SHIKSHA SAMVAD
International Open Access Peer-Reviewed & Refereed
Journal of Multidisciplinary Research
ISSN: 2584-0983 (Online)
Volume-1, Issue-2, Dec- 2023
www.shikshasamvad.com

Role of Yogasana and Meditation in Enhancing Performance in Gymnastics

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Abstract:

Gymnastics is a demanding sport in which physical fitness, technical accuracy and psychological readiness must work together. Yogasana and meditation offer complementary approaches to the development of these qualities. This narrative review examines literature published before 2023 to explore their potential contribution to gymnastic performance. Particular attention is given to flexibility, postural balance, muscular control, concentration, competitive anxiety and recovery. Published findings from gymnastics research, athletic interventions and reviews of sport psychology are interpreted in relation to the practical needs of gymnasts. The available evidence suggests that yoga may improve selected physical fitness characteristics, while mindfulness-based practices may support attention and aspects of the flow experience. However, evidence directly linking a combined yoga and meditation programme to improved competition scores in gymnastics remains limited. An integrated training framework is therefore proposed rather than presented as an experimentally validated programme. The article concludes that appropriately supervised yogasana and meditation can be considered supplementary tools within gymnastics preparation, provided that they do not replace technical training, adequate recovery or injury management.

Keywords: Yogasana, meditation, gymnastics, flexibility, balance, mindfulness, athletic performance.

1. Introduction

Gymnastics combines the expressive qualities of movement with the physical demands of competitive sport. A successful gymnast must develop strength, speed, flexibility, balance and coordination while maintaining accuracy during complex sequences. A routine may require the

athlete to move rapidly from a powerful action to a stable position, perform rotations in the air and land with control. Such changes place considerable demands on both the body and the mind. The ability to perform a movement in practice is not always sufficient to ensure that it will be executed successfully under competitive pressure.

The mental challenges of gymnastics are particularly important because athletes perform under close observation. Judges evaluate execution, and even a small technical error can affect a routine. Fear of falling, concern about evaluation and memories of unsuccessful attempts may interfere with performance. A gymnast must learn to respond constructively to these experiences without losing awareness of the immediate task. Physical and psychological preparation should therefore be viewed as related parts of the same training process.

Yoga provides a useful perspective on this relationship. Originating in Indian philosophical and practical traditions, yoga encompasses more than physical exercise. Yogasana refers to the practice of bodily postures, whereas meditation involves the systematic development of attention and awareness. Although these practices have wider philosophical purposes, selected elements can be adapted to the needs of competitive athletes in an accessible and nonsectarian manner. Their relevance to gymnastics lies in the possibility of developing controlled mobility, bodily awareness and a more stable response to pressure.

The purpose of this article is not to argue that yoga alone can produce a successful gymnast. Technical expertise requires repeated apparatus practice, qualified coaching and progressive conditioning. Rather, the central question is whether selected yoga practices can help athletes make better use of the abilities developed through their regular training. This distinction is important because a change in flexibility or a psychological questionnaire score does not necessarily result in a higher competitive gymnastics score.

2. Objectives of the study

The review examines the physical and psychological demands of gymnastics in relation to yogasana and meditation. It evaluates published evidence concerning flexibility, balance, attention and psychological readiness; identifies possible mechanisms through which these practices could support performance; and proposes a practical framework for integrating them into regular training. A further objective is to distinguish established findings from plausible but untested applications, so that coaches and researchers can make informed decisions without overstating the available evidence.

3. Research methodology

The article adopts a focused narrative review design based entirely on secondary sources. Targeted online searches retrieved relevant PubMed records, journal pages and accessible research texts using combinations of yoga, yogasana, gymnastics, gymnasts, meditation, mindfulness, athletic

performance, balance, flexibility and stretching. Only publications dated before 1 January 2023 were eligible for inclusion. Studies concerning gymnasts were prioritized, followed by research involving athletes in other sports and relevant reviews of physical conditioning or psychological training.

The material was organized into physical preparation, psychological preparation, safety and practical implementation. Numerical results were extracted from the published study by Polsgrove et al. (2016) and are reproduced as independently drawn graphs. Other results were synthesized qualitatively. The review does not claim exhaustive database coverage, duplicate independent screening, formal risk-of-bias scoring or a new meta-analysis. No participants were recruited and no new experimental observations were generated. The proposed programme is an application of the reviewed concepts and should be tested before its effectiveness is assumed.

4. Understanding performance in gymnastics

4.1 Physical components

Gymnastic performance depends on the coordinated use of several physical capacities. Strength allows an athlete to support body weight, maintain positions and produce force against an apparatus. Power enables rapid take-offs and explosive movements. Flexibility provides the range of motion required for many body positions, while stability helps control movement within that range. Coordination connects these qualities into a smooth sequence. A gymnast who possesses adequate strength but cannot direct it at the correct moment may still struggle with a skill.

Balance is equally important during stationary and moving tasks. Standing on one leg, maintaining a handstand and controlling the body on a beam require different forms of stability. These tasks involve information from vision, the inner ear and sensory receptors in muscles and joints. The nervous system must combine this information and make appropriate adjustments. Garcia et al. (2011) found differences in postural control between younger gymnasts and nongymnasts, with the findings depending on age and the availability of visual information. This suggests that balance is shaped by experience and task demands rather than being a single general ability.

4.2 Psychological components

Mental readiness involves attention, confidence, management of emotions and the ability to recover after mistakes. A gymnast may have only a brief period in which to prepare for a routine. During this period, unnecessary thoughts about results can compete with attention to the movement itself. Effective preparation helps the athlete identify the relevant cues and begin the routine with a clear intention.

Performance should not be understood simply as the absence of anxiety. Some excitement is natural and may help an athlete feel ready for action. The difficulty arises when worry becomes so intense that it disrupts decision-making, timing or confidence. Meditation may be useful because

it offers a way of noticing such feelings without automatically reacting to them. The athlete can then redirect attention to the next safe action rather than attempting to eliminate every uncomfortable thought.

5. Role of yogasana in physical preparation

5.1 Flexibility and active mobility

Gymnasts require mobility at the shoulders, hips, ankles and other joints. However, greater range is not always better. A useful range is one that can be controlled in the positions demanded by the sport. Passive flexibility describes movement achieved with external assistance or gravity, while active mobility involves the ability to reach and maintain a position through muscular effort. For a gymnast, developing the second quality is just as important as increasing the first.

Selected yogasana practices offer opportunities to work on both qualities. Standing lunges, gentle forward folds and carefully controlled shoulder movements may help athletes explore their available range. Rather than pushing into the maximum possible position, athletes can practise moving slowly and maintaining alignment. A coach can observe whether the desired motion is occurring at the intended joint or whether the gymnast is compensating elsewhere. This is especially relevant when an athlete appears flexible but obtains the position by excessive movement in the lower back.

Polsgrove et al. (2016) studied yoga as an additional activity for male college athletes. Their findings provide preliminary support for improvements in selected flexibility and balance measures. The participants were not a gymnastics sample, so the findings cannot establish that experienced gymnasts will obtain the same benefit. Athletes already possessing exceptional mobility may have less scope for improvement, and their needs may be better addressed through strength at the limits of their existing range.

5.2 Balance and postural stability

Balance-oriented asanas involve maintaining the centre of mass in relation to the base of support. Vrikshasana, or tree pose, is a simple example in which the athlete transfers weight to one leg and maintains a steady posture. A beginner may use wall support, while an experienced athlete may concentrate on controlling the position without unnecessary movements. The purpose is not to make the posture difficult at all costs, but to develop an awareness of how balance is maintained.

For gymnastics, a useful progression might begin with a stable stance on the floor, continue with controlled changes in arm position, and finally move to appropriate sport-specific drills selected by the coach. A floor-based posture should not be treated as equivalent to beam work. The height, surface width and consequences of an error differ substantially. Nonetheless, low-risk practice can provide an opportunity to observe balance strategies before the athlete attempts more demanding situations.

5.3 Muscular control and alignment

Some yoga postures require sustained muscular activity. A modified plank, chair pose or supported warrior position can challenge the trunk and limbs while allowing a coach to observe alignment. These exercises may contribute to low-load muscular endurance and control, depending on the athlete's starting level and the duration of practice. They also encourage awareness of the relationship between breathing and muscular effort.

Gymnasts, however, need much more than the ability to remain in a posture. Vaulting, tumbling and swinging require rapid force production and specialized strength. A yoga session cannot reproduce these loading requirements. It should be placed alongside established conditioning rather than used to replace it. A reasonable application is to use simple postures during supplementary sessions in which the purpose is controlled movement, not maximal power.

5.4 Timing of stretching

The placement of flexibility exercises within the training schedule matters. Long static holds immediately before explosive activity may be inappropriate. A review by Behm et al. (2016) identified short-term performance differences following stretching and showed that the duration and type of stretching influenced the response. This evidence is relevant to gymnasts because jumping and rapid take-off depend on effective force production.

A practical distinction is to use progressive dynamic activity before demanding skills and reserve longer, comfortable mobility sessions for a separate period. Individual responses should guide decisions. If an athlete reports reduced readiness after a particular routine, the coach should reconsider the timing or amount of stretching. The intention is to complement rather than interfere with technical preparation.

6. Role of meditation in psychological preparation

6.1 Attention and concentration

Meditation commonly involves choosing an object of attention, noticing distractions and returning to the chosen object. In breath-focused practice, the athlete may attend to the natural movement of breathing. When thoughts arise, the task is to recognize them and return gently to the exercise. This repeated process provides a practical way to understand attention as a skill rather than a fixed personality characteristic.

Within gymnastics, the same principle can be adapted to a pre-performance routine. Before starting a movement, the athlete identifies a relevant cue, such as the starting position or rhythm of the approach. If attention shifts towards spectators or possible mistakes, the athlete returns to the cue. During execution, the focus must remain appropriate to the movement and the instructions of the coach. Meditation is therefore practised separately from hazardous skills; closing the eyes or turning attention inward during a difficult apparatus movement is not a suitable training method.

6.2 Competitive anxiety and emotional regulation

A gymnast preparing for competition may experience rapid thoughts, muscle tension or fear of failure. These reactions do not necessarily indicate poor preparation. They may reflect the significance of the event. Meditation offers a method of noticing sensations and thoughts without immediately treating them as instructions to act. For example, the thought that a routine might go badly can be recognized as a prediction rather than an established fact.

This distinction can help an athlete return to a familiar preparation routine. It also allows space for legitimate concerns. If fear reflects an actual technical problem, inadequate equipment or an injury, it should be discussed with the coach rather than dismissed as a distraction. Meditation should never be used to persuade an athlete to perform a skill that is unsafe or beyond their current ability.

6.3 Flow and performance experience

Flow describes a state of strong involvement in an activity, often accompanied by a sense of smooth action and reduced concern about how one appears to others. In gymnastics, the experience may occur when an athlete feels fully engaged in the rhythm of a routine. It is not a condition that can be demanded at every competition. Trying too hard to achieve a special mental state may itself become a distraction.

Research by Cherup and Vidic (2019) is particularly relevant because it examined mindfulness training among female collegiate gymnasts. The study reported changes in two specific aspects of dispositional flow: reduced self-consciousness and the rewarding nature of the activity itself. These findings offer sport-specific psychological support, but they should not be interpreted as evidence that every dimension of flow improved or that competitive scores necessarily increased.

6.4 Confidence and recovery from errors

Confidence grows partly through successful experiences and realistic knowledge of one's abilities. Meditation cannot create technical competence where it is absent, but it may help an athlete respond to ordinary uncertainty. A gymnast who makes an error during a routine can learn to avoid prolonged internal criticism and focus on the next movement, where it is safe and appropriate to continue.

After practice, reflection can be combined with brief meditation. The athlete may notice frustration, identify one useful lesson and discuss a realistic improvement with the coach. This separates constructive evaluation from repeated self-criticism. The approach may also support communication within the training environment, because athletes are encouraged to report difficulties rather than hide them in an attempt to appear mentally strong.

7. Evidence from published research

The evidence available before 2023 is best interpreted according to its closeness to the research question. Studies involving gymnasts offer the strongest population relevance, while research

involving other athletes can provide useful but indirect information. Reviews of stretching and mindfulness help explain possible benefits and limitations, but cannot supply a gymnastics-specific effect estimate when the underlying populations and outcomes differ.

Table 1. Selected evidence and relevance to gymnastics

Study	Evidence type	Relevant outcome
Garcia et al. (2011)	Gymnastics comparison	Postural control, age and vision
Cherup & Vidic (2019)	Gymnast mindfulness intervention	Two flow dimensions
Polsgrove et al. (2016)	College athletes, n = 26	Flexibility and balance
Bühlmayer et al. (2017)	Sport meta-analysis	Mindfulness and performance-related measures
Noetel et al. (2019)	Sport systematic review	Mindfulness and acceptance
Behm et al. (2016)	Stretching review	Acute performance and mobility
Thomas & Thomas (2019)	Gymnastics injury review	Injury context

Note. Narrative synthesis; studies are not statistically pooled.

7.1 Quantitative evidence for physical fitness

The published ten-week study of yoga in college athletes involved 14 participants in the yoga group and 12 in the comparison group. For the present review, two outcomes are displayed with their original units: sit-and-reach distance and single-leg stork-stand duration. The graphs show reported means and standard deviations, not newly collected observations. Because the groups differed at baseline on the balance measure, their final values should not be interpreted as a simple ranking of intervention success.

Table 2. Published fitness measurements (mean ± SD)

Measure	Group	Baseline	Week 10
Sit-and-reach (in)	Yoga	21.4 ± 3.9	23.1 ± 2.5
Sit-and-reach (in)	Comparison	21.4 ± 2.7	21.0 ± 3.6
Stork stand (s)	Yoga	12.5 ± 6.5	16.5 ± 8.3
Stork stand (s)	Comparison	22.7 ± 8.8	18.6 ± 9.6

Source: Polsgrove et al. (2016). Participants were male college athletes, not gymnasts.

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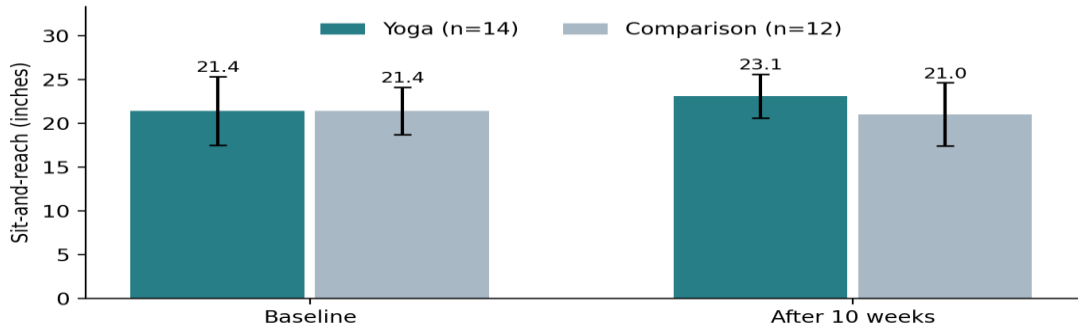
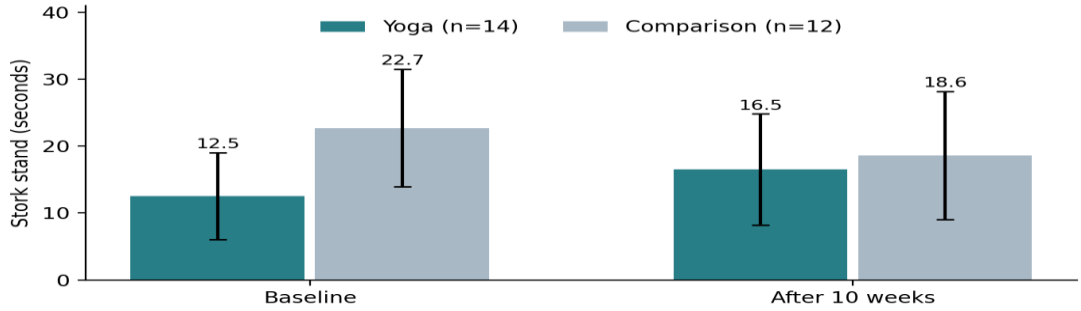
Figure 1. Sit-and-reach performance



Source: Polsgrove et al. (2016); original chart, error bars represent SD.

Figure 2. Single-leg balance performance



Source: Polsgrove et al. (2016); original chart, error bars represent SD.

The figures provide a useful example of how a supplementary programme can be evaluated. The yoga group's mean values moved in a favourable direction, whereas the comparison group's values decreased on both measures. However, the sample was small and the variation among athletes was considerable. Differences in starting ability, training exposure and other influences must be considered. Within-group statistical significance is not equivalent to proof of a between-group treatment effect. A gymnastics-specific investigation would need to address these issues directly.

7.2 Evidence from sport psychology reviews

Bühlmayer et al. (2017) synthesized intervention research on mindfulness in sport. Their review supports continued investigation of mindfulness as a component of mental training but also demonstrates why psychological outcomes and actual sporting results must be separated. Noetel et al. (2019) likewise reviewed mindfulness and acceptance approaches to sports performance. The broader literature is encouraging, although differences in intervention content and methodological quality limit the certainty with which results can be applied to any individual sport.

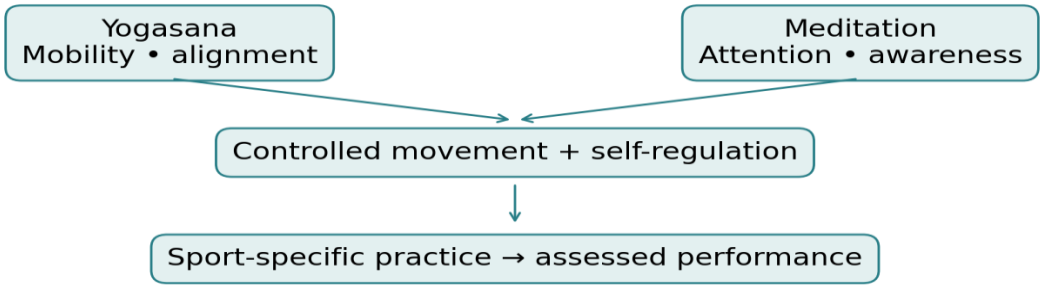
For gymnastics, these findings provide justification for exploring a carefully designed supplementary mental training programme. They do not establish an optimal duration, a universal effect on anxiety or a predictable increase in judged routine scores. It is also possible that an athlete benefits in terms of training experience without showing an immediate improvement in

competition. Such a change can be valuable, but it represents a different outcome and should be reported separately.

8. An integrated body–mind framework

The proposed framework connects yogasana and meditation through three related processes: controlled movement, awareness and regulation. Controlled movement refers to the deliberate practice of alignment and usable mobility. Awareness refers to recognizing bodily sensations and relevant mental events. Regulation refers to choosing an appropriate response, including adjustment of effort, redirection of attention or communication with a coach.

Figure 3. Proposed body–mind framework



Note. Original conceptual illustration; pathways have not been experimentally verified.

A practical example is a gymnast learning a landing. Supplementary physical practice might emphasize ankle mobility and stable lower-limb alignment. Meditation might be used before practice to identify distracting thoughts and select an appropriate cue. Technical coaching then provides specific feedback on the actual landing. These elements work towards a common goal, but their contribution must be assessed through observation of the landing rather than assumed from success in the supplementary exercises alone.

The framework also acknowledges contextual influences. Training volume, rest, nutrition, coaching quality, previous injuries and the difficulty of routines can all affect outcomes. If a gymnast improves following an integrated programme, these variables may offer alternative explanations. A valid research design should therefore examine them rather than attributing every change to yoga or meditation.

9. Proposed training programme for gymnasts

A supplementary programme of eight weeks is proposed as a starting point for supervised evaluation. The duration and schedule are planning choices, not an experimentally established prescription. Two sessions of approximately 25–30 minutes per week may be organized around the existing gymnastics schedule. Short periods of meditation can also be practised on other days if the athlete wishes. The programme should be adapted to age, training experience, available time and medical considerations.

Table 3. Suggested eight-week training progression

Weeks	Physical component	Mental component
1–2	Basic alignment and supported balance	3–5 min natural breath awareness
3–4	Controlled mobility and standing balance	5–7 min attention practice
5–6	Individualized active mobility and stability	7–8 min awareness and task cues
7–8	Consolidation; no forced progression	8–10 min familiar focus routine

Note. Proposed schedule, not published intervention data. Adjust total load and duration individually.

9.1 Selection of yogasana

The exercises should be chosen for a clear training purpose. Tadasana can be used to observe standing alignment, Vrikshasana to practise controlled weight transfer, and a modified Virabhadrasana to explore stability in a split stance. A supported lunge may be useful for comfortable hip mobility, while a modified plank can provide a brief trunk-control task. Shavasana may be used at the end of a separate session when relaxation is appropriate. These exercises should be modified when pain, joint instability or limited movement makes a particular position unsuitable.

Figure 4. Selected standing yogasana postures



Note. Original schematic illustrations, not comprehensive technique instructions.

9.2 Meditation procedure

A basic session can begin with a comfortable seated position and a brief period of natural breathing. The athlete selects a simple attention target and observes it without forcing breathing to follow an unfamiliar rhythm. When distraction occurs, the athlete recognizes it and returns to the target. At the end, the gymnast identifies one useful intention for the next training period. The

exercise should remain voluntary, and athletes who find silent meditation uncomfortable can use a shorter eyes-open version or an alternative mental preparation activity.

In the competition setting, a brief familiar routine may be more useful than introducing a new technique. The athlete can notice their feet on the floor, allow a comfortable breath and recall the first relevant movement cue. The routine should fit within competition rules and should not delay necessary warm-up or communication. Coaches should allow individual variation rather than insisting that every gymnast use identical mental preparation.

10. Safety, recovery and athlete welfare

Training programmes must recognize that gymnastics carries a risk of injury. Thomas and Thomas (2019) reviewed injury research across gymnastics settings, highlighting the importance of understanding the circumstances in which injuries occur. This does not mean yoga has been shown to prevent such injuries. The proposed supplementary programme should be judged by its safety and usefulness, not by a promise that it will eliminate physical risk.

Gymnasts may already possess a large range of joint motion, and additional flexibility work is not appropriate for everyone. Athletes with instability, pain or a history of injury may need individualized advice from a sports medicine professional or physiotherapist. Postures involving extreme back extension, unsupported inversions or heavy pressure on the wrists should not be introduced simply because they resemble gymnastics skills. The instructor should avoid forced stretching and should not use pain as an indication of progress.

Recovery is another area in which expectations should remain realistic. A quiet session may help an athlete transition from training to rest, but it cannot compensate for inadequate sleep, insufficient food or excessive workload. Coaches should monitor the total demands placed on athletes and allow sufficient time for recovery. When a gymnast is injured or unusually fatigued, an additional session may not be helpful, even if the activity is described as gentle.

Psychological safety is equally important. Young athletes should be able to decline an exercise without penalty. Meditation is not a substitute for professional assessment when persistent anxiety, low mood or other mental health concerns are present. A supportive coaching climate should encourage athletes to communicate their needs and prioritize long-term health over short-term results. In this respect, the wider yogic emphasis on moderation and self-awareness can be reflected in everyday coaching decisions without requiring adherence to any religious belief.

11. Application in the Indian context

India offers a distinctive setting for the introduction of yoga-based supplementary training because yoga is familiar within many educational and physical education institutions. Schools, universities and sports academies may be able to organize supervised sessions using existing facilities and trained personnel. A mat, a safe floor area and a suitable instructor are sufficient for many basic

practices. However, low equipment requirements should not be confused with an absence of professional responsibility.

Collaboration between gymnastics coaches, physical education teachers and qualified yoga instructors is desirable. The gymnastics coach can explain the technical demands of the sport, while the yoga instructor can adapt postures and provide guidance on breathing and relaxation. Where possible, a sports psychologist or counsellor can contribute to the development of age-appropriate mental training. The programme should be offered in language that athletes understand, with attention to differences in experience and physical ability.

12. Directions for future empirical research

A useful next step would be a controlled investigation involving gymnasts with similar training experience. Participants could be assigned to usual training, usual training plus yogasana, usual training plus meditation, or usual training plus both practices, provided the available sample supports such a design. An active comparison condition with equivalent instructor contact would help account for the effects of additional attention. Sample size should be determined through an appropriate power analysis before recruitment.

The primary outcome could be the execution score of a standardized routine assessed by qualified judges unaware of group allocation. Secondary outcomes might include active joint mobility, a standardized balance test, landing stability, perceived competitive anxiety and training enjoyment. Assessment conditions should remain consistent across groups, and the evaluation should account for differences in apparatus, age and competitive level. Adverse events and attendance should also be recorded.

Analysis should focus on differences between groups while accounting for baseline measurements. Effect sizes and confidence intervals would show the size and precision of any observed benefit, rather than relying entirely on statistical significance. A follow-up assessment could examine whether changes remain after supervised sessions end. Reporting should include unsuccessful outcomes and withdrawals, as these are important for understanding the true value and feasibility of the programme.

13. Discussion

The research reviewed here supports a cautious interpretation of yoga and meditation as complementary methods of gymnastics preparation. Their most plausible contribution lies in the development of selected capacities that support performance rather than in a direct or universal effect on competitive success. Physical practices can provide structured opportunities to explore mobility and alignment, while meditation can help athletes develop a more deliberate response to distractions and emotional demands.

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The distinction between general physical fitness and sport-specific performance is central. Gymnastics training already includes many exercises for flexibility, strength and balance. A supplementary approach should therefore add something useful instead of repeating existing work at unnecessary cost. For one athlete, the priority may be improved control of an available range of motion. For another, it may be more useful to develop a consistent mental routine before competition. A programme that begins with a needs assessment is more likely to be relevant than one that applies identical exercises to all gymnasts.

There is also a distinction between an immediate experience and a lasting training adaptation. A gymnast may feel calmer following meditation, but that experience alone does not demonstrate improved attentional control over several months. Similarly, an increase in joint range immediately following stretching may not represent a durable improvement. Regular assessment over an appropriate period is needed to establish whether the intended changes occur and whether they matter in the sport.

The proposed framework is valuable primarily as a basis for such assessment. It connects physical and psychological practices with observable training objectives and places technical coaching between supplementary exercise and competitive performance. This avoids an overly simple explanation in which any improvement is automatically attributed to yoga. It also provides a practical foundation for examining the combined and separate contributions of yogasana and meditation.

14. Limitations

The review is based on selected accessible publications rather than an exhaustive systematic search. Direct evidence concerning combined yoga and meditation interventions in gymnasts published before 2023 was limited within the retrieved literature. The quantitative illustration comes from athletes in other sports and cannot be generalized automatically to gymnasts. Differences in methods, intervention duration and outcomes prevent meaningful statistical pooling in this article. Some sources were available as abstracts or bibliographic records, limiting detailed appraisal of their procedures. The proposed training schedule has not been experimentally evaluated in this review, and no causal or numerical prediction of gymnastics performance is made.

15. Conclusion

Yogasana and meditation provide complementary opportunities to address physical and psychological aspects of gymnastics preparation. Selected postures may support controlled mobility, balance and awareness of alignment, while meditation may help athletes practise concentration and respond constructively to competitive pressure. Published research before 2023 offers preliminary support for some of these outcomes, including selected aspects of flow among

collegiate gymnasts. Evidence for improved judged gymnastics performance remains insufficient to draw a firm conclusion.

The most appropriate approach is to integrate these practices selectively within a well-designed training programme under qualified supervision. Technical practice, progressive conditioning, recovery and athlete welfare remain fundamental. Future controlled studies should assess actual gymnastics outcomes alongside physical and psychological measures. Such research can clarify when yogasana and meditation are useful, for whom they are most suitable and how they can be incorporated safely into everyday training.

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An Online Quarterly Multi-Disciplinary
Peer-Reviewed / Refereed Research Journal
ISSN: 2584-0983 (Online)
Volume-01, Issue-02, December- 2023
www.shikshasamvad.com
Certificate Number-Dec-2023/33

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"Role of Yogasana and Meditation in Enhancing Performance in Gymnastics"

Published in 'Shiksha Samvad' Peer-Reviewed / Refereed Research Journal and

E-ISSN: 2584-0983(Online), Volume-01, Issue-02, Month December, Year- 2023.

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