

A Review Article on Exercise and Sports Physiology

Kanika Rawat*

Student, Lakshmibai National Institute of Physical Education, Gwalior

Abstract – Sport science encompasses a broad and complex variety of research concerns. The goal, and the review's main task, is to analyze the most important of such priorities into a cohesive plan for potential sport physiology studies. The unifying theme of this analysis is the possible benefit to elite athlete growth through future work in sport physiology. The analysis advances this concept by an in-depth evaluation of existing expertise and finding specific study fields that will improve the comprehension and implementation of sport physiology most profitable. The physiological limits of the elite competitor's workout efficiency and the tolerance of these physiological processes to further preparation are essential to this concept, likely contributing to overtraining. In fact, the potential to adapt or recover from the ever-increasing demands of training and competition is considered in sections on strength and power development, the child athlete, and performance limitations in multiple marathon activities such as hockey and football. It is noted in the analysis that sport physiology is largely based on developments in computational methods and quantitative calculation. The final portion of the analysis also discusses in depth the physiological assessment, the quality and precision of current and potential practices and the proper understanding of such results.

Keywords: Exercise, Sports, Sports Physiology

INTRODUCTION

Exercise physiology is a scientific discipline which elucidates the effects (in its many forms) of exercise on the body's physiological systems and tissues. It's the research of how response to acute and persistent exercise changes body structure and work. Sport physiology, a new medium that emanates from it, is the application of the principles of exercise physiology to preparing athletes and to improve sport efficiency. Over the last few years, sports psychology has taken on an extremely influential role over professional sports medicine. Clinical sports physiology arises as a sub-component of exercise physiology requiring the implementation of concepts, expertise and abilities in exercise physiology for recovery or treatment of disease or impairment in people. The goal and the main challenge are to put together the most relevant scientific priorities in a coherent strategy for potential sport physiology work.

BENEFITS OF SPORTS

When you are contemplating signing up for a sport for yourself or family member and need some support, then the numerous advantages below are worth bearing in mind.

Healthy sleep

Quick Company claims that fitness and activity releases in the brain hormones that will help you feel more comfortable and secure. Team sports offer an incentive to relax and take part in a fitness-enhancing game. If you play sports outside, you will take advantage of the fresh weather that is supposed to encourage a decent night's sleep.

A Brave Spirit

The heart is a muscle and it needs frequent exercise to help it remain healthy and fit. A healthy heart can pump the blood through the body efficiently. Your heart can improve performance when it's tested with exercise regularly. Better hearts will keep the body function healthier overall.

Fresh Interconnections

Sport brings together a variety of people from various cultures, identities, beliefs and ideologies. Sport will offer a new way of meeting people that you may not communicate with every day. You can then make new friends. And who knows, playing a sport could even open you up new career and business opportunities.

Better pulmonary capacity

Normal exercise allows sufficient energy to be pumped through the bloodstream by the expulsion of carbon dioxide and waste gases. This raises lung ability and boosts lung quality and performance during exercise.

Growing confidence

You will develop your faith and abilities by exercising regularly and working towards seasonal goals. It is especially evident in competitions and matches where you and your colleagues bring their talents to the test. Tiny, gradual milestones during the year will create personal trust over time, allowing you to embark on new tasks and responsibilities in your newly gained faith at work.

Cuts down on work

If you become physically involved the subconscious has an chance to unplug from the pressures and burdens of daily life. Physical activity lowers the body's tension levels, and increases endorphin production. Such endorphins will lend you more strength and enthusiasm toward whatever life has to bring.

Enhancing overall wellbeing

The Public Health Agency states that regular involvement in and being involved in sport can also encourage positive mental health. This involves enhancing your attitude, increasing your sense of well-being, reducing anxiety, battling negative emotions and avoiding anxiety.

BENEFITS OF EXERCISE

- **Help you get weight control.** Exercise plays a significant part, along with nutrition, in regulating the weight and in combating obesity. The calories you consume and drink ought to be equivalent to the fat you use to hold your weight moving. You'll need to burn more calories than you consume and drink to reduce weight.
- **Rising chance of contracting heart disease.** Exercising strengthens the heart and improves circulation. The increased blood flow raises the levels of oxygen in your body. This helps raising the chances of cardiac problems such as elevated cholesterol, heart failure and coronary artery disease. Regular exercise can also improve the blood pressure and the rates of triglycerides.
- **Assist with the control of blood sugar levels in the system.** Exercise will reduce your blood sugar level and boost your insulin balance. This can reduce your risk of developing metabolic syndrome and

diabetes. And if you have one of those illnesses already, exercise can help you manage it

- **Help them stop smoking.** Exercising can make quitting smoking easier by reducing your cravings and symptoms of withdrawal. This will even help you reduce the weight you might benefit by avoiding smoking.
- **Boost emotional health and attitude.** Your body produces hormones during exercise which that boost your morale and help you feel more comfortable. It will help you deal with tension and reduce the chances for depression.
- **Support retain capacity to analyze,** know and assess fresh as you mature. Exercise allows the body to produce proteins and other chemicals which can enhance the brain's structure and function.
- **Keep the bones and muscles healthy.** Daily activity can enable children and teenagers to grow healthy bones. This can delay the decline of bone density that comes with age later in life, too. Doing muscle-strengthening exercises will allow you to improve or retain strength and muscle mass.
- Raising the chances of other cancers including cancer of the prostate, breast, uterine and lung.
- **Increase the risk of slipping.** Evidence suggests that older adults that performing walking and muscle-strengthening exercise in addition to moderate-intensity physical exercise will help raising the chance of declining.
- **Sleep well.** Exercise will make you relax faster and keep asleep longer.
- **Boost your personal health.** Regular exercise can reduce the likelihood of men developing erectile dysfunction (ED). Exercising will further enhance the sexual performance for those who still have ED. Exercising may enhance sexual desire in women.
- **Increase chances of a longer life.** Studies show that physical activity can reduce your risk of early death from major causes of death, such as cardiac disease and some cancers.

SPORT AND EXERCISE PSYCHOLOGY

A common definition of sport psychology is that it is "a study in which psychological principles are applied in an environment for sport or exercise." While this concept may put excessive emphasis on the discipline's applicable nature, it means that empirical research into mental aspects of athletic performance is at least as old as psychology itself. For starters, in the nineteenth century it was observed that when engaging with other riders, racing cyclists appeared to perform at least 25 per cent better than when cycling alone against the clock. This finding that human physical behavior is encouraged by the participation of others has been regarded as "social facilitation" and has been credited to competing performers' capacity to "liberate uniquely accessible latent energy." Interestingly, work in cognitive science has pointed to a clear methodological theory. Actually, certain people's presence appears to enhance the performance of well-learned skills yet hinder the performance of badly trained talents. Unfortunately, the discipline of sport psychology is challenging to describe specifically in spite of possessing a scientific history lasting more than a century. That is so because of the discipline's twin track personality. Further explain, as we mentioned in the previous section, psychology of sport and exercise is used not only as a sub-field of traditional psychology but also as one of the sport sciences. In addition, rather than psychology, he described sport and exercise psychology as a "branch of fitness and sports science."

Given this theoretical challenge in precisely defining the field, three characteristics of sport psychology are worthy of note. Second, usually it's called a method. As such, it is dedicated to the idea that its arguments should be either falsifiable or ready to be verified using objective and systematic methods of empirical investigation. Additionally, sport psychology includes the study of both fitness and competitive sporting behavior. In other terms, health and leisure physical activity is just as relevant to psychology as competitive sport is to sport and exercise. The title of the Journal of Sport Psychology was modified to the Journal of Sport and Exercise Psychology in 1988, in formal recognition of this reality. We'll discuss fitness and wellness science in Chapter 8. Thirdly, the study of sport and exercise is both a career and a science. Therefore both theoretical and applied measurements are applicable to this discipline. So although some sport psychologists are involved in rigorous studies intended to assess how the mind performs in a range of sports and fitness environments, some include specific guidance and instruction on performance improvement and/or safe living. Recognizing this differentiation, the Association for the Advancement of Applied Sport Psychology (AAASP) was established in 1985 to serve the growing needs of psychologists in applied sport. In this text, each of these three main aspects in sport psychology – adherence to empirical methods, focus

on the analysis in fitness as well as competition, and the presence of an applicable aspect of the field – will be illustrated. In passing it should be remembered that there has not always been a harmonious relationship between researchers and practical practitioners in sport psychology. And some fundamental scholars in the area conclude that athletes and coaches will not be supported with medical resources before a substantial body of expertise has been developed utilizing scientific methods. In the other side, other empirical scholars suggest that within the sports culture there is an immediate need for psychiatric treatment, and that this study will guide the philosophy and practice of sport psychology. Despite this theoretical-practitioner controversy, practical sport psychology has evolved steadily in recent years. To demonstrate, this sub-field has its own specialist associations, many affiliated publications, and over one thousand postgraduate educational programmes in the United States, Australia, Britain, Canada and South Africa. Nevertheless, the overwhelming majority of these programs are housed in the departments of exercise science rather than psychology departments — a reality which indicates that applied sport and exercise psychology has not yet been completely incorporated into conventional psychology. In the next portion of the book, we'll discuss this topic of technical certification and preparation in more depth. Nevertheless, at this stage let us quickly summarize several important incidents in the past of the discipline.

SPORT AND EXERCISE PSYCHOLOGY AS A PROFESSION

We discussed sport and exercise psychology as a scientific specialty in the previous segment. Let us now investigate its legal standing. There are three crucial issues to be answered in this way. First, what precisely are psychologists doing at sport? Third, what is the correct approach for supplying customers such as athletes and coaches with sports counseling services? Third, how can one count as a professional in sport? Let us now turn to each of these matters.

HEART RATE VARIABILITY (HRV)

Autonomic Innervations of the Heart

The heart and circulatory framework are principally constrained by the higher cerebrum place (headquarters) and by the cardiovascular control region situated in the mind stem, through the action of the ANS. The ANS includes the thoughtful and parasympathetic nerves (vagal nerves) surge to the heart and veins, which are fundamentally managed by the medulla. Especially, the core tractus solitarius in the medulla gets tactile info and invigorates cardiovascular reactions for feeling and physical pressure. From the medulla, the parasympathetic vagus nerve innervates the heart to the thoughtful

nerve strands. The privilege and left vagus nerves innervate the sinus atrial (SA) and atrioventricular hubs, separately. The atria are additionally innervated by vagal efferent, while the ventricular myocardium is scantily innervated by the vagal efferent. Thoughtful efferent nerves are available all through the atria, especially in the SA hub and ventricles. Thoughtful incitement builds the HR, and contractility and conduction speed through the intercession of α and β adrenoreceptors. Parasympathetic incitement has the contrary impacts through the muscarinic receptor. Autonomic control of the cardiovascular framework is additionally influenced by baroreceptors, chemoreceptor, muscle afferents, neighborhood tissue digestion, circling hormones, and ecological conduct. Albeit thoughtful and parasympathetic frameworks are dynamic very still, the parasympathetic filaments discharge acetylcholine, which acts to impede the pacemaker's capability of the SA hub and therefore diminish the HR.

HRV AND SPORTS PSYCHOLOGY

Application of HRV on Sports Training

While there are significant physical and physiological variations between athletes preparing for multiple athletic events, HRV is now one of the widely common methods of sports sciences for preparation and rehabilitation control. The probability of applying HRV to this variation is focused on the assumption that autonomic cardiovascular control is a significant determinant of training changes before becoming sensitive to the results of exercise. In accordance with these findings, an ANS distinction between sedentary subjects and recreationally active subjects or athletes in various athletic modalities has shown that athletes display a distinct HRV profile to sedentary subjects, with an average improvement in HRV and parasympathetic cardiac regulation, although evidence indicates that high-intensity exercise may be persistent. The liberal sympathetic prevalence of peak training load in amateur marathon athletes will forecast success in the run. And a change from vagal to sympathetic predominance in autonomic cardiovascular regulation has been documented, varying from low intensities to peak training loads on world-class rowers. Endurance and squad sporting practices have also been seen to cause an elevated parasympathetic variation over the 24 h reporting duration (higher RMSDD, PNN50 and HF, and lower LF / HF ratio). Therefore, performance professional athletes have a strong parasympathetic sound compared with casual athletes and non-athletes; demonstrating that physical fitness is a significant predictor affecting the independent regulation of the heart.

NEW FRONTIERS IN SPORTS PHYSIOLOGY

Effective success of sportsmen involves the incorporation of various physiological and psychological processes, working together to control the duration of exercise in a manner that can minimize the time required or maximize the job performed. The mechanisms that inhibit task efficiency are fiercely contested, and may rely on a number of variables like job size, setting, external conditions, human training status, and a range of psychological constructs. Traditionally, a reductionist perspective has been preferred that contributes to a better comprehension and stresses cardio-respiratory physiology, however the function of the brain is increasing traction and how that incorporates various processes. Such various methods, though, could have contributed to a false dichotomy and now, with a deeper knowledge of all domains, both viewpoints need to be put together.

- The sport physiologist would be expected to learn the following in the immediate future:
- Scientific experience in basic science (cardiology, respiratory physiology, etc.)
- Broad institutional foundation implemented (prescription workout, athletic / sport training)
- Advanced systems and machinery
- Analysis capabilities superior.

In recent times the function of the following is further delved:

- Different groups exercise: individuals with disabilities, disabled persons, infants and pregnant women;
- Updating emerging tools and methods
- Exercise to promote body processes in complex microgravity, deep water, high altitudes, etc. settings.

EXERCISE AND RENAL FUNCTION

Exercise causes significant improvements in hemodynamic renals and in the excretion of electrolytes and protein. Active production of renal fluid during exercise is reduced. The drop is linked to the workout rate, because when strenuous training is completed, the renal blood flow will decline to 25 percent of the resting value. During this cycle is involving the fusion of sympathetic nerve involvement and production of catecholamine compounds. Reducing the renal blood flow during exercise has a concomitant impact on the glomerular filtration volume, although the latter during exertion falls significantly less than the former. The degree of hydration, however, has considerable impact on the rate of glomerular filtration. In vigorous exercise an

antidiuretic activity is detected. Changes in the flow of urine depend on the antidiuretic hormone levels in the plasma, which are enhanced by vigorous exercise.

The inhibitory effect of physical activity on certain electrolytes (Na, Cl, Ca, P). Nevertheless, for potassium, several research show that mild to intense activity doesn't reliably impact potassium excretion. Improved development of aldosterone allows the body retain sodium by growing its reabsorption from the diluted tubular fluid. Recent studies suggest sympathetic stimulation during exercise can be involved. Hard work results in increased excretion of erythrocytes and leucocytes in urine. In various sports, cylindruria has been observed frequently in post-exercise urine.

Proteinuria post-exercise is a common phenomenon in humans. This tends to be directly related to workout strength, rather than its length. This urine protein excretion is a temporary process with about a half-time of 1 hour. Post-exercise proteinuria has a different pattern than normal physiological proteinuria. Immunochemical techniques show that post-exercise proteinuria is of the mixed glomerular-tubular kind, prevalent in the former. The improved clearance of plasma proteins indicates greater pulmonary permeability and limited reduction of tubular macromolecular reabsorption.

Under special conditions of exercise haemoglobinuria and myoglobinuria can be observed. The degree of hydration seems important in reducing these anomalies.

OBESITY, FAT MASS, OSTEOPONTIN AND EXERCISE TRAINING

Corpulence is an ailment that comprises the significant hazard factor for the advancement of insulin obstruction, diabetes and resulting diabetes-related confusions, for example, small scale and macrovascular illness. Ceaseless poor quality irritation has been depicted as a key part of fat tissue development in stoutness. Kindled fat tissue is portrayed by upgraded discharge of cytokines and enlistment of leukocytes, specifically macrophages. Current proof proposes that these cytokines, regularly alluded to as Adipokines, including Resistin, Visfatin, Apelin, Omentin, Chemerin, IL-6, MCP-1, PAI-1, or TNF- α connect corpulence to the improvement of fundamental insulin opposition. Developing confirmations recommended that Osteopontin (OPN) is a principle controller of fat tissue aggravation, insulin obstruction and diabetes mellitus.

Osteopontin(OPN), a glycoprotein was first recognized in 1986 in osteoblasts. Osteopontin is a multifunctional protein, profoundly communicated in bone. The prefix of word 'osteo' demonstrates that

the protein is communicated in bone, the addition 'pontin' is gotten from 'pons' the Latin word for connect that implies osteopontin's job as a connecting protein. Osteopontin is otherwise called bone sialoprotein I (BSPI), early T-lymphocyte actuation (ETA-I), Urinary stone protein, Nephropontin and Uropontin discharged phosphoprotein 1(SPP 1) and Rickettsia obstruction (Ric) 44 K BPP (bone phosphoprotein) is a human quality item. Osteopontin, an extracellular basic protein is made out of ~ 300 amino acids buildups and has ~ 30 sugar deposits joined including ten sialic corrosive deposits. The protein is wealthy in acidic buildups 30 – 36 % are either aspartic or glutamic corrosive deposits. The high centralization of Osteopontin could be liable for various changes inside the atherosclerotic plaque that would advance plaque shakiness. Many key controllers of bone arrangement and bone basic proteins are communicated in atherosclerotic plaques, including bone morphogenetic protein-2, grid carboxyglutamicacidprotein and OPN. OPN intervenes connection of the two osteoblasts and osteoclasts to bone mineral through communication with integrin. It seems, by all accounts, to be the aftereffect of mineralization and is associated with the restraint of vascular calcification. Constant aggravation is a focal attribute of atherosclerosis, where oxidized lipids are viewed as significant provocative upgrades. OPN is a marker of coronary vein sickness action and effectively associated with plaque movement, calcification and solidness.

Weight is frequently exclusively credited to absence of exercise. Exercise-prompted weight reduction is considered as a protected strategy to forestall stoutness related infections. It was, in this manner, imperative to clarify how normal exercise adjusts corpulence intervened aggravation. The calming impacts of customary exercise might be interceded by means of a decrease in the instinctive fat mass (with an ensuing reduction in adipokines discharge) and the incitement of a mitigating domain with each exercise meeting. You announced that exercise-incited fat misfortune is related with decrease of serum osteopontin fixation however was not connected with muscle to fat ratio in stout subjects. It has been additionally exhibited that OPN articulation in cardiomyocytes was fundamentally associated with the weakened capacity of the left ventricle, which was the primary wellspring of coursing OPN plasma levels. Besides, adipokines is included either straightforwardly or by implication in the guideline of bone redesigning. You noticed the adjustment in serum leptin level actuated by exercise may incite the difference in bone renovating and the difference in bone digestion may influence the serum OPN levels. Likewise, caloric limitation incited weight reduction has all the earmarks of being a hazard factor for quick bone misfortune. Be that as it may, physical movement actuated weight reduction jelly bone mineral thickness.

WHAT DO SPORT PSYCHOLOGISTS DO?

With an end goal to address the issue of what sport therapists do, the game and exercise segment of the British Psychological Society sorted out a discussion intended to investigate the expert work and encounters of its individuals. What rose up out of this discussion was an intriguing range of exercises which ran from the arrangement of mental abilities preparing plans for competitors (e.g., footballers, sprinters and hustling drivers) to the structure and usage of wellbeing advancement programs for non-athletic populaces (e.g., to urge individuals to take part in increasingly standard physical movement). All the more for the most part, the expert exercises of game and exercise therapists fall into three principle classes: (i) applied consultancy work (remembering guidance for execution improvement just as the arrangement of advising and clinical brain science administrations); (ii) training; and (iii) research. Before we investigate these capacities, in any case, two alerts ought to be noted. To start with, there is extensive cover between these three classifications by and by (a highlight which we will return later in this segment). Second, most of game clinicians work just low maintenance in this field. Ordinarily, the expert work from which they infer a large portion of their salary lies in some other zone of brain research or game science, for example, addressing and research.

EDUCATION

1. Sport and exercise brain research is a one of a kind logical order, however it infers its hypothetical and applied points of view from a few wellsprings of logical and applied information. These are basically:
2. Sport Science and Kinesiology, including engine learning/advancement/control, biomechanics and exercise physiology
3. Psychology, particularly the social and psychological streams, just as different sub-controls of applied brain research
4. Health Sciences, particularly clinical, social and conduct information
5. Methodology, specifically estimation, appraisal and assessment, just as factual techniques.

THE EFFECTS OF SLEEP LOSS ON EXERCISE PERFORMANCE

In spite of the fact that its actual capacity stays indistinct, rest is viewed as basic to human physiological and intellectual capacity. Similarly, since rest misfortune is a typical event preceding rivalry in competitors, this could altogether affect

upon their athletic presentation. A significant part of the past examination has detailed that exercise execution is contrarily influenced following rest misfortune; nonetheless, clashing discoveries imply that the degree, impact, and instruments of rest misfortune influencing exercise execution stay questionable. For example, research demonstrates some maximal physical endeavors and gross engine exhibitions can be kept up. In correlation, the couple of distributed examinations researching the impact of rest misfortune on execution in competitors report a decrease in sport-explicit execution. The impacts of rest misfortune on physiological reactions to exercise likewise stay ambiguous; in any case, it seems a decrease in rest quality and amount could bring about an autonomic sensory system awkwardness, mimicking side effects of the overtraining condition. Moreover, increments in acute provocative cytokines following rest misfortune could advance resistant framework brokenness. Of further concern, various examinations researching the impacts of rest misfortune on intellectual capacity report increasingly slow exact psychological execution. In light of this specific circumstance, this survey intends to assess the significance and predominance of rest in competitors and sums up the impacts of rest misfortune (limitation and hardship) on exercise execution, and physiological and intellectual reactions to exercise. Given the ambiguous comprehension of rest and athletic execution results, further exploration and thought is required to acquire a more noteworthy information on the cooperation among rest and execution.

EFFECT OF PHYSICAL ACTIVITY ON PRE-SCHOOL CHILDREN

These days guardians are over cognizant and over worried about the scholastics of their youngsters. They accept that solitary instruction will profit their kids and physical action has nothing to do with the eventual fate of a kid. This is an off-base idea and numerous multiple times this hypokinetic way of life brings about unexpected frailty status of youngsters. Much examination considers reasoned that a seemingly endless amount of time after year the development and advancement of the kids in India is being shunted. The conceivable explanation might be this repugnance for physical movement. As per World Health Organization (WHO) Global Strategy on Diet, Physical Activity and Health report 2016 the quantity of hefty kids under five years old is 41 billion. What's more, practically 50% of them has a place with Asia. This report is an admonition that physical action culture in India, alongside other Asian nations are at threat. Lousy nourishment and machine cultures driving our youngsters into an existence with exceptional medical problems. At present India is considered as the Diabetic capital of the world, and if this circumstance proceeds by 2018 India will become the Lifestyle infections capital (WHO, 2016). This illuminates the need of preschool physical activity intervention. Hence the analysts made an

endeavor to contemplate the expected impacts of physical action on pre-younger students.

A decrease in the Body Mass Index mirrors a decrease in the rate muscle versus fat and an improvement in the fit body mass. In the current setting kids are powerless against obesity due to the utilization of lousy nourishments. Physical activity intervention is a likely answer for youngster heftiness. The basic motor wellness boundaries like quality and adaptability are crucial in choosing the personal satisfaction of the youngsters. There is an opposite connection between physical wellness and absenteeism in schools. The results of the current investigation is in concurrence with results i.e., moderate to incredible physical action improves quality parameters and improvement in Fat Free Mass Index. Overall the study illuminates the significance of physical activity engagement in youngsters for the best possible development and development and for establishing the framework of a physical activity culture.

FUTURE PERSPECTIVES

The future improvements of game and exercise brain research ought to be considered from educational, professional, hierarchical and logical points of view. There is a propensity toward increasing differentiation from one viewpoint and toward multi-point of view and between disciplinary methodologies on the other. Culturally diverse game and exercise brain research is likewise a developing enthusiasm among various scholars and experts. Increasingly logical exertion is required to better appreciate the linkage between the passionate, psychological and engine frameworks under conditions which summon different level of weight. In such undertakings, specialists will incorporate over-social and undercover neurological measures. Also, more examination will be given to confirm based practice, which depends on longitudinal contextual investigations and regular perceptions to additionally upgrade execution interview.

CONCLUSION

In this part, I have clarified that game and exercise brain research is both a science and a calling in which the standards and techniques for brain research are applied in game and exercise settings. Most of youngster's physical and emotional wellness, solid constitution, solid will, loaded with essentialness, is an indication of a solid national imperativeness, is an indication of social development and progress, is a significant part of national exhaustive quality. Physical exercise is a viable method to improve the strength of understudies, and irreplaceably affects the arrangement of youthful good character, scholarly turn of events, tasteful achievement and solid way of life. It is of incredible vital noteworthiness to

reinforce the school sports in universities and colleges, to fortify the constitution, improve the far reaching nature of undergrads, understand the modernization of training, assemble solid HR and develop the communist constructors and replacements of good, intelligent and tasteful turn of events.

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Corresponding Author

Kanika Rawat*

Student, Lakshmibai National Institute of Physical Education, Gwalior