NSCA®
NATIONAL STRENGTH AND CONDITIONING ASSOCIATION

2022 NSCA TACTICAL ANNUAL TRAINING

#NSCATactical22

CONFLICT OF INTEREST STATEMENT

Michael Oldham:

I currently have, or I have had in the past 8 years an affiliation or financial interest with Texas A&M University – Commerce around this presentation, including:

- Employment
- Research funding
- Scholarship

Hussien Jabai:

I currently have, or I have had in the past 8 years an affiliation or financial interest with Jabai Performance around this presentation, including:

- Employment
- Research

POLICE ACADEMY PHYSICAL PREPARATION

EXPECTATION VS REALITY

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Session Goals

GOAL 1
Discuss real world data regarding police academy cadet physical preparation

GOAL 2
Analyze comparisons of expectations of academy goals and actual outcomes

GOAL 3
Compare standards of assessment in departments with and without physical ability entry parameters

GOAL 1

REAL WORLD DATA REGARDING POLICE ACADEMY CADET PHYSICAL PREPARATION

STUDY POPULATION

Central Texas
Day Class - 6 months (40 hr/wk)
Night Class - 9 months (28 hr/wk)

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Demographics

Day Class:

- Average age: **26**
- 95% Sponsored by agencies
- *n* = 21 ⟶ 14

Demographics

Night Class:

- Average age: **33**
- 80% Sponsored by agencies
- *n* = 21 ⟶ 14

Day Class

Physical Training (PT)

- Conducted by 1 main "trainer"
- Physical training regularly used as punishment

Night Class

Physical Training (PT)

- Conducted by 1-2 "trainers"
- Physical training NOT typically used as punishment

Variables of Interest

Anthropometric Data

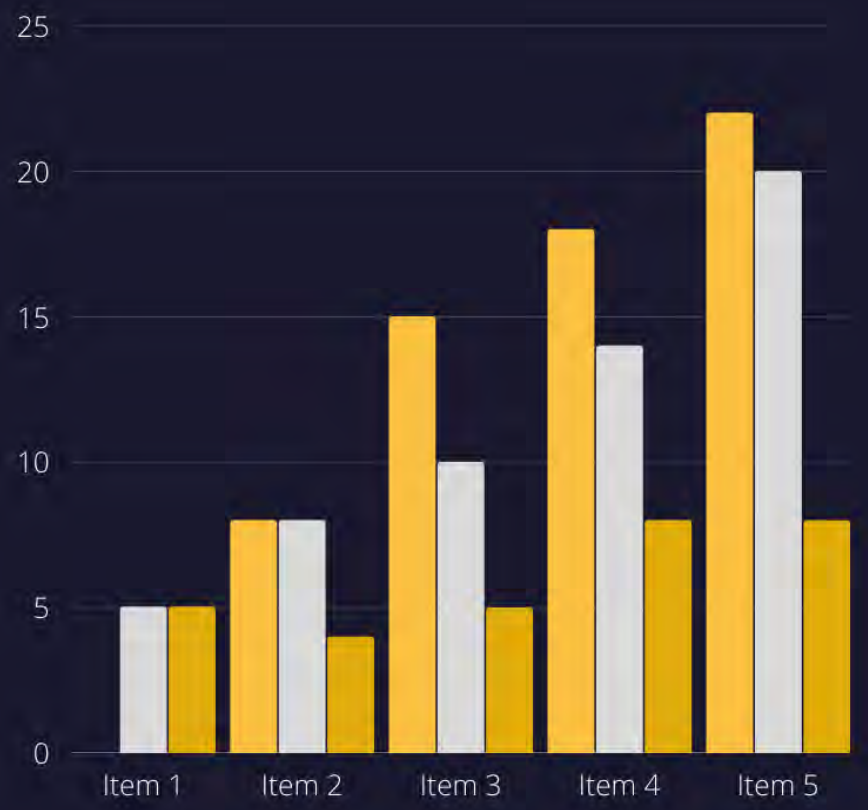
How did cadets change regarding body measurements - Repeatable, easy to measure, little equipment needed; Validity - marginal

Performance Data

How did cadets change regarding measures within job ttask analysis variables; Validity - moderately high

Mobility Data

How did cadets change in their ability to functionally move, as measured by DARI Motion Capture and YBT; Validity - high



Assessment Variables

Anthropometric Data

Age, Gender, Height, Weight, Body Circumferences,

Grip Strength

Simple measure of muscular strength; ability to grasp and hold assailant

Y- Balance Test (YBT)

Range of motion in lower back and lower limbs; Move body into positions of stability and balance

Margaria-Kalamen Power Test

Functional of explosive and functional power; Climb stairs quickly and move explosively

2-Mile Run

Based on Army Combat Fitness Test validation at under 17-minutes; high work/recovery rate

DARI Motion Analysis

Uniquely designed protocol for police academy

- ROM Analyses:
  - Unilateral Squat
  - Trunk Flexibility - A/P, Lateral, Rotation
- Performance Analyses
  - Concentric Jump - Squat Jump
    - Rate of Force Development
    - Jump Impulse
    - Jump Absorption
    - Jump Power

Order of Tests MATTERS!

General Guidelines:

Anthropometrics

Mobility

Strength**

Power

Endurance

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** Pragmatic decision due to space and timing of cadets

Anthropometrics

YBT

Grip Strength **

DARI Motion Analysis

Margaria - Kalamen Step Test

2-Mile Run

Total Test Time for 21 Cadets: 4 Hours

8-10 Test Administrators

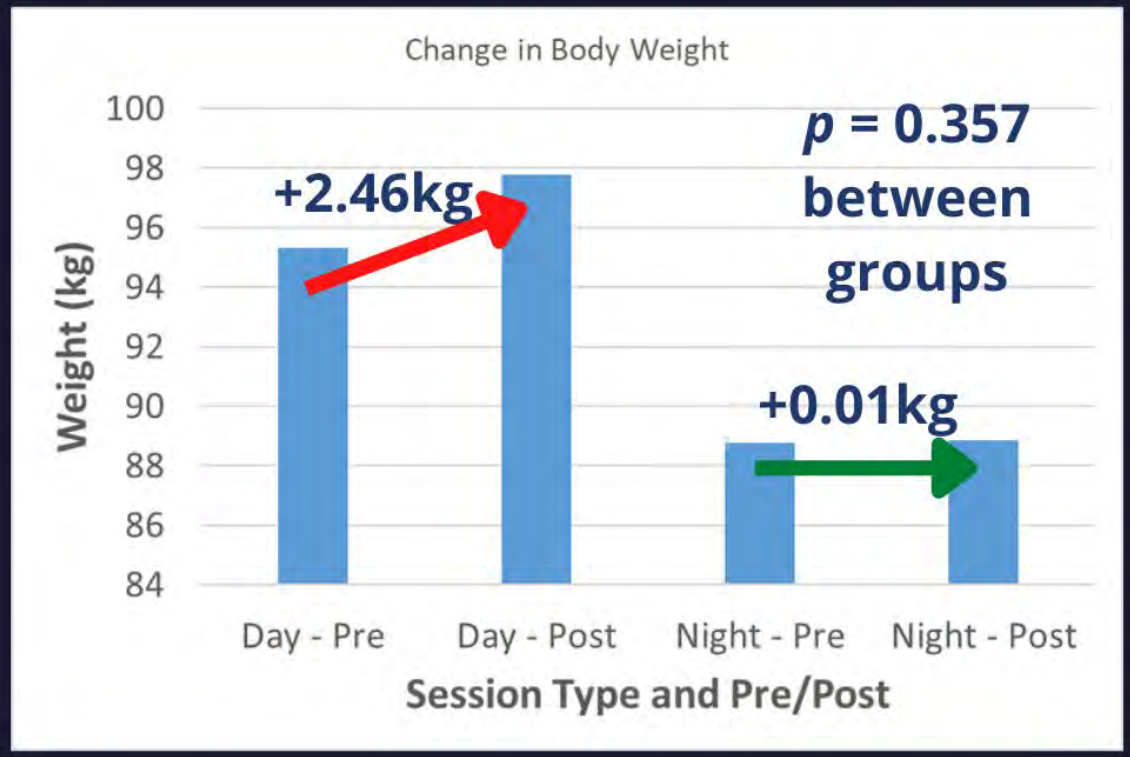
Anthropometrics

Neck Circumference
Day Class: + 1.64% --> 0.63 cm
Night Class: + 0.64% --> 0.24 cm

Chest Circumference
Day Class: - 7.17% --> -7.5 cm
Night Class: - 0.22% --> -0.23 cm

Waist Circumference
Day Class: + 2.28% --> 2.08 cm
Night Class: + 0.78% --> 0.72 cm

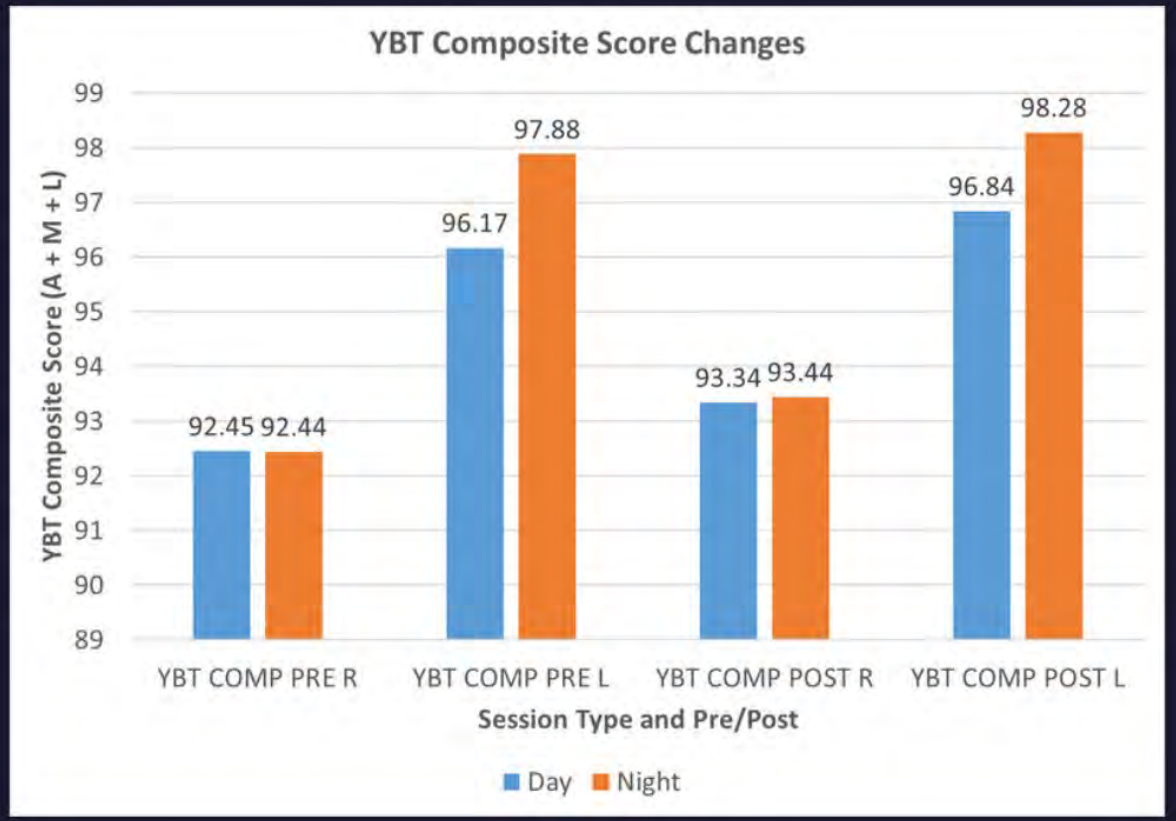
Hip Circumference
Day Class: + 1.36% --> 1.52 cm
Night Class: + 1.35% --> 1.78 cm



Y Balance Test (YBT)

Significant Increase
3% - 6% increase in composite score for both Day and Night classes

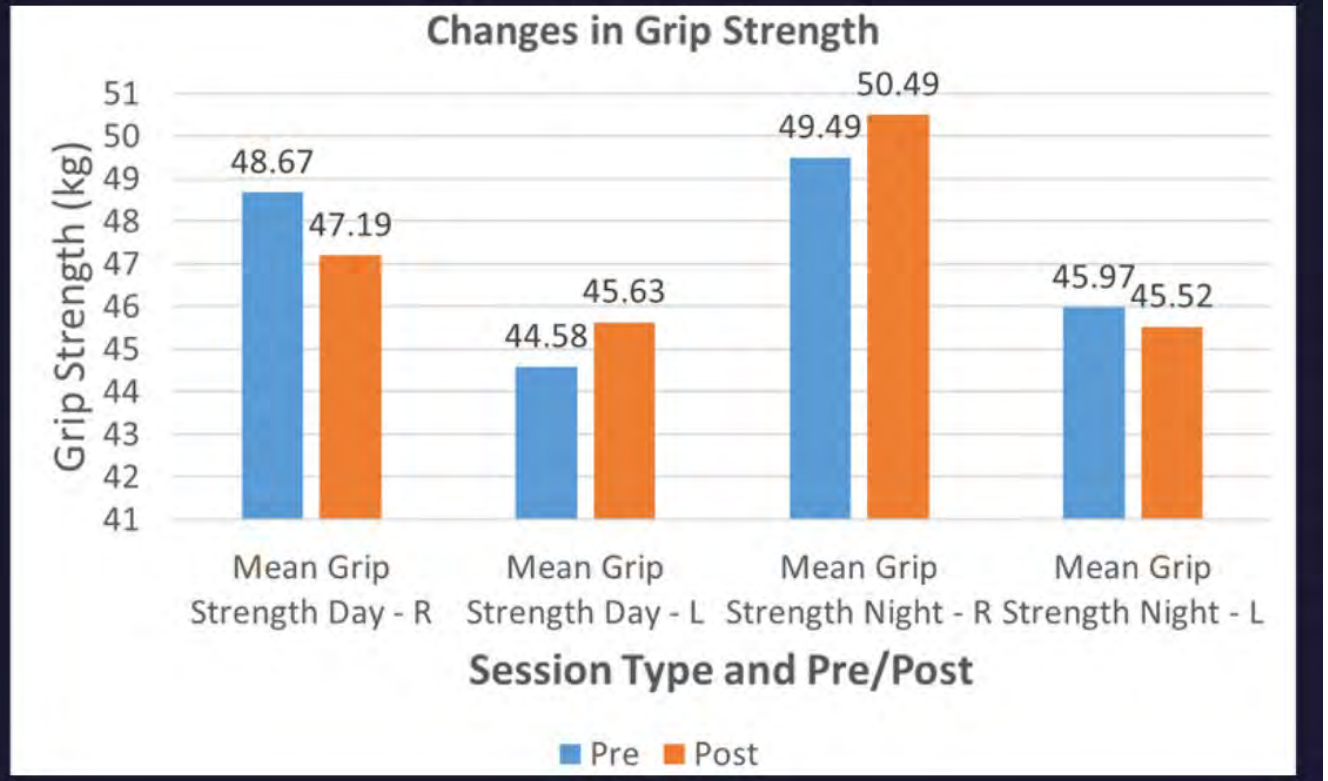
NOT Statistically Significant
Rate of increase in flexibility was statistically the same for both left and right legs for both classes
($p > 0.05$)



Grip Strength

No Signficant Changes

While performance values both increased and decreased, no signficant difference ($p > 0.05$) exists between classes or grip side



Margaria - Kalamen Step Test - Time

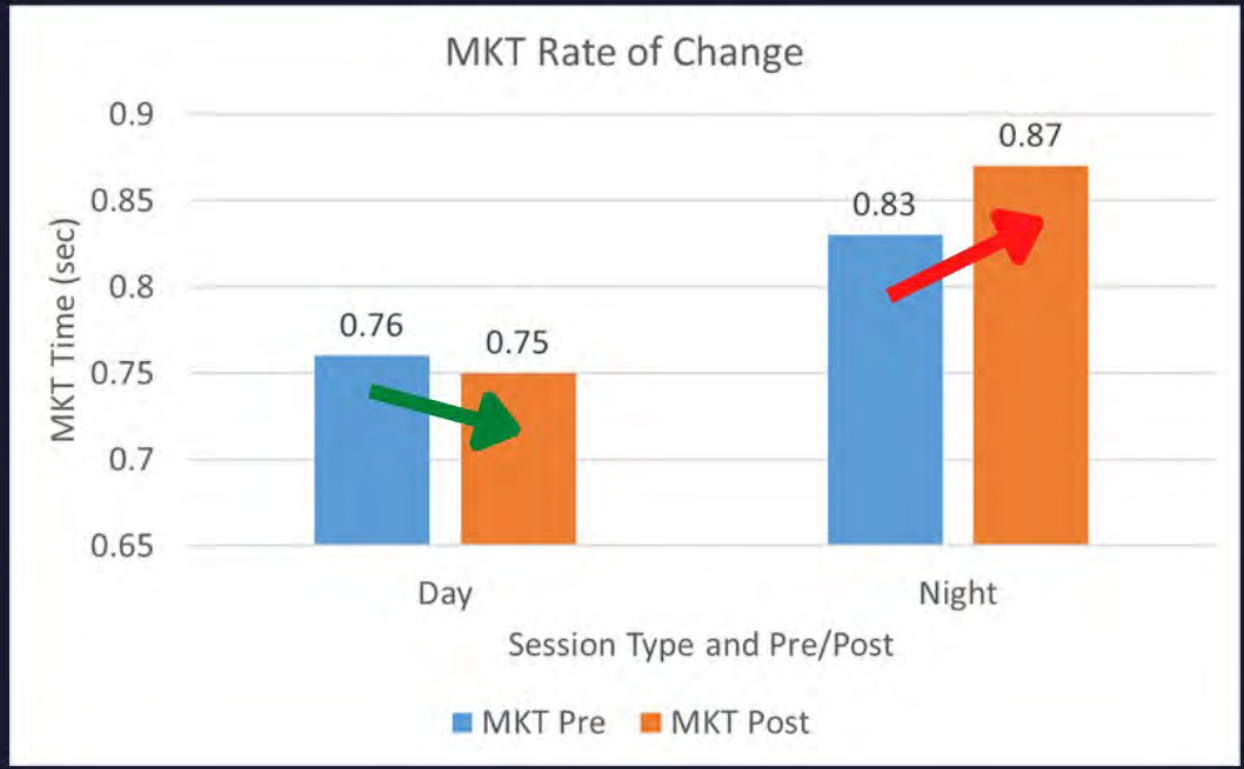
Functional Power / Functional Mobility

Statistically Significant Difference

Rate of change comparing Day to Night classes was signicantly different, $p = 0.004$

Note: Step protocol: 6 m run-up; one foot on 3rd, 6th, 9th step.

In both classes there were 2 cadets that could NOT complete the protocol and were modified to 2, 4, 6

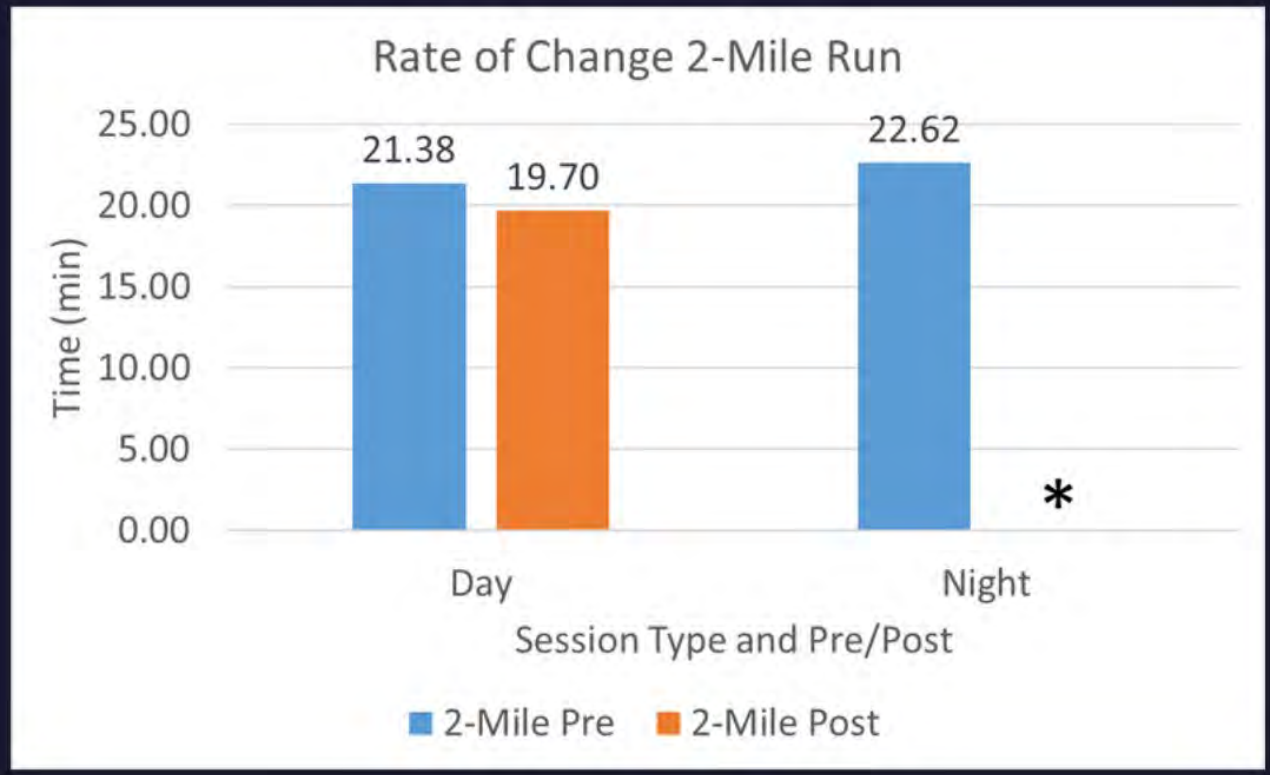


2-Mile Run Perfomance

Significant Change

Overall average time decreased signficantly $p = 0.042$ for the Day class.

*__Note__: Night class did not complete the Post Test Run due to weather conditions: 28 degree F / sleet / slick road conditions



DARI

- Markerless Motion Capture System
- Automated Data Analytics for Movement
- Mobile or Stationary
- ROM vs Performance --> JTA

DARI MOTION

www.darimotion.com

Mobility Analysis

Actual ROM vs Functional Mobility

TRUNK MOBILITY

- Anterior / Posterior ROM; Lateral ROM; Rotational ROM (R/L)
- Thoracic Vertebrae vs Lumbar Vertebrae

FUNCTIONAL ROM

- Unilateral Squat - Depth as Percentage of Lower Body Height (LBH)

PERFORMANCE VARIABLES

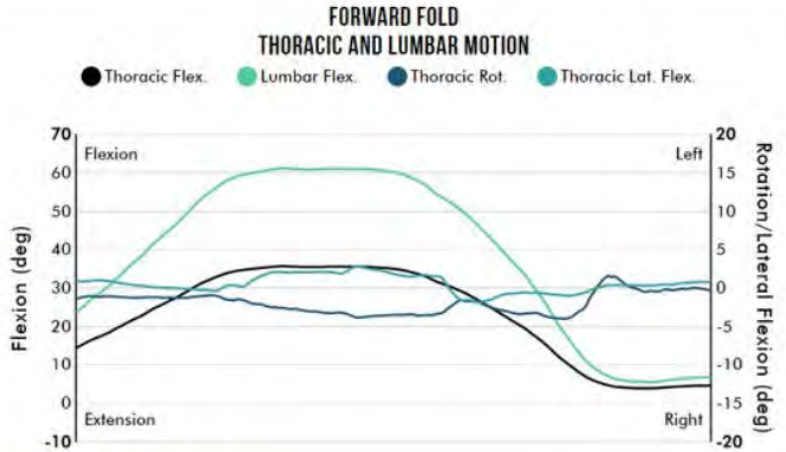
- Concentric jump % of LBH
- Jump Impulse
- Jump Power
- Jump Absorption

FORWARD FOLD

TEST2_OLDHAM | 1.93 METERS | 86 KILOGRAMS | APRIL 13, 2022

VARIABLE	VALUE	TARGET
Thoracic Flexion Max	35.8°	> 23°
Lumbar Flexion Max	61.3°	> 51°

VARIABLE	VALUE	TARGET
Total Thoracic Lateral Flexion	3.1°	--
Total Thoracic Rotation	2.9°	--
Total Lumbar Lateral Flexion	2.3°	--
Total Lumbar Rotation	1.3°	--



TRUNK MOBILITY

LATERAL FLEXION AND FORWARD FOLD

Session/Time	TLFlex - TL - R	TLFlex - TL - L	TLFlex - LP - R	TLFlex - LP - L	Ffold - TL	Ffold - LP
Day - Pre	32.24	33.18	17.59	18.48	37.22	53.38
Day - Post	31.82	18.49	17.56	15.67	32.73	44.03
% Change	-1.30	-44.27	-0.17	-15.21	-12.06	-17.52
Session/Time						
Night - Pre	32.27	31.1	16.56	15.87	31.3	39.69
Night - Post	35.09	15.87	18.17	16.22	29.35	36.59
% Change	8.74	-48.97	9.72	2.21	-6.23	-7.81

TRUNK MOBILITY

ROTATIONAL ROM - RIGHT vs LEFT

Session/Time	RL - Rot R - TL	RL - Rot R - LP	RL - Rot L - TL	RL - Rot L - TL
Day - Pre	22.28	10.8	22.23	11.81
Day - Post	18.19	11.49	21.4	10.57
% Change	-18.36	6.39	-3.73	-10.50
Session/Time				
Night - Pre	15.17	8.59	10.69	6.22
Night - Post	18.43	11.74	20.18	11.82
% Change	21.49	36.67	88.77	90.03

FUNCTIONAL ROM

SINGLE LEG SQUAT – RIGHT vs LEFT

Session/Time	Unit Squat R % LBH	Unit Squat L % LBH
Day - Pre	24.46	24.46
Day - Post	27.77	25.62
% Change	13.53	4.74
Session/Time		
Night - Pre	27.64	26.79
Night - Post	26.07	24.93
% Change	-5.68	-6.94

PERFORMANCE

SQUAT JUMP DYNAMICS

Session/Time	Con Jump %	Jump Impulse (Ns)	Jump Absorption (m)	Jump Peak Power (W)
Day - Pre	43.33	262.59	0.1361	3721.80
Day - Post	46.65	296.5	0.1328	4140.79
% Change	7.66	12.91	-2.42	11.26
Session/Time				
Night - Pre	40.92	235.65	0.1036	3404.88
Night - Post	47.45	261.49	0.1022	3950.32
% Change	15.96	10.97	-1.35	16.02

Overall Findings

Anthropometric Data

- Day Class - highest increase in weight and circumferences despite "structured" S/C programming

Performance Data

- Day Class - increases in power; decreased 2-mile time; no change in grip strength
- Night Class - increase in power; decrease in functional power; no change in grip strength

Mobility Data

- Day Class - Increase in YBT; significant decrease in functional mobility in trunk
- Night Class - Increase in YBT; significant increases in functional mobility in trunk

GOAL 2

COMPARISONS OF EXPECTATIONS OF ACADEMY GOALS AND ACTUAL OUTCOMES

Adherence Factors

Factors that may impact the potential for a cadet to participate in or complete physical fitness training

Motivation

- Cadets may lack intrinsic or extrinsic motivation
- Absence of PAT to qualify for graduation = potentially decreased improvement focus
- Absence of agency PAT may continue to drive lack of performance motivation

Grading Factor

- PT may not be mandated by state governing entity
- Due to lack of mandatory training from state level, academy might decrease the stress and requirements of PT
- Physical Ability Test does not reflect academic standing; might not even be tied to qualification to graduate

Moral

- Physical training may increase unification of academy class
- Based on observation/feedback: Implementation of physical training in day class displayed quicker cohesion of group versus night class without program

Ability

- Potential for fear of reflection to sponsoring agency
- Assessments performed by external entity may create confusion and concern amongst cadets

Weak-Link Syndrome

- Comparison between cadets
- Cadets who "fall-behind" may overtrain to catch up
- Overtraining = potential overuse injuries

Teaching To The Test

The reality of BPOC curriculum

Michael Oldham, PhD and Hussien Jabai, CSCS, TSAC-F

Police Academy Physical Preparation – Expectation vs. Reality

Passing State Exam

- Physical fitness training can sometimes be observed as conflicting with "study sessions"
- Physical fitness training is considered as "extra", and not required by state entity

Agency - Personnel Demand

- Quick turnaround on personnel
- Physical fitness testing associated with graduation potentially seen as an obstacle

Health-related Curriculum

- Physical fitness, nutrition, and stress management curriculum is limited
- The curriculum may also teach content, rather than application (based on how the sections are taught by instructor)

The Physical Fitness Program

Expectation versus Reality

Michael Oldham, PhD and Hussien Jabai, CSCS, TSAC-F

Expectations	Reality
Physical fitness training is required by the state governing entity	Physical fitness training is not a requirement, and sometimes seen as a hinderence
Strength and conditioning programs are planned/pre-established, monitored, and regulated.	Many programs: • are not pre-established; "on-the-fly" • do not contain any form of assessment • often multiple instructors • may not even contain any form of training
Strength and conditioning programs are instructed by highly qualified fitness professionals.	The instructors of programs may or may not possess any form of exercise science / fitness credentials or qualifications.

Attrition within a Police Academy

Factors that may impact attrition rates

Injury/Training Failure

- correlation between fitness level and attrition rate (mainly aerobic performance)
- progression throughout first half of academy; maintain fitness or display regression throughout second half of academy
- presence of overuse injuries

Knowledge Failure

- Inability to maintain good academic standing with academy
- Lack of evidence to support correlation between academic performance and level of education, prior military experience, or age

GOAL 3

STANDARDS OF ASSESSMENT IN DEPARTMENTS WITH AND WITHOUT PHYSICAL ABILITY ENTRY PARAMETERS

Factors for Entry Testing

Factors that may impact testing battery and established standards

Factors

Is the test valid?
How was the test validated? By who?

Is the entry test designed by job-task specificity or based on fitness attributes/components?
Are the fitness attributes tested generalized or based on JTA?

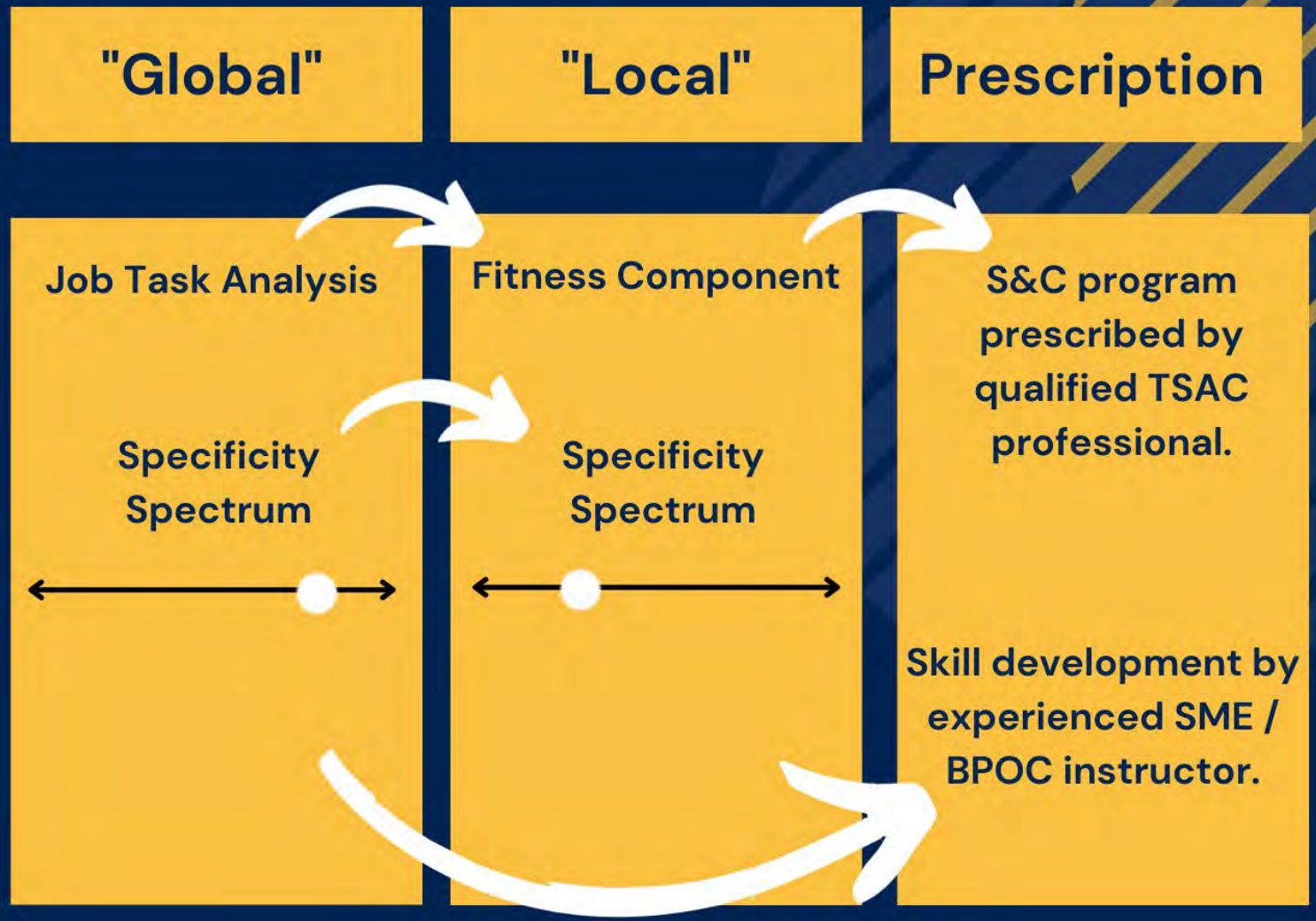
Is the test safe?
What is the risk of injury for participants?

What is the complexity of the test?
Does the test require a large amount of instruction?
Does the test require additional equipment or test administrators?

Testing Ideology

The flow from testing, to assessment, to prescription

Testing Ideology



Be Proactive!

Make a plan; Adapt to feedback

Academy Check-List

- Organize and facilitate validated cadet assessments
- Certify instructors within scope of practice (TSAC)
- Establish a strength and conditioning program
- Analyze assessment results and address feedback

References

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