Golden Sun-Rise
International Journal of Multidisciplinary on Science and Management
ISSN: 3048-5037/ Volume 2 Issue 4 Oct-Dec 2025/ Page No: 233-242
Paper Id: IJMSM-V2I4P125/ Doi:10.71141/30485037/V2I4P125

Research Article

Motor Imagery Training in Sports Psychology Improves Tennis Service Performance Among Competitive Young Tennis Athletes: A Scoping Review

Rosdara Masayuni Binti Mohd Sani[1], Justin Wei Yuen Fu[1], De Hang Ooi[1], Luqman Nul Hakeem Bin Abdul Rahim[2], Ean Hin Ooi[3]

[1]*Jeffrey Cheah School of Medicine and Health Sciences, Monash University Malaysia, Selangor, Malaysia.*

[2]*Lowry Sports Academy, Persiaran Medini Central 6, Bandar Medini Iskandar, Johor Bahru, Malaysia.*

[3]*School of Engineering, Monash Universiy Malaysia, Selangor, Malaysia.*

Received: 22 November 2025 Revised: 24 November 2025 Accepted: 26 November 2025 Published: 28 November 2025

Abstract - *Tennis, a highly intricate and competitive sport, has gradually become more popular in today's society, with a 25.6% and 13.6% increase in the number of players and coaches worldwide respectively in 2024 from 2019. One important aspect of tennis is its service, contributing 25% of tennis points in a match and is mainly influenced by accuracy and stroke velocity. In order to enhance athletic performances, many coaches adopt sports psychology in training sessions, with the most commonly applied one being motor imagery training (MIT). However, queries regarding MIT's aftermaths on tennis service performance persist. Therefore, this scoping review aims to investigate MIT's efficacy in improving tennis service performance among competitive young tennis athletes. Databases such as SCOPUS, Ovid MEDLINE, Google Scholar and PubMed were utilised in sourcing relevant English articles published from 1990 onwards. A total of 9 relevant articles were obtained. All the yielded studies discovered MIT may potentially be efficient in enhancing tennis service performance and able to mitigate Ramadan-induced performance decline. In conclusion, MIT is recommended to be implemented in training regimes. However, more research about this topic should be conducted as there are still limited available studies and information gaps to fill in, such as its feasibility for applying to other tennis skills, sports, efficacy in para-athletes or in the medical field for patient rehabilitation and performance optimisation.*

Keywords - *Tennis, Motor Imagery Training, Sport Psychology, Young Tennis Players.*

I. INTRODUCTION

In recent years, tennis has surged in popularity, with the International Tennis Federation (ITF) reporting a 25.6% rise in tennis players from 84.4 million in 2019 to 106 million in 2024 across 199 countries [1]. The current number of coaches around the world is 175,000 in 2024, a 13.6% increase from 2019, and Asia accounts for 33.4% of the world's tennis-playing population, making it the biggest tennis-playing continent [1]. Tennis matches are conducted on different surfaces like clay and hard courts. Tennis athletes demonstrate sporadic muscular actions, switching between vigorous and active recuperation periods during matches [2].

One quintessential tennis component is its service, which contributes 25% of tennis scores [3]. However, mastering a perfect serve is daunting considering the sophisticated coordination of movements of limbs and joints required to efficiently gather and transmit power from the ground up to the racquet head, also known as the kinetic chain [4]. A tennis serve is influenced mainly by accuracy and stroke velocity [5]. Accuracy is defined as the precision of ball placement on the opposing court, while stroke velocity is the ratio of the ball's travel distance to time [6]. Thus, players should train physically (agility and muscle strength) and technically (backhand, forehand and holding the racket) as it heightens their service performance. Additionally, an

alternative that coaches and sports psychologists commonly deploy to boost athletic performance and self-confidence is MIT [7]. Malaysia has recently trialled MIT for Paralympians, as shown in figure 1 below [8].

MIT involves mentally visualising actions without physical execution and is explained by various theories. The first is the psychoneuromuscular theory, which illustrates that MIT stimulates the motor cortex and produces neuromuscular activation resembling actual movements [9]. Next is the symbolic learning theory, which states that MIT produces a mental blueprint that develops the future automation of actions [10]. Lastly is the bioinformational theory, which depicts mental imagery as a structured set of features stored in long-term memory. It takes a behavioral approach, activating suppressed environmental cues and stimulus responses to improve task performance [11]. MIT enhances motor expertise, which aids the brain's activity-dependent neural reorganisations, regulating both actual and imagined performance. MIT is instrumental in various sports, assisting players in improving their motor skills and competition preparation [12].

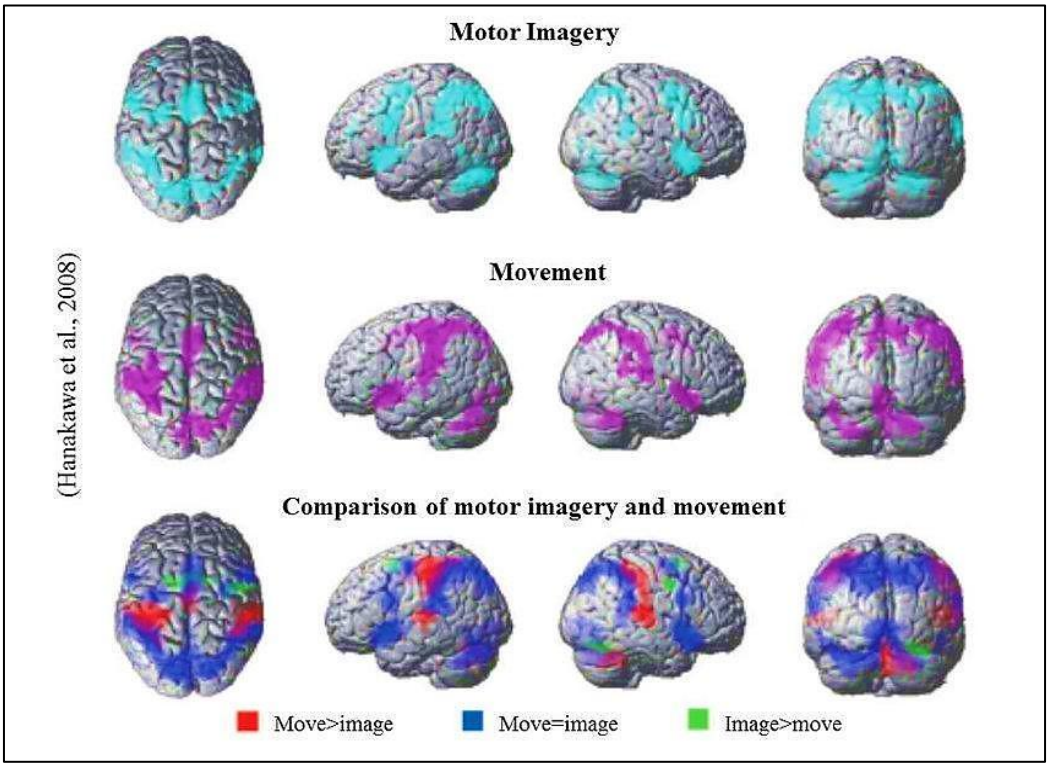

Figure 1. Brain Activity Taken with fMRI during Motor Imagery and Actual Execution of an Upper Extremity Task [13]

MIT has different sensory modalities, including kinesthetic imagery (KI), internal visual motor imagery (IVI) and external visual motor imagery (EVI). KI involves mentally experiencing simulated actions and concentrating on force, stretching, speed, movement effort, and relaxation sensations [14]. It is also known as first-person perspective MIT. IVI also adopts a first-person view, visualising motor actions as if seeing them through one's own eyes [14].

EVI, or a third-person perspective, necessitates athletes to simulate movement mentally as though being captured by a camera [15]. The perspective athletes choose to practise hinges on numerous factors like individual preference, experience and task requirements, such as whether it is a form-based task, goal-directed task or closed or open motor skills.

Many uncertainties about MIT persist, as research outcomes remain inconsistent. For instance, although some studies discovered MIT has been shown to enhance service speed, other research did not observe this trend. Additionally, despite most studies suggesting that an internal imagery focus is more beneficial in enhancing tennis service performance compared to an external imagery focus, other studies disagreed. Therefore, a

narrative review of this topic is required to consolidate previous research's findings regarding its effectiveness in tennis service performance and address some contradictory findings.

This scoping review aims to investigate MIT's effectiveness in enhancing tennis service performance in young tennis athletes, improving the confidence of athletes during competitions when performing the serve and mitigating fasting-induced declines in service performance. The proposed hypothesis is that MIT training will enhance tennis service performance and mitigate Ramadan's negative effects on tennis service performance, validating previous studies' results.

II. METHODOLOGY

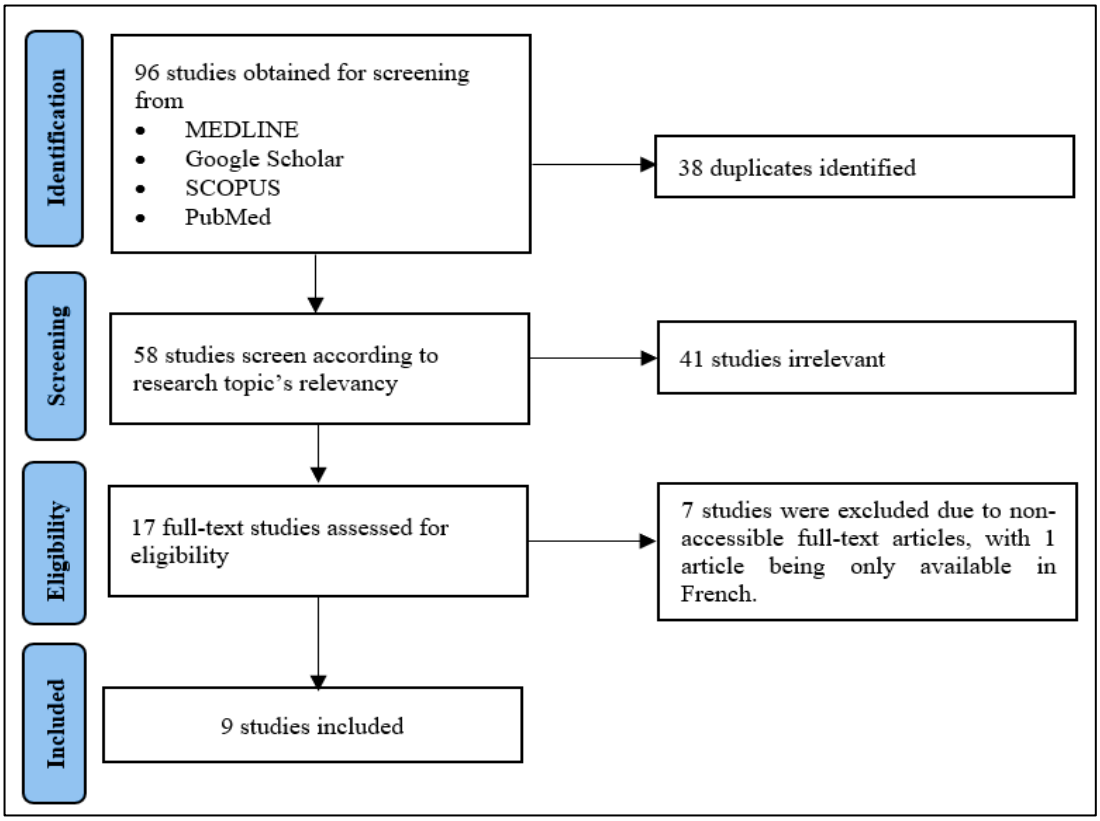

Figure 2. PRISMA Chart Illustrating the Selection Process of Relevant Articles for Review

A. Search Strategy

Articles published between 1990 and 2025 documenting MIT's effectiveness in elevating tennis service performance in young tennis athletes were sourced using several databases like Ovid MEDLINE, Google Scholar, PubMed, and SCOPUS. During the search process, keywords like "tennis", "tennis service", "young tennis players", "motor imagery training", "imagination" and "mental imagery" were used. The keywords were amalgamated by applying Boolean operators like "AND" and "OR" to hone the search for pertinent articles.

B. Inclusion Criteria

English articles focusing on MIT's effectiveness on tennis service among young tennis athletes were included. Additionally, English studies reporting on other interventions combined with MIT on tennis performance, like service were included.

C. Exclusion Criteria

Articles lacking English version and focusing on an identical topic but consisting of study populations of non-young tennis players aged 18 and above were excluded.

D. Number of Articles Yielded

A total of 9 pertinent articles were scrutinised and included in this study.

III. RESULTS

A. Influence of MIT on Tennis Service Performance

Seven articles examining MIT's efficacy on tennis service performance among young tennis players, aged 9 to 18, were included. Before the studies commenced, demographics and anthropometric measurements of participants such as their height were taken, and they were required to complete the Movement Imagery Questionnaire (MIQ-3, MIQ-3F) or its revised version (MIQ-R, MIQ-RS) to evaluate athletes' imagery ability. Before planned physical training sessions and the actual tennis service performance evaluation in the intervention groups, MIT sessions were conducted. Each session lasted 10 to 15 minutes and began with either a script containing precise tennis service elucidation being read aloud or instructions regarding which thinking perspective to apply (1st or 3rd person perspective) being given to tennis players. The majority of outcomes demonstrated consistent enhancements in service accuracy, technique, and overall performance in the imagery training group with varying levels of efficacy contingent upon imagery type, study design, and participant expertise. However, some studies reported mixed results regarding service speed and return accuracy.

Table 1. Summary of Results of Reviewed Articles

Study Title	Author(s) / Year	Research Outcomes
Effect of Motor Imagery Training on Tennis Service Performance in Young Tennis Athletes	Fortes *et al.*, 2019 [16]	• Controlled and randomised experimental investigation lasting 8 weeks among 28 young male tennis players (15 to 16 years old, training amount: 4 times per week, 2 hours per day) • Participants were randomly divided into imagery training group (ITG) and control group (CG, watch the Olympics history videos). • Upon evaluating the serve accuracy, stroke velocity and service performance (accuracy X stroke velocity), moderate improvements were noted for all performance indicators in ITG, with CG demonstrating statistically insignificant changes.
Effects of Motor Imagery Training on Service Performance in Novice Tennis Players: The Role of Imagery Ability	Robin *et al.*, 2023 [17]	• Controlled experimental study lasting 25 weeks among 33 right-handed novice tennis players aged 9 to 13 (training amount: 4 times per week, 2 hours per day). • Participants were assigned to either good imagery, poor imagery or control groups based on their Movement Imagery Questionnaire for Children (MIQ- C) scores. • Technical quality, success percentage and service speed of the Good and Poor Imager groups' participants who completed MIT before serving were significantly higher compared to the Control group, which completed a countdown chore.
Motor Imagery and Tennis Serve Performance: The External Focus Efficacy	Guillot *et al.*, 2014 [18]	• Test-retest experimental design lasting 16 weeks among 12 young elite tennis players aged 11 (5 boys and 7 girls; Weekly tennis training: 7 ± 1 h; conditioning training every week: 2 hours). • MIT was implemented biweekly during the study's last 8 weeks, whereby each subsequent

		practice trial was preceded by participants being required to mentally practice tennis service. • After regular training, successful serves percentage raised by 8%, and after MIT, it increased by an additional 4%. • The accuracy score was noted to remain identical after regular training but after MIT, it elevated significantly • Mean velocity dropped by 3.5 % after regular training and noticed a significant rise of 6.2 % after MIT. • Successful first-ball serve percentage heightened significantly by 4 % after normal training and by another 6% after MIT. • After normal training, points won percentage following a first-ball serve heightened by 10% and after MIT, by another 30%.
Does Motor Imagery Training Improve Service Performance in Tennis Players? A Systematic Review and Meta-Analysis	Deng *et al.*, 2024 [19]	• A systematic review and meta-analysis of 9 studies including 548 participants aged 9 to 18 years old • MIT displayed no alteration ($p = 0.076$) in service return accuracy and speed. • After MIT ($p = 0.007$), higher service accuracy values ($p < 0.001$) were discovered with heterogeneity and moderate effect. • MIT also demonstrated a rise ($p = 0.003$) in service technique with low heterogeneity and moderate effect.

Internal and External Imagery Effects on Tennis Skills Among Novices	Dana and Gozalzadeh, 2017 [20]	• A pre-post experimental design study lasting 5 days among 38 young novice tennis players aged 15 to 18 (training volume: day 1: pre-test, day 2 to 4: 4 practice sessions, day 5: post-test).
		• Participants were distributed to 3 different groups after finishing MIQ, which are:
		  • Internal imagery group (imagine 1st person perspective)
		  • External imagery group (imagine 3rd person perspective)
		  • Control group (mental math exercise)
		• The internal imagery group's serve performance error decreased from 183.91 to 73.8 cm, the external imagery group's from 197.16 to 100.83 cm, and the control group's from 195.25 to 134.83 cm.

Mental Imagery Training Programs for Developing Sport-Specific Motor Skills: A Systematic Review and	Lindsay *et al.*, 2021 [21]	• A systematic review and meta-analysis of 36 studies, with 2 studies revolving around tennis service included in analysis. • Both studies concluded MIT combined with

Meta-Analysis		physical practice enhances tennis service performance, with their evidence quality rated 5/11 (fair) and 6/11 (good) by PEDro scale.
Influence of Motor Imagery Modality on First-Serve Performance in Tennis Players	Laurent *et al*., 2024 [22]	• Sample size: 20 male young tennis players aged 9 to 13 • A 4-week study, and participants completed MIQ-3f before study commencement. • Participants were enquired about their preferred motor imagery ability (internal visual (IVI), external visual (EVI), kinesthetic(KI)), and they had 4 motor imagery training sessions across 4 weeks (1st week: control, 2nd week: IVI, 3rd week: EVI and 4th week: KI). • No significant main effect on service speed noted. • Higher service success percentages were observed in KI and IVI (M = 59%, 55%) conditions compared to EVI condition (M = 52%) and control (45%). • Efficiency scores, rated by three blinded experts (0-5 scale) based on difficulties of receivers returning the serves, were higher in IVI (1.8) and KI (2.0) than in Control and EVI (both 1.5).

B. Influence of MIT on Mitigating Negative Impacts of Ramadan on Tennis Service Performance

One study by Fekih et al. [23] assessed whether MIT could reduce the negative impacts of tennis service during Ramadan month. Thirty-eight young male tennis players participated in a 4-week randomised, controlled study conducted during Ramadan month. Players were distributed into two groups, namely the imagery training group (IMG, n = 18) and the control group (CG, n = 20, watching Olympics history videos).

Both groups conducted the same two-hour physical training plan over Ramadan from 5 pm to 7 pm, with MIT sessions occurred 3 times per week across 48 hours, totalling 12 sessions. Results revealed that all performance metrics' (accuracy, running speed and performance (precision x speed)) effect of group/time interaction ($p < 0.01$) was discovered, with IMG only showing improvement ($p = 0.01$) and thus the negative consequences of Ramadan on tennis service performance might be reduced or counteracted with MIT [23].

C. Influence of Additional Interventions together with MIT on Tennis Service Performance

One pre-post experimental study conducted by Robin et al. [24] lasting 5 days (training volume: day 1: pre-test, day 2 to 4: four practice sessions, day 5: post-test) focusing on the effects of the incorporation of self-talk into the MIT routine on tennis service performance was reviewed.

Thirty-eight young tennis players were recruited and divided into 3 groups, namely the motor imagery group (MIG), motor imagery and self-talk group (MISTG) and control group. In MIG, players imagined from a third-person view while delivering an excellent serve before each physical service, facilitated with an imagery script read out to them.

In MISTG, players imagined and spoke out what they were imagining to themselves. Performance indicators included success percentage, service speed and technical quality. Upon evaluation, MIG and MISTG had enhanced success percentage from pre- to post-test, with control group remaining constant. In terms of serve speed, only MISTG improved significantly from pre- to post-test ($p < .01$). All groups showed improvements in technical quality, with MIG and MISTG showing significant rise from pre- to post-test ($ps < .01$), with MISTG possessing the best post-test performance ($ps < .01$) [24].

IV. DISCUSSION

According to this scoping review, MIT has positively affected tennis service performance (overall performance, service accuracy, stroke velocity and success rate) across various imaging abilities (good or poor) and skill levels (experts or novices) as well as mitigated Ramadan's negative effects on tennis service, matching our hypothesis. This is because MIT may alter spinal-level synaptic activity and stimulates brain areas resembling motor execution in terms of intention, planning and neural circuit engagement.

Moreover, studies indicate that MIT enhances muscle coordination and strength potentially due to enhanced muscle electromyographic (EMG) activation [16]. As an illustration, Wang et al. [25] observed a greater EMG amplitude among 16 Chinese badminton players' dominant hand muscles holding the racket while undergoing MIT. Furthermore, Di Rienzo et al. [26] scrutinised MIT's effect in players (volleyball, handball and tennis) and found out elevated EMG in biceps brachii. Control group studies showed no statistically significant changes in performance metrics, likely due to inefficient and insufficient training sessions, particularly for skilled players who require greater and longer training sessions to yield significant elevations.

Studies by Deng et al. [19] and Laurent et al. [22] revealed no significant alterations in service speed. This could occur because service speed depends more on strength growth or technical refinements, with MIT not deliberately affecting these components directly, stemming conflicting literature outcomes [27]. Moreover, miniscule effects on service speed could originate from inadequate week distribution in honing each component of tennis service. Technically challenging movements can slow down imagery, prolong trials, and increase inaccuracies, negatively impacting performance.

For instance, Laurent et al. [22] had only 4 sessions (20 service balls) across 4 weeks, which is limited. Robin et al. [28] proposed extending the acquisition phase consisting of having 20 sessions over 3 months to enhance service speed. Novices demonstrated greater improvements in service speed than skilled players [17]. This can be explained by novices having greater capacity for improvement compared to skilled athletes [28].

Dana and Gozalzadeh [20] reported IVI to be more instrumental in elevating closed-skill tasks such as the tennis serve compared to EVI, which is more effective for open skills. Closed motor skills like swimming and the tennis service occur in stable and predictable environments, which provides athletes with ample time to prepare and execute, whereas open skills like football and tennis backhand stroke performance occur in dynamic environments requiring real-time adjustments [29]. IVI boosts spatial accuracy and target prediction [30]. Laurent et al. [22] further backs this as participants in KI and IVI groups noted a 41% and 31% enhancement in tennis service success rates, compared to 16% in the EVI group.

However, EVI also elevates tennis service performance too, highlighted by the findings from Guillot et al. [18]. EVI enhances form-based tasks by allowing athletes to readily envision the overall motions and positions vital for optimal performance while IVI is useful for goal-oriented activities or motor skills that involve visual field variations [31]. KI is instrumental for intersegmental coordination actions or muscle strength.

MIT was recommended to be implemented before physical training sessions because tiredness disrupts mental image generation [32]. However, other research showed positive effects of MIT when conducted during or after physical training. Kanthack et al. [33] discovered that physically exhausted athletes who visualised a simple movement showed enhanced accuracy performance.

Additionally, incorporating mental routines like instructional self-talk into MIT further enhances tennis service success rate as it aids focus, alleviates distractions, and bolsters the learninh of complex movements [24]. Intervention, pre-service and performance routines, and Mental Training Programs (MTP) can enhance mental resilience by reducing competition anxiety and improving self-confidence [34].

MIT's efficacy is influenced by 7 factors abbreviated into the PETTLEP model, consisting of physical, environment, task, timing, learning, emotion and perspective [35]. Firstly, the physical aspect requires tennis athletes to achieve an arousal state resembling how they perform in a match when undergoing MIT. Conditioning

is also imperative. During Ramadan, Muslims are requested to fast and avoid sexual intercourse throughout the month [23]. Ramadan-induced service decline stems from altered sleep wake cycle and reduced fluid intake rather than fasting-induced dietary uptake as no difference in caloric intake concerning carbohydrates, and proteins and lipids proportions was noted during Ramadan compared to before [23]. Reduced sleep during Ramadan happens because Muslims eat and drink until late hours, preventing them from falling asleep [23]. Furthermore, reduced fluid intake induces dehydration, which is measured by body mass reduction at Ramadan's end compared to the afternoon one day prior to Ramadan, causing reduced muscular performance [23]. Secondly is the environment, which suggests MIT should occur in a competition atmosphere, like wearing their competition attire with a racket in hand at the tennis court to enhance context awareness and promote relaxation in competitive settings [27]. The task component involves personalising imagery script to align with participants' experiences. Next is timing whereby real-time motor imagery is more effective than slow-motion motor imagery. Participants' learning ability and emotions must be considered during MIT as they are vital for memory strengthening. Lastly is perspective whereby participants' preferences matter. When performing their preferred modality, one-third of participants obtained greater efficacy scores and percentage of successful first service balls [22].

When to re-evaluate MIT effects depends on timing. Effects should be re-evaluated immediately or within 15 minutes post-training, while short-term consolidation (occurring over 4-6 hours) was suggested to be re-evaluated after 12 hours, especially if sleep is included because sleep can enhance motor memory and reduce learning interference [35]. For long-term consolidation, re-evaluation should take place after 24 hours or longer as learning interference decreases thereafter. Studies on motor skill retention often test after one night of sleep or even days later [36]. A consensus strength in this scoping review is the utilization of debriefings after each MIT session, ensuring participants adhere to imagery instructions and identify any image-forming challenges at each session, which permits enhanced experimental control.

This scoping review presents several limitations. Firstly, studies by Fortes et al. [16] and Fekih et al. [23] lacked evaluation of tennis service technique, such as the kinematic analysis through playback videos or observation. Additionally, control group's participants performed a neutral counting-down task, which may encounter interference from action execution [17]. The study by Robin et al. [24] lacked a self-talk-only condition group, making it unclear if self-talk alone would be effective on performance. Furthermore, some non-instructed participants might naturally use self-talk, while control group participants might have reduced motivation induced by experimental conditions. These methodological limitations restrict the breadth of performance analysis. Small sample size seen in studies by Guillot et al. [18] (n = 12) and Laurent et al. [22] (n = 20) reduces statistical power and makes generalisation arduous.

While usage of MIQ was deemed a study strength by some, Laurent et al. [22] mentioned its usage as a potential limitation as tennis-specific movements might not be completely represented because the questionnaire centres on simple motions that may not accurately reflect tennis players' motor movements during practice or competitions. Another limitation category involves other external factors. Studies by Lindsay et al. [21] and Fekih et al. [23] had their physical performance assessed during the afternoon, whereby performance declines more than in the morning. Moreover, while disrupted sleep-wake cycles were discussed as a potential factor of Ramadan-related performance drop, participants' sleep duration data were not recorded, making assessing sleep disturbances' full impact arduous. Despite body weight being taken, it remains an indirect hydration level indicator.

V. FUTURE DIRECTION AND SUGGESTIONS

The number of articles correlating MIT to tennis service performance is still limited and more research should be conducted to fill information gaps and further verify previous outcomes related to performance. With studies mentioning all 3 modalities being able to enhance tennis service performance, designing and assessing MIT with each session containing all combined modalities being practised in physical training programs could be explored further. Aside from self-talk, other mental training programs' effectiveness in influencing tennis service performance when combined with MIT, should be delved into further as mental strength is an imperative aspect

of competitive tennis. The study of MIT should also be expanded to other tennis skills like stroke performance, to other sports like badminton, to para-athlete populations where current evidence is scarce, and to medical contexts such as stroke rehabilitation and performance optimisation in healthcare, in order to assess its capabilities to the fullest.

VI. CONCLUSION

This study intends to determine if MIT can enhance tennis service performance in competitive young tennis athletes. According to the findings, this study concluded that MIT could be effective in enhancing tennis service performance, and it is recommended that MIT be included within practice routines of not just tennis athletes, but novice players as well. However, it is important to be aware of the PETTLEP factors when implementing MIT to achieve maximum effectiveness. Adding psychological strategies like self-talk into MIT for further enhancing mental toughness also elevates the overall efficacy of the intervention.

Conflicts of Interest

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests.

Funding Statement

This work did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

VII. REFERENCES

1. C. Bowers, "ITF Global Tennis Report: Participation Hits 106 Million in Five Years," *International Tennis Federation*, Nov. 28, 2024. [Online]. Available: https://www.itftennis.com/en/news-and-media/articles/itf-global-tennis-report-participation-hits-106-million-in-five-years/
2. Á. López-Samanes, J. G. Pallarés, A. Pérez-López, R. Mora-Rodríguez, and J. F. Ortega, "Hormonal and Neuromuscular Responses During a Singles Match in Male Professional Tennis Players," *PLOS One*, vol. 13, no. 4, 2018. Google Scholar | Publisher Link
3. D. Whiteside and M. Reid, "Spatial Characteristics of Professional Tennis Serves With Implications for Serving Aces: A Machine Learning Approach," *Journal of Sports Sciences*, vol. 35, no. 7, pp. 648–654, 2017. Google Scholar | Publisher Link
4. M. Kovacs and T. Ellenbecker, "An 8-Stage Model for Evaluating the Tennis Serve," *Sports Health*, vol. 3, no. 6, pp. 504–513, 2011. Google Scholar | Publisher Link
5. M. J. Hayes, D. R. Spits, D. G. Watts, and V. G. Kelly, "Relationship Between Tennis Serve Velocity and Select Performance Measures," *Journal of Strength and Conditioning Research*, vol. 35, no. 1, pp. 190–197, 2018. Google Scholar | Publisher Link
6. Y. Le Mansec, B. Pageaux, A. Nordez, S. Dorel, and M. Jubeau, "Mental Fatigue Alters the Speed and Accuracy of the Ball in Table Tennis," *Journal of Sports Sciences*, vol. 36, no. 23, pp. 2751–2759, 2017. Google Scholar | Publisher Link
7. M. Slimani, D. Tod, H. Chaabene, B. Miarka, and K. Chamari, "Effects of Mental Imagery on Muscular Strength in Healthy and Patient Participants: A Systematic Review," *Journal of Sports Science and Medicine*, vol. 15, no. 3, pp. 434–450, 2016. Google Scholar | Publisher Link
8. N. Anuar and N. Bahar, "Imagery Training for Malaysian Paralympics Athletes – An Important Step Toward Sports Equity," *British Journal of Sports Medicine*, vol. 57, no. 10, pp. 613–614, 2023. Google Scholar | Publisher Link
9. M. Jeannerod, "Neural Simulation of Action: A Unifying Mechanism for Motor Cognition," *NeuroImage*, vol. 14, no. 1 Pt 2, pp. S103–S109, 2001. Google Scholar | Publisher Link
10. American Psychological Association, "Symbolic Learning Theory," *APA Dictionary of Psychology*, 2018. [Online]. Available: https://dictionary.apa.org/symbolic-learning-theory
11. M. M. Bradley, N. Sambuco, and P. J. Lang, "Imagery, Emotion, and Bioinformational Theory: From Body to Brain," *Biological Psychology*, vol. 183, p. 108669, 2023. Google Scholar | Publisher Link
12. J. Munzert and B. Lorey, "Motor and Visual Imagery in Sports," in *Multisensory Imagery*, pp. 319–341, 2013. Google Scholar | Publisher Link
13. T. Hanakawa, M. A. Dimyan, and M. Hallett, "Motor Planning, Imagery, and Execution in the Distributed Motor Network: A Time-Course Study With Functional MRI," *Cerebral Cortex*, vol. 18, no. 12, pp. 2775–2788, 2008. Google Scholar | Publisher Link
14. N. Robin, G. R. Coudevylle, A. Guillot, and L. Toussaint, "French Translation and Validation of the Movement Imagery Questionnaire-Third Version (MIQ-3F)," *Movement and Sport Sciences*, vol. 2, no. 108, pp. 23–31, 2020. Google Scholar | Publisher Link

15. Q. H. Yu, A. S. N. Fu, A. Kho, J. Li, X. H. Sun, and C. C. H. Chan, "Imagery Perspective Among Young Athletes: Differentiation Between External and Internal Visual Imagery," *Journal of Sport and Health Science*, vol. 5, no. 2, pp. 211–218, 2016. Google Scholar | Publisher Link
16. L. de S. Fortes et al., "Effect of Motor Imagery Training on Tennis Service Performance in Young Tennis Athletes," *Journal of Sport Psychology*, vol. 28, no. 1, pp. 157–168, 2019. Google Scholar | Publisher Link
17. N. Robin, R. Carien, K. Taktek, V. Hatchi, and L. Dominique, "Effects of Motor Imagery Training on Service Performance in Novice Tennis Players: The Role of Imagery Ability," *International Journal of Sport and Exercise Psychology*, vol. 22, no. 5, pp. 1070–1082, 2023. Google Scholar | Publisher Link
18. A. Guillot, S. Desliens, C. Rouyer, and I. Rogowski, "Motor Imagery and Tennis Service Performance: The External Focus Efficacy," *Journal of Sports Science and Medicine*, vol. 12, no. 2, pp. 332–338, 2014. Google Scholar | Publisher Link
19. N. Deng, K. G. Soh, B. B. Abdullah, and D. Huang, "Does Motor Imagery Training Improve Service Performance in Tennis Players? A Systematic Review and Meta-Analysis," *Behavioral Sciences*, vol. 14, no. 3, p. 207, 2024. Google Scholar | Publisher Link
20. A. Dana and E. Gozalzadeh, "Internal and External Imagery Effects on Tennis Skills Among Novices," *Perceptual and Motor Skills*, vol. 124, no. 5, pp. 1022–1043, 2017. Google Scholar | Publisher Link
21. R. S. Lindsay, P. Larkin, A. Kittel, and M. Spittle, "Mental Imagery Training Programs for Developing Sport-Specific Motor Skills: A Systematic Review and Meta-Analysis," *Physical Education and Sport Pedagogy*, vol. 28, no. 4, pp. 444–465, 2021. Google Scholar | Publisher Link
22. D. Laurent, R. Carien, and N. Robin, "Influence of Motor Imagery Modality on First-Serve Performance in Tennis Players," *Motor Control*, vol. 28, no. 4, pp. 377–390, 2024. Google Scholar | Publisher Link
23. S. Fekih, M. S. Zguira, A. Koubaa, L. Masmoudi, N. L. Bragazzi, and M. Jarraya, "Effects of Motor Mental Imagery Training on Tennis Service Performance During the Ramadan Fasting: A Randomized, Controlled Trial," *Nutrients*, vol. 12, no. 4, p. 1035, 2020. Google Scholar | Publisher Link
24. N. Robin, R. Carien, and D. Laurent, "Tennis Service Performance in Beginners: The Effect of Instructional Self-Talk Combined With Motor Imagery," *Journal of Motor Learning and Development*, vol. 10, no. 1, pp. 200–211, 2022. Google Scholar | Publisher Link
25. Z. Wang et al., "The Effect of Motor Imagery With Specific Implement in Expert Badminton Player," *Neuroscience*, vol. 275, no. 1, pp. 102–112, 2014. Google Scholar | Publisher Link
26. F. Di Rienzo, Y. Blache, T. F. D. Kanthack, K. Monteil, C. Collet, and A. Guillot, "Short-Term Effects of Integrated Motor Imagery Practice on Muscle Activation and Force Performance," *Neuroscience*, vol. 305, no. 2, pp. 146–156, 2015. Google Scholar | Publisher Link
27. A. Guillot, C. Genevois, S. Desliens, S. Saieb, and I. Rogowski, "Motor Imagery and 'Placebo-Racket Effects' in Tennis Serve Performance," *Psychology of Sport and Exercise*, vol. 13, no. 5, pp. 533–540, 2012. Google Scholar | Publisher Link
28. N. Robin, L. Dominique, E. Guillet-Descas, and O. Hue, "Beneficial Effects of Motor Imagery and Self-Talk on Service Performance in Skilled Tennis Players," *Frontiers in Psychology*, vol. 13, pp. 6–11, 2022. Google Scholar | Publisher Link
29. Y. F. Li, T. Gao, L. P. Luo, and S. He, "Comparative Effects of Open-Skill and Closed-Skill Sports on Executive Function in University Students," *Frontiers in Psychology*, vol. 15, p. 1457449, 2024. Google Scholar | Publisher Link
30. L. Hardy and N. Callow, "Efficacy of External and Internal Visual Imagery Perspectives for Enhancement of Performance on Tasks in Which Form Is Important," *Journal of Sport and Exercise Psychology*, vol. 21, no. 2, pp. 95–112, 1999. Google Scholar | Publisher Link
31. A. White and L. Hardy, "Use of Different Imagery Perspectives on the Learning and Performance of Different Motor Skills," *British Journal of Psychology*, vol. 86, no. 2, pp. 169–180, 1995. Google Scholar | Publisher Link
32. L. Demougeot and C. Papaxanthis, "Muscle Fatigue Affects Mental Simulation of Action," *Journal of Neuroscience*, vol. 31, no. 29, pp. 10712–10720, 2011. Google Scholar | Publisher Link
33. T. F. D. Kanthack, A. Guillot, L. R. Altimari, S. N. Nagy, C. Collet, and F. Di Rienzo, "Selective Efficacy of Static and Dynamic Imagery in Different States of Physical Fatigue," *PLOS One*, vol. 11, no. 3, e0149654, 2016. Google Scholar | Publisher Link
34. C. Morais and A. R. Gomes, "Pre-Service Routines, Mental Toughness and Performance Enhancement of Young Tennis Athletes," *International Journal of Sport Psychology*, vol. 50, no. 2, pp. 176–192, 2019. Google Scholar | Publisher Link
35. P. Knackstedt, "Optimal Timing of a PETTLEP Mental Imagery Intervention on a Dart Throwing Task," M.S. thesis, University of North Carolina at Greensboro, 2011. Google Scholar | Publisher Link
36. J. W. Krakauer and R. Shadmehr, "Consolidation of Motor Memory," *Trends in Neurosciences*, vol. 29, no. 1, pp. 58–64, 2006. Google Scholar | Publisher Link