

Author, Year Country Study Design Sample Size	Population Intervention Outcome Measure	Results
<p>(Jan & Wilson, 2004) USA Observational N=31</p>	<p>Population: Age at interview: 13.9 (3-46) yr; Age at Injury: 5 mo-18 yr (n=20 <8 yr); Gender: males=15, females=16; Level of Injury: cervical=12 (n=4 ventilator dependent), thoracic=16, lumbar=3. Severity of injury: complete=18, incomplete=13. Intervention: None. Outcome Measures: Type (i.e., nociceptive [musculoskeletal or visceral] versus neuropathic), quantity and severity of pain, Lansky Play Performance Scale, Adolescent Pediatric Pain Tool.</p>	<ol style="list-style-type: none"> 1. In the entire group, 35% reported no pain and 65% reported pain. 2. Nociceptive pain was identified in 48% (15/31) and neuropathic pain was identified in 19% (6/31). 3. The nociceptive cohort was subclassified as having 10 with musculoskeletal and 8 with visceral pain. 4. For group injured at a very early age (<3 yr old) 72% reported pain and 28% were pain free. 5. The nociceptive-musculoskeletal group had 60% complete and 40% incomplete injuries. 6. All the nociceptive-visceral group had complete injuries. 7. The neuropathic group had 50% complete and 50% incomplete injuries. 8. Lansky Play Scale scores ranged 50-100 with a mean of 92 and mode of 90. <p>For word-graphic ratings, the range of scores was 0.5-8.0 with a mean of 4.9.</p>
<p>(Defresne et al., 2003) France Observational N=24</p>	<p>Population: Age: 2-14 yr; Gender: males=11, females=13. Intervention: None. Outcome Measures: Motor outcomes; urinary sequelae; Paine's scale; cerebrospinal fluid obtained by lumbar puncture; spinal MRI.</p>	<p>Initial phase</p> <ol style="list-style-type: none"> 1. 88% (21/24) of the patients had severe pain, which was usually symmetric (18/21) and located in one or more spinal segments (11/21), although 6 patients had leg pain and 5 had headaches. 2. Fever was a presenting symptom in 14 of 24 patients and was not more common in the patients with a prior infection. 3. Neurologic symptoms were present initially in only 50% of the patients and consisted of motor loss (10/12) or sphincter dysfunction (4/12). 4. Sudden onset of a severe motor deficit was noted in 8 patients, of whom 7 became unable to walk within 12 hours and one had respiratory insufficiency. 5. The motor symptoms antedated the sphincter dysfunction in two thirds of the patients (16/24) and were asymmetric in 71%. <p>Plateau</p> <ol style="list-style-type: none"> 6. Back pain was noted in 75% (18/24) of patients, more commonly in the neck (56%, 10/18); all but 1 patient had flaccid paralysis. 7. The motor deficit became symmetric in 67% (16/24) of the patients. 8. The lower limb weakness was severe in 18 (75%) patients, and one or more deep tendon reflexes in the lower limbs were abolished in 20 (83%) patients. 9. Weakness in the upper limbs was present in 10 (42%) patients and was consistently moderate. 10. A single patient had tetraplegia. 11. Abnormalities in sensation were found in 19 (83%) patients, being asymmetric in 20 (82%) patients and consistent with a thoracic lesion in 21 (88%) patients and with a cervical lesion in 3 (12%) patients.

		<p>12. Sphincter dysfunction was present in 20 patients: in 12 patients, whereas in 8 patients, the dysfunction was moderate; 11 patients had anal sphincter dysfunction.</p> <p>13. Optic neuritis was present in 4 patients.</p> <p>Recovery phase (n=16)</p> <p>14. 2 (13%) children had severe motor sequelae.</p> <p>15. 8 (50%) patients recovered normal motor function. 4 (25%) patients had moderate motor sequelae and 2 (13%) had mild motor sequelae.</p> <p>16. Sensory abnormalities resolved completely in 7 children (54%).</p> <p>17. Of the 15 patients with sphincter dysfunction, 5 (33%) recovered normal sphincter function within a mean of 7 months (15 days-2 yr), 5 (33%) had mild sequelae, and 5 (33%) had severe sequelae.</p> <p>18. According to Paine's scale, 5 (31%) children achieved a full recovery, 4 (25%) had minimal sequelae, and 7 (44%) had mild or severe sequelae.</p> <p>19. Supraspinal symptoms recovered fully in all 16 patients.</p> <p>Prognostic factors</p> <p>20. An unfavorable outcome was more common among patients with complete paraplegia ($p=0.03$) and/or a time to maximal deficit shorter than 24 hours ($p=0.005$).</p> <p>21. A favorable outcome was associated with a plateau shorter than 8 days ($p=0.03$), the presence of supraspinal symptoms ($p=0.01$), and a time to independent walking shorter than 1 month ($p=0.01$).</p> <p>Cerebrospinal fluid</p> <p>22. Abnormalities were found in 15 (62%) patients. The white blood cell count ranged from 0 to 1800/μL (mean 210/μL), and lymphocytes were the main cell type in 12 of 15 patients.</p> <p>23. The protein level was slightly elevated (up to 120 mg/dL) in 3 (20%) patients.</p> <p>24. Cerebrospinal fluid protein electrophoresis was normal in 9 of 13 patients and showed a pattern consistent with a transudate (no oligoclonal bands) in the remaining 4 patients.</p> <p>25. 5 of 24 patients had serologic evidence of a recent viral infection (herpes simplex virus, n1; Epstein-Barr virus, n=1, varicella-zoster virus, n=1; and measles, n=2).</p> <p>MRI data</p> <p>26. 2 of 6 children who underwent spinal MRI had normal findings; among the 4 other children, 1 had multiple lesions in the cervical region and conus medullaris and 3 each had a single lesion in the thoracic spinal cord.</p> <p>27. Edema of the spinal cord was visible on T1-weighted sequences in 2 children.</p> <p>28. On T2-weighted sequences, all lesions exhibited high signal intensity and extended along two or more vertebral segments.</p>
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<p>(Vogel et al., 2002b) Part II USA Observational N=216</p>	<p>Population: Age at injury: 14.1±4.0 yr; Age at interview: 28.6±3.4 yr; Gender: males=150, females=66; Time since injury: 14.2±4.6 yr; Level of injury: tetraplegia=123, paraplegia=93. Severity of injury: C1-4 ABC=41, C5-8 ABC=67, T1-S5 ABC=82, tetra/para D=26. Intervention: None. Survey. Outcome Measures: Prevalence of pain.</p>	<p>Ankle Pain and Contractures</p> <ol style="list-style-type: none"> 1. Ankle pain or contractures affected 53 subjects, with 29 individuals having contractures alone, 18 reported pain only, and 6 had complaints of both contractures and pain. 2. Ankle pain was significantly associated with older age at injury (p=0.018) and tetraplegia (p=0.005). 3. Ankle contractures were not significantly associated with any of the study variables. <p>Elbow Pain and Contractures</p> <ol style="list-style-type: none"> 4. Elbow pain or contractures affected 43 subjects with 27 experiencing elbow pain alone, 10 had elbow contractures alone, and 6 had both. 5. Those with elbow pain were significantly older at follow-up (p=p=0.026) and had a longer duration of their SCI (p=0.041). 6. As expected, elbow contractures were significantly more common in those with tetraplegia (p=0.040) and were significantly associated with lower ASIA motor scores (p=0.016) and lower total FIM (p=0.010) and motor FIM scores (p=0.009). <p>Shoulder, Back, and General Pain</p> <ol style="list-style-type: none"> 7. Shoulder pain was reported by 48% of subjects and limited activities in 21% of those affected. 8. Shoulder pain was significantly associated with older age at interview (p=p=0.045), and longer duration of injury (p=0.034). 9. Shoulder pain was not significantly associated with degree of neurological impairment or FIM scores. 10. Of the 216 participants, 22% complained of back pain, which was not associated with any of the demographic, impairment or functional limitation variables. 11. Overall, 69% complained of pain. 12. In addition to shoulder, back, elbow, and ankle, pain involved other areas including leg (19), neck (14), hip (12), wrist (10), knee (9), feet (8), hands (8), and miscellaneous sites (12). 13. Race/ethnicity was the only study variable that was significantly associated with pain, with pain more common in whites (p=0.016).

		14. There was no significant difference in the prevalence of pain among those with violent injuries (71%) in comparison to those with nonviolent injuries (69%); however, pain was significantly more common in subjects with spasticity compared to those without spasticity ($p=0.001$).
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