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# Evaluation of a stress prevention program for young high-performance athletes<sup>☆</sup>



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## ABSTRACT

**Objective:** The present study evaluated the effectiveness and acceptance of a stress prevention program for young elite athletes in education.

**Method:** In a non-randomized controlled trial 28 elite athletes (swimming, basketball, boxing, weight lifting) participated in a stress prevention training. The control group, consisting of 28 elite athletes (swimming, basketball, soccer, boxing, weight lifting, wrestling, triathlon), did not receive a training. Mean age was 17.50 years in the experimental group and 16.36 years in the control group. 75.0%, respectively 67.9% were female. The main outcome measures were perceived stress, self-efficacy and knowledge about stress and stress prevention before and 4 weeks after the program. Additionally, program satisfaction was analyzed in the experimental group.

**Results:** Participants of the experimental group showed significant improvements in self-efficacy and knowledge in the analysis with the paired *t*-test, ANOVA results only revealed a trend for a significant effect on knowledge. No significant effects were found in the control group. Participants rated our prevention program as beneficial and recommendable.

**Conclusion:** The training program increased the knowledge about stress and stress prevention and had a positive effect on self-efficacy.

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## 1. Introduction

For a long time, mental disorders were a topic rarely talked about in the world of high performance sports despite athletes having to endure high physical and mental challenges often already at a young age. Following several prominent elite athletes' and coaches' public reports about burnout and depression worldwide, both experts and the general public have become more aware of this problem. Moreover, athletes themselves have become more mindful of mental problems though data suggests that the prevalence of depression does not differ largely from the general population (Nixdorf, Frank, Hautzinger, & Beckmann, 2013; Yang et al., 2007). In a study from Breuer and Hallmann (2013) 11.4% of the questioned elite athletes reported to be suffering from burn-out while 9.3% stated to have depressive disorders.

The relationship between stress and depression is generally accepted (Kessler, 1997). Extant literature suggests that this correlation also exists between high performance athletes' depressive symptoms and chronic stress (Nixdorf et al., 2013). Kleinert, Boss, and Breuer (2010) detected stress-associated complaints among elite athletes; 46% felt little regeneration after sleep, 16% felt insufficiently recuperated and 13% were unsatisfied with their stress management. Also, insufficient recovery is correlated with depressive symptoms (Nixdorf et al., 2013) and might increase overtraining and risk of injury (Andersen, & Williams, 1999). Furthermore, overtraining syndrome itself has been connected to depressive disorders (Armstrong, & VanHeest, 2002).

In most competitive sports, the training workload is high during adolescence. On average, elite German athletes train 18 h per week and spend another 14 h with sport related activities, such as travel time, competitions, and physiotherapy (Breuer & Wicker, 2010). Furthermore, absenteeism from school or university due to training camps or competitions has to be considered. In consequence, elite athletes not only have to deal with high workloads in training but also have to take care of their education at the same time. Especially, before graduation students' have to cope with high pressure levels. Correspondingly, athletes report that school is a key stressor and that they found it difficult to combine sport and schooling (Gustafsson, Hassmén, Kenttä, & Johansson, 2008). In light of training and educational demands as well as the high pressure to compete, conflicts within the team or with the coach, possible injury and being in the public eye, it is not surprising that elite athletes report a higher stress level than the corresponding age group in the population (Richartz, Albert, Sallen & Hoffmann, 2010). Nixdorf et al. (2013) showed a correlation between coping strategies and depressive symptoms of elite athletes, therefore, suggesting that the acquisition of such strategies might prevent them. Correspondingly, in a review, Rumbold, Fletcher, and Daniels (2012) stated that stress management programs for elite athletes, especially multimodal interventions, have a positive effect on various stress components. However, all interventions analyzed in the review only measured the athletes' competitive stress experience. The authors criticized that up to now organizational stress and personal stress have been neglected. Perna, Antoni, Baum, Gordon, and Schneiderman (2003) developed a cognitive behavioral stress management with seven 35–40 min sessions. Besides explaining stress, somatic and cognitive strategies were implemented for stress reduction and emotional expression was also encouraged. The program's main aim was to reduce athletes' days of absenteeism due to injury or illness. Results showed a significant reduction of absenteeism due to illness or injury and less negative affect. To date, stress prevention programs for elite athletes are rare. Furthermore, many existing programs focus on the improvement of athletic performance or the prevention of injury and not on the prevention of stress or mental illness.

The purpose of this study was to develop an intervention program which reduces stress. The program consists of six sessions, each lasting 30 min, which took place once a week for the experimental group. The program content comprised symptoms, development, and consequences of stress, relaxation techniques, mindfulness, cognitive restructuring, balance, social contacts, overtraining, and extrinsic and intrinsic motivation. The control group did not receive any intervention. The study was evaluated in terms of perceived chronic stress, self-efficacy, knowledge about stress and satisfaction with the program. We hypothesized that the experimental group would feel less stressed, show more self-efficacy, and have greater knowledge about stress after the intervention in comparison to the control group.

## 2. Methods

### 2.1. Procedure

The project "Stress prevention training for young athletes" is part of the center of excellence for the prevention of psychological and psychosomatic disorders in the working and educational world, which was funded by the Ministry of Science, Research and the Arts in Baden-Württemberg.

To note, the study design was not a randomized controlled design. Analyzed data were obtained between April and August 2014. Participants were recruited by contacting coaches and Olympic Training Centers in Heidelberg, Munich, and Freiburg. Inclusion criteria were (1) the attendance of school or university and (2) the competitive performance of sport on a top national level with training taking place on at least 5 out of 7 days and (3) an age between 15 and 25 years. After recruiting elite athletes for the experimental group, we looked for matching elite athletes (age, gender, type of sport, competitive performance level, training load) for the control group. All participants were investigated at baseline (T0) and again approximately 10–12 weeks later (T1) and data were obtained via self-report questionnaires as detailed below. For the experimental group, the stress prevention program took place right after T0 for the duration of 6 weeks. There was one session per week which lasted 30 min. T1 data were obtained at a 4 week follow-up after the end of the program. The group size ranged between 9 and 13 students. The program took place at the athletes' training site or boarding school. The controls received no intervention.

The two intervention trainers were employees of the Department of General Psychiatry at the University Hospital in Heidelberg with a background in high-performance sport. Most groups were chaired by the same trainer (a female, 35 year-old, resident physician) who also trained the second trainer, a 23 year-old female medical student.

The study was fully explained to all participants. Informed consent was obtained from each participant and the protection of data privacy was guaranteed. All measurements were conducted in accordance with the Declaration of Helsinki. If they were under the age of 18, their parents were also informed and provided written informed consent. The study was approved by the Ethics Committee of the Medical Faculty of the University of Heidelberg (No. S-017/2014).

### 2.2. Stress prevention program

We developed a program, which aimed to meet the unique demands of young elite athletes performing on a top national level while attending schooling or university at the same time. We conducted a literature search for existing stress management programs and sport specific risk factors for burn-out. We

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