

Coaching Applications
**Stress-Related Breathing Problems:
An Issue for Elite Swimmers**

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Abstract

Twenty-four elite competitive swimmers (age 15 -25) from two Norwegian swimming clubs were examined, investigating possible associations between breathing problems and physiological and psychological lack of recovery. The swimmers performed three physiological tests for bronchial hyperresponsiveness. In addition, a series of psychological questionnaires were completed. Swimmers' concerns over their errors were related to perceived recovery. Possible links between psychological and physiological stress symptoms may be explained by the Cognitive Activation Theory of Stress (CATS), and signifies the importance of finding the right balance between training and recovery.

Introduction

Over the last thirty years there has been an increase in the numbers of swimmers diagnosed with breathing problems. A prevalence of exercise induced asthma and bronchial hyperresponsiveness is elevated especially among elite endurance athletes and this seems to be an increasing problem. For a coach this means that swimmers may be particularly exposed to trouble since inhalation of chlorine is thought to be an airway-provoking factor during training and competitions. Recently, coaches and swimmers have started to question whether breathing problems could be worsened in more stressful periods. This was the background to the present study.

Swimming might be considered one of the most physically and mentally demanding of all sports, because it comprises of hard in-water and out-of-water training programs. Hence, swimmers are part of a high risk group for experiencing overtraining and burnout. In addition to the hard training routine, many are students with additional study obligations, having several training bouts a day.

The total stress load they are exposed to can be exacerbated by breathing problems, impeding the recovery process. Theoretically, if the total stress load is high and sustained over a long period of time, the increased arousal levels will subsequently result in strain and possible health problems. This might be explained by the Cognitive Activation Theory of Stress (CATS) and such problems include changes in immune functions. Considering the total load and possible lack of restitution, we aimed to examine possible links between breathing problems and physiological and psychological recovery (or perceived lack thereof) in these elite swimmers.

Method

Twenty-four elite competitive swimmers (15 male, 9 female) from two clubs in Norway (15-25 years, M age = 18.25 years, SD = 1.60) participated. All athletes were competing at a high national and/or international level, training a minimum of 2 to 3 (some 5) hours daily. They were also full time students at different colleges or universities. Four swimmers were diagnosed with asthma, and five with an allergy. Nine swimmers (37.5 %) used anti-allergy or anti-asthma drugs, which is 3-6 times higher than the typical figure in the normal population in the Nordic countries. We followed national and ethical guidelines in the study.

All swimmers completed one Methacholine challenge and two Eucapnic voluntary hyperventilation (EVH) tests. EVH is an indirect test for bronchial hyperresponsiveness and act through the similar mechanisms as exercise. Methacholine provocation is a direct measurement of bronchial hyperresponsiveness. Swimmers also completed a series of questionnaires consisting of scales measuring perfectionism, burnout, recovery and perceived motivational climate.

Results and discussion

Fifteen swimmers had at least one positive test result to either one of the EVH tests or to the methacholine challenge (62.5%). When coding the swimmers as responsive or non-responsive, we found significant correlations between bronchial hyperresponsiveness and psychological variables, despite of having few swimmers in the study. Two of the findings are especially important. First, the number of swimmers with bronchial hyperresponsiveness was disturbingly high. Second, we found association between psychological and physiological elements, where athlete's concern over mistakes was related with balance between training and recovery.

Thus, breathing problems may be one marker for reduced recovery. When athletes are concerned whether they train enough and worry about mistakes, the athlete might work too hard, both in- and outside of the sport. If the athlete's total load becomes excessive (sport, school, etc.), whether it is physical, psychological or a combination of both, their recovery might suffer.

In an individual sport, like swimming, coaches and athletes should have good chances to develop close and interdependent relationships. To communicate about and adapt the total load (parental pressure, massive training, and unsuccessful recovery) may be of central concern for coaches. The participants in this study talked openly about breathing problems being exacerbated in stress overload situations. A trustful coach-athlete relationship benefitted these athletes' recovery. Coaches are therefore advised to underscore a climate that emphasizes personal improvement in swimmers, and downplay an environment that fosters too much rivalry in training as the latter might exacerbate breathing problems when the athletes may not dare to take a pause.