

INTEGRATED YOGA AND SPORTS TRAINING FOR OPTIMIZING PHYSICAL FITNESS, MENTAL RESILIENCE, RECOVERY, AND COMPETITIVE PERFORMANCE

¹Dr. Sumana Pothugunta, ²Dr. Sonam Kumari (PT), ³Dr. Ribha Sharma, ⁴Dr. Kanak Soni, ⁵Dr. Mukesh Kumar Mishra, ⁶Dr. Ankan Sinha

¹Principal, Specialization in Yoga, Sri Visweswara Yoga Research Institute, Andhra Pradesh, 517502 India.

E-mail ID: sumankrishna78@gmail.com, ORCID ID: 0009-0004-6210-2632

²Assistant Professor, University school of physiotherapy and radiology, Rayat Bahra university, Mohali, Punjab, India.

E-mail ID: drsonamk69@gmail.com, ORCID ID: 0009-0009-0964-2257

³PhD Scholar, Physiotherapy, Chandigarh University, E-mail ID: Ribhasharma15@gmail.com, ORCID ID: 0009-0006-0945-0915

⁴Associate Professor and Head of Department, Faculty of Naturopathy and yogic sciences – Patanjali Wellness Centre, University of Patanjali, Haridwar 249405, E-mail ID: Drkanaksoni@uop.edu.in, ORCID ID: 0009-0006-7250-2407

⁵Assistant Professor, Physical Education, Kalicharan P.G College, Lucknow- 226003, E-mail ID: mkspe88@gmail.com ORCID ID: 0000-0001-8529-3057

⁶Associate Professor, Physical Education, Exercise Physiology, Government Degree College, Dharmanagar (Affiliated with Tripura University), E-mail ID: ankansinha4770@gmail.com, ORCID ID: 0009-0009-7203-3059

ABSTRACT

The incorporation of yoga into mainstream sports training has become a topic of interest, as it is a multi-dimensional approach to enhancing sports performance, psychological state, and recovery. This review synthesizes current evidence on the physiological, functional, psychological, and sport-specific relevance of yoga within athletic training. The literature reviewed suggests that yoga has the potential to be used in conjunction with existing conditioning, with demonstrated benefits for flexibility, balance, joint stability, functional movement, respiratory control, autonomic regulation, attention, emotional regulation and perceived recovery. Further evidence indicates potential benefits for competitive anxiety, mental resilience, confidence, concentration, burnout recovery, and performance consistency, especially when the yoga-based practices are combined, rather than used alone. Further research findings in the sport of cricket, handball, basketball, tennis, golf, archery and baseball support contextualized programming based on technical and physical demands. Despite these benefits, there is limited evidence base due to the lack of consistent protocols, small sample sizes, brief duration of interventions, and varying outcome measures. Standardized interventions, dose-response, longitudinal designs, objective biomarkers and direct competition-based outcomes should be prioritized in future research. In conclusion, yoga seems to offer the most benefit when used as a part of a sports training program as a complementary, individualized, and periodized training method and not as a replacement for traditional sports training.

KEYWORDS: yoga, sports training, mental resilience, recovery, athletic performance

1. INTRODUCTION

Competitive sport has become a very challenging environment where sporting accomplishments require more than just incremental improvements in strength, speed or endurance. The demands on athletes have grown as training and competition have become more intense, more frequent, more technically complex, and more demanding for continuous performance (Koprivica, 2018). Modern athlete development, therefore, needs to be multi-faceted, encompassing movement competence and adaptability, physical conditioning, and psychological readiness and recovery. The Athletic Skills Model also focuses on the development of general movement skills and flexible motor competence as pillars for continued athletic progress, and not only on the development of narrow skills (Wormhoudt et al., 2017). The key role of sports training in this process is emphasized, as structured overload, specificity, progression, and recovery are essential for physiological adaptations and improvement in performance (Kasper, 2019). Physical activity and sport also offer significant physiological and psychological health benefits, but this is dependent on the nature of training exposure and demands management in sport (Malm et al., 2019). Therefore, training strategies for performance optimization need to focus on optimizing athletic capacities and regulating the athlete's stress level, functional movement and recovery between training and competitive exposure.

Yoga can be a complementary treatment that could help meet some of these needs. It is a discipline that includes physical and contemplative practices that are connected, and is typically interpreted as 'flexibility training' (Jung & Hull, 2023). In health and performance settings, yoga integrates postural exercises, breathing techniques, attunement, and meditation, which have the potential to impact physical and psychophysiological function (Khalsa et al., 2024). Because of these qualities, yoga has become very relevant to sports contexts where athletes have to contend with physical load, cognitive stress, emotional strain and recovery needs. The possible benefits of yoga in sport are not limited to a few areas of the sport. Yoga-related practices have been linked with better physical readiness, psychological wellbeing, and attributes that

can contribute to athletic effectiveness and recuperation (Meena & Bairwa, n.d.). The studies on exercise and yoga also show some positive effects on anxiety and depressive symptoms and therefore their importance in the regulation of stress and psychological well-being (Saeed et al., 2019). When it comes to competitive settings where concentration, emotional stability, confidence and resilience can play a part in the athlete's ability to perform consistently, such effects are important. The available literature is also heterogeneous, and neurobiological evidence indicates that yoga can impact brain structures and functions related to cognitive and behavioral regulation as well (Gothe et al., 2019).

Though there is an increasing interest in yoga in the athletic training field, the evidence is scattered throughout the physical fitness, psychological health, recovery, and performance outcomes. These domains are studied separately and it is hard to see how yoga can be systematically integrated with conventional sports training to make complementary adaptations. Further challenges in direct comparison between studies come from variation in yoga protocols, variation in athletes, training duration, competitive level, and the outcome measure. The association between yoga-induced changes and measurable competitive performance is also not as well defined as in terms of general health and wellness.

In light of this, this review sets out to critically review the literature on the integration of yoga in sports training and its contribution to physical fitness, mental resilience, recovery and competitive performance. It also aims to help elucidate the mechanisms that underlie these outcomes, assess their real-world applicability in athletic training, and pinpoint where there is an evidence gap that warrants research for the creation of individualized, sport-specific, and evidence-based integrated training strategies.

2. Physiological and Theoretical Basis of Integrated Yoga–Sports Training

Yoga offers a multidimensional training stimulus through a coordinated mind–body system that corresponds to the physical postures, controlled breathing, attentional regulation and contemplative practices. These components can engage diverse domains that are interconnected, such as flexibility, strength, balance, respiratory control, emotional regulation, and body awareness (Brems, 2025). Evidence from various yoga practices demonstrates that the effects of yoga differ depending on the postural, breathing, meditation and relaxation components of each yoga practice, which allows for choice of practice to match desired athletic adaptations (Matko et al., 2021). The physiological demands of sports training vary according to exercise intensity, duration, movement pattern, and sport specificity (Sousa et al., 2019). Developing adaptations in the musculoskeletal system due to repeated exposure to appropriately prescribed exercise, including adaptations in skeletal muscle, connective tissues, joints and bone, will give greater tolerance to mechanical loading and better physical capacity (Cakmak, 2023). Combining yoga into this training system could be a tool that enhances conventional conditioning by adding mobility, controlled movement, and body-awareness stimuli to the training without reducing the sport-specific strength, endurance or technical training.

Another theoretical foundation for the integration of yoga and sports training is called “neuromuscular integration.” Proprioceptive information is essential for joint-position awareness, postural adjustment, coordination and dynamic control during efficient athletic movement. Proprioceptive training has been shown to have positive effects on balance and some aspects of sports performance, highlighting the relevance of sensory–motor control in sports preparation (Yılmaz et al., 2024). Yoga poses that require a controlled transition, stabilization and coordination of movement can also be a context for developing these qualities. Another crucial area of yoga and athletic conditioning is the regulation of respiration. Controlled yogic breathing can affect breathing patterns and respiratory function, as evidenced by pulmonary-function measures being improved after yogic breathing practice in competitive young swimmers (Hakked et al., 2017). These adaptations could be applicable to sports that involve coordination between ventilation, movement and exertional control.

Another link between yoga and recovery and psychophysiological readiness is autonomic regulation. Yoga in sport environments has been linked to autonomic nervous system (ANS) functioning, pointing to the possibilities of influencing physiological activation and restoration in a balanced way (Frank et al., 2020). Additionally, athletes' stress response and performance reliability could be affected by the mind–body technique, as it connects physiological control and psychological reactions to training and competition (Chen et al., 2025). The theoretical value of integration is then that of the convergence of physical conditioning and psychophysiological regulation. Yoga can be used to connect physiological and psychological processes by using coordination of movement, breath, attention and regulation, and sports training can ensure the specificity and progressive loading with regard to athletic development (Sindhu & Poornimadarshini, 2025). An integrated model, in turn, may be seen as complementary, rather than substitutive, in which yoga's complementary capacities can augment an athlete's capacity to adapt to, recover from and reliably perform challenging sports training.

This integrated training of yoga and sports thus shows a plausible basis along the musculoskeletal pathway, the proprioceptive pathway, the respiratory pathway, the autonomic pathway and the mind–body pathway. Its merit is in being used in conjunction with sport-specific training and in regulating and/or functional adaptations rather than in place of the sport-specific conditioning.

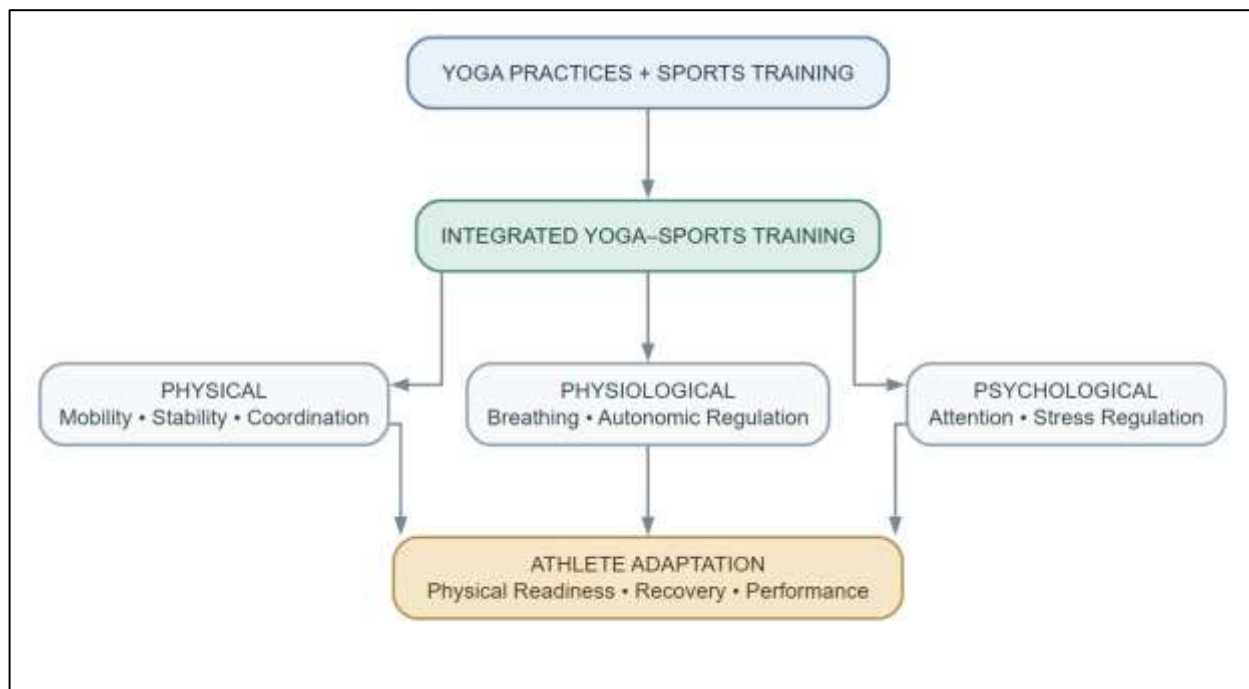


Figure 1. Conceptual Pathways Linking Integrated Yoga–Sports Training to Athlete Adaptation

3. Physical Fitness and Functional Performance

Flexibility, strength, balance, cardiorespiratory capacity, agility, and movement efficiency are all factors that contribute to physical fitness in sport and are interdependent. Yoga can be used in conjunction with traditional conditioning to challenge athletes with a range of controlled motion, holding and sustaining postures, and multi-directional and coordinated movements. A 12-week structured yoga intervention resulted in increased flexibility, balance and joint kinematics in University athletes, suggesting that yoga can make a contribution to functional qualities which are relevant to athletic movement (Choudhary et al., 2025). The importance of maintaining movement quality within a challenging training and competition load is especially related to muscular strength and flexibility. Yogasana is a repetition of isometric stabilization/body-weight loading along with progressive movement through functional ranges. There is evidence that yogasana practice can enhance muscular strength, body flexibility and balance, and yoga breathing could be one of the interventions to stop the losses of selected adaptations in detraining periods (Bhunia & Ray, 2024). These results indicate that yoga can be used to provide conditioning beyond flexibility.

Balance and agility are key elements of functional performance as athletes need to rapidly stabilise the body when accelerating, decelerating, changing direction, or reacting to an unpredictable scenario. Core-stability yoga has shown potential relevance in sports that involve multidirectional movements, such as elite football players, in terms of enhancing their dynamic balance and agility (Mejail & Nestares, 2025). In addition, stabilization could be of functional benefit; yoga-based training has been found to have a beneficial effect on ankle and knee stabilization in children who play team handball (Sebestyén et al., 2025).

Cardiorespiratory fitness still plays an integral role in maintaining exercise capacity and endurance for repeated exercise. Yoga practices that integrate yoga postures with controlled breathing can also play a role in cardiovascular and respiratory efficiency in addition to musculoskeletal benefits. In a recent interventional study with young subjects, a positive effect of yoga practice on cardiorespiratory fitness was observed, which indicates that yoga can be used as a complementary tool for overall physical conditioning (Mittal et al., 2023). How athletes are able to incorporate mobility, stability, coordination and neuromuscular control into complex movements is also a major determinant of functional performance. Yoga interventions for collegiate athletes have shown benefits in functional movement patterns, showing that the benefits of yoga can be found beyond specific physical attributes to integrated movement quality (Xu et al., 2022). Yoga is also relevant as a complementary intervention to boost multiple aspects of physical fitness, as evidenced by the literature (Pramanik et al., 2025), alongside other exercise and sports-training approaches.

Yoga can be combined with sports conditioning to work on flexibility, strength, balance, joint stability, cardiorespiratory capacity, agility, and functional movement. The value of these qualities in terms of performance might best be obtained by enhancing the integration of these qualities instead of the development of individual fitness components. Table 1 shows the general physical and functional changes reported in yoga studies that target specific athletes.

Table 1. Evidence on Physical and Functional Effects of Yoga in Athletes

Population/Context	Yoga Approach	Main Outcome	Key Finding	Study
University athletes	12-week structured yoga	Flexibility, balance, joint kinematics	Improved functional parameters	Choudhary et al. (2025)
Physically active	Yogasana +	Strength, flexibility,	Improved physical	Bhunia & Ray

participants	breathing	balance	fitness	(2024)
Elite football players	Core-stability yoga	Balance, agility	Improved dynamic performance	Mejail & Nestares (2025)
Young participants	Yoga intervention	Cardiorespiratory fitness	Favorable fitness changes	Mittal et al. (2023)
Handball players	Yoga training	Ankle/knee stability	Better joint stabilization	Sebestyén et al. (2025)
Collegiate athletes	Yoga intervention	Functional movement	Improved movement patterns	Xu et al. (2022)

4. Mental Resilience and Psychological Readiness

In addition to physical training, athletes' ability to manage their reactions to stress, focus, emotions and respond to pressure is also vital to competitive performance. A balance between Yoga and modern sports science offers a model for psychological regulation to be developed in conjunction with physical skills, enhancing comprehensive athlete preparation (Geetha & Dineshkumar, 2025). Competitive anxiety may interfere with attentional control, decision making and motor execution and confidence, especially when the athletes feel that the competitive demands exceed their coping resources. Since then, yoga-based programs have shown promise in decreasing competitive anxiety experienced by badminton players; thus, controlled movement, breathing and relaxation can aid athletes in controlling psychological arousal prior to and during badminton competition (Kusuma, 2017). However, Yoga Nidra can offer some benefits that could help with mental resilience and improve performance consistency in elite athletes, as evidenced by emerging research (Karthika, 2025). In sporting activities where quick information processing and task engagement are crucial, attentional control is also significant. Yoga practices involve intentional attention to posture, breath and sensations, which provide repeated opportunities to practice attentional regulation. Preliminary neurophysiological support for the link between yoga and attentional functioning has been found in changes in attention-related outcomes and frontal electroencephalographic theta/beta activity, as shown by evidence from yoga interventions (Baba Kaya et al., 2025). These effects could be important, particularly for athletes who need to remain focused when tired, distracted and under competition pressure. Emotional regulation and resilience are what drive athletes to perform during setbacks, errors, selection pressures and varying performance. Psychological flexibility and resilience among competitive athletes may be strengthened by integrating mindfulness with yoga, which can increase awareness of emotional responses and reduce automatic reactions to stressful situations (Geetha, 2025). In addition, psycho-yogic training has been linked to enhanced psychological health in low-performing female athletes, suggesting its potential in addressing athletes with psychological problems related to their sports performance (Saha et al., 2025). Another important link between psychological readiness and execution is self-confidence, which is also a major component of this. In terms of rhythmic gymnastics, the use of Yogalates exercise has been reported to affect the students' confidence in sports in addition to their fundamental skills performance, indicating that mind–body conditioning may positively affect both perceived capability and actual task execution (Alazawy, 2025). A sport-specific approach (which incorporates sport plus yoga) could also link psychological control with the development of sport performance, rather than on its own (Pandey & Singh, 2025). Yoga-based techniques can therefore support athletes' psychological readiness by addressing competitive anxiety, attention, emotional regulation, resilience, well-being, and confidence. This may be especially beneficial when psychological training is conceptualized in a sport-specific context rather than as an endpoint of mental health. Figure 2 illustrates how yoga-based psychological regulation may support emotional control, cognitive control, mental resilience, and psychological readiness under competitive demands.

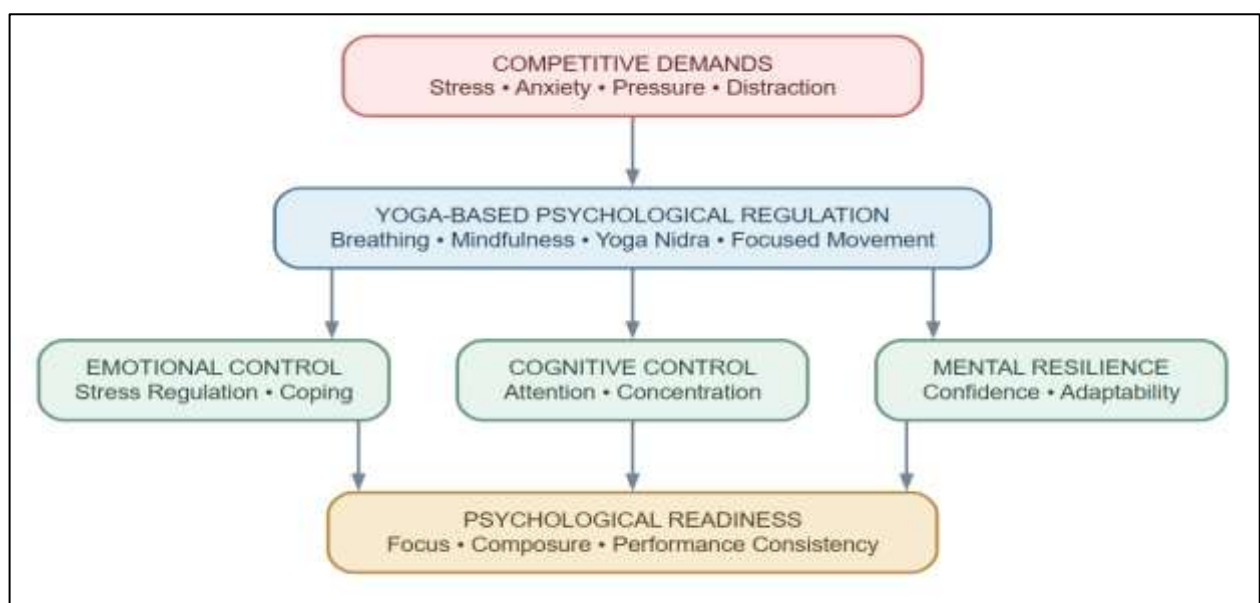


Figure 2. Yoga-Based Pathways Supporting Mental Resilience and Psychological Readiness in Athletes

5. Recovery, Fatigue Management, and Injury Prevention

Recovery is a critical component of maintaining training quality, physiological adaptation, and competitive readiness, especially when athletes are exposed to repeated high-intensity training workloads. Yoga can be used in combination with other treatment methods that focus on low-impact exercise, breathing and relaxation. Comparative evidence suggests that yoga might have an acute effect on post-exercise heart rate, respiratory rate, blood pressure, and heart rate variability, thus supporting the role of yoga in acute cardiovascular and autonomic recovery (Petviset et al., 2025). Damage to muscle tissue caused by exercise may cause soreness, loss of strength, a decreased range of motion, and affect physical function. Active recovery strategies are routinely used to control these symptoms, but vary in effectiveness depending on recovery outcome and protocol (Fares et al., 2022). Yoga may be incorporated into this recovery model through low-load movement, mobility-focused exercise, and controlled physical activity. Yoga has also been studied in the context of Taekwondo athletes' resuming training after high-intensity exercise with the aim of restoring physical function and fitness in the "recovery" phase (Liu et al., 2020). Likewise, sufficient sleep and appropriate physiological and psychological down-regulation are crucial to restoration. Competitive stress, travel and heavy training can disrupt sleep and thus negatively affect recovery. The position of Yoga Nidra between wakefulness and sleep-related relaxation has been suggested for sports-related contexts, such as restorative and athlete recovery (Di Fronso & Bertollo, 2021). This can be especially beneficial if the cognitive or physiological activation is ongoing and hinders recovery between training bouts. Flexibility, balance, movement control, musculoskeletal function, level of stress and recovery status must be considered when working on injury prevention. Yoga has been considered as a modality to reduce a number of the predisposing factors for sports-related injuries, due to combined effects on physical and psychological functioning (Arbo et al., 2020). The literature also shows a broader case for embedding yoga in exercise and sport science as a preventative and management strategy for musculoskeletal issues, and its role in mental health (Halappa, 2023). The cumulative effect of fatigue may go beyond the point of being physically tired to the point of being physically fatigued from the cumulative effect of requirements of training and psychological demands over the resources available for recovery. Athlete burnout is an important expression of this imbalance, in which the athlete's psychological energy is used up, and he or she experiences a decline in functioning related to sport. The relevance of yoga extends beyond physical recovery, as an integrated Yoga Nidra–mindfulness intervention also holds promise for managing psychological recovery from a state of burnout in athletes (Kumar, 2025).

Yoga can thus play a role in recovery management in autonomic restoration, recovery after exercise, sleep-related relaxation, modifying risk of injury, and psychological recovery. It is most appropriate when used as an adjunct to a structured recovery plan, and the specific practice should be chosen based on training load, athlete requirements, and recovery phase. Table 2 provides a summary of the key psychological, recovery and injury-related uses of yoga that are important for athletic preparedness.

Table 2. Psychological, Recovery, and Injury-Related Applications of Yoga

Domain	Yoga Approach	Athlete-Relevant Outcome	Practical Relevance	Evidence
Competitive anxiety	Yoga program	Lower anxiety	Competition readiness	Kusuma (2017)
Mental resilience	Yoga Nidra	Resilience, consistency	Psychological recovery	Karthika (2025)
Attention	Yoga practice	Improved attention	Focus and concentration	Baba Kaya et al. (2025)
Post-HIIT recovery	Yoga recovery	HR, RR, HRV recovery	Acute recovery	Petviset et al. (2025)
Injury prevention	Yoga	Modifiable injury factors	Risk reduction	Arbo et al. (2020)
Athlete burnout	Yoga Nidra + mindfulness	Mental health recovery	Burnout management	Kumar (2025)

6. Competitive and Sport-Specific Performance

The most relevant aspect of yoga to sports performance is when the benefits are seen in sport-specific physiological, technical and cognitive aspects of performance. Mobility, balance, control, and conditioning are also linked to quality of performance in cricket, which may be translated into the ability to execute repetitive movements under competitive conditions, with benefits for bowlers (Vaidya et al., 2021). Data on top Romanian athletes also suggest that yoga could be an aid to traditional training and play, helping to develop various aspects of athletic performance, but not as a substitute for sport-specific training (Bucea-Manea-Țoniș et al., 2023). In high-velocity sports, there is a need for speed, for getting the movements right and in the right sequence, and for controlling the cardiovascular system. Some advanced yoga techniques have been found to enhance the HR efficiency and HV motor fitness of intercollegiate male handball players, which is relevant to intermittent, high-intensity team sports (Vijayapandi, 2025). Additionally, yoga can aid in the development of technical skills by fostering greater body awareness, movement accuracy, focus, and self-control, which can help with learning and maintaining consistency in movement (Sharma, 2025).

Cognitive and psychological readiness is also an important part of competitive performance. Changes in competitive women's basketball players in three domains of cognition, psychology and function following a structured yoga

intervention suggest that improved performance effects could be found in combination rather than individual adaptations (Vijayalakshmi & Saroja, 2025). Such an effect is especially important in open-skill sports in which athletes are required to synchronize their physical activities with speedy perception and decision-making and emotional control in a multidimensional way. Integrated training could be even more effective if yoga is directly integrated with already established conditioning modalities. A randomized controlled trial in intermediate-level male tennis players has shown that a 12-week yoga (mobility) and elastic band resistance training program benefits functional fitness, highlighting the potential of combining mobility and neuromuscular control training with resistance training (conditioning) for sports (Choudhary et al., 2025). This integration might be more relevant to performance settings than to a treatment as a stand-alone.

There are also adaptations for sports in precision- and technique-dominated activities. A six-week yoga program was shown to be feasible and showed potential to impact movement control and stability, which could lead to improvements in technical execution in golfers (Sorbie et al., 2019). A specially designed yoga module was validated and tested for feasibility in archery, justifying the adaptation of postural, attentional and control requirements of individual sports to the yoga content (Baishya et al., 2025). Athlete perceptions also validate the applicability of the yoga and mindfulness practices in professional sport. Previous professionals in sports describe their experience with these practices regarding preparation, recovery, awareness and performance demands, suggesting acceptability and perceived usefulness can help with continued integration into high-performance settings (Wehrmann et al., 2024).

Yoga seems to be most useful for an athlete's competitive performance when it is sport-specific, strategically integrated and related to the technical and physical demands of that sport. It can manifest itself in a variety of ways, such as enhanced efficiency of movement, improved functional fitness, cognitive control and consistency, but not through a one-size-fits-all performance mechanism. The evidence for each sport shows a wide range of applications and areas of performance focus with regard to yoga, as detailed in Table 3.

Table 3. Sport-Specific Applications of Yoga and Performance Relevance

Sport/Context	Intervention	Performance Domain	Reported Relevance	Reference
Cricket	Yoga training	Fitness, bowling performance	Performance support	Vaidya et al. (2021)
Handball	Advanced yoga	Motor fitness, heart-rate efficiency	High-intensity performance	Vijayapandi (2025)
Basketball	Structured yoga	Cognitive and functional performance	Multidimensional readiness	Vijayalakshmi & Saroja (2025)
Tennis	Yoga + resistance training	Functional fitness	Integrated conditioning	Choudhary et al. (2025)
Golf	6-week yoga	Swing mechanics	Technical execution	Sorbie et al. (2019)
Archery	Sport-specific yoga module	Postural and attentional demands	Feasible application	Baishya et al. (2025)
Baseball	Yoga + mindfulness	Preparation and recovery	Professional acceptability	Wehrmann et al. (2024)

7. Practical Integration, Research Gaps, and Future Directions

To embed yoga into a sports training context, it is necessary to align the practices being used with the sport-specific needs and requirements of the athlete. There are flexibility-oriented yoga models that can be used when mobility restrictions or range of motion requirements are applicable, but the postures, sequencing and progression should be based on the biomechanical needs of the sport and not the generic approach to yoga (Muliarta, 2023). Therefore, a critical look at yogasana in sport also argues for employing yoga as a complementary conditioning approach in existing training methodologies, rather than as an alternative approach to sport-specific conditioning (Sharma, 2020). Frequency, duration, training phase and athlete experience must be taken into consideration in program design. In addition to different physical levels of intensity, different foci on breathing, attentional focus and relaxation, as well as varying motivations for practicing and preferred yoga styles indicate that yoga techniques vary significantly, as well as the practice and the practitioners themselves (Telles et al., 2017). The differences indicate that a one-size-fits-all approach to prescriptions might not be appropriate for all athletes. It is therefore important to integrate it in an individualized manner in relation to training objectives, recovery status, competition programme, and yoga experience.

Another crucial factor to take into account is sport context. One of the reasons for this is that various types of exercise have different psychological and well-being experiences, suggesting that the impact of yoga could be different based on the nature of the sport, i.e., team, individual, technical or endurance (Marschin & Herbert, 2021). Yoga should therefore be implemented to develop mobility during the active recovery period, to monitor attention and/or to rejuvenate during low-load periods within each preparatory, competitive and transition phase of periodization. Implementation also relies on acceptance and accessibility for the athletes. Even if sport and yoga are perceived to be mutually compatible and having a positive impact, some men feel yoga is not sport enough, or does not fit with their sporting identity, thus limiting uptake (Cagas et al., 2021). More broadly, facilitators and barriers to participation have been identified as perceptions of benefits, social environment, access, quality of instructor, prior experience, and culture (Cagas et al., 2023). When Yoga is introduced in high-performance settings these factors have to be taken into consideration.

Currently, there is limited evidence base due to varying intervention protocols, small and/or narrowly defined samples, different outcome measures, and brief intervention lengths. Future studies are needed to compare well-defined components of yoga, to determine dose–response relationships, and to differentiate yoga for recovery, mobility, cognition, and performance. Randomized controlled designs, long-term monitoring, objective physiological measures, and direct competition-based outcomes should be implemented more to aid in making causal inferences and strengthen the applicability of the results. Future research should also investigate whether yoga has different effects on various sporting events, by sex, competitive level, training age and baseline psychological/physical state of the player. Multicomponent interventions need to be compared with conventional conditioning alone to see if there is any performance benefit from yoga in addition to traditional training. The key to effective integration will not be a generic yoga program, but rather the individualization of yoga practices to the athlete, sport, and training phase. Standardized and sport-specific evidence remains insufficient to establish precise prescriptions for high-performance settings. The practical needs, gaps in the evidence and research priorities for progress towards individualized and sport-specific yoga–sports training are integrated in Figure 3.

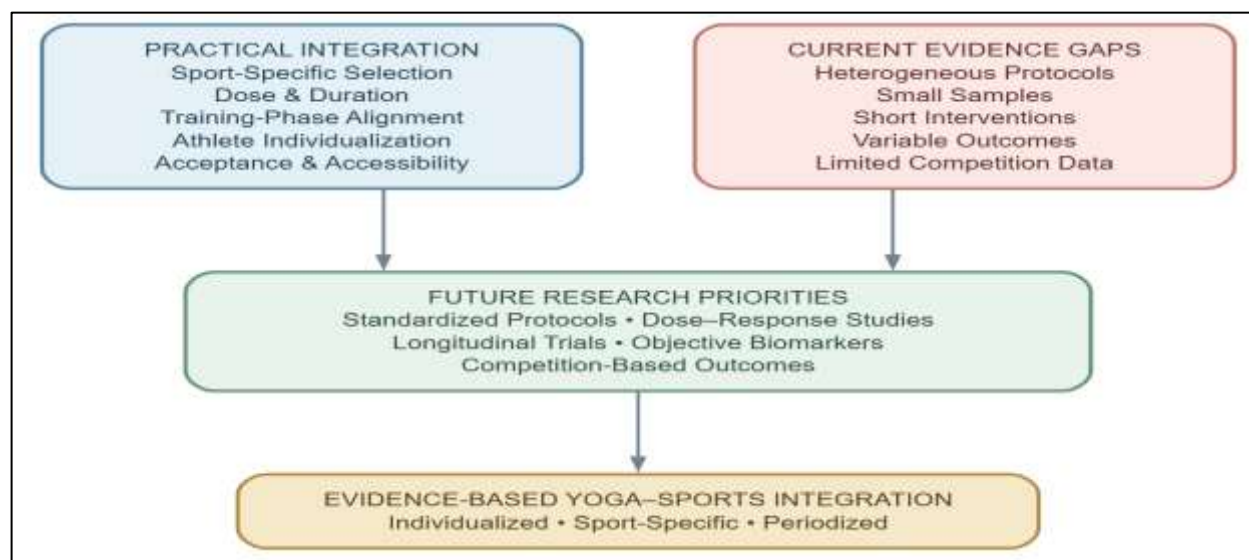


Figure 3. Practical Integration, Evidence Gaps, and Future Research Priorities for Yoga–Sports Training

8. CONCLUSION

The combination of yoga with sports training provides a complementary approach to preparing athletes in a multi-dimensional way. Yoga evidence reviewed suggests that flexibility, balance, stability and movement in their functional context, cardiorespiratory regulation and recovery, attentional and emotional regulation, and joint stability are key areas where it can play a role, whereas conventional sports training is crucial for sport-specific strength, endurance, skill, and progressive adaptation. Psychological evidence also supports the value of competitive anxiety, resilience, concentration, confidence and consistency of performance, especially when yoga-based practices are integrated within a wider context of athlete preparation rather than alone. There are additional applications for recovery, including autonomic recovery, relaxation in sleep, injury risk management and burnout recovery. The findings from sport-specific analyses across cricket, handball, basketball, tennis, golf, archery, and baseball reinforce the importance of contextualized rather than uniform application. The evidence remains limited by short interventions, small samples, heterogeneous protocols, variable outcome measures, and limited direct competition-based evidence. Standardized protocols and dose–response studies, longitudinal studies, objective biomarkers, and direct performance measures should be a priority in future research to develop more concrete evidence-based prescriptions for yoga–sports integration for individualization and periodization.

REFERENCES

1. Alazawy, R. (2025). Effect of Yogilates exercises on sport confidence and the performance of some basic skills in rhythmic gymnastics among female students. *Retos*, 70, 280-291.
2. Arbo, G. D., Brems, C., & Tasker, T. E. (2020). Mitigating the antecedents of sports-related injury through yoga. *International Journal of Yoga*, 13(2), 120.
3. Baba Kaya, H., Görün, L., Alper, R., Akpınar, S., Koç, M., Çelen, A., ... & Pepe, Ş. (2025). The effect of kids yoga practices on attention levels and frontal EEG theta/beta ratio. *Frontiers in Psychology*, 16, 1650897.
4. Baishya, A., Hazarika, D., & Metri, K. (2025). Yoga for archers: Development, validation, and feasibility testing of a yoga module. *International Journal of Yoga*, 18(2), 199.
5. Bhunia, G. B., & Ray, U. S. (2024). Improvement in muscular strength, body flexibility and balance by yogasana and with reduced detraining effects by yoga breathing maneuvers: A non-randomized controlled study. *Journal of Ayurveda and integrative medicine*, 15(1), 100815.
6. Brems, C. (2025). Yoga as a mind-body practice. In *Nutrition, fitness, and Mindfulness: an evidence-based Guide for Clinicians* (pp. 209-231). Cham: Springer Nature Switzerland.

7. Bucea-Manea-Țoniș, R., Paun, D. G., Mindrescu, V., & Cătună, C. (2023). Yoga, an appurtenant method to improve the sports performance of elite Romanian athletes. *Sustainability*, 15(5), 4264.
8. Cagas, J. Y., Biddle, S. J., & Vergeer, I. (2021). Yoga not a (physical) culture for men? Understanding the barriers for yoga participation among men. *Complementary therapies in clinical practice*, 42, 101262.
9. Cagas, J. Y., Biddle, S. J., & Vergeer, I. (2023). When an activity is more than just exercise: a scoping review of facilitators and barriers for yoga participation. *International Review of Sport and Exercise Psychology*, 16(1), 93-154.
10. Cakmak, A. (2023). Adaptation of the musculoskeletal system to exercise. In *Functional exercise anatomy and physiology for physiotherapists* (pp. 373-389). Cham: Springer International Publishing.
11. Chen, S., Patel, A., & Weber, K. (2025). Mind–Body Synergy: Evaluating the Effects of Ayurvedic Practices on Athlete Stress Levels and Performance Consistency.
12. Choudhary, P. K., Choudhary, S., Wulandari, I., & Saha, S. (2025). Analyzing the Effects of a 12-Week Yoga and Elastic-Band Resistance Training Program on Functional Fitness in Intermediate-Level Male Tennis Athletes: A Randomised Controlled Trial. *Physical Education Theory and Methodology*, 25(6), 1358-1370.
13. Choudhary, S., Choudhary, P. K., Sahu, K. K., Rajpoot, Y. S., Karmakar, D., & Saha, S. (2025). The impact of a 12-week structured yoga intervention on flexibility, balance, and joint kinematics in university athletes: A quasi-experimental study. *Physical Education Theory and Methodology*, 25(4), 927-937.
14. Di Fronso, S., & Bertollo, M. (2021). The thin line between waking and sleeping in athletes: A call for yoga nidra in the sporting context. *Frontiers in Psychology*, 12, 654222.
15. Fares, R., Vicente-Rodríguez, G., & Olmedillas, H. (2022). Effect of active recovery protocols on the management of symptoms related to Exercise-Induced muscle damage: A systematic review. *Strength & Conditioning Journal*, 44(1), 57-70.
16. Frank, J., Seifert, G., Schroeder, R., Gruhn, B., Stritter, W., Jeitler, M., ... & Voss, A. (2020). Yoga in school sports improves functioning of autonomic nervous system in young adults: A non-randomized controlled pilot study. *PLoS One*, 15(4), e0231299.
17. Geetha, K. (2025). Mindfulness and Yoga Synergy: Enhancing Emotional Regulation and Mental Resilience in Competitive Athletes. *Journal of Yoga, Sports, and Health Sciences*, 23-30.
18. Geetha, K., & Dineshkumar, P. (2025). Integrating Traditional Yoga and Modern Sports Science: Toward a Unified Framework for Human Optimization. *Journal of Yoga, Sports, and Health Sciences*, 8-15.
19. Gothe, N. P., Khan, I., Hayes, J., Erlenbach, E., & Damoiseaux, J. S. (2019). Yoga effects on brain health: A systematic review of the current literature. *Brain Plasticity*, 5(1), 105-122.
20. Hakked, C. S., Balakrishnan, R., & Krishnamurthy, M. N. (2017). Yogic breathing practices improve lung functions of competitive young swimmers. *Journal of Ayurveda and integrative medicine*, 8(2), 99-104.
21. Halappa, N. G. (2023). Integration of yoga within exercise and sports science as a preventive and management strategy for musculoskeletal injuries/disorders and mental disorders—a review of the literature. *Journal of bodywork and movement therapies*, 34, 34-40.
22. Jung, C. G., & Hull, R. F. C. (2023). Yoga and the West. In *Collected Works of CG Jung* (pp. v11_527-v11_586). Routledge.
23. Karthika, J. (2025). The role of Yoga Nidra in mental resilience and performance consistency in elite athletes. *Journal of Yoga, Sports, and Health Sciences*, 39-44.
24. Kasper, K. (2019). Sports training principles. *Current sports medicine reports*, 18(4), 95-96.
25. Khalsa, S. B., Cohen, L., McCall, T., Telles, S., & Cramer, H. (2024). The principles and practice of yoga in health care. Jessica Kingsley Publishers.
26. Koprivica, V. (2018). Tendencies in modern sport. *Physical education and sport through the centuries*, 5(1), 32-48.
27. Kumar, S. P. (2025). Integrated Yoga Nidra–Mindfulness Intervention for Athlete Burnout: A Controlled Study on Mental Health Recovery. *Journal of Yoga, Sports, and Health Sciences*, 16-22.
28. Kusuma, D. W. Y. (2017). Effect of yoga program on mental health: competitive anxiety in semarang badminton athletes. *Jurnal Kesehatan Masyarakat*.
29. Liu, F., Hou, G., & Liang, C. (2020). Effects of Resuming Training Using Yoga on Physical Functions and Fitness of Taekwondo Athletes After High-intensity Training.
30. Malm, C., Jakobsson, J., & Isaksson, A. (2019). Physical activity and sports—real health benefits: a review with insight into the public health of Sweden. *Sports*, 7(5), 127.
31. Marschin, V., & Herbert, C. (2021). Yoga, dance, team sports, or individual sports: Does the type of exercise matter? An online study investigating the relationships between different types of exercise, body image, and well-being in regular exercise practitioners. *Frontiers in Psychology*, 12, 621272.
32. Matko, K., Bringmann, H. C., & Sedlmeier, P. (2021). Effects of different components of yoga: A meta-synthesis. *OBM Integrative and Complementary Medicine*, 6(3), 1-27.
33. Meena, A., & Bairwa, R. The Power of Yoga in Sports: Enhancing Performance and Well-Being.
34. Mejail, M., & Nestares, B. K. (2025). Influence of Core Stability Yoga on Dynamic Balance and Agility among Elite Football Players. *Journal of Yoga, Sports, and Health Sciences*, 1-7.
35. Mittal, G., Kothari, R., Yadav, A., Bokariya, P., & Sharma, K. (2023). Divulging the impetus of yoga on cardiorespiratory fitness and its persona in alleviating anxiety experienced by youth: a cohort interventional study. *Cureus*, 15(5).
36. Muliarta, I. W. (2023). Yoga Exercise Models for Flexibility. *Jurnal Pedagogi dan Pembelajaran*, 6(1), 40-47.

37. Pandey, R., & Singh, R. (2025). Speed development in field hockey: integrating training methods with yoga practices. *Int J Phys Educ Sports*.
38. Petviset, H., Pakulanon, S., Rusmeeroj, S., & Rukdang, B. (2025). Yoga vs. static stretching: Recovery impact on male athletes' post-HIIT heart rate, respiratory rate, blood pressure, and heart rate variability analysis. *International journal of exercise science*, 18(6), 79.
39. Pramanik, T. N., Rahaman, A., Saha, G. C., Roy, A., & Pradhan, P. (2025). Yogic practices as a complementary approach to physical fitness: An intervention study. *Physical Education Theory and Methodology*, 25(1), 109-119.
40. Saeed, S. A., Cunningham, K., & Bloch, R. M. (2019). Depression and anxiety disorders: benefits of exercise, yoga, and meditation. *American family physician*, 99(10), 620-627.
41. Saha, S., Pahan, M. K., Karmakar, D., Kaur, G. I. J., & Gurjar, R. (2025). Psycho-yogic training and its effects on the psychological well-being of underperforming female athletes. *Journal of Bodywork and Movement Therapies*.
42. Sebestyén, M., Binnenbruck, A., Nemes, R., Bakó, D., Dobos, K., Adorján, G., & Ökrös, C. (2025). Effects of yoga on ankle and knee stabilization in young male team-handball players: A study based on assessments. *SPRINT–Sports Research International*, 2(2), 50-58.
43. Sharma, M. S. (2025). Yoga for Skill Development & Compassion. *Yoga: Tradition to Transformation*, 57.
44. Sharma, S. (2020). *Yogāsana & Sports—A Critical Review Study*. The Essence of Yoga, 186.
45. Sindhu, S., & Poornimadarshini, S. (2025). Yoga as an Integrative Science: Bridging Physiology, Psychology, and Performance in Health and Sports. *Journal of Yoga, Sports, and Health Sciences*, 31-39.
46. Sorbie, G. G., Low, C., & Richardson, A. K. (2019). Effect of a 6-week yoga intervention on swing mechanics during the golf swing: A feasibility study. *International Journal of Performance Analysis in Sport*, 19(1), 90-101.
47. Sousa, A., Ribeiro, J., & Figueiredo, P. (2019). Physiological demands in sports practice. In *The sports medicine physician* (pp. 37-44). Cham: Springer International Publishing.
48. Telles, S., Sharma, S. K., Singh, N., & Balkrishna, A. (2017). Characteristics of yoga practitioners, motivators, and yoga techniques of choice: A cross-sectional study. *Frontiers in public health*, 5, 184.
49. Vaidya, S. S., Agarwal, B., Singh, Y., & Mullerpatan, R. (2021). Effect of yoga on performance and physical fitness in cricket bowlers. *International Journal of Yoga Therapy*, 31(1).
50. Vijayalakshmi, C., & Saroja, S. (2025). The Effects of a Structured Yoga Intervention on Cognitive, Psychological, and Functional Performance in Competitive Women's Basketball Players: A Two-Group Controlled Experimental Study. *Physical Education Theory and Methodology*, 25(6), 1328-1336.
51. Vijayapandi, D. (2025). Impact of Advanced Yoga Techniques Significantly Enhance High-Velocity Motor Fitness and Heart Rate Efficiency in Inter Collegiate Men Handball Players. *Anusandhanvallari*, 6050-6057.
52. Wehrmann, R., Dietrich, K. M., & Nguyen-Feng, V. N. (2024). Yoga and mindfulness training for professional baseball players: A narrative study on perspectives and practices. *International journal of yoga therapy*, 34(2024).
53. Wormhoudt, R., Savelsbergh, G. J., Teunissen, J. W., & Davids, K. (2017). *The athletic skills model: optimizing talent development through movement education*. Routledge.
54. Xu, D., Wu, H., Ruan, H., Yuan, C., Gao, J., & Guo, M. (2022). Effects of yoga intervention on functional movement patterns and mindfulness in collegiate athletes: a quasi-experimental study. *International Journal of Environmental Research and Public Health*, 19(22), 14930.
55. Yılmaz, O., Soylu, Y., Erkmen, N., Kaplan, T., & Batalik, L. (2024). Effects of proprioceptive training on sports performance: a systematic review. *BMC Sports Science, Medicine and Rehabilitation*, 16(1), 149.