Table 2. Characteristics of included studies – Indicatiestelling en timing voor tracheotomie

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
Included in systematic review Andriolo, 2015 (n=8)						
Barquist, 2006	N at baseline Intervention: 29 Control: 31 Mean age: 51.8 (whole sample), range: 18 to 87 Gender: 46 male/ 14 female (whole sample)	Intervention: Early tracheostomy: before day 8 Control: Late tracheostomy: after day 28 † Comparison: early tracheostomy vs late tracheostomy	30 days	Duration of mechanical ventilation (measured as mean ventilation-free days at day 30), complications (measured as ventilator-associated pneumonia; and major complications related to the tracheostomy)	Although times of follow-up were explicitly announced for some outcomes (mean ventilation-free days at day 30), study authors did not explicitly report follow-up times for the other outcome data	Moderate risk
Bösel, 2013	N at baseline Intervention: 30 Control: 30 Mean age: 61 (whole sample)	Intervention: Early tracheostomy: percutaneous dilatational tracheostomy (PDT) within 3 days from intubation Control: Late tracheostomy: PDT between days 7 and 14 from intubation if extubation, although aimed for, was	6 months	Duration of mechanical ventilation (measured as sum of half-days on the ventilator until the participant was ventilator-independent for 24 hour); Weaning duration (measured as sum of half-days spent under the possible application of a weaning protocol, and spent within specific stepwise phases of such a protocol); and complications (frequency of pneumonia, sepsis, and types of complications associated with the procedure (bleeding, malfunction, etc)		Moderate risk

		not possible until then. Comparison: early tracheostomy vs late tracheostomy				
Dunham, 1984	N at baseline Intervention: 34 Control: 40 Age (range): 17 – 75 (whole sample)	Intervention: early group (transtracheal intubation at 3 to 4 days after initiation of translaryngeal Intubation) Control: late group (transtracheal intubation performed 14 days after initiation of translaryngeal intubation, if continued intubation was required) Comparison: early tracheostomy vs late tracheostomy		Complications (pneumonia and other complications)	No information provided on gender. There was high risk of bias due to insufficient randomization and allocation concealment, incomplete outcome data, and selective reporting.	High risk
Rumbak, 2004	N at baseline Intervention: 60 Control: 60	Intervention: Tracheostomy within 48 hours after intubation Control: Late tracheostomy at days 14 to16		Duration of mechanical ventilation (measured as days mechanically ventilated); sedative use (measures as days sedated), complications (measured as pneumonia, gastrointestinal bleed, and acute myocardial infarction)	Random sequence generation not explicitly mentioned. Although the airways were assessed for oral, laryngeal and tracheal damage at	Moderate risk

	Mean age: 63 (whole sample) Gender: 65 male/ 55 female (whole sample)	Comparison: early tracheostomy vs late tracheostomy			10 weeks post intubation, no explicit information was provided about time of follow-up for the other outcomes	
Terragni, 2010	N at baseline Intervention: 209 Control: 210 Mean age: 61.5 (whole sample) Gender: 138 male/142 female (whole sample)	Intervention: Early tracheostomy: after 6 to 8 days of laryngeal intubation Control: Late tracheostomy: after 13 to 15 days of laryngeal intubation Participants from both groups were subjected to percutaneous tracheostomy Comparison: early tracheostomy vs late tracheostomy		Duration of mechanical ventilation (measured as ventilator-free days (at day 28)), complications (measured as ventilator associated pneumonia), adverse events	This study was supported by the Regione Piemonte Ricerca Sanitaria Finalizzata grant 03-08/ACR ASx44, which had no role in the design and conduct of the study; collection, management, analysis and interpretation of the data; or preparation, review or approval of the manuscript	Moderate risk
Trouillet, 2011	N at baseline Intervention: 109 Control: 107	Intervention: Early tracheostomy (before the end of calendar day 5 after surgery)	90 days	Duration of mechanical ventilation (measured as ventilator-free days), and days of MV during 1 to 60 days), use of sedatives	Funding: French Ministry of Health. The study sponsor did not participate in the study design, data collection, data analysis, data interpretation or writing or the	Moderate risk

	Mean age: 65 (whole sample) Gender: male, 66% (n=143)	control Prolonged intubation with tracheostomy only when mechanical ventilation exceeded day 15 after randomization Comparison: early tracheostomy vs late tracheostomy			decision to submit this manuscript for publication	
Young, 2013	N at baseline Intervention: 455 Control: 454 Mean age: 63.9 (whole sample) Gender: male, 58.6% (n=527)	Intervention: Early tracheostomy: within 4 days of mechanical ventilation Control: Late tracheostomy: after 10 days of mechanical ventilation Comparison: early tracheostomy vs late tracheostomy		-	This study was supported by the University of Oxford, the UK Intensive Care Society and the Medical Research Council, which had no influence on the design and conduct of the study; the collection, management, analysis and interpretation of the data; or preparation, review or approval of the manuscript. The randomization service was provided by the Health Services Research Unit at the University of Aberdeen	Moderate risk
Zheng, 2012	N at baseline Intervention: 58 Control: 61	Intervention: early PDT group (patients tracheostomized with PDT on day 3 of MV)	60 days	Duration of mechanical ventilation (measured as ventilator-free days at day 28 after randomization), use of sedatives (measured as sedation-free days at day 28 after randomization), weaning duration (measured as successful weaning rate at day 28 after randomization), and complications (measured as: the incidence of ventilator associated pneumonia (VAP);	RoB due to inadequate blinding and loss to follow up in the control group and not in the intervention group.	Moderate risk

	Age (mean, SD) Intervention: 67.5±14.7 Control: 67.9±17.6 Sex (Male (*n* (%)) Intervention: 39 (67.2%) Control: 35 (57.4%)	Comparison: Late PDT group (patients tracheostomized with PDT on **day 15** of MV if they still needed MV) Comparison: early tracheostomy vs late tracheostomy		intraoperative complications; and postoperative complications)	Comment by authors: *the bed to nurse ratio in our ICU was* *1:2.5 during the period of this study. Insufficient nurses* *might have increased incidence of VAP,28 and might in* *turn have increased duration of MV, length of ICU stay,* *and mortality in the studied cohort*	
Separate RCTs (n=4)						
Mohamed (2014)	N at baseline Intervention: 20 Control: 20 Age (mean, SD) Intervention: 55.30±20.13 Control: 59.95±18.47 Sex (Male (*n* (%))	Intervention: Early PDT (tracheostomy within the first 10 days of MV) Comparison/control: late PDT (tracheostomy after 10 days of MV) Comparison: early tracheostomy vs late tracheostomy	Not mentioned	number of days from the initiation of ventilation to tracheostomy, from tracheostomy to weaning (the duration of mechanical ventilation), from tracheostomy to discharge from ICU (length of stay) and hospital length of stay.	No conflict of interest declared. Small study sample.	Moderate risk

	Intervention: 19 (95%) Control: 14 (70%)					
Blot, 2008	N at baseline Intervention: 61 Control: 62 Age (median, range) Intervention: 55 (19 – 88) Control: 58 (20-88) Sex Intervention male: 45 (74%) Control male: 43 (69%)	Intervention: early tracheostomy (≤4 days) Control: prolonged intubation* Definition comparison: early tracheostomy vs prolonged intubation	60 days	Mobilization, complications, duration of mechanical ventilation, use of sedation, comfort, and dysphagia	The treatment could not be blinded, there is a high chance of recruitment bias, and the study is underpowered.	High risk
Bouderka, 2004	N at baseline Intervention: 31 Control: 31 Age (mean, SD)	Intervention: early tracheostomy (5-6 days) Control: prolonged intubation Definition comparison:	Presumed short-term	Complications and duration of mechanical ventilation	The treatment could not be blinded.	Moderate risk

	Intervention: 41.1, 17.5 Control: 40, 19 Sex Intervention (male): 58% Control (male): 65%	early tracheostomy vs prolonged intubation				
Saffle, 2002	N at baseline Intervention: 21 Control: 23 Age (mean, SD) Intervention: 44.5, 4.3 Control: 51.3, 4.0 Sex Intervention: NR Control: NR	Intervention: early tracheostomy Control: conventional therapy*** Definition comparison: early tracheostomy vs prolonged intubation	Not mentioned, But longest length of stay 153 days.	Duration of mechanical ventilation.	The treatment could not be blinded.	Moderate risk

PDT: percutaneous dilutional tracheostomy; VAP: ventilator associated pneumonia

****Patients in control group could not receive tracheostomy until at least 14 days after translaryngeal intubation, 16 ultimately received a tracheostomy***

For further details, see risk of bias table in the appendix

****Continued endotracheal intubation as needed, with tracheostomy performed on postburn day 14 if necessary***

† 4 participants in the 'late' group had a surgical tracheostomy placed on days 17, 18, 19 and 21 to facilitate transfer to long-term care