



Influence of Plyometric and Traditional Training on Selected Power Performance Variable Among School Level Handball Players

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ABSTRACT

Handball is a fast-paced, dynamic sport that requires a combination of speed, leg explosive power, power, and technical skills. As one of the most popular team sports worldwide, it demands players to exhibit high levels of physical fitness and athleticism to excel on the court[1]. Given the multifaceted nature of the game, training programs aimed at enhancing performance among handball players often incorporate a variety of methods targeting different aspects of physical conditioning. Influence of plyometric and traditional training on selected power performance variables among school level handball players. To achieve the purpose of the study, forty-five (n=45) school boys handball players were randomly selected from the Bangalore District inter – school handball players, Bangalore, Karnataka, India during the year 2023-2024. The age of subjects ranged between 15-17 years. The subjects were divided in to Three groups randomly 15 in each group. experimental group I (Plyometric training group), experimental group II (traditional training group) and control group III they were not participated in any specific training. Two experimental groups underwent training for a period of 8 weeks. The subjects were tested on selected on power performance related variables namely explosive strength of school level boys handball players. The analysis of covariance was used to find out the significant difference if any, among the experimental group and control group ‘F’ ratio were computed to the variation on the groups. The ‘t’ ratio was applied to find out the significant improvement in all the variables of ‘t’ groups. In all the cases, 0.05 level of confidence was fixed to test the significant improvement which was considered as appropriate. Statistically significant improvements in baseline scores in fitness variables of explosive strength comparable between the one group of school boys’ players. Leg explosive strength improved by 2.37, 2.26 and 2.17 in the control group. Additional research on long-duration intervention in elite players may help to establish the role of plyometric training and traditional training in conventional handball skills for plyometric training. Additional research on long-duration intervention in elite players may help to establish the role of plyometric training and traditional training in conventional handball skills for sports training.

Key Words: plyometric, traditional, explosive strength and handball

INTRODUCTION

HANDBALL

Explosive power, a crucial component of athletic performance, refers to the ability to generate maximal force in minimal time. In the context of handball, explosive power plays a significant role in actions such as jumping, sprinting, throwing, and changing direction quickly. Enhancing explosive power enables players to execute these movements with greater speed, efficiency, and force, thereby improving performance on the court. Several factors contribute to explosive power, including muscle strength, speed of contraction, neuromuscular coordination, and the stretch-shortening cycle (SSC). Plyometric training, characterized by rapid stretching and contracting of muscles, is particularly effective in improving explosive power by enhancing the SSC. During plyometric exercises, such as depth jumps, bounding, and medicine ball throws, the muscles undergo rapid eccentric (lengthening) contractions followed by concentric (shortening) contractions, resulting in greater force production.

Incorporating plyometric exercises into training programs for handball players can lead to adaptations in the neuromuscular system, including increased motor unit recruitment, improved rate of force development, and enhanced muscle-tendon stiffness, all of which contribute to greater explosive power output. Additionally, plyometric training promotes improvements in muscle fiber type distribution, favoring the development of fast-twitch muscle fibers responsible for explosive movements.

Furthermore, strength training focusing on compound movements such as squats, deadlifts, and Olympic lifts can also contribute to improvements in explosive power by enhancing overall muscle strength and force production capabilities. When combined with plyometric exercises, a comprehensive training approach can maximize gains in explosive power among handball players.

Overall, developing explosive power is essential for optimizing performance in handball, and incorporating plyometric training, along with other strength and conditioning strategies, can effectively enhance this critical aspect of athletic performance. By systematically integrating these training methods into their programs, coaches and athletes can improve explosiveness, leg explosive power, and overall on-court performance in handball.

PLYOMETRIC TRAINING

It's important for individuals to start plyometric training at an appropriate intensity and progress gradually to minimize the risk of injury. Additionally, plyometric exercises should be tailored to the specific needs and skill level of the athlete, with proper attention to technique and form. Incorporating plyometric training into a comprehensive strength and conditioning program can be highly beneficial for athletes looking to improve their explosive power and athletic performance.

TRADITIONAL TRAINING

Traditional training refers to the conventional methods of physical conditioning and strength training that have been used for decades to improve overall fitness, muscular strength, endurance, and athletic performance. These methods typically involve structured resistance training, cardiovascular exercises, flexibility training, and sometimes additional components such as core strengthening and balance exercises.

METHODOLOGY

In order to fulfill the objective of investigating the influence of plyometric and traditional training on selected power performance variables among school-level handball players, a sample of forty-five (n=45) male inter-school handball players was selected from Bangalore district, Karnataka, India[2]. The participants were divided into three groups of equal size, each comprising fifteen subjects. Their ages ranged from 15 to 17 years, and they all had a minimum of three years' experience in handball, having represented their respective school teams. The study focused on the following variables: explosive strength, with experimental group I undergoing plyometric training, experimental group II undergoing traditional training, and the control group not participating in any specific training or conditioning program. The experimental treatments, namely plyometric training and traditional training, were administered over a duration of 8 weeks, with each group conducting sessions three times a week on alternate days. Each session lasted for 60 minutes. These training programs were conducted in addition to the regular handball training schedule. Detailed descriptions of both training packages can be found in Appendices I, II, and III.

STATISTICAL TECHNIQUE

The data collected from the three groups before and after the experimental treatments underwent statistical analysis utilizing analysis of covariance (ANCOVA). When the 'F' ratio for adjusted post-test means reached significance, Scheffe's test was utilized as a post hoc measure to detect significant differences among paired means. A confidence level of 0.05 was established for hypothesis testing in all instances.

The analysis unveiled significant findings in numerous physiological performance variables subsequent to the experimental treatments. Specifically, the post hoc Scheffe's test revealed significant differences in paired means within and across the three groups. These disparities offer valuable insights into the effects of the experimental treatments on the power-related performance variables under scrutiny.

Further interpretation of the results suggests a discernible impact of the experimental treatments on the selected power performance variables. These findings enhance our comprehension of the treatments' efficacy in augmenting power performance among the study participants.

Overall, the statistical analysis conducted utilizing ANCOVA and Scheffe's test emphasizes the importance of the experimental treatments in influencing the physiological performance variables examined in this study. These results provide valuable insights for future research and the development of targeted interventions aimed at optimizing power performance in similar populations.

RESULTS AND ANALYSIS

The study evaluated the influence of independent variables on various criterion variables over an eight-week training period. The primary focus was on explosive strength, a power-related variable. Pre- and post-intervention testing was conducted on all subjects for the selected dependent variables. Statistical analysis involved dependent 't'-tests and Analysis of Covariance (ANCOVA) on the data collected from experimental groups. Significant 'F' ratios for adjusted post-test means prompted further investigation using Scheffe's Post hoc test to identify paired mean differences, with a confidence level of 0.05 set for all analyses.

The analysis revealed significant differences in paired mean differences post-intervention, indicating the effectiveness of the interventions on the selected physiological variables, including resting heart rate. These results underscore the importance of the eight-week training period in inducing changes in leg explosive strength variables.

The utilization of statistical techniques like dependent 't'-tests, ANCOVA, and Scheffe's Post hoc test provided a comprehensive understanding of the effects of the experimental treatments. In conclusion, the findings emphasize the significance of independent variables in influencing physiological variables such as leg explosive strength. They contribute to understanding the efficacy of interventions in enhancing power-related performance variables outcomes within the study population.

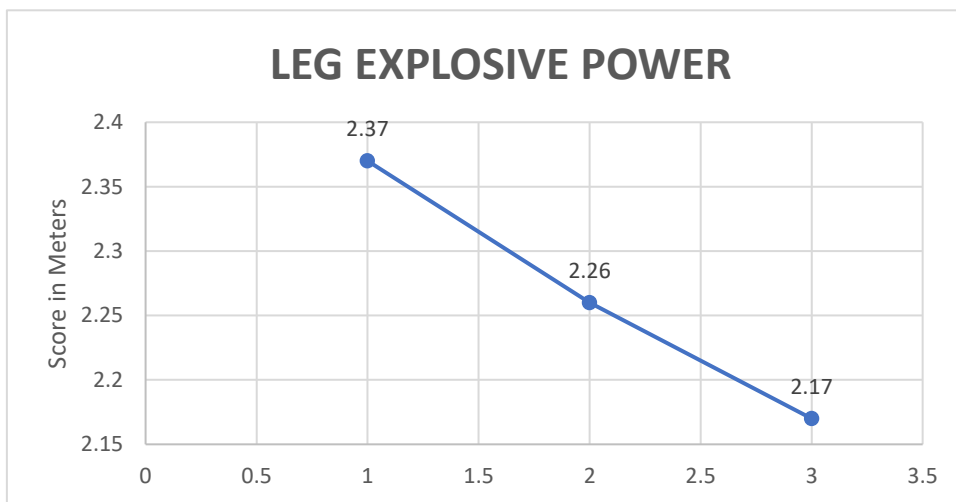
Table – 1

ANALYSIS OF COVARIANCE OF PRE TEST AND POST MEAN AMONG PLYOMETRIC TRAINING GROUP, TRADITIONAL TRAINING GROUP AND CONTROL GROUP ON LEG EXPLOSIVE STRENGTH

	Plyometric training Group	Traditional Training Group	Control Group	Source of Variance	Sum of square	df	Mean square	F-value
Pre test Mean	2.13	2.15	2.19	Between	0.030	2	0.015	1.92
				Within	0.329	42	0.008	
Post test Mean	2.35	2.25	2.20	Between	0.181	2	0.090	10.44*
				Within	0.363	42	0.009	
Adjusted post mean	2.37	2.26	2.17	Between	0.286	2	0.143	40.22*
				Within	0.146	41	0.004	

Figure -1

BAR DIA GRAM THE ADJUSTED POST TEST MEAN VALUES OF PLYOMETRIC AND TRADITIONAL TRAINING GROUP AND CONTROL GROUP ON LEG EXPLOSIVE POWER



In findings of notable explosive plyometric training

control group. The statistically significant improvement observed in leg explosive power underscores the effectiveness of the plyometric training and traditional training program in enhancing this particular aspect of power related performance variables of leg explosive power.

Based on these results, it can be concluded that participation in the plyometric training regimen led to a significant increase in selected power related performance variables, particularly in leg explosive power. This suggests that the plyometric training sessions positively influenced participants' leg explosive power, enabling them to move more quickly and efficiently[7].

These findings contribute to the growing body of evidence supporting the efficacy of plyometric training and traditional training in improving various aspects of power related performance variable, including leg explosive power. As leg explosive power plays a crucial role in many sports and activities, the implications of these results are significant for athletes, fitness enthusiasts, and individuals seeking to enhance their overall physical performance.

Further research may delve deeper into the specific mechanisms through which plyometric training enhances leg explosive power and explore its application across different populations and settings. Nonetheless, the present study provides valuable insights into the potential benefits of incorporating plyometric and traditional training into fitness programs aimed at improving leg explosive power and overall physical performance.

CONCLUSION

conclusion, the this study indicate a enhancement in leg power following and traditional compared to the

RECOMMENDATIONS

Based on the findings of this study, several recommendations can be made for future research:

Investigate the Effects on Different Demographic Groups

Conduct similar studies focusing on the impact of plyometric and traditional training on leg explosive power and other fitness variables among women. Considering factors such as age, fitness level, and any specific physiological differences between genders can provide valuable insights into how plyometric and traditional training affects various demographic groups.

Explore the Influence of Nutrition

Investigate how different nutritional plans or dietary interventions may interact with plyometric and traditional a training to influence leg explosive power and other fitness outcomes. Understanding the synergistic effects of nutrition and exercise can offer comprehensive strategies for optimizing physical performance.

Longitudinal Studies

Conduct longitudinal studies to assess the long-term effects of plyometric and traditional on leg explosive power and overall fitness. Tracking participants over an extended period can reveal any sustained improvements in leg explosive power and provide insights into the durability of the training effects.

Comparison with Other Training Modalities

Compare the effectiveness of Plyometric and traditional training with other forms of high-intensity interval training (HIIT) or traditional endurance training methods in improving leg explosive power. This comparative analysis can help identify the most efficient training strategies for enhancing leg explosive power in different populations.

Incorporate Multi-dimensional Assessments

Utilize multi-dimensional assessments to comprehensively evaluate leg explosive power, including measures of speed, coordination, balance, and reaction time. This holistic approach can provide a more nuanced understanding of how Plyometric and traditional training impacts different components of leg explosive power.

Consider Real-world Application

Explore the applicability of Plyometric and traditional training in practical settings, such as sports training programs or fitness routines for individuals with specific leg explosive power-related goals. Assessing the feasibility and effectiveness of implementing Plyometric and traditional training in real-world contexts can inform practical recommendations for athletes and fitness enthusiasts.

Account for Individual Variability

Recognize and account for individual variability in response to Plyometric and traditional training. Factors such as genetic predisposition, training adherence, and motivation levels can influence the outcomes of Plyometric and traditional training interventions, warranting personalized approaches to optimize results. By addressing these recommendations, future research can further advance our understanding of the effects of Plyometric and traditional training on leg explosive power and contribute to the development of evidence-based strategies for enhancing physical performance across diverse populations[8].

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