusion three months later for failure of initial instrumentation. Unfortunately, she developed worsening upper extremity weakness and dexterity and was transferred to Penn Presbyterian Medical Center for further management.

On initial evaluation she had MRC grade 2 strength in her bilateral proximal upper extremities, and grade 4 strength in the distal upper extremities with a positive Hoffman's sign bilaterally.¹ MRI of the cervical and thoracic spine showed kyphosis at C5-6, pullout of bilateral C3 pedicle screws, an epidural phlegmon, and fluid collections both prevertebral and about the instrumentation concerning for infection (Figure 1). Intraoperative cultures from an initial washout grew methicillin-sensitive *Staphylococcus aureus*. A PEG was placed during this hospitalization to augment her nutrition. She went to a rehabilitation facility on a course of vancomycin and rifampin recommended by infectious disease and returned six weeks later for definitive staged fixation. During the first preparatory procedure, the posterior cervicothoracic hardware was removed and she

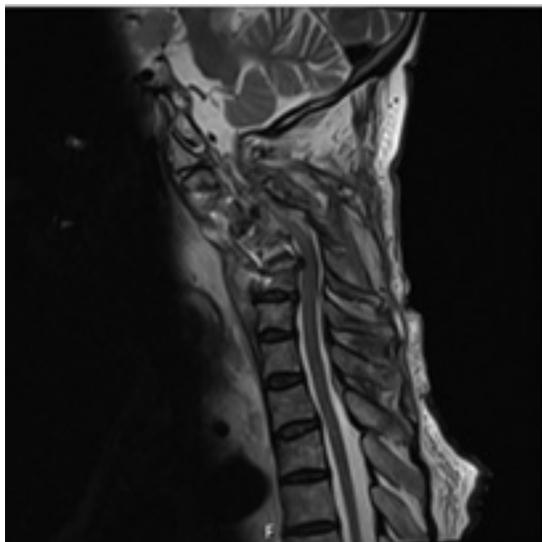


Figure 1. Cervical spine MRI showing prevertebral collection and collapse of C5 vertebral body.

underwent an occipital-T5 fusion with tricortical allograft and BMP, and halo vest placement.

In the second definitive procedure, a C3-C6 corpectomy with free fibula autograft fusion was performed using a two team (orthoplastics and neurosurgery) approach. The cervical spine was accessed using a traditional anterior approach to C2-C7 (Figure 2a). The previous corpectomy cage was noted to be loose, cut in half with a metal-cutting burr, and removed. Corpectomies of C3-C6 were then completed with removal of the C2-C3 and C6-C7 disc spaces.

Concomitantly, a vascularized free fibula graft with skin paddle was harvested from the patient's right leg using the technique outlined by Heitmann and Levin.² After the fibula was harvested, it was cut to the appropriate length and fitted into the corpectomy defect. The superior and inferior portions were impacted against the inferior C2 and superior C7 endplates, respectively (Figure 2b). A spring plate spanning the C6 and C7 levels anteriorly and two screws in the C7 vertebral body was used to prevent anterior subluxation of the fibula graft.

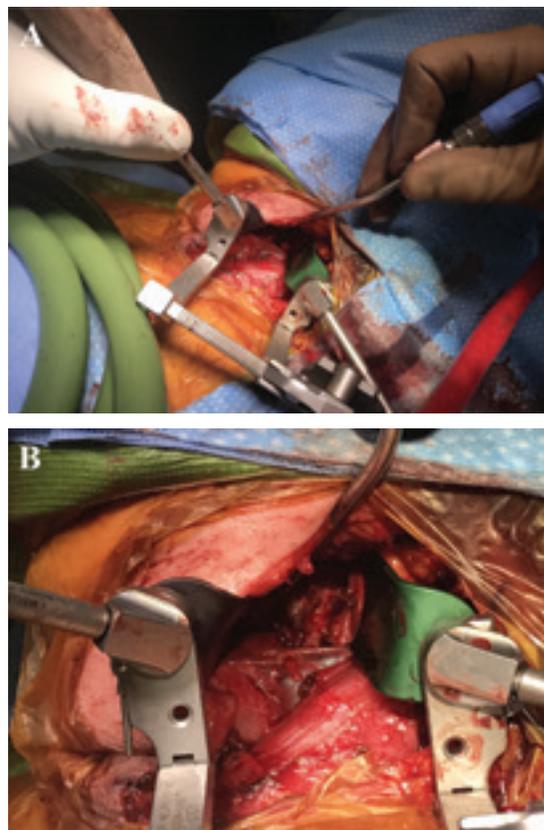


Figure 2. (A) Anterior approach to cervical spine; **(B)** Free fibula (highlighted by dotted blue line) inset at C2-C7.

The peroneal artery supplying the fibula was anastomosed in an end-to-side technique to the external carotid artery. One of the venae comitans was hand sewn to the external jugular vein and the second vena comitans to a large transverse external jugular vein branch. The flap was monitored using an implantable Cook doppler probe around the artery. The halo vest was replaced at the end of the case.

She remained NPO in the perioperative period to monitor for esophageal tears and received nutritional support through her PEG tube. She was transitioned from a halo to a Minerva (cervico-thoracic) brace at six weeks. X-rays at six weeks and a CT Scan at nine weeks after surgery demonstrated stable graft alignment (Figure 3). She was allowed to eat by mouth at that time and her PEG tube was removed. Five months post-operatively she was transitioned to a soft cervical collar due to skin erosions. X-rays continue to demonstrate stable graft position and no evidence of infection recurrence (Figure 4).

Conclusion

This case report shows that free fibula vascularized bone graft can effectively replace allograft in complex cervical spine fusion in the setting of osteomyelitis. Vascularized tissue is more resistant to reinfection after adequate debridement than non-vascularized auto or allograft.³⁻⁵ This procedure

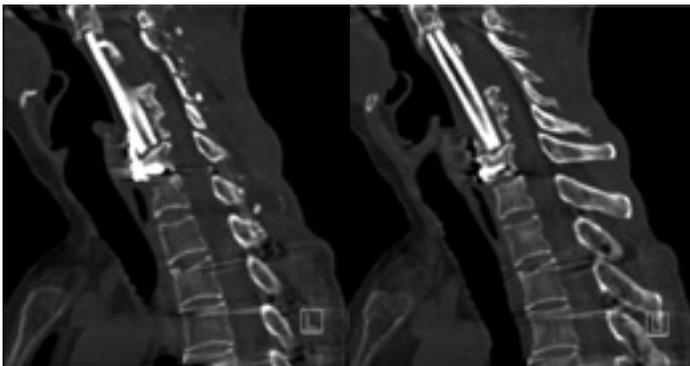


Figure 3. CT scan of cervical spine three months postoperatively demonstrating stable positioning of free fibula graft.



Figure 4. Xrays of cervical spine five months postoperatively with unchanged position of free fibula graft.

can be done efficiently by using a two-team approach both intraoperatively and preoperatively for surgical planning.

References

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