Supplementary Digital Content 1

Table 1. Breathing Pattern during the Ventilatory Procedures in PSV and NAVA

	PSV							NAVA							*p* ANOVA	
	PS7	**PS10**	**PS12**	**PS14**	**PS16**	**PS18**	**PS20**	**$NAVA_{PS7}$**	**$NAVA_{PS10}$**	**$NAVA_{PS12}$**	**$NAVA_{PS14}$**	**$NAVA_{PS16}$**	**$NAVA_{PS18}$**	**$NAVA_{PS20}$**	**PSV**	**NAVA**
NAVA level ($cmH_2O.\mu V^{-1}$)	-	-	-	-	-	-	-	0.4 [0.2–0.9]	0.6 [0.3–1.1]	1.0 [0.5–1.5]	1.2 [0.7–1.8]	1.5 [1.0–2.4]	2.0 [1.2–2.5]	2.5 [1.8–3.0]	-	-
Paw mean (cmH_2O)	10 [10–11]	13 [12–13]*	15 [14–15]*	17 [15–17]*	18 [17–19]*	20 [19–21]*	22 [21–23]*	10 [8–10]	11 [10–13]	13 [12–15]*	14 [13–17]*	15 [14–18]*	18 [16–20]*	21 [17–27]*	<0.0001	<0.0001
V_T/kg (ml/kg)	6.0 [4.6–7.1]	6.5 [4.7–8.0]	6.9 [5.2–7.9]	7.2 [5.7–8.3]*	7.1 [6.0–8.8]*	7.1 [6.2–9.0]*	8.1 [6.8–9.6]*	5.8 [5.0–6.9]	6.4 [5.1–7.9]	6.5 [5.2–8.4]	6.6 [5.4–8.8]*	6.4 [5.1–9.1]*	7.4 [5.1–9.8]*	7.6 [5.7–10.0]*	<0.0001	<0.0001
RR (/min)	30 [28–39]	28 [26–41]	28 [26–40]	27 [26–39]	28 [25–38]	28 [25–38]	28 [22–34]	32 [27–39]	29 [26–41]	27 [26–40]	29 [22–40]	31 [21–39]	33 [24–41]	32 [22–40]	0.0217	0.0488
T_I (sec)	0.66 [0.56–0.94]	0.60 [0.49–0.85]	0.62 [0.51–0.89]	0.59 [0.40–0.84]	0.61 [0.44–0.89]	0.62 [0.43–0.82]	0.64 [0.44–0.85]	0.67 [0.51–0.89]	0.61 [0.42–0.87]	0.62 [0.44–0.85]	0.59 [0.43–0.85]	0.53 [0.44–0.80]*	0.50 [0.41–0.75]*	0.51 [0.42–0.74]*	0.7845	0.0011
T_T (sec)	2.16 [1.84–2.23]	2.19 [1.48–2.37]	2.18 [1.55–2.38]	2.27 [1.56–2.54]	2.22 [1.62–2.63]	2.21 [1.63–2.46]	2.33 [1.86–2.88]	2.08 [1.59–2.30]	2.22 [1.48–2.41]	2.28 [1.54–2.39]	2.10 [1.53–2.79]	2.12 [1.59–3.15]	2.06 [1.48–2.74]	2.12 [1.56–2.89]	0.0003	0.2989
T_I/T_T (%)	35.9 [28.5–41.5]	31.0 [29.0–39.0]	32.5 [27.3–38.8]	28.5 [25.3–38.5]	31.5 [26.5–37.3]	30.8 [25.5–36.5]	30.7 [23.8–35.5]	37.0 [29.0–39.5]	31.0 [27.3–39.0]	28.5 [25.0–38.3]	29.0 [22.3–38.3]*	27.5 [18.3–36.3]*	26.0 [22.5–31.8]*	26.2 [21.8–30.5]*	0.6419	0.0362
V_E (l/min)	9.7 [8.4–12.4]	10.9 [9.5–13.2]	10.9 [10.1–14.4]*	10.9 [9.7–14.4]*	11.7 [10.0–14.9]*	12.0 [9.6–15.0]*	12.0 [9.9–14.9]*	11.1 [8.8–13.2]	10.9 [9.4–14.2]	11.3 [9.6–14.7]	10.7 [9.8–14.6]	11.5 [10.2–13.5]	12.7 [10.2–14.6]	12.7 [10.9–15.5]	<0.0001	0.0002
V_T/T_I (ml/sec)	476 [437–631]	530 [439–671]	525 [428–736]	489 [439–747]	528 [429–760]	541 [428–730]	559 [472–727]	461 [419–509]	516 [453–572]	548 [463–608]	569 [499–621]*	576 [499–633]*	611 [576–687]*	652 [593–732]*	0.1992	<0.0001

Values are indicating median (interquartile range).

NAVA = neurally adjusted ventilatory assist; Paw = airway pressure; PSV = pressure support ventilation; RR = respiratory rate; T_I = inspiratory time; T_T = total neuroventilatory cycle; T_I/T_T = inspiratory duty cycle; V_E = minute ventilation; V_T = tidal volume; V_T/T_I = mean inspiratory flow.

* $p < 0.05$ *vs*. the lowest assist level within the same ventilatory mode (*i.e.*, PS7 ou $NAVA_{PS7}$).

Table 2. Relationship between Electromyographic Activities of Extradiaphragmatic Inspiratory Muscles and Diaphragm

	EAan-EAdi		EAscal-EAdi	
	ρ	*p*	*ρ*	*p*
Overall	0.61	<0.0001	0.60	<0.0001
Ventilatory mode				
PSV	0.49	<0.0001	0.61	<0.0001
NAVA	0.70	<0.0001	0.54	<0.0001
Patient (No)				
1	0.68	0.008	-	-
2	0.53	0.05	-	-
3	0.18	0.6	-	-
4	0.94	<0.0001	0.41	0.2
5	0.57	0.03	0.48	0.08
6	0.54	0.05	0.40	0.2
7	0.89	<0.0001	0.81	0.0005
8	0.88	<0.0001	0.67	0.009
9	0.76	0.002	0.63	0.02
10	0.44	0.1	0.59	0.03
11	0.90	<0.0001	0.97	<0.0001
12	0.79	0.0007	0.56	0.04

Values are indicating the Spearman's rank correlation coefficient (ρ) and its associated p-value, between EAan and EAdi, EAscal and EAdi, for all the measures, according to the ventilator mode, and for the 12 separate patients.
EAan = electromyographic activity of Alae nasi; EAdi = electromyographic activity of diaphragm; EAscal = electromyographic activity of scalene; NAVA = neurally adjusted ventilator assist; PSV = pressure support ventilation.

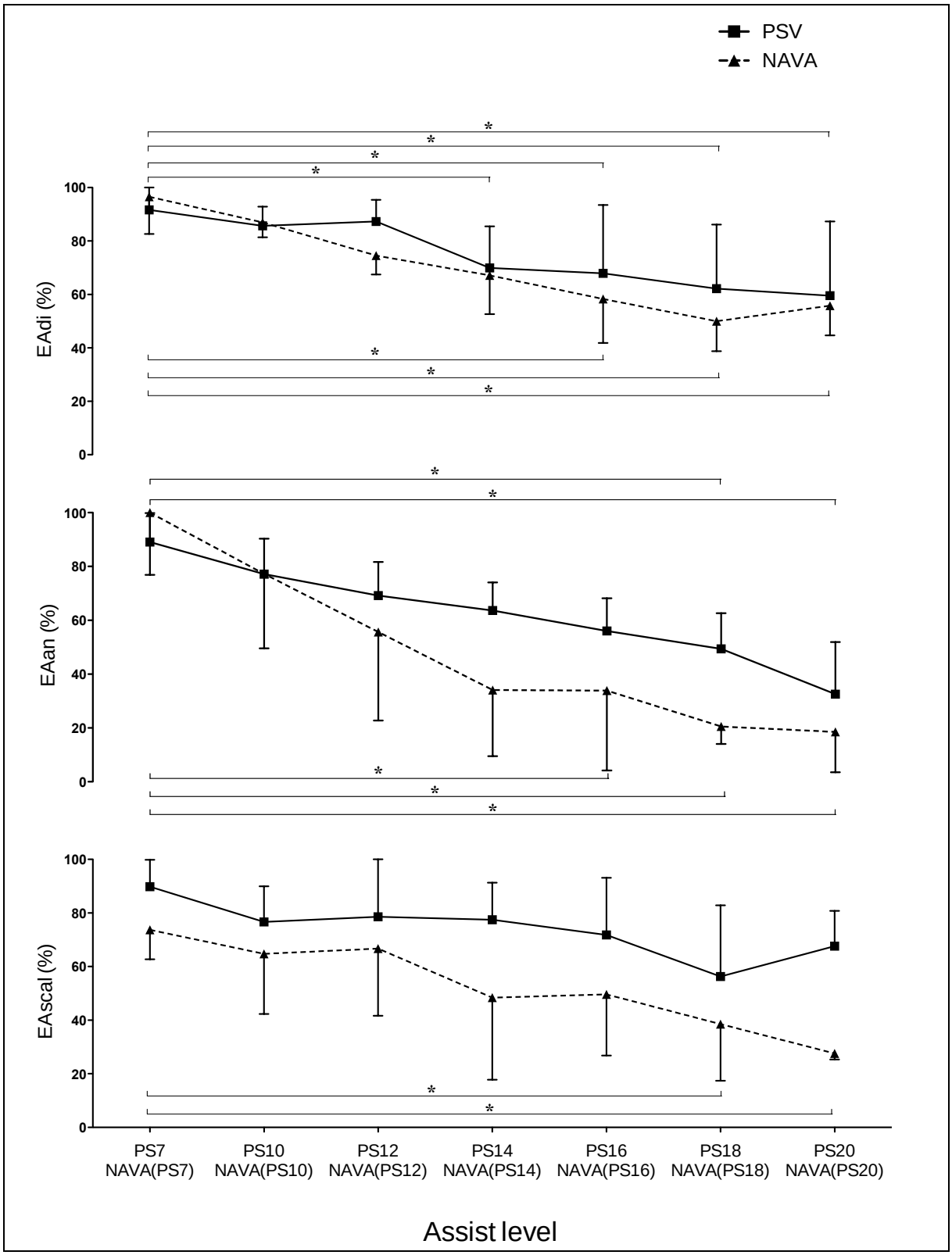

Fig. 1. Changes in electromyographic activities of diaphragm (EAdi), Alae nasi (EAan), and scalene (EAscal) with increasing assist level in pressure support ventilation (PSV; square, solid line) and neurally adjusted ventilatory assist (NAVA; triangle, dashed line). NAVA levels are each presented with their corresponding assist level in PSV, according to NAVA preview function. Data are indicating median (interquartile range). * $p < 0.05$ *vs.* assist level indicated.

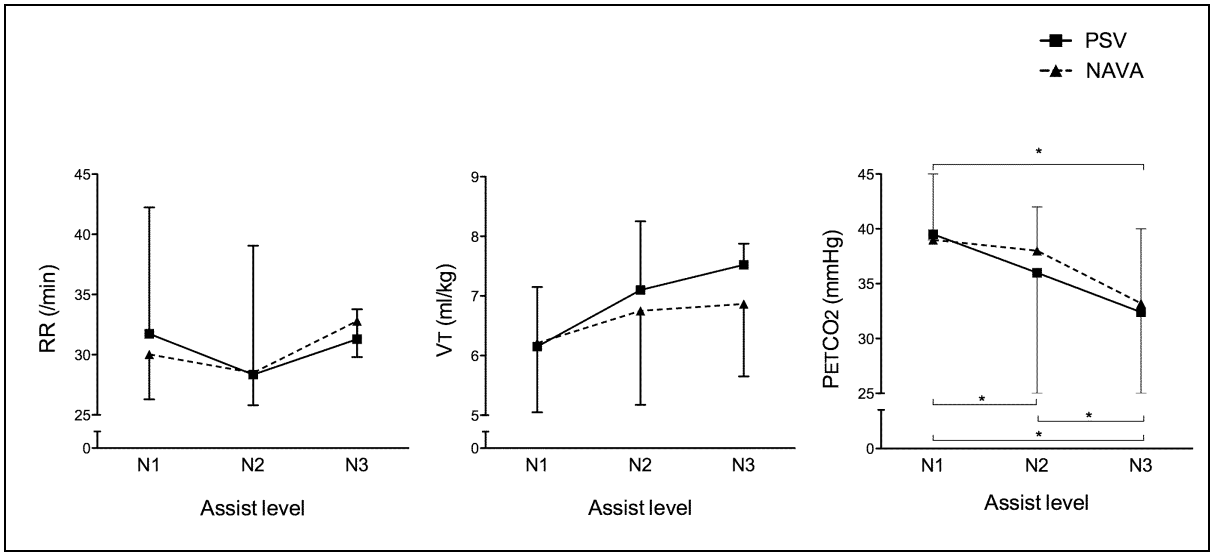

Fig. 2. Comparisons of respiratory rate (RR), tidal volume (V_T), and end-tidal partial pressure of carbon dioxide ($P_{ET}CO2$) according to assist level and ventilatory mode (PSV, square and NAVA, triangle).

EAdi = electromyographic activity of diaphragm; NAVA = neurally adjusted ventilatory assist; N1 = assist level resulting in EAdi of 80-100%; N2 = assist level resulting in EAdi of 60-80%; N3 = assist level resulting in EAdi of 40-60%; PSV = pressure support ventilation.

Data are expressed as median (interquartile range). * $p < 0.05$ *vs.* assist level indicated with the same mode.

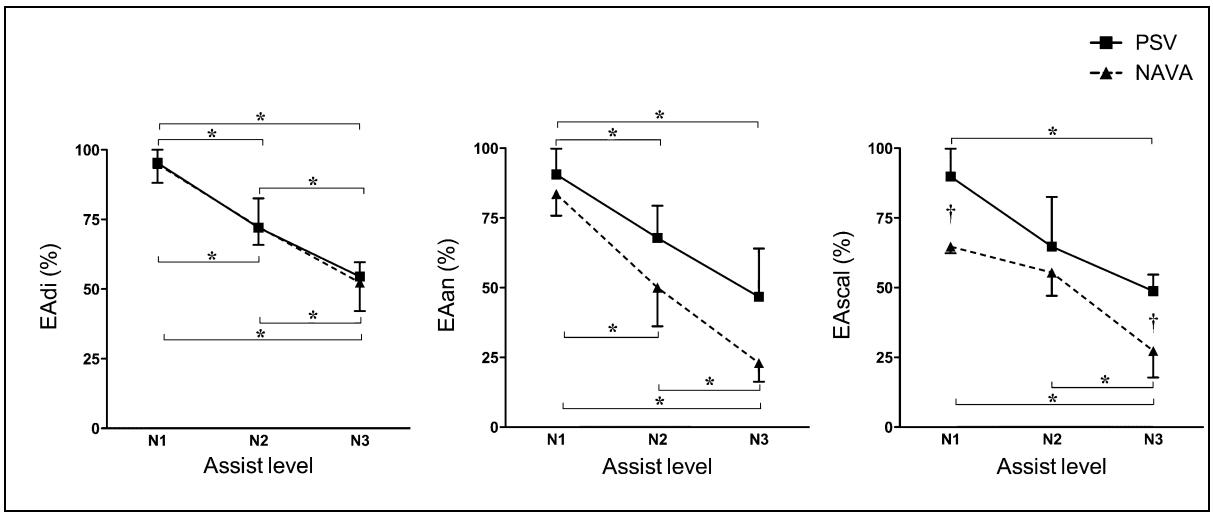

Fig. 3. Comparisons of electromyographic activities of diaphragm (EAdi), alae nasi (EAan), and scalene (EAscal) muscles according to assist level and ventilatory mode (PSV, square and NAVA, triangle).

NAVA = neurally adjusted ventilatory assist; N1 = assist level resulting in EAdi of 80-100%; N2 = assist level resulting in EAdi of 60-80%; N3 = assist level resulting in EAdi of 40-60%; PSV = pressure support ventilation.

Data are expressed as median (interquartile range). * $p < 0.05$ *vs.* indicated assist level with the same mode. † $p < 0.05$ between PSV and NAVA within the same assist level group.

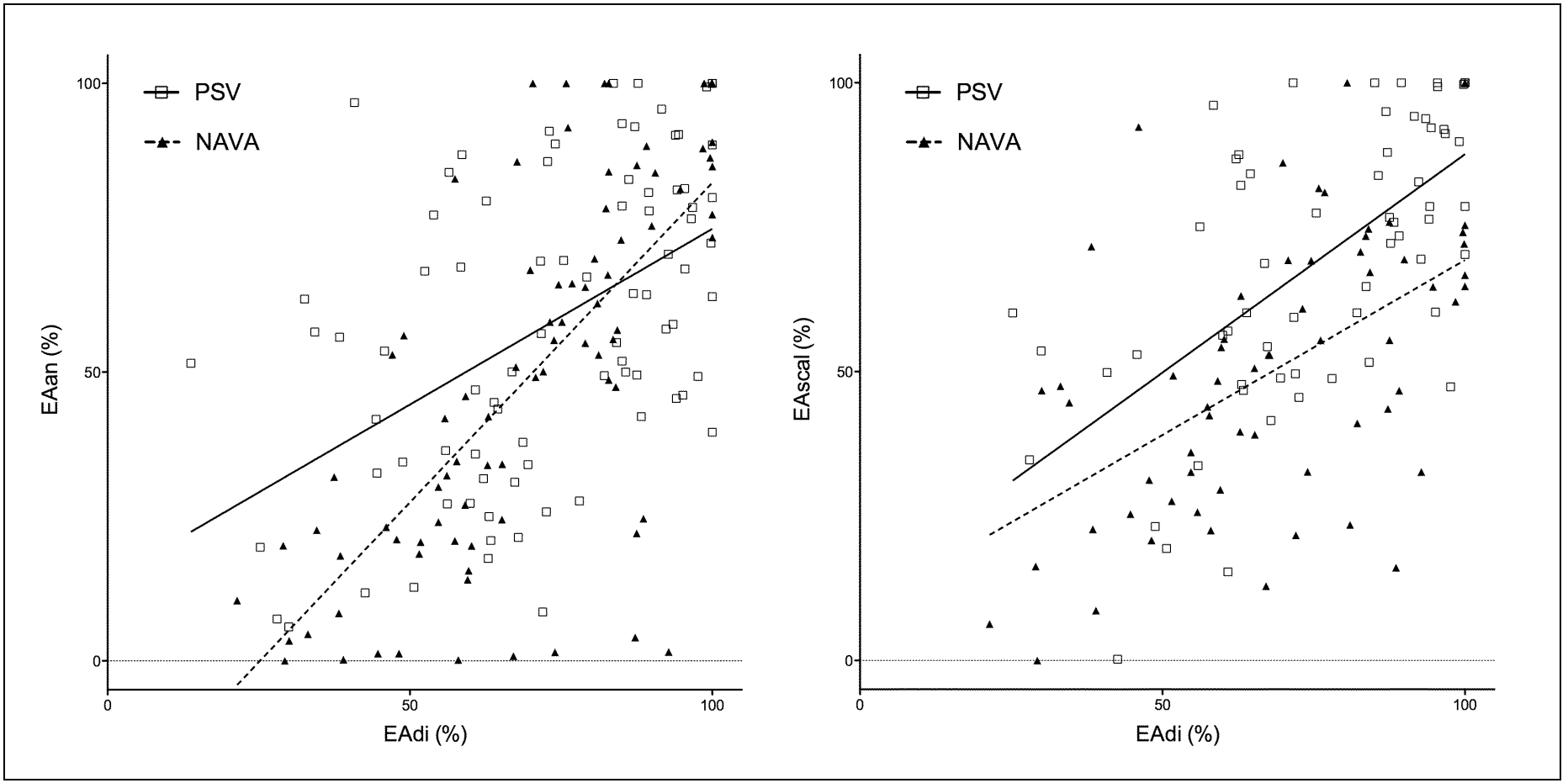

Fig. 4. Relationship between electromyographic activities of diaphragm (EAdi) and Alae nasi (EAan) or scalene according to ventilatory mode. NAVA = neurally adjusted ventilatory assist; PSV = pressure support ventilation.
Each point represents the values of EAan or electromyographic activity of scalene (EAscal) and the corresponded EAdi for each step of the ventilatory procedure in PSV (empty square) and NAVA (filled triangle). Lines are indicating the corresponding linear regression in PSV (solid line) and NAVA (dashed line).