

EFFECTS OF 21 DAY ALTITUDE TRAINING CAMP IN ELITE SWIMMERS ON LUNG DIFFUSING CAPACITY FOR CARBON MONOXIDE (DLCO)

BRAJDIĆ ŠĆULAC A.¹, Skroče K.¹, Peršić I.¹, Ivaniš V.¹, Travica Samsa D.¹, Ljubojević S.¹, Peršić V.¹

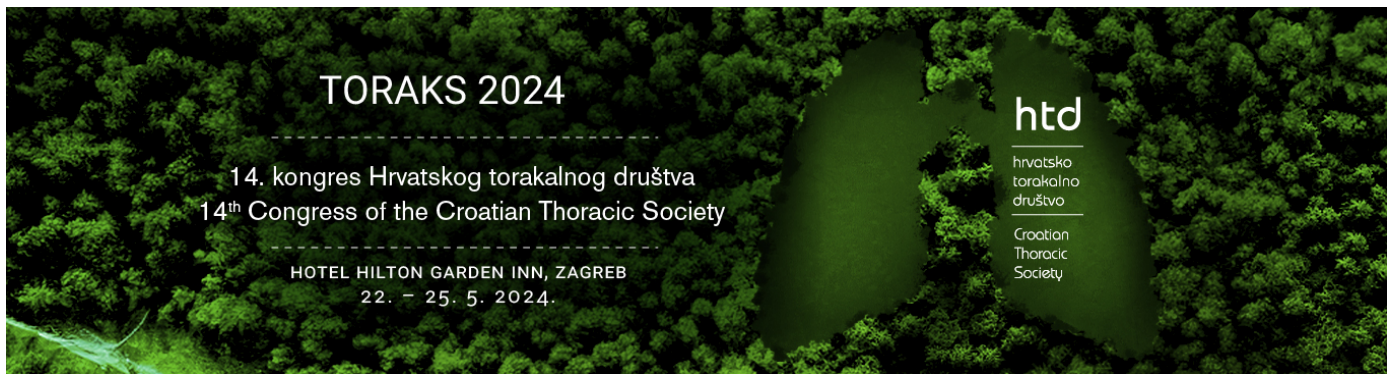
¹ Thallasoterapia Opatija, Special hospital for medical rehabilitation of heart, lung and rheumatic diseases Opatija, University of Rijeka, Rijeka, Croatia
Department of Rehabilitation and Sports Medicine

Objective:

Aim:

The exposure to hypobaric hypoxia can affect lung gas exchange, and hypoxic pulmonary vasoconstriction may elicit pulmonary oedema. The purpose of this study is to evaluate whether there are changes in DLCO during a 21-day altitude training camp (~2400 m) in elite swimmers.

Methods:



Methods:

Participants completed a 21-day high altitude (~2400m) swimming training camp. The training schedule was 10 swimming sessions and 4 dry-land sessions per week. To evaluate the changes in lung diffusion capacity (DLCO) induced by the altitude training camp, DLCO was measured prior to the training camp and immediately after the completion of the 21-days training block, using the single-breath method. Differences in haemoglobin (Hb) concentration and maximal inspiratory pressure were assessed prior to and after the training camp. All participants were given an IMT (*inspiratory muscle training*) device with instructions to use the device twice daily.

Result:

Results:

Participants were 8 international level swimmers (2 females and 6 males; 22 ± 2 years; 182.5 ± 9.0 cm; 74.7 ± 6.35 kg) with a training volume of ~90 km per week. Significant decrease of DL_{CO} (31.07 ± 5.70 vs 27.89 ± 4.31 mL·min⁻¹·mmHg⁻¹, $p = 0.013$, $d = 0.630$) were detected while alveolar volume (VA) remained unchanged (6.85 ± 1.17 vs. 6.82 ± 0.82 L; $p = 0.916$; $d = 0.028$) and the transfer coefficient of the lung for carbon monoxide decreased significantly (KCO; 4.54 ± 0.66 vs. 4.08 ± 0.36 mL·min⁻¹·mmHg⁻¹·L⁻¹; $p = 0.023$; $d = 0.860$). Moreover, PI_{max} significantly increased post altitude (134.0 ± 22.14 vs. 155.63 ± 22.14 cmH₂O; $p = 0.042$; $d = 1.048$) as well as Hb concentration (146.0 ± 14.28 vs. 152.50 ± 13.82 g/L; $p = 0.043$; $d = 0.463$).



Conclusion:

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21-day altitude training camp in elite swimmers consisting of swimming sessions and dry land sessions, resulted in significant decrease of DLCO on account of decrease in transfer coefficient values, possibly due to development of non-cardiogenic interstitial lung oedema.