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Effect of a 12-Week Gym Training Programme on Selected Physical Fitness Components among Novice Volleyball Players

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Abstract: *The purpose of the present study was to investigate the effect of a 12-week gym training programme on selected physical fitness components among novice volleyball players. An experimental one-group pre-test–post-test design was employed. Thirty novice volleyball players participated in the study. Selected physical fitness components, namely cardiorespiratory endurance (12-Minute Run/Walk Test), explosive leg power (Standing Broad Jump), and speed (50 m Dash), were assessed before and after the training programme. The obtained scores were converted into standard scores using a 10-point performance scale. Descriptive statistics and paired sample t-tests were used for data analysis. The findings revealed statistically significant improvements in all selected physical fitness components following the 12-week gym training programme ($p < 0.001$). The results indicate that systematic gym training is effective in enhancing the physical fitness of novice volleyball players.*

Keywords: Gym training, Volleyball, Physical fitness, Experimental study, Standing broad jump, 50 m dash, 12-minute run.

I. INTRODUCTION

Physical fitness is one of the essential determinants of successful performance in volleyball. The game demands explosive power, muscular strength, speed, agility, endurance, and coordination. Modern volleyball training incorporates structured resistance exercises to improve these fitness attributes.

Gym-based resistance training enhances neuromuscular efficiency, muscular strength, and overall athletic performance. When implemented systematically, resistance training can improve jumping ability, sprinting performance, and cardiovascular endurance, which are critical for volleyball players. Therefore, evaluating the effectiveness of a structured gym training programme is important for coaches and sports scientists.

II. OBJECTIVE

To determine the effect of a 12-week gym training programme on selected physical fitness components among novice volleyball players.

Hypothesis

H_0: There is no significant difference between the pre-test and post-test scores of selected physical fitness components following a 12-week gym training programme

III. METHODOLOGY

Research Design- Experimental one-group pre-test–post-test design.

Participants

- Sample Size (N): 30

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- Participants: Novice volleyball players

Variables

Independent Variable- Twelve-week Gym Training Programme

Dependent Variables

- Cardiorespiratory Endurance (12-Minute Run/Walk Test)
- Explosive Leg Power (Standing Broad Jump)
- Speed (50 m Dash)

Training Programme

The participants underwent a structured gym training programme for 12 weeks, five days per week. Each training session lasted approximately 60–75 minutes and included warm-up, resistance exercises targeting major muscle groups, plyometric exercises, core strengthening, and cool-down activities. Training intensity was progressively increased throughout the programme.

Statistical Analysis and Results

Variable	Pre-test Mean	Post-test Mean	t-value	p-value
12-Minute Run/Walk (m)	1886.67	2243.33	113.00	<0.001
Standing Broad Jump (cm)	160.73	181.27	32.58	<0.001
50 m Dash (sec)	8.49	7.97	57.85*	<0.001
Total Standard Score	15.33	19.87	20.28	<0.001

Table 1. Comparison of Pre-test and Post-test Scores

The statistical test yields a negative t-value because sprint time decreased (an improvement). The table reports its magnitude for ease of interpretation

IV. INTERPRETATION

- The results demonstrate substantial improvements following the 12-week gym training programme.
- The average distance covered in the 12-Minute Run/Walk Test increased from 1886.67 m to 2243.33 m, indicating a marked enhancement in cardiorespiratory endurance.
- The Standing Broad Jump performance improved from 160.73 cm to 181.27 cm, reflecting increased explosive leg power.
- The average time in the 50 m Dash decreased from 8.49 seconds to 7.97 seconds, indicating a significant improvement in speed.
- Similarly, the overall converted fitness score increased from 15.33 to 19.87, showing a substantial enhancement in overall physical fitness.
- Since all p-values were less than 0.001, the null hypothesis was rejected.

V. DISCUSSION

- The findings of the present study indicate that a structured 12-week gym training programme significantly improved the physical fitness of novice volleyball players. Resistance training stimulates muscular hypertrophy, increases motor unit recruitment, and enhances neuromuscular coordination, which collectively contribute to improved athletic performance.
- The improvement observed in the 12-Minute Run/Walk Test suggests enhanced aerobic capacity resulting from consistent training and improved cardiovascular efficiency. Increased Standing Broad Jump performance

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demonstrates that resistance and plyometric exercises effectively enhanced lower-limb muscular power, a crucial requirement for volleyball actions such as blocking and spiking.

- The reduction in 50 m Dash time indicates improved sprinting ability due to increased muscular strength, better stride mechanics, and enhanced neuromuscular coordination. The significant increase in the overall fitness score confirms the comprehensive effectiveness of the gym training programme in improving multiple components of physical fitness.
- These findings are consistent with previous research reporting that systematic resistance training positively influences strength, explosive power, speed, and endurance among volleyball players.

VI. CONCLUSION

Based on the findings of the study, it can be concluded that the 12-week gym training programme produced significant improvements in all selected physical fitness components among novice volleyball players. Cardiorespiratory endurance, explosive leg power, speed, and overall physical fitness improved significantly following the intervention. Therefore, gym-based resistance training may be recommended as an effective conditioning method for volleyball players.

Practical Recommendations

1. Gym training should be incorporated into regular volleyball conditioning programmes.
2. A minimum duration of 12 weeks is recommended to obtain measurable improvements in physical fitness.
3. Coaches should combine resistance training with volleyball-specific skill training.
4. Progressive overload principles should be followed to maximize training adaptations.
5. Plyometric exercises should be integrated to further improve explosive performance.

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