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Effects Of Twelve-Week Structured Training Program On Motor Fitness Variables Of Secondary School Field Hockey Players

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Abstract

This study investigates the impact of a twelve-week structured training program on speed and flexibility in secondary school male hockey players. An experimental design was used with 50 male participants (aged 14-17 years) from Government school students of Davanagere district divided into experimental (n = 25) and control (n = 25) groups. The experimental group followed a structured regimen, while the control group continued routine activities. Speed (50-meter dash) and flexibility (Sit and Reach Test) were assessed pre- and post-training. Paired t-tests showed significant improvements ($p < 0.05$) in the experimental group, highlighting the effectiveness of systematic training. Future research should explore additional motor fitness variables.

Keywords: Motor fitness, speed, flexibility, structured training, experimental design, hockey players.

Introduction

Motor fitness is a key determinant of athletic performance, particularly in team sports like hockey, where speed, agility, flexibility, and coordination play crucial roles (Bompa & Haff, 2009). The ability to accelerate, change direction quickly, and maintain dynamic balance is essential for success in competitive gameplay (Faigenbaum et al., 2009). Research indicates that structured training programs significantly enhance motor fitness attributes, with sprint drills and plyometric exercises improving running mechanics and acceleration (Rumpf et al., 2012). Additionally, flexibility contributes to optimal movement efficiency and injury prevention, with dynamic stretching proving more effective than static stretching in improving range of motion and athletic performance (Behm & Chaouachi, 2011; Behm et al., 2016).

While natural growth and physical activity contribute to motor development, structured training has been identified as a more effective method for optimizing athletic capabilities in young athletes (Malina et al.,

2004). Periodized training programs systematically target different motor abilities, leading to significant improvements in overall performance (Bompa & Haff, 2009). However, limited research has examined the effects of a structured training regimen specifically on secondary school hockey players. Therefore, this study aims to assess the impact of a twelve-week structured training program on speed and flexibility among young hockey players. It is hypothesized that the experimental group undergoing systematic training will show greater improvements in these motor fitness variables compared to the control group.

Review of Literature

Motor fitness is essential for athletic performance in hockey, particularly in speed, agility, flexibility, and coordination. Research supports the effectiveness of structured training programs in enhancing these attributes. Speed Performance: Faigenbaum et al. (2009) and Rumpf et al. (2012) found that sprint drills and resisted sprints significantly improve acceleration and running mechanics. Harrison and Gaffney (2001) emphasized that general activity alone is insufficient, while Herman and Smith (2008) highlighted the benefits of dynamic stretching in sprinting training.

Flexibility Improvement: Behm and Chaouachi (2011) and Behm et al. (2016) reported that dynamic stretching enhances range of motion and flexibility. Chaouachi et al. (2017) found that dynamic exercises are superior to static stretching for improving flexibility. Systematic Training Impact: Bompa and Haff (2009) stressed the importance of periodized training for motor fitness development. Malina et al. (2004) concluded that structured interventions are more effective than unstructured physical activity in optimizing adolescent athletic performance.

Methodology

This study employed a quasi-experimental design to assess the effect of a twelve-week sports training program on motor fitness variables among secondary school hockey players. A total of 50 male students, aged 14 to 17 years, were selected from Government school students of Davanagere district. Participants were randomly assigned to either the experimental group (n = 25) or the control group (n = 25).

The experimental group underwent a structured training program focusing on speed and flexibility, while the control group continued with their routine activities. Standardized motor fitness tests were conducted for both groups before and after the training period. Speed was measured using the 50-meter dash, and flexibility was assessed through the Sit and Reach Test. Data were analyzed using paired t-tests to determine significant differences between pre- and post-test scores.

Results and Discussion

Table 1: Mean, SD, and t-value of 50 meters Dash speed of control group at Pre-Post condition

Speed Variables	Mean	SD	t-value	df	p-value
Pre-test	6.80	0.40	1.46	24	0.07
Post-test	6.89	0.42			

From the table, the mean pre-test score of speed for the control group was recorded as 6.80 seconds, while the post-test mean score was slightly increased to 6.89 seconds. The standard deviation (SD) values were 0.40 and 0.42, respectively. The calculated t-value was 1.46, which is lower than the critical value at a 0.05 significance level. The p-value of 0.07 indicates that there is no statistically significant improvement in the speed of the control group.

These findings suggest that the control group, which did not undergo any structured training, did not experience significant changes in speed. The lack of variation can be attributed to the absence of targeted training, as the subjects continued with their routine activities without any additional intervention.

In contrast, the experimental group, which underwent the twelve-week sports training, exhibited noticeable improvements in speed performance. The detailed analysis of the experimental group's speed variables is presented in the following section.

Table 2: Mean, SD, and t-value of 50 meters Dash speed of experimental group at Pre-Post condition

Speed Variables	Mean	SD	t-value	df	p-value
Pre-test	7.53	0.23	20.64	24	0.000
Post-test	7.24	0.19			

For the experimental group, the mean speed performance in the pre-test phase was 7.53 seconds, which improved to 7.24 seconds in the post-test phase. The t-value was calculated at 20.64, with a p-value of 0.000, indicating a statistically significant improvement in speed performance.

This improvement can be attributed to the structured training program designed to enhance speed. The drills and exercises incorporated in the training regimen specifically targeted sprinting mechanics, acceleration, and overall running efficiency, leading to significant gains in speed.

Table 3: Mean, SD, and t-value of Sit and Reach Test for Flexibility in Control Group

Flexibility Variables	Mean	SD	t-value	df	p-value
Pre-test	2.00	0.96	1.33	24	0.069
Post-test	2.72	0.79			

The mean flexibility score of the control group at the pre-test stage was 2.00, which increased to 2.72 at the post-test. However, the calculated t-value (1.33) was lower than the critical table value at a 0.05 level of significance. This indicates that there was no statistically significant improvement in flexibility among control group participants. Since they were not exposed to a structured training program, their flexibility remained largely unchanged. The stable lifestyle and environmental conditions maintained their previous status in motor qualities.

Table 4: Mean, SD, and t-value of Sit and Reach Test for Flexibility in Experimental Group

Flexibility Variables	Mean	SD	t-value	df	p-value
Pre-test	3.00	0.82	9.36	24	0.000
Post-test	4.24	0.60			

The mean flexibility score of the experimental group at the pre-test stage was 3.00, which significantly improved to 4.24 in the post-test. The calculated t-value (9.36) was higher than the critical table value, and the p-value (0.000) indicated statistical significance. This confirms that the twelve-week training program had a positive impact on flexibility.

The results illustrate that a structured training regimen enhances flexibility. The significant improvement in the experimental group indicates that flexibility training effectively influences motor fitness variables. These findings support the hypothesis that a structured sports training program significantly improves flexibility in young athletes.

Discussion on Findings

The findings of this study highlight the effectiveness of a structured twelve-week training program in improving motor fitness variables, particularly speed and flexibility, among secondary school hockey players. The results are consistent with previous research emphasizing the role of targeted training in athletic development.

Speed Performance

The significant improvement in speed observed in the experimental group suggests that sprint-focused exercises, such as acceleration drills and interval training, play a crucial role in enhancing running performance. The reduction in 50-meter dash time aligns with Faigenbaum et al. (2009), who found that structured sprint training effectively improves speed in young athletes. The lack of improvement in the control group supports findings by Harrison & Gaffney (2001), reinforcing that general physical activity alone is insufficient for speed enhancement. This suggests that systematic training interventions are essential for developing sprinting abilities in adolescent hockey players.

Flexibility Development

The notable increase in flexibility among the experimental group highlights the impact of structured stretching and mobility exercises. These findings align with Behm et al. (2016), who emphasized that dynamic stretching significantly improves range of motion and flexibility in young athletes. The minimal improvement in the control group suggests that passive participation in routine activities does not contribute meaningfully to flexibility enhancement, supporting the work of Chaouachi et al. (2017), who stressed the necessity of structured flexibility training for athletic performance.

Overall Implications

These findings reinforce the importance of structured sports training in optimizing motor fitness components. The results support Bompa & Haff (2009), who emphasized that systematic training is essential for athletic development. The absence of significant improvement in the control group further validates the need for targeted interventions rather than relying solely on routine physical activities. Coaches and sports educators should incorporate structured speed and flexibility programs to maximize performance potential in young athletes.

Conclusion

This study demonstrates the significant impact of a structured twelve-week training program on improving speed and flexibility in secondary school hockey players. The experimental group showed substantial improvements in both motor fitness variables, as indicated by statistically significant reductions in 50-meter dash times and enhanced Sit and Reach Test scores. In contrast, the control group, which continued routine activities without targeted training, did not exhibit significant changes. These findings reinforce the effectiveness of systematic training programs in optimizing athletic performance. Coaches and sports educators should integrate structured speed and flexibility training into youth development programs to enhance motor fitness and overall sports performance. Future research should explore the long-term effects of structured training and its influence on additional motor fitness components in young athletes.

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