

## **Abstract**

**Title:** Influence of Wim Hof method on freediver performance

**Objectives:** The aim of this thesis is to find out whether Wim Hof's method (WHM) can demonstrably improve the performance of a freediver and whether, as an added component of regeneration in his training unit, it can demonstrably contribute to the improvement of selected physiological parameters, compared to a group practicing Pranayama in combination with cold exposure and meditation and a control group without intervention. Another goal is to compare the results obtained in the individual groups for a period of two and four weeks of measurement and thus objectify the effect of the selected intervention.

**Methods:** As part of the issue of improving the athlete's performance, selected physiological parameters of individuals engaged in freediving on the breath were observed. For the implementation, the WHM was used, which uses the connection of psychological and physical resistance to stress factors. A total of 32 healthy male subjects in the age range of 32–61 years participated in the study, who were randomly divided by lot into 3 as closely as possible groups of 10–11 members each for WHM or Pranayama training, or into a control group. The experiment consisted of an initial measurement, where input data was taken from the participants and the input parameters of STA apnea, heart rate (HR) and oxygen (O<sub>2</sub>) saturation were measured. This was followed by a separate intervention in the form of home exercise every morning after waking up for four weeks. After the 14<sup>th</sup> day of the experiment, a control measurement took place, where the same parameters were taken from the participants as during the initial measurement, as well as during the output measurement, which took place after 4 weeks of the experiment. As part of the thesis, the differences in measured values were assessed between the group undergoing the WHM in comparison to the second group, whose conditions were slightly modified, and the third, control

group, which did not make any changes to its daily schedule. The obtained data were subsequently recorded, processed and evaluated.

**Results:**

The results of the measurements showed that both the WHM and the Pranayama method are suitable as an added component of regeneration in a freediver's training unit. Both methods can demonstrably contribute to the improvement of selected physiological parameters in HR and STA apnea, including the subjective evaluation of the survey. The inclusion of both methods in a freediver's training preparation can be considered suitable techniques for making the athlete's sports performance more efficient. Both methods had an effect on prolonging the length of the STA apneic pause as well as on optimizing the HR of the probands after 4 weeks of the experiment. When compared, the WHM had a smaller impact on the average length of the STA apneic pause (2.3 minutes) compared to Pranayama (over 2.7 minutes) after 4 weeks of application, but the difference in results is statistically insignificant in this respect. For the third measurement, according to the F-test 3.031 and p-value 0.065, the results do not differ at the 5 % level of significance, however, at the 10 % level of significance, this difference could be demonstrated. In the Pranayama group, 2 weeks were enough to prolong the static apneic pause, in the WHM a 4 week intervention was needed. In the measurement of HR, there was a slight improvement in the WHM group after 4 weeks of intervention (8.6 BPM), on the contrary, the best results were achieved in the Pranayama group after the 14<sup>th</sup> day of the experiment (5.7 BPM). According to the paired t-test, the results of HR changes are conclusive in the second and third measurements ( $p < 0.001$ ,  $p < 0.001$ ). In the third measurement, for the WHM and Pranayama groups, the HR results are significant at the 5 % level of significance ( $p = 0.013$  and  $p = 0.008$ ). Within the measurement of O<sub>2</sub> saturation, the largest average difference in all groups was in the second and third measurements. The average difference in the second and third measurements was the same, 4.7 %. In the first measurement, the average difference was lower, 2.2 %. According to the paired t-test, the results of the change in O<sub>2</sub> saturation

are conclusive for all measurements. The variables measured according to the two-factor ANOVA test with repeated measurements were statistically insignificant ( $F=1.658$ ,  $p=0.200$ ). A positive assessment of the experiment prevailed in the subjective evaluation of the intervention using a questionnaire. Results are only valid for freedivers.

**Keywords:** freediving, respiration, negative thermotherapy, Wim Hof method, Pranayama