



Validation of Unit Level Instructed Eagle Tactical Athlete Program to Modify Human Performance Characteristics



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ABSTRACT

INTRODUCTION: The effectiveness of a physical training program is limited by structure of the program and the knowledge and skills of the instructor. The Eagle Tactical Athlete Program (ETAP) was developed for the Soldiers of the 101st Airborne Division (Air Assault) and previously validated to favorably modify human performance characteristics when implemented by non-military personnel in a controlled environment. **PURPOSE:** To validate the effectiveness of ETAP to modify human performance characteristics when instructed at the unit level by Soldiers who previously completed the ETAP Instructor Certification School (ICS) as one of the Division's individual training courses. **METHODS:** A total of 34 Soldiers (Age: 27.1 ± 7.0 years, Height: 1.76 ± 0.08 m, Mass: 80.4 ± 13.4 kg) participated. Pre and post testing was performed to assess changes in body composition, aerobic capacity, anaerobic power/capacity, strength/flexibility (shoulder, torso, knee), and postural stability. Soldiers performed ETAP as standard physical training at the unit level and were instructed by the unit leaders during a pre-deployment workup phase. Paired t-tests or Wilcoxon tests were used to evaluate significant differences (p < 0.05). **RESULTS:** Subjects performed 38.6 ± 13.3 days of unit training (exposure rate: 50.3 ± 17.5%). Significant improvements were demonstrated in knee flexion strength (Pre: 105.0 ± 18.5 %BW, Post: 114.9 ± 21.9 %BW), shoulder external rotation flexibility (Pre: 101.3 ± 19.9°, Post: 116.1 ± 11.0°), posterior shoulder flexibility (Pre: 104.0° ± 7.1, Post: 108.4 ± 6.5°), postural stability (Pre: 19.9 ± 14.5, Post: 13.7 ± 5.7 GRF SD), and anaerobic capacity (Pre: 7.6 ± 1.1 W/kg, Post: 7.81 ± 1.0 W/kg). **SUMMARY AND CONCLUSION:** The results of the study suggested that Soldiers who perform ETAP, when instructed by those who completed ICS training, demonstrated moderate improvements in several human performance variables. These improvements occurred despite the varied exposure due to training requirements and impact on physical training. Effective implementation of ETAP to improve or maintain physical performance must consider initial and continued training of the instructors (ICS), adjustments to physical training program based on tactical requirements, and ability to complete while deployed.

INTRODUCTION

- The effectiveness of a physical training program is limited by structure of the program and the knowledge and skills of the instructor
- The Eagle Tactical Athlete Program (ETAP) was developed for the Soldiers of the 101st Airborne Division (Air Assault) based on injury epidemiology, tactical requirements, and biomechanical, musculoskeletal, and physiological characteristics
- ETAP has been previously validated to favorably modify human performance characteristics when implemented by non-military personnel
- The purpose of the current study was to validate the effectiveness of ETAP to modify human performance characteristics when instructed at the unit level by Soldiers who previously completed the ETAP Instructor Certification School (ICS) as one of the Division's individual training courses

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SUBJECTS

- A total of 34 active duty Soldiers from the 101st Airborne Division (Air Assault) participated in this study (Age: 27.1 ± 7.0 years; Height: 1.76 ± 0.08 m; Mass: 80.4 ± 13.4 kg)
- Soldiers performed ETAP as standard physical training at the unit level and were instructed by the unit leaders during a pre-deployment workup phase

EXPERIMENTAL DESIGN AND METHODS

PROCEDURES

- Pre and post testing was performed to assess changes in human performance characteristics
- Body composition was assessed with The BodPod Body Composition System (Cosmed, Chicago, IL) through air displacement plethysmography (Figure 1)
- Body mass (kg) and percent body fat (%BF) were used for final analysis

Anaerobic Power/Capacity Test

- Anaerobic power/capacity was measured utilizing an electromagnetic cycling ergometer and Wingate protocol (RacerMate, Inc, Seattle, WA) (Figure 2)
- Anaerobic power and anaerobic capacity were normalized to body mass and reported as the peak and average wattage generated during the entire 30 seconds of the test, respectively
- Normalized anaerobic power/capacity (watts/kg) were used for final analysis

Strength And Flexibility Tests

- Average peak torque (%BM) for shoulder, torso, and knee strength (concentric/concentric, 60°/sec) and range of motion for the torso were measured with the Biodex Isokinetic Dynamometer (Biodex Medical Systems, Inc, Shirley, NY)
- Shoulder and knee flexibility was measured using a digital inclinometer and standard range of motion testing procedures

Postural Stability Test

- Postural stability was assessed in single-leg stance (barefoot) and measured using a force plate (Kistler Instrument Corp, Amherst, NY) (Figure 6)
- Standard deviations of normalized ground reaction forces were used in final analysis

STATISTICAL ANALYSIS

- Paired t-tests or Wilcoxon tests were used to evaluate significant differences between pre and post measures (p < 0.05)



FIGURE 1. Body Composition Test



FIGURE 2. Anaerobic Power /Capacity Test



FIGURE 3. Knee Flex/Ext Strength Test



FIGURE 4. Torso Rotation



FIGURE 5. Posterior Shoulder Flexibility



FIGURE 6. Postural Stability

RESULTS

- Subjects performed 38.6 ± 13.3 days of unit training (exposure rate: 50.3 ± 17.5%)
- Significant improvements were demonstrated in knee flexion strength, shoulder external rotation flexibility, posterior shoulder flexibility, postural stability, and anaerobic capacity
- Significant changes are presented in TABLE 1

TABLE 1: Description of Improvements

| | PRE Mean (SD) | POST Mean (SD) | p - value |
|--|------------------|-------------------|-----------|
| Knee Flexion Strength (%BM) | 105.0 (18.5) | 114.9 (21.9) | p < 0.05 |
| Shoulder External Rotation Flexibility (Degrees) | 101.3 (19.9) | 116.1 (11.0) | p < 0.05 |
| Posterior Shoulder Flexibility (Degrees) | 104.0 (7.1) | 108.4 (6.5) | p < 0.05 |
| Postural Stability (%BW)* | 19.9 (14.5) | 13.7 (5.7) | p < 0.05 |
| Anaerobic Capacity (Watts/kg) | 7.6 (1.1) | 7.81 (1.0) | p < 0.05 |

* Standard deviation of ground reaction forces normalized to body weight (%BW)

SUMMARY AND CONCLUSIONS

- Soldiers who performed ETAP, when instructed by those who completed ICS training, demonstrated moderate improvements in several human performance variables
- These improvements occurred despite the varied exposure due to training requirements and impact on physical training
- Effective implementation of ETAP to improve or maintain physical performance must consider initial and continued training of the instructors (ICS), adjustments to physical training program based on tactical requirements, and ability to complete while deployed

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