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Does coincidence anticipation timing improve in police officers after a 4-week video intervention?E. Mundy^a, A. Shim^a, R. Lockie^b, D. Newman^c, M. Smith^a, W. Davis^d^aCollege of Saint Mary, United States of America^bCal State University, United States of America^cFlorida Atlantic University, United States of America^dAthens State University, United States of America

Introduction: Decision making is a critical part of a police officer's daily routines. Improving the ability to make proper decisions with accuracy improves the response and effectiveness of proper outcomes. The purpose of this study was to determine if a 4 week/twice per week 15-minute video simulation intervention program would improve coincidence anticipation timing in police officers.

Methods: Relatively healthy police officers (age 39±17 years; height 175.28 ± 12.72 cm; mass 88 ± 25.4 kg) from a Midwest law enforcement agency were selected for the 4-week study. A one group pre/post design (n=15) was selected for this investigation. Coincidence Anticipation timing scores were measured pre/post using a Bassin anticipation timer (Model 35575 Lafayette Instruments, Lafayette, IN) The object stimulus speed was set at 3 mph in accordance with prior studies. The pre and post time scores were measured in .001 seconds. A Virtra (V-100 model, Tempe, AZ), a 300-degree active video shooting simulator was selected as the intervention. Each participant performed a different video moving target simulation for 15 minutes, two times per week, for 4 consecutive weeks.

Results: A dependent t-test (SPSS ver. 26) determined a significant relationship (p = 0.035) between pre and post coincidence anticipation scores after 4 weeks.

Discussion: Moving video shooting simulations provided the ability for subjects to actively track targets compared to older video methods. This investigation was a novel approach towards proving dynamic video shooting simulations can improve object interception scores within several weeks of active practice. In conclusion, a 4-week video simulation training program can significantly improve coincidence anticipation timing in police officers.

Impact and application to the field: Concurrent and additional training for police officers using video simulators can help with decision-making process while out in the field. Constant training interventions are necessary to maintain readiness of law enforcement personnel to reduce injuries and fatalities.

Conflict of interest statement: My co-authors and I acknowledge that we have no conflict of relevance to the submission of this abstract.

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(P9)

Does phalanx range of motion correlate to buttoning speed in adults?J. Clark^a, H. Vredenburg^a, A. Shim^a, J. McDonald^a, T. Ruppert^a, G. Cesar^b^aCollege of Saint Mary, United States of America^bMadonna Rehabilitation Hospital, United States of America

INTRODUCTION: Hand usage is substantial in physical sports and daily activities. However, the use of fingers with physical activities

requires a certain range of motion when discussing improving or maintaining fine motor skill development, especially with older adults. The purpose of this study was to determine if a relationship existed between phalanx flexibility and the speed of buttoning down a shirt.

METHODS: Subjects (n = 15) from a Midwestern facility volunteered to participate in this study (age: 50.63 ± 2.6 years). All participants were healthy with no upper extremity injuries. A valid and reliable digit instrument (Baseline 12-1015 model finger goniometer, White Plains, NY, USA) was selected to measure distal, middle phalanx flexion and phalanx extension of the forefinger of the subject's dominant hand. All subjects sat on a chair resting their elbows and forearms in a pronated position on a table while the researcher recorded the degrees of range of motion (ROM) using the finger goniometer for distal, middle phalanx flexion and phalanx extension of the dominant hand. Participants were then provided a 5-button (1.27 cm button width) shirt made by the same manufacturer. All sized shirts were fitted for each participant according to their shirt size before the time trials. The researcher digitally timed the participants in .001 seconds on how fast the participant could button down the shirt taking the best time trial of 3 attempts. Pearson correlations were analyzed using SPSS version 27.

RESULTS: The relationship between the variables displayed a strong negative correlation between the dominant distal phalanx flexion ROM and buttoning speed (r = -0.73). Other results displayed a weak positive correlation between the middle phalanx digit ROM to best buttoning speed time (r = .06), and finger extension ROM compared to best buttoning speed (r = 0.03) trial.

DISCUSSION: Major significance was found between the dominant forefinger distal phalanx flexion ROM and the fastest trial of buttoning down a shirt (r = -0.73). This indicates total grip strength may not be the primary or sole intervention when attempting to improve efficiency of fine motor function in physical or daily activities.

APPLICATION TO THE FIELD: This discovery could change therapy methodologies or physical training techniques with care givers or therapists on improving or restoring this fine motor skill. Replication of a sport skill or daily task might not be the only practical use towards skill restoration.

All co-authors have no conflict of interest towards the relevance of this submission.

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(P10)

Do police academy fitness scores correlate to final academic scores in cadets; a pilot studyM. Tangeman^a, A. Shim^a, R. Lockie^b, J. Dawes^c, I. Bonder^a^aCollege of Saint Mary, United States of America^bCal State University, United States of America^cOklahoma State University, United States of America

Introduction: To successfully complete academy training, law enforcement recruits must exhibit proficiency in both, levels of physical fitness and academic testing/cognitive abilities. Insight into the relationship between levels of physical fitness and academic testing could provide valuable information into the improvement of academy preparation and training. The purpose of this study was to determine if a relationship exists between physical fitness tests and academic scores for cadets currently in academy.

Methods: All cadets (N=15; 13 males, 2 females) volunteered to participate in this study as part of a cohort completing 16-weeks of academy testing and training. All subjects were deemed to be in

good health and signed a voluntary consent for academy data to be released and analyzed. Cadets were then screened for five physical fitness components: vertical jump, 1-minute push-up test, 1-minute sit-up test, 300-m run, and 2.4-km run. For the entirety of the 16-week academy, physical training was completed daily in addition to academic lectures and tactical skills training. All practitioners followed the same exact protocols while testing for the five physical fitness components. A combination of academic and situational skill performance was assessed throughout the duration of the academy. Primary investigators were provided with participant academic data for analysis.

Results: A Pearson correlation (SPSS ver. 26, New York, NY) revealed no statistical significance ($p=0.52$) existed between physical fitness testing components and academic scores. Of all the fitness components, the vertical jump had a weak to moderate negative relationship with academic scores ($r = -.357$). The results of this investigation indicate there is not a direct relationship between commonly performed physical fitness tests and academic scores during academy training.

Discussion/Conclusion: All police academy classes are tested on physical fitness and academic proficiencies, including occupational skill work. Cadet physical fitness levels could indirectly affect academic and skill performance based on the cadet's ability to recover from physical stressors. Past research indicates increased fatigue and stress from high-intensity activity potentially decreases an individuals' cognitive abilities. Subsequently, increases in inflammation due to high physical stress may lead to a reduction in physical performance. While no statistically significant correlations were discovered in this study, previous observations suggest increases in perceptual motor skill learning have been shown to improve academic scores. By gathering insight into possible correlations between physical fitness components and academic scores, law enforcement agencies could reduce overall costs and improve upon current academy training procedures, thus improving cadet graduation rate.

Impact/Application to the field:

- While statistically significant relationships were not discovered, the data and information collected may be used to direct law enforcement academy personnel toward an emphasis on improving cadets' physical and academic performance.
- Improvements in the academy preparation of cadets could increase the current pool of active law enforcement officers, thus reducing stress and improving on positive outlook of veteran law enforcement officers.

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(P12)

Towards defining muscular regions of interest from axial magnetic resonance imaging with anatomical cross-reference: A scoping review of lateral hip musculature

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Introduction: Measures of hip muscle morphology and composition (e.g., muscle size and fatty infiltration) are possible

with magnetic resonance imaging (MRI). Standardised protocols or guidelines do not exist for evaluation of hip muscle characteristics, hindering reliable and valid inter-study analysis. This scoping review aimed to collate and synthesise MRI methods for measuring lateral hip muscle size and fatty infiltration to inform the future development of standardised protocols.

Methods: Five electronic databases (Medline, CINAHL, Embase, SportsDISCUS and AMED) were searched. Healthy or musculoskeletal pain populations that used MRI to assess lateral hip muscle size and fatty infiltration were included. Lateral hip muscles of interest included tensor fascia late (TFL), gluteus maximus, gluteus medius, and gluteus minimus. Data on MRI parameters, axial slice location, muscle size and fatty infiltrate measures were collected and analysed. Cross referencing for anatomical locations were made between MRI axial slice and E-12 anatomical platinat sections.

Results: From 2692 identified publications, 79 studies contributed data on volume ($n=31$), cross sectional area (CSA) ($n=24$), and fatty infiltration ($n=40$). Heterogeneity was observed for MRI parameters and anatomical boundaries scrutinizing hip muscle size and fatty infiltration. Seven single level axial slices were identified that provided consistent CSA measurement, including three for both gluteus maximus and TFL, and four for both gluteus medius and minimus. For assessment of fatty infiltration, six axial slice locations were identified including two for TFL, and four for each of the gluteal muscles.

Discussion: Several consistent anatomical levels were identified for single axial MR slice to facilitate muscle size and fatty infiltration muscle measures at the hip, providing the basis for reliable and accurate data synthesis and improvements in the validity of future between studies analyses. Further studies into whole muscle measures are required to further optimise methodological parameters for hip muscle assessment.

Impact and application to the field: This work establishes the platform for standardised methods for the MRI assessment of lateral hip musculature and will aid in the examination of musculoskeletal conditions around the hip joint.

Conflict of interest statement: My co-authors and I acknowledge that we have no conflict of interest of relevance to the submission of this abstract.

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(P13)

Does distal phalanx pinch strength correlate to buttoning speed in female adults?

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INTRODUCTION: Hand usage is substantial in physical sports and daily activities. However, the use of fingers with physical activities requires force between the thumb and index finger when discussing improving or maintaining fine motor skill development, especially with older adults. The purpose of this study was to determine if a relationship existed between distal phalanx pinch strength and the speed of buttoning down a shirt.

METHODS: Subjects ($n = 20$) from a Midwestern facility volunteered to participate in this study (age: 40.75 ± 13.56 years). All female participants were healthy with no upper extremity injuries. A Jamar Hydraulic Pinch Gauge, (model# H&PC-10192; JLW Instruments) was used to measure the pinch strength of the thumb and index distal phalanx of the subject's dominant hand. All subjects stood upright in a comfortable stance, grasped the dynamometer's circular head with their opposite hand, and placed