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ESSENTIAL YOGA PRACTICES FOR FOOTBALL PLAYERS TO ENHANCE SPORTS PERFORMANCE

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Abstract

Football demands high levels of muscle strength, aerobic capacity, and anaerobic power to meet the sport's physical and physiological challenges. Yoga has been shown to enhance flexibility, stability, endurance, and cognitive function, benefiting both physical performance and mental well-being. Despite this, there is a notable absence of studies specifically focused on sport-specific yoga practices for football players. The study aims to identify essential yoga practices for football players based on input from subject matter experts. A total of 76 yoga practices were identified through a review of classical texts and supported by research evidence. To establish the validity of these practices, a panel of 30 subject matter experts (SMEs) was consulted. The data were analysed using Lawshe's Content Validity Ratio (CVR) to assess content validity. Among the 76 integrated yoga practices subjected to validation, 38 practices achieved a CVR score of ≥0.33, signifying high content validity ($p<0.05$), *while the remaining 38 practices had a CVR score of <0.33, indicating low content validity. The 38 practices with a CVR score of ≥0.33 were deemed essential for football players. The study highlights the potential of yoga to improve overall athletic performance and reduce injury risk, emphasizing the need for incorporating sport-specific yoga programs.*

Keywords: *Yoga module, yoga for football, yoga for athletes, yoga for sports players*

INTRODUCTION

Football is a physically demanding sport requiring high levels of fitness, technical skill, and tactical expertise (Pramanik et al., 2022). The physical and physiological demands on players vary significantly based on their playing positions (Wellman et al., 2016; Sumarno & Ristiawan, 2022). For instance, defenders, midfielders, and strikers engage in varying amounts of sprinting, running, and other movements, with players spending approximately 40.6% of match time in purposeful movement (Bloomfield et al., 2007), additionally, players perform numerous directional changes, averaging 726 turns per match, which highlights the need for agility and quickness (Bloomfield et al., 2007).

Football places substantial cardiovascular, metabolic, and biochemical demands on players. Intense physical exertion during a match lead to significant post-match biochemical changes, such as fluid deficits and elevated enzyme levels (Pohl et al., 1981). The sport requires both aerobic and anaerobic capacities, and training regimens should address these needs to optimize performance and recovery (Reilly, 2003). Therefore, tailored training programs and performance analyses are crucial to optimizing player development and overall team performance (Pramanik et al., 2022). Training enhances key physical and physiological attributes, such as grip and back strength, flexibility, anaerobic power, and VO_2max, while reducing body fat and resting heart rate (Ghosh et al., 2023). In addition to the physical and physiological demands, psychological factors and tactical understanding are vital components of a football player's overall performance.

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Football players face significant psychological demands and challenges, both on and off the field, that can impact their performance and well-being. These challenges include stress management, motivation, and the need for psychological support. Players often experience high levels of stress related to performance evaluation and competition, which can hinder their mental well-being (Olmedilla et al., 2019). A study indicated that autonomy is a key predictor of burnout symptoms, highlighting the importance of motivational support in training environments (Martínez-Alvarado et al., 2016). Players often grapple with negative emotions such as anxiety and low self-confidence, which can be exacerbated by external pressures from coaches and family. Poor mental health can hinder performance, yet many athletes do not seek help, exacerbating their challenges (Gorczynski et al., 2019).

On-field demands include coping with performance pressure and developing psychological skills like relaxation, imagery, and self-talk to enhance performance (Konter et al., 2019). These challenges differ by gender and can impact proper adaptation to elite football. Despite the importance of psychological skills in football success, systematic integration of sport psychological services still faces resistance, partly due to lack of knowledge among football staff and coaches (Konter et al., 2019).

Yoga is a multifaceted, highly structured mindfulness-based practice that improves critical aspects of athletic performance (Kogler, 1995). Yoga is a method of mind-body fitness that includes an amalgamation of muscular movement and mindful awareness of the breath, the self, and energy (Collins, 1998; Woodyard, 2011). It has been found that with other training methods, yoga can be a vital component of athletic training programs (Broad, 2012; Iftekher et al., 2017). Yoga differs from other typical forms of exercise training as it requires multi-structural involvement that gives a difficult task to the body in various ways (Iftekher et al., 2017; Kaminoff and Matthews, 2007). Therefore, this multi-dimensional approach distinguishes yoga from typical training practices, contributing to its effectiveness in promoting both physical and mental fitness.

Yoga practice has been demonstrated to significantly enhance various aspects of muscular strength, endurance, and flexibility. Evidence indicates improvements in lower body and chest muscle strength (Pauline & Rintaugu, 2011), upper body muscular endurance, and trunk flexibility (Gruber, 2008), as well as increased deadlift strength (Tracy & Hart, 2013), agility (Bal & Kaur, 2009), and muscular efficiency (Ray, 1986). Further studies have reported improvements in muscular endurance and hand-grip strength (Madanmohan et al., 1992), flexibility (Ray et al., 2001b), and balance (Polsgrove et al., 2016). Additionally, yoga has been shown to enhance aerobic capacity, as indicated by increased absolute and relative maximal oxygen uptake (VO2max), leading to higher maximal work output (Raju et al., 1997), as well as improvements in forced vital capacity (Bhole et al., 1970) and reductions in body fat (Bera & Rajapurkar, 1993).

Yoga also contributes to improvements in key physiological variables essential for athletic performance, including anaerobic and aerobic performance, cardiovascular endurance (Ray et al., 2001a; Balasubramanian & Pansare, 1991; Bera & Rajapurkar, 1993), cardiac recovery index (Muralidhara & Ranganathan, 1982), and lactate threshold (Ray et al., 2001b). In addition to its physical benefits, yoga has been shown to improve cognitive functions such as learning, vigilance, memory, concentration (Galantino et al., 2008), attention (Van Yperen, 2003), perceptual efficiency, and reaction time (Stueck & Gloeckner, 2005). Furthermore, regular yoga practice has been associated with enhancements in mood states (Khalsa et al., 2012) and emotional health (Gillen & Gillen, 2008), contributing to overall psychological well-being.

Yoga practice has been shown to significantly influence gamma-aminobutyric acid (GABA) levels, with improvements observed following regular practice (Streeter et al., 2012). Selvamurthy et al. (1998) demonstrated that yoga mitigates stress-induced sympathetic overactivation, resulting in decreased cortisol levels and overall stress reduction. This shift towards parasympathetic dominance was associated with a 3.7% reduction in systolic blood pressure, as well as lower levels of epinephrine and norepinephrine. Studies have further demonstrated that yoga reduces anxiety (Streeter et al., 2010) and promotes relaxation, including the reduction of stress at the cellular level, lowering free radical levels, improving oxidative stress markers, and increasing EEG theta activity (Field et al., 2010).

The impact of yoga on mental health is well-supported by research, with numerous studies linking its practice to significant reductions in anxiety (Subramanya & Telles, 2009; Sarang & Telles, 2007) and depression (McDermott et al., 2014; Woolery et al., 2004). Additionally, yoga has been shown to alleviate stress and improve mood states (Granath et al., 2006; Streeter et al., 2010), while also enhancing relaxation responses (Kulmatycki & Bukowska, 2007) and increasing motivation (Donohue et al., 2006). Moreover, consistent yoga practice has been found to promote mindfulness (Brisbon & Lowery, 2011; Shelov et al., 2009), contributing to broader improvements in mental well-being.

Despite substantial evidence highlighting the positive impact of yoga on physical, physiological, and psychological outcomes, there has been minimal integration of yoga practices into sports training programs. Furthermore, research on the role of yoga in enhancing athletic performance, promoting psychological health, alleviating training-related fatigue, preventing sports injuries, and aiding in rehabilitation remains limited. The aim of this study is to identify a set of essential yoga practices specifically tailored for football players by

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conducting a thorough review of ancient yoga texts and existing scientific literature addressing the demands of the sport and the potential advantages of yoga interventions.

RESEARCH METHODOLOGY

Preliminary List of Yoga Practices for Football Players

A comprehensive list of yoga practices was developed, incorporating practices supported by classical yogic texts (such as Hath Yoga and Ashtanga Yoga texts) and scientific research. The proposed Yoga Practices was selected for the study based on the physiological demands, psychological challenges, and match activity profiles specific to football players. The preliminary list consisted of 76 yoga practices. The yoga practices included in the study encompass a wide range of yogic techniques, including yoga postures (*asanas*), regulated breathing (*prānāyāma*), cleansing techniques (*kriya)*, meditation (*dhāranā* and *dhyāna*), as well as loosening exercises (*sukshma vyāyāma, shithil-karani,* and *shakti-vikāsak vyāyāma*) and yogic relaxation techniques.

Inclusion and Exclusion Criteria

Subject matter experts (SMEs) with clinical experience were included if they held either a Doctor of Medicine degree or a Doctorate (PhD) in Yoga with at least 5 years of experience, or a Master's degree (M.Sc. Yoga) or certification as a yoga therapist with at least 7 years of experience. Experts with less than 5 years of experience for doctors or doctorates, and less than 7 years for yoga therapists, were excluded.

Evaluation of the Yoga Practices by Experts

The list of yoga practices was presented to the panel of 30 subject matter experts (SMEs), who satisfied the study criteria. The validation process involved a structured group discussion with 30 SMEs. The experts evaluated and validated the yoga practices in the proposed list based on a three-point scale - (i) Not essential, (ii) Useful but not essential, and (iii) Essential. The panel of 30 SMEs evaluated each item in the list, indicating whether they deemed it "essential", "Useful but not essential" or "Not essential" for the football players to enhance psycho-physiological attributes and sports performance.

Data Extraction and Analysis

Data were analyzed using Lawshe's (1975) method of Content Validity Ratio (CVR) following the evaluation process. The data was collected from the SMEs, sorted in a tableau (using excel sheets) to compute the numbers of experts deemed the item as 'essential' (Ne), based on the responses by SMEs. The CVR was calculated, by applying the Lawshe's Formula of CVR (Lawshe, 1975), to assess the content validity of each item in the list.
According to Lawshe's formula (1975), an item is considered crucial if more than half of the experts indicate it as "essential", thus establishing its minimum threshold for content validity. The mean CVR represents the overall content validity. For an item to be considered valid, it must achieve a critical CVR value of at least 0.33, the threshold for a panel of 30 experts. Thus, items with a CVR value of ≥ 0.33 were deemed to have sufficient content validity.

Lawshe's formula:

$$CVR = \frac{N_e - \left(\frac{N}{2}\right)}{\frac{N}{2}}$$

For the current study,
N = 30 (total number of SMEs included in the study)
N_e = Number of experts agreeing for an item "essential"
$\frac{N}{2}$ = 30 / 2 = 15
$N_{critical}$ = 20 (Minimum number of experts required to agree an item "essential")
$CVR_{critical}$ = 0.33 (Minimum CVR value against N=30)
P value = Probability of success ($p \leq 0.05$)

RESULT

A comprehensive list of 76 yoga practices, encompassing all key elements of yoga, was developed for this study. The list was subsequently evaluated by 30 subject matter experts (SMEs) to assess the validity of each item based on the psycho-physiological demands of competitive football. Content validity ratios (CVR) for each practice were calculated using Lawshe's formula to determine their relevance and necessity. According to Lawshe's method, a critical CVR value of 0.33 is required to validate an item when evaluated by 30 SMEs. Therefore, any practice with a CVR value equal to or greater than 0.33 (≥ 0.33) was considered to have sufficient content validity.

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The analysis revealed that 38 out of the 76 yoga practices achieved a CVR equal to or greater than the critical threshold (≥ 0.33), indicating a significant level of content validity ($p \leq 0.05$). These practices were deemed "essential" for football players and are listed in Table 1. Conversely, the remaining yoga practices, which scored a CVR value below 0.33 (< 0.33), demonstrated lower content validity and are recommended as complementary postures that may assist in aligning the body and mind. Table 2 outlines these complementary yoga practices. The list of validated yoga practices, as approved by the 30 experts, is presented in Table 1 and designated as "Essential Yoga Practices for Football Players."

Table 1 – Shows yoga practices with CVR score 0.33 and above (≥0.33)

Sr. No.	Essential Yoga Practice List	Ne	CVR
	Loosening Exercise		
1.	Jogging (slow jogging, forward jogging, backward jogging, side wise jogging)	27	0.80
2.	Forward and Backward Bending	25	0.67
3.	Side Bending	25	0.67
4.	Pawanmuktasana Kriya	24	0.60
5.	Twisting	24	0.60
	Sukshma Vyayama		
6.	Scandasanchalan (Shoulder movements)	23	0.53
7.	Katisanchalana (waist movements)	22	0.47
8.	Janusanchalana (Knee movements)	24	0.60
9.	Padasanchalana (Ankle movements)	25	0.67
	Breathing Exercise		
10.	Ankle stretch breathing	26	0.73
11.	Tiger breathing	21	0.40
12.	Straight leg raise breathing	23	0.53
13.	Suryanamaskar (19 Dynamic & 1 slow)	27	0.80
	Asanas		
14.	Ardha Matsyendrasana	21	0.40
15.	Baddha Konasana	24	0.60
16.	Bhujangasana	21	0.40
17.	Chakrasana	23	0.53
18.	Hanumanasana	20	0.33
19.	Naukasana	21	0.40
20.	Padahastasana	26	0.73
21.	Parivritta Trikonasana	25	0.67
22.	Sarvangasana	20	0.33
23.	Setubandhasana	20	0.33
24.	Shalabhasana	21	0.40
25.	Shasankasana	21	0.40
26.	Shavasana	24	0.60
27.	Trikonasa	22	0.47
28.	Veerabhadrasana	22	0.47
29.	Vrikshasana	25	0.67
	Pranayama		
30.	Nadishuddhi Pranayama	29	0.93
31.	Bhramari	24	0.60
	Relaxation Techniques		
32.	IRT	21	0.40
33.	QRT	21	0.40
34.	DRT	29	0.93
	Meditation		
35.	Cyclic Meditation	26	0.73
36.	OM Meditation	20	0.33
	Shatkriyas		
37.	Vaman Dhauti	22	0.47
38.	Trataka	21	0.40

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Table 2 – Shows yoga practices with CVR score below 0.33 (<0.33)

Sr No	Specific Practice List	Ne	CVR
	Sukshma Vyayama		
1.	Greevasanchalana (Neck movements)	17	0.13
2.	Hands in & out breathing	14	-0.07
3.	Hands stretch breathing	17	0.13
4.	Dog breathing	17	0.13
5.	Rabbit breathing	15	0
6.	Shasankasana breathing	17	0.13
	Asanas		
7.	Ardha kati Chakrasana	15	0
8.	Bakasana	13	-0.13
9.	Bhadrasana	17	0.13
10.	Dandasana	19	0.27
11.	Dhanurasana	16	0.07
12.	Garudasana	19	0.27
13.	Gomukhasana	17	0.13
14.	Halasana	19	0.27
15.	Koormasana	14	-0.07
16.	Kukkutasana	11	-0.27
17.	Makrasana	18	0.20
18.	Markatasana	14	-0.07
19.	Matsyasana	13	-0.13
20.	Matsyendrasana	16	0.07
21.	Mayurasana	9	-0.40
22.	Navasana	19	0.27
23.	Paschimottanasana	18	0.20
24.	Shahmrugasana	7	-0.53
25.	Tadasana	17	0.13
26.	Tuladharasana	13	-0.13
27.	Ushtrasana	12	-0.20
28.	Utthana koormasana	9	-0.40
29.	Utthanpadasana	17	-0.13
	Pranayama		
30.	Bhastrika	18	0.20
31.	Ujjayi	13	-0.13
32.	Shitali	19	0.27
33.	Sheetkari	15	0
	Meditation		
34.	Yoga Nindra	18	0.20
	Shatkriyas		
35.	Kapalbhati	19	0.27
36.	Jal Neti	16	0.07
37.	Sutra Neti	7	-0.53
38.	Nauli	11	-0.27

DISCUSSION

The present study aims to address a significant gap in the existing literature by identifying yoga practices that may benefit football players, with a particular focus on sport-specific applications. Despite the growing interest in cross-training and holistic approaches to athletic development, no prior research has systematically identified and validated yoga practices tailored specifically for football players. This study seeks to fill that gap by evaluating yoga practices that could serve as effective tools for cross-training, strength training, and mental well-being interventions for athletes.

The present study was conducted in two phases: (a) the development of an extensive list of yoga practices specifically designed for football players, and (b) the validation of these practices by experts. A total of 30 qualified yoga experts from Swami Vivekananda Yoga Anusandhana Samsthana (SVYASA) in Bangalore and

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Lakulish Yoga University (LYU) in Ahmedabad participated in the validation phase. These experts were selected based on their fulfilment of specific study criteria and contributed their insights, experience, and expertise to validate the validation of the cohesive yoga practices. Their involvement was instrumental in ensuring the relevance and appropriateness of the proposed yoga practices for football players.

Incorporating yoga into sport-specific training offers a unique and holistic approach to enhancing athletic performance by addressing both, physical and mental components. Traditional sports training regimens focus on specific physical activities to target particular domains of fitness required for the physical and physiological demands of sport. In contrast, yoga is a mindfulness-based physical practice that integrates both, mental and physical components, allowing for the simultaneous improvement of multiple fitness aspects. Despite its low-intensity nature within the lactate threshold, yoga enhances physical performance by optimizing breathing efficiency, improving basal metabolism, and increasing cardiovascular reserve. Additionally, its psycho-physiological benefits, such as mental relaxation and stress reduction, further support athletic performance (Ray et al., 2011). Therefore, yoga serves as a complementary and multifaceted approach, an effective addition to traditional sports training protocols.

Research on the effects of Suryanamaskar (Sun Salutation) has demonstrated significant improvements in various physical and physiological parameters. These include enhanced flexibility, body composition, resting pulse rate, and body mass index (BMI), as well as reductions in both systolic and diastolic blood pressure (Anbalagan et al., 2021; Mody, 2011). Additionally, Suryanamaskar has been shown to alleviate hamstring tightness (Shaikh & Moharkar, 2020), improve hip abductor flexibility (Regmi & Joshi, 2020), and increase upper-body and shoulder muscular strength, endurance, core stability, balance, static strength, agility, and explosive leg power (Thander, 2021). Furthermore, *Suryanamaskara* has been associated with improved cardiorespiratory fitness (Mody, 2011) and reductions in stress and anxiety (Anbalagan et al., 2021).

Shithilikarna Vyayama (loosening practices) enhances stamina and improves joint mobility. *Sukshma Vyayama* is a unique set of yogic micro-movement practices that engage the entire body, including joints, muscles, and organs. These practices improve endurance, increase lung volume, enhance ligament flexibility, and greater joint mobility (Madankumar, 2018). Both, *Shithilikarna Vyayama* and *Sukshma Vyayama* are found to effectively alleviate joint stiffness, increase joint flexibility, and prepare the body for more advanced yoga postures (Telles et al., 2007).

Yogasanas strengthens the body, promotes harmonious functioning, and calms the mind (Villacres et al., 2014). Yogic postures enhance balance, strength, and overall flexibility, while supine and prone yoga poses specifically reduce stiffness in the back, hips, and lower limbs, aiding mobility. Asanas strengthen the lower body joints, hamstrings, calves, and muscles around the knees, improving body balance. Inverted and seated postures target the abdominal, back, and bicep muscles, increasing lung efficiency and spinal flexibility. Additionally, supine and prone poses improve abdominal strength, enhance spinal flexibility, and increase the range of motion in the spine and lower limbs (Uma et al., 1989; Telles et al., 2014).

Pranayama slows the breathing rate and restores autonomic balance, promoting mental calmness (Villacres et al., 2014) and reducing depression, anxiety, and post-traumatic stress by fostering stress resilience and relaxation (Brown & Gerbarg, 2009). It enhances autonomic balance through mental regulation (Telles et al., 1994), increases lung awareness, corrects breathing patterns, and boosts lung capacity (Kumar & Kumar, 2017). The combined practice of *yogasana*, *pranayama*, and meditation reduces basal respiratory rate (RR), heart rate (HR), resting HR, and improves VO_2max, cardiovascular, and respiratory health (Bhunia & Ray, 2020).

Immediate effect of *Bhramari Pranayama* practice (5 minutes) significantly reduces systolic and diastolic blood pressure (BP), decreases HR, and promotes parasympathetic dominance in cardiovascular regulation (Pramanik et al., 2009, 2010). *Nadi-Shodhana* Pranayama rapidly enhances cardiopulmonary responses and cognitive function (Subbalakshmi & Saxena, 2005), while *Anulom-Vilom* and *Bhastrika* Pranayama significantly improve vital capacity and VO_2max (Bal, 2010). Pranayama strengthens respiratory muscles through sustained inhalation and exhalation (Raghuraj & Telles, 1997) and shifts the autonomic system towards vagal (parasympathetic) dominance (Shashikiran et al., 2015; Pal, 2015). Additionally, it positively influences respiratory (Beutler et al., 2016) and cardiovascular functions (Jain, 2016).

Meditation, particularly *Dharana* and *Dhyana*, has been shown to enhance creativity, energy levels, and cognitive functions while reducing insomnia, anxiety, and psychosomatic conditions, thus improving overall health (Parnabas et al., 2014). Regular meditation practice decreases glucocorticoid levels and oxidative stress, leading to a reduced physiological response to stressors and lower hormone-stressor interaction rates (Sudsuang et al., 1991; Jevning et al., 1978; MacLean et al., 1997).

A single session of cyclic meditation (CM) calms the mind, enhances mindfulness, and heightens awareness of the mind, body, and breath, leading to improved higher mental functions (Vinchurkar et al., 2014). CM has been shown to significantly reduce salivary amylase and pulse rate while increasing blood oxygen levels in high school athletes, contributing to reduced stress, tension, anxiety, depression, dejection, and confusion (Hiraoka & Gudapti, 2017). Additionally, CM improves cognitive and somatic anxiety, boosts self-confidence (Biju Lona, 2020),

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enhances cognitive processing and attention (Sarang & Telles, 2006, 2007), and improves sleep quality by increasing slow-wave sleep (Patra & Telles, 2009).

Relaxation techniques have been shown to effectively reduce stress, anxiety, and depression, while promoting relaxation of both the body and mind (Parnabas et al., 2014). These techniques also enhance concentration, self-confidence, and athletic performance, while decreasing blood pressure and overall stress levels (Parnabas & Mahamood, 2012; Pragman, 1998; Weinberg & Gould, 2011; Parnabas et al., 2014).

STRENGTHS OF THE STUDY

The yoga practices included in this study encompass a diverse array of yogic practices, including *Sukshma-Vyayama*, *Shithilikarana Vyayama*, *Shat-Kriya*, *Asanas*, *Pranayama*, *Dharana*, *Dhyana*, and yogic relaxation techniques. This module is grounded in evidence-based research and informed by various classical and contemporary yogic texts, making it integrative rather than focused on a single aspect of yoga.

The experts involved in the validation process were selected from multiple schools of yoga, many of whom have experience across different traditions. This approach ensured that the yoga practices were not limited to any one school of thought, thereby enhancing its applicability to a broader audience.

This study is valuable for raising awareness about the benefits of yoga concerning specific sports movements, athlete health, and mental well-being. The findings provide a substantial foundation for future research in sports science, offering insights that can guide subsequent investigations in this area.

LIMITATIONS OF THE STUDY

The findings may not apply to all football players, as factors such as playing level, age, and physical condition were not considered. The study identifies essential practices based on expert opinion without empirical evidence measuring their impact on football performance. The practices may not account for cultural differences or specific contextual factors that influence their effectiveness among diverse athlete populations.

The efficacy of the identified yogic practices, including their duration, frequency, and order, requires validation through a randomized controlled trial (RCT). The lack of long-term data makes it difficult to assess the sustained impact of these yoga practices on performance and injury prevention. Some identified practices may overlap in benefits, complicating the understanding of each practice's unique contributions. Conducting an RCT based on this protocol can serve as a foundation for future studies, paving the way for more extensive research on yoga practices tailored for basketball and tennis players.

Addressing these limitations in future research could strengthen the applicability and robustness of findings related to yoga practices for football players.

CONCLUSION

Previous scientific investigations have largely overlooked the potential of yoga as a cross-training method for football, failing to explore its benefits for both physical conditioning and psychological resilience. The current research is, therefore, novel in its effort to validate specific yoga practices for football players, offering evidence-based insights into their practical utility within the context of athletic performance and overall mental health.

This study successfully identified 38 essential yoga practices for football players, validated through expert input and rigorous content analysis using Lawshe's Content Validity Ratio (CVR). The findings underscore the significant potential of these practices to enhance athletic performance, improve flexibility, stability, and endurance, and promote cognitive function and mental well-being. Moreover, the results advocate for the integration of sport-specific yoga programs into training regimens for football players, which may lead to improved performance outcomes and reduced injury risk. Further research is encouraged to explore the long-term benefits and applications of these yoga practices within the context of football training and performance.

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