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To develop and validate an Integrated Yoga Module for Tennis Players

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ABSTRACT

Tennis athletes need a combination of low-intensity and high-intensity aerobic and anaerobic capabilities. Sports related fatigue, injury, stress and anxiety reduce the sports performance of a player. The main objective of any sports training should be to refrain from the onset of fatigue, stress and anxiety during competition and training. Integrated Yoga has been researched extensively. It shows that yoga helps improve psychophysiological components such as aerobic and anaerobic capacities, cardiovascular fitness, while reducing fatigue, competitive stress and anxiety. Yoga also improves relaxation and mindfulness, hence, improving performance. However, a valid yoga module is unavailable for tennis sports athletes. IYM for tennis players is developed based on ancient yogic text and previous research evidence. The yoga module was presented to 30 SMEs to evaluate and validate a total number of 82 practices included in the proposed module based on a three-point scale. The content validity has been calculated by applying Lawshe's formula of content validity ratio (CVR). According to Lawshe's formula, 0.33 is the critical value of CVR required for validation with 30 SMEs. Data analysis shows that out of 82 yogic practices, 41 yogic practices showed significant content validity ($p<0.05$). Results show that, among the 82 practices, 41 were found to be essential (CVR ≥ 0.33) and 41 were found to be not essential (CVR <0.33). However, the feasibility and efficacy of the Integrated Yoga Module for tennis players need to be determined by future studies.

Key words: *Fatigue; Overtraining; Sports Performance; Yoga for Athletes; Yoga Training*

INTRODUCTION

Tennis is one of the world-class, competitive racket sports based on physical abilities and sport-specific technical skills. The tennis sport is characterised by intermittent exercise, combination of low-intensity and high-intensity aerobic and anaerobic capabilities of motor skills involving powerful movements such as quick starts and stops running at different speeds, acceleration, deceleration, turns, changeovers, power, strength, multidirectional agility, repetitive overhead motions and explosive muscle actions during different strokes (Kovacs, 2007; Fernandez et al., 2006).

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Therefore, tennis players need to acquire sport-specific physiological attributes, such as power, aerobic fitness and muscle strength to reach the optimal level of match performance (Kovacs, 2006). Hence, it is essential to identify and comprehend the required physical characteristics and physiological responses, to understand the nature of the sport is crucial for developing an effective integrated yoga module for professional tennis athletes as per the physical and psychophysiological needs of a sport.

Tennis is an anaerobic sport (Fox & Mathews, 1974; Kovacs, 2007) with aerobic breaks between the rallies, making athletes to perform short bursts of high-intensity movements with intervals of rest of low-intensity activities over approximately 2-4 hours of match play (Fernandez et al., 2006; Kovacs, 2007). The higher the game intensity, the faster will be the heart beats. The studies show that the mean HR of 20 to 30-year-old trained tennis players ranges between 140-160 beats per minute (bpm). The mean HR of players during singles and doubles tennis competitions are 94 ± 15.6 and 164 ± 15.8 bpm, respectively. These values of mean HR correspond to 70% and 80% of HRmax. During long and fast rallies HR can increase up to 190 to 200 bpm with approximately 100% of HR*max*, indicating an intense activity during a play (Fernandez *et al.,* 2006; Kovacs, 2007). Smekal *et al.* (2001) reported peak VO_2 values close to 50 mL/kg/min during a simulated match play, representing approximately 80% of VO2max.

LA levels increases with increase in the activity profile during game. LA levels reported to be relatively low during actual tennis match play (8 to 2.8 mmol/L). Although, during long and intense rallies, LA levels increases up to 8 mmol/L, indicating an increased participation of glycolytic processes to supply the energy need (Fernandez *et al.,* 2008; Mendez-Villanueva et al., 2007), with increases in rate of perceived exertion (RPE) in response to increase in the match activity (longer rallies or more strokes per rally), suggesting a correlation between RPE values and variables describing the match characteristics (Mendez-Villanueva et al., 2007).

The combination of excessively long periods of intensive training load and lack of appropriate recovery period can lead to an advanced fatigue state, which negatively impacts the competitive performance of the athlete, termed as ‘Overtraining Syndrome’ (OTS) (Kuipers & Keizer 1988; Lehmann *et al.,* 1991). The work-to-rest ratios of competitive tennis athletes’ range between 1:2 and 1:5, and fatigue has been reported to reduce the tennis-hitting accuracy significantly by 81% of the ground stroke and a 30% decrease in accuracy of service, (Davey et al., 2003; Kovacs, 2006; 2007). Fatigue reduces the running movement efficacy and the quality of movement patterns (Ferrauti *et al.,* 2001). Fatigue has a detrimental effect on muscular functioning of an athlete. Tennis matches and training induce muscle damage as players are subjected to strenuous eccentric contractions (Ellenbecker et al., 2007).

Overtraining induces a long-lasting imbalance in autonomic nervous system activity (Kuipers & Keizer 1988; Lehmann et al., 1998). In overtrained athletes, this imbalance is characterized by a predominance of the parasympathetic or the sympathetic activity, depending on the type of overtraining (Kuipers & Keizer 1988; Lehmann et al., 1998). Intrinsic dysfunctions of the hypothalamic–pituitary–adrenal axis (HPA axis) response to a stress situation have been reported in OTS-affected athletes from exercise-induced stimulation (Meeusen et al., 2013, 2010, 2004; Lehmann et al., 1993).

Repetitive strain and sprain injuries (overuse injuries) are the most common type of injuries found in the tennis player (Chandler, 1998, Kovacs, 2007). Repetitive nature of the game and speed are the main cause of overuse injuries (Chandler, 1998; 1995) where 210 km/h serves are common (Kovacs, 2007). High-intensity exercise for long durations is linked with immunosuppression, higher susceptibility to infection (Smith, 2004) microtraumas and a local inflammatory reaction in the musculature triggering changes in serum markers of inflammation (Bresciani et al., 2010; Main et al., 2010). Increased levels of oxidative stress may lead to OTS, which is also related to inflammation, resulting in an impaired antioxidant defence and a lack of expected adaptations to training (Tanskanen et al., 2010).

Tennis players found to be significantly tighter in sit and reach flexibility, more flexible in dominant shoulder external rotation and nondominant shoulder external rotation, with reduced range of motion (ROM) in both hamstrings than other athletes, but an even poorer ROM in their back leg, while serving (Chandler et al., 1990). Lower back pain and injury are common complaints among elite tennis players, and this correlates with poor lower back and hamstring ROM. It is extremely important to implement a hamstring lengthening (stretching) programme from

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an early age so that the athlete will still be improving performance by using the low ready position, but will not be (counterproductively) increasing the chance of lower back or hamstring injury resulting from tight and inefficient hamstring or lower back ROM (Kovacs, 2006).

Strength is required, in muscles and joints, for improving performance (ball velocity) and reducing injuries of joints, tendons, ligaments and so on. For optimum stroke execution, a desired grip strength, wrist strength, grip endurance and shoulder strength are required (Kibler et al., 1989).

The sleep pattern of an individual may influence the pre-competitive stress and competitive achievements, and lack of sleep can negatively affect the competitive performance (Silva & Paiva, 2013). Plasma cortisol levels increase in response to intense and prolonged exercise (Kraemer et al., 2001; Bird & Tarpenning, 2004). Elevated cortisol levels are associated with depressed mood during overtraining periods (O'Connor et al., 1989).

Athletes that enter overtraining levels report elevated depression symptoms (Morgan et al., 1987). The chronic presence of Interleukin 6 (IL-6) is linked with clinical depression and worse mood in endurance trained athletes (Cullen et al., 2017). Competitive stress is reported to increase cognitive anxiety and reduce self-confidence in tennis players, more in the losing player of the competition than the winner (Filaire et al., 2009; Schober, 2018).

Yoga Intervention

Yoga is a multifaceted, highly structured activity that improves critical aspects of athletic performance (Kogler, 1995). The physical part of yoga (hatha yoga) consists of several stretching and strength building postures which are known to improve strength and flexibility and also have effects on metabolic, physiological and psychological aspects of human being (Ramos-Jimenez et al., 2009).

Improvement in body flexibility is one of the most apparent and quickly attainable effects of regular hatha yoga practice, since it is based on gradual stretching of muscle and connective tissue around bones and joint (Woodyard, 2011), static retention of yoga postures and movements of joints through the entire existing ROM (McCall, 2007). Several studies have been reported that regular yogic practice improves overall body flexibility (Ray et al., 1983; Pauline & Rintaugu, 2011), flexibility of the spine, lower back ROM, shoulder flexibility, and the hamstring muscles (Grabara, 2016; Tracy & Hart, 2013). Regular yoga training improves the flexibility and balance as well as whole body measures, may also enhance athletic performances that require these characteristics (Polsgrove et al., 2016; Iftekher et al., 2017)

Yoga training practice also improves muscular strengths of leg and chest muscles (both sides), (Pauline & Rintaugu, 2011), upper body muscular endurance and increased trunk flexibility (Gruber, 2008), deadlift strength, (Tracy & Hart, 2013), agility (Bal & Kaur, 2009), muscular efficiency (Ray, 1986), muscular strength, cardio-respiratory endurance and reaction time (Vijayalakshmi & Surendiran, 2005; Nambinarayanan et al., 1992), enhance muscle torque (Buśko & Rychlik, 2006), increase in handgrip strength (Reddy, 2010), enhanced strength steadiness, balance and control (Hart and Tracy, 2008).

From an athletic performance standpoint, yoga practice improves cardiovascular performance (Harinath et al., 2004), respiratory pressures, significant improvements in respiratory muscle strength and endurance (Mahadevan et al., 2008; Nambinarayanan et al., 1992; Raju et al., 1997b), increases breathe holding capacity (Nambinarayanan et al., 1992) improves absolute and relative maximal oxygen uptake producing maximal work output (Tran et al., 2001; Raju et al., 1997a; Ray et al., 2001b). Yogic practice also improves physical performance in terms of aerobic performance, anaerobic performance, body composition and cardiovascular endurance (Ray et al., 2001b), improve the cardiac recovery index (Muralidhara & Ranganathan, 1982), respiratory rate and energy expenditure (Ray et al., 2011).

There are studies that show yoga to improve strength, flexibility and ROM as part of injury rehabilitation or prevention. Decline in lower and upper extremity injuries have been observed due to yoga (McLean, 2009). Yoga can also significantly improve the chronic lower back pain, fatigue and pain (Chuang et al., 2012; Holtzman & Beggs, 2013).

Integrated yoga intervention reduce inflammatory markers, lowers basal TNF-α and IL-6 levels and also reduces the amount of increase of TNF-α and IL-6 to a physical challenge of moderate to strenuous exercise and alters pro-inflammatory cytokine levels (Vijayaraghava et al., 2015), reduces the levels of interleukin (IL)-1β, IL-8, and monocyte chemotactic protein -1 (MCP-1) (Twal et al., 2016), reduced perceived stress (Hartfiel et al., 2011), aids injury prevention, increases body awareness, recovery time (Sharma, 2015), and delay the onset of muscle soreness following strenuous activity (Boyle, 2004).

The effect of yoga has also been linked to enhancements in mental health, including reduction in anxiety (Subramanya and Telles, 2009; Sarang & Telles, 2007), depression (McDermott *et al.,* 2014; Woolery *et al.,* 2004), improvement in stress and enhanced mood states (Granath *et al.,* 2006; Streeter *et al.,* 2010), enhanced the state of relaxation (Kulmatycki & Bukowska, 2007), motivation (Donohue et al., 2006) and enhanced mindfulness (Brisbon & Lowery, 2011; Shelov *et al.,* 2009).

Gamma amino butyric acid (GABA) levels showed improvement in response to yogic practice (Streeter et al., 2012), reduced sympathetic activity, decreased cortisol level and stress (Kamei et al., 2000) thus, shifting the equilibrium towards parasympathetic dominance (Selvamurthy *et al.,* 1998), decreased anxiety (Streeter et al., 2010), increased relaxation including reduction in stress at cellular levels, reducing free radicals, improving oxidative stress, decreased anxiety and increasing EEG theta activity (Field *et al.,* 2010) following yoga practice. An improvement in the antioxidant status is supportive in preventing many pathological processes caused by impaired antioxidant system of body (Bhattacharya et al., 2002; Martarelli *et al.,* 2011; Sinha *et al.,* 2007). Yoga improves cognitive and somatic anxiety in athletes (Kusuma & Bin, 2017), and improvements on almost every sleep measure (Khalsa, 2004).

Integrated Yoga Module

The modern game scenario, along with demanding tournament schedules, is highly stressful for the elite players to cope with edging competition and continuously battling for the top positions in the respective sport making the physical fitness to be of utmost importance. A foremost objective of tennis training should be to refrain from the onset of fatigue during competition and training (Kovacs, 2007). Finally, at competition phase, optimal performance demands a healthy body, and consolidation of not only the physiological elements but also the psychological, technical and tactical components (Smith, 2003).

Despite of enough evidences on positive impact of yoga on physical, physiological and psychological parameters, little work has been done to integrate the yoga practices in the sports training programs and to investigate the effect of yoga intervention on sports performance, psychological health of athletes, reducing sports training overload fatigue, sports injury prevention and rehabilitation. The purpose of the proposed study is to develop and validate the integrated yoga module (IYM) for the tennis athletes by reviewing the ancient texts and scientific studies on sports demands and yoga.

Materials and Methods

Development of IYM for Tennis Players

A customized protocol was developed, that comprised yoga practices supported by the classical texts and research evidence. The proposed IYM is based on the physiological needs and demands, psychological challenges and match activity profile of tennis players. The preliminary yoga module was comprised of 82 yoga practices. Flow chart (figure 1) shows the step-by-step process of design of the study.

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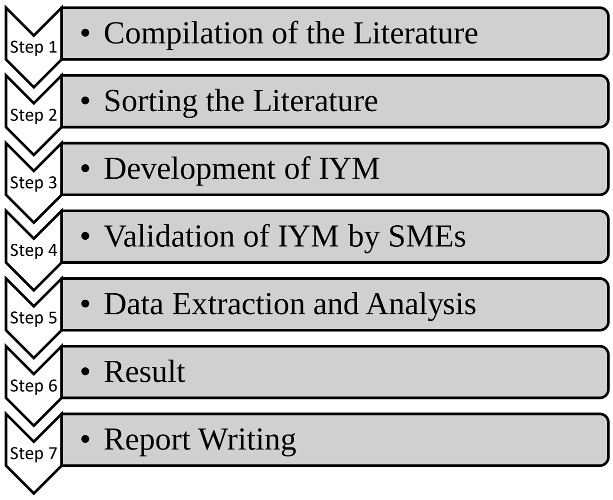

Figure 1: Flow Chart of IYM Development Process

Inclusion and Exclusion Criteria

Yoga experts (SMEs) with clinical experience - who have either a doctorate (PhD) or Doctor of Medicine degree in Yoga, with a minimum of 5 years' experience or a Master's degree in yoga (M.Sc. Yoga) or yoga therapist, with a minimum of 7 years' experience. Doctors or Doctorates with less than 5 years of experience and yoga therapist with less than 7 years of experience were excluded.

Validation of the IYM by experts

For validation, the developed yoga module was presented to the panel of 30 subject matter experts (SMEs), who satisfied the study criteria. These experts were requested to participate in evaluation and validate the practices in the proposed module on the basis of three-point scale as follows. (i) Not essential (ii) Useful but not essential (iii) Essential

Data Extraction and Analysis

The data that was collected from the SMEs, sorted in a tableau, to compute the numbers of experts deemed the item as 'essential' (N_e), to calculate CVR of each item to check the validity, by applying Lawshe's Formula of CVR (Lawshe, 1975). According to Lawshe's formula, if more than half of the panellists indicate that an item is essential, then that item has the minimum content validity and the minimum CVR value (critical value of CVR) needed for validation of content against 30 SMEs is 0.33. Hence, critical value for CVR for 82 yoga practices, to evaluate the content as "valid" is CVR value equal or above 0.33 (≥ 0.33).

Lawshe's formula: $\boldsymbol{CVR} = \frac{N_e - \left(\frac{N}{2}\right)}{\frac{N}{2}}$

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 ≤ 0.05)

RESULT

A structured integrated yoga module for tennis players, with 82 items (yoga practices) was taken into consideration for the validation from 30 yoga experts. CVR was calculated by applying the Lawshe's formula. It has been found that out of 82 IYM practices selected for validation, 41 practices achieved CVR value equal or above the critical value (≥ 0.33), indicating high content validity (p ≤ 0.05) (Table 1). These practices are considered to be "essential" for tennis players. Other practices achieved CVR value below 0.33 (<0.33) (Table 2), indicating low content validity and these practices were used as complimentary poses for important postures to align the body and mind. Table 1 shows the list of 'essential' Yoga practices that satisfied the minimum Lawshe's CVR value and established as 'Valid Integrated Yoga Module for Tennis Players' approved by 30 Yoga experts.

Table 1: Valid Integrated Yoga Module for Tennis Players with CVR value ≥ 0.33

SN	Item	N_e	CVR
1.	Jogging (Slow Jogging, Forward Jogging, Backward Jogging, Side Wise Jogging)	26	0.73

2.	Forward and Backward Bending	26	0.73
3.	Side Bending	27	0.8
4.	Twisting	26	0.73
5.	Scandasanchalan (Shoulder Movements)	23	0.53
6.	Katisanchalana (Waist Movements)	23	0.53
7.	Janusanchalana (Knee Movements)	23	0.53
8.	Padasanchalana (Ankle Movements)	22	0.46
9.	Hands Stretch Breathing	25	0.66
10.	Ankle Stretch Breathing	26	0.73
11.	Tiger Breathing	20	0.33
12.	Straight leg Raise Breathing	22	0.46
13.	Suryanamaskar	25	0.66
14.	Trikonasan	23	0.53
15.	Parivritta Trikonasana	29	0.93
16.	Vrikshasana	23	0.53
17.	Padahastasana	22	0.46
18.	Ardha kati Chakrasana	20	0.33
19.	Paschimottanasana	23	0.53
20.	Chakrasana	23	0.53
21.	Ushtrasana	22	0.46
22.	Janusheerasana	21	0.4
23.	Gomukhasana	22	0.46
24.	Veerabhadrasana	20	0.33
25.	Bhujangasana	27	0.8
26.	Dhanurasana	20	0.33
27.	Naukasana	20	0.33
28.	Setubandhasana	22	0.46
29.	Utthanpadasana	24	0.6
30.	Sarvangasana	22	0.46
31.	Shavasana	25	0.66
32.	Nadishuddhi Pranayama	29	0.93
33	Bhastrika	22	0.46
34	Bhramari	28	0.86
35	Yoga Nidra	22	0.46
36	IRT	22	0.46
37	QRT	20	0.33
38	DRT	26	0.73
39	Kapalbhati	26	0.73
40	Trataka	27	0.8
41	Cyclic Meditation	23	0.53

Table 2: Items with CVR value below 0.33 (< 0.33)

SN	Item	N_e	CVR
1.	Pawanmuktasana Kriya	19	0.26
2.	Greevasanchalana (Neck Movements)	18	0.2
3.	Hands in & out breathing	19	0.26
4.	Dog Breathing	12	- 0.2
5.	Rabbit Breathing	11	- 0.26
6.	Shasankasana Breathing	15	0
7.	Tadasana	16	0.06
8.	Tuladharasana	9	-0.4
9.	Shahmrugasana	10	-0.33
10.	Shuleenasana	12	-0.2
11.	Bhadrasana	15	0

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12.	Ardha Matsyendrasana	19	0.26
13.	Marjariasana	13	-0.13
14.	Matsyasana	13	-0.13
15.	Markatasana	19	0.26
16.	Vakrasana	16	0.06
17.	Chasasana	11	- 0.26
18.	Raajkapotasana	15	0
19.	Pawanamuktasana	17	0.13
20.	Shasankasana	15	0
21.	Hanumanasana	18	0.2
22.	Garudasana	19	0.26
23.	Shalabhasana	16	0.06
24.	Mayurasana	14	-0.06
25.	Halasana	13	-0.13
26.	Sarpasana	15	0
27.	Bakasana	14	-0.06
28.	Koormasana	10	-0.33
29.	Kukkutasana	9	-0.4
30.	Matsyendrasana	10	-0.33
31.	Navasana	17	0.13
32.	Utthana Koormasana	11	- 0.26
33.	Makrasana	19	0.26
34.	Ujjayi	9	-0.4
35.	Shitali	14	-0.06
36.	Sheetkari	14	-0.06
37.	Jal Neti	15	0
38.	Sutra Neti	13	-0.13
39.	Vaman Dhauti	18	0.2
40.	Nauli	11	- 0.26
41.	Om Meditation	19	0.26

Discussion

In the present study, efforts have been made to develop a valid integrated yoga module for tennis players by selecting sport-specific yoga practices. However, till date there is no previous attempt has been made on validating an IYM for tennis players that can be used as cross-training. This study was conducted in two phases: (a) developing the yoga module for tennis players and (b) experts' validation of the module for tennis players. Thirty qualified yoga experts from Swami Vivekananda Yoga Anusandhana Samsthana (SVYASA), Bangalore and Lakulish Yoga University (LYU), Ahmedabad, who fulfilled the study criteria, participated and contributed in the current study by providing deeper insight with their expertise and experience, into the validation phase of IYM.

Sports specific training regimen utilizes specific activities to improve the specific domains of physical fitness required for the physical and physiological demands of sport. In contrast, yoga is a mindfulness-based physical activity with a holistic approach towards mind and body, which can simultaneously enhance several specific components of fitness. Although, yogic intervention involves low intensity practices within lactate threshold, physical performance improvement is possible owing to both better economy of breathing by basal metabolism and also by improvement in cardiovascular reserve. Other factors such as psycho-physiological and better relaxation may contribute to it (Ray et al., 2011).

Studies on the effect of *Suryanamskara* reports significant improvement in flexibility, body composition, resting pulse rate, BMI, systolic and diastolic blood pressure (Anbalagan et al., 2021; Mody, 2011), hamstring tightness (Shaikh & Moharkar, 2020), hip abductor flexibility (Regmi & Joshi, 2020), upper-body and shoulder muscular strength endurance, core stability, balance, static

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strength, agility and explosive leg power (Thander, 2021), cardiorespiratory fitness (Mody, 2011), stress and anxiety (Anbalagan et al., 2021).

Loosening practices (*Shithilikarna Vyayama)* and *Sukshma Vyayamas* helps in loosening the joints and reducing the stiffness, which consequently aid in improving mobility. Loosening exercises are intended to increase flexibility of joints and to prepare for the practice of yoga postures (Telles et al., 2007).

Yogasanas strengthens all organs of the body and start functioning in a harmonious manner and the mind becomes tranquil (Villacres et al., 2014). The *yoga asanas* (body postures) help in improving balance, strength, overall flexibility of the body. Other supine and prone postures help in improving flexibility and strength and reducing the stiffness in the back, hip, and lower limb muscles, thereby aiding mobility.

Pranayama slows down breathing rate and restores autonomic balance thereby calming the mind (Villacres et al., 2014). Pranayama reduces depression, anxiety, and post-traumatic stress disorder by inducing stress resilience and relaxation (Brown & Gerbarg, 2009). It promotes autonomic balance through mastery over the mind (Telles et al., 1994). Breathing exercises increases awareness of breathing, clears the lungs, corrects breathing pattern, and increases lung capacity (Kumar & Kumar, 2017). Practice of *Yogasana, Pranayama* and meditation reduces basal RR, HR, and resting HR and improves VO2max, cardiovascular and respiratory systems (Bhunia & Ray, 2020). Immediate effect of short-term practice (for 5 minutes) of *Bhramari Pranayama* reports significant reduction in systolic and diastolic BP, with a slight decrease in HR and induces parasympathetic dominance on cardiovascular system (Pramanik et al., 2009, 2010). *Nadi-Shodhana Pranayama* can rapidly modify cardiopulmonary responses and enhance the capacity to solve simple problems (Subbalakshmi & Saxena, 2005). *Anulom-Vilom* and *Bhastrika Pranayama* significantly improve the vital capacity and VO2*max* (Bal, 2010).

A single session of cyclic meditation (CM) tranquils the mind and improves level of mindfulness, with heightened awareness of mind, body and breath, which further enhances the higher mental functions (Vinchurkar et al., 2014). CM significantly reduces salivary amylase and pulse rate with significant increase in blood oxygen level, of high school athletes, with improvements in stress levels, tension, anxiety, depression, dejection and confusion (Hiraoka & Gudapti, 2017). CM improves cognitive anxiety, somatic anxiety, and increases self-confidence among athletes (Biju Lona, 2020), enhances cognitive processing, attention cognition (Sarang & Telles, 2006; 2007), quality of sleep by increasing slow wave sleep (Patra & Telles, 2009).

Trataka improves selective attention, response inhibition, cognitive flexibility, heart rate variability (HRV) and breathing rate, increase in vagal tone by a decrease in HR (Swathi et al., 2021). *Kapalabhati* promotes decarboxylation and oxidation, activation of sympathetic nervous system, enhances cognition, and improves overall metabolism (Swathi et al., 2021), improves cognitive performance and attention (Joshi & Telles, 2009) and decreases anxiety (Telles et al., 2019). Immediate effects of kapalabhati shows improvement in motor performance (Telles et al., 2014), finger dexterity (Telles et al., 2012), spatial and working memory tasks (Gupta et al., 2019). Sympathetic arousal (Telles et al., 2011), and metabolic activation (Telles et al., 2015), improvements in the cognitive tasks (Pradhan, 2013).

Relaxation techniques help in reducing stress, anxiety, depression and improving the relaxation of the body and mind. (Parnabas et al., 2014). Like any other exercise protocol, an ideal yoga intervention consists of modes (types), frequencies, intensities, durations, and progression. Determining the appropriate mode depends upon the athlete preference. The frequency, intensity, and duration are specific to the type of activity and should be customized according to the athlete's ability to safely perform the activity. However, the module remains to be tested for feasibility.

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Strength of the Study

The module was developed systematically on the grounds of scientific literature reviews and various classical yogic texts. The yoga module is consisting of multidimensional yogic elements, such as *Sukshma-Vyayama, Shithilikarana Vyayama, Shat-Kriya, Asanas, Pranayama, Dharana* and *Dhyana* and relaxation practices. Hence, the yoga module is integrative in nature rather than just focusing on any particular limb of yoga. Experts selected for the validation process were from different schools of yoga, some having been exposed to multiple schools of yoga, ensuring that the module was not confined to any one school of yoga. This type of study is useful to create awareness about yoga for athletes, sport psychology and sports related activity. For research of sports related studies, the results of this study would provide a substantial base for conducting future trials.

Limitations of the Study

It's a first attempt to develop a validated yoga module for tennis players, and yogic practices, duration of practices, frequency and the order has to be tested by a randomized control trial (RCT) to prove its efficacy. All the practices do not have research proven background. Further study to investigate the feasibility of the IYM is needed. Hence, once this protocol goes for RCT can become a curtain raiser for future.

Conclusion

A comprehensive IYM for tennis players has been developed, consists of 82 practices was validated by 30 yoga experts. It is found that, among the 82 practices, 41 found to be essential (CVR ≥0.33) and 41 found to be not essential (CVR <0.33). Based on the findings from this study, the IYM for tennis players suggests good content validity. This present IYM is a valid module for tennis athletes. However, the feasibility and efficacy of the IYM must be determined by future studies.

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