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Efforts to Enhance Long-Barred Weapon Shooting Accuracy Through Visualization and Imagery Training for TNI AU Members at Syamsudin Noor Air Base

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ABSTRACT

Shooting proficiency is a crucial competency required of Indonesian Air Force soldiers, relying not only on physical technique but also on mental preparedness in high-pressure situations. However, results from long-barreled weapon shooting training at Sjamsudin Noor Air Force Base indicate that a majority of personnel have not achieved optimal accuracy levels. This study aims to enhance shooting accuracy through the implementation of visualization and imagery-based mental training techniques. Adopting the Kemmis and McTaggart Sports Action Research (PTO) model, the study was conducted in two cycles with ten Indonesian Air Force members selected purposively as subjects. The assessment instruments included a shooting accuracy test (10 shots in a prone position) and a mental readiness questionnaire utilizing a Likert scale. Findings revealed an increase in average accuracy scores from 38.30 in the pre-action phase to 52.60 in Cycle I, and further to 64.60 in Cycle II. Additionally, the mental readiness questionnaire scores improved, ranging from 4.0 to 4.3, indicating a significant enhancement in participants' concentration, calmness, and self-confidence. In conclusion, the use of imagery has proven to be effective in boosting both technical skills and psychological readiness in shooting training. This approach can be systematically integrated into military training programs to strengthen individual performance under stress.

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INTRODUCTION

Shooting ability is a crucial competency that every TNI soldier must possess, particularly within the TNI Air Force. This skill reflects not only technical proficiency but also mental readiness, concentration, and self-control in high-pressure situations. In a military context, shooting accuracy is a key factor in mission success and the safety of the team in the field. Therefore, developing effective training management, especially for shooting skills, is strategically important for optimizing the operational readiness of soldiers (Sopiin et al., 2023).

However, field observations indicate that the outcomes of long-barreled shooting training at Sjamsudin Noor Air Force Base have not achieved the expected accuracy

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levels. The gap between training objectives and actual performance reveals weaknesses in both technical and psychological aspects that impact soldiers' overall effectiveness. Key factors contributing to this issue include suboptimal mastery of basic shooting techniques and insufficient coaching on psychological aspects such as concentration, self-confidence, calmness, and anxiety control. Given that shooting is a sport requiring high precision, mental readiness is a critical component.

One psychological approach shown to enhance athlete performance is the use of visualization and imagery methods. Imagery training is a fundamental cognitive process in learning and motor performance (Cumming & Williams, 2012). Through imagery, individuals can enhance awareness of motor processes, increase mental readiness, and improve the execution of technical skills (Vlad Teodor et al., 2017). Imagery involves the mental execution of a movement without physical muscle movement, yet it activates the same motor nerve pathways as actual physical activity (Mizuguchi et al., 2012). This technique has been widely utilized in sports such as archery, golf, and shooting, demonstrating improvements in concentration, composure, and shooting accuracy (Mizuguchi et al., 2012; Wattimena, 2020). Additionally, imagery can boost athlete confidence, enhance performance related to sports skills, and cultivate a positive mindset regarding one's abilities (Lubis & Permadi, 2020; Riyadi et al., 2019). According to Dzaki (2019), imagery serves as a psychological strengthening tool, aiding athletes in developing strategies and achieving optimal performance.

In the Indonesian military context, particularly within the Indonesian Air Force, the application of imagery methods in shooting practice is not yet commonplace. In contrast, international organizations such as the ISSF (International Shooting Sport Federation) have integrated mental training as an essential component in the development of shooting athletes (Ragil Kurniawan et al., 2022). Shooting sports encompass various types, both recreational and competitive, at national and international events (Faisol, 2024). Accuracy in shooting is a fundamental skill that requires continuous training. It is defined as the ability to direct an object precisely toward a target to achieve a goal effectively (Akbar, 2025). In both sport and military contexts, accuracy is a competency that can be enhanced through various training methods, including mental approaches like imagery (Hasibuan, 2024).

Based on this background, a strategic solution is to systematically and structurally integrate visualization and imagery training into the shooting training program. This approach aims not only to enhance technical aspects but also to strengthen soldiers' mental readiness in facing pressure and critical situations in their duties.

This research will be conducted using the Sports Action Research (SAR) method with the primary objective of testing the effectiveness of visualization and imagery methods in improving the accuracy of long-barreled weapon shooting among TNI AU members at Sjamsudin Noor Air Force Base. It is anticipated that this approach will significantly contribute to enhancing the technical performance and mental readiness of soldiers and will be part of developing a more comprehensive and scientific military training program that integrates physical, technical, and psychological aspects.

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METHODS

This research employs a Sports Action Research approach utilizing a spiral model developed by Kemmis and McTaggart, which comprises four interconnected components: planning, action, observation, and reflection (Nurtanto & Sofyan, 2015). Each component is executed sequentially across two cycles, designed to promote gradual and continuous improvement in the shooting practice process through the use of imagery techniques. In the initial cycle, the primary focus is on introducing and implementing the fundamentals of visualization and imagery training. Insights gained from this cycle are leveraged to enhance the training strategy in the second cycle, which aims to reinforce multisensory imagery techniques and bolster the mental readiness of the participants.

The subjects of this study consisted of 10 members from the Indonesian Air Force Base Sjamsudin Noor, all of whom were actively engaged in a long-barreled weapon shooting training program. Participants were selected purposefully based on their consistent involvement in regular training sessions. The research instruments included: 1) a long-barreled shooting accuracy test (10 shots per participant in a prone position) to measure improvements in technical skills, and 2) a mental readiness questionnaire based on a Likert scale, designed to assess dimensions such as focus, calmness, and self-confidence before and after the imagery intervention. Data analysis was conducted in a descriptive quantitative manner; specifically, this classroom action research utilized a mixed-method approach—combining both quantitative and qualitative methods—to analyze assessment data across each cycle (Ahwan et al., 2023). This was done to observe trends in changes to shooting performance and mental readiness, complemented by qualitative evaluations derived from reflective notes from field observations.

RESULTS AND DISCUSSION

Result

Initial Conditions (Pre-Action)

Before the implementation of the action, an initial test was conducted involving 10 members of the Indonesian Air Force Base Sjamsudin Noor. The test assessed their shooting accuracy with long-barreled weapons in a prone position, utilizing 10 rounds each. The results indicated an average shooting accuracy of 38.30, with a standard deviation of 3.77. Most participants failed to meet the expected accuracy standards, with many shots straying from the centre of the target. This outcome highlights deficiencies in both consistency and control during shooting.

Furthermore, the results from the mental readiness questionnaire revealed that participants exhibited relatively low levels of concentration and self-confidence. This finding underscores the importance of not only technical skills but also psychological factors, such as mental readiness and focus, which must be enhanced before effective shooting practice.

Cycle I – Initial Implementation of Imagery Exercises

The first cycle stage centres on the introduction and application of visualization and imagery exercises before the shooting session. These exercises are conducted over

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5–10 minutes, utilizing audio scripts and video guides that help participants vividly imagine the ideal shooting process in detail. This includes aspects such as body positioning, aiming techniques, and the anticipated results of the shot.

The results indicated that participants experienced enhanced focus and mental engagement. Quantitatively, the average accuracy score rose to 52.60. Notably, several participants demonstrated significant improvement, particularly those who engaged with the imagery technique with high levels of vividness and concentration.

However, reflections from Cycle I revealed certain areas for enhancement, including a need for longer imagery sessions and more personalized scripts. Additionally, some participants struggled to maintain consistent imagery throughout the exercises.

Cycle II – Strengthening Imagery Strategy

In response to the findings from the reflection phase, the strategy in the second cycle was enhanced by:

1. Extending the imagery duration to 15 minutes
2. Providing individualized and more targeted visualization scripts
3. Offering verbal feedback following the imagery sessions

As a result, the average accuracy score increased significantly to 64.60, with a standard deviation of 5.58. Participants demonstrated improved composure, focus, and confidence during their shooting practice. They were able to create and retain detailed mental images, applying them consistently throughout their sessions.

The results from the Pre-Cycle, Cycle I, and Cycle II phases are displayed in tables and diagrams for clarity. Below is a table outlining the PTO results:

Table 1.
Recapitulation of Pre-Cycle, Cycle I, and Cycle II Results

Level of Measurement	Average Score	Improvement
Initial Test	38,30	-
After Cycle I	58,00	+19,70
After Cycle II	70,70	+12,70
Total Increase	-	+32,40

Based on this, the Action Research results graph can be seen in the following graph:

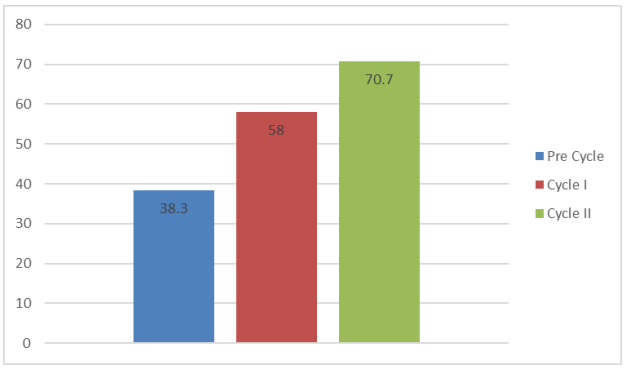

Figure 1.
Action Research Result Chart

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Mental Readiness Questionnaire Results

The majority of participants either agreed or strongly agreed with several statements within the questionnaire, including: 1) "I feel more confident after visualizing shooting." 2) "I maintain focus even when distractions are present." 3) "Visualization enhances my sense of preparedness before shooting."

The average score on the questionnaire ranged from 4.0 to 4.3 (on a scale of 5), suggesting a significant improvement in mental and cognitive readiness following participation in imagery training.

Discussion

This study seeks to enhance the accuracy of long-barreled shooting among members of the Indonesian Air Force at the Sjamsudin Noor Air Force Base through imagery-based mental training. Analysis of the research data from the initial conditions, Cycle I, and Cycle II revealed that imagery intervention had a significant impact on improving shooting performance. The average accuracy score rose steadily from 38.30 in the pre-action phase to 52.60 in Cycle I, and further increased to 64.60 in Cycle II. This upward trend demonstrates that imagery not only proves to be technically effective but also positively influences the mental readiness of participants.

These findings align with Sumedha's assertion (2018) that shooting accuracy is contingent upon mastery of technique, physical condition, and mental preparedness. Imagery has been shown to serve as a vital link connecting technical and psychological elements, leading to an overall enhancement in performance. To delve deeper into this topic, the discussion will focus on three primary points: the mechanism of imagery as a multisensory strategy, the impact of imagery on mental readiness, and the implications of these findings within the context of military training.

Imagery as a Multisensory Cognitive Training Strategy

Imagery is the process of mentally visualizing an action or movement without any actual physical movement. In this study, imagery was utilized through structured visualization sessions that incorporated audio and video guidance. This approach helped participants vividly imagine each aspect of the shooting process, from assuming a position and taking a breath to aiming and pulling the trigger. This activity engages visual, kinesthetic, and even emotional dimensions, creating a complete shooting simulation.

According to Nobuaki (2012), imagery involves the mental execution of motor movements, which can activate the motor areas of the brain even without muscle contraction. This implies that imagery training functions similarly to real training for the central nervous system, supporting the development of stable motor movement patterns. Similarly, Cornelias (2024) explains that imagery facilitates vicarious learning, allowing the brain to practice ideal movements without physical fatigue. In this context, imagery reinforces accurate motor representations, gradually forming more precise neuro-motor connections. Participants who consistently engage in imagery sessions demonstrate improved coordination, consistency, and efficiency in their shooting performance.

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The Influence of Imagery on Mental and Emotional Readiness

Imagery plays a significant role in enhancing the mental readiness of participants, in addition to improving their motor skills. Results from a questionnaire indicated an increase in scores related to focus, confidence, and calmness during shooting activities. The average participant response ranged from 4.0 to 4.3 on a Likert scale from 1 to 5, reflecting a high level of agreement on the benefits of imagery for mental preparation.

This finding aligns with research conducted by Ferry (2020) and Anggi (2023), which demonstrated that imagery can lower anxiety levels, enhance concentration, and boost self-confidence under performance pressure. In military contexts, the ability to remain calm, focused, and confident is crucial for success, particularly in high-pressure shooting situations.

Through the use of imagery, participants learn to anticipate distractions, manage mental stress, and create "success experiences" in their minds. This supports the principle of performance psychology that suggests internalized perceptions of success can help reduce tension and improve decision-making in critical situations.

Implementation of Imagery in Military Training

Imagery plays a crucial role in military training because it effectively integrates physical and mental training into a streamlined and efficient approach. This study demonstrates that imagery not only enhances accuracy scores but also fosters greater psychological readiness. The significant improvement in shooting scores from the pre-action phase to the conclusion of cycle II serves as evidence of the success of this training method.

According to Sopiin (2023), military shooting training should focus not only on technical skills but also on psychological development. Imagery, grounded in sports science and cognitive psychology, effectively bridges the gap between technical demands and mental readiness. This supports Bianca's (2021) assertion that imagery is beneficial in high-performance training, including military sports, as it improves technical skills while facilitating psychological recovery.

By incorporating structured and individualized imagery techniques, this training can become an integral part of the military training curriculum. This is especially important for personnel who face technical challenges and significant psychological pressure, such as during shooting practice.

CONCLUSION

This study demonstrates that imagery-based mental training is effective in enhancing long-barrel shooting accuracy among members of the Indonesian Air Force at Sjamsudin Noor Air Force Base. The imagery intervention was conducted over two training cycles, showing a gradual increase in accuracy scores, from an average of 38.30 in the pre-intervention phase to 52.60 in Cycle I, and reaching 64.60 in Cycle II. This total increase of 32.40 points highlights the significant impact of imagery on shooting technical skills.

In addition to improving physical performance, imagery also contributes to participants' mental readiness. Questionnaire results indicated that most participants felt more focused, confident, and calm after undergoing visualization training. An average score of 4.0 to 4.3 on the Likert scale suggests that imagery helps participants manage stress, maintain concentration, and build self-confidence when facing shooting tasks.

These findings support the theory that imagery serves as a multisensory cognitive training strategy capable of activating movement representations in the central nervous system, forming more stable movement patterns, and enhancing emotional readiness. In a military context, imagery has proven to be relevant as part of regular training, bridging the gap between the mastery of techniques and psychological preparedness efficiently.

Therefore, imagery can be recommended as an effective alternative training approach to enhance the shooting quality and mental readiness of military personnel, especially in high-pressure training or task situations. Additionally, the application of the TGT cooperative learning model can significantly improve the learning outcomes of volleyball underhand serve among fifth-grade students at SDN 2 Maju Bersama, as evidenced by marked increases in each learning cycle.

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