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# CHANGES IN FAT MASS, FAT FREE MASS, CARDIORESPIRATORY FITNESS AND GRIP STRENGTH ACROSS A COLLEGE POPULATION

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## Introduction

- Traditional college students are typically more physically fit during their freshman year compared to their senior year.
- The cause of decreased fitness levels of college students could be the lack of structure within their new lifestyles.
- Many studies examine fitness level using BMI and VO<sub>2</sub>Max while fewer studies examine body strength.
- Testing handgrip strength has proven to be a valid technique in evaluating body strength as a measure of fitness level.

## Purpose

The purpose of this data analysis is to examine how fat mass (FM), fat free mass (FFM), handgrip strength and VO<sub>2</sub>Max change in a college-aged population.

## Methods

- A five-year cross-sectional design was used to assess a sample of college students in an introductory wellness class.
- Subjects were taken through the following screenings: height, weight, body fat percentage, grip strength, minute sit-ups, push-ups, and estimated VO<sub>2</sub>Max.
- Body Fat was analyzed using a Tanita scale. Grip strength was assessed using a handgrip dynamometer. Estimated VO<sub>2</sub>Max and heart rate recovery were assessed using the Tecumseh sub-maximal step test.
- Subjects were age 18-25 years and divided into four different age groups: 1=18-19, 2=20-21, 3=22-23, 4=24-25.

## Statistical Analysis

- One-way ANOVAs were conducted to examine changes in the estimated VO<sub>2</sub>Max, FFM, FM and handgrip strength.

## Results

- Comparing the whole population across age groups, there was no significant change in FM and estimated VO<sub>2</sub>Max.
- Handgrip strength (F(3,3103)=11.53,P<0.001) and FFM (F(3,1357)=7.58,P<0.001) did change across age groups.
- Students had a significant increase in handgrip strength from ages 18-19 (38.13 kg) to ages 24-25 (42.89 kg), respectively.
- Students had an increase in FFM from ages 18-19 (57.10 kg) to ages 22-23 (61.82kg), respectively.

|                        | Age (year)   | Sex                | BMI          | Fat Mass (kg) | Fat Free Mass (kg) |
|------------------------|--------------|--------------------|--------------|---------------|--------------------|
| Participants (n=3,379) | 19.40 ± 1.50 | M=55.4%<br>F=44.6% | 25.19 ± 5.72 | 17.52 ± 12.47 | 58.66 ± 13.60      |

TABLE 1. Participant Characteristics



Figure 1. Fat Free Mass

## Results

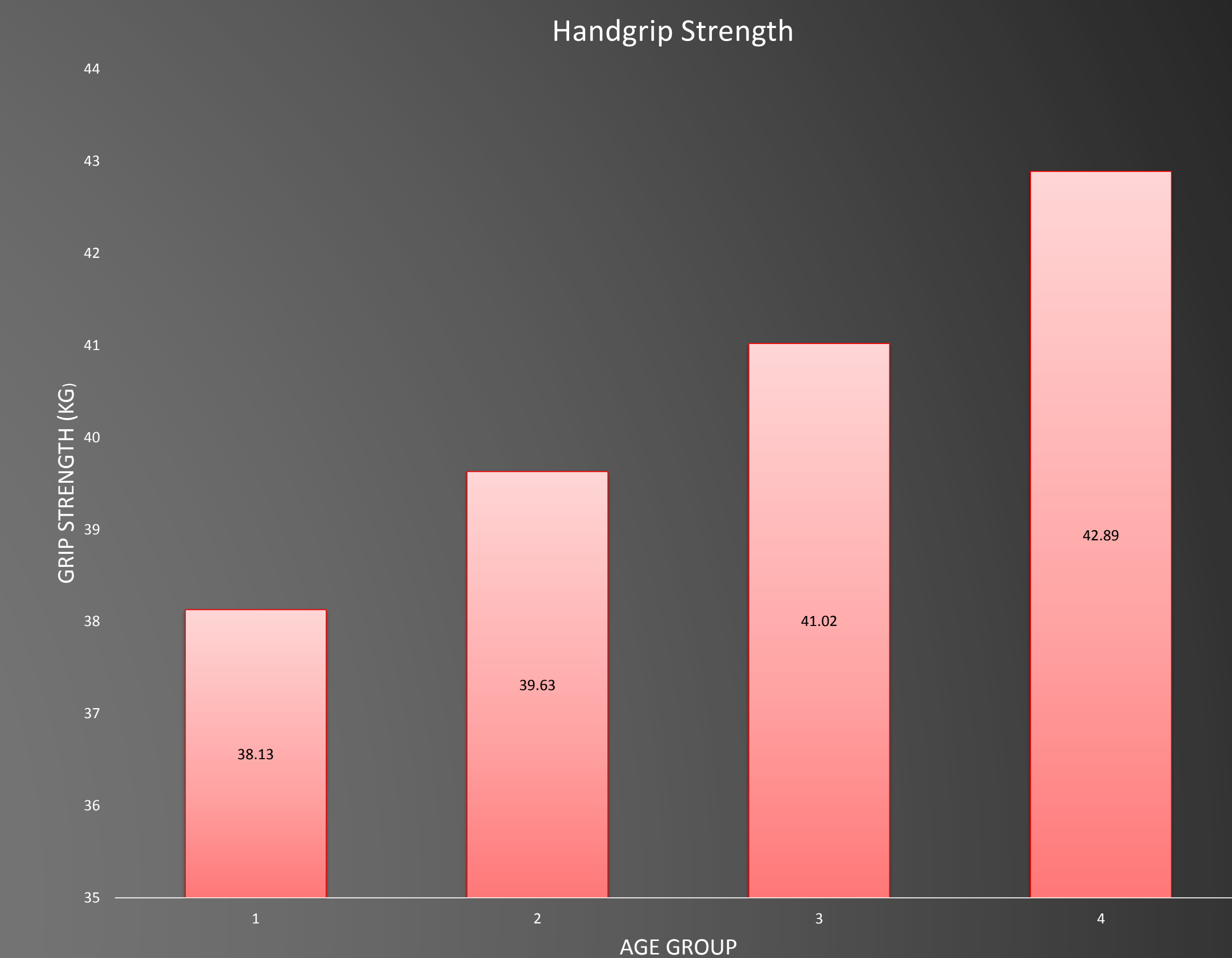


Figure 2. Handgrip Strength

## Conclusion

- The results demonstrated that college-aged students have both an increase and decrease in measures of fitness and body composition.
- It should be noted that measures of strength and FFM increase during college years.
- Cardiorespiratory fitness and FM remain stable throughout the collegiate career.
- Future research should examine methods to improve cardiorespiratory fitness and in turn decrease FM.

## References

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