

# ASSOCIATIONS BETWEEN ISOMETRIC STRENGTH AND COUNTERMOVEMENT JUMP PERFORMANCE IN FIREFIGHTER RECRUITS



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## Introduction

Firefighting requires a high level of physical capability, particularly strength and power, to execute essential tasks such as lifting heavy equipment, advancing hose lines, and performing rescue operations. Given these demands, generating lower-body power may be critical for operational performance.

## Purpose

This study aimed to investigate the relationship between absolute and relative isometric strength and countermovement vertical jump (CMJ) performance among firefighter recruits.

## Methods

Forty firefighter recruits (age:  $22.12 \pm 4.32$  yrs, height:  $180.19 \pm 6.79$  cm, body mass:  $81.45 \pm 15.89$  kg) completed isometric mid-thigh pull (IMTP) strength testing ( $165.86 \pm 49.86$  kg) and performed a CMJ test ( $56.76 \pm 12.40$  cm). Relative IMTP (rIMTP) strength was calculated by dividing the IMTP score by the subject's body mass. A Shapiro-Wilk test revealed that the distributions of the selected variables significantly deviated from normality; thus, Spearman correlation analyses were utilized to determine relationships between these variables.



Table 1: Spearman Correlation Matrix Among IMTP\_kg, rIMTP, and CMJ

Variable	1	2	3
1. IMTP(kg)	-		
2. rIMTP (kg/body mass)	.46*	-	
3. CMJ (cm)	.47*	.57*	-

Note. \* $p < .05$ .

## Results

A significant positive correlation was observed between IMTP and CMJ ( $r = 0.47$ ,  $p = 0.036$ ), suggesting that as IMTP increases, CMJ performance tends to improve. Additionally, a significant positive correlation was found between rIMTP and CMJ ( $r = 0.57$ ,  $p = 0.002$ ). This highlights a stronger association between relative strength and CMJ performance.

## Conclusion

These findings suggest that developing relative lower-body strength may be essential for optimizing power production in firefighter recruits. However, the extent to which absolute and relative strength influence movement efficiency while wearing personal protective equipment and carrying occupational loads remains unclear. Future research should explore these relationships to better inform training strategies that enhance performance under job-specific conditions.

## Practical Applications

Training programs should emphasize relative strength development to enhance recruits' ability to generate power effectively, potentially improving performance in physically demanding firefighting tasks.

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