
The Effects Of Altering Equipment On Police Uniform In Relation To Agility

Introduction

The use of protective equipment on officers is increasing as violence becomes a larger threat in the cities. One of the ways officers can become better equipped is with the use of body armour to prevent certain injuries such as stabbing and gunshots. However, a study by Dempsey et al, 2013 found most belts and safety vests can weigh between 17 to about 20 lbs. As a result this has negative results in terms of performing functional tasks while on duty such as: lifting, carrying, climbing over objects as well as balance (Dempsey et al. , 2013). In terms of stride length it has been reported that the weight on the vest and belt impacts the gait of the officer, decreasing the stride length and the velocity (Lewinski et al. , 2014). Due to officers moving in multiple directions on the duty, the added weight is seen to impede their performance (Dempsey et al. , 2013). In doing so officers are forced to exert more energy in their tasks, resulting in a decrease in overall work capacity (Tomes et al. , 2017). Therefore it is essential to find methods that can improve the mobility and functionality for officers.

While the body armour offers the officers much more protection, it comes with a trade off as the use of the protective equipment begins to decrease their mobility and impact their physical health (Lewinski et al. , 2014). In fact a study performed by (Ramstrand et al. , 2015) illustrated that there is a higher incidence of musculoskeletal injuries especially in the lower back region. As a result it has been reported by approximately 43% percent of officers on duty that they experience back pain at least once a week (Elgmark et al. , 2013). Furthermore; there are some positives as research indicates that wearing a weighted vest improves the posture of the officer because it counter balances the weight placed by the belt (Ramstrand et al. , 2015). However the body needs to adjust for this added weight creating problems with gait and balance (Dempsey et al. , 2013). Due to the high incidence of low back pain, action must be taken to correct this situation. An attempt should be to understand how the body works with the vest to prevent a decrease in job performance (Ramstrand et al. , 2015).

One of the ways to combat the ever growing issue of musculoskeletal injuries is by analyzing the kinematics. Understanding the relation that holster placement has on the body can help future researchers make better accommodations. Placing a belt mounted hip holster results in less hip rotation as opposed to wearing it on the thigh (Larsen et al. , 2016). Another way of assessing the kinematics of the officers is by completing physical assessments with the weight attached to them. Agility training requires individuals to control their body while changing directions rapidly without their balance, speed or body control being hindered (Raya et al. , 2013). As a result 86. 6% of law enforcement believes that agility testing is crucial in policing (Bisset et al. , 2012). The Illinois Agility Test (IAT) allows the individuals to engage in multidirectional movements (unidirectional, bidirectional and multidirectional movements), this is imperative for police officers, as engaging in these movements can improve coordination, body control and reduces the risk injury (Raya et al. , 2013). Combing speed testing with protective equipment can allow researchers to analyze the kinematics of the movement and make adjustments accordingly.

There is ample literature regarding relationships between the kinematics of police officers in regards to leaded protective equipment: however there is very limited research in terms of speed and functionality. With that being said there is also little research investigating effects of different loads on gait, posture and performance of police officers. This is especially true in terms of adjusting equipment on the vests and belts in order to determine whether moving around equipment can impact the functionality of the officer. Therefore the purpose of this study is to examine the effects of altering equipment on police uniforms in an effort to improve speed and agility within police officers.

The results from this study can have a great effect for future research. The results of the study can help law enforcements improve their speed and mobility if there is a threat present. In doing so every second counts when on the job so improving speeds by seconds can make a huge difference. Having an officer improve their agility it may lead to a greater number of apprehended suspects, allow them to get out of harm's way faster. Most importantly it they can feel more comfortable while they are on duty.

Methods Participants

Students in the Police College, police officers and police cadets will be invited to participate in the study. The participants will vary in age from 20-30 years of age. All participants are required to be physically fit with no history of cardiovascular disease or neurological deficits and free of musculoskeletal injuries.

Instrumentation/ Tests

- Illinois Agility test/ fanshawe agility course
- Cones/ pylons
- Stopwatch for timing
- Weighted vest
- Weighted belt Design
- Repeated measures design
- Advantages: Fewer Participants, more sensitive to finding differences between groups
- Disadvantage: Order Effect – the effect that the order of introducing treatment has on the DV
- Practice --> improvement in performance because of repeated practice with a task --> By randomly assigning to groups and having half do each condition and then switching will help with this
- Fatigue --> Deterioration in performance due to being tired, bored, distracted --> Will have time between conditions to combat this Procedure

Participants will be randomly divided into two groups: A - Will have more weight around the belt, group B - Will have less weight on the belt and more weight placed on the chest. The participants will have to complete the Illinois Agility Test (IAT). This test consists of participants starting in a prone position on the floor behind the starting line. They will have their arms at their sides with their head facing forward. A countdown of three, two, and one will be given, once the researcher says, "go" the participant will travel 10 meters in a straight line and touch a tape mark with their foot. They will be required to turn around and travel to the centre cone and weave through four cones forward and then weave through them again on their way back.

Following that the participant will be required to travel to a second tape mark on the floor and then run towards the finish line. All groups will complete the course one at a time; the time will be scored once they cross the finish line. Once complete the participants will be given 5 minutes to rest. In this time they will switch equipment and perform the IAT once more.

Statistical Testing

For the purpose of this study the results will be calculated with a Paired T-Test. This will be done in order to compare the two scores of the speed for both groups. It will help determine whether there is any significance of the results

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