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# The Effects of Ability-Based versus Traditional Physical Training on the Health and Fitness of Custody Assistant Recruits

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## ABSTRACT

Custody assistants (CAs) maintain security in detention facilities, and may need to perform physical tasks such as inmate restraint. Due to this demand and need for general fitness, physical training programs are often used during academy. Traditional training (TT) typically follows a paramilitary, one-size-fits-all model. This approach may not be optimal for the individual recruit. **PURPOSE:** To determine the effects of ability-based training (ABT) versus TT in CA recruits. **METHODS:** Retrospective analysis was conducted on two CA recruit classes who completed an 8-week academy. Physical training was completed twice per week, and incorporated circuit training and running. The TT group (18 males, 13 females) followed a model where all recruits completed the same exercises with the same intensity; the ABT group (17 males, 12 females) had exercises tailored towards their ability. In the week before academy, recruits completed the following assessments: body mass (BM); body fat percentage (BF%); resting heart rate (RHR); blood pressure (BP); waist circumference (WC); waist-to-hip ratio (WHR); combined grip strength; push-ups and sit-ups in 60 s; and YMCA step test recovery HR. In the first week of academy, recruits completed 201-m (220-yard) and 2.4-km (1.5-mile) runs. Post-testing occurred in the final week of academy. Independent samples t-tests evaluated between-class pre-test differences. Paired samples t-tests detected if pre- to post-training changes occurred within groups. Change scores were calculated for each variable for each group; independent samples t-tests compared the change scores between the groups. Alpha levels were set at  $p \leq 0.05$ . **RESULTS:** The TT group had lower BF%, BP, and WC; completed more sit-ups; and were faster in the 2.4-km run before training ( $p \leq 0.04$ ). After academy, the TT recruits decreased WHR, and improved grip strength, YMCA recovery HR, and 201-m and 2.4-km run times ( $p \leq 0.03$ ). However, the TT also increased diastolic BP ( $p < 0.01$ ). The ABT recruits decreased BM, BF%, RHR, and WC following academy ( $p \leq 0.01$ ). These recruits also improved push-ups, sit-ups, YMCA recovery HR, and 201-m and 2.4-km run times ( $p \leq 0.03$ ). Compared to the TT recruits, ABT recruits had greater positive changes in BF%, RHR, diastolic BP, and sit-ups ( $p \leq 0.02$ ). The TT recruits had more favorable changes in WHR and grip strength ( $p \leq 0.02$ ). **CONCLUSIONS:** Recruits who completed TT and ABT during academy generally experienced favorable changes to health and fitness. The degree of positive change in variables such as BF%, RHR, and sit-ups was greater for ABT recruits. Further, the TT recruits experienced an increase in diastolic BP. This could have been due to the overall stress of academy, which incorporated physical training that was not ability-based. It should be noted that TT recruits generally displayed better health and fitness prior to academy, so their ceiling for improvement may have been lower. However, when coupled with the diastolic BP increase, this may provide evidence for ABT. Fitter recruits may require a more individualized training stimulus. **PRACTICAL APPLICATIONS:** TT and ABT training can improve the health and fitness of CA recruits. However, TT may have contributed to a diastolic BP increase in recruits, indicative of poorer recovery or systemic fatigue. ABT training also led to a greater range of favorable recruit health and fitness changes. Given the job demands experienced by CAs, training staff should explore the use of ABT.

## INTRODUCTION

- Custody assistants (CAs) are typically responsible for assisting law enforcement officers with maintaining security in custody detention, station jails, or court lockup facilities (4). Most of the job tasks for CAs are relatively sedentary (e.g., office work, supervision of inmates). However, there are certain tasks that could be very physically demanding for the CJ, including cell searches, responding to alarms, and physical confrontations with inmates (3). As a result of these job demands and need for general fitness, CA recruits will often complete academy training.
- Physical training programs are typically an important component of law enforcement and custody academies. In many law enforcement academies, the traditional training (TT) model typically follows a paramilitary, one-size-fits-all approach (1,5). However, this approach may not be optimal for the individual recruit. This could especially be problematic for CA recruits, where previous research has shown a wide range of fitness capabilities (i.e., muscular strength and endurance, anaerobic and aerobic capacity) (4).
- Ability-based training (ABT), or training tailored towards the individual, may be a better approach to use for CA recruits. ABT training could reduce the risk of injury during a training academy, as well as lead to better fitness adaptations in most recruits (1,2,5,6).
- The purpose of this study was to determine the effects of ABT versus TT in CA recruits during an 8-week training academy.



## METHODS

- Retrospective analysis was conducted on two CA recruit classes who each completed an 8-week academy. The TT group had 18 males and 13 females (age range: 18-46 years); the ABT had 17 males and 12 females (age range: 18-52 years).
- In the week prior to academy, recruits completed the following assessments: body mass; body fat percentage (BF%); resting heart rate (RHR); blood pressure (BP); waist circumference (WC); waist-to-hip ratio (WHR); combined grip strength; push-ups and sit-ups in 60 s; and YMCA step test recovery HR. In the first week of academy, recruits completed 201-m (220-yard) and 2.4-km (1.5-mile) runs. Post-testing for all tests occurred in the final week of academy.
- Physical training was completed twice per week, and incorporated circuit training and running. The TT group followed a model where all recruits completed the same exercises with the same intensity; the ABT group had exercises tailored towards their ability. TT circuit training sessions typically featured body weight calisthenics, while the running sessions often incorporated group formations runs. The ABT circuit training sessions were adapted from Moreno et al. (5); the ABT running sessions were adapted from Cesario et al. (1). The training staff implemented sessions as appropriate within the two training academies, as schedules needed to be flexible due to the many demands required during a law enforcement training academy.
- Independent samples t-tests evaluated between-class pre-test differences. Paired samples t-tests detected if pre- to post-training changes occurred within groups. Change scores were calculated for each variable for each group (2). Independent samples t-tests compared the change scores between the groups. Alpha levels for all parts of the analyses were set at  $p \leq 0.05$ .

## RESULTS

**Table 1.** Descriptive (mean  $\pm$  SD) data for the TT and ABT CA recruits pre- and post-training academy.

	TT Recruits (n = 31)			ABT Recruits (n = 29)		
	Pre	Post	Pre-Post p	Pre	Post	Pre-Post p
Body Mass (kg)	73.76 $\pm$ 13.05	74.23 $\pm$ 12.75	0.295	76.02 $\pm$ 14.36	76.95 $\pm$ 14.49*	0.003
BF%	20.70 $\pm$ 6.02	20.31 $\pm$ 5.87	0.409	32.14 $\pm$ 7.04§	29.91 $\pm$ 7.26*	<0.001
RHR (bpm)	74.53 $\pm$ 10.89	77.97 $\pm$ 9.10	0.099	78.66 $\pm$ 14.12	71.52 $\pm$ 7.72*	0.007
Systolic BP (mmHg)	123.71 $\pm$ 15.12	120.32 $\pm$ 7.80	0.192	138.93 $\pm$ 18.12§	137.79 $\pm$ 18.04	0.515
Diastolic BP (mmHg)	72.90 $\pm$ 9.16	78.52 $\pm$ 5.98*	0.004	86.56 $\pm$ 7.37§	85.33 $\pm$ 10.30	0.435
WC (cm)	82.26 $\pm$ 9.08	79.27 $\pm$ 14.32	0.168	87.67 $\pm$ 8.97§	84.89 $\pm$ 9.74	0.008
WHR	0.87 $\pm$ 0.07	0.81 $\pm$ 0.12*	0.007	0.85 $\pm$ 0.08	0.85 $\pm$ 0.07	0.640
Grip Strength (kg)	73.85 $\pm$ 16.86	78.00 $\pm$ 19.28*	0.027	71.20 $\pm$ 22.19	69.59 $\pm$ 24.46	0.168
Sit-ups (repetitions)	37.55 $\pm$ 8.76	36.74 $\pm$ 7.78	0.406	31.10 $\pm$ 6.44§	33.93 $\pm$ 7.45*	0.025
Push-ups (repetitions)	38.35 $\pm$ 18.11	40.23 $\pm$ 13.90	0.162	30.14 $\pm$ 15.12	34.21 $\pm$ 13.25*	0.014
YMCA Recovery HR (bpm)	129.16 $\pm$ 20.23	105.97 $\pm$ 13.53*	<0.001	137.03 $\pm$ 17.70	108.21 $\pm$ 8.54*	<0.001
201-m Run (s)	35.13 $\pm$ 6.83	32.97 $\pm$ 4.56*	0.021	39.79 $\pm$ 18.41	32.14 $\pm$ 4.08*	0.017
2.4-km Run (min:s)	12:55 $\pm$ 2:35	11:42 $\pm$ 1:39*	<0.001	14:37 $\pm$ 2:27§	13:05 $\pm$ 1:33*	<0.001

§ Significantly ( $p \leq 0.05$ ) different from the TT pre-test data.

\* Significant ( $p \leq 0.05$ ) change from pre- to post-test.

- The descriptive data for the TT and ABT groups is shown in Table 1. Before training, the TT group had lower BF%, BP, and WC; completed more sit-ups; and were faster in the 2.4-km run ( $p \leq 0.04$ ).
- Post academy training, the TT recruits decreased WHR, and improved grip strength, YMCA recovery HR, and 201-m and 2.4-km run times. However, the TT also increased diastolic BP.
- The ABT recruits decreased body mass, BF%, RHR, and WC following academy. These recruits also improved push-ups, sit-ups, YMCA recovery HR, and 201-m and 2.4-km run times.
- The change score data is shown in Table 2. Compared to the TT recruits, ABT recruits had greater positive changes in BF%, RHR, diastolic BP, and sit-ups. The TT recruits had more favorable changes in WHR and grip strength.

**Table 2.** Change score (mean  $\pm$  SD) data for the TT and ABT CA recruits pre- and post-training academy.

	TT (n = 31)	ABT (n = 29)	p
Body Mass (kg)	0.47 $\pm$ 2.39	0.92 $\pm$ 1.52	0.394
BF%	-0.39 $\pm$ 2.48	-2.23 $\pm$ 2.14*	0.004
RHR (bpm)	3.43 $\pm$ 11.02	-7.14 $\pm$ 13.11*	0.001
Systolic BP (mmHg)	-3.39 $\pm$ 14.12	-1.14 $\pm$ 9.16	0.477
Diastolic BP (mmHg)	5.61 $\pm$ 9.94	-1.22 $\pm$ 8.01*	0.006
WC (cm)	-2.98 $\pm$ 11.75	-2.77 $\pm$ 5.08	0.930
WHR	-0.07 $\pm$ 0.13	-0.01 $\pm$ 0.06*	0.024
Grip Strength (kg)	4.15 $\pm$ 9.97	-1.61 $\pm$ 6.14*	0.009
Sit-ups (repetitions)	-0.81 $\pm$ 5.33	2.83 $\pm$ 6.43	0.020
Push-ups (repetitions)	1.87 $\pm$ 7.27	4.07 $\pm$ 8.37	0.281
YMCA Step Test Recovery HR (bpm)	-23.19 $\pm$ 22.80	-28.83 $\pm$ 18.45	0.299
201-m Run (s)	-2.17 $\pm$ 4.88	-7.66 $\pm$ 16.32	0.083
2.4-km Run (s)	-73.41 $\pm$ 77.87	-92.96 $\pm$ 109.48	0.442

\* Significantly ( $p \leq 0.05$ ) different from the TT group.

## CONCLUSION

- Recruits who completed TT and ABT during academy generally experienced favorable changes to health and fitness. The degree of positive change in variables such as BF%, RHR, and sit-ups was greater for ABT recruits. ABT training for CA recruits could be more applicable given the wide range of fitness present in this population (4).
- The TT recruits also experienced an increase in diastolic BP. This could have been due to the overall stress of academy. Nonetheless, physical training that was not ability-based could have contributed to this negative change.
- It should be noted that TT recruits generally displayed better health and fitness prior to academy, so their ceiling for improvement may have been lower. However, when coupled with the diastolic BP increase, this may provide evidence for ABT. Fitter recruits may require a more individualized training approach.

## PRACTICAL APPLICATIONS

- TT and ABT training can improve the health and fitness of CA recruits. However, TT may have contributed to a diastolic BP increase in recruits, indicative of poorer recovery or systemic fatigue.
- ABT training also led to a greater range of favorable recruit health and fitness changes. Given the job demands experienced by CAs, law enforcement training staff should explore the use of ABT.

### References

- Cesario, K, Moreno, M, Bloodgood, A, and Lockie, R. A sample ability-based conditioning session for law enforcement and correctional recruits. *TSAC Report* 52: 6-11, 2019.
- Cocke, C, Dawes, J, and Orr, RM. The use of 2 conditioning programs and the fitness characteristics of police academy cadets. *J Athl Train* 51: 887-896, 2016.
- Jamnik, VK, Thomas, SG, Shaw, JA, and Gledhill, N. Identification and characterization of the critical physically demanding tasks encountered by correctional officers. *Appl Physiol Nutr Metab* 35: 45-58, 2010.
- Lockie, RG, Fazilat, B, Dulla, JM, et al. A retrospective and comparative analysis of the physical fitness of custody assistant classes prior to academy training. *Sport Exerc Med Open J* 4: 44-51, 2018.
- Moreno, M, Cesario, K, Bloodgood, A, and Lockie, R. Circuit strength training with ability-based modifications for law enforcement recruits. *TSAC Report* 51: 26-33, 2018.
- Orr, RM, Ford, K, and Sterli, M. Implementation of an ability-based training program in police force recruits. *J Strength Cond Res* 30: 2781-2787, 2016.