**Appendix FA 517 Recovery Position Scoping Review Data Tables**

**TABLE 1. SUMMARY OF INCLUDED STUDIES**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 1A: Details of included studies: Decreased level of consciousness due to medical aetiology or intervention** | | | | |
| **Author, year** | **Design, Country** | **Population** | **Intervention / Comparator** | **Outcomes** |
| Adnet 1999 745 | Observational descriptive study of body position and suspected aspiration pneumonia in acutely poisoned patients.  Paris, France | 250 consecutively enrolled patients in an intensive care unit, presenting acutely poisoned and comatose (Glasgow Coma Scale 12 or less. | The body positions of the poisoned patients were classified as prone (PP), supine (SP), left lateral decubitus (LLD), right lateral decubitus (RLD) or semi-recumbent (SR).  Suspected aspiration pneumonia determined by chest radiograph. | One hundred twelve patients (54%) were included in the SP group, 30 (15%) in the LLD group, 25 (12%) in the PP group, 20 (10%) in the RLD group, and 18 (9%) in the SR group.  The prone position and semi-recumbent position were associated with a significantly decreased rate of suspected aspiration pneumonia. There was no significant difference between LLD, RLD, and SP groups with respect to incidence of pulmonary infiltrates.  The lateral decubitus position does not appear to protect against aspiration pneumonia in poisoned patients, when compared with other body positions. Moreover, the prone position is least often associated with subsequent radiographic findings of suspected aspiration in this series. |
| Arai 2005 949 | The effects of body position shifting and common airway manoeuvres such as chin lift and jaw thrust on airway patency (stridor score and upper airway dimensions by endoscopy) in anesthetized children scheduled for adenotonsillectomy. | Eighteen children aged 1–11 year anesthetized with sevoflurane | Upper airway dimensions and stridor score were recorded. After baseline recording, chin lift and jaw thrust were performed in both the supine and the lateral decubitus position. | Chin lift, jaw thrust, and lateral position increased the airway dimensions and improved the stridor score.  Stridor score for supine positioning was 4 IQR (4-4) versus 3 for lateral position (IQR (2-3) p <0.005.  Moreover, lateral positioning enhanced the effects of these airway manoeuvres on airway patency.  Lateral positioning combined with airway manoeuvres provided better airway patency for anesthetized children with adenotonsillar hypertrophy. |
| Arai 2004 1638 | Simple experimental trial of airway position on stridor score in anaesthetized children undergoing surgery for obstructive sleep apnoea  Kochi, Japan. | 30 children (aged one to ten years), with obstructive sleep apnoea syndrome, scheduled for elective adenotonsillectomy were anesthetised and underwent airway stridor assessments in supine and lateral positions. | Airway patency was assessed clinically as follows: stridor score 1 = normal breathing sounds detected by auscultation over the trachea, 2 = stridor over the trachea detected by stethoscope, 3 = stridor detected without auscultation (audible), 4 = no airway sound detectable over the trachea. | Median stridor score was 4 (25%–75% inter- quartile range 3–4) at a baseline measurement. Thoracoabdominal asynchronous movement was observed during the baseline measurement, but chin lift and/or jaw thrust improved the movement with stridor loud enough for everyone around the patients to notice in almost all cases (median score 3 [3–4] and 3 [2–3], respectively). The lateral position improved airway patency from 4 (3–4) to 3 (2–3). There was additional improvement in stridor scores when lateral positioning was combined with airway manoeuvres. |
| Freire-Tellado 2016 e1 | Case Series (letter to the editor)  Lugo, Spain | During 2013 and 2014 emergency medical services responded to seven out of hospital cardiac arrest victims who were assessed as unresponsive and breathing prior to being placed in the recovery position. |  | 7 cases of missed out of hospital cardiac arrest are reported. |
| Julliand 2016 531 | Prospective observational multicentre cohort study  11 paediatric emergency departments in 6 European countries | Children (age 8 to 18 years) with loss of consciousness defined as “an interruption of consciousness without response to stimulation, regardless of the length of interruption” (n=553)  191 patients age was <2 years (34.5%), 109 patients had chronic disease (19.7%) and 243 has a history of loss of consciousness (43.9%).  Two most common aetiologies were vasovagal syncope in 124 patients (22.4%) and seizures in 162 patients (29.3%) . | Parents put patient in recovery position in 145 (26.2%) of cases. | Independent association between the recovery position and a decreased admission rate with an adjusted OR of 0.28 (95% CI 0.17 to 0.48, p<0.0001).  Recovery position was associated with a decreased admission rate when a longer hospitalisation was considered as outcome (conventional or PICU hospitalisation vs direct discharge from the PED or admission in a short-stay observational unit): an OR=0.43 (95% CI 0.21 to 0.88, p=0.02).  No statistical interaction between the recovery position and patient age. |
| Kumar 1996 69 | Case report (letter to the editor)  London, UK | 27-year-old male, injected heroin the night before presenting to ED | The patient was left in the recovery position for approximately 12 hours after being found apnoeic and unresponsive following injecting heroin. | A diagnosis of lower motor neurone (sic) palsy of the left radial and left common peroneal nerves. Function was completely recovered after three weeks of physiotherapy. |
| Litman 2005 484 | Magnetic resonance study protocol was performed with the deeply sedated child in the supine position. Then each subject was turned laterally (based on a randomization scheme for each episode) on the magnetic resonance gurney. Then the upper airway scans were repeated using the same protocol as for the supine scans.  Philadelphia, USA | 17 children aged 2–11 years requiring MR examination of the head or neck region using deep sedation with propofol were included. | The images were processed and segmented automatically to render a three-dimensional reconstruction of the upper airway, including its surface description, centreline, and volume. A centreline through the airway is computed that passes through all points maximally distant from the perimeter of the airway at sequential planes orthogonal to the airway axis. The total upper airway volume was computed as a product of the centreline length and the mean cross-sectional area. Cross-sectional areas at planes orthogonal to the centreline were computed every 0.2 mm after interpolation, filtering, and thresholding of the original axial slices. The cephalad border of the upper airway was defined as the posterior edge of the vomer and used the vocal cords as a lower landmark with which to divide the upper airway into 10 consecutive (10%) equidistant intervals along the centreline to facilitate analysis and comparison between body positions. Only airflow-conducting portions of the upper airway are used for the analysis of volume and cross-sectional area. | The separate results from the right and left lateral positions were similar and were therefore combined for the final analysis. Sixteen of the 17 subjects had increases in total upper airway volume when placed in the lateral position. As a group, the total airway volume was 6.0 ± 2.9 ml3in the supine position (mean ± SD) and 8.7 ± 2.5 ml3(mean ± SD) in the lateral position (P < 0.001). |
| Svatikova 2011 262 | Randomized crossover study of positional therapy for sleep apnoea in stroke.  USA | 18 adults within the first 14 days of ischemic stroke | Apnea-hypopnea index (events/h), mean (no intervention):  27 in non-supine positions, 49 in supine position. | Positional therapy reduced the amount of supine positioning by 36% (95% CI: 18–55% (P < 0.001)). The AHI was reduced by 19.5% (95% CI: 4.9–31.9% (P = 0.011)), when using posi- tional therapy compared to sleeping ad lib. |
| Turkington 2002 2037 | Observational study of respiratory disturbance index (RDI) in different sleeping positions.  Leeds, UK | 120 stroke patients investigated more than 24 h after onset | Sleep study equipment (Alice 4) was used to monitor patients oronasal airflow, HR, ECG, SpO2, Respiratory strain, snoring, body position, and ambient lighting for a minimum of 6hrs, maximum of 24hrs. | RDI (events/h), mean: Left lateral position: 14; Right lateral: 12 and Supine: 29. p < 0.0001.  Numbers for left and right lateral are not reported in text or table but estimated from figure. |

RDI – respiratory distress index

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 2. Details of included studies: Healthy volunteer studies with normal level of consciousness** | | | | |
| **Author, year** | **Design, Country** | **Population** | **Intervention / Comparator** | **Outcomes** |
| Blake 2002 289 | Comparison of the left lateral recovery position with the modified High Arm IN Endangered Spine (HAINES) position on thoraco-lumbar rotation, flexion and lateral flexion.  Parkville, Australia | 38 healthy volunteers | Participants had their spinal alignment assessed in the lateral recovery position and later in the modified HAINES position. In each position four digital photographs were taken: one from in front, one from behind, one from above and one along the longitudinal axis of the body from the head end. A total of 304 digital images were analysed. Assessments were made of six angles allowing measurement of thoraco-lumbar flexion, lateral flexion and rotation and cervical flexion, lateral flexion and rotation. | There was greater cervical lateral flexion and extension of the cervical spine in the lateral recovery position compared to the modified HAINES position. There was more thoracic/lumbar spine rotation and lateral flexion in the modified HAINES group.  Two participants preferred HAINES to the lateral recovery position (19 vs 9). Although it didn’t reach statistical significance. Two participants reported “pins and needles” in their abducted arm in the HAINES position. |
| Doxey 1998 161 | Simple experimental trial  Chesterfield and Derbyshire, United Kingdom | 100 healthy volunteers, basic life support trainees, 81 of whom were clinicians. | 1992 (lower arm in front of chest) versus 1997 (lower arm behind back) recovery positions | 96 of the participants reported feeling “safe” in the 1992 position versus 58 in the 1997 position (P <0.001).  83 of the participants reported being comfortable being turned into the 1992 position versus 30 being turned into the 1997 position (P <0.001). One in the position 84 participants reported feeling “comfortable” in the 1992 versus 43 in the 1997 position.  Pain was reported by 39 participants in the 1997 position versus 12 in the 1992 position.  94 vs 54 found the 1992 position easier to perform, more would be “happy to use” the 1992 guidelines. |
| Freire-Tellado 2017 173 | Simple randomized trial comparing detection of respiratory arrest in simulated patients undergoing head-tilt-chin-lift (HTCL) airway assessment compared to the recovery position (RP).  Lugo, Spain | 59 basic life support trained university students | One week after basic life support training the participant responded to a simulated cardiac arrest performed by a trained actor who simulated normal, then agonal breathing (for 2 minutes), then respiratory arrest (for 2 minutes). The simulation ended after 4 minutes or when the participant attempted to deliver chest compressions. | Fifty-five (91.52%) participants correctly evaluated the simulated victim as unresponsive but normally breathing; 27 placed them in the recovery position RP and 28 in HTCL. Out of the 27 participants that placed the victim in RP, 14 (51.8%) detected respiratory arrest within 2 min compressions compared to the 23 (82.14%) out of the 28 in the HTCL group (p = 0.006). Odds ratio (OR) of 6.571.  The time required by participants who detected breathing cessation and initiated cardiac compression within 2 min varied greatly. The RP group took an average of 31.92 s (range = 2–104; SD = 25.49) to detect it as compared to the HTCL group that took an average of 17.52 s (range = 4–47; SD 11.37). The difference in the mean detection time of breathing cessation was statistically significant, t (35) = 2.365 (p = 0.024). |
| Fulstow 1993 89 | Simple experimental trial comparing two recovery positions.  Portsmouth, United Kingdom | 6 healthy volunteers | Participants were positioned:   * supine for five minutes in the 1992 European Resuscitation Council recovery position, or * left lateral semi-prone recovery position previously recommended by the UK Resuscitation Council   Each position was held for up to 10 minutes while undergoing skin temperature, limb colour, SPO2 and plethysmograph monitoring. A wash out period was used between recovery positions. | The 1992 ERC position resulted in 4/6 (67%) of participants reporting circulatory problems venous and/or arterial insufficiency.  The 1992 ERC recovery position resulted in venous engorgement and blotchy skin mottling. Discomfort and a numb feeling occurred in 3 of the 4 participants placed in the “new” position, 2/4 lost plethysmography waveform and demonstrated falling finger temperature suggesting arterial occlusion. An unknown number of participants complained of discomfort in the affected limb for a short time after the trial had concluded. |
| Navarro-Paton 2019 104 | Simple experimental trial.  Cardiff, Wales | 86 healthy volunteers | Comparison between ERC 1992 and ILCOR 1997 recovery positions. using open ended and close ended Likert scale questions. | Participants in the role of provider found the 1992 recovery position easier than the 1997. Closed question asking if they preferred positioning the patient to the near or far side were asked; but not reported.    Participants in the role of victim placed in the ERC 1992 recovery position were more likely to report positively on the near side arm position, the turning process, and the final position (all P<0.001).  The following are examples typical of qualitative comments made by trainees: “This hurts!! it felt like my arm was breaking.” (ILCOR 97) “I definitely prefer ERC 92, ILCOR 97 was damn painful.” “I strongly recommend my lifeguard team not to use ILCOR 97 as it is uncomfortable for the casualty.” |
| Navarro-Paton 2019 104 | Randomized cluster-controlled trial comparing breathing assessments at i) regular intervals using the recovery position (RPregular), ii) every minute using the recovery position (RPmin) or iii) continuously using the head-tilt-chin-lift manoeuvre (HTCL)  Lugo, Spain | 192 school children aged 10 to 12 years old, were randomly assigned into three arms  1. RP follow 2015 guidelines (RPregular)  2. RP check respirations every minute (RPminute).  3. No recovery position, maintain head tilt chin lift (HTCL) | Immediately after the BLS the participants evaluated cardiac arrest situations in a  simulation carried out by an actor who played the victim. The actor breathed normally at the time of the fall and during the first minute, but his breathing pattern became progressively slower and  deteriorated over the following minute (agonal breathing) and concluded in breathing arrest at the beginning of the third minute, remaining apnoeic for two minutes. | Breathing evaluation in the recovery position group was correct 79% (n=48) of the time, increasing to 58% (n=95%) with breathing assessment every minute and rose to 97% (n=60) with the head-tilt-chin-lift.  113 participants detected cardiac arrest before the end of the simulation: 16 (26.2%) out of the 59 participants in the RPregularly group, 41 (67.20%) out of 61 in the RPminute group, and 56 (90.3%) out of 62 in the HTCL group. Statistically significant differences were found between RPregularly and RPminute group (p < 0.001; OR = 5.766, CI 2.63–12.60), RPregularly and HTCL groups (p < 0.001; OR = 21.094, CI 7.57–58.80) and between RPminute and HTCL groups (p = 0.002; OR = 4.553, CI 1.679–12.943). |
| Turner 1998 153 | Survey of first aid training participants peeforming and experiencing the 1992 and 1997 recovery positions | 687 participant surveys | 302 participants trained in the 1992 position versus 385 taught the 1997 position, then surveyed as rescuers regarding ease of execution, position steadiness, speed and ease of learning. Participants were also surveyed from the perspective of victims regarding smoothness of role, ability to breath, comfort and stability. | The median survey scores of the victim perspective scores were reported in a pooled fashion. Comparison of the results showed higher scores for the 92 position compared to the 97 position (P <0.001, Mann-Whitney U test). The median combined score for the 1992 position was 29 compared to 24 for the 1997 position (p <0.001). |
| Rathgeber 1996 13 | Simple randomized experimental trial (2 studies of 2 different recovery positions, 4 positions total)  Gottingen, Germany | 20 healthy volunteers  10 healthy volunteers | 20 healthy volunteers randomized to the AHA or ERC position for the first 15minutes then the other position thereafter.  10 healthy volunteers in the MMC and in the Rautek’s position according to the same protocol.  Before and between recovery position volunteers were positioned supine. | Discomfort was reported by 11/20 participants in the ERC position, 4/20 in the AHA position, 5/10 in the MMC position and 4/10 in the Rautek position.  All recovery positions except the AHA decreased photoplethysmographic index and non-invasive peripheral blood pressure amplitude. |

RP = recovery position; HTCL = head-tilt-chin-lift

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 3. Details of included studies: Patient positioning for ventilation during sleep** | | | | |
| **Author, year** | **Design, Country** | **Population** | **Intervention / Comparator** | **Outcomes** |
| Barnes 2017 107 | Systematic review and meta-analysis of positional modification techniques for supine obstructive sleep apnoea | 5 data bases from 1946 to 2016, 25 articles included. Nine studies with 293 participants included in the final review. Seven studies with 180 participants presented data available for meta-analysis. | Interventions (multiple and diverse) to prevent participants from sleeping in the supine position. | Positional techniques compared to non-standard therapy  Meta-analysis for four studies (206 participants) for the primary outcome of AHI was performed. There was a significant reduction in AHI favoring positional techniques ((mean difference 9.59 events per hour, 95% CI 12.48 to 6.69), p < 0.00001). There was no significant heterogeneity with I2 1⁄4 3% (p 1⁄4 0.38). |
| Browaldh 2013 846 | Comparative study of patients treated surgically for or observed with obstructive sleep apnoea.  Sweden | 62 obstructive sleep apnoea patients | Oxygen desaturation index events per hour before treatment for the surgical intervention group compared with the observation only group. | Obstructive sleep apnoea events per hour in the observation group was 62.7 per hour in the supine position and 44.6 per hour in all other positions. In the preoperative group in the supine position were 54.4 per hour and 41.1 per hour in all other positions. No p-values reported. |
| Cao 2005 215 | Descriptive sleep study of nadir (lowest) SpO2 in lateral vs. supine sleeping position.  China | 225 adults with known obstructive sleep apnoea syndrome | SpO2 study of lowest recorded value comparing supine sleepers with lateral sleepers. Participants with known positional obstructive sleep apnoea versus non-positional were reported separately. | Lowest mean SpO2 for positional obstructive sleep apnoea syndrome sleepers was 79.5% for the lateral group and 78.9% for the supine group. For the non-positional sleepers, the lowest recorded mean SpO2 was 75.1% in the lateral position and 71.5% in the supine position. No p-values reported. |
| do Prado 2002 66 | Retrospective analysis of polysomnograms of patients assessed for obstructive apnoea with hypoxia index >1 (AHI) in sleeping positions  USA | 80 children (1–10 years) with suspected obstructive sleep apnoea syndrome | Obstructive AHI in lateral, prone, or supine sleeping positions, measured by PSG. | Obstructive AHI (events per hour), mean: seven in lateral positions, eight in supine. Does not report standard deviation. No significant difference. A regression analysis showed longer apnoeic duration side versus supine position after controlling for obesity (group/value not given, p=0.034. Prone positioning resulted in the fewest apneic spells, supine in the fewest apnea-hypopnea events, although statistical significance is unable to be determined. |
| Isono 2002 780 | Observational study  Japan | 8 anesthetized patients undergoing endoscopic assessment of pharyngeal mechanics prior to elective obstructive sleep apnea surgery | Patients anesthetized and airway closing pressure measured in lateral and supine positions at two areas (retropalatal and retroglossal airway). Airway pressure (PAW, cmH2O) was measured to cessation of air passage. This PAW equals the airway closing pressure, Pcrit. | Airway closing pressure (Pcrit, cmH2O) Retropalatal airway Lateral: −1.86, supine: 2.05 whereas the Retroglossal measurements were Lateral: −3.17, supine: 0.49 |
| Jordan 2003 1512 | Descriptive study of ventilation, end-tidal carbon dioxide (CO2), upper airway resistance, heart rate, and finger photoplethysmogram pulse wave amplitude after both spontaneous and tone-induced arousal from non-rapid eye movement sleep.  Australia | 33 healthy participants | Polysomnographic study (PSG) study reporting baseline inspiratory minute ventilation (MV) and upper airway resistance (Rua) in left lateral and supine position. | MV, mean (l/min): Men: Lateral: 7.5, supine: 7.0 and Women: Lateral: 5.9, supine: 6.0. MV: Small differences, may not be clinically important.  Rua, mean (cmH2O/l): Men: Lateral: 4.1, supine: 5.8 and Women: Lateral: 3.4, supine: 6.6. Rua: Higher airway resistance in supine position. Reports “significantly difference”, though no p-value is provided. |
| Kim 2011 276 | Observational study of AHI in supine sleeping position vs. all other positions.  Korea | 75 adults with obstructive sleep apnea syndrome |  | Study confirms that obstructive sleep apnea is position dependent in more than 50% of patients and non-supine position would lower the apnea-hypopnea index.  No data given, should be interpreted with caution. Conference proceedings only. |
| Li 2006 437 | Observational study of AHI in in lateral vs. supine sleeping positions, measured by PSG.  China | 54 adults with obstructive sleep apnea |  | Overall apnea-hypopnea index in supine position was higher than in lateral positions, p = 0.000  Should be interpreted with caution. Abstract only. |
| Nisbet 2014 81 | Observational study of apnea hypopnea index Down Syndrome (DS), with matched controls.  Michigan, USA | 76 children with DS, 76 age/gender/AHI/year of matched participants without DS. | Non-supine versus supine sleep positions. | AHI (events/h) in non-DS, median: REM sleep: 8.3 in non-supine positions, 17.8 in supine position. We report data from control group, as DS may be too indirect. Reports interquartile range, not standard deviation.  Participants in both arms had more frequent AHI events per hour supine vs. non-supine. |
| Oksenberg 2000 1018 | Descriptive observational study of apnoea and oxygen saturation in sleeping adults.  Israel | 30 “Non-positional” OSAS patients who were selected because they had >30 apnoeic episodes in both supine and lateral positions (26M:4F; avg 57.6y/o SD11.7yrs; avg BMI 32.3 DS4.3). | Patients with supine versus lateral sleep positions were compared according to apnoea duration, minimum oxygen saturation and the difference between minimum and maximum oxygen desaturation. | The mean apnoea duration in the supine position was 26.6 compared to 22.8 seconds. The mean minimum SpO2 was 82% in the supine position and 86.2% in the lateral position. The mean difference in the reported SpO2 was 8.3% in the lateral position and 12.6% in the supine position. |
| Penzel 2001 90 | Observational sleep study reporting.  USA | 16 male adult patients with suspected obstructive sleep apnea syndrome | Upper airway closing pressure comparing supine and lateral positions. Reported during three phases of sleep. | Airway closing pressure expressed as Pcrit. cmH2O; Light sleep (n=15) = -2.2 (3.6) compared to 0.6 (0.8) Supine. |
| Pereira 2005 1014 | Retrospective chart review  USA | 60 children (under 3 years), who underwent polysomnography to evaluate obstructive sleep apnoea | Children aged 3 years and younger and subsequently underwent adenotonsillectomy were included in the study. Patient demographics and polysomnography were analysed for data on the respiratory disturbance index (RDI), time spent in each body position, number of apnoeic events in each position, oxygen saturation, and time spent in each stage of sleep. | The mean supine sleep RDI was 18.5(5.1) compared with 7.2(1.9) for the mean nonsupine sleep RDI. The mean RDI increased from 5.6 to 8.5 when more than 50% of the time was spent in supine sleep. There was a further increase to 10.5 when supine sleep increased to 75% of the total sleep time. The mean +/- standard deviation supine sleep RDI was 18.5 +/- 5.1, and the mean nonsupine RDI was 7.2 +/- 1.9, which was statistically significant (P = .02). |
| Rosenberg-Adamsen 1997 590 | Descriptive study of oxygen saturation during sleep in supine compared with lateral positioning  Denmark | 13 preoperative gastrointestinal surgery patients | Mean SpO2 supine versus lateral positioning during preoperative night and mean number of desaturations per hour, defined as sudden 5% reduction in patient’s baseline. | No difference in mean SpO2 in the supine or lateral position. Statistically significant difference in the number of desaturation episode per hour: lateral position 3 per hr compared to 13 per hr supine. |
| Sasai 2011 116 | Descriptive study of mean arterial oxygen saturation (SaO2) in different sleep positions in patients with obstructive sleep apnea syndrome (OSAS).  Japan | 30 adults with obstructive sleep apnoea sorted by OSAS severity. | Mean average SaO2 (%) and duration of aponia were longer while supine compared with all other sleep positions among both moderate and severe OSAS patients | Mean average SaO2 (%), supine vs. all: Moderate OSA: Supine: 93.9, all positions: 95.1 and Severe OSAS: Supine: 88.0, all positions: 88.4p < 0.01 and < 0.05, respectively, but at least in the severe OSAS group the differences are not clinically important. |
| Zhang 2007 1321 | Observational study of apnoea/hypopnea index in sleeping positions, measured by PSG.  China | 45 children (3–13 years) with OSA | Effect of lateral vs. supine sleeping positions, on PSG (EEG, EMG, EOG, EKG, nasal airflow, SpO2, respiratory strain, snoring) | AHI (events per hour), median: 0 in left and right lateral position, 11.9 in supine. Reports interquartile range, not standard deviation. P < 0.001 and p = 0.003, respectively. Overall AHI for total sleep time was highest in supine group across groups. |

CCRV = chest compression release velocity; mm/s=millimetres per second; ROSC= return of spontaneous circulation; mRS = modified Rankin Score; CPC = cerebral performance category

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 4. Details of included studies: Cadaver studies of spinal alignment in recovery positions** | | | | |
| **Author, year** | **Design, Country** | **Population** | **Intervention / Comparator** | **Outcomes** |
| Del Rossi 2014 539 | Repeat measures design, cadaveric model of cervical spine injury  Tampa, FL, USA | Ten cadavers with no previous cervical pathology. A complete segmental injury (resulting in global instability) was surgically created at the cervical spine (C5-C6) region of all cadavers. | All cadavers were placed into the lateral recovery position and HAINES position.  All recovery positions were repeated 3 times with each cadaver and began with the cadaver in a standard starting position, which consisted of the cadaver lying supine on the ground and the head and neck aligned with the torso.  An electromagnetic tracking device was used to capture all linear translation motions produced between the fifth and sixth cervical vertebrae segment. | No statistically significant results were reported in this study comparing fifth and sixth cervical vertebrae lateral-medial, compression-distraction or anterior-posterior movement. |
| Hyldmo 2016 1003 | Repeated measures design, cadaveric model of cervical spine injury  Kristiansand, Norway | Five fresh cadavers with surgically induced cervical instability at C5-C6. | The Cadavers had baseline ROM assessed for flexion, extension, rotation and lateral bending prior to induction of instability. After spinal lesions were created cadavers were placed in four positions and underwent electronic cervical spine motion tracking. The positions were: recovery position, HAINES position one leg flexed, HAINES position two legs flexed, and the lateral trauma position.  Same methods used in Del Rossi et al. 2014 | Regression analyses estimates indicated statistically significant differences between the recovery position and the three other positions. For the recovery position, the estimate in lateral bending was 11.9°. While both HAINES positions caused a similar range of motion, the motion caused by lateral trauma position was 2.6°less (P=0.037). The linear axial range of motion in the recovery position was 13.0 mm. In comparison, the HAINES 1 and 2 showed significantly less motion (-5.8 and -4.6 mm, respectively), while the LTP did not (-4.0 mm, P=0.067).  In this cadaver study the lateral trauma position appears to result in the least amount of cervical spine movement when rolling from supine. |