

## Abstract

Carrying loads is essentially learned through nurture and the environment you live in. Humans at one point in their lives utilize this method of carrying loads to achieve a specific task. Military service personnel make use of this method quite often in their daily work environment. Military personnel are accustomed with being injured and the recovery process which follows. All studies reviewed, revealed that there is a correlation between lower extremity problems and load carrying force. This research was done on military service members to find the exact motion that load becomes an issue for basic movement (walking, jogging, and pivoting). Military service members need more research in determining why such load carrying forces cannot be alleviated. This study sought after a definitive answer to show there is such a correlation between the two variables. Service members (N=40), ages 20-40, will document personal medical history, get instructed on testing parameters, perform series of tests, and record any physical pain or discomfort. The results in the end were compared to that of other participants to determine the correlation between carrying loads and lower extremity injuries. It is hypothesized that the correlation between carrying loads will positively increase the chance of lower extremity injury.

## Introduction

- Osteoarthritis (OA) is a chronic degenerative disease that damages the cartilage, bone, and surrounding soft tissues within the affected joint (Cameron, Driban, & Svoboda, 2016).
- Active-duty military service members were significantly more likely to experience knee OA, hip OA, and other OA diagnosis, regardless of the area, in comparison to all other nonexposed subjects (Cameron, Driban, & Svoboda, 2016).
- Military service members or tactical athletes are exposed to the factors of OA more than the average adult due to physical activity and load carrying capacities. Thus, resulting in the increased risk for acute traumatic joint injury (Cameron, Driban, & Svoboda, 2016).
- The purpose of this study was to determine if carrying load capacities do effect lower extremities and knee ligaments within military personnel.



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## Methods

### Participants

- N = 40
- 20 Male
- 20 Female

### Criteria

- Age 20-40
- Active duty
- 3<sup>rd</sup> Marine Reg.
- No lower extremity surgery or injury in past 5 years.

### Pre-Test

- Medical History Questionnaire
- Consent Form
- Instruction
- Pre-Test Questionnaire

### Testing

- Walking, Jogging, Running, Jumping, and Incline/Decline walking.
- Questionnaire's
- Rest

### Post-Test

- Cool down
- Post-Test Questionnaire

### Data Analysis

- Tables & Figures
- Data Matrix

## Experimental Design

Designing the testing environment that the participants were placed in came from another research experiment (Looney, 2018) but had different stages and equipment used. The main factor in this experiment was the carrying loads participants were given. A normal military pack is between 70-100lbs, if not more. Packs in the experiment were measured at three different weights (70,85,100) for the 5 tests shown in the methods section.

Walking was a 2 minute test on grass with packs ranging from 70, 85, and 100 lbs. Jogging was 1.5 minutes with the same respective pack weight. Running lasted 1 minute at a percent of 65% of their total max effort, which equates to a pace above a jog but not full-length strides. Testing for turning consisted of a four-cone square drill. The cone drill test called for one full lap around clockwise and then counterclockwise. Jumping included two legged jumps for a single set of 5 repetitions. Loads stayed the same for incline and decline walking tests. The length to walk the incline and decline segments were 10 meters. Breaks were held at 10 minutes in between different tests to allow ample rest time for lower extremity recovery .

## Conclusion

- One limitation was the ability to score potential pain and soreness based upon every human having their own threshold. This was complicated to quantify when speaking in terms of complete raw data. The study did not look into percentage or angles of flexion/extension of the knee itself but rather more for overall pain and soreness with the knee and other surrounding areas (quadriceps, hamstrings, and calves).
- Upon further research, the hypothesis of load carrying capacities effecting the lower extremities of military personnel within the parameters of this study showed a positive correlation.
- All information is best suited for any military member that requires a load carrying event to be performed.
- A fully-funded research experiment would allow military service members to have exceptional equipment and tests to better the future of these service personnel.

## References

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Hebrews 6:10