

One Trip, One Slip, One Fall: Carrying something wrong can end it all.

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INTRODUCTION

- Muscle strength can influence balance. Stronger muscles all over the body generally allow a person to have better balance (Daubney & Culham 1999).
- Age and height can influence and help determine the best position to use when an individual is carrying extra weight (Lee & Lee 2003).
- Most cases of workplace falls and injuries occur when a worker is carrying extra weight (Bentley 2009).

AIM OF STUDY

Primary objective: To see if carrying extra weight will make the subject more stable.

Secondary objective: To find the best place to hold a load of weight.

Hypothesis: The subject will be more stabilized when they hold extra weight closer to their center.

METHODS

Balance ball, video camera, and other equipment was set up

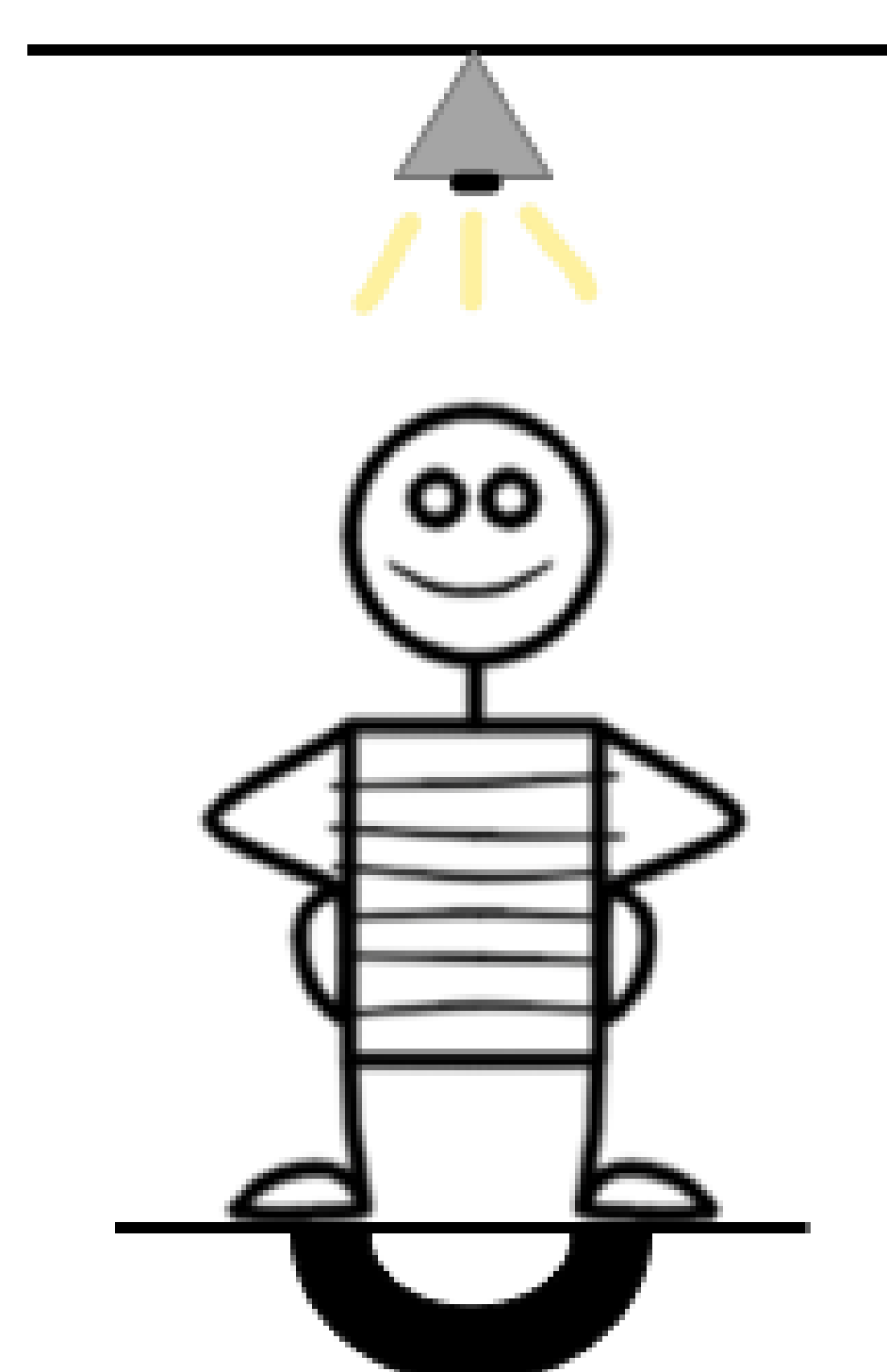
Subject was recorded in position 1

Subject was recorded in position 2

Subject was recorded in position 3

Subject was recorded in position 4

Data was analyzed every 5 frames using ImageJ.



RESULTS

Figure 1: Graphs of subject's movement. (A) depicts the movement of subject while arms are placed at the center of the body with no added weight. (B) depicts the movement of the subject while arms are out horizontally with no added weight. (C) depicts the movement of subject while arms are placed at the center of the body with added weight. (D) depicts the movement of the subject while arms are out horizontally with added weight.

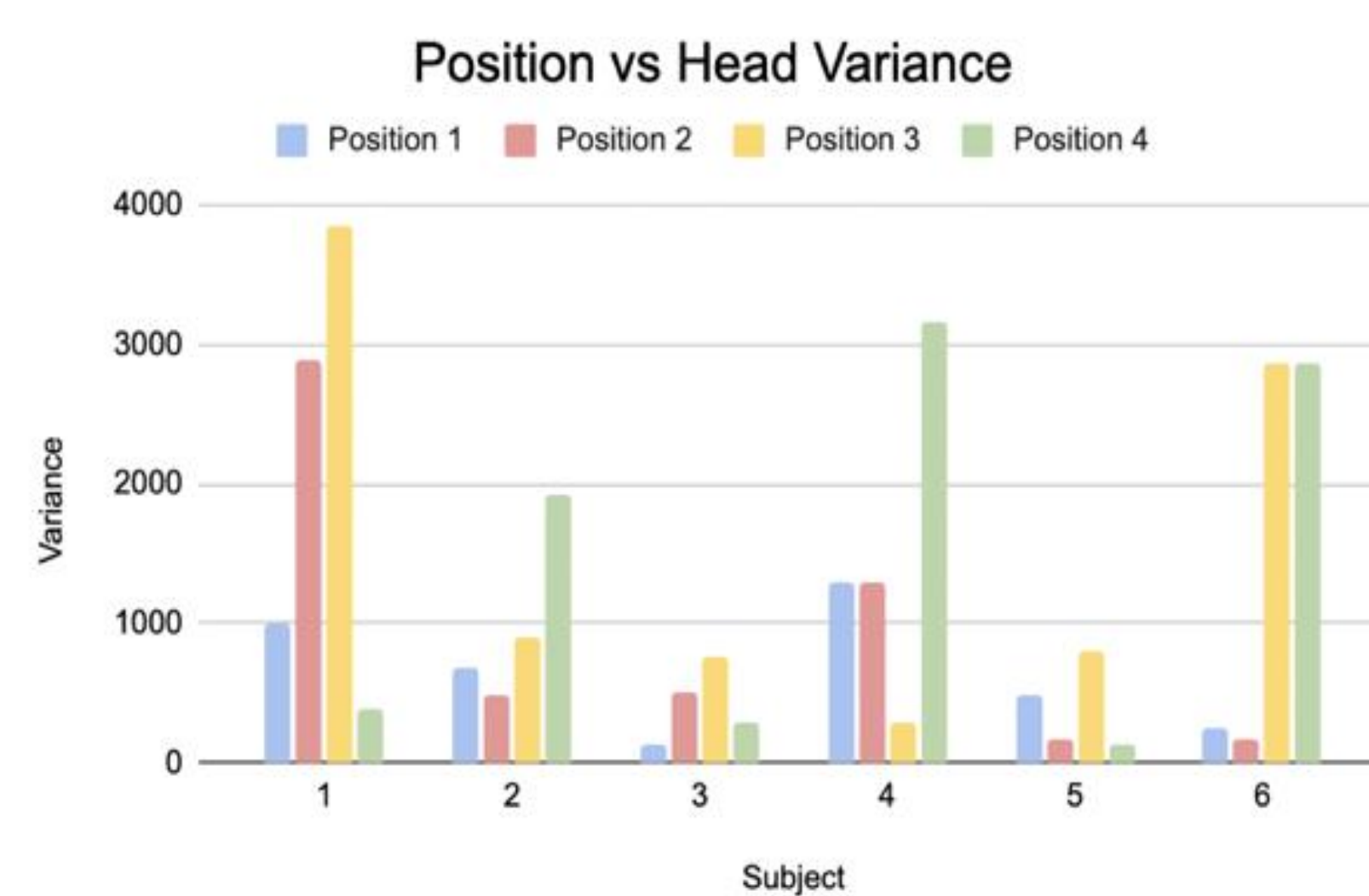
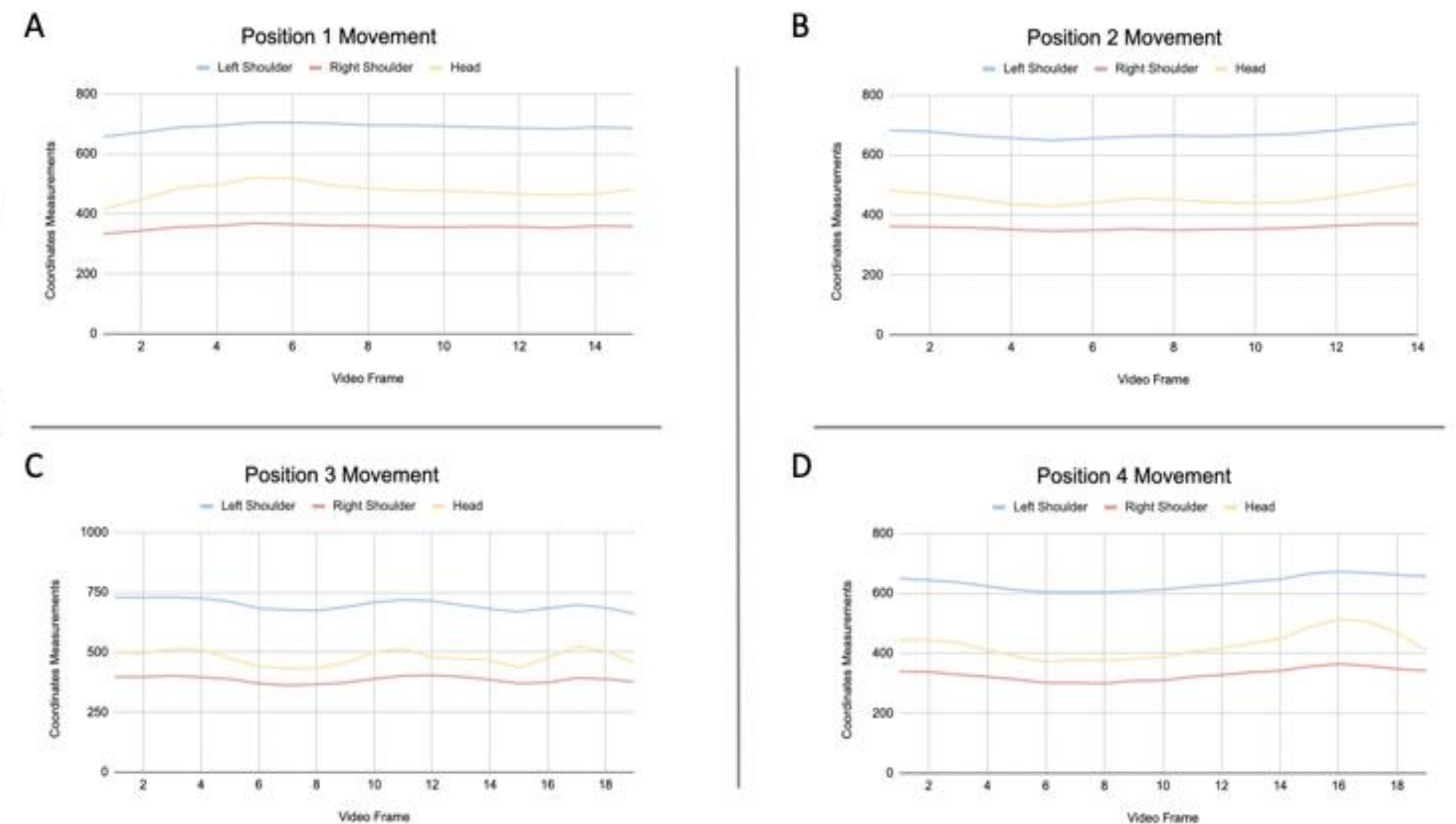


Figure 2: Comparing Subject's Head Variance in the Various Four Positions.

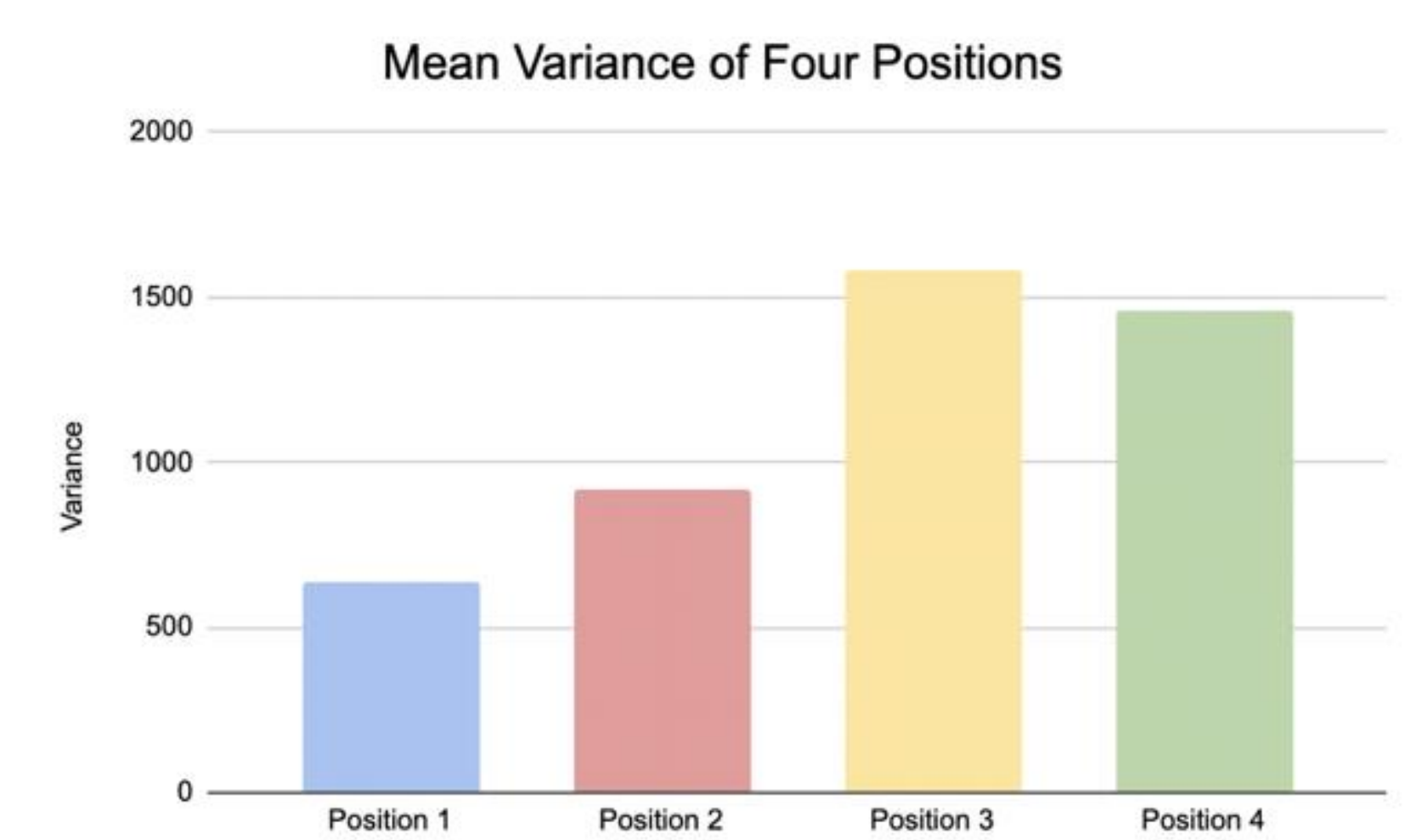


Figure 3: Graph of Mean Head Variance for the Four Positions

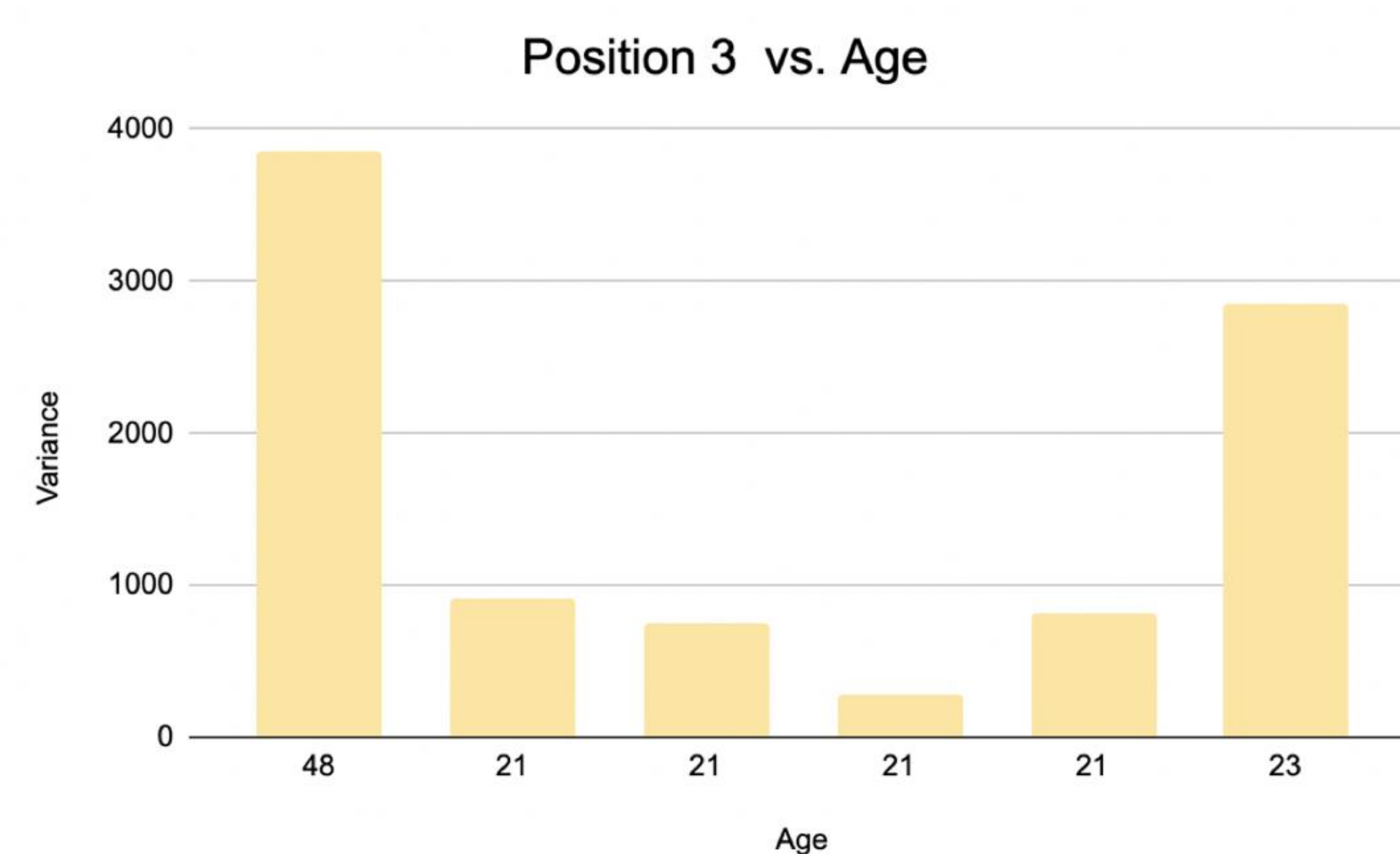


Figure 4: Graph of Subjects Age Compare to Their Variance in Position 3

CONCLUSIONS

- Participants were most steady in position 1, when they were not holding extra weight. This contradicts our hypothesis.
- Participants were less steady in both of the positions that involved holding extra weight.
- Our data suggests there is a correlation between older age and decreased stability.

LIMITATIONS

- Subjects did not have a period of time after being handed the weights to find their balance.
- There was only a total of 6 participants, one of which was an outlier.

CITATIONS

Lee, T. & Lee, Y. 2003. An investigation of stability limits while holding a load. *Ergonomics*, 46:5, 446-454.
 Daubney, M.E. & Culham, E.G. 1999. Lower-extremity muscle force and balance performance in adults aged 65 years and older. *National library of Medicine*, 79,12:1177-1185.
 Bentley, T. 2009. The role of latent and active failures in workplace slips, trips and falls: An information processing approach. *Science Direct* 40:2, 175-180.