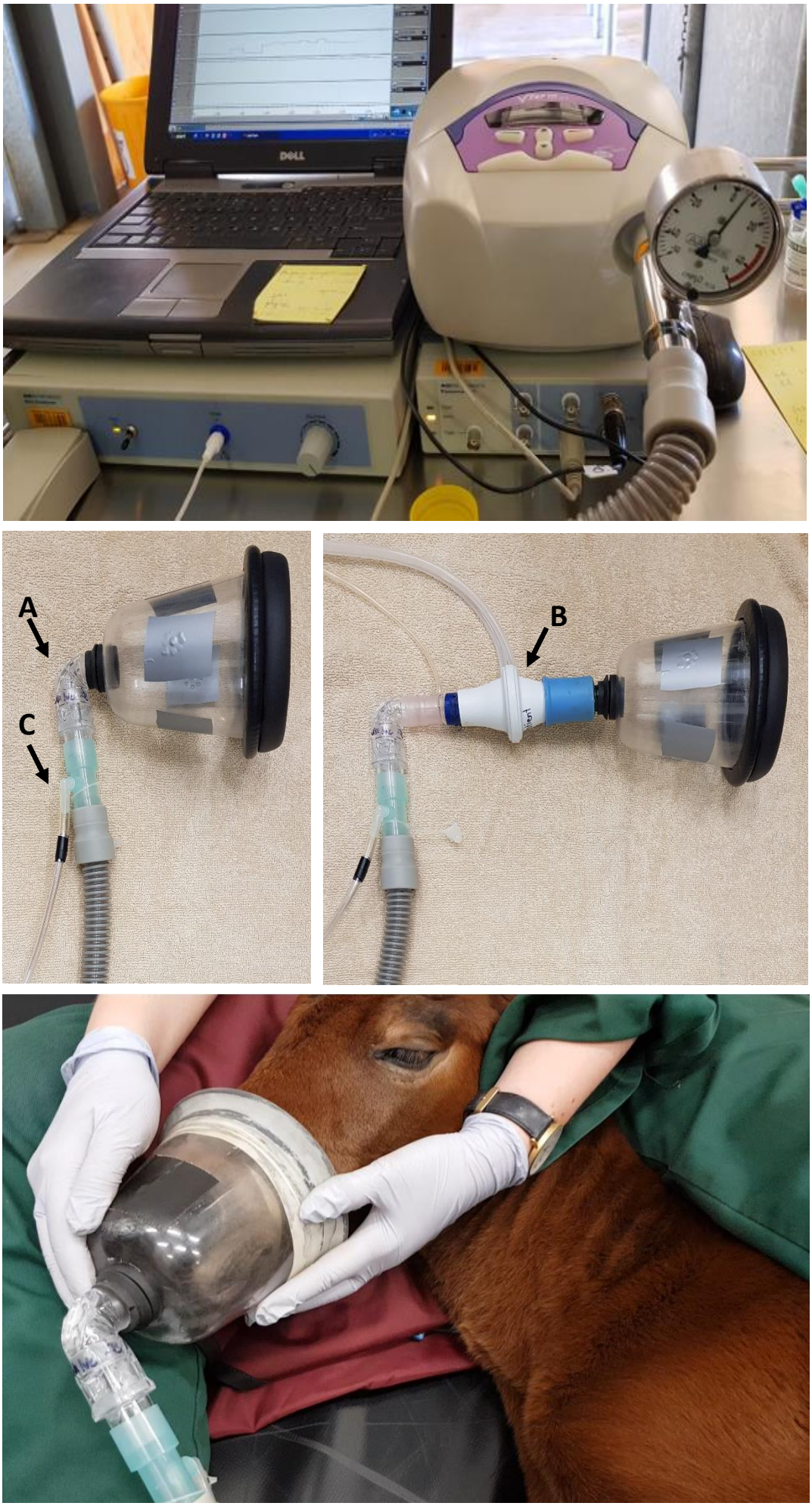
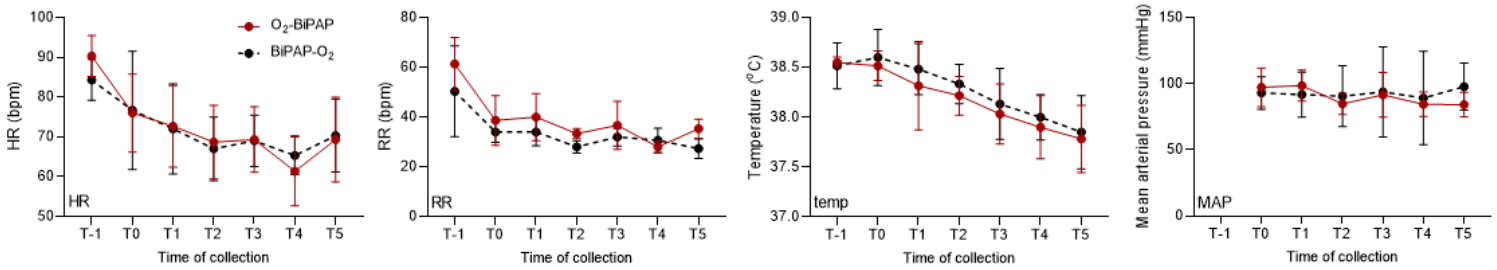
Supplementary Table S1: Research foals and treatment schedule used in the current study. All foals were sired by a Connemara stallion out of Standardbred (F2 and F7) or Thoroughbred (F5, F6, F8, F9) mares. There were two colts (F2 and F6) and four fillies. DOB, date of birth; BW, body weight; T2, treatment allocated to T2; T4, treatment allocated to T4; interval, time between Phase 1 and Phase 2 for each foal.

			Phase 1					Phase 2					
Foal	Gender	DOB	Date	Age (d)	BW (kg)	T2	T4	Date	Age (d)	BW (kg)	T2	T4	Interval (d)
F2	M	27/08/2018	18/10/2018	52	111	O_2	BiPAP	24/10/2018	58	126	BiPAP	O_2	6
F6	M	31/08/2018	19/10/2018	49	121	BiPAP	O_2	24/10/2018	54	131	O_2	BiPAP	5
F9	F	1/09/2018	19/10/2018	48	125	O_2	BiPAP	23/10/2018	52	132	BiPAP	O_2	4
F7	F	5/09/2018	22/10/2018	47	110	BiPAP	O_2	26/10/2018	51	114	O_2	BiPAP	4
F8	F	9/09/2018	23/10/2018	44	114	O_2	BiPAP	26/10/2018	47	118	BiPAP	O_2	3
F5	F	28/10/2018	13/12/2018	46	86	BiPAP	O_2	18/12/2018	51	92	O_2	BiPAP	5

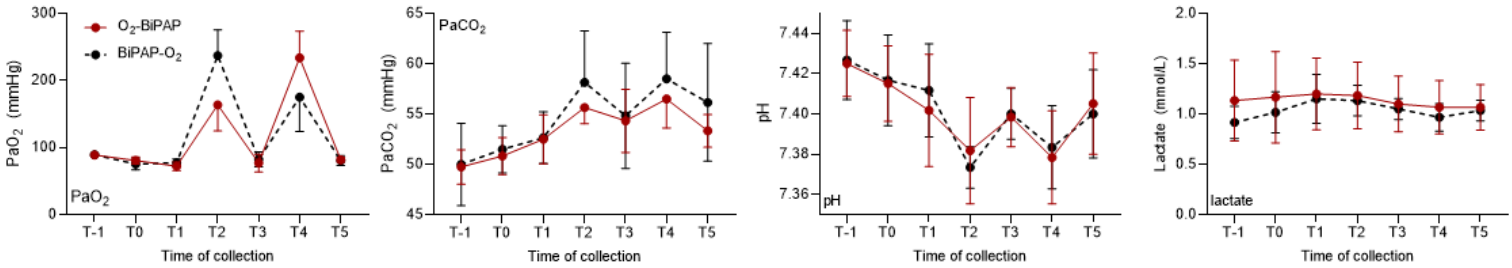
Supplementary Figure S1: BiPAP ventilator, spirometer and gas analyser (top), mask with vented non-rebreathing elbow valve (A) and spirometry flow head (B). Oxygen was added to the circuit at C.



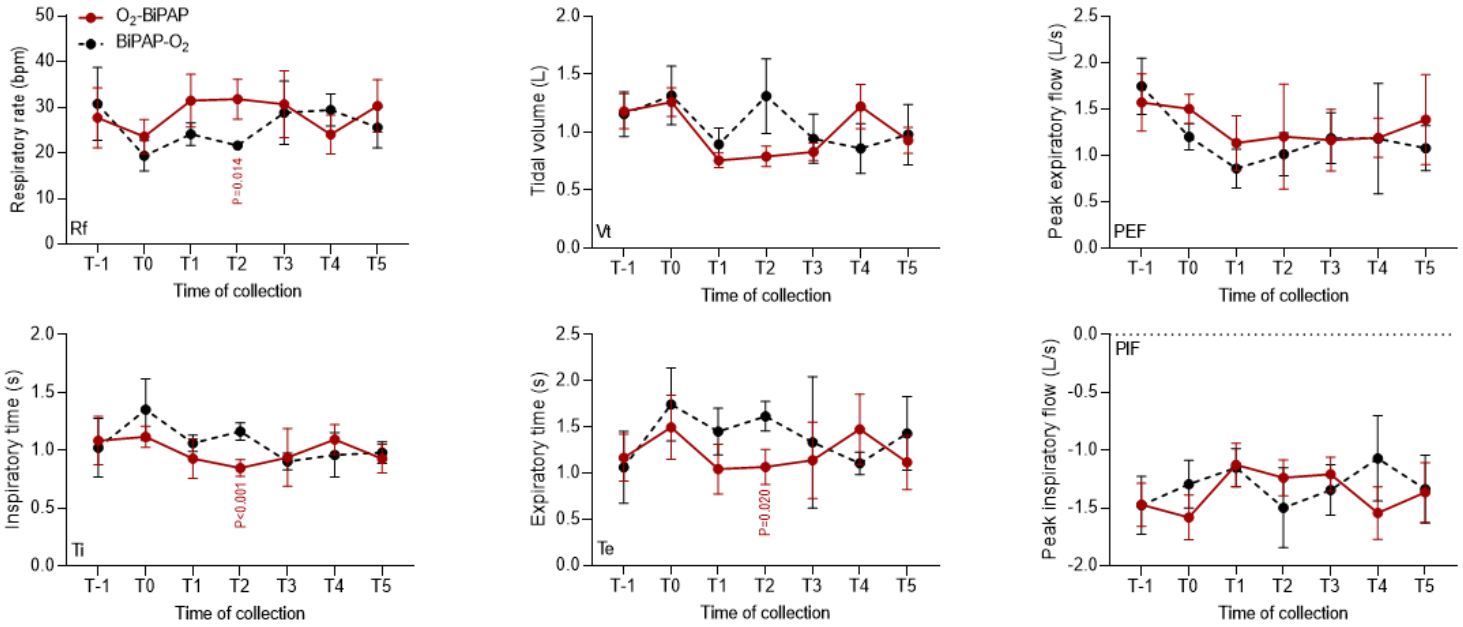
Supplementary Figure S2: Effect of sequence (BiPAP or supplementary O_2 as the first administered treatment) on heart rate (HR), observed respiratory rate (RR), rectal temperature (temp) and mean arterial pressure (MAP). A significant effect of time ($P<0.001$) was observed for all variables except MAP ($P=0.529$), but there were no effects attributable to sequence (O_2–BiPAP, supplementary O_2 at T2, BiPAP at T4; BiPAP-O_2, BiPAP at T2, supplementary O_2 at T4). Data are shown as mean and standard deviation.



Supplementary Figure S3: Effect of sequence (BiPAP or supplementary O_2 as the first administered treatment) on blood gas parameters. A significant effect of time was observed for the partial pressure of O_2 (PaO_2), CO_2 ($PaCO_2$) and pH (all $P<0.001$), and for lactate ($P=0.012$). There were no effects attributable to sequence (O_2–BiPAP, supplementary O_2 at T2, BiPAP at T4; BiPAP-O_2, BiPAP at T2, supplementary O_2 at T4). Data are shown as mean and standard deviation.



Supplementary Figure S4: Effect of sequence (BiPAP or supplementary O_2 as the first administered treatment) on spirometry results. A significant effect of time was observed for respiratory rate during spirometry (RR, P=0.032), tidal volume (Vt, P<0.001), inspiratory time (Ti, P=0.027), expiratory time (Te, P=0.05), peak expiratory flow (PEF, P<0.001) and peak inspiratory flow (PIF, P=0.039). Significant time-sequence interactions were observed for RRs (P<0.001), Vt (P<0.001), Ti (P=0.008), Te (P<0.001) and PIF (P=0.001) with significant effects observed between results obtained following O_2 supplementation and following BiPAP at T2, as shown; other pairwise comparisons were not significant. The time-sequence interaction for PEF was not significant (P=0.291). Data are shown as mean and standard deviation.



Supplementary Figure S5: Effect of sequence (BiPAP or supplementary O_2 as the first administered treatment) on inhaled and exhaled gas parameters. Significant time effects were observed for the maximum inspired O2 concentration (FiO2max), minimum observed O_2 concentration (FiO_2min) and O_2 extraction (all P<0.001). Significant time-sequence interactions were observed (all P≤0.001), and significant pairwise comparisons are shown. Significant time effects were also observed for maximum expired CO_2 concentrations ($FeCO_2$max, P=0.023), CO_2 elimination (P=0.001), but not for minimum CO_2 concentrations (insp CO_2, P=0.438). Time-sequence interactions were significant for all CO_2 parameters (P=0.014, P=0.002 and P=0.004, respectively), but pairwise comparisons were not significant. There were no effects attributable to sequence. Data are shown as mean and standard deviation.