

Author Year; Country Score Research Design Total Sample Size	Methods	Outcome
<p>Wang et al. 2020</p> <p>USA</p> <p>Prospective controlled trial</p> <p>Level 2</p> <p>N=207</p>	<p>Population: N=207, 159 with SCI and 48 non-injured controls</p> <p>Treatment: Participants lay in supine position and 5 min of resting data were recorded. Participants were then passively moved into the seated position. Beat-to-beat blood pressure and heart rate were recorded continuously during the transition and throughout the seated position lasting for 4 min or 15 min.</p> <p>Outcome measures: BP, HR, ECG</p>	<ol style="list-style-type: none"> 1. Dramatic increases in heart rate that accompanied decreases in systolic and diastolic blood pressure after moving the participant to an upright position were evident within each level and severity of injury. 2. Individuals with SCI that did not meet the criteria for orthostatic hypotension still had a drop in SBP between 10 and 20 mmHg and/or a drop in DBP between 5 and 10 mmHg and still experienced an increase in HR (>10 BPM). 3. Those individuals with SCI that did meet the criteria for having orthostatic hypotension also experienced profound increases in HR.
<p>Wang et al. 2022</p> <p>USA</p> <p>Prospective controlled trial</p> <p>Level 2</p> <p>N=55</p>	<p>Population: N=55, 33 with SCI and 22 non-injured participants</p> <p>Treatment: BP was measured every 10, 15, or 20 min while awake and every 30 min while asleep. HR was measured continuously. All participants were to keep a diary of activities that affect their BP and the presence of symptoms without a related event.</p> <p>Outcome measures: BP and HR</p>	<ol style="list-style-type: none"> 1. SBP, DBP, and HR did not show a nocturnal dip in participants with SCI compared to the ambulatory non-injured and wheelchair non-injured group. 2. SBP was significantly increased while awake compared to asleep in the ambulatory non-injured group but not the wheelchair non-injured group or SCI group (awake, 122 [108–133]; asleep, 103 [91–113]; $p < 0.01$). 3. HR was significantly elevated while awake compared with asleep in ambulatory non-injured group (awake, 73 [63–89]; asleep, 63 [53–73]; $p < 0.01$) and wheelchair non-injured group (awake, 76 [66–84]; asleep, 60 [54–66]; $p < 0.05$), but not the SCI group. 4. Among participants with SCI, SBP, DBP, and HR decreased while awake compared to asleep (reversed nocturnal dip).

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<p>Park et al. 2024</p> <p>Korea</p> <p>Prospective controlled trial</p> <p>Level 2</p> <p>N=27</p>	<p>Population: N=27</p> <p>Treatment: Participants remain still in a supine position for 6 min, then were tilted to a 60-degree position using a tilt table and remained in that position for another 6min. Measurement of R-R intervals and BP were conducted. Difference in HRV between people with OH and those without OH, as well as between people with symptoms of OH and those without symptoms of OH were analysed.</p> <p>Outcome measures: R-R intervals and BP</p>	<ol style="list-style-type: none"> 1. Comparison between without OH and with OH: Among participants with OH, the mean RR interval was lower (878.78 ms compared to 970.80 bpm, $p<0.109$), and the mean HR was higher during the 60-degree tilt-up test compared to the participants without OH (69.95bpm compared to 62.92bpm, $p<0.106$), however these results were non-significant. 2. Comparison between symptomatic and asymptomatic OH: The mean HR was significantly lower in the symptomatic OH group than in the asymptomatic OH group, in both the supine position (62.61bpm compared to 76.48bpm, $p<0.007$) and the 60-degree tilt-up position (66.78bpm compared to 84.27bpm, $p<0.001$). The mean R-R intervals were significantly higher in the symptomatic OH group for both the supine position and the postural challenge (970.57ms compared to 797.18ms, $p<0.005$, and 906.75ms compared to 719.95ms, $p<0.000$, respectively). 3. In the 60-degree tilt up position, the mean values of lowest diastolic and systolic BP were lower in the symptomatic group compared to the asymptomatic group (46.88 compared to 47.50, and 72.22 compared to 78.50, respectively), although there was no significant statistical difference.

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<p>Stampas et al. 2019</p> <p>USA</p> <p>Prospective controlled trial</p> <p>Level 2</p> <p>N=18</p>	<p>Population: N=18 SCI, 10 people with tetraplegia, 8 with paraplegia; N=6 controls</p> <p>Treatment: BP was recorded while seated in wheelchairs after waiting 5 mins. Participants were then transferred to the exam table in supine position for 10 mins and BP and HRV were measured. Finally, participants were transferred to a seated position with immediate BP and HRV recordings.</p> <p>Outcome measures: BP and HRV</p>	<ol style="list-style-type: none"> 1. In the resting seated position, there were no differences in HRV measures when people with SCI were grouped by presence of OH. However, those with OH had lower SBP compared to those without OH [106mmHg (16) v 136 mmHg (27), $p=0.049$] and controls [132 mmHg (10), $p=0.024$]. 2. The expected BP changes seen with postural challenge when grouping by OH were observed, but significant differences were only detected by DBP. In those with OH, DBP was lower in OH [59.8 mmHg (9.5)] compared to controls [78.7 mmHg (12.3), $p=0.033$] and SCI without OH [78.6 mmHg (11.1), $p=0.017$]. 3. Mean HR was significantly increased (109.8 bpm (45.5)) and mean RR was decreased (612.6 ms (174.3)) in OH compared to controls (68.6 bpm (9.8), 891 ms (123.5), respectively).
<p>Hansen et al. 2021</p> <p>Denmark</p> <p>Case series</p> <p>Level 4</p> <p>N=158</p>	<p>Population: N=158, 109 males, 49 females, 449 meals</p> <p>Tetraplegia: 94; Paraplegia: 64; Non-traumatic SCI: 85; Diabetes: 16; Other neurological diseases: 20</p> <p>Treatment: Each participant was to keep a diary of activities, including time of meals, including snacks and nutrition through percutaneous endoscopic gastrostomy tube (PEG-tube), and symptoms of hypo- and hypertension (e.g., dizziness, headache, sweating). Physical activity including physical therapy appointments and transfers were noted in the diary as well.</p>	<ol style="list-style-type: none"> 1. Median sBP was 120 mmHg before breakfast, 125 mmHg before lunch, 125 mmHg before dinner, and 118 mmHg during the night. 2. A total of 114 (25.3%) episodes of decrease in SBP within two hours after a meal met the criteria of PPH in 78 (49.4%) participants. In seven (4.4%) participants, the decrease in SBP was associated with symptoms of hypotension. 3. The median time from ingestion of the meal until PPH was registered was 60 min (min 15, max 120 min). The median change in SBP during PPH was

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	<p>Postprandial hypotension (PPH) is defined as a decrease of ≥ 20 mmHg in SBP or a SBP of < 90 mmHg after having been > 100 mmHg before the meal within two hours after a meal.</p> <p>Outcome measures: sBP</p>	<p>-28 mmHg (min: -87; max: -15 mmHg).</p> <ol style="list-style-type: none"> 20 of 114 (17%) episodes interpreted as PPH occurred simultaneously with transfers noted in the diary, while 26 (23%) occurred simultaneously with physical activity e.g., physical exercise, physiotherapy, and occupational therapy. PPH and age had an odds ratio of 1.039 ($p = 0.001$); PPH and level of injury had an odds ratio of 1.512 ($p = 0.023$); PPH and injury completeness had an odds ratio of 9.482 ($p = 0.000$).
Katzelnick et al. 2019 USA Case Series Level 4 N=113	<p>Population: N=113, 85% male, 64% cervical</p> <p>Treatment: Participants recorded their blood pressure using an ambulatory blood pressure monitor and heart rate at least three times a day for 30 days</p> <p>Outcome measures: Blood pressure, heart rate</p>	<ol style="list-style-type: none"> Average 30-day SBP (114 ± 17 mm Hg), DBP (71 ± 9 mm Hg) and HR (73 ± 9 bpm) were within normal range ($p < 0.05$) Average SBP, DBP, and HR were significantly lower in the tetraplegic group compared with the low thoracic group, and SBP and HR were significantly lower compared with the high thoracic group ($p < 0.05$).
Kee et al. 2021 Korea Case series Level 4 N=100	<p>Population: N=100, tetraplegia</p> <p>Treatment: None. Authors reviewed the medical records of 100 patients with a cervical SCI who underwent carotid duplex ultrasonography (CDU). The differences between the systolic blood pressure, diastolic blood pressure, and CBF volume in the supine posture and after 5 min at 50° tilt were evaluated.</p> <p>Outcome measures: Blood flow velocity, peak systolic velocity, end diastolic velocity, mean</p>	<ol style="list-style-type: none"> 40 participants complained of presyncopal symptoms during the tilt. Presyncopal symptoms occurred when the CBFV decrease was more than 21% after tilt ($p < 0.05$).

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	<p>velocity, vessel diameter, vessel area</p> <p>Determined correlation of CBF change with presyncopal symptoms, and factors affecting cerebral autoregulation.</p>	
<p>Vaccaro et al. 2022</p> <p>USA</p> <p>Pre-post</p> <p>Level 4</p> <p>N=53</p>	<p>Population: N=53 with traumatic SCI</p> <p>Treatment: While the participants rested quietly, 10-min of supine data collection was initiated prior to passive repositioning of the participants and a 10-min seated data collection period.</p> <p>Outcome measures: Beat-to-beat ECG and TCD signals, HR, and CBFv</p>	<ol style="list-style-type: none"> 1. The magnitude of change in SBP during the sit-up test was not significantly associated with NLI (slope (b) = -0.39 mm Hg/segment, 95% CI for b = -0.89 to 0.11 mm Hg/segment) 2. The effect of postural change on SBP conformed to the parameters of sensorimotor impairment as assessed on the ISNCSCI exam. 3. The sit-up test did not induce a systematic change in SBP among study participants, (range in SBP change = -53.8 to +18.9 mm Hg, 95% CI of the mean difference = -4.1 to 1.3 mm Hg, d = -0.16).