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Resisting Arrest: Analysis of Different Prone Body Positions on Time to Stand and Engage

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INTRODUCTION

- Police officers' job tasks can include patrolling assigned areas to ensure civilians are adhering to the law, investigating crimes or accidents, and executing arrests (3,5).
- According to recent research, in 2020, 11.9% of police officers were victims of assault while on the job (4). Moreover, data has shown that a total of 60,105 officers were reported assault victims, of weapons such as guns, knives, and more (4). Further research is needed to support arrest techniques in situations that could place the officer in danger, while still maintaining safety of the detainee.
- An isolated police officer executing an arrest can be placed in a dangerous situation should the detainee become non-compliant. This then can result in the police officer needing to take further action, such as restraining an individual before the situation escalates beyond control. Further research is needed to ascertain the position that a detainee can be placed in that takes the longest time for them to rise from the ground, as this can influence the officer's reaction time to a life-threatening situation.
- The purpose of this study was to determine differences between participants' time from four prone positions to a standing athletic position which would theoretically prepare the participant to physically engage with or run from the officer (similar to what could be seen during an interaction between police and detainees).

METHODS

- Twenty-four college-aged participants were recruited for this study; 9 participants were female (age = 23.11 ± 2.20 years; height = 164.4 ± 4.4 cm; body mass = 63.60 ± 8.70 kg) and 15 were male (age = 26.33 ± 6.43 years; height = 175.4 ± 7.5 cm; body mass = 79.90 ± 13.32 kg).
- The following prone positions (Figure 1) were examined in one session: prone position with hands hidden under the chest (PHC); prone position with arms perpendicular to the torso and palms of the hand facing up (PPU); prone position with arms perpendicular to the torso, palms of the hand facing up, with ankles crossed on the ground (PPUAC); and prone position with arms perpendicular to the torso, palms of the hand facing up, with ankles crossed but elevated toward the lower back (PACKB). The order of these positions was randomized amongst participants. Participants were instructed to rise to an athletic stance from each of these positions as explosively and quickly as possible. An athletic stance was defined as participants standing in a quarter squat position with the head and chest up, and hips and knees flexed (Figure 2).
- Each participant's trial was recorded by a camera (Sony CX405 Handycam®, Sony, Tokyo, Japan). The time to stand was calculated via frame-by-frame analysis using motion analysis software (BinaryVideoX, Binary Sports, Sliáč, Slovakia) from movement initiation in the prone position until participants were standing in the athletic position.
- A 2 (sex) x 4 (position) repeated measures ANOVA with Bonferroni post hoc calculated between-position differences ($p < .05$).

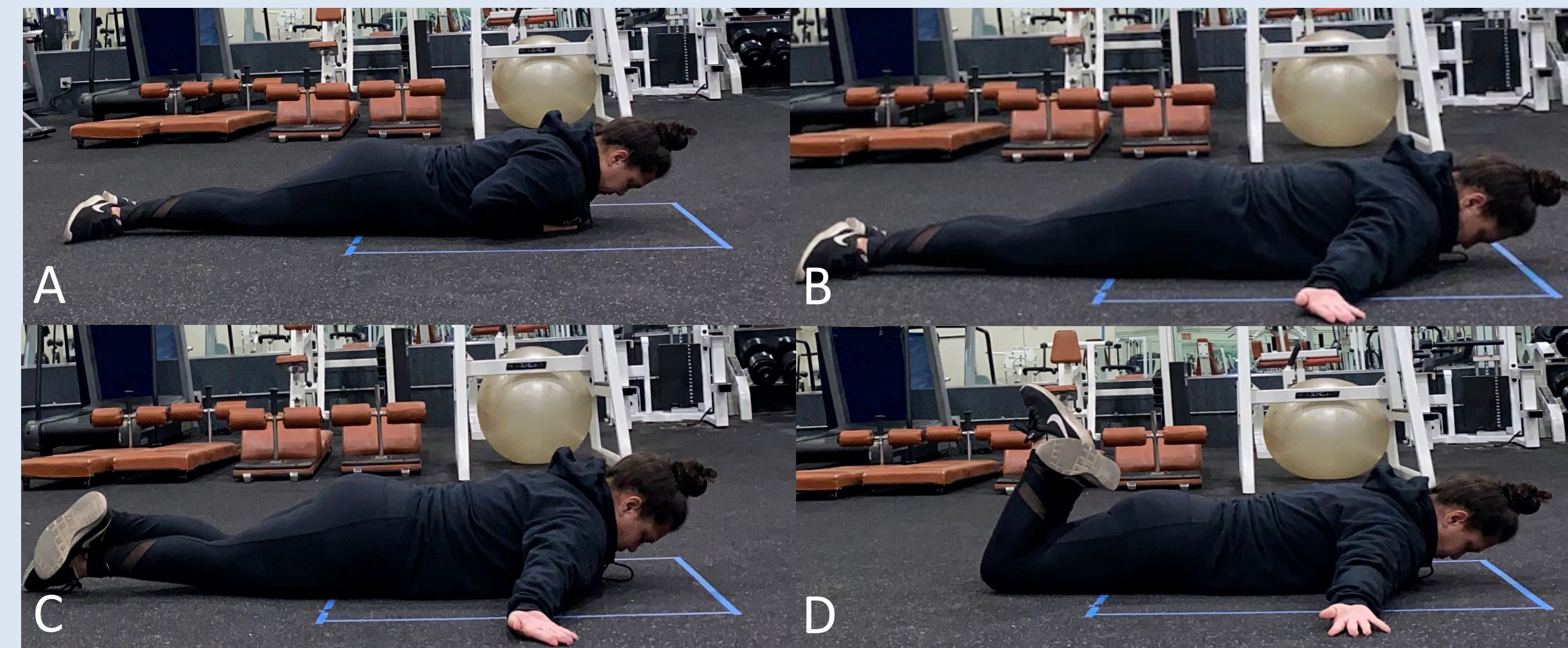


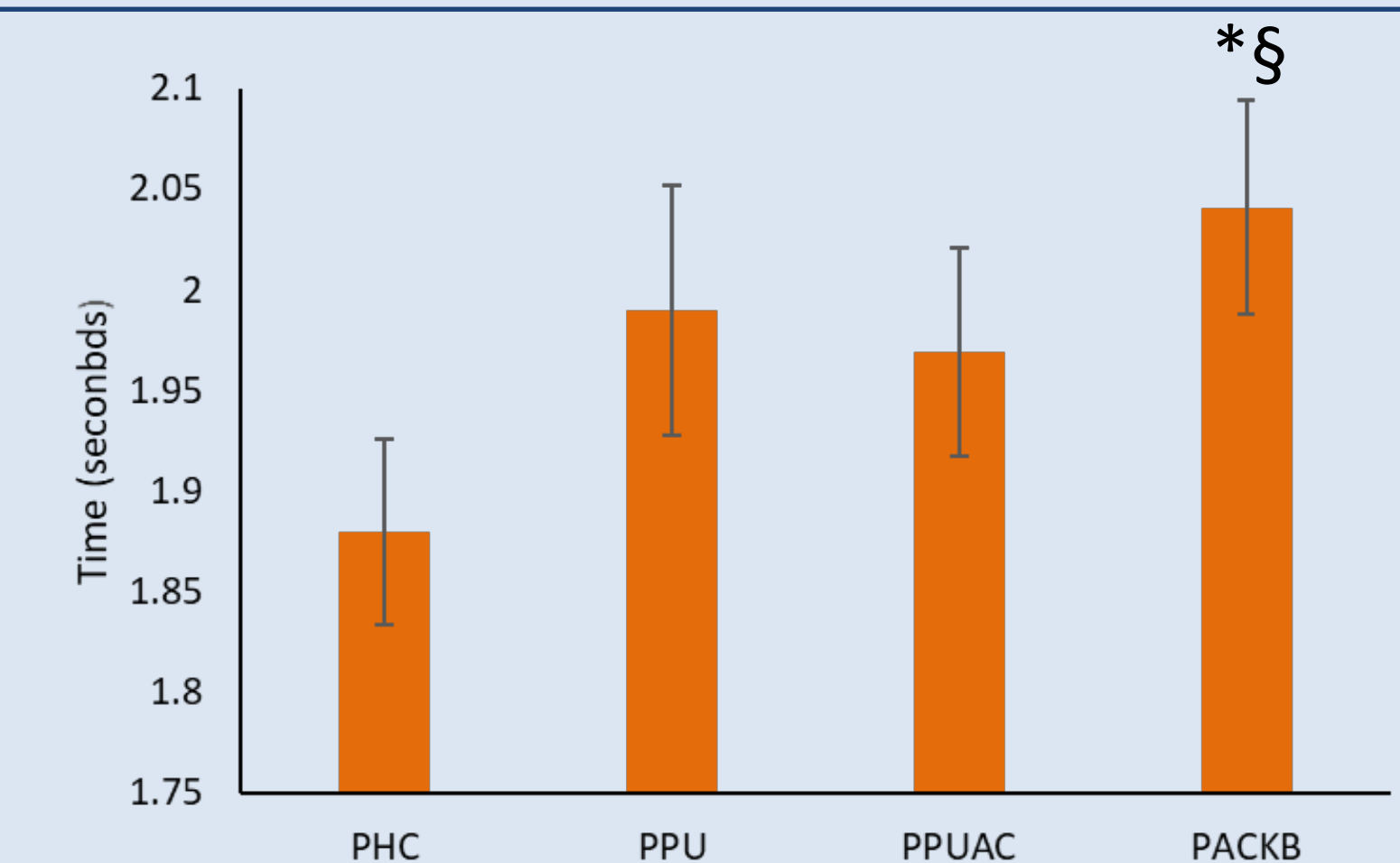
Figure 1. (A) prone position with hands hidden under the chest (PHC); (B) prone position with arms perpendicular to the torso and palms of the hand facing up (PPU); (C) prone position with arms perpendicular to the torso, palms of the hand facing up, with ankles crossed on the ground (PPUAC); and (D) prone position with arms perpendicular to the torso, palms of the hand facing up, with ankles crossed and elevated toward the lower back (PACKB).



Figure 2. Athletic position participants maintained once they explosively popped up from the ground from various prone positions

RESULTS

- There was a significant interaction for position ($p = .003$) but not sex ($p = .415$). The descriptive data for time to rise from the four prone positions is shown in Figure 3.
- The PACKB position was significantly slower than the PHC ($p < .001$) and PPUAC positions ($p = .045$) and had the slowest time to reach a standing position (~2.041 seconds). There were no significant differences between the PHC, PPU, and PPUAC positions.



* Significantly ($p < .05$) different from the PHC position. § Significantly ($p < .05$) different from the PPU position.
Figure 3. Descriptive data (mean ± SD) for average time to stand from the four prone positions (PHC, PPU, PPUAC, PACKB).

CONCLUSIONS

- Data has shown that the average duration of time that it takes an officer to draw their weapon from their holster is 1.5 seconds (1). While this is not the only option available to officers when engaged with a suspect (2,6), this does illustrate the time stress placed on officers when a suspect becomes non-compliant. Participants in this study all were able to rise from the four randomized prone position variations on the floor to a standing athletic position in approximately 2 seconds or less. This demonstrates that the reaction time of detainees could be relatively fast despite the physical position that they are being held in. Accordingly, officers need to consider arrest techniques that provide them with the most time to make appropriate and safe decisions.
- As reaction time of the detainee could influence an officer's safety, this study showed that the palms of the hand facing up, with ankles crossed on the ground (PPUAC) position seemed to require to most time for a detainee to stand and potentially engage an officer. Further, from a safety perspective the detainee's hands could be seen at all times (unlike the PHC position).
- This means that the PPUAC position could potentially provide the greatest safety for both the detainee and the officer. This is especially important in situations where an officer needs to detain an offender if they are working alone or while waiting for backup.
- The PACKB may provide an officer room to react should the offender choose to engage with the officer or run away. Future research should investigate the time to physically engage with an officer or to sprint a specific distance away following being placed in the different arrest positions.

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