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EXTENDED ABSTRACT

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The Effectiveness of Training Methods in Improving Short-Distance Swimming Performance: Systematic Literature Review

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I. INTRODUCTION

Speed is a fundamental determinant of performance in competitive swimming. Consequently, the enhancement of swimming speed becomes a primary focus in the design of training programs, not only for elite athletes but also for novice swimmers who are in the process of developing their foundational technical and physical skills. This study aims to provide a scientific understanding of the most effective training methods based on recent empirical findings, thereby offering a meaningful contribution to the advancement of swimming coaching science, especially for beginner coaches.

II. METHODS

This research uses the PICO (Population, Intervention, Comparison, and Outcome) method to assist the article selection process. Using a PICO-structured form can elicit more detail, result in more complex and specific search strategies, and thus improve precision of retrieval [1]. The use of PICO will make it easier for authors to find relevant references to support the research.

III. RESULTS AND DISCUSSION

Following an in-depth analysis of the selected literature, 9 articles were identified that met all eligibility criteria to serve as the primary data sources for this review. 6 articles investigated in-water training methods, while the remaining 3 articles focused on dryland training methods. To provide a clear overview of the literature screening process, the following figure illustrates the detailed article selection flow.

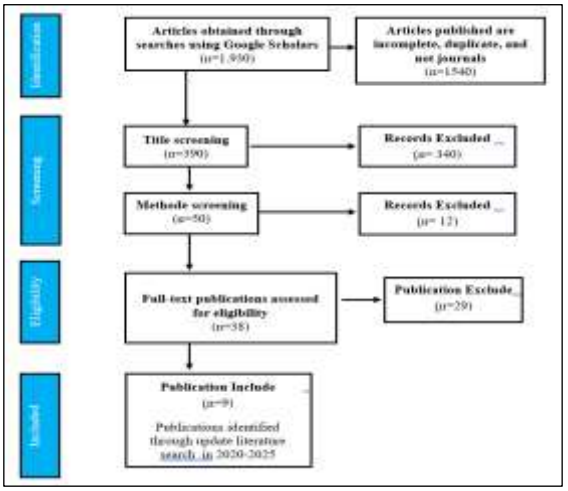


Fig. 1 Prism Flow Diagram

The results of the review of articles included in the inclusion category are presented in Table 1 below, which displays a summary of previous studies on training methods to improve short-distance freestyle swimming speed.

TABLE I
OUTCOME OF METHODS IN IMPROVING SHORT-DISTANCE SWIMMING PERFORMANCE

	Author Name & Year	Results
1	(Permatasari et al., 2025)	Significant improvement (p=0.018). Average time decreased by ~5.88 seconds (45.31s → 39.43s). The interval training group outperformed the dry land kicking group.
2	(Kurniawan, 2025)	A very significant improvement (p=0.000). The average time decreased by 4.16 seconds (46.36s → 42.20s).
3	(Arsyad et al., 2025)	A very significant improvement (p=0.000). The average time decreased by 6.28 seconds (62.41s → 56.13s).
4	(Afif et al., 2024)	Significant improvement (t=11.265 > t-table). Average time decreased by 2.22 seconds.
5	(Nurdin & Marzuki, 2024)	Significant improvement (p<0.05). Time decreased by 0.055 seconds (fins group) & 0.045 seconds (paddles group). Both aids were effective.
6	(Yuliana et al., 2021)	Significant improvement (t=1.51 > t-table). Speed increased by 2.93%.
7	(Morakurnia et al., 2024)	Significant improvement (t=2.98 > t-table). Average time decreased by 0.76 seconds.
8	(Kusmita et al., 2022)	A very significant improvement (p=0.000). The average time decreased by 1.878 seconds.
9	(Wicaksono & Putri, 2020)	Significant improvement (p<0.05). Box Jump is more effective than Burpee, increasing speed by 3.53%.

IV. CONCLUSIONS

Based on a systematic synthesis of nine research articles, it can be concluded that various training methods, both in-water and land-based, have been proven effective in improving 50-meter freestyle swimming speed.

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