LIBERTY UNIVERSITY

Montview Liberty University Journal of Undergraduate Research

Volume 2 | Issue 1 Article 8

2016

# Human Performance Assessments in Cadet Populations

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## Abstract

**Introduction:** This study assessed potential physiological differences between the Ranger Challenge (RC) Competition team and junior year cadets in an Army Reserve Officer Training Corps (ROTC) program. **Methods:** RC (m = 11, f = 2) and junior year cadets (m = 7, f = 3) were assessed in the following areas: 1) quickness and agility (5-10-5 shuttle run), 2) total-body power (standing broad jump), and 3) grip strength (hand grip dynamometry) assessed. The 5-10-5 shuttle run was performed twice (opening once to the left and once to the right). The standing broad jump required that cadets stand with their toes behind a line, perform a maximum of three preparatory movements, triple extend their knees, hips, and ankles while using their upper body to propel them as far forward as possible. After the jump the distanced reached was measured from the line to the heel of the nearest foot. Hand grip dynamometry was performed once on each hand. The cadet held the dynamometer out to his or her side and squeezed it as they lowered it to their hip. **Results:** There were no significant differences between groups for the 5-10-5 shuttle run (p = 0.91), standing broad jump (p = 0.49), or grip strength (p = 0.31). **Conclusion:** RC did not outperform the junior year cadets in these assessments of human performance.

## Introduction

United States Army Reserve Officer Training Corps (ROTC) is one of the two main avenues for soldiers to commission as Officers. A cadets's third year is considered the most important, as this year is followed by a culminating training event known as the Cadet Leaders Course (CLC) at Fort Knox, Kentucky.

During their third year, cadets act as Non-Commissioned Officers (NCO), carrying out tasks set by the commanders and senior cadets that include physical training three days a week, weekly field training (once a week), and general accountability of lower cadets assigned to them. Because they are leading physical training, junior year cadets tend to be in the upper half of all cadets regarding physical fitness.

Another notable group of cadets is the Ranger Challenge (RC) team. During the spring semester prior to this assessment RC cadets trained twice as much to other cadets in ROTC. As a result, training adaptations and the level physical fitness should have been significantly greater for RC than for junior year cadets, due to increased volume and intensity as well as the incorporation of resistance training.

During the summer, nearly all cadets go to some form of cadet training at Fort Knox. All third-year cadets attend the 28 day CLC, with the possibility of follow-on training elsewhere. During these summer months and, especially during CLC, physical training is restricted due to time constraints and the risk of injury. Therefore, cadets are at risk of losing muscular strength or power and agility they gained prior to their summer training.

## Methods

RC team (m = 11, f = 2) and junior year cadets (m = 7, f = 3) had their 1) quickness and agility (5-10-5 shuttle run), 2) total-body power (standing broad jump), and 3) grip strength (hand grip dynamometry) assessed at the beginning of the fall semester. The 5-10-5 shuttle run was performed twice (opening once to the left and once to the right). Followed by, running 5 yards, touching a line on the ground, turning around, running 10 yards touching a line on the ground, turning around, and again running 5 yards with the time recorded once the cadet passed the starting point a final time. The standing broad jump required that cadets stand with their toes behind a line, perform a maximum of three preparatory movements, and triple extend their knees, hips, and ankles while using their upper body to propel them as far forward as possible. The cadet stuck the landing and the measurement was taken at the heel of the foot nearest to the line.Hand grip dynamometry was performed once on each hand. The cadet held the dynamometer out to his or her side and, squeezed it as they lowered it to their hip.

**Table 1. Descriptive Characteristics of Cadets (Means and SD)**

| Variable | Mean (RC) | SD (RC) | Mean (Junior) | SD (Junior) |
|---|---|---|---|---|
| **Age (y)** | 19.9 | 1.4 | 21.4 | 2.3 |
| **Height (cm)** | 177.0 | 9.0 | 173.2 | 11.9 |
| **Weight (kg)** | 72.3 | 6.6 | 73.3 | 12.6 |
| **Body fat (%)** | 14.0 | 6.5 | 19.9 | 10.4 |

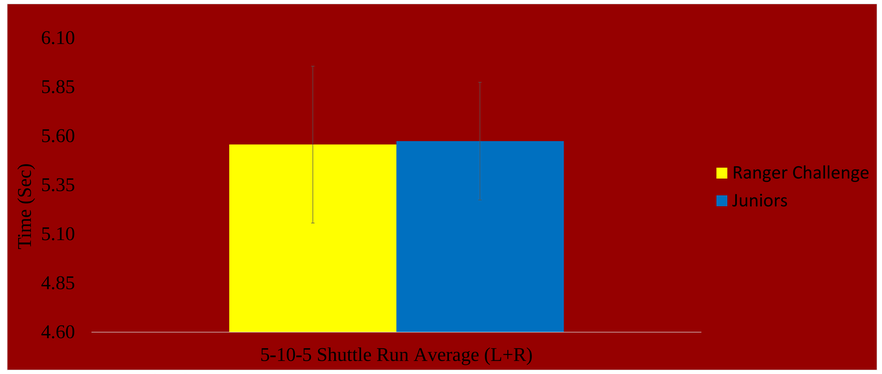


Figure 1: Average Shuttle run time (Ranger Challenge Team vs. Junior year cadets)

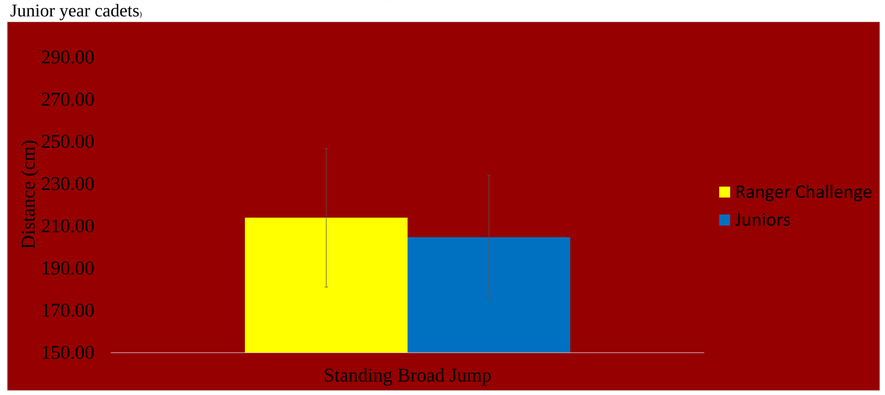


Figure 2: Average standing broad jump (Ranger Challenge Team vs. Junior year cadets)

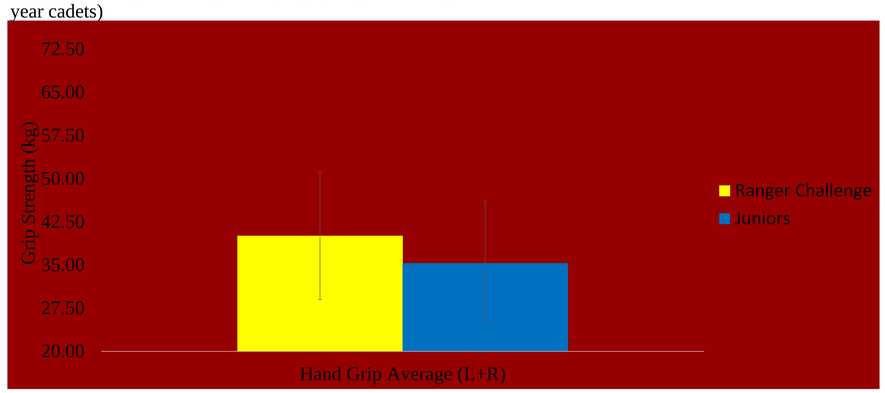


Figure 3: Average hand grip strength (Ranger Challenge Team vs .Junior year cadets)

## Results & Conclusion

**Results**

No statistically significant differences were found between RC and the junior cadets for the 5-10-5 shuttle run (p = 0.91), standing broad jump (p = 0.49), or grip strength (p = 0.31).

**Conclusions**

With no statistical differences observed, it was concluded that when returning from summer break RC did not outperform junior year cadets in these assessments of human performance. Changes in cadets priorities as they leave for summer break and the rigors of performing at CLC are two potential reasons for these outcomes.

One of the limitations of this study is the fact that these assessments were no conducted in the spring semester prior to summer break. Conducting the assessment in the spring semester would have helped with determining the effect that summer break had on cadet performance. Ideally, having three assessments (pre-summer break, post-summer break, pre-winter break, and post-winter break) would strengthen our ability to determine the effects summer break has on cadet performance.

## Future Work

1. These assessments were a precursor to research now being conducted on the Occupational Physical Assessment Test (OPAT). The OPAT is being used by Cadet Command to assess Cadets' ability to fulfill various job roles specific to combat jobs.
2. Other research currently being conducted after these assessments is focusing on Ranger Athlete Warrior (RAW) assessments and the Ranger Physical Assessment Test (RPAT). These are being used to assess RC team members' physical ability to perform in the annual RC event.

## Acknowledgments

We would like to thank LTC Bret Hamilton (Liberty University) and LTC Mark Houston (University of Virginia) for their guidance and support in conducting this project.