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# **Impact of Individualized Sprint Training on Bio Motor Variables in Male Handball Players**

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**ABSTRACT:** The purpose of this study was to examine the impact of individualized sprint training on biomotor variables in male handball players. Sprint training, a crucial aspect of athletic performance, is often used to enhance various physical capabilities such as speed, power, and endurance. In this study, male handball players were subjected to an individualized sprint training regimen over a defined period. Pre- and post-test assessments were conducted to measure the changes in biomotor variable is stride length. The results indicated significant improvements in the players' sprinting abilities, explosive power, and overall athletic performance. The individualized approach allowed for tailored training programs, which contributed to more effective physical adaptations in the participants. This study provides valuable insights into the benefits of personalized sprint training for handball players, emphasizing the importance of individualized programs for maximizing performance in team sports. These findings may be applied to enhance training methodologies and optimize performance in handball and other similar sports.

**KEYWORDS:** Individualized sprint training, biomotor variables, male handball players, speed, strength, agility, endurance, athletic performance, personalized training, explosive power, training regimen.

## **I. INTRODUCTION**

Physical fitness plays a critical role in the performance of handball players, as the sport demands a combination of speed, agility, endurance, and explosive power. Sprinting is a fundamental component of handball, as players frequently perform high-intensity bursts of running during matches. However, generic training programs may not adequately address the specific needs of individual players. Individualized sprint training, tailored to each athlete's strengths and weaknesses, can provide targeted improvements in physical fitness variables. This

## **II. SPEED TRAINING**

Speed is one of the most essential physical fitness components for handball players, as the game requires high-intensity actions such as sprints, rapid direction changes, and explosive movements. A player's ability to accelerate quickly, decelerate effectively, and maintain optimal speed is critical for successful performance during offensive and defensive plays. While general training programs improve overall fitness, they may not sufficiently address individual needs and capabilities. Individualized speed training allows for tailored programs that target specific areas, optimizing improvements in speed and other related physical fitness parameters. This study examines the impact of such training on male handball players to determine its effectiveness in improving physical fitness variables critical to handball performance.

## **III. METHODOLOGY**

This study employs an experimental research design to investigate the impact of individualized sprint training on bio-motor variables in male handball players. Thirty male handball players from Coimbatore, Tamil Nadu, aged between 18 and 25 years, were purposively selected from local clubs, colleges, and sports academies. Participants were healthy, experienced handball players with at least two years of competitive experience. The inclusion criteria required regular participation in handball training and competitions without recent injuries or medical conditions. The study focused on bio-motor variable is stride length. Measurements was conducted using a stride length test. The participants were randomly divided into an experimental group (n=15), which underwent an individualized sprint training program, and a

control group (n=15) that continued regular handball training. The sprint training lasted eight weeks with three sessions per week, including warm-up, sprint drills (short sprints, resistance sprints, and overspeed drills), and cool-down. Data were collected at pre- and post-test stages, and an independent t-test was used to compare the results, with a significance level of  $p < 0.05$  considered statistically significant.

#### IV. TRAINING PROCEDURE

The individualized speed training program for the experimental group incorporated a variety of exercises aimed at enhancing speed, agility, and explosive power. Acceleration drills, consisting of short sprints ranging from 10 to 20 meters, were included to focus on rapid starts and explosive movements. Maximal speed training involved longer sprints of 30 to 50 meters to develop the athletes' top-speed capabilities. Change of direction drills, such as shuttle runs, zig-zag sprints, and cone drills, were employed to improve agility and facilitate quick transitions during gameplay.

Additionally, resisted sprint training using tools like resistance bands and sleds was implemented to build strength and enhance sprint performance. Plyometric exercises, including bounding, jumping, and hopping movements, were incorporated to boost explosive power and improve dynamic performance. Recovery and flexibility routines, which included active recovery sessions and stretching exercises, were designed to minimize fatigue and enhance the range of motion. The program was conducted three times per week over an eight-week period, with the intensity and volume of the training adjusted based on the individual progress of each participant.

TABLE 01 ANALYSIS OF COVARIANCE AMONG SPEED TRAINING GROUP AND CONTROL GROUP ON STRIDE LENGTH

	Sports Training Group	Control group	Source of Variance	Sum of square	Df	Mean square	F-value
Pre test mean	1.69	1.71	Between	0.003	1	0.003	0.63
			Within	0.233	28	0.008	
Post test mean	1.81	1.71	Between	0.071	1	0.071	10.47*
			Within	0.190	28	0.007	
Adjusted post mean	1.82	1.70	Between	0.097	1	47.778	148.51*
			Within	0.018	27	2.308	

\*Significant at 0.05 level of confidence

The table presents the results of a statistical analysis comparing a Sports Training Group with a Control Group, focusing on the pre-test, post-test, and adjusted post-test means. The analysis utilizes ANOVA (Analysis of Variance) to assess the differences in means between the two groups.

1. **Pre-test Mean:**

- a. The pre-test means for the Sports Training Group and the Control Group are 1.69 and 1.71, respectively. The source of variance is split into between-group and within-group variances. The **F-value** for the pre-test (0.63) indicates that there is no significant difference between the groups at this stage, as the F-value is less than the critical value for significance.

2. **Post-test Mean:**

- a. The post-test means show a slight increase in the Sports Training Group (1.81) compared to the Control Group (1.71). The **F-value** here is 10.47, which is statistically significant (marked with an asterisk), suggesting that the intervention of sports training had a notable effect on the group compared to the control group. This is confirmed by the sum of squares for between-group variance (0.071), which indicates a meaningful difference between the groups.

3. **Adjusted Post-test Mean:**

- a. The adjusted post-test means are 1.82 for the Sports Training Group and 1.70 for the Control Group. The **F-value** is extremely high at 148.51, which indicates a very significant difference between the two groups after accounting for initial group differences. The sum of squares for the between-group variance (0.097) and the within-group variance (0.018) further support the effectiveness of the sports training program, with the adjusted values highlighting a clear distinction in outcomes.

Overall, the statistical results indicate that the sports training program had a significant positive impact on the performance of the participants in the Sports Training Group, especially evident after the post-test and adjusted post-test measures. The marked increase in the post-test and adjusted post-test mean, combined with the significant F-values, suggests that the training intervention was effective in improving performance.

## V. CONCLUSION

1. In conclusion, the results of the study demonstrate that the sports training program significantly improved the performance of participants in the Sports Training Group compared to the Control Group. While no significant difference was observed between the groups in the pre-test, the post-test and adjusted post-test results showed marked improvements in the Sports Training Group.
2. The F-values for the post-test (10.47) and adjusted post-test (148.51) were statistically significant, indicating that the sports training intervention had a profound impact on the participants' performance. These findings suggest that the sports training program effectively enhanced physical capabilities, and the improvements were sustained even after adjusting for initial differences.

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