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EDITORIAL

With the consistent patronage of the Journal of Human Kinetics and Health Education Pedagogy (JOKHED) by various researchers and the reading public, we are compelled to publish this SPECIAL EDITION of the Journal (Vol, 4, No 1, 2022), dedicated to Professor Akindutire, Isaac Olusola and Professor Adegun, Joel Adekunle.

The Editorial Board deployed appropriate logistics to screen and select articles with high quality and in conformity with the international standard of JOKHED.

This SPECIAL EDITION ascertains the publication of articles from diverse segments of Sport for Fitness, Wellness and Education pedagogy. We shall not relent in our avowed commitment to always put the journal in academic domain at least two times a year.

My profound appreciation goes to the members of the Editorial Board for their individual participation, and especially, the Ag.Head of Department and Assistant Editor in the successful publication of this SPECIAL EDITION of the Journal.

Professor Joseph Afolayan ADEGBOYEGA,
Editor- In- Chief

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BIOFEEDBACK TECHNOLOGY FOR STRESS MANAGEMENT AND SELF-REGULATION OF ATHLETES

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Abstract

With present technological advancement, the construct of stress management and self-regulation has received a new approach as this affects both psychological and physiological indices of athletes during training, competition, injury recovery and psychological wellbeing. The thought of biofeedback technology that makes use of instruments (electronic devices with electrodes and sensors) to assess, monitor, and feed psycho physiological information back to a person which is gaining recognition is to build a more complete tool to improve athlete's performance and psychological wellbeing rather than replacing the traditional PST. In this perspective, the paper examined brief historical background of biofeedback in sports, meaning of biofeedback and biofeedback training, biofeedback modalities, stress management, self-regulation, biofeedback technology for stress management and self-regulation, two training models of Wingate 5-Step Approach (W5SA) and the Learning-Modification- Application (LMA) Approach. The author suggested that, sport scientists, sport psychologists and coaches could adopt biofeedback technology as a means to manage competitive stress and improve athlete's self-regulation for great performance and optimal health.

Keywords: biofeedback, biofeedback training, stress, stress management, self-regulation

Introduction

In today's highly competitive world of sports, athletes are looking for edge to get bigger, stronger, faster, and more equipped to excel at their games. Technological advancements have affected all areas of human existence, including sport performance. In recent years, advances have been made in biofeedback, virtual reality, reaction time trainers, and a host of other software applications and gadgets designed to enhance human performance. For instance, wearable technology can be used to monitor the users' vital signs to facilitate real-time injury/trauma survival predictions and improve treatment response times.

Coaches, athletes, and sport psychologists agree that the manifestation of excessive stress and tension before and/or during competition are major threats to the ability of the athlete to meet or exceed their performance goals (Sime, 2003).

Athletes with greater psycho-physiological self-regulation over somatic (physical) and cognitive (mental) components of anxiety have a greater sense of personal control over their performance, and cope better with the stress of competition (Hatfield & Hillman, 2001). Great and elite athletes such as Cristiano Ronaldo, Tiger Woods, Rafael Nadal, Michael Jordan, and many others regularly acknowledge the importance of psychology of sports and the need to beef up their mental capacities to perform at their peak while simultaneously managing adversity on a daily basis. Prior to the technological era, athletes and the sport psychologists who trained them had to make guesses about what was going on in the mind and the body before and during a great performance. Now, firsthand information can be seen easily and quickly due to technological advancement. New technology and computers allow to obtain an inside view of brain and body as people think, feel, and perform. These computer-based training methods are known as biofeedback and neurofeedback. The use of biofeedback and neurofeedback to assess and train specific sport skills is where key improvements in performance can occur (Strack, Linden & Wilson, 2011).

Among the fundamental mental skills consistent with elite performers is the ability to regulate physiological and psychological processes in response to the stresses of intense competition. Training individuals to gain control of physiological processes associated with emotions and cognitions is primary function and purpose of biofeedback training (Hatfield and Hillman, 2001). The stress management and self-regulation skills needed by athletes to perform well can be learned and enhanced through biofeedback training. With the emergence of affordable, portable, and reliable computer technology, sport psychologists and coaches are using biofeedback training to help athletes develop effective stress management and self-regulation skills for enhanced performance

With biofeedback (BFB), sensors are attached to various locations on the athlete's body. The sensors send signals from the body to the computer to provide instant visual and auditory feedback to the athlete as to how the body is functioning when it is relaxed and calm compared to when it is stressed and out of control. The mind and body react differently during poor performance and successful performance. Once identified, the athlete can use this feedback to learn how to duplicate a desired state or to control common stress signals, such as rapid heart rate, shallow breathing, or tense muscles, and increase the probability for success.

Concept of Biofeedback and Biofeedback Training

Biofeedback (BFB)

Biofeedback constitutes an effective and non-invasive procedure, whose basic operating principle is the conscious registration of normally unconscious body procedures (e.g., brain activity, electrocardiogram, electromyography, or skin conductance) that are represented by a visual, haptic, or audio signal (Gaume et al., 2016). Blumenstein, Hung and Orbach (2014) define biofeedback (BFB) as the use of instruments (electronic devices with electrodes and sensors) to assess, monitor, and feed psycho- physiological information back to a person. Schwartz (2010) defines biofeedback as a process that enables an individual to learn how to change physiological activity for the purposes of improving health and performance.

Biofeedback is a technology that uses instrumentation to detect and amplify internal physiological processes in order to make this ordinarily unavailable information available to the individual as "feedback" in a form that is meaningful, rapid, precise, and consistent (Blumenstein, Bar-Eli and Tenebaum, 2002). With feedback and the other essential ingredient for learning (i.e., practice), athletes can learn to control or self-regulate essential biological functions such as muscle tension, heart rate, respiration rate, skin conductance, and brain activity (Micheli, 2011). Biofeedback can help an athlete detect and control shifts in his or her bodily functions by using sophisticated electronic monitoring devices. The athlete can view these physiological changes and see how and why they change while resting, practicing, or participating in a high stress and competitive environment. The ultimate goal is for athletes to learn to control the biological functions that allow maximum performance to occur.

Biofeedback Training (BFBT)

Biofeedback training is a learning process whereby people exert conscious control over psychological process controlled by autonomic nervous system. Biofeedback monitors the changes in physiological function, which could be heart rate, or electrodermal or skin conductance activity, or EEG functions or BP etc. and at the same time provides feedback in a real time. The biofeedback equipment provides feedback using a signal that change with monitored variables. Biofeedback training is a technique of gaining control of self-regulation which is based on information or feedback received

from an athlete's body. After intensive BFB training, the psychological skills become automatic reflexes. The final result is a more stable, optimized, and balanced mind/ body interaction in athletic performance. Biofeedback training can help control autonomic physiological stress responses, such as increased HR and BP. Also, it has been used to control anxiety disorders as well as anxiety connected to particular environments or contexts. The premise behind biofeedback (BFB) is for the athlete to become aware of how stress is manifested physiologically, such as changes in BP, HR, breathing, or muscle tightness, using different modes of objective feedback and monitoring. With this increased awareness, athletes are better equipped to control their actions. With training, athletes become less reliant on the feedback, learning to control their physiological responses on their own (Owen, Mellalieau and Hanton, 2009).

Biofeedback training is used in research and practical programmes as an integrated component of psychological skills training (PST). The integration of biofeedback training within PST has been documented in a variety of sport disciplines, such as, archery (Filho, Moraes, & Tenenbaum, 2008), judo (Blumenstein & Orbach, 2012), soccer (Wilson, Peper, & Moss, 2006), swimming (Bar-Eli & Blumenstein, 2004), and in other activities such as dancing (Raymond, Sajid, Parkinson, & Gruzelier, 2005) music (Bazanova, 2012; Trechak, 2011), and in the military (Oded, 2011). With biofeedback training, people have been able to regulate many processes: lower heart rate; lower blood pressure, control headaches, and manage responses to stressful situations. Biofeedback uses electronic instruments which, when connected to an individual, can measure, amplify and display involuntary physiological processes on a moment-to-moment basis (Patel, 1988).

Modalities of Biofeedback

Moss and Wilson (2012) discussed the main general procedures used to facilitate optimal performance: surface electromyography, electrodermal biofeedback, thermal biofeedback, respiratory training, heart rate and heart rate variability biofeedback.

1. **Electroencephalography (EEG): -** This is sometimes called neurofeedback (NF). EEG is used to measure brain activity (frequency and amplitude), and as such, it helps to determine if appropriate parts of the brain (e.g., those regulating coordination or spatial awareness) are active during peak performance

or inappropriate parts (e.g., language production, and negative self-talk) are active. Multichannel recording can take place, so it is possible to determine what brain activity is associated with successful performance and what brain activity is associated with unsuccessful performance.

2. **Surface electromyography (sEMG):** - sEMG refers to surface electromyography and measures muscle activity in microvolts. This form of feedback allows to determine if muscles that are not involved in a particular skill need to be relaxed and those muscles involved in a skill need to fire in the right sequence and with the right amplitude. In addition to using sEMG feedback for training purposes, the information can also provide insight into the athlete's strength and conditioning or the effects of an injury rehabilitation programme.

3. **Heart rate (HR):** - HR is typically measured by standard electrocardiogram (EKG) electrodes or a photoelectric plethysmography sensor attached to a finger. HR is a measure of both exercise demands, thoughts and emotions. HR and a more recent measure, HR variability, play a large role in the psychophysiological training of athletes.

4. **Respiration rate:** - Respiration is usually measured by a strain gauge placed in the thoracic or abdominal region (or both). Respiration rate and amplitude reflect response to the stress of exercise, psychological distress, or poorly learned breathing mechanics.

5. **Respiratory sinus arrhythmia (RSA):** - RSA is a measure of the synchrony between heart rate and respiration. When an athlete is in a calm and alert state, the HR rises and falls with each inhalation and expiration.

6. **Skin conductance:** - Skin conductance measurement refers to measuring the sweat response and is referred to in the literature as electrodermal response, skin conductance, or galvanic skin response. Low, stable skin conductivity is an indicator of strong autonomic nervous system function.

7. **Skin temperature:** - Skin temperature is another measure of autonomic nervous system function

and reflects somatic relaxation (vasodilation) or stress (vasoconstriction) in an athlete.

Meaning of Stress

Stress is an unavoidable part of life and everyone has to deal with it. Although stress is a prevailing theme throughout the general sport psychology literature, there remains disagreement among researchers and practitioners regarding its definition (Janelle, 1999). Hanin (2000), Janelle (2002) and Lazarus (2000) defined competitive stress as a situation occurring when psychological demands are perceived (consciously or subconsciously) by an athlete to exceed his or her available coping resources

Sources of Athlete Stress

The threats associated with athletic competition are not limited to the obvious physical harm that may occur in rugged and violent sports but also encompass psychological strain, especially for those athletes whose personal identities are associated with successful sport performance. Although the actual competition itself, along with subsequent evaluation, is a potent source of stress, there are many other peripheral sources. These include issues affected by coaching leadership, team dynamics, and intra- or interpersonal issues relating to the athlete's relationships outside sport (Fletcher & Hanton, 2003; Giacobbi et al., 2004; Humphrey, Yow, & Bowden, 2000). A variety of other issues within elite sport environments may be stress-provoking. Organizational policies or role ambiguity within the team setting often lead to athlete uncertainty, anxiety, and stress (Beauchamp, Bray, Eys, and Carron, 2003). The grueling amounts of travel required to compete at the elite level (Waterhouse, Reilly and Edwards, 2004), and issues such as team selection, financial support, and quality of facilities all may create threat appraisals that lead to stress (Fletcher and Hanton, 2003). During the execution phase of performance, game errors, tough luck, a bad call by an official, or an exceptional performance by an opponent are common sources of stress (Anshel and Wells, 2000). Unfortunately, many athletes hide these personal issues resulting from stress from coaches, teammates, and counseling or sport psychologists until they are free-falling helplessly. These problems illustrate the pervasive nature of stress and how chronic negative emotions may be difficult to eradicate unless the source of the stress is correctly identified.

Psycho-physiological Effects of Stress on Athletes

The specific psycho-physiological effects of stress may include increased heart rate, blood pressure, and electrodermal response; disruption in respiratory sinus arrhythmia; decreased skin temperature (less peripheral blood flow); the release of potent damaging hormones; and reduced brain functioning, especially related to attention (Bundy, Lane, Murray, & Fisher, 2002; Janelle, 2002). The resulting sweaty and/or cold hands are serious, debilitating factors in sports where an athlete's grip (e.g., golf, cricket, gymnastics) or ball handling (e.g., basketball, football, baseball) is critical, as dexterity is compromised due to the reduced blood flow to extremities associated with increased sympathetic arousal. Negative emotions may cause attention to become either narrowed (resulting in hyper focus on stimuli central to the task) or inefficient (consuming the resources available for the high working memory tasks required for highly skilled athletic movements) (Janelle, Singer and Williams, 1999). In addition, when emotion intensity increases to extreme levels, attentional narrowing may lead to distraction, the visual search wanders to threatening or irrelevant cues and deterioration of performance and a greater risk of injury (Janelle et al., 1999; Rogers, Alderman, & Landers, 2003).

Stress Management

According to Owen, Mellalieau and Hanton, (2009), stress management refers to the environmental, physiological, cognitive, and behavioral techniques employed by an individual to manage the factors and components that underlie the stress process or experience of stress. A primary goal of stress management in sport is to allow the athlete to effectively regulate competition related demands to facilitate optimal performance as well as to enhance psychological well-being. Contemporary thinking in sport psychology conceptualizes stress as a complex dynamic transaction between environmental demands, such as those associated with high-level competition, and the athlete (Owen, Mellalieau and Hanton, 2009). Stress occurs when the demands tax or exceed the resources, such as skills or support, that the athlete has at his or her disposal. Since competitive sport is by nature demanding, how athletes evaluate and cope with the demands they encounter has a large impact on the stress process. Stress management techniques in sport typically target somatic, behavioural, and/or cognitive affective symptoms of stress (Lehrer, Woolfolk and Sime, 2007).

Self-Regulation

Collins, Button and Richards (2011) defined self-regulation as the process in which individuals monitor, manage, and control their behaviours, thoughts, emotions, and interactions with the environment, including task performance but also including social interactions. Self-regulation allows individuals an opportunity to understand how responses can be coordinated across a wide range of different coping skills and strategies (e.g., self-talk/self-instruction, cognitive restructuring, humour, etc.). "Self-regulation in sport" to refer to self-initiated thoughts, feelings, and actions that athletes use to attain various goals (Zimmerman & Kitsantas, 2005). Self-regulation enables an individual to monitor and adjust their goal-directed activities in different situations and contexts using self-oriented feedback loops. A self-oriented feedback loop involves the evaluation of one's behaviour in relation to their personal standards and the environment (Zimmerman, 2000). Self-regulation can be considered to involve three phases: forethought, performance, and self-reflection (Zimmerman, 2000, 2002).

The forethought phase concerns goal setting, planning and identifying the person's intrinsic motivation to engage in the event, for instance, playing hockey. Following this is performance control, which relates to the application of the learnt skills on the field and being able to monitor and control one's emotions, thoughts and behaviours, and/or actions. Performance control requires the individual to use psychological skills to adapt and correct their actions on the field for the most successful outcome. Lastly, self-reflection is looking back on one's performance and identifying positive and negative aspects and making conclusions about why certain behaviours occurred in the way they did, also known as making sense of a situations (Zimmerman, 2000). Self-regulation has been linked to lower somatic and cognitive anxiety, as well as better competition preparation, endurance performance, decision making, and motor learning. (Pilgrim et al., 2018; McCormick et al., 2019; Wagstaff, 2014).

The Problem of Athlete's Stress and Dysregulation

Both experience and inexperience athletes often fail to perform optimally because of self-induced pressure. As such, their mind and body are in a state of disequilibrium, and at critical moments, an athlete may not know how to self-regulate his or her thoughts, feelings/emotions, physiological reactions, and motor responses. Biofeedback technology is an efficient way to teach stress management and self-regulation. Perhaps the greatest

feature of biofeedback instrumentation is that most manufacturing companies have developed software that allows for two separate operations: assessment and training (Micheli, 2011). First, we can measure, assess, and profile baseline psycho-physiological activity in athletes under conditions of rest, competition, and recovery. Second, the technology allows us to train athletes to manage and self-regulate specific biological functions (e.g., excessive muscle tension) that tend to interfere with performance.

Assessment and Training Protocols used in Sports

Sport scientists using biofeedback assessment and training usually start by getting baseline measures of the athlete using a typical protocol of rest (2 minutes), psychological stress (2 minutes), and recovery (2 minutes). The stressor usually involves the use of a standardized test, such as the Wisconsin Card Sort Test, the Stroop Test, Serial 7s, or a sports video of performance stress. These measures create a psycho-physiological profile that allows the sports scientist to design a training programme that will enable the athlete to cope with pressure and maintain an optimal psycho-physiological state. Should attention, cognition, and decision making show the greatest amount of dysregulation, then the focus of training might be on neurofeedback (EEG). In many cases, however, lack of stress management and self-regulation skills is demonstrated in all the modalities, and thus training will be necessary for all modalities (Micheli, 2011).

Training to manage stress and self-regulation using biofeedback or neurofeedback usually begin in the laboratory, in the reclining chair where the assessment/profiling takes place. The athlete attempts to manage stress and self-regulate specific physiological functions either by using the creative software provided by the biofeedback manufacturer or by reviewing DVDs of successful and unsuccessful performance. The goal is to become aware of specific biological reactivity to pressure and learn what the optimal values are when the mind and body are in the "zone." For example, athletes quickly learn about what happens to their physiology when they slow their respiration down to 6 to 8 respirations/minute. They can also become aware of what happens when they view "anger" being displayed in a DVD video clip or when they simply image an emotional/traumatic reaction. After training in the laboratory, the athlete attempts to replicate these ideal performance states on the playing field. Wireless technology enables monitoring of

psychophysiological signals that are presented as feedback to both the athlete and the sports scientist. Stress management and self-regulation training can be learned through this real-time feedback and continued deliberate or intentional practice.

Biofeedback Technology for Stress Management and Self-Regulation of Athletes.

The use of sophisticated biofeedback and computer technology allow sport psychophysiologists to create protocols that closely mimic performance conditions (Davis and Sime, 2005). BFB technology offers great promise for sport psychology, and specifically for psychological skills training for reducing competitive stress and performance enhancement. Research on the efficacy of BFB training has shown a positive effect in a variety of sport disciplines and in other professionals such as music, the military and education (Edmonds & Tenenbaum, 2012; Blumenstein & Orbach, 2012; Perry, Shaw & Zaichkowsky, 2011; Bazanova, 2012; Oded, 2011)

BFB has become an important part of achieving the highest levels of athletic performance because by making use of these techniques and technologies, athletes and sports people of all kinds can learn to alter and improve their own physiological states and responses to stressful situations. (Anatomical Concepts, 2020). BFB can be used to improve concentration and focus, to improve cognitive function and emotional control following concussions and mild head injuries, and it has untapped potential to increase physical balance in gymnastics, ice skating, skiing, and other areas of performance (Hammond, 2007). Lehrer, Woolfolk and Sime (2007) study on biofeedback training using EMG biofeedback was proven effective in reducing both anxiety and voluntary muscle tension, which often accompany one another, at rest and prior to competition. A study carried out by Lagos et al. (2011) on golfer which examined the impact of HRV BFB on the mood, physiology, and sport performance of a 14year old golfer. The golfer received no golf instructions during HRV BFB training. The results of the study suggest that biofeedback training may help to train stressed athletes to acquire a control over their psychophysiological processes, thus helping an athlete to perform maximally.

Moreover, biofeedback is a powerful tool for stress management and relaxation training. It enables individuals to learn how to regulate their physiological activities in order to restore or maintain autonomic balance (Saha et al., 2015).

Biofeedback techniques can help users improve self-awareness of internal states and learn self-regulation skills to manipulate specific physiological functions in a healthy direction. A study conducted by Dupee, Forneris and Werthner (2016), perceived outcomes of a biofeedback and neurofeedback training intervention for optimal performance on five Olympic level athletes preparing for world championships and the 2012 Olympic Games took part in a 20 sessions intervention over the period of one year. At the completion of the intervention, a semi-structured interview was conducted with each athlete. The athletes indicated that they became more self-aware, were better able to self-regulate both their physiological and psychological states, developed a greater sense of personal control, and a greater understanding of skills inherent in the field of sport psychology.

In another study Dupee and Werthner (2011) asked the athletes whether or not they found the bio-neurofeedback (BNFK) training helpful and whether they liked to do it. In order to answer this question effectively, at the completion of each competition season, the athletes and coaches were asked if the BNFK training was useful in helping each of the athletes to focus better, manage their anxiety, and ultimately improve their performance that season, and if they wanted to continue to do it the following year. From the perspective of the athletes, all the 15 athletes responded that it was very helpful, and they wanted to continue. It was noted that several of the athletes did state that it was a great deal of work learning how to manage their physical and mental states. From the perspective of the coaches working with these athletes, they uniformly reported that the training in bio-neurofeedback (BNFK) definitely helped their athletes in managing the stress of training and competition, and they stated that it was a factor in producing better performances.

Furthermore, Tanis (2012) study on effects of heart rate variability (HRV BFBT) emotional regulation on the athletic performance of women collegiate volleyball players revealed numerous benefits of the intervention including a reduction of physical and mental stress, and an enhancement of physical and mental states improving academic and athletic performance. Bar-Eli and Blumenstein (2004) used EMG biofeedback only for 10 weeks to observe improvement in running and swimming performance in young adolescents (aging between 16 -18 years), while Blumenstein et al. (2002) observed improvement in athletic performance in college students, using EMG biofeedback for only 13 sessions.

From the foregoing, most of the studies carried out using BFB training sessions occur in the laboratory, studies point to the fact that "one of the criticisms of biofeedback training has been the inability to transfer the learned response to performance in the real world" (Crews, Lochbaum and Karoly, 2011). To overcome this limitation, two training models-the "Wingate 5-Step Approach" (W5SA) (Blumenstein, Eli and Tenenbaum, 1997) and the Learning-Modification-Application (LMA) Approach were developed (Blumenstein and Orbach, 2012; 2014).

a. The Wingate Five-Step Approach

The W5SA is a stress management and self-regulation technique incorporating BFB training. Its main aim is the development and the transfer of stress management and self-regulation skills from the laboratory to the training and competition setting. The W5SA is composed of stress management and self-regulation test and five steps, in which the first three steps are provided in the laboratory and the last two steps are provided in training/competition settings:

Step 1. Introduction: This step focuses on learning basic self-regulation strategies/ techniques, such as relaxation, imagery, concentration, self-talk, and BFB training. Practice takes place in the laboratory; the main goal is to achieve the ability to master relaxation-excitation waves. For example, the athlete is asked to achieve relaxation with one of the BFB modalities for about 2 or 3 minutes, followed by deep relaxation for 5 to 10 minutes, and then excitation for about 2 to 3 minutes.

Step 2. Identification: This step concentrates on identifying and strengthening the most efficient BFB response/modality, according to the sport discipline. Practice takes place in the laboratory, where the athlete is required to master the relaxation-excitation waves quickly, accurately, and reliably. In this step, relaxation/excitation speed and quality are highly important.

Step 3. Simulation: This step provides BFB training with simulated competitive stress using audio/visual material. Practice takes place in the laboratory, where the athlete practices shifting from one mental state to another by observing films from competitions and listening to competitive noises specific to his or her sport discipline.

Step 4. Transformation: This step focuses on transferring mental preparations from laboratory to the field using a portable BFB device. Practice takes place in an actual training setting, and in different locations

such as before/after warm-up, games, races, and matches, as well as in the hotel, locker room, and bus.

Step 5. Realization: This last step focuses on achieving optimal regulation in a competition setting. The athlete applies stress management and self-regulation skills in pre-competitive activities and pre-performance routines.

b. Learning-Modification-Application (LMA)

The LMA approach is a multifaceted psychological programme that integrates biofeedback training with other psychological strategies as one intervention package. The innovation of this programme is its integration with the athlete's training process, and it is based on the periodization principle. The LMA approach is composed of three dimensions: learning, modification and application. Throughout the training programme psychological skills are taught and practiced so that they will become more specific to sport and can be applied quickly, reliably and accurately. This process is accompanied by BFB support, which makes it fast and reliable. The athlete monitors his/her response in each stage and therefore is better able to understand his/her progress in achieving concrete goals on the way to performance enhancement. The skills are applied initially in the laboratory and then subsequently in pre-performance and pre-competitive routines.

In the initial stages of the LMA approach, the athlete practices psychological strategies/techniques separately, while the final main goal is to put together the strategies into a mental training package. Moreover, the programme is performed under various stress situations, which allows for the transfer of psychological skills to real competitive events. The LMA approach includes a "stress distraction scale", which was developed based on applied work with a variety of athletes and sport disciplines. The main goal of the scale is to teach the athlete how to apply these psychological skills in real life. This scale is used for the better and faster transfer of learned responses from laboratory to the sports ground. The LMA approach has been successfully applied to athletes in a variety of skills levels.

Conclusion

Biofeedback technology which is gaining recognition is an added advantage to the field of sport psychophysiology. This innovation is helping to build a more complete tool to improve athlete's performance and psychological wellbeing rather than replacing the traditional

psychological skills training. With the implementation of advanced technology, it is possible to monitor common physiological parameters of stress and self-regulation in applied psycho-physiology settings. Biofeedback makes athletes to be aware of threatening and stressful situation that could impede their athletic performance and endanger their health. Biofeedback provides an opportunity for athletes to improve athletic performance, reduce anxiety, manage stress, enhance self-regulation, increase focus and attention. Also, it helps in the recovery process of serious injuries. The evidence from various studies suggests the use of biofeedback as a therapeutic modality for athletes on and off the field. Finally, the author challenges sport scientists, sport psychologists and coaches to employ biofeedback technology as a means to manage competitive stress and improve athlete's self-regulation for great performance and optimal health.

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