Table S1 Respirator settings and respiratory parameters at begin and at end of weaning process

Parameter	First measurement	Last measurement
Ventilation mode		
Pressure controlled (Bilevel)	3 (6)	0
Assisted spontaneous breathing	47 (94)	50 (100)
Respiration rate [/min]	19 (8)	17.5 (10.5)
FiO$_2$	0.35 (0.15)	0.3 (0.05)
PEEP [mbar]	6 (1)	6 (2)
pInsp [mbar]	19 (N/A)	N/A
pASB [mbar]	10 (4)	10 (2)
Tidal volume [mL]	537.5 (230)	548.5 (302.5)
Respiratory minute volume [L/min]	10.2 (2.9)	8.85 (3.95)
Respiratory free time within the last 24 hours [min]	180 (360)	900 (210)

Data are given as median (IQR) or n (%). Units of measurement are given in the respective line in square brackets. FiO$_2$, fraction of inspired oxygen; PEEP, positive end expiratory pressure; pInsp, inspiratory pressure; pASB, inspiratory assist pressure.

Table S2 Sonographic parameters over the first three measurements at begin of weaning process.

Sonographic parameter	Day 0 (at admission)		Day 3 after admission		Day 6 after admission		P value
	n	Median (IQR)	n	Median (IQR)	n	Median (IQR)	
Inspiratory diaphragmatic thickness [mm]	45	2.58 (1.64)	45	3.33 (1.33)	45	3.54 (1.47)	0.016
Expiratory diaphragmatic thickness [mm]	45	2.19 (1.34)	45	2.67 (1.25)	45	2.88 (1.21)	0.090
Fractional thickening [%]	45	15.03 (16.14)	45	13.66 (19.59)	45	18.42 (14.77)	0.033
Excursion [cm]	41	0.7 (0.6)	43	0.7 (0.7)	42	0.75 (0.7)	0.056
M. quadr. fem. (half) [cm]	45	1.6 (0.88)	45	1.7 (0.69)	45	1.58 (0.6)	0.249
M. quadr. fem. (lower third) [cm]	45	1.28 (0.46)	45	1.25 (0.63)	45	1.28 (0.39)	0.572

Data are given as median (IQR). Units of measurement are given in the respective line in square brackets. The data consists of the averaged data with and without respirator at a given time point. The presence of a statistically significant difference over the course of time was examined using a Friedman rank sum test. Significance level α=0.05. IQR, interquartile range; M. quadr. fem., musculus quadriceps femoris.

Table S3 Pairwise comparisons of the parameter "Inspiratory diaphragmatic thickness"

Timepoint of measurement	Day 0 (at admission)	Day 3 after admission
Day 3 after admission	0.094	–
Day 6 after admission	0.004	0.49

Data represent the respective P values. Pairwise comparisons were carried out using a Wilcoxon-Nemenyi-McDonald-Thompson test. Significance level α=0.05.

Table S4 Pairwise comparisons of the parameter "Fractional thickening"

Timepoint of measurement	Day 0 (at admission)	Day 3 after admission
Day 3 after admission	0.988	–
Day 6 after admission	0.439	0.355

Data represent the respective P values. Pairwise comparisons were carried out using a Wilcoxon-Nemenyi-McDonald-Thompson test. Significance level $\alpha=0.05$.

Table S5 Sonographic parameters over the last three measurements before completion of weaning process.

Sonographic parameter	6 days before last measurement		3 days before last measurement		Last measurement before completion of weaning		P value
	n	Median (IQR)	n	Median (IQR)	n	Median (IQR)	
Inspiratory diaphragmatic thickness [mm]	45	3.30 (1.24)	45	2.88 (1.42)	45	2.72 (1.92)	0.186
Inspiratory diaphragmatic thickness [mm]	45	2.64 (0.98)	45	2.48 (1.04)	45	2.32 (1.80)	0.077
Fractional thickening [%]	45	19.35 (16.75)	45	16.52 (11.33)	45	17.96 (11.99)	0.062
Excursion [cm]	42	0.75 (0.75)	43	0.75 (0.8)	42	0.88 (0.55)	0.029
M. quadr. fem. (half) [cm]	45	1.52 (0.59)	45	1.61 (0.62)	45	1.52 (0.53)	0.661
M. quadr. fem. (lower third) [cm]	45	1.23 (0.53)	45	1.23 (0.44)	45	1.27 (0.35)	0.979

Data are given as median (IQR). Units of measurement are given in the respective line in square brackets. The data consists of the averaged data with and without respirator at a given time point. The presence of a statistically significant difference over the course of time was examined using a Friedman rank sum test. Significance level $\alpha=0.05$. IQR, interquartile range; M. quadr. fem., musculus quadriceps femoris.

Table S6 Pairwise comparisons of the parameter "Excursion"

Timepoint of measurement	6 days before last measurement	3 days before last measurement
3 days before last measurement	0.581	–
Last measurement before completion of weaning	0.270	0.842

Data represent the respective P values. Pairwise comparisons were carried out using a Wilcoxon-Nemenyi-McDonald-Thompson test. Significance level $\alpha=0.05$.