Article

Bio-Motor Training Meets Meditation: A New Sports Paradigm

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Bio-Motor Training Meets Meditation: A New Sports Paradigm

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Abstract

The evolving landscape of modern sports demands a scientific and systematic approach to athlete development, emphasizing bio-motor abilities, physiological systems, and psychological well-being. This document explores the critical components of sports training, including general and sport-specific physical fitness, bio-motor abilities (strength, speed, endurance, flexibility, agility, and coordination), and the role of cardiovascular and respiratory systems in optimizing athletic performance. It highlights the significance of periodized training programs tailored to athletes' specific needs, incorporating scientific principles and modern methodologies. Additionally, the integration of yoga and meditation, particularly through practices like Ashtanga yoga and breath-focused meditation, is examined for their potential to enhance physical, physiological, and psychological variables. Despite extensive research on individual motor abilities and training methods, a gap exists in studies comprehensively analyzing the combined effects of bio-motor training and meditation. This study proposes to address this gap by investigating how integrated training approaches impact athletic performance, offering insights for coaches and athletes aiming to achieve peak performance.

Keywords: bio-motor abilities; sports training; athletic performance; yoga and meditation; cardiovascular system; respiratory system; physical fitness

Introduction to Modern Sports Development

The world of games and sports is ever-expanding and continuous nowadays. In the 21st century, the world is progressing with tremendous speed in all disciplines, including sports. Just as all sectors are growing and undergoing drastic modifications according to the present scenario, focusing on requirements and demands based on research, the field of sports also requires modifications. Researchers utilize their potential .and come up with new ideas to elevate the level of games and sports in different areas such as training, equipment, surfaces, diet and nutrition, and exercises among others. In sports, all these areas are crucial for enhancing performance while competing in sports competitions against opponents. Athlete performance is entirely dependent on the latest technology, scientific knowledge, and modern training, which emerge from research in various areas within the field of physical education and sports.

Fundamentals of Sports Training

The word "Training," in its broad sense, refers to a systematic, scientific, and organized process that aims to enhance the performance of athletes. In the field of sports, training involves preparing a sports person to attain their highest level of performance during the main competition. For that, one needs to be very specific while training. Before the execution of any training, it is well planned, completely based on the principles of sports training, which aim to attain peak performance during the main competition. In the process of planning the training program, primary focus remains on enhancing specific factors rather than addressing all aspects. Simultaneously, careful attention is dedicated to understanding the athlete's requirements. The training program is prepared based on

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periodization and different training cycles, considering all pre-decided factors that will be improved through the training. (Uppal, 2017) The training process involves preparing athletes, where coaches play a vital role in this preparation. Coaches plan the training schedule based on set outcomes at the ends of the training program, focusing on the athlete's results. They indulge in training by collecting different information from literary sources, incorporating their own experiences in the field. Through this, coaches identify factors related to training and fitness, keeping attention to the parameters which are necessary for optimal performance of the athlete. To produce a top-quality athletes and enhanced performance, .a coach must consider multiple components and various factors. Performance is not solely based on one factor;. Rather, it is a combination. of several factors, including general physical fitness, sport specific physical fitness, skill, technique, tactic, physiological, hematological and psychological components, as well as health maintenance and injury prevention. To ensure success, trainers utilize necessary resources by using different means and method of training, by keeping in consideration the athlete's age, sex, level of play, maturity, and experience. Athletes aiming to improve their performance, require good general physical fitness, along with bio-motor abilities such as endurance, speed, strength, flexibility, and coordination which is the foundation ofany sporting event. These abilities create a strong foundation in any athlete for load tolerance in various activities. Just as no buildings can be built on a weak foundation, similarly bio-motor abilities serves as pillars for athlete to achieve better performance. In different sports specific abilities are emphasized, including strength, endurance, speed, and flexibility where some sports require a combination of abilities, such as strength-endurance, speed-endurance, and speed-strength. (Bompa and Haff,1983)

Scientific Foundations of Physical Education and Sports

With the introduction of the basic principles of science, physical education and sports has become a subject of scientific research. There are so many factors which influence the physical and mental well-being of athletes in competitive sports, encompassing (A) Diet & Nutrition,(B) Psychological factor like motivation, determination, aggression, anxiety, mental fatigue, mental toughness, frustration tolerance etc.(C) Physical factors like speed, endurance, flexibility, agility, and strength etc.(D) Physiological factor like blood BP, HR, vital capacity tidal volume, residual volume, positive and negative breath holding capacity etc, Haematological aspects like complete blood count, blood lactate, blood glucose , uric acid etc, (E) Training etc.A sport includes all forms of competitive physical activity which aims to maintain or improve the performance of an athlete by using different means and methods of training. (Uppal, 2017)

In sports competitions, athletes perform and get exhausted physically and mentally to achieve success. The winner is the one who has undergone comprehensive training. Effective training programs encompass various types, means and methods to develop the performance. To excel in any sport, athletes must possess overall fitness, which comprises three key components: first- general physical fitness (a. muscular strength b. muscular endurance c. cardiovascular endurance d. flexibility), second- health-related physical fitness (a. muscular strength b. muscular endurance c. cardiovascular endurance d. flexibility e. freedom from obesity) and third- motor fitness components: a. muscular strength b. muscular endurance c. cardiovascular endurance d. flexibility e. freedom from obesity f. power g. speed h. agility i. balance j. reaction time. These components play a vital role, during competitions and throughout the practice session. However, certain sub-components—such as strength, endurance, speed, and flexibility—dominate in each of these fitness elements. (Kansal, 2018)

Components of Athletic Fitness

Athletic performance is completely dependent on the fitness level of an athlete where some of the factors of bio-motor abilities are dominated by combinations of speed, strength, endurance, flexibility, agility and balance. These abilities help athletes to get success in their field, to full-fill their dreams which they have long desired and in maintaining their performance to the best possible level.

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Nowadays, most sports activities have a predominant bio-motor ability which plays a vital role in performing several skills related to that particular sporting activity to win any game or to perform well. For example, the dominant Bio-Motor ability necessary for being successful in long-distance running is generally considered to be endurance. Similarly every sporting activity has a dominant bio-motor ability however; study suggests that sporting activities affected by different bio-motor abilities. This can be clearly seen by the studies that the muscular strength appears to influence running speed and endurance. For example, strength of leg and power appear to be significantly related to sprint speed. Recent evidences suggest that, stronger and more powerful athletes perform better in the sports activity. So with this we can postulate that bio-motor abilities i.e. Strength, Speed and Endurance are playing a vital role in performing any sporting event. Therefore, to maximize athletic performance these Bio-Motor abilities should always be trained in concert with the other motor components. (Bompa,1983).

Importance of Bio-Motor Abilities in Sports

Motor ability is one of the most important aspect for performing physical activities, and those who have these motor abilities are considered to be a fit athlete until any injury and illness takes place. There are several components of the bio-motor abilities that are following; strength (Grip strength, Leg Strength, Shoulder Strength), speed (reaction speed, speed of movement, acceleration, sprinting speed endurance), endurance, power, agility and co-ordination (Reaction ability, combinatory ability, orientation ability balance ability, rhythm. ability and adaptation ability) Flexibility etc. Motor abilities reflect the present ability to perform any motor skills during sporting activities and without this motor ability performing any activity will be difficult for the individual. Almost all physical activities incorporate one or more elements of duration, quickness, force, and the range of motion and all different elements play a vital role while performing any skill or any activity in the sport. During exercise, overcoming the resistance is considered as strength and different forms of strength will help the athlete in different situations like overcoming the resistance for prolonged time is considered as strength endurance. Similarly, in the case of explosive strength, overcoming the resistance in the shortest possible time and overcoming the maximum weight or resistance comes under maximum strength. When high frequency and quickness is maximized then it is considered as speed. Performing the movement with speed is considered as speed of movement and in case of duration, number distance and then endurance is considered. On the other hand, if the range of motion is maximized, a flexibility movement is being performed. At last, when an exercise having a high degree of complexity and coordination of two or more than two parts is required, it is known as co-ordination. Some of athletes are more capable than others while performing skills in the competitions or in practice session just because of their motor abilities are termed as “talented” and such athletes who are able to develop their bio-motor abilities exhibit a better performance than the ones who are unable to develop the same. Therefore they are called dominant motor or bio-motor abilities. The term "motor" refers to movement, whereas the prefix "bio" is added to illustrate the biological importance of these three abilities (Bompa, 1999).

During training, athletes perform the physical activities with the help of body limbs which is mainly compact of bones and muscles. While performing any activity contraction of muscles required energy. Food acts as an indirect source of energy and it is supplied to the required muscles in the form of adenosine-tri-phosphate (ATP). When any physical activity is performed by an athlete, the reserve energy is utilised first and the other energy systems kick in, when the reserve energy gets exhausted, according to the nature as well as the timing of the activity where the athlete is burning their calories in the form of (kcal),getting the energy in form of ATP which is resynthesized with ADP and CP is the process of the energy system. Different types of energy systems are active during different stages of training. i.e. ATP PCR system, Glycolytic and Oxidative system and involving their internal organs through different systems to provide favourable situation for the physical activity. (Tiwari,2009)

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Role of Cardiovascular and Respiratory Systems

In normal daily life, the body's various mechanisms and systems operate efficiently to ensure survival. However, engaging in physical activity requires a significant increase in energy, prompting several essential bodily systems to play crucial roles. One such system is the cardiovascular system, which is responsible for supplying oxygenated blood to different parts of the body during prolonged physical activities, the cells and tissues engaged in the effort demand a substantial supply of nutrients to perform optimally. The cardiovascular system facilitates this process by transporting blood, which contains various nutrients, through a network of blood vessels, including capillaries. Moreover, the cardiovascular system aids in the removal of metabolic waste products, such as carbon dioxide (CO2), from the body, thereby contributing to the maintenance of homeostasis. In summary, the cardiovascular system serves multiple functions, including meeting the increased demand for oxygen and nutrients during physical activity, delivering fresh blood to cells and tissues, and expelling metabolic waste products to uphold the body's internal balance.(Tiwari, 2009).

While nutrient intake is crucial for the activity, the survival and function of cells and tissues depend significantly on the presence of oxygen. Cells and tissues require oxygen to sustain life and perform their tasks, as most chemical reactions in the body occur in its presence. The respiratory system plays a vital role in meeting the body's demand for oxygen during prolonged physical activities. The respiratory system consists of the nasal cavity, sinuses, larynx, trachea, bronchial tree, and lungs. Through the process of respiration, it supplies oxygen to the body and removes carbon dioxide along with other metabolic waste products. This dual function—providing oxygen and eliminating waste—is especially critical during physical activities. The respiratory system becomes indispensable during physical exertion, ensuring an adequate supply of oxygen to cells and tissues. Simultaneously, it efficiently eliminates waste products, which is crucial for activities involving endurance and repetitive exercises over an extended period. Insufficient oxygen supply can lead to a decline in performance and endurance. Proper oxygen supply enhances muscle response and efficiency during physical activity, contributing to improved athletic performance. The cardiovascular system complements this by delivering essential nutrients through the blood, while the respiratory system ensures the supply of oxygen to cells and tissues, promoting optimal functioning. In everyday situations, these systems perform their functions seamlessly. However, during physical activities, they work more efficiently to meet the increased demand. In the current context, practices like yoga, including asanas, pranayama, and meditation, play a pivotal role in strengthening these systems. By engaging in physical activity, individuals not only fulfill the body's demand for oxygen but also contribute to the overall enhancement and resilience of these physiological systems. (Tiwari, 2019)

Yoga and Its Role in Enhancing Physiological Systems

The essence of yoga in life can be likened to a skillful driver guiding a vehicle along the right path toward its destination. In the yoga sutras of patanjali, a collection of teachings on yogic philosophy dating back around two thousand years, there are one hundred and ninety-five aphorisms that provide a philosophical guide for navigating the challenges of human existence. Patanjali introduces an eight-fold path known as ashtanga, or "eight limbs," offering fundamental principles for leading a purposeful and meaningful life. These eight limbs, include yama, niyama, asana, pranayama, pratyahara, dharana, dhyana, and samadhi, serve as a comprehensive guide for personal development. The initial four steps focus on .refining the human personality, achieving mastery over the body, and cultivating awareness. The subsequent four steps are dedicated to the human senses, in training the mind to attain a heightened state of consciousness. (Wali, 2020)"Astanga yoga" is the Sanskrit term for "The eight limbs of yoga," as presented by Maharshi Patanjali. This ancient philosophy, with its one hundred and ninety-five statements, acts as a manual for navigating life's complexities. By adopting such teachings the individuals become capable to live a healthy, meaningful, and purposeful life, which promotes balance and self-awareness in individual.

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The essence of yoga, much like a skilled driver navigating a vehicle, lies in exercising control over the body, breath, and mind for an effective and harmonious existence. (Dogra, 2021)

Meditation and Its Impact on Well-Being

Meditation is the act of concentrating your thoughts, reflecting on yourself. People think that deep meditation can impact physical, physiological, and mental well-being, as well as the course of illness. It is a state of awareness that you can truly understand through direct, intuitive experience. Unlike everyday experiences, which are often constrained by time, space, and cause-and-effect, meditation goes beyond these limits. In meditation, thoughts about the past and future fade away, confining only the awareness of 'I am' in the endless present. Regular meditation aids in gradually increasing self-awareness and freeing oneself not just from external limitations but also from inner struggles. The main aim of life, according to the ancient yogic teachings, salvation, which comes from understanding the ultimate truth about oneself and their place in the universe—a realization achieved through meditation. "Meditation is like a secret door to freedom—a mysterious ladder from earth to heaven, from darkness to light, and from mortality to immortality." Meditation is a universal practice that helps people in finding inner calmness, dealing with stress, and, for the ones who are inclined towards spirituality, in establishing a connection with God or the universe. It can be done alone or in groups, is easy to learn, doesn't require changing beliefs, and is compatible with most religions. Focusing on the breath is a common meditation method in various spiritual traditions like Hinduism, Buddhism, Taoism, Judaism, and Christianity. In Buddhism, it's called Anapanasati, concentrating on breathing in and out, a technique taught by the Buddha. Meditation involves redirecting attention to pure consciousness—the core of our being. Often, we lose touch with our true selves due to external distractions, leading to habits or dependencies on external awareness. To counter this, turning attention inward is done by focusing on something with an opposite effect, and the breath serves as that object, connecting the body, mind, and spirit. Calm breathing corresponds to a relaxed body, while agitated breathing reflects a stressed or tense body. This connection highlights the importance of breath in meditation. (Thiyagachanthan and Chandrasekaran, 2010)

Researchers have conducted several studies on motor abilities in various domains. Notable examples include “Training on The Effect of Circuit Motor ability on Players” by Pathan. T. I, .“Effect of Continuous Training and Fartlek Training on Selected Physical, Physiological and skill related variables of football players” by Madankumar. T, “Isolated and Cumulative Training Effects on Physical fitness, Physiological and Haematological Variables of Tribal students” by Kumar. S. P. and “Effects of Circuit Training and Package training on selected Physical, Physiological and Haematological Variables among School Boys” by Krishnamoorthy. M .Some of the studies have also been done in yoga and meditation by others researchers in different areas like; .“Effect of cyclic meditation and yoga nidra on selected Physiological and Psychological variables in college level Athletes” by Lona. B. k, .“Effect of Physical and Combined Physical cum Yogic Practices on selected physical, Physiological, Psychological variables and performance factor of kabaddi players” by Kumar. S. and “Effects of isolated and combined effects of Yogic Practices and physical activity on health related Fitness among college students” by Kumaresa. M, Pandian. M etc. From these existing studies, a noticeable gap has been identified. No study has comprehensively examined all motor abilities together and also its combination with meditation on physical, physiological, and hematological variables. The scholar aims to reveal the research question arising. from the identified gap and formulate a research question. The study endeavors to identify changes in variables, providing valuable knowledge to athletes those who are looking to improve their performance through these specialized training approaches.

Several studies have examined various aspects of athletic performance and bio-motor abilities across different sports and populations. Kaur and Singh (2019) demonstrated that massage and yogic exercises significantly improve post-endurance workout recovery by enhancing the blood lactate clearance rate. Kumar and Singh (2024) compared athletes from Northeast and South India, finding regional differences in physical and physiological components such as bio-motor abilities, which are

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crucial for sport-specific performance. Similarly, Singh (2015) analyzed middle- and long-distance runners, highlighting differences in endurance and cardiovascular fitness. Coordination, another key bio-motor ability, was studied by Singh and Kaur (2014), who found that time of day significantly influences the coordinative abilities of female football players. Das and Singh (2024) further explored how chronotype affects performance depending on the time of day, offering implications for training optimization. Jabeen and Shah (2023) emphasized the role of motor abilities in movement control, underlining their importance in athletic performance. The impact of hydration was examined by Singh et al. (2023), who noted that fluid intake alters body water compartments, muscle mass, and fat percentage in track athletes. DSP Singh (2021) reported that tapering exercises improve hemoglobin levels, thus enhancing cardiovascular efficiency. Kaur (2021) also focused on middle- and long-distance runners, examining how respiratory parameters affect endurance. The psychological influence of music on performance was highlighted by Singh (2020), who found that slow and soft instrumental music enhances running output. Singh (2019) assessed motor fitness variables like agility and coordination in table tennis players. Kalkal and Singh (2015) compared different stretching techniques and their effects on hamstring flexibility. Singh (2015) revealed that menstrual cycle phases impact aerobic capacity in female athletes. Singh and Kumar (2013) found physiological variations among track and field athletes based on their events. Finally, SS and Kumar (2013) discovered that the duration of active warm-up significantly influences sprint performance, linking directly to speed and power as bio-motor abilities.

Conclusions

The document underscores the multifaceted nature of athletic performance, emphasizing that success in sports relies on a synergistic combination of bio-motor abilities, including strength, speed, endurance, flexibility, agility, and coordination. These abilities form the foundation for athletes to tolerate training loads and excel in competitive settings. The integration of scientific training principles, such as periodization and sport-specific fitness, is crucial for optimizing performance. Furthermore, the cardiovascular and respiratory systems play pivotal roles in meeting the energy demands of physical activity, while practices like yoga and meditation enhance physiological and psychological resilience. Existing research highlights the benefits of individual training components, but a comprehensive study combining bio-motor abilities with meditation is lacking. This gap presents an opportunity for future research to explore how integrated training approaches can elevate athletic performance, providing valuable insights for developing holistic training programs tailored to athletes' needs.

References

Anand, M., Vaithianathan, K., Saran, K. S., & Prasanna, T. A. (2019). Effect of Game-Specific Circuit Training and Plyometrics on Selected Physiological and Haematological Variables of Handball Players. *Scopus Ijphrd Citation Score*, 10(7), 365-368

Anitha, J., Kumaravelu, P., Lakshmanan, C., & Govindasamy, K. (2018). Effect of plyometric training and circuit training on selected physical and physiological variables among male Volleyball players. *International Journal of Yoga, Physiotherapy and Physical Education*, 3(4),26-32.

Arunprasanna, T., Sundar, M., &Jaskar, K. M. M. (2019). Isolated and Combined Effect of Continuous Run Alternate Pace Run on Selected Motor Fitness Physiological Haematological Variables among Male Athletes. *Indian Journal of Public Health Research & Development*, 10(11).

Baechle T. R. (1994) Essential of Strength Training and Conditioning. Champaign Illinois: *Human Kinetics Publishers.*

Bhalekar. S, (2019) Pranauama mudra and meditation, *Kaivalyadhama.*

Bisla. N & Ghai. G. D. (2019), *Retrieved from unpublished thesis. shodhganga.inflibnet.ac.in*:http://hdl.handle.net/10603/289636, p-18.

 doi:10.20944/preprints202507.0871.v1

Bompa. T. O and Haff. G. G (2009). Periodization Theory and Methodology of Training *USA: Human Kinetics* (Vol. 5).

Bompa. T. O. Periodization: theory and methodology of training */5th ed*.

Broome, J. R. N., Orme-Johnson, D. W., & Schmidt-Wilk, J. (2005). Worksite stress reduction through the Transcendental Meditation program. *Journal of Social Behavior and Personality,* 17(1), 235.

Bulent Turna, Mahmut Alp. (2020). The Effects of Functional Training on Some Biomotor Abilities and Physiological Characteristics in Elite Soccer Players. *Journal of Education and Learning*, v9 n1p164-170 .

Creswell, J. W. (2008). *Johns Hopkins Bloomberg School of Public Health Retrieved From wiki/Educational Research*09.03 2019.

Delmonte, M. M. (1984). Physiological responses during meditation and rest. Biofeedback and Self-regulation, 9(2), 181-200.

Dogra, K. (2021). The yoga Tradition: its Phylosophy and Practice. *Vidya Books.Delhi* 110002:

Elamaran M et.al. (2014). Efficacy of Intensive and Extensive Interval Training on Selected Biomotor Abilities among Schoolboys. *International Journal of Physical Education, Fitness and Sports,* Vol 3.

Gharaat. M. A, Ramezani. A (2018). Effect of two high intensity interval trainings on performance and rheological characteristics of elite male rowers. *Journal of practical studies of biosciences in sports* Vol-6, 135-144.

Hamlin, M. J., &Hellemans, J. (2007). Effect of intermittent normobaric hypoxic exposure at rest on haematological, physiological, and performance parameters in multi-sport athletes. *Journal of sports sciences,* 25(4), 431-441.

Harinath, K., Malhotra A. S., Pal, K., Prasad, R., Kumar, R., Kain, T. C., & Sawhney, R. C. (2004). Effects of Hatha yoga and Omkar meditation on cardiorespiratory performance, psychologic profile, and melatonin secretion. *The Journal of Alternative & Complementary Medicine,* 10(2), 261-268.

KALKAL, A. K., & SINGH, S. (2015). EFFECT OF SLOW STRETCH & HOLD, BALLISTIC, AND PROPIOCEPTIVE NEUROMUSCULAR FACILITATION METHODON HAMSTRING FLEXIBILITY. *International Journal of Behavioral Social and Movement Sciences*, *4*(1), 16-25.

Kamakhya. K and Ishwar V. B. (2008). Super Science of yoga. *New Delhi: Standard Publisher.*

Kamlesh M. L and Sangral. M.S (1980). Principles and history of physical education, *Prakash brothers educational publishers, Ludhiana.*

Kansal. D.K, A Practicle Approach to test measurement and evaluation. *K. K publications New Delhi-* 110002

Kantyka, J, Herman, D. Roczniok, R., & Kuba, L. (2015). Effects of aqua aerobics on body composition, body mass, lipid profile, and blood count in middle-aged sedentary women. *Human Movement,* 16(1), 9-14.

Kaur, B., Singh, S. P., & Kaur, R. (2001). Structural Profile and Fat Patterning between Two Endogamous Groups of Punjabi Females. *The Anthropologist*, *3*(4), 247-250.

Kaur, M. G., & Singh, S. P. (2019). Effect of selected massage and yogic exercise on the recovery pattern of blood lactate after an endurance workout. *International Journal of Physiology, Nutrition and Physical Education*, *4*(1), 2047-2049.

Kjaer, M, & Galbo. H (1988). Effect of physical training on the capacity to secrete epinephrine. *Journal of Applied Physiology*, 64(1), 11-16.

Kumar, P., Rathore, A., Narwaria, D., & Singh, S. (2012). A Comparative Study of Job Satisfaction between Teachers at Different Set-ups. *International Journal of Behavioral Social and Movement Sciences*, *1*(4), 110-115.

Kumar, R., & Singh, S. (2024). A Comparative Investigation of Physical and Physiological Components of Team Game Athletes from Northeast and South India. *Indian Journal of YOGA Exercise & Sport Science and Physical Education*, 55-60.

Kumar. K and Basavaraddi.I (2008). Super Science of yoga. *Standard publishers (INDIA) New Delhi.*

Kumaravelu.P, Govindasamy.K, (2018). Efficacy of SAQ drills on selected bio-motor abilities. *International Journal of Yogic, Human Movement and Sports Sciences,* 3(1): 160-161.

Madhankumar, T, &Sakthignanavel, D. (2015). Effectiveness of Continuous Running and Fartlek Training on Selected Physiological Variables of Football Players. *Clear International Journal of Research in Management, Sciences & Technology*, 5(10).

 doi:10.20944/preprints202507.0871.v1

Mengistie, A. B., Reddy, R. C., & Babu, M. S. (2013). The effects of workout-based combination of aerobic and resistance exercise training in obese adults of northwest ethiopia. *International Journal of Sports Sciences & Fitness*, 3(1).

Morseth. B, Graff-Iversen. S, Jacobsen.B. K, Jorgensen. L, Nyrnes. A, Thelle. D. S, Vestergaard. P, Lochen. M. L (1 August 2016,). Physical activity, resting heart rate, and atrial fibrillation: *The Tromso Study. European Heart Journal*, 37(29), 2307–2313.

Nirmala. M and Angamuthu K. (2014). Sodhganga. *Retrieved from unpublished thesis.https://shodhganga.inflibnet.ac.in:8443/jspui/handle*/10603/62729:

Pardeep, K., Dharmendra, N., Somanpreet, S., & Arun, S. (2012). Comparison Of Achievement Motivation Among Sports Persons Of Different Socio-economic Status.

Peng, C. K., Henry, I. C., Mietus, J. E., Hausdorff, J. M., Khalsa, G., Benson, H., & Goldberger, A. L. (2004). Heart rate dynamics during three forms of meditation. *International journal of cardiology*, 95(1), 19-27.

Porcari,J.P, Probst.L, Forrester.K et.al. (2016). Effect of Wearing the Elevation Training Mask on Aerobic Capacity, Lung Function, and Hematological Variables. *Journal of sports science and medicine*, 379-386.

Rahul, S. K., Yadav, R. K., Rajpurohit, G. S., Singh, P., Singh, S., Verma, V., ... & Mittal, A. (2023). Legal Labyrinths: Examining the Complexity of Drug Abuse Cases Pendency in Punjab, India.

Ribeiro, A. S., Tomeleri, C. M., Souza, M. F., Pina, F. L. C., Schoenfeld, B. J., Nascimento, M. A., &Cyrino, E. S. (2015). Effect of resistance training on C-reactive protein, blood glucose and lipid profile in older women with differing levels of RT experience Age-37(6), 1-11.

Sheykhlouvand, M., Gharaat, M., Khalili, E., Agha-Alinejad, H., Rahmaninia, F., & Arazi, H. (2018). Low-volume high-intensity interval versus continuous endurance training: Effects on hematological and cardiorespiratory system adaptations in professional canoe polo athletes. *The Journal of Strength & Conditioning Research*, 32(7), 1852-1860.

Singh, C. (2018). Assessment of Physical Abilities and Competition Performance of Female Gymnasts. *Ignited Minds Journals*, V-5 P.7-15.

Singh, H. (2023). Science of sports training. agra, India: *Friends publication.*

Singh, R., & Singh, S. P. (2014). An Analysis among Physiological and Physical Fitness of Middle Distance and Long Distance Runners. *International Journal of Advanced Computer Research*, *4*(4), 979.

Singh, S. P., & Singh, R. (2015). Menstruation Cycle & Aerobic Capacity of Female Athletes an Analysis. *International Journal of Physical Education Sports Management and Yogic Sciences*, *5*(1), 20-24.

Singh, S. P., & Singh, S. Body Mass Index Among The Females Accommodated At Homes And Girls Hostel Of Sri Guru Granth Sahib World University Fatehgarh Sahib–An Analysis.

Singh, S., & Kaur, L. Effect of different time of day on the coordinative ability of inter-university level female football players. *Int. J. Phy. Edu. Spo*, *2*(1), 16-19.

Singh, S., & Kumar, P. (2013). PHYSIOLOGICAL DIFFERENCES BETWEEN ATHLETES OF SELECTED EVENTS IN TRACK AND FIELD–A COMPARATIVE STUDY. *International Journal of Behavioral Social and Movement Sciences*, *2*(1), 235-241.

Singh, S., & Kumar, R. (2025). Counterfeiting in India's Sports Industry: Navigating Trademark Challenges and Legal Strategies.

Singh, S., & Muqarram, M. Application and Procedure of Repeated Measures ANOVA in Statistics with SPSS.

Singh, S., Kumar, S., Kaur, N., Choudhary, S., Sekhawat, D. S., Singh, B., & Kaur, J. FLUID INTAKE AND FLUCTUATION IN TOTAL BODY WATER (TBW), INTRACELLULAR WATER (ICW), EXTRACELLULAR WATER (ECW), SKELETAL MUSCLE MASS (SMM) AND PERCENTAGE BODY FAT (PBF) OF TRACK AND FIELD ATHLETES.

Singh, S., Singh, S., & Dhadwal, M. K. FAT PROPORTION AMONG UNIVERSITY STUDENTS AND A FAT BURNING TRAINING PROGRAM: AN INFLUENTIAL ANALYSIS.

Singh. A, Bains. J, Gill. J.S, Brar. R.S, (2002). Essentials of Physical Education. India: *Kalyani publication.*

Talaee, M., Nazem, F., Taherabadi, S. J., & Sajadi, S. (2017). Effects of Six Weeks Combined Training Program on Hematological Parameters in Elite Basketball Players. Annals of *Applied Sport Science*, 5(1), 15-23.

Thiyagachanthan and Chandrasekaran K. (2010). Isolated and Combined Effects of Yogic Practices and Physical Exercises on Selected Physical Physiological and Anthropometric Variables among College Men Football

 doi:10.20944/preprints202507.0871.v1

Players. Tiruchirappali, Tamil Tadu, India. *Retrieved from unpublished thesis https://shodhganga.inflibnet.ac.in://hdl.handle.net*/10603/214909

Tiwari, S. (2019). Exercise Physiology. *Sports Publication,New Delhi* I.S.B.N; 81-7879-298-2.

Turna, Bulent. (2020, June 06). The Effects of 6-Week Core Training on Selected Biomotor Abilities in Soccer Players. *Journal of Education and Learning*, Vol. 9, 99-109.

Valarmathi, V. V. (2014). Effect of Aerobic Training on Percentage of Body Fat and Resting Heart Rate among College Obese Women. *International Journal of Physical Education, Fitness and Sports*, 76-79.

Vijayalakshmi, V., &Jayabal, T. (2013). Effects of combination of own body resistance exercise and plyometric with and without yogic practices on selected physical and physiological variables among adolescent boys. *International Journal of Advanced Life Sciences, 6(3),* 246-251.

Wali,S.(2020). Retrieved from *unpublished thesis Shodhganga https://shodhganga.inflibnet.ac.in: 8443 / jspui /handle*/10603/308467:

Wardyn G. G., Rennard S. I., Brusnahan S. K., Guire T. R., Carlson M. L., Smith L. M., & Sharp, J. G. (2008). Effects of exercise on hematological parameters, circulating side population cells, and cytokines. *Experimental hematology*, 36(2), 216-223.

Westcott, W. L., Winett, R. A., Anderson, E. S., & Wojcik, J. R. (2001). Effects of regular and slow speed resistance training on muscle strength. *Journal of sports medicine and physical fitness*, 41(2), 154.

Wilson. G. J., Newton. R. U., Murphy. A. J., & Humphries. B. J. (1993). The optimal training load for the development of dynamic athletic performance. *Medicine and science in sports and exercise*, 25(11), 1279-1286.

Wolkove N., Kreisman, H, Darragh. D, Cohen. C & Frank, H. (1984). Effect of transcendental meditation on breathing and respiratory control. *Journal of Applied Physiology*, 56(3), 607-612.

Yadav, R. K., & Singh, S. (2020). PHYSICAL EDUCATION AND SPORTS IN NAAC AND NEP-2020. *International journal of Multidisciplinary educational research, ISSN-2277-7881*, *9*.

Yadav, R. K., & Singh, S. SPORTS MARKETING AND GLAMOUR IN SPORTS IS DEVELOPING IN THE SHADOW OF PHYSICAL EDUCATION.

Yadav, R. K., & Singh, S. THE CORRELATION BETWEEN TIME MANAGEMENT AND STUDENT LEARNING OUTCOMES IN PHYSICAL EDUCATION.