



Impacts of Isometric Strength Training with Specific Drills on Enhancing Strength Factors among School Level Basketball Players (A Pilot Study)

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ABSTRACT

The objective of this study was to examine the impacts of isometric strength training with specific drills on enhancing strength factors among school-level basketball players. To accomplish this goal, a sample of five school level boys basketball players aged between 14 and 17 years was randomly selected from the National Sports School in Coimbatore district. A single-group design was employed for the study. The assessment of strength factors was conducted using standardized tests. Leg strength was evaluated using the wall squat test, core strength was measured through the plank test, lower back strength was assessed using the back extension test, and lower body strength endurance was evaluated with the agility hurdle jump test. These tests provided objective measures of the players' strength capabilities across different muscle groups and functional movements relevant to basketball. The selected participants underwent a four-week isometric strength training program with specific drills. The pilot study group, consisting of five participants, engaged in targeted exercises designed to improve strength factors directly related to basketball performance. The drills were carefully tailored to replicate the movements and demands encountered during basketball gameplay, ensuring the training's specificity and applicability to on-court performance. After the completion of the training program, the collected data was analyzed using a paired t-test. This statistical analysis aimed to determine whether there were any significant improvements in the assessed strength factors following the four-week intervention. A confidence level of 0.05 was utilized to ascertain the statistical significance of any observed improvements, ensuring that the findings were reliable and not attributable to chance. The results of the study indicated a significant difference in the criterion variables. This difference was attributed to the specific drills administered to the experimental group, which resulted in notable improvements in leg strength, core strength, lower back strength, and lower body strength endurance among school-level basketball players.

Keywords: Specific Drills, Leg Strength, Core Strength, Lower Back Strength, Lower Body Strength Endurance, School Level Boys and Basketball Players.

INTRODUCTION

Basketball is a highly demanding sport that requires a combination of skills, athleticism, and physical strength. Among the various factors contributing to a player's performance, strength plays a crucial role in determining their success on the court. The ability to generate and withstand force is vital for executing powerful moves, defending against opponents, and dominating the game. Therefore, enhancing strength factors among school-level basketball players becomes a key aspect in their overall development.

One effective method of improving strength in basketball players is through isometric strength training with specific drills. Isometric exercises involve static muscle contractions without joint movement, allowing athletes to target and isolate specific muscle groups. This training approach has gained popularity in recent years due to its effectiveness in increasing strength and enhancing muscular endurance. By incorporating isometric strength training into basketball players' routine, they can benefit from various advantages. Firstly, isometric exercises help develop muscle strength in a way that mimics the demands of basketball movements, such as jumping, sprinting, and changing directions rapidly. This specificity allows players to transfer the gained strength directly to their on-court performance.

Secondly, isometric strength training is time-efficient and can be easily incorporated into a training program. With specific drills designed to target muscle groups commonly utilized in basketball, coaches and trainers can create focused training sessions that address the specific needs of the players. This targeted approach allows for efficient use of training time, maximizing the benefits gained from each session.

Additionally, isometric strength training has been shown to improve joint stability and prevent injuries, which are common in basketball due to the explosive nature of the sport. Strengthening the muscles surrounding the joints enhances their ability to absorb and distribute forces, reducing the risk of strains, sprains, and other injuries. Thus, the present study has been carried out to study the enhancing strength factors among school level basketball players through isometric strength training with specific drills.

METHODOLOGY

The present study aimed to investigate the effectiveness of isometric strength training with specific drills in enhancing strength factors among school-level basketball players. The research focused on a sample of five basketball players randomly selected from the National Sports School in Coimbatore district. The participants' age ranged between 14 and 17 years, and all of them were male.

To assess the various strength factors, standardized tests were employed. The wall squat test was conducted to evaluate leg strength, the plank test was used to assess core strength, the back extension test was employed to measure lower back strength, and the agility hurdle jump test was utilized to evaluate lower body strength endurance. These tests provided objective measurements of the players' strength capacities across different muscle groups and functional movements relevant to basketball.

The study adopted a single-group design, where all participants underwent the isometric strength training program with specific drills. The training program lasted for a duration of four weeks, during which the participants engaged in targeted exercises designed to improve strength factors relevant to basketball performance. The specific drills were carefully chosen to mimic the movements and demands encountered during gameplay, ensuring the training's specificity and transferability to on-court performance.

Following the completion of the training program, the collected data was subjected to statistical analysis using the paired t-test. This analysis aimed to determine if there were any significant improvements in the assessed strength factors after the four-week intervention. A confidence level of 0.05 was employed, ensuring that any observed improvements were statistically reliable and not due to chance.

By analyzing the data and interpreting the results, the study aimed to provide evidence regarding the effectiveness of isometric strength training with specific drills in enhancing strength factors among school-level basketball players. The findings would not only contribute to the existing knowledge on strength training in basketball but also offer practical insights for coaches, trainers, and players in optimizing training programs and improving performance levels.

TRAINING PROGRAMME

The isometric strength training with specific drills lasted for a total duration of four weeks. The training sessions were conducted for 60 minutes each, and the load was progressively increased throughout the training period. The participants engaged in training three days a week, specifically on Mondays, Wednesdays, and Fridays. Each training session began with a 15-minute warm-up period to prepare the participants for the exercises. The warm-up included activities aimed at increasing body temperature and promoting flexibility.

The isometric strength exercises performed during the training sessions included wall sits, planks, glute bridges, high planks, and superman's. These exercises targeted specific muscle groups and aimed to improve strength and stability. In addition to the strength exercises, the participants also practiced specific dribbling drills, such as ball rolls, zigzag dribbles, and low and high dribbles. Each of these drills was performed for one repetition with three sets. Passing drills were also incorporated into the training program and included wall chest passes, double hand passes, and bounce passes. The participants performed 25 repetitions of each passing drill for three sets. Furthermore, shooting drills were included in the training regimen, which consisted of triangle shots, three-direction shots under the basket, and 0-degree position shots. The participants completed 20 repetitions of each shooting drill for three sets. To conclude each training session, a 10-minute cooling-down period was implemented to gradually lower the participants' heart rate and promote muscle recovery.

Throughout the four-week training period, the participants followed this structured routine, combining isometric strength exercises with specific dribbling, passing, and shooting drills. The program aimed to enhance strength factors and basketball skills while ensuring proper warm-up and cool-down procedures to optimize performance and minimize the risk of injuries.

STATISTICAL TECHNIQUES

The collected data was analyzed using a paired t-test to assess the impact of isometric strength training with specific drills on enhancing strength factors among school-level basketball players. The significance level was set at 0.05, which is commonly accepted as an appropriate level of confidence for this study. This statistical test allowed for the evaluation of the statistical significance of any observed improvements in the strength factors resulting from the training program.

RESULTS

Table-I

Relationship of Mean, SD and 't'-Values of the Leg Strength, Core Strength, Lower Back Strength and Lower Body Strength Endurance between Pre & Post Test of the Isometric Strength Training with Specific Drills of Basketball Players

Isometric Strength Training with Specific Drills	Variables	Test	Mean	S. D	't' Values
	Leg Strength	Pre test	40	1.58	8.55*
		Post test	43.20	1.64	
	Core Strength	Pre test	31.60	2.70	11.22*
		Post test	35.80	3.34	
	Lower Back Strength	Pre test	11.60	1.14	8.55*
Post test		14.80	1.78		
Lower Body Strength Endurance	Pre test	31.60	2.70	10.15*	
	Post test	35.40	3.60		

*Significant at 0.05 level of confidence

Table I presents the mean values of pre-test and post-test scores for the isometric strength training with specific drills group. The pre-test mean scores were 40 for leg strength, 31.60 for core strength, 11.60 for lower back strength, and 31.60 for lower body strength endurance. After the intervention, the post-test mean scores increased to 43.20 for leg strength, 35.80 for core strength, 14.80 for lower back strength, and 35.40 for lower body strength endurance.

The corresponding t-ratios were calculated as 8.55, 11.22, 8.55, and 10.15, respectively. In comparison, the table value for a significance level of 0.05 and a degree of freedom of 4 is 2.77. The obtained t-ratios exceeded the table value, indicating statistically significant changes in leg strength, core strength, lower back strength, and lower body strength endurance among the school-level boys' basketball players who underwent isometric strength training with specific drills.

To provide a visual representation of the mean values, Figure 1 graphically illustrates the changes in leg strength, core strength, lower back strength, and lower body strength endurance for the isometric strength training with specific drills group.

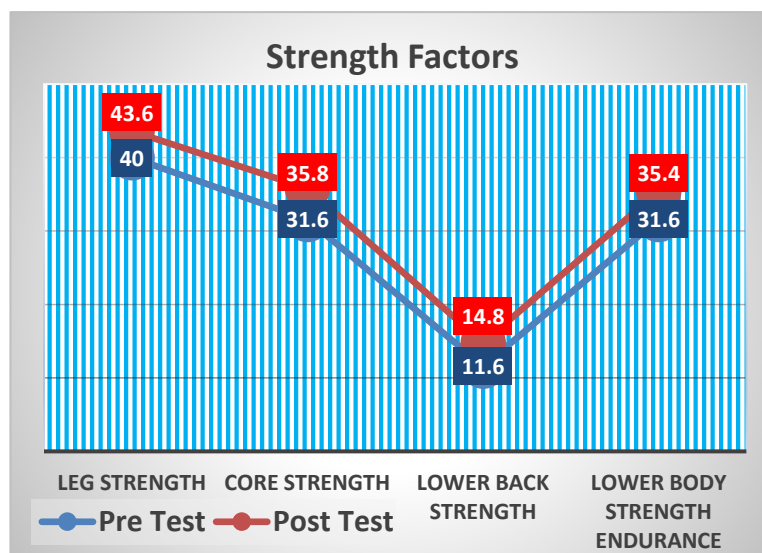


FIGURE-1: LINE DIAGRAM SHOWING THE PRE-TEST & POST-TEST ON LEG STRENGTH, CORE STRENGTH, LOWER BACK STRENGTH AND LOWER BODY STRENGTH ENDURANCE OF ISOMETRIC STRENGTH TRAINING WITH SPECIFIC DRILLS

DISCUSSION ON FINDINGS

The practice of isometric strength training with specific drills has been shown to be highly beneficial for school-level basketball players. This study aimed to examine the impact of such training on leg strength, core strength, lower back strength, and lower body strength endurance in basketball players at the school level. The participants in this study engaged in a variety of isometric strength exercises during their training sessions. These exercises specifically targeted different muscle groups, including the legs, core, lower back, and overall stability. Examples of exercises included wall sits, planks, glute bridges, high planks, and superman's. By focusing on these specific muscle groups, the training aimed to improve strength and stability, which are vital for basketball performance. In addition to the strength exercises, the participants also incorporated specific dribbling drills into their training regimen. These drills, such as ball rolls, zigzag dribbles, and low and high dribbles, helped enhance their ball handling skills and overall coordination on the court. The results of the study demonstrated significant improvements in leg strength, core strength, lower back strength, and lower body strength endurance among the participants who underwent the isometric strength training with specific drills. These findings align with previous studies conducted by **Ascender et al. (2019)** and **Marcolin et al. (2018)**, which have also highlighted the positive effects of isometric strength training on various strength factors in athletes. The outcomes of this study suggest that incorporating isometric strength training with specific drills into the training programs of school-level basketball

players can yield significant improvements in their strength and overall performance. These findings provide valuable insights for coaches, trainers, and players seeking to enhance their physical capabilities and excel in the sport.

CONCLUSIONS

The findings of this study suggest that the practice of isometric strength training with specific drills has a positive impact on leg strength, core strength, lower back strength, and lower body strength endurance among school-level basketball players. The results indicate that there was progressive improvement in these strength factors among the participants who underwent the combined training program over a period of four weeks.

The study concluded that the individualized effects of isometric strength training with specific drills showed statistically significant positive changes in leg strength, core strength, lower back strength, and lower body strength endurance of school-level basketball players. These findings highlight the effectiveness of incorporating this training approach into the players' routines to enhance their physical capabilities and overall performance on the court.

It is important to acknowledge the limitations of the study, as the findings are specific to the sample of school-level basketball players and may not be generalized to other populations. Additionally, the study's duration was limited to four weeks, and long-term effects of isometric strength training with specific drills were not explored.

Nevertheless, the study's results provide valuable insights into the benefits of incorporating isometric strength training with specific drills for school-level basketball players. The findings support the notion that such training can lead to improvements in leg strength, core strength, lower back strength, and lower body strength endurance, thereby enhancing the players' overall physical abilities.

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