

**Supplementary table 1. At the stage of checking eligibility of potential studies through reviewing full-text, we excluded 29 studies according the following reasons.**

<b>1. Ineligible design (n=9)</b>
[1] Lago Alessandra Fabiane, Goncalves Elaine Cristina, Silva Elaine Caetano, et al. Comparison of Energy Expenditure and Oxygen Consumption of Spontaneous Breathing Trial Conducted With and Without Automatic Tube Compensation[J]. J Clin Med Res, 2015, 7: 700-5.
[2] Do Thanh Nho, Seah Tian En Timothy, Phee Soo Jay. Design and Control of a Mechatronic Tracheostomy Tube for Automated Tracheal Suctioning[J]. IEEE Trans Biomed Eng, 2016, 63: 1229-1238.
[3] Guérin Claude, Terzi Nicolas, Mezidi Mehdi, et al. Low-pressure support vs automatic tube compensation during spontaneous breathing trial for weaning[J]. Ann Intensive Care, 2019, 9: 137.
[4] Hsu Yeong-Long, Tien Ai-Jia, Chang Mei-Yun, et al. Regional ventilation redistribution measured by electrical impedance tomography during spontaneous breathing trial with automatic tube compensation[J]. Physiol Meas, 2017, 38: 1193-1203.
[5] Mu Yu, Liu Yang, Peng Min, et al. Trend analysis of rapid shallow breathing indices during spontaneous breathing trial may improve predictive accuracy of extubation success[J]. Zhonghua Yi Xue Za Zhi, 2013, 93: 357-61.
[6] Lovas A, Molnár Z. T-piece improves arterial and central venous oxygenation in tracheostomized patients as compared to continuous positive airway pressure/pressure support ventilation[J]. Minerva Anesthesiol, 2013, 79: 492-7.
[7] Erwan L'Her. Automatic tube compensation: is it worthwhile?[J]. Respiratory Care, 2012, 57(5): 813.
[8] Tanios MA, Epstein SK. Spontaneous breathing trials: should we use automatic tube compensation?[J]. Respiratory Care, 2010, 55(5): 640-2.
[9] Stocker R, Fabry B, Stein S, et al. Added work of breathing, respiratory pattern and determination of ventilator weaning readiness in inspiratory pressure support and and automatic tube compensation[J]. Unfallchirurg, 1996, 99: 764-70.
<b>2. Ineligible patients (n=5)</b>
[1] Aguilar G, Jover J L, Soro M, et al. Additional work of breathing and breathing patterns in spontaneously breathing patients during pressure support ventilation, automatic tube compensation and amplified spontaneous pattern breathing[J]. Eur J Anaesthesiol, 2005, 22: 312-4.
[2] Maisch S, Reissmann H, Katzenstein O, et al. Mechanical interaction between patient and ventilator in biphasic positive airway pressure (BIPAP)-digital and mechanical simulations[J]. Anesthesiol Intensivmed Notfallmed Schmerzther, 2002, 37: 665-73.
[3] Haberthür C, Mols G, Elsasser S, et al. Extubation after breathing trials with automatic tube compensation, T-tube, or pressure support ventilation[J]. Acta Anaesthesiol Scand, 2002, 46: 973-9.
[4] Oczenski Wolfgang, Kepka Anton, Krenn Herbert, et al. Automatic tube compensation in patients after cardiac surgery: effects on oxygen consumption and breathing pattern[J]. Crit Care Med, 2002, 30: 1467-71.
[5] Guttman J, Haberthür C, Mols G. Automatic tube compensation[J]. Respir Care Clin N Am, 2001, 7: 475-501.
<b>3. Ineligible outcomes (n=14)</b>
[1] Goncalves Elaine Cristina, Lago Alessandra Fabiane, Silva Elaine Caetano, et al. How Mechanical Ventilation Measurement, Cutoff and Duration Affect Rapid Shallow Breathing Index Accuracy: A Randomized Trial[J]. J Clin Med Res, 2017, 9: 289-296.
[2] Frutos-Vivar F, Esteban A. Weaning from mechanical ventilation: why are we still looking for alternative

methods?[J]. <i>Med Intensiva</i> , 2013, 37: 605-17.
[3] Aguilar G, Jover JL, Soro M, et al. Additional work of breathing and breathing patterns in spontaneously breathing patients during pressure support ventilation, automatic tube compensation and amplified spontaneous pattern breathing[J]. <i>European Journal of Anaesthesiology</i> , 2005, 22(4): 312.
[4] Knight DJW, Moppett IK, Hardman JG. Breathing pattern and workload during automatic tube compensation, pressure support and T-piece trials in weaning patients[J]. <i>Eur J Anaesthesiol</i> , 2003, 20: 932.
[5] Mols G, Rohr E, Benzing A, et al. Breathing pattern associated with respiratory comfort during automatic tube compensation and pressure support ventilation in normal subjects[J]. <i>Acta Anaesthesiologica Scandinavica</i> , 2010, 44(3): 223-230.
[6] Guttman J, Bernhard H, Mols G, et al. Respiratory comfort of automatic tube compensation and inspiratory pressure support in conscious humans[J]. <i>Intensive Care Med</i> , 1997, 23: 1119-24.
[7] Bien Mauo-Ying, Shui Lin You, Shih Chung-Hung, et al. Comparisons of predictive performance of breathing pattern variability measured during T-piece, automatic tube compensation, and pressure support ventilation for weaning intensive care unit patients from mechanical ventilation[J]. <i>Crit Care Med</i> , 2011, 39: 2253-62.
[8] Elsasser Serge, Guttman Josef, Stocker Reto, et al. Accuracy of automatic tube compensation in new-generation mechanical ventilators[J]. <i>Crit Care Med</i> , 2003, 31: 2619-26.
[9] Wrigge H, Zinserling J, Hering R, et al. Cardiorespiratory effects of automatic tube compensation during airway pressure release ventilation in patients with acute lung injury[J]. <i>Anesthesiology</i> , 2001, 95: 382-9.
[10] Fujino Yuji, Uchiyama Akinori, Mashimo Takashi, et al. Spontaneously breathing lung model comparison of work of breathing between automatic tube compensation and pressure support[J]. <i>Respir Care</i> , 2003, 48: 38-45.
[11] Kuhlen R, Max M, Nibbe L, et al. Respiratory pattern and respiratory strain in automatic tube compensation and inspiratory pressure support[J]. <i>Anaesthesist</i> , 1999, 48: 871-5.
[12] Kuhlen R, Max M, Dembinski R, et al. Breathing pattern and workload during automatic tube compensation, pressure support and T-piece trials in weaning patients[J]. <i>Eur J Anaesthesiol</i> , 2003, 20: 10-6.
[13] Oto J, Imanaka H, Nishimura M. Effects of Automatic Tube Compensation on Respiratory Workload In Used Endotracheal Tubes[C]//American Thoracic Society International Conference. 2011.
[14] Haberthür C, Fabry B, Stocker R, et al. Additional inspiratory work of breathing imposed by tracheostomy tubes and non-ideal ventilator properties in critically ill patients[J]. <i>Intensive Care Med</i> , 1999, 25: 514-9.
<b>4. Ineligible intervention (n=1)</b>
[1] Fabry B, Haberthür C, Zappe D, et al. Breathing pattern and additional work of breathing in spontaneously breathing patients with different ventilatory demands during inspiratory pressure support and automatic tube compensation[J]. <i>Intensive Care Med</i> , 1997, 23: 545-52.