Author Year Country Research Design Score Total Sample Size	Methods	Outcome
Liu et al. (2017) China Case Series N=11	**Population:** Mean age=54.1 yr; Gender: male=10, female=1; Level of injury: not reported; Severity of injury: ASIA A=0, B=1, C=6, D=4, E=0. **Intervention:** Individuals with delayed cervical central cord syndrome were retrospectively studied to investigate the efficacy of surgical intervention. **Outcome measures:** American Spinal Injury Association (ASIA) motor score; Japanese Orthopedic Association (JOA) score; SF-36; Neurologic status. **Chronicity:** The mean time from injury to surgical intervention was 92.4 days.	1. ASIA motor scores significantly improved post-surgical intervention ($p<0.05$). 2. A significant improvement in JOA scores was observed within the first six mo following surgical intervention ($p<0.05$). 3. The mean scores of physical functioning, bodily pain, vitality, social functioning, and mental health of individuals significantly improved post-surgical intervention on the SF-36 questionnaire ($p<0.05$). 4. ASIA grade significantly improved after surgical intervention ($p<0.05$).
Jug et al. (2015) Slovenia Cohort $N_{Initial}=48$, $N_{Final}=42$	**Population:** *Early group (n=20):* Mean age: 52.0 yr; Gender: males=16, females=4; Level of injury: C=19, C/T=1; Level of severity: AIS A=13, B=1, C=6. *Very Early group (n=22)*: Mean age: 44 yr; Gender: males=18, females=4; Level of injury: C=20, C/T=2; Level of severity: AIS A=13, B=5, C=4. **Intervention:** Participants received early (8-24 hr) or very early (<8 hr) decompression and fusion. Outcomes were assessed before treatment and at 6 mo follow-up. **Outcome Measures:** American Spinal Injury Association (ASIA) Impairment Scale (AIS); ASIA Motor Scale (AMS).	1. The rate of AIS improvement >1 grade was 28% greater in the very early group than in the early group, but the difference was not significant (RR=1.81, 95%CI=0.76-4.30, p=0.115). 2. The rate of AIS improvement >2 was 36% greater in the very early group than in the early group (RR=2.08, 95%CI=1.12-3.87, p=0.015). 3. The odds of AIS improvement >2 was over 100% greater in the very early group than early group after adjusting for pre-operative AIS grade and degree of spinal canal compromise (OR=11.08, p=0.004). 4. The odds of AIS improvement >2 did not significantly differ based on completeness of injury (OR=0.26, p=0.087) or degree of spinal canal compromise (OR=0.94, p=0.066). 5. The odds of AIS improvement >2 were at least 2% lower for each additional hr from injury to surgery (OR=0.83, p=0.029). 6. The median improvement in AMS score was significantly greater in the very early group than early group (+38.5 versus +15.0, p=0.0468).
Kepler et al. (2015) Canada Case Control N=68	**Population:** *Early surgery (n=19):* Mean age=52.1 yr; Gender: male=63%, female=37%; Level of injury: not reported; Severity of injury: mean ISS=18.1.	1. No significant differences were observed in ASIA motor scores (p=0.36), the change in ASIA motor score within seven days (p=0.34), the number of individuals who had early improvement (p=.94), time spent in ICU (p=0.84), or

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	Delayed surgery (n=49): Mean age=59.2 yr; Gender: male=72%, female=27%; Level of injury: not reported; Severity of injury: mean ISS=19.8. **Intervention:** A retrospective review was conducted to characterize changes in ASIA motor scores within the first week after traumatic central cord syndrome to identify predictors of improved early outcome in individuals treated with early versus delayed surgical intervention. **Outcome measures:** American Spinal Injury Association (ASIA) motor score; Overall Length of Stay (LOS); LOS in Intensive Care Unit (ICU). **Chronicity:** The average length of hospital stay in ICU was 3.4 days, while overall hospital length of stay was 10.5 days.	overall LOS (p=0.59) between the early and delayed groups.
Samuel et al. 2015a USA Case Series N=2636	**Population:** Mean age: 56.6 yr; Gender: males=833, females=227; Injury etiology: fall=586, motor vehicle accident=317, bicycle=59, other=98; Level of injury: T12-L3. **Intervention:** Individuals with acute traumatic central cord syndrome who underwent surgery were retrospectively analyzed. Individuals were analyzed by time to surgery. Mean time to surgery was 3.5 days. **Outcome Measures:** Mortality, Adverse Events.	1. Delayed surgery was associated with a decreased odds of inindividual mortality (p=0.04) 2. Delayed surgery was associated with a 19% decrease in odds of mortality with each 24 hr increase in time until surgery. 3. The association of time to surgery with serious adverse events was not statistically significant (p=0.09). 4. The association of time to surgery was associated with increased odds of minor adverse events (p<0.001).
Samuel et al. 2015b USA Case Series N=1060	**Population:** Mean age=56.6 yr; Gender: male=833, female=227; Level of injury: not reported; Severity of injury: mean ISS score=19.5. **Intervention:** A retrospective review of surgically treated individuals with acute traumatic central cord syndrome to determine the association of time to surgery on mortality and adverse events. **Outcome measures:** Mortality; Serious adverse events; Minor adverse events.	1. Delayed surgery was associated with decreased odds of individual mortality (OR=0.81, p=0.04), or a 19% decreased in odds of mortality with each 24 hr increase in time to surgery. 2. No significant differences were observed between time to surgery and serious adverse events (p>0.05), however, time to surgery was associated with increased odds of minor adverse events (OR=1.06, p<0.001).

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	Chronicity: The mean time to surgical decompression was 3.5 days, while the mean length of hospital stay was 14 days.	
Anderson et al. (2012) USA Case Series N=69	**Population:** Mean age: 59.0 yr; Gender: males=39, females=30; Injury etiology: falls=49, motor vehicle accident=13, sports=6, traumatic intubation=1; Injury severity: AIS C=28, D=41. **Intervention:** Individuals with traumatic central cord syndrome were retrospectively analyzed. Individuals had early surgery (<24 hr, n=14), midrange surgery (24-48 hr, n=30), or late surgery (>48 hr, n=25). Mean length of acute care hospitalization was 13 days and mean follow-up time was 11 mo. **Outcome Measures:** American Spinal Injury Association (ASIA) Grade, ASIA Motor Score (AMS).	1. There was a significant improvement in mean AMS between initial presentation and hospital discharge, and between hospital discharge and final follow-up ($p=0.01$ and $p<0.001$, respectively). 2. Overall, 74% of individuals improved one or more AIS grades. 3. ASIA-C individuals: 6 (21.4%) were still ASIA-C at final follow-up, 19 (67.9%) had improved to ASIA-D, and 3 (10.7%) had improved to ASIA-E. 4. ASIA-D individuals: 12 (29.3%) were still ASIA-D at final follow-up and 29 (70.7%) had improved to ASIA-E. 5. There was no significant difference in rate of AMS improvement between all surgery groups.
Chen et al. (2009) China Case Series $N_{Initial}=56$, $N_{Final}=49$	**Population:** Mean age: 55.9 yr; Gender: males=40, females=9; Injury etiology: motor vehicle accident=29, fall=16, sports=3, Other=1; Level of injury: cervical. **Intervention:** Individuals with traumatic central cord syndrome who underwent surgical repair were retrospectively analyzed. **Outcome Measures:** American Spinal Injury Association (ASIA) Motor Scores, Short Form 36 (SF-36), Walking Index for Spinal Cord Injuries (WISCI).	1. Significant improvement in ASIA scores was achieved during the first 6 mo after surgical intervention. 2. Younger individuals had a significantly greater improvement in the ASIA motor score compared to older individuals ($p=0.023$). 3. On the SF-36, many individuals complained that spasticity and neuropathic pain were major factors leading to poor quality of life. 4. There was no significant difference between individuals who underwent surgery within 4 days of injury or after 4 days of injury. 5. There was no significant difference in WISCI scores.
Aito et al. (2007) Italy Case Control N=82	**Population:** Mean age: 52.0 yr; Gender: males=72, females=10; Injury etiology: motor vehicle accident=47, falls=30, sports=5; Injury severity: AIS A=2, B=12, C=37, D=31; Time since injury range: >18 mo. **Intervention:** Individuals with traumatic central cord syndrome were retrospectively analyzed and compared to those receiving conservative treatment. **Outcome Measures:** Type of Treatment, Length of Stay (LOS), Neuropathic Pain,	1. 45% of participants were treated surgically and 55% conservatively. 2. Average LOS was 120 days (24–390), but less for those treated without surgery. 3. Individuals under 65 years had better outcomes with less neuropathic pain. 4. FIM and WISCI scores highly correlated with the younger to older age groups ($p<0.001$). 5. ASIA impairment scale, both from admission to discharge and from discharge to follow-up, showed a

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	Functional Independence Measure (FIM), Walking Index for Spinal Cord Injuries (WISCI), American Spinal Injury Association (ASIA) Impairment Scale.	significantly greater improvement for younger age groups (p<0.01).
Dvorak et al. 2005 Country Design N=X		1.
Guest et al. (2002) USA Case Control N=50	**Population:** Mean age: 45.0 yr; Gender: males=31, females=19; Injury etiology: motor vehicle accident=22, fall=19, sports=9. **Intervention:** Individuals with traumatic central cord syndrome (CCS) who underwent surgical repair were retrospectively analyzed based on timing of surgery: early (<24 hr, n=16) and late (>24 hr, n=34). Mean follow-up period was 36 mos. **Outcome Measures:** American Spinal Injury Association (ASIA) Motor Score (AMS), Post-Spinal Injury Motor Function Scale (PSIMFS).	2. Individuals with CCS secondary to acute disc herniation or fracture/dislocation who underwent early surgery significantly greater overall motor improvement was observed than in those who underwent late surgery (p=0.04). 3. Overall motor outcome in individuals with CCS secondary to spinal stenosis or spondylosis who underwent early surgery was not significantly different from that in those who underwent late surgery (p=0.51). 4. Worse motor outcomes were found in individuals who were older than 60 years of age and in whom initial bladder dysfunction was present (p=0.03 and p=0.02, respectively) compared with younger individuals without bladder dysfunction.