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# Neuroimaging Highlight

*Editors: Richard Farb, David Pelz*

## Spinal Cord Transection in a Child After Non-Penetrating Trauma

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A three-year-old male child presented after sustaining a fall from a second story window onto a fence below. The long axis of the child's vertebral column was oriented perpendicular to the length of the fence, causing the majority of the forces to be directed to the spinous processes of T3-4. Initial neurological examination demonstrated complete loss of motor and sensory function below the T4 level.

Magnetic resonance imaging (MRI) of the spine demonstrated spinal cord transection at the T4 vertebral level on both T1 and T2 weighted images (Figure 1 and 2 respectively), with disruption of the posterior column elements from T2-4 levels. In addition, T3 and T4 vertebral body fractures can be seen on the T1 weighted images (Figure 1). The child underwent a posterior T1-5 thoracic fusion with intraspinous wiring and autologous bone graft followed by a period of immobilization in a modified TLSO brace. At six-month follow-up, the patient achieved a solid fusion but remains with complete motor and sensory loss below the T4 level.

The overall incidence of spinal cord injury in the pediatric population is low, especially in children less than five, with between one and 18 injuries per million children per year, with minor variance depending on geographic location<sup>1,2</sup>. The more common age of presentation is in the 12 to 18 year range with the majority being cervical and thoracic injuries and related to traffic accidents and sports<sup>2,3</sup>. The minority of pediatric patients present with injury from falls, representing 5.8% of all spinal cord injuries<sup>3</sup>. Documentation of an approximate 60-70% rate of complete spinal cord injury<sup>3</sup> has been seen. Most complete spinal transections are described in neonatal complications related to the birthing process, with or without assisted delivery<sup>4,5</sup>. Birth related transections are almost exclusively cervical spinal cord lesions.

Overall, long-term survival in the pediatric population is reduced, with an increase in the annual risk of dying when compared to adults with similar injuries. Shavelle et al<sup>6</sup> described a 31% increase in yearly odds of dying in those



**Figure 1:** Saggital T2-weighted MR image of the cervicothoracic spine demonstrating complete transection of the spinal cord at the T2-T4 level.

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**Figure 2:** Sagittal T1-weighted MR image of the cervicothoracic spine with transection of the spinal cord at T2-T4.

pediatric patients (defined as age under 16) with spinal injury compared to their similarly injured adult counterparts. Although spinal cord transection in young children has been described<sup>7</sup>, it remains a rare but devastating occurrence.

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