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Relationship Between Explosive Strength And Game Performance Of Kabaddi Players

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Abstract: This study investigates the relationship between explosive strength (both leg and arm) and game performance among high school Kabaddi players (boys) in Vijayapura District, Karnataka. Utilizing a descriptive survey method, the study involved 45 boys Kabaddi players aged 14-17 years. Explosive strength was measured through the standing broad jump for legs and the medicine ball throw for arms, while game performance was assessed using a coaches' rating scale. The data analysis employed Karl Pearson Product-Moment Coefficient of Correlation, One-way ANOVA, and LSD's Post Hoc test.

Results indicated a moderate positive correlation between leg explosive strength and Kabaddi game performance ($r = 0.526$, $p < 0.05$), suggesting that players with higher leg explosive strength tend to perform better. Conversely, arm explosive strength showed a weaker correlation with game performance ($r = 0.305$, $p < 0.05$) and significant differences among different play positions. ANOVA results revealed significant differences in leg explosive strength across play positions. However, no significant differences were found in arm explosive strength across play positions.

The study concludes that leg explosive strength is a critical factor influencing Kabaddi performance, while arm explosive strength has a less significant impact. Based on these findings, it is recommended that training programs emphasize leg strength development, consider play positions in training strategies, and explore additional factors affecting performance in future research. These insights are intended to guide coaches and players in enhancing Kabaddi performance through targeted physical training and performance evaluation practices

Index Terms **-** Relationship, Explosive Strength, Leg strength, Arm strength, Game performance, Kabaddi players

1. Introduction

Kabaddi is a traditional Indian sport that demands a high level of physical prowess and strategic acumen. Among the various physical attributes essential for success in Kabaddi, explosive strength-particularly in the legs and arms-plays a pivotal role. Explosive strength allows players to execute powerful raids, perform quick tackles, and maintain agility during intense matches. This study explores the relationship between explosive strength and game performance among high school Kabaddi players in Vijayapura District, Karnataka. By examining this relationship, the study aims to highlight the critical role of explosive strength in enhancing Kabaddi performance and provide insights into how targeted training can improve player effectiveness.

Several studies have documented the importance of explosive strength in sports performance. For example, Vinyagam and Selvamuthukrishnan (2021) emphasized the relevance of leg explosive strength in influencing Kabaddi playing capacity. Similarly, Bhavya and Pujari (2021) found that physical variables, including explosive strength, were significantly correlated with Kabaddi performance. These findings highlight the need for a deeper understanding of how explosive strength impacts performance at the high school level, particularly in the context of regional variations and player development needs in Karnataka.

2. Significance of the Study

This study's significance lies in its potential to enhance the understanding of how explosive strength affects Kabaddi performance among high school players in Vijayapura District. By focusing on high school players, the research aims to address a gap in the literature concerning the physical conditioning of young Kabaddi players. The findings could provide valuable insights for coaches and sports educators to develop more effective training programs tailored to improving explosive strength and overall performance in Kabaddi.

The research has practical implications for training regimens in Kabaddi, as highlighted by studies such as those by Yallappa (2020) and Devaraju and Needhiraja (2012), which emphasized the role of explosive strength and other physical components in enhancing player performance. By identifying specific relationships between explosive strength and game performance, the study can help in designing targeted interventions to boost performance among young players. Additionally, the results may contribute to the broader field of sports science by providing region-specific data on the physical attributes critical for success in Kabaddi, thereby supporting the development of more refined and effective training methodologies.

3. Review of Related Literature

Explosive strength is a crucial physical attribute for Kabaddi players, as it significantly influences their performance on the field. Kabaddi, a fast-paced and physically demanding sport, requires players to have superior leg and arm strength to execute effective raids, tackles, and defensive maneuvers. Understanding the relationship between explosive strength and game performance can provide valuable insights for enhancing training programs and improving players' on-field effectiveness. This review of literature examines various studies that explore the impact of explosive strength on Kabaddi performance, focusing on the physical attributes essential for success in the sport.

3.1 Studies Cited

Vinyagam and Selvamuthukrishnan (2021) investigated the role of physical and mental factors on the playing capacity of inter-collegiate Kabaddi players in Thiruvalluvar District. Their study highlighted the importance of leg explosive strength and muscular endurance in influencing Kabaddi playing capacity, while psychological factors like self-confidence and competition anxiety had no significant correlation. This highlights the relevance of explosive strength in determining performance levels in Kabaddi.

Bhavya and Pujari (2021) explored the physical and psychological variables affecting Kabaddi performance among female players in Mandya District. Their findings reinforced the significance of physical factors, such as leg explosive strength and muscular endurance, in enhancing playing ability. Psychological variables did not show a significant correlation, aligning with Vinyagam and Selvamuthukrishnan's results and emphasizing the role of physical attributes in performance.

Yallappa (2020) examined the relationship between Kabaddi performance and physical fitness and psychological variables among university players. The study found that leg explosive power and endurance were significantly correlated with performance, supporting the idea that explosive strength is critical for achieving high performance in Kabaddi.

Shivaleela, Martin and Edward (2017) compared motor fitness and performance between Kho-Kho and Kabaddi players. The study revealed that Kabaddi players had higher strength but lower performance in other fitness components compared to Kho-Kho players. This highlights the specific importance of strength in Kabaddi but also suggests that explosive strength alone may not be sufficient for optimal performance.

Sardar and Pandey (2016) focused on the correlation between physical fitness components and Kabaddi performance. Their results indicated a significant relationship between performance and cardiovascular endurance, agility, and explosive strength, while flexibility and speed had less impact. This reinforces the critical role of explosive strength in performance but also suggests that other physical components are relevant.

Devaraju and Needhiraja (2012) studied the impact of anthropometrical and physical variables on Kabaddi playing ability among college players. They found that explosive strength, agility, and speed were strongly correlated with performance. This study supports the notion that explosive strength, along with other physical attributes, is essential for predicting Kabaddi performance.

3.2 Overview of Studies and Research Gap

The reviewed studies collectively highlight the significant role of explosive strength in determining Kabaddi performance. While leg explosive strength consistently correlates with better performance, other factors such as agility, speed, and cardiovascular endurance also contribute to overall effectiveness. However, there is a need for more research specifically focusing on high school Kabaddi players, particularly in the context of regions like Vijayapura District, Karnataka. Investigating how explosive strength influences performance at the high school level can provide targeted insights for developing effective training programs and optimizing player development strategies in this demographic.

4. Statement of the Problem

Relationship between Explosive Strength and Game Performance of Kabaddi Players.

5. Methodology

5.1 Method : Descriptive Survey Method was followed for the present investigation.

5.2 Selection of Samples: Forty-five high school boys of Kabaddi game drawn from different high schools situated at Vijayapur District, Karnataka State are selected as subjects on purposive sampling technique. The age of the subjects were ranged from 14-17 years.

5.3 Selection of Variables: The following criterion variables selected for the study

Variables	Test Procedure	Criterion Measure
1. Leg Explosive Strength	Standing Broad Jump	In Meters
2. Arm Explosive Strength	Medicine Ball Throw	In Meters
3. Kabaddi Game Performance	Coaches Rating Scale	In points

5.4 Statistical Procedure: The Coefficient of Correlation was utilized to find out the relationship between Physical Fitness and Kabaddi game performance of high school Kabaddi players (boys). One-way ANOVA Statistical technique was used to find out the significant differences in the Leg Explosive Strength and Arm Explosive Strength of Kabaddi game players among different play positions of boys along with LSD's Post Hoc Test. The level of significance was fixed at 0.05 level.

6. Results and Discussion

The relationship between explosive strengths (leg and arms) as physical fitness of Kabaddi players (boys) and their game performance were determined by applying Karl Pearson Product-Moment Coefficient of Correlation. The results are presented in Table-1.

Table-1: Relationship between Physical Fitness (Leg and Arm Explosive Strengths) and Kabaddi game performance of Kabaddi players of high school boys (N=45, df=43).

Variable	Mean	Standard Deviation	'r' value	Sig. Level
1. Leg Explosive Strength	2.236	0.268	0.526	*
2. Arm Explosive Strength	5.513	0.988	0.305	*
Kabaddi game performance of Kabaddi players	51.895	6.860		

* Significant at 0.05 level (Table Value =0.304)

Table-1 presents the correlation between leg and arm explosive strengths and Kabaddi game performance. The results show:

- **Leg Explosive Strength**: The mean is 2.236 with a standard deviation of 0.268, and the correlation coefficient (r) is 0.526, which is significant at the 0.05 level. This indicates a moderate positive relationship between leg explosive strength and Kabaddi game performance. Players with higher leg explosive strength tend to perform better in Kabaddi.
- **Arm Explosive Strength**: The mean is 5.513 with a standard deviation of 0.988 and the correlation coefficient (r) is 0.305, which is also significant at the 0.05 level. This shows a weaker positive relationship between arm explosive strength and game performance compared to leg explosive strength. While arm strength contributes to performance, it is less influential than leg strength.

Table-2: Calculation of One-way Analysis of Variance on Leg Explosive Strength (in mtrs.) of Kabaddi players.

Source of Variance	Sum of Squares	df	Mean Square	F Value	Sig. Level
Between Groups	0.657	2	0.329	5.51	*
Within Groups	2.505	42	0.060		
Total	3.162	44			

* Significant at 0.05 level [Table F-ratio at 0.05 level for 2 and 42 (df) =3.23]

Table-2 presents the results of the One-way Analysis of Variance (ANOVA) for leg explosive strength among Kabaddi players across different play positions. The ANOVA results show a significant F value of 5.51 with a p-value of 0.05, indicating a notable difference in leg explosive strength among the riders, defenders and allrounders. The Between Groups sum of squares is 0.657 with a mean square of 0.329, while the Within Groups sum of squares is 2.505 with a mean square of 0.060. These findings suggest that leg explosive strength varies significantly depending on the play position, highlighting the importance of considering various playing positions when evaluating and training for explosive leg power in Kabaddi players.

Table-2(A): LSD's Post Hoc Result on Leg Explosive Strength (in Mtrs.) over different play positions.

Different Play positions of Kabaddi players			**Mean Difference**
Raiders	**Defenders**	**Allrounders**	
2.136	2.166	–	0.030
–	2.166	2.406	0.240*
2.136	–	2.406	0.270*

*Significant at 0.05 level.

Table-2(A) presents the LSD Post Hoc test results for leg explosive strength among Kabaddi players in different play positions: Raiders, Defenders, and Allrounders. The results show a mean difference of 0.030 between Raiders and Defenders, which is not statistically significant. This suggests that there is no significant difference in leg explosive strength between players who specialize as Raiders and those who serve as Defenders. However, the mean difference between Defenders and Allrounders is 0.240, which is significant at the 0.05 level. Additionally, the mean difference between Raiders and Allrounders is 0.270, also significant at the 0.05 level. These findings indicate that Allrounders possess significantly greater leg explosive strength compared to both Raiders and Defenders. The significant differences between Allrounders and the other two positions suggest that the role of an Allrounder in Kabaddi might require higher levels of leg explosive strength, possibly due to the versatile and demanding nature of the position that combines both offensive and defensive skills.

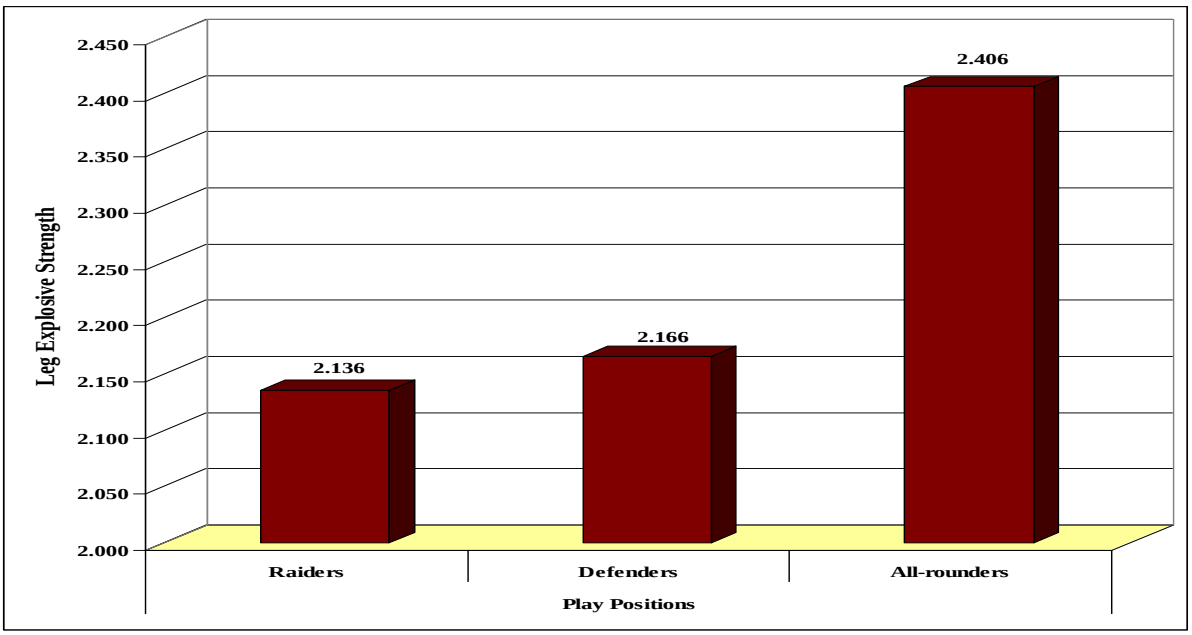

Fig.1: Comparison of mean scores of leg explosive power of Kabaddi game players among different play positions.

Table-3: Shows the calculation of One-way Analysis of Variance on Arm Explosive Strength (in mtrs.) of Kabaddi players of high schools.

Source of Variance	Sum of Squares	df	Mean Square	F Value	Sig. Level
Between Groups	1.129	2	0.565	0.57	NS
Within Groups	41.858	42	0.997		
Total	42.987	44			

[NS]Not Significant [Table F-ratio at 0.05 level for 2 and 42 (df) =3.23]

Table-3 presents the results of the One-way Analysis of Variance (ANOVA) for arm explosive strength across different play positions. The analysis shows that the Sum of Squares between Groups is 1.129, with a Mean Square of 0.565 and the Sum of Squares within Groups is 41.858, with a Mean Square of 0.997 as F Value of 0.57 is less than the table value. The non-significant F value indicates that there are no statistically significant differences in arm explosive strength among the various play positions in Kabaddi. This suggests that arm explosive strength does not vary considerably based on the player's position in the game.

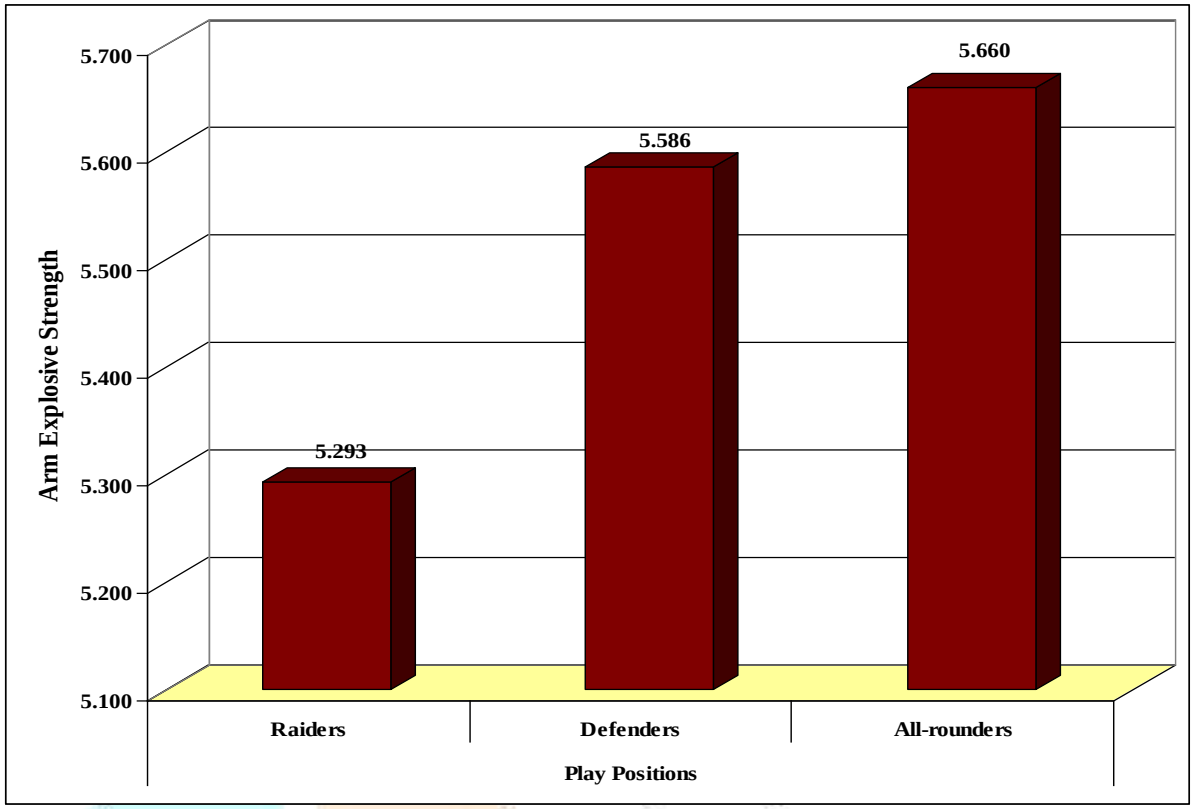

Fig.2: Comparison of mean scores of arm explosive strength of Kabaddi game players (boys) of different play positions.

7. Discussion of Results

The results reveal that leg explosive strength has a moderate positive correlation with Kabaddi game performance, indicating its critical role in enhancing player effectiveness. Players with better leg explosive strength are likely to perform better, aligning with previous findings by Vinyagam and Selvamuthukrishnan (2021) and Bhavya and Pujari (2021), who emphasized the importance of physical attributes in Kabaddi.

The ANOVA results for leg explosive strength highlight significant differences among play positions, suggesting that all-rounder players tend to have better leg explosive strength, which contributes to their performance. This is consistent with findings from Sardar and Pandey (2016), who noted significant relationships between physical fitness components and Kabaddi performance.

In contrast, the analysis of arm explosive strength did not show significant differences among play positions, which could imply that while arm strength is important, it is less variable and impactful compared to leg strength. This is supported by the study of Devaraju and Needhiraja (2012), which found that physical attributes like leg strength were more predictive of Kabaddi performance.

8. Conclusion and Suggestions

8.1 Conclusion

The study confirms that leg explosive strength significantly influences Kabaddi game performance among high school Kabaddi players (boys). The significant correlation between leg explosive strength and performance highlights its importance in enhancing athletic capabilities in Kabaddi. In contrast, arm explosive strength shows a weaker correlation and does not significantly differ among play positions.

8.2 Suggestions

1. **Training Programs**: Kabaddi training programs should prioritize developing leg explosive strength through targeted exercises such as plyometrics and strength training. Coaches should incorporate these exercises to enhance players' performance.

2. **Focus on Play positions**: Since significant differences in leg explosive strength were observed among different play positions, training programs could be tailored to specific play positions to optimize performance outcomes.

3. **Further Research**: Future research should explore the impact of other physical and psychological factors on Kabaddi performance and investigate the role of arm explosive strength in more detail. This could provide a comprehensive understanding of all factors contributing to success in Kabaddi.

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