

Yogic Practices and Influence on Physical Fitness Adaptation in Wrestlers from Malappuram District

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Abstract: In Malappuram, wrestling is part of Kerala's culture. Wrestler fitness research is popular but restricted. This study shows how yoga affects Kerala wrestlers' fitness levels, demonstrating its potential for training. This study examined how targeted yoga workouts affected core strength and flexibility in Malappuram wrestlers. The study examined whether these activities improved wrestling-related physical qualities. This quantitative, experimental study examined how yoga activities affected wrestlers' physical features. The experimental group of 40 Malappuram wrestlers did a 6-week yoga program to improve flexibility and core strength, while the control group continued their regular training. The sit-and-reach test tested flexibility, while a one-minute bent-knee sit-up test measured core strength. Under ethical, informed permission and data confidentiality guidelines, SPSS paired t-tests were used to analyze data. The control group showed no significant changes in flexibility or core strength, with pre-test and post-test mean flexibility scores of 24.75 (SD = 1.62) and 25.05 (SD = 1.28), respectively, and a t-value of 0.87963 and p-value of 0.195. However, the experimental group improved significantly, with pre-test flexibility scores of 25.00 (SD = 1.56) rising to 30.00 (SD = 1.86) post-test, providing a t-value of 8.9727 and a highly significant p-value of 0.0000001464. Targeted yoga interventions increased wrestlers' flexibility and core strength, but the control group did not. These findings emphasize the value of yoga in training to improve athletic performance and reduce injury risk.

Keywords: Physical Fitness; Yogic Practices; Fitness Standards; Wrestling Performance; Core Strength; Athletic Performance; Spiritual Practices; Mindfulness and Concentration.

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1. Introduction

Yoga, a discipline with roots in ancient India, integrates mental, physical, and spiritual practices aimed at holistic well-being [1]. The term "yoga" is derived from the Sanskrit word "yug," meaning unity or togetherness. From a spiritual perspective, yoga symbolizes the cohesive alignment of mind, body, and spirit, fostering balance and inner harmony [2]. Yoga is a well-regarded fitness practice that strengthens muscles, improves flexibility, enhances balance, and boosts endurance. Although highly effective in these areas, its impact on cardiorespiratory fitness and body composition varies with intensity, style, and frequency [3]. Combined with other exercises, yoga offers a balanced approach to overall physical fitness. Also, this regular

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practice is a highly beneficial complement to physical and sports training programs, offering diverse advantages that elevate physical and mental performance [4]. It promotes increased flexibility, balance, mental focus, and stress resilience, making it a valuable addition to conventional training routines. Integrating yoga into a wrestler's training program can enhance physical strength, flexibility, and mental well-being, all of which are crucial for optimal performance. Similarly, it improves core strength for better stability and control, increases flexibility for more efficient technique execution, and reduces injury risk [5]. Additionally, it fosters mindfulness and concentration, helping wrestlers manage stress and anxiety during competitions. By incorporating yoga into their training, wrestlers can adopt a holistic approach that enhances their physical abilities and mental resilience [6].

Research in sports shows that yoga improves cardiorespiratory endurance, muscle strength, and flexibility, benefiting wrestling performance. Enhanced endurance allows athletes to maintain exertion during matches, while increased strength supports powerful movements [7]. Improved flexibility is essential for a greater range of motion and injury prevention, making yoga a valuable addition to a wrestler's training regimen [8]. A wrestler's ability to execute techniques and minimize injury risk can be improved through regular yoga practice, which enhances flexibility and range of motion [9]. Yoga's dynamic and static poses stretch and strengthen key muscle groups, particularly the hips, shoulders, and spine, enabling optimal positioning during matches [10]. Additionally, yoga promotes body awareness and core strength, supporting stability and control. It also aids in muscle recovery, reducing the risk of overuse injuries. Overall, incorporating yoga into a wrestler's training routine enhances performance and fosters a safer training environment [11]. A structured, core-specific training program that incorporates yoga poses targeting the core has been demonstrated to enhance the performance of back and hip extensors, which are essential for effective wrestling maneuvers [12]. Physical fitness is a multifaceted concept involving various attributes that enable individuals to perform physical activities effectively and efficiently. It is typically achieved through regular exercise and balanced nutrition [13].

Regular physical activity is essential for preventing and managing significant health issues and mortality, particularly aging-related issues [14]. Regular exercise improves cardiovascular health, strengthens muscles and bones, and boosts metabolism, reducing the risk of chronic diseases such as heart disease, diabetes, and osteoporosis [15]. Additionally, it enhances cognitive function and mobility, which is crucial for preserving independence and quality of life in older adults [16]. Integrating fitness into daily routines provides substantial health benefits and encourages longevity as individuals age. Besides, physical fitness is closely linked to engaging in dynamic and creative cognitive activities, which significantly contribute to improved overall mental health and well-being [17]. And fitness is vital for maintaining overall health, enhancing performance in specific tasks, and improving quality of life across diverse populations [18]. Regular physical activity not only supports physical well-being but also boosts mental health and emotional resilience, benefiting individuals of all ages and backgrounds. Incorporating specialized training methods, such as CrossFit, into sports training can significantly enhance general and sport-specific physical fitness [19]. This approach effectively improves strength, endurance, and overall athletic performance, equipping athletes with the skills needed for success and resilience in competition [21]. Physical fitness is vital for sports performance, enhancing key attributes like strength, agility, endurance, and flexibility [20].

Diverse training methods help athletes develop a balanced fitness profile that meets their performance goals. Effective training programs and coaching feedback enhance athlete satisfaction and performance [22]. Combining sports medicine with customized training plans improves physical fitness and contributes to athletic success [23]. Sports performance is a complex trait influenced by factors such as physical fitness, training, psychological factors, data analysis, environmental conditions, and genetics. By effectively addressing and improving these aspects, athletes can boost their performance [24]. A holistic approach that considers all these factors enables athletes to fully realize their potential and achieve greater success in their respective sports. Participating in regular physical activity is vital for enhancing both physical and mental well-being [25]. Key benefits include improved muscle strength, alleviation of symptoms of mental health disorders, and enhanced cognitive function. Moreover, regular exercise contributes to overall wellness, elevates mood, and can improve sleep quality. By making regular physical activity a priority, individuals can cultivate a healthier lifestyle and experience substantial improvements in their overall health and quality of life [26]. Although there is substantial research on specific yogic exercises and their effects on the physical aspects of wrestling, studies centered on the Malappuram district are limited [27].

The existing literature frequently overlooks the psychological dynamics at this level, especially the connection between yogic postures and psychological factors among male and female athletes across sports [28]. Studies on the effects of specific yogic exercises on physical variables among wrestlers reveal notable gaps, particularly for wrestlers from regions such as Malappuram district [29]. Existing research seldom examines how these exercises impact wrestling-specific physical qualities, such as core stability and endurance, which are essential for competitive success [30]. Additionally, there is limited exploration of possible gender-based differences in these outcomes, and few long-term studies assess the lasting benefits of yogic training, underscoring the need for more in-depth investigation [31]. This study on yogic exercises and their effects on physical variables in wrestlers is significant for several reasons [32]. It aims to enhance athletic performance by exploring how yogic practices improve essential attributes, such as core strength and endurance, that are vital to success in wrestling [33]. The findings will

aid coaches and athletes in developing tailored training programs that incorporate these exercises, optimizing physical conditioning and competition outcomes [34]. Additionally, by focusing on wrestlers from Malappuram district, the research addresses specific cultural contexts, thereby ensuring its relevance [35]. The study also examines potential gender differences in the effects of yogic practices, promoting inclusive training strategies [36]. Overall, this research fills a crucial gap in the literature, emphasizing a holistic approach to athlete development that integrates physical, mental, and overall well-being [37].

2. Materials and Methods

2.1. Selection of Subjects

The study involved 40 wrestlers (aged 15–23 years) from Malappuram, Kerala, India, who were randomly allocated into a control group (n = 20) and an experimental group (n = 20). Conducted at the Malappuram Wrestling Club, the participants were healthy, free from acute or chronic illnesses, non-smokers, abstained from alcohol, and did not use medications during the study. All had normal vision and provided written informed consent after the study details were explained. Table 1 presents their descriptive characteristics [38].

Table 1: Descriptive characteristics

Age		
Range	15-23	-
Mean (SD)	19 (4.0)	-
Gender		
Male	40	100%
Practiced Yoga During Previous Weeks		
Yes	0	0%
No	40	100%

2.2. Participants

Forty wrestlers were randomly selected from 75 in the Malappuram district, following specific inclusion criteria. Data were collected through pre- and post-assessments of flexibility (via Chakrasana and Paschimottanasana) and abdominal strength (via Sarvangasana, Noukasana, and Ustrasana). Participation was voluntary, with ethical standards maintained. Descriptive statistics and paired t-tests analyzed within-group changes, evaluating the impact of yogic practices on physical performance.

2.2.1. Inclusion Criteria

- Age group 15-23
- Professional Wrestlers
- Experienced Wrestlers
- Male Wrestlers

2.2.2. Exclusion Criteria

- New Wrestlers
- Injured Wrestlers
- Inexperienced Wrestlers
- Female Wrestlers

2.3. Experimental Design

The study employed a proper experimental design using a randomized pre-test–post-test-controlled group approach. This six-week intervention aimed to evaluate the effects of yogic practices on flexibility and abdominal strength. Probability sampling was utilized to ensure equal selection opportunities for all individuals in the population, enhancing the reliability and generalizability of the results.

2.4. Experimental Protocol

The experimental group followed a structured yoga program designed to enhance flexibility and abdominal strength. Flexibility was measured using poses such as Chakrasana (Wheel Pose) and Paschimottanasana (Seated Forward Bend), with results recorded via the standard sit-and-reach test. Abdominal strength was assessed through Sarvangasana (Shoulder Stand) and Naukasana (Boat Pose), with performance quantified using the one-minute bent-knee sit-up test for consistency. Descriptive statistics were used to summarize participants' demographics and key variables. Sessions were held daily from 6:30 to 7:30 a.m. at the Malappuram Wrestling Club, under the guidance of certified yoga instructors to ensure accurate practice. The control group maintained their regular activities without additional training. Pre- and post-intervention assessments of physical and fitness parameters were conducted for all participants. Further details of the intervention are provided in Table 2.

Table 2: Brief yoga intervention module

No.	List Yoga Practices	Time Duration (60 min)	Schedule
1	Chakrasana (Wheel Pose)	2 sets of 20 seconds each	Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday
2	Ushtrasana (Camel Pose)	2 sets of 20 seconds each	
3	Paschimottanasana (Seated Forward Bend)	2 sets of 20 seconds each	
4	Sarvangasana (Shoulder Stand)	2 sets of 20 seconds each	
5	Naukasana (Boat Pose)	2 sets of 20 seconds each	

2.5. Instrument and Tools

The sit-and-reach test is a widely used assessment of flexibility in the lower back and hamstrings, commonly used in physical education and fitness evaluations. Participants use a sit-and-reach box or a ruler, sitting on the floor with legs straight and feet flat against the measuring device. They then reach forward with their hands while keeping their knees locked, holding the position briefly before recording the distance reached in centimeters or inches. Scoring is determined by how far the fingertips extend beyond the toes, with positive scores indicating a reach past the toes and negative scores indicating a shortfall. For example, a reach of 5 cm beyond the toes results in a score of +5 cm, while a reach of 3 cm short of the toes results in a score of -3 cm. A positive score indicates good flexibility, which is vital for athletic performance and injury prevention. Overall, the sit-and-reach test provides a quick and effective way to assess flexibility, often guiding the development of personalized stretching programs. To measure pulse rate manually, gently place your index and middle fingers on the radial or carotid artery, count the beats for 15 seconds, and multiply by 4 to calculate the BPM. Alternatively, count for 30 seconds and multiply by 2.

Be sure to observe the pulse's rhythm and strength, following a standardized procedure for accurate, effective measurements. This approach is simple, economical, and appropriate for general use in both clinical and fitness settings. The sit-up test is a widely recognized assessment of abdominal strength and endurance, crucial to overall fitness and athletic performance. Participants lie on their backs on a flat, non-slip surface, with knees bent at 90 degrees and feet flat on the ground, placing their hands behind their heads or crossed over their chests. They then perform as many sit-ups as possible within one minute, curling their torso toward their knees until their elbows touch. An assistant may hold the feet for stability, but this is optional. The total number of successful sit-ups completed is recorded as the score, providing a clear measure of core strength. A score of 0 to 10 sit-ups generally indicates below-average abdominal strength and endurance, while 11 to 20 sit-ups reflect average performance. Scores of 21 to 30 sit-ups are considered above average, and 31 or more sit-ups indicate excellent strength and endurance. These ranges may vary by age and gender norms, so it's important to consult the relevant scoring table for an accurate assessment. This numerical scoring system allows easy comparison of an individual's abdominal strength with that of their peers.

2.6. Test Administration

To measure flexibility, participants were instructed to sit comfortably and follow a demonstrated procedure. The sit-and-reach test is a widely used assessment of lower back and hamstring flexibility, commonly used in physical education and fitness evaluations. Participants use a sit-and-reach box or a ruler, sitting on the floor with legs straight and feet flat against the measuring device. Scoring is determined by how far the fingertips extend beyond the toes, with positive scores indicating a reach past the toes and negative scores indicating a shortfall. The sit-up is a trusted and efficient way to evaluate abdominal strength, valued for its reliability, ease of execution, and ability to activate various muscle groups. Sit-ups primarily target the rectus abdominis and external obliques, with significant activation of the hip flexors, providing a comprehensive assessment of core strength. A common method involves measuring abdominal endurance by counting the number of sit-ups completed in 1 minute, making it a straightforward and widely used fitness assessment tool.

2.7. Statistical Analysis

In this study, data analysis is conducted using the R software for Statistical Computing (version 4.1.1). To assess the significant effect of specific yogic exercises on the physical parameters of wrestling players, a paired t-test is applied. This statistical method is widely used to compare the means of two related groups and determine if there is a statistically significant difference. It ensures robust, reliable results by adhering to standard research practices for analyzing pre- and post-intervention data. A significance level of 0.05 was established for this study. Since the data follows a normal distribution, the results are reported as the mean (M) and standard deviation (SD).

3. Result

The study's results highlighted significant differences in physical assessments between the control and experimental groups of wrestlers. In the flexibility assessment, the control group had a pre-test mean of 46.45 (SD = 3.24) and a post-test mean of 46.35 (SD = 3.18), with a T value of -0.27085 and a P value of 0.6053, indicating no significant change. Conversely, the experimental group exhibited a pre-test mean of 47.2 (SD = 2.80) and a post-test mean of 54.7 (SD = 3.34), resulting in a T value of 9.3789 and an extremely significant P value of 0.00000007317, demonstrating a substantial improvement due to the targeted yogic exercises. In the abdominal strength assessment, the control group reported a pre-test mean of 24.75 (SD = 1.62) and a post-test mean of 25.05 (SD = 1.28), yielding a T value of 0.87963 and a P value of 0.195, indicating no significant change. In contrast, the experimental group showed a pre-test mean of 25 (SD = 1.56) and a post-test mean of 30 (SD = 1.86), with a T value of 8.9727 and a P value of 0.00000001464, indicating a significant enhancement in abdominal strength. These results underscore the effectiveness of specific yogic exercises in improving both flexibility and abdominal strength among the wrestlers in the experimental group.

3.1. Abdominal Core Strength

The study found that the control group, consisting of 20 wrestlers, did not show a statistically significant change in performance between the pre-test and post-test evaluations. The pre-test mean score was 24.75 (standard deviation = 1.62), while the post-test mean score increased slightly to 25.05 (standard deviation = 1.28). The statistical analysis yielded a t-value of 0.87963 and a p-value of 0.195, indicating that the intervention applied to this group had a negligible effect on their overall performance. These results suggest that the training regimen followed by the control group may not have been sufficiently rigorous or effective in fostering meaningful improvements in abdominal strength and endurance. The lack of statistically significant findings underscores the necessity for further investigation into the specific components of training that could enhance athletic performance. Additionally, these outcomes emphasize the importance of implementing targeted, evidence-based interventions to maximize athletes' physical capabilities. Continuous monitoring and assessment are essential for identifying effective training strategies in sports performance.

3.2. Flexibility

The study's findings demonstrated that the control group of 20 wrestlers did not show any significant improvement between their pre-test (M = 46.45, SD = 3.24) and post-test (M = 46.35, SD = 3.18) scores, with a t-value of -0.27085 and a p-value of 0.6053. This indicates that the standard training methods used by the control group did not result in measurable gains in flexibility. Conversely, the experimental group showed a significant improvement from the pre-test (M = 47.2, SD = 2.80) to the post-test (M = 54.7, SD = 3.34), with a t-value of 9.3789 and a p-value of < 0.0001. This result underscores the effectiveness of the targeted yogic exercises in enhancing physical performance. The thorough statistical analysis supports the premise that specific yogic interventions can enhance athletic performance, underscoring the importance of incorporating these practices into training regimens. The significant advancements observed in the experimental group further suggest that yogic exercises could be a valuable complement to traditional training approaches in sports science (Table 3).

Table 3: Comparison of abdominal core strength and flexibility between the control group and the experimental group

Group	Mean	Standard Deviation	T-Value	P-Value
Abdominal Core Strength				
Control Group (20 Wrestlers)	Pre-Test: 46.45	3.24	-0.27085	0.6053
	Post-Test: 46.35	3.18		
Experimental Group (20 Wrestlers)	Pre-Test: 47.2	2.80	9.3789	0.00000007317
	Post-Test: 54.7	3.34		
Flexibility				
Control Group (20 Wrestlers)	Pre-Test: 24.75	1.62	0.87963	0.195
	Post-Test: 25.05	1.28		
Experimental Group (20 Wrestlers)	Pre-Test: 25	1.56	8.9727	0.00000001464

	Post-Test: 30	1.86		
<i>Note: SD = standard deviation; p = significance level; p < 0.05; t = t-statistic value.</i>				

4. Discussion

The main goal of this study is to examine the effects of specific yogic exercises on selected physical variables among wrestlers in Malappuram district. This research seeks to enhance understanding of how these targeted exercises impact different dimensions of physical performance, ultimately contributing to the knowledge of practical training strategies in wrestling and encouraging the incorporation of yogic practices into athletic training regimens. The study's findings demonstrated that specific yogic exercises significantly impacted the physical variables of wrestlers in the Malappuram district. The experimental group participating in these targeted yogic practices experienced notable improvements in flexibility and abdominal strength, while the control group showed minimal changes. Furthermore, statistical analysis validated the significant performance enhancements observed in the experimental group, highlighting the effectiveness of incorporating yogic exercises into training programs to boost athletic performance and overall physical fitness.

4.1. Abdominal Core Strength

This research investigated differences in abdominal core strength between the control and experimental groups of wrestlers. By comparing these groups, the study aimed to assess the impact of targeted interventions on core strength, providing valuable insights into practical training methods to enhance wrestling performance. Our study demonstrated that targeted yogic postures significantly enhanced core strength in the experimental wrestlers, underscoring the effectiveness of focused training for boosting athletic performance. Multiple studies have indicated that yoga significantly improves core muscle strength. For instance, a three-month yoga program substantially increased core muscle strength among participants, underscoring yoga's effectiveness as a valuable means of enhancing physical fitness and stability. Yogic postures combined with breathing exercises can substantially improve core strength, as demonstrated by greater muscle activation and better strength test results in children and adults. Practicing yoga regularly improves overall muscle strength and endurance, with a notable increase in muscle strength throughout various body regions, especially the core. A well-structured twelve-week yoga program significantly enhanced core strength among preschoolers, demonstrated by improved performance in sit-up and standing long jump tests. This finding underscores the efficacy of early yoga interventions in supporting crucial physical development and laying a strong foundation for lifelong fitness in young children. A study found that structured yoga interventions can effectively reduce performance anxiety, improve life satisfaction, and enhance athletic performance among elite athletes.

These results underscore yoga's value as a tool for building mental resilience and enhancing performance in competitive sports. Regular yoga can enhance several aspects of athletic performance, including respiratory efficiency, mental health, and physical conditioning, making it a valuable component of athletes' training. Similarly, incorporating regular yoga practice into athletic training programs significantly benefits physical and mental performance, ultimately improving overall sports outcomes. This well-rounded approach boosts flexibility, endurance, mental resilience, and focus, making yoga an effective tool for optimizing athletic potential. Practicing yoga and mindfulness has been shown to strengthen mental toughness, closely associated with enhanced performance, progress toward goals, and resilience in handling pressure and adversity. These practices build a solid mental foundation that supports sustained excellence in competitive settings. They enhance psychological and physiological aspects, such as strength, flexibility, balance, and coordination, which are crucial for injury prevention and enhancing athletic performance. Consistent yoga practice can minimize the risk of injuries by incorporating appropriate warm-up routines, professional guidance, real-time posture monitoring, and an emphasis on enhancing balance and flexibility. Additionally, awareness of injury-prone areas and adherence to preventive strategies are essential for ensuring safe and effective practice. Including these components makes yoga a beneficial addition to training routines, enhancing physical health and mental well-being. This well-rounded approach boosts flexibility, strength, and resilience, equipping athletes with a solid foundation for improved performance and well-being.

4.2. Flexibility

This study examined differences in flexibility between the control and experimental groups of wrestlers. Analyzing these groups aimed to determine the effects of targeted interventions on flexibility, offering valuable insights into effective training strategies to boost wrestling performance. Our study revealed considerable improvements in flexibility in the experimental group relative to the control group. Implementing targeted flexibility exercises led to significant improvements in the experimental group, whereas the control group showed only slight gains, underscoring the importance of structured flexibility training in wrestling. Practicing yoga weekly can greatly enhance flexibility, making it a valuable addition to fitness routines that promote overall well-being. Yoga is effective in improving flexibility across diverse populations, including healthy children, older women, and college-aged men. For example, an eight-week yoga program led to significant gains in flexibility among overweight older women, illustrating yoga's adaptability as a beneficial exercise for individuals of varying ages and fitness levels. These findings

highlight the value of integrating yoga into regular physical activity to enhance overall health and flexibility. Yoga is effective in improving flexibility, especially in the hamstrings and lumbar area. Studies indicate that both short-term (6 weeks) and long-term (12 weeks) yoga programs lead to significant gains in flexibility.

Additionally, evidence suggests that male participants often experience more substantial improvements in flexibility than their female counterparts. These results highlight the importance of integrating yoga into fitness routines to enhance flexibility and overall physical health. Yoga effectively enhances balance and coordination, which are crucial for athletic success. Research has shown that participants of all genders experience improvements in static and dynamic balance following yoga training, highlighting its value for athletic development. Engaging in regular yoga practice has been shown to improve muscle strength and endurance, which are essential for athletes to maintain optimal muscle tone and reduce the likelihood of injury. This integration of yoga into athletic training supports sustained physical resilience and contributes to long-term performance benefits. Consistent practice of specific yoga flexibility postures can greatly improve athletic performance and help prevent injuries. When these postures are tailored to the unique requirements of each sport and performed with proper technique, they enhance range of motion, muscle balance, and joint stability, all of which are vital for achieving peak performance and reducing the likelihood of injury. Incorporating targeted yoga practices into daily routines can lead to marked improvements in physical and mental well-being, ultimately boosting overall performance and personal growth. Regular engagement in these exercises enhances core strength, flexibility, balance, and mental resilience, which are crucial for sustained health, effective stress management, and peak performance across a range of sports and physical activities.

5. Conclusion

The study shows that some yogic practices can significantly affect key physical performance characteristics in wrestlers, including flexibility and core strength. The experimental group, which performed specific yoga routines, showed significant increases in these areas compared with the control group, highlighting yoga's effectiveness as a valuable component of athletic training regimens. These findings suggest that yoga is not simply an add-on activity but a bona fide training intervention that can enhance key physical capacities required for sports performance. The data also suggest that yoga may improve essential physical qualities directly related to sports performance. More flexibility can help you move across a broader range of motion and with greater movement efficiency. More core strength can improve your stability, balance, and overall body control. These benefits can give players a competitive edge in training and competition. Yoga may also play a significant role in injury prevention and healing by reducing muscular tension, improving posture, and supporting physical resilience. This research adds to the expanding body of evidence highlighting the benefits of physical training through holistic, non-invasive approaches to improve strength, endurance, and resilience. Regular yoga practice as part of athletes' training programs appears to be a valid method for optimizing performance outcomes. Future research might develop sport-specific yogic techniques, examine their applications across a variety of athletic disciplines, and investigate their long-term effects. These findings provide useful insights into the development of standardized yoga-based therapies that may be effectively implemented into sports performance programs.

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