Association between isometric leg-back strength and lower body power in law enforcement officers

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Association Between Isometric Leg-Back Strength and Lower Body Power in Law Enforcement Officers.

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Abstract

Law enforcement personnel must possess a high level of physical capabilities that often include dynamic movements which are outcomes of both lower body strength and power. These qualities are often expressed in athletic environments where significant relationships have been observed between dynamic lower-body strength and power. Thus, it's speculated that similar relationships may exist between these measures in law enforcement personnel.

PURPOSE: To determine if significant relationships exist between lower body strength and power in law enforcement personnel.

METHODS: Archival data from a US law enforcement agency (n=595, age: 39.2 + 8.1 years, Ht: 179.9 + 7.4 cm, Body mass: 92.54 + 16.2 kg) were used in the present study. Lower body strength (leg and back) were assessed via a lower body dynamometer in both absolute; (LBDa) and relative (LBDr) body mass. Vertical jump height (VJ) and body mass (kg) were used to determine estimated power output (PAPw) via Sayer's equation (Sayers et al. 1991). Pearson product moment correlation ($p < 0.05$) was performed to determine the relationship between LDBa, LBDr, VJ and PAPw.

RESULTS: Significant relationships were observed between LBDa and VJ (r= .403, p = .0001), LBDa and PAPw (r = .605, p = .0001) and LBDr and VJ (r= .564, p = .0001) whereas no relationship was observed between LBDr and PAPw (r = -.049, p = .232).

CONCLUSIONS: The present study demonstrates that absolute lower body strength and power are significantly related, both in terms of vertical jump and estimated power output while relative lower body strength was related to vertical jump but not estimated power output. These suggest that law enforcement personnel require similar strength and power relationships as seen within athletic populations.

Introduction

Law enforcement personnel must possess a high level of physical capabilities that often include dynamic movements which are outcomes of both lower body strength and power. These qualities are often expressed in athletic environments where significant relationships have been observed between dynamic lower-body strength and power. Thus, it's speculated that similar relationships may exist between these measures in law enforcement personnel.

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Methods

Archival data from a US law enforcement agency (n=595, age: 39.2 + 8.1 years, Ht: 179.9 + 7.4 cm, Body mass: 92.54 + 16.2 kg) were used in the present study. Lower body strength (leg and back) were assessed via a lower body dynamometer in both absolute; (LBDa) and relative (LBDr) body mass (2). Vertical jump height (VJ) and body mass (kg) were used to determine estimated power output (PAPw) via Sayer's equation (3). Pearson product moment correlation ($p < 0.05$) was performed to determine the relationship between LDBa, LBDr, VJ and PAPw.

Results

Results are shown in Table 1. Significant relationships were observed between LBDa and VJ (r= .403, p = .0001), LBDa and PAPw (r = .605, p = .0001) and LBDr and VJ (r= .564, p = .0001) whereas no relationship was observed between LBDr and PAPw (r = -.049, p = .232).

https://tnstatetroopers.com/

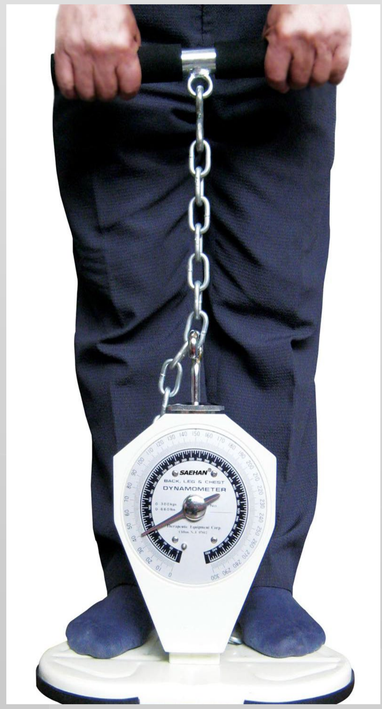
Table 1. Correlations

		VJ	PAPw
LBDa	p	0.403	0.605
	r	0.0001	0.0001
LBDr	p	0.564	-0.49
	r	0.0001	0.232

* P = ≤ .05; ** p≤.0; p =† ≤.001

Conclusions

The present study demonstrates that absolute lower body strength and power are significantly related, both in terms of vertical jump and estimated power output while relative lower body strength was related to vertical jump but not estimated power output. These suggest that law enforcement personnel require similar strength and power relationships as seen within athletic populations (1).



https://www.clinicalhealthservices.com/BackLegandChestDynamometer6LiftingTask.aspx

Practical Application

The present findings indicate consideration when planning strength and conditioning programs for law enforcement personnel. Specifically, the myriad of dynamic movements that are required by these personnel indicate the need for lower body strength and power development. However, outcomes between these may be different such that absolute strength may be more closely linked with absolute power production whereas relative strength may exhibit greater enhancement of vertical jump capabilities.

References

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