Author Year Country Research Design Score Sample Size	Methods	Outcome
Richard-Denis et al. 2018 Canada Case control Level 3 N = 81	**Population:** (*Group 1*): Mean age: 43.6 yr; Gender: male=75.4%, female=24.6%; Injury severity: Mean ISS= 35.3. (*Group 2*): Mean age; 42.5yr; Gender: male=83.3%, female=16.7%; Injury severity: Mean ISS=42.7%. **Intervention:** Patients in group 1 were transferred early to a level-1 trauma center for surgical management of SCI. Patients in Group 2 were transferred late (post-operatively) to the same SCI trauma center for care. **Outcome Measures:** Tracheostomy requirement, MV requirement, ventilation and support duration. **Chronicity:** Patient population was defined as acute SCI.	1. Group 2 had significantly higher rates of required tracheostomies (p=0.004). 2. There were no significant differences between groups in terms of the number of patients who required MV support. 3. There was a significant difference between groups for the number of days spent on ventilation, with Group 2 spending on average 50 more days on ventilation (p=0.006).
Cinotti et al. 2019 France Pre-post Level 4 N = 117	**Population:** 117 patients with a traumatic cervical SCI admitted in the ICU in the first 48 hours; 81 males and 36 females; mean age 46.5 years; AIS A (n = 67), AIS B (n = 16), AIS C (n = 18), and AIS D (n = 16); and clinical motor level (ASIA score) C2 (n = 4), C3 (n = 2), C4 (n = 22), C5 (n = 36), C6 (n = 20), C7 (n = 15), and T1 (n = 3). **Intervention:** Study was divided in two periods (where patients were analyzed receiving different intervention protocols):	1. During the intervention period, overall bundle compliance* was achieved in 0 patients in the control group and 5 (8.3%) patients after the rehabilitation program implementation. 2. Median ICU LOS was not statistically different between the two periods (26 [16–47] vs. 29 [11.00–46.75] days; p=0.9). 3. During the control period, the Delta ASIA motor score between ICU discharge and admission was +6 [0–14], as compared to +16 [4–

	• Control phase (n = 57): Consisted of all consecutive patients who were admitted to ICUs receiving general care according with local protocol and French guidelines. • Intervention phase (n = 60): Involved all consecutive patients receiving an early rehabilitation strategy with an ET in case of upper injury (> C6), bronchial drainage physiotherapy, assisted cough with mechanical insufflator/exsufflator in atelectasis and aerosol therapy based on beta-2 mimetics, among other techniques. *Some of the interventions remained similar in the two intervention phases. **Outcome Measures:** The Delta ASIA motor score (ASIA motor score variation between ICU admission and ICU discharge) in the subgroup of patients with AIS grade A; compliance with rehabilitation program; the number of respiratory complications; in-ICU LOS; hospital LOS; ASIA score at 1 year; and 1-year mortality. **Chronicity:** Patients were admitted in the ICU in the first 48 hours.	32] with the rehabilitation program ($p < 0.05$). In a multi-variate linear regression model, the intervention period was significantly associated with a higher Delta ASIA motor score (β coefficient, 11.4; CI_{95} [1.9–21.0]; $p = 0.01$). In the subgroup of patients with AIS Grade A patients, the Delta ASIA motor scale was +1 [0–10] in the control period, and +10 [3–24]; $p = 0.02$) in the intervention period. 4. One year after SCI, the Delta ASIA motor score between 1-year follow-up and ICU admission remained higher in the intervention phase than in the control period (+34 [15–60] vs. +11 [0–33]; $p < 0.05$). * Overall bundle compliance is defined by the association of ET as recommended in the 7 days after ICU admission, protective ventilation (6–8 mL/kg^{-1}), PEEP >0 cmH_2O, early enteral nutrition, early mobilization, and early active perineal care, within 48 h after ICU admission.
Romero-Ganuza et al. 2015 Spain Pre-post Level 4 N = 68	**Population:** Mean age: 53.8 yr; Gender: male=49, female=19; Level of SCI: C1-C4=44, C5-C8=11, thoracic=13. **Intervention:** Patients were treated with a specific respiratory care comprehensive rehabilitation program.	1. Five patients died in hospital. 2. The average LOS for survivors was 195.6 days. 3. 63/68 of patients were discharged to the community, 47 patients were discharged home, 13 were discharged to

	Outcome Measures: Hospital mortality, LOS, discharged to community, discharged home, discharge to extended care facilities, discharge to acute care hospital, weaned from ventilation, patients with permanent respiratory support. **Chronicity:** Patients were admitted within 3 months of injury.	extended-care facilities, and 3 were sent to an acute care hospital setting. 4. 23 patients were weaned at the hospital. 5. 20 patients had permanent respiratory support.
Wong et al. 2012 USA Post-test Level 4 N = 24	**Population:** Mean age: 33 yr; Gender: male=22, female=2; Level of injury: C1-C4; Severity of injury: complete=79%, incomplete=21%; AIS A-D. **Intervention:** Retrospective analysis of patients who received a hospital program at an SCI specialty unit of HVtV, high frequency percussive ventilation, and mechanical insufflation-exsufflation were compared before and after the program. **Outcome Measures:** Occurrence of high tidal ventilation, high frequency percussive ventilation, mechanical insufflation-exsufflation, initiating a speaking valve, ventilator weaning attempts, time from admission to ventilator wean. **Chronicity:** Average time from injury to transfer to the SCI unit was 33.8 days.	1. In 14 patients who were weaned off the ventilator, the average day to be weaned from the time of admission was 27.6 days (*SD* 12.9 days). 2. Three participants with C3 AIS A were ventilator weaned in 24 to 62 days (average 43.67 days). Eight participants with C4 AIS A were ventilator weaned in 14 to 31 days (average 22.13 days). Two participants with C4 AIS B were weaned from the ventilator in 19 to 22 days (average 20.5 days). One participants with C4 AIS C was weaned in 37 days. 3. Six participants were decannulated prior to discharge to home, and the average days to be decannulated after admission was 42.0 days (*SD* 16.6 days).
Cameron et al. 2009 Australia Cohort Level 2 N = 102	**Population:** Age range: 24-52 yr; Gender: male=78, female=24; Level of injury: C4-C8. T1-T5, T6 and below; Severity of injury: complete=44, incomplete=58; AIS A-D. **Intervention:** Patients either received tracheostomy review	1. There were no significant differences with regards to hours mechanically ventilated (p=0.71) and hours in ICU (p=0.60) between pre-TRAMS patients and post-TRAMS patients.

	and management services (post-TRAMS group, 2003-2006) or did not receive tracheostomy review and management services (pre-TRAMS group, 1991-2001). **Outcome Measures:** Hours mechanically ventilated, hours in ICU, length of hospital stay, duration of cannulation, initiation of communication through a one-way speaking valve, deaths. **Chronicity:** Length of acute hospital stay was a median of 60 days (pre-TRAMS group) and 41.5 days (post-TRAMS group); time since injury was not specified.	2. Post-TRAMS patients had a significantly shorter hospital stay compared to pre-TRAMS patients (p=0.03). 3. Post-TRAMS patients had a significantly shorter duration of cannulation compared to pre-TRAMS patients (p=0.03). 4. Post-TRAMS patients began using one-way speaking valves significantly earlier than pre-TRAMS patients (p<0.01). 5. There were no tracheostomy-related deaths in either group.
Vitaz et al. 2001 USA Cohort Level 2 N = 58	**Population:** Mean age: 33 yr; Gender: not specified; Level of injury: C1-T5; Severity of injury: not specified. **Intervention:** Patients either received treatment according to the clinical care pathway (Group 1) or received regular treatment (Group 2; control). **Outcome Measures:** The following during hospital stay: episodes of pneumonia, length of hospital stay, length of ICU stay, days on ventilator. **Chronicity:** Average overall length of hospital stay was 36 days and 24 days for Group 1 and Group 2 patients, respectively; time since injury was not specified.	1. Patients in Group 1 experienced significantly fewer episodes of pneumonia compared to patients in the control group (p<0.05). 2. Patients in Group 1 experienced a significantly shorter stay in the hospital (p<0.05) and ICU (p<0.05) and required significantly fewer days on the ventilator (p<0.05) compared to patients in the control group.