



Technical Note

En bloc excision of a dermal sinus tract

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ABSTRACT

Dermal sinus tracts are a form of spinal dysraphism that arises from a failure of dysjunction early in embryogenesis. They are diagnosed in pediatric patients and who present with a dimple, infection, or neurologic deficit. The tract is surgically excised *en bloc* to avoid contamination from the tract, which harbors bacteria. However, dermal sinus tracts typically terminate intradurally, rendering their *en bloc* excision difficult. To avoid entering the tract, allowing for an *en bloc* excision, we modified the usual technique employed for accessing the spinal intradural space. An *en bloc* excision of the dermal sinus tract was successfully performed. The patient recovered from the procedure neurologically intact and her postoperative course was uncomplicated. We conclude that *en bloc* excision of a dermal sinus tract down to the intradural space is feasible with modifications to standard operative technique.

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1. Introduction

During normal embryogenesis, successful closure of the neural tube is followed by separation of the overlying ectoderm, a process termed dysjunction.¹ Failure of dysjunction following completion of neural tube closure results in a focal persistent connection between the developing spinal cord and the neuroectoderm. This is termed a dermal sinus tract (DST).^{2,3} DST usually occur at the lumbar or lumbosacral junction vertebral level, although they can occur in the cervical and thoracic regions as well.⁴ Diagnosis is typically made in the first decade of life by pediatricians.⁵ DST can present as a midline dimple, meningitis, or with a neurologic deficit related to spinal cord tethering.⁵ DST commonly extend into the intradural space and often terminate in the spinal cord itself because they are related to a failure of separation of the dermal ectoderm from the neural tube.⁶ This poses a unique challenge to attempts at *en bloc* excision. Here, we present the first description of a modified technique used to achieve a complete, *en bloc* excision of a DST.

2. Illustrative patient

A 52-year-old woman presented with bilateral upper extremity paresthesias over the volar aspect of the forearms and hands. The paresthesias had been worsening over the preceding year, prompting her primary care physician to obtain an MRI scan of the cervical spine, which demonstrated a DST associated with signal hyperintensity in the dorsal columns (Fig. 1). Her physical examination

was significant for a prominent dimple over the cervicothoracic junction (Fig. 2) that she stated had been present her whole life. Her neurological examination was significant for loss of sensation to light touch only over a broad area of the forearm and hands. Sharp touch and temperature sensation were preserved. Cranial nerves, motor, reflexes and gait examination were within normal limits of examination. Given the increasingly bothersome sensory disturbance and risk of infection, she elected to undergo an *en bloc* surgical excision of her DST.

2.1. Procedure

In the operating room, the patient was placed in a prone position with her head fixed in a Mayfield headholder (Fig. 3). An elliptical skin incision was made centered around the tract. The dissection was carried out in the subcutaneous space with Metzenbaum scissors to avoid entering the DST. Using steady traction along the tract, we dissected the tract alternating from the left to the right side until the fascia was encountered (Fig. 4). The fascia was incised with a 15-blade scalpel in an elliptical fashion, exposing the spinous process. The extensor muscles were separated from the lamina using monopolar cautery.

It was presumed that the DST had entered the midportion of the spinous process and continued between the two hemilamina. The lamina was cut bilaterally using a small cutting burr until the dura was encountered (Fig. 5). With the dura in view, the sinus tract could be seen extending from the undersurface of the lamina to the dura in the midline. Retracting the dissected pedicle, which consisted of skin, subcutaneous tissue, fascia, bone, and sinus tract, from side to side, an elliptical durotomy was created with an 11-blade scalpel. The sinus tract was observed to be entering the

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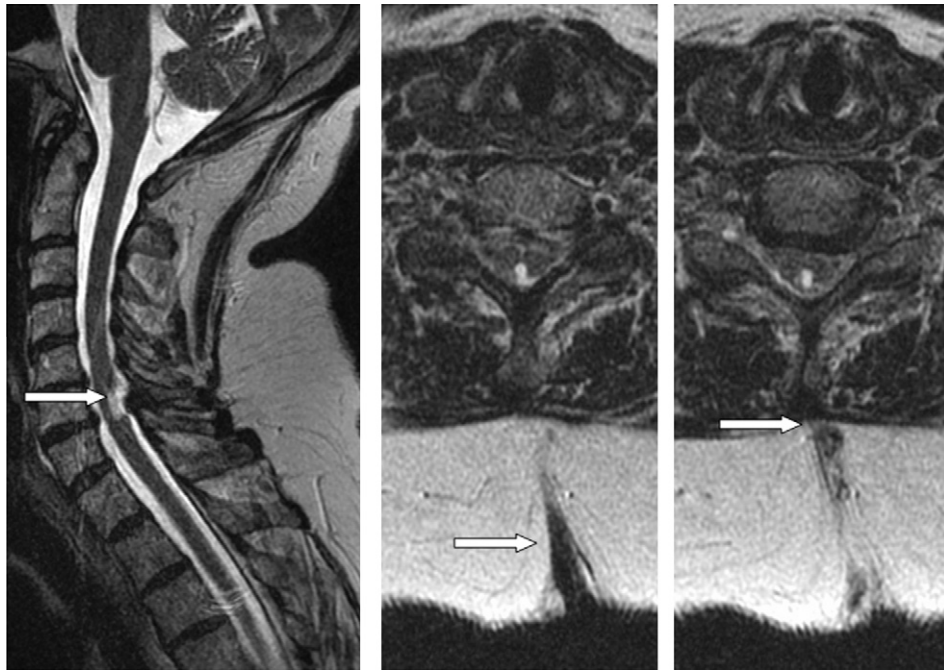


Fig. 1. Sagittal (left) and axial (middle, right) T2-weighted MRI showing a dermal sinus tract (arrow – middle, arrow – right) associated with a signal hyperintensity (arrow – left) in the dorsal columns.

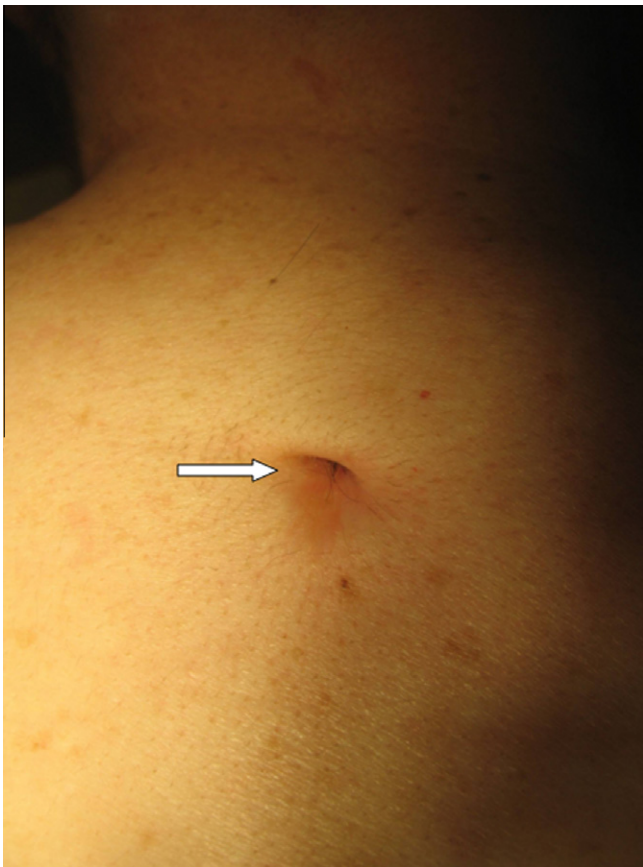


Fig. 2. A pre-operative photograph of a female patient showing a prominent dimple of the dermal sinus tract over the cervicothoracic junction (arrow).

substance of the spinal cord in the midline. It was cut with a micro-scissor flush with the dorsal columns, allowing for a complete

excision of the tract from skin to spinal cord (Fig. 6). Histological examination confirmed that this was a DST. The patient made an uncomplicated recovery without developing any new neurological deficit.

3. Discussion

DST must undergo surgical removal to avoid complications related to its natural history.⁶ Infection, presenting either as meningitis or abscess formation, is the major risk associated with an untreated lesion.^{7–14} It is no surprise that a direct conduit from the skin to the intradural space can lead to bacterial infection. Further complicating matters, recurrent infection can disrupt the anatomy rendering *en bloc* excision of the DST difficult.¹⁵ DST can also lead to tethering of the spinal cord, which depending on the vertebral level affected, can produce progressive neurological deficits.^{16,17}

DST have been reported to develop at all segments of the vertebral column, with approximate relative rates reported at 1% at the cervical, 10% at the thoracic, 41% at the lumbar, and 35% at the lumbosacral levels.¹⁸ During embryo development, the cutaneous ectoderm separates from the neuroectoderm (dysjunction); focal failure results in a persistent connection (DST) that often terminates in neural structures.^{19,20} This explains why a DST can be present through a focally bifid neural arch and why intradural exploration is mandatory. When resecting these lesions, it is important to avoid stopping at the tip of a spinous process because this will leave the intradural segment of the cord tethered.

The technique described here is advantageous for two main reasons: (i) it prevents bacterial contamination; and (ii) it allows for a higher likelihood of complete excision. The DST is lined with squamous epithelium that is continuous with the skin. By preventing any breach to this surface, an *en bloc* technique facilitates a sterile excision. Additionally, developing an excision plane around the tract leads to greater confidence in a complete excision of the DST. Of note, this technique does require a larger incision and more retraction to facilitate movement of the pedicle for dissection.

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