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Effects of Biofeedback Training on Basketball Players' Physical and Mental Skill Measures

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Abstract

The study's goal was to determine how biofeedback training affected the physical and mental skill measures of female basketball players. Thirty female basketball players were chosen as the study's subjects. They received a six-week biofeedback training course. There was a pre- and post-test, and the acquired f value of 2.962 was higher than the necessary table value of 2.06 in both instances. Therefore, the research was significant at a 0.05 level of confidence, and the researcher's hypothesis was accepted. Sport psychology is being increasingly recognised as a crucial member of the sports medical team in a multidisciplinary setting. According to research, biofeedback training can significantly improve physical and mental skill measurements in women's basketball players. Biofeedback is a technique that gives people immediate feedback on their bodily processes, allowing them to become more conscious of and in control of their physiological and psychological states.

Key words include biofeedback, mental skill assessments, and physical performance.

Introduction

In order to monitor a variety of different functions controlled by the autonomic nervous system, equipment of various types is utilised in the procedure known as biofeedback. Heart rate, blood pressure, breathing, and other measurable aspects of human functioning will frequently be included in biofeedback data.

Real-time feedback is used in biofeedback training, a non-invasive method for improving physical and mental performance metrics. This study of the literature examines how biofeedback training affects the physical and mental performance of female basketball players. This review intends to offer insights into the efficacy of biofeedback training as a method for enhancing performance in female basketball players by synthesising the existing studies.

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The ongoing connection between a subject's mental and emotional processes and how well their body is functioning physically is referred to as biofeedback. In this sense, biofeedback is a sort of training and coaching that aims to change the subject's behaviour. Its goal is to help athletes develop the skills necessary to effectively regulate the interplay between their physical and mental performance. It contains.

Deep inhalation

Progressive muscular relaxation involves alternating between contracting and relaxing various muscle units.

Using guided imagery, you can calm your mind and increase your sense of relaxation by focusing on a particular image (such the hue and texture of an orange).

Focusing your thoughts and letting go of unfavourable feelings are two aspects of mindfulness meditation.

Utilising electrical instruments, the biofeedback technique gives real-time input on physiological processes like heart rate, muscle tension, and skin temperature. A study that was published in the International Journal of Physical and Social Sciences in 2016 examined the effects of biofeedback training on physical and mental skill measures among university women basketball players. This feedback can be used to help people learn to control these processes and enhance their physical and mental performance. The athletes' heart rate variability, muscle tension, and skin temperature were dramatically improved following biofeedback training, according to the study. The players' self-reported levels of calm, attention, and concentration also improved. The study also discovered that biofeedback training had a positive effect on the players' basketball performance. The results of this study suggest that biofeedback training can be an efficient way to enhance the physical and mental performance of women basketball players. The players who received biofeedback training made more free throws, had a higher shooting percentage, and scored more points per game than the players who did not receive biofeedback training. The practise of biofeedback can assist athletes learn to regulate their physiological functions and enhance their capacity for relaxation, attention, and focus. Basketball players may perform better as a result of these developments. Sports performance enhancement utilising biofeedback training has attracted a lot of interest since it emphasises the development of athletes' physical and mental abilities. This evaluation of the literature examines the effects of biofeedback training on measurements of the physical and mental abilities of female basketball players. The review will summarise the studies that have already been done, look at trends, and talk about how biofeedback training can improve the performance of female basketball players.

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Physical ability evaluations:

Muscle control is strengthened with biofeedback training, which also helps female basketball players perform better overall on the court and with their shooting, dribbling, and general performance.

Enhancing players' balance and stability can help them retain greater postural control when performing various basketball moves including pivoting, jumping, and turning. Biofeedback can also help with this.

Increased strength and endurance: Biofeedback training can help players optimise their strength and endurance, leading to enhanced performance during strenuous physical activities like jogging, jumping, and sprinting. It does this by delivering precise and fast data on muscle activation.

Mental test scores:

Enhanced focus and attention: Biofeedback training can help female basketball players achieve prolonged focus and attention. Players can learn to regulate and optimise their attentional states and so enhance their focus during practises and games by receiving real-time feedback on brainwave activity.

Management of stress and anxiety: Women's basketball players who struggle with these issues may find biofeedback to be a helpful tool. Players can improve their performance under pressure by learning to recognise and control their stress responses by receiving feedback on their heart rate variability, skin conductance, and muscle tension.

Confidence and self-efficacy growth: Consistent biofeedback training can aid in the confidence and self-efficacy growth of female basketball players. Players may recognise their development and accomplishments thanks to rapid feedback on their physiological and psychological states, which boosts their confidence on the court.

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Review of the literature

Electronic monitoring is used in the biofeedback approach to offer data on physiological processes like heart rate, blood pressure, muscle tension, and skin temperature. People can then be trained to manage these processes using this knowledge.

There is some evidence to support the idea that biofeedback training can enhance the physical and cognitive abilities of female basketball players. For instance, a study by Malathi S. Archana Mani et al. (2016) discovered that biofeedback training significantly improved a group of female basketball players' heart rate variability, muscle tension, and self-confidence. According to a different study by Manchanda Ruchi et al. (2012), a group of female basketball players who underwent biofeedback training showed gains in their spatial-temporal ability, reaction time, and visual attention.

According to these studies, biofeedback training could be a helpful strategy for enhancing the physical and mental skill measures of female basketball players. To validate these results and establish the most effective method of providing biofeedback training to this population, additional research is required.

The following are some possible advantages of biofeedback training for female basketball players:

- a higher heart rate variability, which can help you perform better and feel less stressed.
- muscles that are less tense, which can increase range of motion and shield against injury.
- improved decision-making and performance under pressure due to an increase in self-assurance.
- increased visual attention, reaction time, and spatial-temporal abilities, all of which can help players perform better on the court.

There are a few things to consider if you're a female basketball player interested in trying biofeedback training. Finding a certified biofeedback practitioner who can work with you to create a programme that is suited to your particular needs is crucial first. Second, exercise consistently and with patience. To see results, patience and work are required. Last but not least, keep in mind that biofeedback training is not a panacea. Although it is a useful tool for enhancing both your physical and mental performance, it is not the only aspect that will affect how well you perform on the court.

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Electronic databases including PubMed, Scopus, and Google Scholar were used to conduct a thorough literature search. Articles published between 2010 and 2016 were taken into consideration, and the search terms used included "biofeedback training," "women basketball players," "physical skills," and "mental skills." This review covered both experimental and observational investigations.

Physical Skills: Numerous studies have shown that biofeedback training improves the physical skills of female basketball players. Athletes' performance has been enhanced by training regimens that make use of biofeedback equipment like heart rate monitors, accelerometers, and electromyography sensors in areas like balance, agility, coordination, and jumping ability. These devices' real-time visual and aural feedback helps athletes perform better during practise and competition by improving body control and movement precision.

Mental Acuity: It has been discovered that biofeedback training helps female basketball players improve their mental acuity. Numerous research indicate that biofeedback can successfully lower anxiety, sharpen attention, and enhance emotional control. Athletes can learn to control their physiological reaction to stress by using techniques like heart rate variability (HRV) biofeedback, which improves decision-making abilities and performance under pressure.

Studies have looked into the combined effects of teaching physical and mental skills to female basketball players while employing biofeedback. Integrating the two modalities has demonstrated promising improvements in overall performance. Athletes have greater attention, concentration, and self-confidence by synchronising their physical and mental states, which improves game strategy and collaboration.

Hypothesis

The study's central hypothesis was that biofeedback training would enhance basketball players' physical and mental skill performance.

Selected Reviews

The Beyond the Barriers Peak Performance Programmes offer you remarkably easy-to-use yet highly efficient techniques that are the result of 30 years of psychophysiological, neurocardiological, and biophysical research and hundreds of studies in the areas of neurology, cardiology, and psychology. Our state-of-the-art training provides effective ways for improving performance by mastering how to control the body's reaction to stress and aggressive anxiety. Athletes learn how to regulate their emotions and maintain autonomic nervous system balance for top performance whenever needed.

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After analysing more than 60 studies on biofeedback, The Institute of Psychiatry at King's College London concluded that over 80% of studies showed some degree of clinical symptom reduction as a result of biofeedback exposure. They called biofeedback therapy a "non-invasive, effective psycho-physiological intervention for psychiatric disorders." Their study reveals that biofeedback treatments have been effective in treating a variety of common diseases, including anxiety, autism, depression, eating disorders, and schizophrenia. However, biofeedback therapies are becoming more popular in the management of chronic pain and injury recovery as well as the therapy of mental problems. Due to the fact that therapists today provide a variety of biofeedback methods, specialists advise patients to try many bio-regulating techniques throughout their sessions. It has been proven that this is the most efficient way to dramatically lessen symptoms.

Methodology

In terms of acquiring data, biofeedback makes use of a variety of techniques. The most popular of these gadgets is a heart monitor, which records information on heart rate and physical activity. Heart monitors are small, portable gadgets that barely affect an athlete's performance at all. The measurement of heart rate, blood pressure, oxygen uptake (VO2max, an expression of how much oxygen can be processed by the body at different levels of exertion), and perspiration rate (an indicator of how effectively the thermoregulatory system functions under variable stresses) are all examples of sophisticated biofeedback technologies. Electromyography (EMG), which measures the amount of tension and electrical activity in the muscles at different moments, when subjected to varying pressures, may be used in addition to these parameters to monitor brain wave activity. The information gleaned from these biofeedback measurements can easily be contrasted to the findings of other physical tests of autonomic function, including the evaluation of basketball skills. Thirty female basketball players were chosen for the study, and they were split into two groups: the experimental group and the control group. The pre- and post-tests were used to gauge the study's importance.

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Computation Analysis of Variance (Articles) of Pre test and Post test Means of Skill Performance and Mental Skill Measurement

		Control Group	Skill Performance	Mental skill Measure	Sources of variance	Sum of squares	Df	Mean square	F ratio
Post – Pre	Mean	5.13	6.50	6.13	Between	8.117	2	2.706	2.962
	S.D	.99	.76	.99					
	No	5	9	8	Within	23.750	27	.913	
Total						31.867	29		

Table value = 2.06 , df = (0.05) (27)

Findings and Discussion

- ✓ Shooting test: A three-minute shooting test was used. The participant was asked to execute as many shots as possible from any position on a marked perimeter of 366 cm radius from the hoop for 90 seconds. The participant was responsible for shooting and retrieving the ball himself.
- ✓ Mental Skills Questionnaire: Used to measure the mental imagery, self Confidence and Concentration
- ✓ For examining the improvement in the dependent variables on day one, day ten and one month follow-up along with inter-group comparison.
- ✓ The obtained f value of 2.962 was greater than the required table value of2.06. So the study was significant at 0.05 level of confidence and the Hypothesis of the researcher was accepted.

Recommendation

- The role of sport psychology in a multidisciplinary context is increasingly recognized as an important component of the sports medicine team. Just as clinical athlete support is critical in dealing with injuries, the sport science support team also plays an integral role in guiding the athlete toward preparation and/or re-entry to the athletic playing field.
- Multidisciplinary sports medicine centres that cater to a variety of athletes' needs will play an increasing role in guiding athletes toward injury prevention, sport-specific training and performance enhancement.

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- The future appears promising with the development of multifaceted sport medicine facilities that-in addition to clinical support-will incorporate psychological skills training and strategies for performance enhancement, which may include the utilization of biofeedback, reaction-time training, vision training, sport-specific decision training, virtual reality simulators and sport performance analytics.

Conclusion:

In summary, biofeedback training has the potential to be a powerful tool for improving both physical and mental skill assessments in female basketball players. It is possible to increase overall performance, resulting in better results during training and competition, by incorporating biofeedback devices and training procedures into regular practise sessions. It is advised to conduct more research to better understand the long-term impacts and ideal duration of biofeedback training programmes for female basketball players.

The examined literature reveals the potential value of biofeedback training for improving physical and cognitive performance among female basketball players. According to the studies, biofeedback interventions can enhance a variety of skills, including muscle activation, balance, jumping ability, focus, attentiveness, and anxiety control. To determine the long-term effect of biofeedback training on enhancing performance in women's basketball, more thorough research are needed.

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