WESTERN SYDNEY
UNIVERSITY

FINAL REPORT

The effect of *GO2 Premium Oxygen Supplement* on oxygen availability (arterial and muscular) during rest and exercise

Prepared for GO2Life Pty Ltd.

Submitted by Dr Jason Siegler, Western Sydney University

University of Western Sydney
ABN 53 014 069 881 CRICOS Provider No: 00917K
Locked Bag 1797 Penrith NSW 2751 Australia
westernsydney.edu.au

Study Rationale:

To purpose of this study was to determine whether oxygen availability (arterial and muscular) during rest and exercise is influenced by ***GO2 Premium Oxygen Supplement***. The general aims of the study are to provide 1) intramuscular and arterial oxygen availability data on changes that may persist in humans after ingestion of ***GO2 Premium Oxygen Supplement*** while under the conditions of terrestrial and simulated altitude (~ 3000 m), and 2) provide a logical starting point for isolating mechanisms underpinning performance outcomes.

Participants

Ten (n=10) recreationally trained males and females completed all aspects of the study. All participants had previous experience of high intensity exercise and were familiarised with the high-intensity protocol required prior to the trials. Participants maintained a similar diet and refrained from intense exercise and alcohol consumption for 24 h, and from caffeine for at least 3 h prior to each testing session.

Methods

The participants attended the laboratory on five occasions (one familiarisation and four experimental) at the same time of day for each trial, with the experimental trials separated by a minimum of 9 days. On the first visit, they performed a standard graded exercise test to determine % relative workload for the experimental cycling task on a SRM^{M} cycle ergometer as well as a familiarisation trial 30 minutes after completing the graded exercise test (repeat 30 second efforts at 120% of peak power with 30 seconds rest between). During their familiarisation visit, they were also provided with 2 separate containers with either 20 mL of ***GO2 Premium Oxygen Supplement*** in each, or 2 with 20 mL of a taste-matched placebo liquid (depending on their subsequent experimental trial). They were instructed to consume the liquid over 2 consecutive days prior to their experimental trials (double-blinded). Prior to the initial experimental trial, participants were also asked to complete a 24 h recall of their diet leading into the day of the trial, and asked to replicate this diet prior to all remaining trials.

On the next four visits, upon arriving to the laboratory and after a 10-min period of seated rest they had a small amount of capillary blood collected from the finger-tip to determine their resting blood lactate concentrations. Participants then consumed the final 20 mL liquid (***GO2 Premium Oxygen Supplement***

or placebo) and were prepared for the exercise trials. Participants were fitted with equipment measuring muscle oxygenation (Near Infrared Spectroscopy (NIRS)), arterial oxygen saturation and heart rate. Furthermore, and depending on whether the trial was at terrestrial or simulated altitude, participants were fitted with a mask to breathe through the portable hypoxic simulator (http://www.ats-altitude.com/performance/products/). Participants then completed an initial 5 minute warm followed by 10 minutes at low intensity (40% below Ventilatory Threshold (VT)), followed immediately by another 10 minute cycling task at 10% below VT. Finally, participants cycled for 30 seconds at 120% of their max power output, followed by a 30 second recovery (30:30) repeatedly until they could no longer sustain the task. Continual sampling of arterial and intramuscular O_2 availability, heart rate and blood lactate (final minute of each stage) was conducted throughout all phases of the cycling task. Upon completion, post-exercise blood lactate samples were collected (IP) at 5, 10 and 15 minutes post exercise.

Data & Statistical Analysis

All statistical analyses was completed using IBM SPSS Statistics version 24 (SPSS Inc., Chicago, IL). The descriptive data is presented as mean ± SD. Oxygen availability changes during rest and exercise across trials were analysed using a a two-way (condition x time) ANOVA for repeated measures. Two-tailed statistical significance will be accepted at $p < 0.05$.

Results

Muscle and arterial oxygenation:

There were no statistical differences between the different conditions (placebo or GO_2) for muscle tissue oxygenation, however during the hypoxia trial there were trends for the GO_2 condition to have a lower tissue saturation index during the submaximal stages (indicated in red circle in **FIGURE 1**). The arterial oxygenation (SaO_2%) declined only as a result of the hypoxia and was not different between conditions (placebo or GO_2).

Blood lactate:

There were no statistical differences between the different conditions (placebo or GO_2) for blood lactate throughout the measurement period (**FIGURE 2**).

Exercise Performance:

There were no statistical differences between the different conditions (placebo or GO_2) for performance times throughout the measurement period (**FIGURE 3**), however when analysed separately (e.g. for sea level or hypoxia) the performance times trended toward an improvement in the GO_2 trial during the sea level condition ($p = 0.09$).

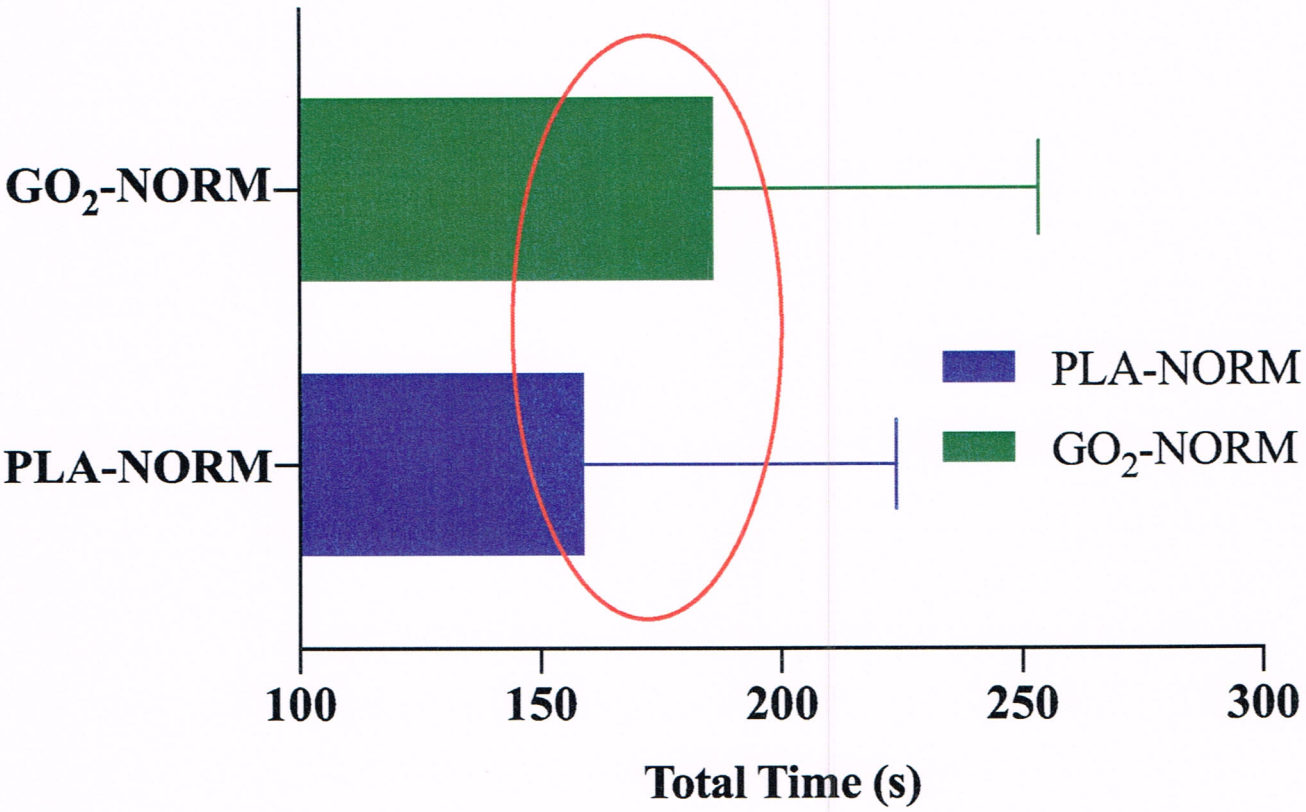
Conclusions

The primary aim of this study was to provide data on any changes that may persist in humans after 3 consecutive days of ingesting 20 mL of ***GO2 Premium Oxygen Supplement***. Our findings suggest that ***GO2 Premium Oxygen Supplement*** does not significantly improve muscle tissue saturation (TSI%), although there were trends for TSI% to be lower in the ***GO2 Premium Oxygen Supplement*** during hypoxic (e.g. simulated altitude) conditions. As a result of this trend, we would recommend repeating these measurements under hypoxic conditions but include larger sample sizes and more informative blood measures (e.g. partial pressure of O_2 (PO_2)). Unlike previous work has demonstrated, blood lactate was not different throughout the four experimental trials (FIGURE 2).

A rough performance indicator was used in this study (total cycling time during the 30:30s intervals) given the recreationally trained nature of the participants. When performance times were analysed using a repeated measures statistical design where all four experimental trials were included, there were no statistical differences other than the effects of altitude (e.g. altitude impaired performance). However, when analysed separately (e.g. sea level and altitude) using a paired sample t-test, the ***GO2 Premium Oxygen Supplement*** in the sea level trial trended toward improving performance (non-significant finding of $p = 0.09$) (FIGURE 3).

In summary, the data collected in this study is inconclusive as to the efficacy of ***GO2 Premium Oxygen Supplement***. Given some of the trends observed (particularly in the muscle tissue saturation under simulated altitude), however, does warrant further investigation using more invasive measures. Furthermore, we recommend the company consider extensively profiling the recovery (e.g. hours and days) after intense exercise training (both functionally in the muscle and blood (e.g. oxidative stress markers)) rather than focusing on acute exercise performance.

FIGURE 3


GO2-NORM
PLA-NORM
PLA-NORM
GO2-NORM
100
150
200
250
300
Total Time (s)

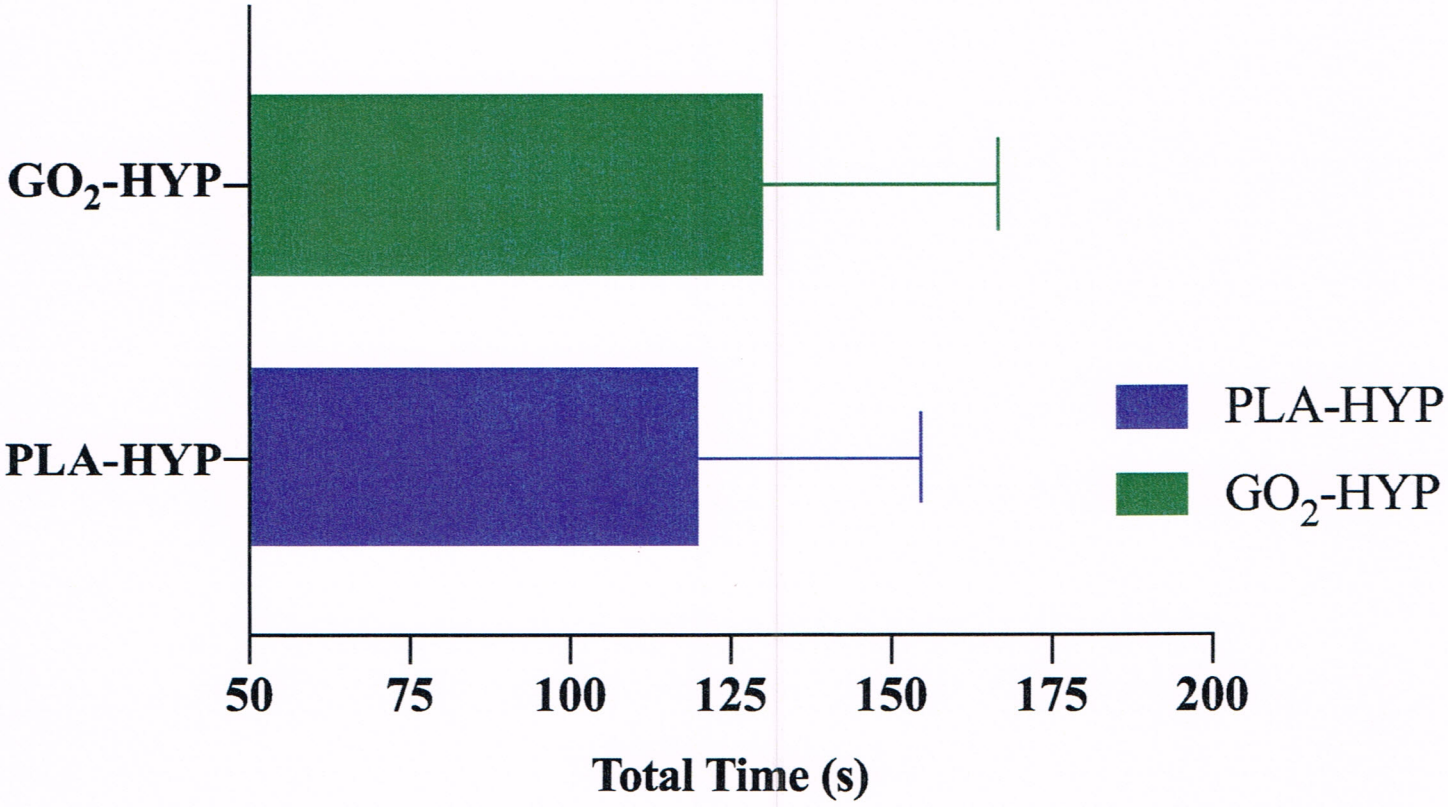

GO2-HYP
PLA-HYP
PLA-HYP
GO2-HYP
50
75
100
125
150
175
200
Total Time (s)

FIGURE 2

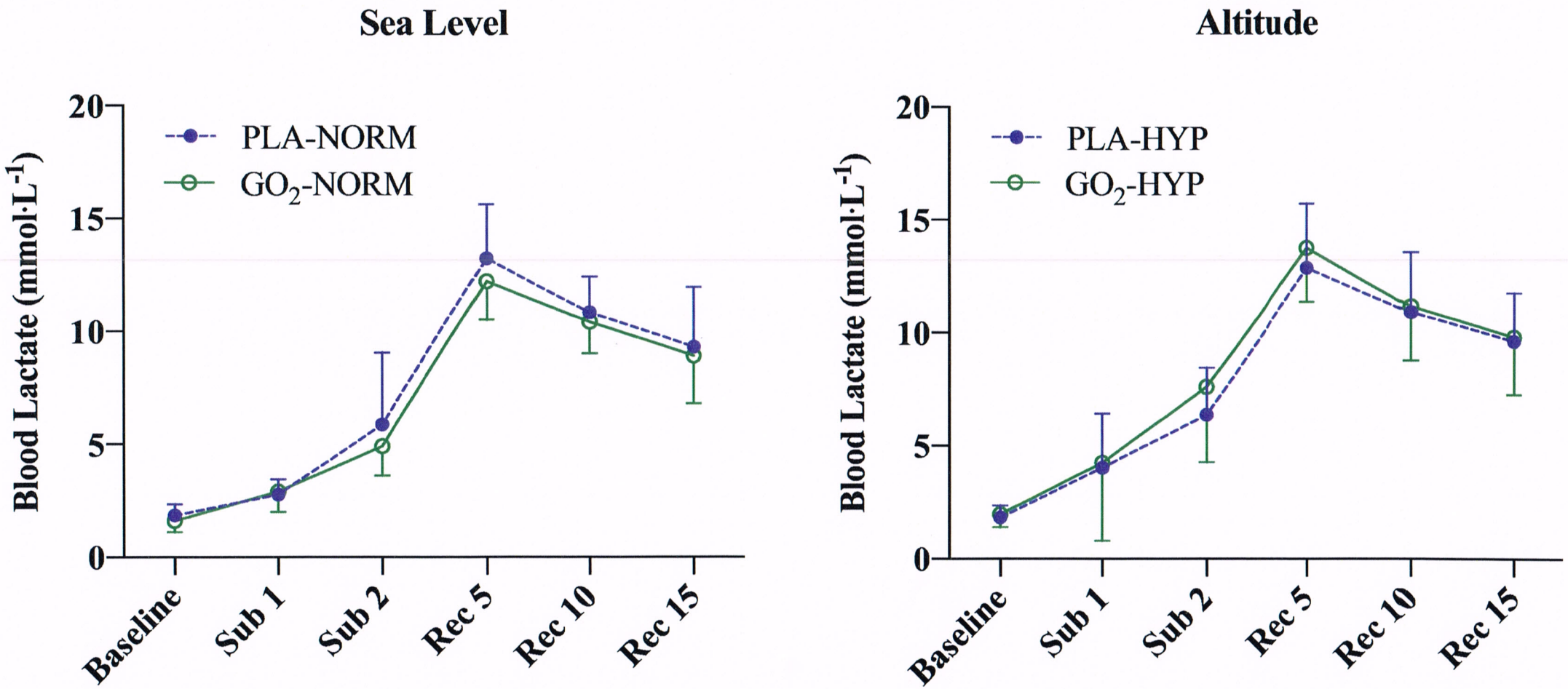
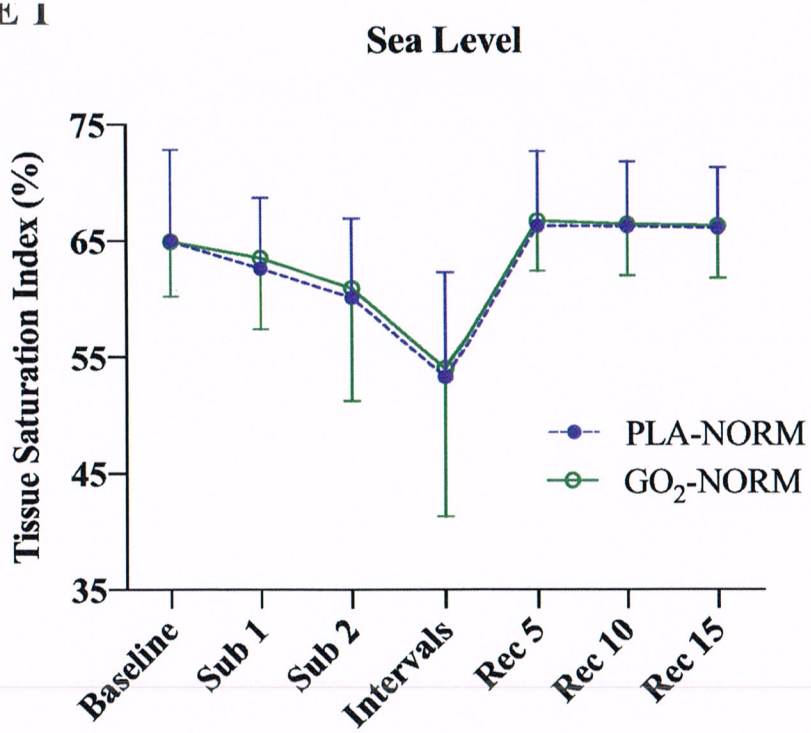
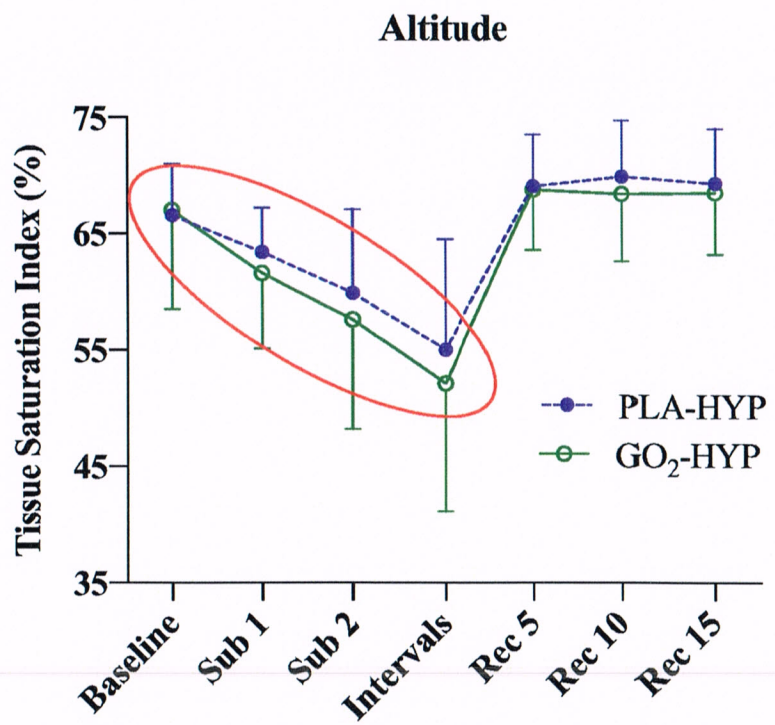
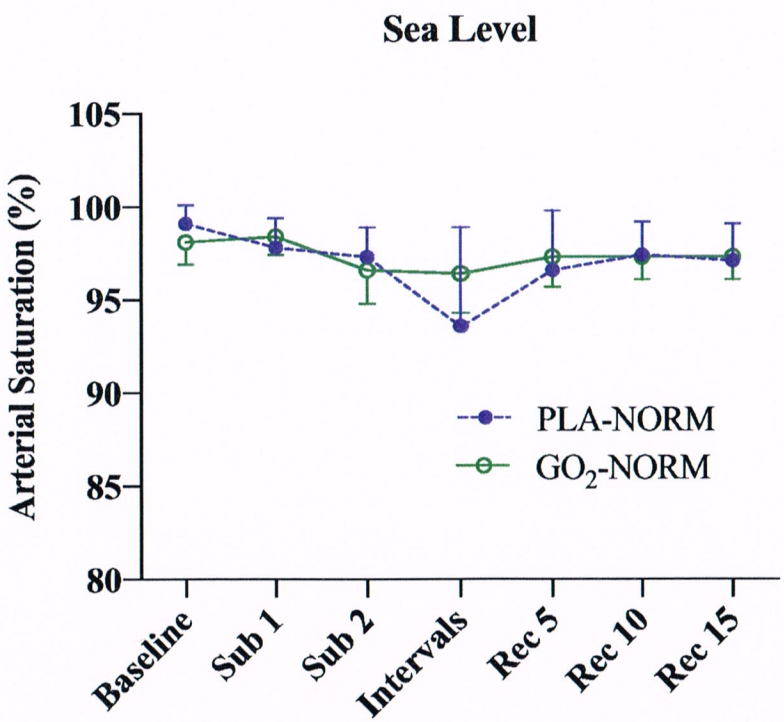
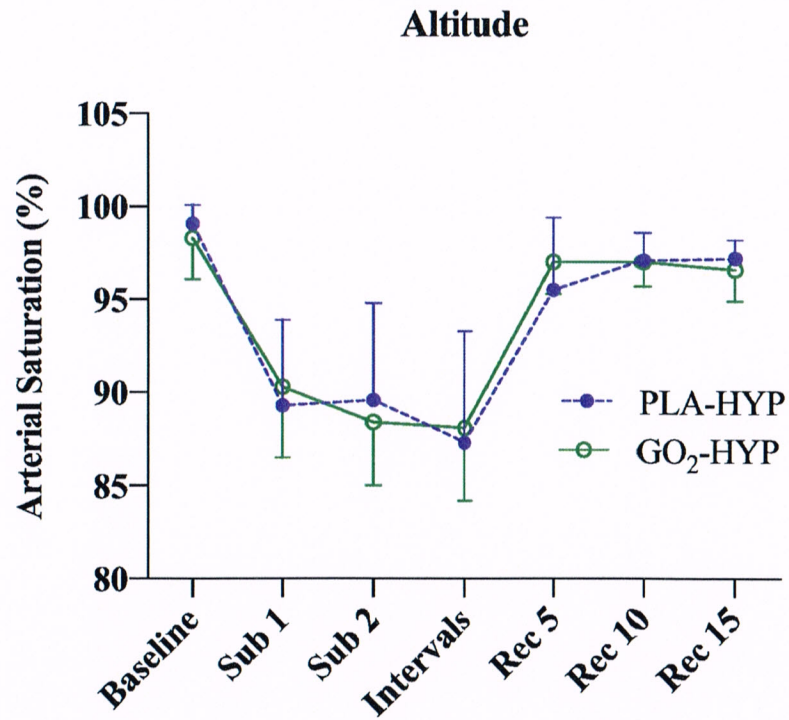

Sea Level
Altitude
Blood Lactate (mmol·L-1)
20
15
10
5
0
PLA-NORM
GO2-NORM
PLA-HYP
GO2-HYP
Baseline
Sub 1
Sub 2
Rec 5
Rec 10
Rec 15

FIGURE 1


Sea Level
Tissue Saturation Index (%)
75
65
55
45
35
PLA-NORM
GO2-NORM
Baseline
Sub 1
Sub 2
Intervals
Rec 5
Rec 10
Rec 15


Altitude
Tissue Saturation Index (%)
75
65
55
45
35
PLA-HYP
GO2-HYP
Baseline
Sub 1
Sub 2
Intervals
Rec 5
Rec 10
Rec 15


Sea Level
Arterial Saturation (%)
105
100
95
90
85
80
PLA-NORM
GO2-NORM
Baseline
Sub 1
Sub 2
Intervals
Rec 5
Rec 10
Rec 15


Altitude
Arterial Saturation (%)
105
100
95
90
85
80
PLA-HYP
GO2-HYP
Baseline
Sub 1
Sub 2
Intervals
Rec 5
Rec 10
Rec 15