



Body Composition Variables Correlation with Relative Handgrip Strength in Male Athletes Compared to Non-Athletes

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Introduction

- According to Franchini et al. (2018) absolute handgrip strength (HGS) increases within different weight classifications, whereas higher relative strength has been seen in light weight categories.
- The purpose of this study is to discover the extent to which lean muscle mass (LMM), fat free mass (FFM), age, and height correlate to HGS in student-athletes compared to non-student-athlete males.
- It is hypothesized that having a higher parameter in body mass, height, and FFM will result in a higher HGS in athletes than in non-athletes. It is secondly hypothesized that an increase in age will decrease absolute handgrip strength.

Method

Participants for this study were 12 college-aged males. Six participants were student-athletes; six participants were non-student-athletes. Height and weight were taken prior to data collection to input information into the bioelectrical impedance. The testing protocols were explained to each participant. Body fat percentage and lean muscle mass was assessed using the bioelectrical impedance device. Researchers instructed clients on how to properly hold and use the handgrip strength dynamometer. Once participants were ready with their dominant arm to their side at a 90-degree angle, they then squeezed the hand grip dynamometer while keeping proper form. The red line in the dynamometer records the highest overall strength obtained by a subject, which is what was recorded into the Excel for data. Assessors then cleaned tables, bioelectrical impedance, and hand grip dynamometer as well as swept the floors. This process was completed for each of three testing periods, for a total of 6 tests. Body Fat %, Lean Muscle Mass %, and Hand Grip Strength (kg) for each subject (n=12) were put into excel and compared and contrasted based on whether or not the male subject was a student-athlete or not a student-athlete.



Results

Table 1

Participant Characteristics	Athlete	Non-Athlete
Age*	19-21	20-32
Height (cm)	185.21	175.76
Weight (kg)	112.04	89.17
FFM (%)	20.25	20.3
LMM (%)	79.75	79.70

Note: All values are of average. FFM = Fat Free Mass, LMM = Lean Muscle Mass

*Age is a ranged value

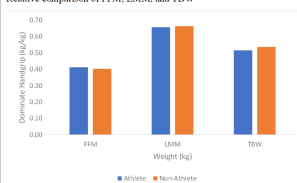
Table 2

Handgrip Strength	Athlete		Non-Athlete	
	Dominant	kg/kg	Non-Dominant	kg/kg
Athlete	57.78 kg	0.52	58 kg	0.52
Non-Athlete	47.89 kg	0.54	46.39 kg	0.42

Note: All values are of average

Figure 1

Relative comparison of FFM, LMM, and TBW



Note: All values are averaged. FFM = fat free mass, LMM = lean muscle mass, and TBW = total body weight

The results of the study showed that the higher weighted participants had an average weight of 269.17 ± 29.23 (lbs.) had a higher absolute handgrip strength of 60.33 ± 8.39 (kg) as compared to the lower weight participants with an average weight and handgrip strength of 176.25 ± 6.48 (lbs.) and 45.33 ± 8.55 (kg), respectively. Relative to dominate HGS, FFM, and total body weight athletes had a higher value of FFM 0.52 (kg/kg) and the non-athletes had a higher value for total body weight of 0.57 (kg/kg).

Discussion

According to Fernandes et al. (2012) handgrip strength has a positive relationship with body mass, height, and muscle mass, whereas maximum handgrip strength decreases with age after reaching peak at 20 years of age. The results of the study did show a positive relationship HGS and higher body composition variables of the athlete group averaging at a weight of 112.04 ± 25.68 (kg) having an average of dominate HGS of 57.78 (kg) agreeing with the initial hypothesis and Fernandes et al. (2012).

When comparing to relative dominate HGS of athletes to non-athletes this study showed that non-athletes had a higher relative value of 0.54 ± 0.49 (kg/kg) than that of the athletes with a value of 0.52 ± 0.42 (kg/kg). Thus, concurring with the study conducted by Franchini et al. (2016). The second hypothesis was proven wrong due to older athletes and non-athletes performing better than those at 20 years of age.

According to Vincenzo et al. (2020) handgrip strength for athletes was predicted by fat free mass (FFM) of an individual, whereas body weight alone was a predictor for non-athletes. The results of this study showed that athletes and non-athletes had a relative value for FFM of 0.52 kg/kg and 0.26 kg/kg, whereas total body weight had relative values of 0.49 kg/kg and 0.57 kg/kg, respectively. These results aid in the finding found from Vincenzo et al. (2020) suggesting that FFM is a predictor for athletes, whereas total body weight predictions can be made for non-athletes.

Conclusion

- It was found that though athletes had a higher absolute HGS than non-athletes, when compared to relative HGS values non-athletes were on par or achieved higher values.
- Limitations to this study was the number of participants was small, and one of the researchers participated within the study.
- Further research should investigate the muscularity comparison to HGS and participant's physical hindrances.

References

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