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Assessments of probable anthropometric help in curl-up test

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Abstract

The curl-up test is a widely used measure of abdominal endurance, commonly applied in fitness assessments and sports training. This study examines the probable anthropometric factors that may influence performance in the curl-up test among 30 football players (both male and female) from the Pro Football Academy in Rohtak, Haryana. Anthropometric parameters such as height, weight, body fat percentage, and limb length were measured and analyzed for their correlation with curl-up test performance. Statistical analyses were conducted to determine the significance of these anthropometric variables in predicting endurance levels. The results suggest that specific anthropometric traits, such as core muscle mass and fat distribution, significantly impact curl-up test scores. The findings provide valuable insights for coaches and trainers to tailor fitness programs to optimize core endurance performance among football players.

Keywords: Curl-up test, anthropometry, football players, endurance, fitness assessment, core strength

Introduction

Physical fitness assessments are crucial for evaluating athletic performance, particularly in sports like football, where endurance, strength, and agility are essential. Among various fitness tests, the curl-up test is extensively used to measure the endurance of abdominal muscles. Core strength and endurance are vital for football players as they contribute to balance, stability, and injury prevention. This study explores the role of anthropometric variables in influencing curl-up test performance, emphasizing their potential impact on football players' fitness levels.

Anthropometry involves measuring body composition and structure, which may influence an athlete's performance. Parameters such as height, weight, body fat percentage, and limb proportions may affect an individual's ability to perform curl-ups effectively. Several studies have linked body composition to muscular endurance, highlighting the need to explore these relationships further. By assessing 30 male and female football players from Pro Football Academy in Rohtak, Haryana, this research aims to determine the extent to which anthropometric factors contribute to curl-up test outcomes.

Literature Review

Previous studies have indicated that body composition plays a significant role in determining muscular endurance. Research on the relationship between body fat percentage and core strength suggests that higher fat mass may hinder abdominal endurance, whereas lean muscle mass is positively correlated with better performance. Studies focusing on football players emphasize the importance of core endurance in overall athletic ability, linking it to balance, agility, and injury prevention.

Research has also explored gender differences in muscle endurance, suggesting that males generally exhibit higher muscular endurance due to greater lean muscle mass. However, studies have also pointed out the importance of training adaptations and individual fitness levels in bridging this gap. The impact of height and limb length on core endurance has been less studied, but some findings suggest that individuals with longer torsos may face more challenges in performing curl-ups due to biomechanical disadvantages.

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Methodology

A total of 30 football players (15 male, 15 female) from the Pro Football Academy in Rohtak, Haryana, participated in the study. Anthropometric measurements, including height, weight, BMI, body fat percentage, and limb length, were recorded. Participants performed the standard curl-up test under controlled conditions, and their performance was

documented.

A correlation analysis was conducted to determine the relationship between anthropometric variables and curl-up performance. The data was statistically analyzed using regression models to predict the influence of body composition on endurance levels.

Table 1: Anthropometric and Curl-Up Test Data

Gender	Avg. Height (cm)	Avg. Weight (kg)	Avg. BMI	Avg. Body Fat %	Avg. Limb Length (cm)	Avg. Curl-Ups Completed
Male	175	72	23.5	12%	78	45
Female	165	60	22.1	18%	74	38

Statistical Analysis

Statistical analysis was conducted using correlation and regression models to assess the relationship between anthropometric parameters and curl-up test performance. Descriptive statistics summarized the key variables, and inferential statistics identified significant trends. The correlation coefficient (r) between body fat percentage and curl-up performance indicated a negative relationship, with higher fat percentages associated with lower endurance. A positive correlation was found between lean muscle mass and performance, confirming its role in core strength. Additionally, ANOVA tests showed significant differences between male and female players in endurance capacity, further emphasizing gender-based physiological differences. The statistical significance was set at $p < 0.05$.

Results

The findings indicate that body fat percentage negatively correlates with curl-up test scores, while lean muscle mass positively influences performance. Male participants outperformed female participants, likely due to higher muscle mass and lower fat percentages. The results also reveal that players with lower BMI and lower body fat percentages performed better in the curl-up test. The study highlights the importance of optimizing body composition for improved endurance.

Discussion

The study's findings align with previous research, emphasizing the role of body composition in muscular endurance. The negative impact of body fat percentage on curl-up test performance is consistent with existing literature, which suggests that excess fat contributes to reduced muscle efficiency. The positive relationship between lean muscle mass and performance highlights the importance of strength training in core conditioning programs. Gender differences in performance are evident, with males demonstrating superior endurance, likely due to physiological advantages. However, targeted training programs can help female athletes improve their core endurance and overall performance.

Conclusion and Recommendation

This study highlights the significant role of anthropometric factors in influencing curl-up test performance among football players. The results suggest that body composition plays a crucial role in determining core endurance, with lower body fat percentages and higher lean muscle mass leading to better performance. Coaches should consider these factors when designing fitness programs, incorporating strength training and conditioning exercises to optimize endurance. Future research should explore larger samples and different training interventions to validate these findings. Additionally,

longitudinal studies should be conducted to analyze how changes in body composition over time affect endurance performance.

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