Assessing lean body mass, body fat and physical activity in eSports players compared to non-eSports players

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TAP TO GO BACK TO KIOSK MENU

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ABSTRACT

- Purpose: To investigate body composition and activity levels in collegiate eSports players compared to their age-matched controls.
- Methods: This study was conducted at NYIT College of Osteopathic Medicine. Male or female players 18-25 years of age were measured for body composition on a Lunar iDEXA scan. Their daily activity was monitored (step count, calories, duration and quality of sleep) using Fitbit Charge™. Participants were asked to complete a questionnaire describing their physical activities. Participants were divided based on involvement in the NYIT eSports team.
- Results: The step count in the collegiate eSports players was significantly lower than the age matched controls (p=.004; 6040.2 ± 3028.6 to 12843.8 ± 5661.1). However, there was no difference for the total sleep time, as the eSport players had an average of 388 ± 98 minutes of sleep per night compared to an average of 441 ± 1.03 minutes of sleep per night in the age-matched controls (p=.07). There was a statistically significant difference in body fat percentage (P=0.05), total lean mass (P=0.003), and regional lean mass (P-values all less than 0.05), with eSports players having a higher body fat percentage and a lower total and regional lean mass.
- Conclusion: eSports players were significantly less active and had a higher body fat % and lower lean body mass. Additionally, the study helped support the notion that although BMI may be acceptable in many eSport athletes, perhaps looking at body composition (specifically body fat percentage and lean body mass) would be a more effective tool to determine health.

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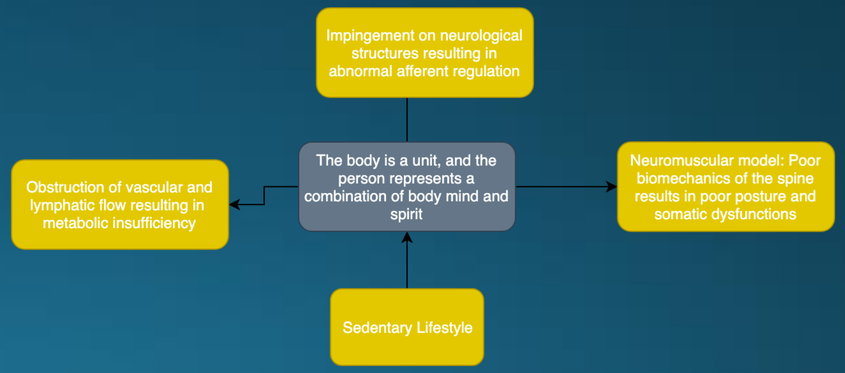
INTRODUCTION

- There is a lack of information to the potential health ramifications resulting from sedentary behavior in eSports players and in populations that sit for extended periods of time[1,2].
- The majority of the literature uses body mass index (BMI) as an indicator of being overweight or obese[3], but in regards to overall "health", BMI requires further investigation into its value as a predictor of good health[4]. Using body composition and lean body mass to determine the health of this new subset of teenagers/young adults who play video games much more than their age-matched peers may be more effective.
- The importance of investigating body composition and activity levels in a more sedentary population can be tied back to the osteopathic tenets of the inter-relationship between structure and function, as well as the body being a unit.

Primary Hypothesis and Secondary Hypothesis

- We hypothesize that the collegiate eSport players will be significantly less active than their age-matched peers.
- We hypothesize that the body composition of collegiate eSport players will be significantly different than age matched peers. Specifically, body fat percentage will be higher and lean body mass will be significantly lower.



Click picture to enlarge

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METHODS

This observational prospective cohort was approved by the New York Institute of Technology Internal Review Board. 21 male participants signed written consent to be in this study. Eleven competitive collegiate eSport players (age 20.2 ± 1.7), and ten age matched controls (age 19.2 ± 1.3) from the same college campus who were not eSport players or gamers participated.

Click pictures to enlarge

Inclusion criteria: 1. Women or men 18-30 years of age 2. Participants were divided on membership in the NYIT eSports team.

Exclusion criteria: 1. Any contraindication to have a DEXA scan performed based on the American College of Radiology's practice guidelines.

Body Composition: All participants underwent body composition testing on a GE™ Lunar dual-energy absorptiometry machine (Lunar™ I-Dexa General Electric, Atlanta, GA) located on the campus of NYIT. This machine analyzes whole body composition including total mass, lean mass, fat mass, fat percent and visceral fat.

Activity and Sleep: Daily activity was monitored for 7 consecutive days 24 hours a day by a Fitbit Charge™. The Fitbit™ activity monitor is a quantitative tool to assess steps per day/week, calories, exercise, sleep duration and quality of sleep. The Fitbit™ uses sensors to track heart rate, activity, steps, and sleep. The monitor was placed on the non-dominant wrist of each subject and eSport players were asked to remove the watch while they were gaming to avoid false movement readings.

Results

Variables	ESport (n=11)	Controls (n=10)	Difference	*P* Value
BMI (lb)	23.7 (3.3)	24.9 (2.1)	-1.21	0.35
Body fat (%)	24.0 (6.7)	19.1 (6.0)	**-4.9**	**0.05***
Total fat mass (lb)	38.1 (14.1)	31.8 (12.3)	6.3	0.31
Arm fat mass (lb)	4.4 (1.5)	4.0 (1.6)	0.43	0.55
Leg fat mass (lb)	12.6 (4.3)	11.3 (4.1)	1.24	0.52
Trunk fat mass (lb)	19.1(8.5)	14.4 (6.7)	4.66	0.20
Visceral fat (lb)	0.74 (0.5)	0.44 (0.3)	.3	0.07
Total lean mass (lb)	111.8 (8.8)	131.5 (18.7)	**-8.95**	**0.003***
Arm lean mass (lb)	14.4 (1.7)	17.1 (3.0)	**-2.77**	**0.02***
Leg lean mass (lb)	37.8 (3.9)	47.7 (9.0)	**-9.90**	**0.004***
Trunk lean mass (lb)	51.2 (4.2)	58.9 (6.9)	**-6.92**	**0.01***
BMC (lb)	6.4 (0.7)	7.1 (0.9)	.7	0.06

Table A: Body composition via DEXA scan between eSports and non-eSports players – click image to enlarge

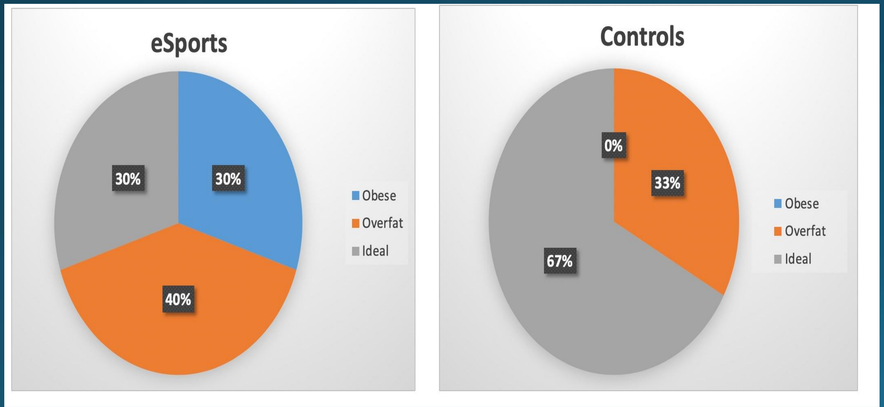

Figure A: Proportion of participants body composition according to BMI. – click image to enlarge

Variable	ESport (n=11)	Control (n=10)	P Value
Age	20.2 (1.7)	19.2 (1.3)	0.09
Step Count (2 weeks)	6040.2 (3028.6)	12843.8 (5661.1)	**0.004 ***
Sleep (min)	388 (98)	441 (1.03)	0.07
Hours played daily	4.6 (2.6)	N/A	N/A
Hours played without break daily	4.0 (3.2)	N/A	N/A
Hours on computer recreational/school use daily	4.3 (1.9)	1.7 (1)	**0.001***
Days per week they exercise	1.7 (1.9)	4.8 (1.2)	**0.001***
Minutes of exercise	39.5 (40.4)	56.7 (26.8)	0.29

Table B: Body composition via Fitbit Charge™ comparison between eSports and non-eSports players – click image to enlarge

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CONCLUSION

- eSports players were significantly less active and had a higher body fat percentage and lower lean body mass.
- Descriptive statistics and an independent t-test were used for both hypotheses to determine significant differences in measures obtained by the DEXA Scan and the FitBit Charge.
- Body fat percentage was statistically higher in the eSports players. Total lean mass and regional lean mass were statistically lower compared to the non-eSports players.
- Step count and days per week of exercise were statistically lower in eSports players. The amount of hours spent on a computer for recreational/school use daily was statistically higher in eSports players.
- Although BMI may be acceptable in many eSport athletes, perhaps looking at body composition (specifically body fat percentage and lean body mass) would be a more effective tool to use to determine health.

Limitations of this study include:

- Inaccurate self-reporting of hours exercised in questionnaire
- Need to obtain more participants to gain more power to conduct statistical analyses
- Fitbit Charge™ is good at counting steps, but not a good indicator of other physical activities.

Future Research:

- Larger group of participants
- More research needs to be conducted to support the effectiveness of body composition parameters over BMI and to its effectiveness on determining health on sedentary populations.

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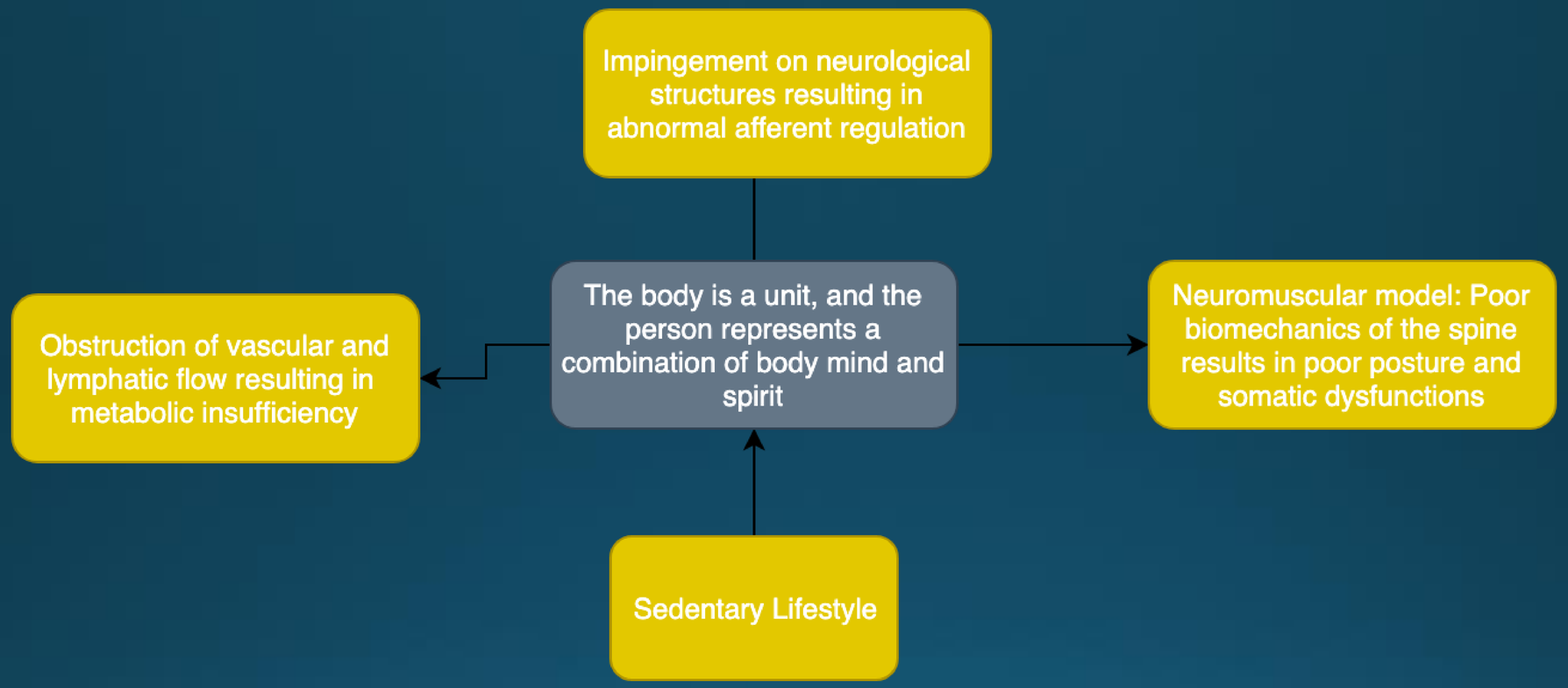

Figure A. Physical interrelations of sedentary lifestyle with osteopathic considerations.

Fitbit Charge ™

GE Lunar iDEXA™

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Data are means with standard deviation of means in parenthesis. Asterisk (*) represents significance (P< 0.05)

Table A: Body composition via DEXA scan between eSports and non- eSports players. eSports players are more likely to have a larger body fat percentage but had less lean mass in comparison to controls.

Variable	ESport (n=11)	Control (n=10)	P Value
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Step Count (2 weeks)	6040.2 (3028.6)	12843.8 (5661.1)	**0.004 ***
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Days per week they exercise	1.7 (1.9)	4.8 (1.2)	**0.001***
Minutes of exercise	39.5 (40.4)	56.7 (26.8)	0.29

Table B: Body composition via Fitbit Charge™ comparison between eSports and non-eSports players. Step count reveals that eSports players had a significantly less amount of steps in comparison to controls.

Body Composition of Participants according to BMI

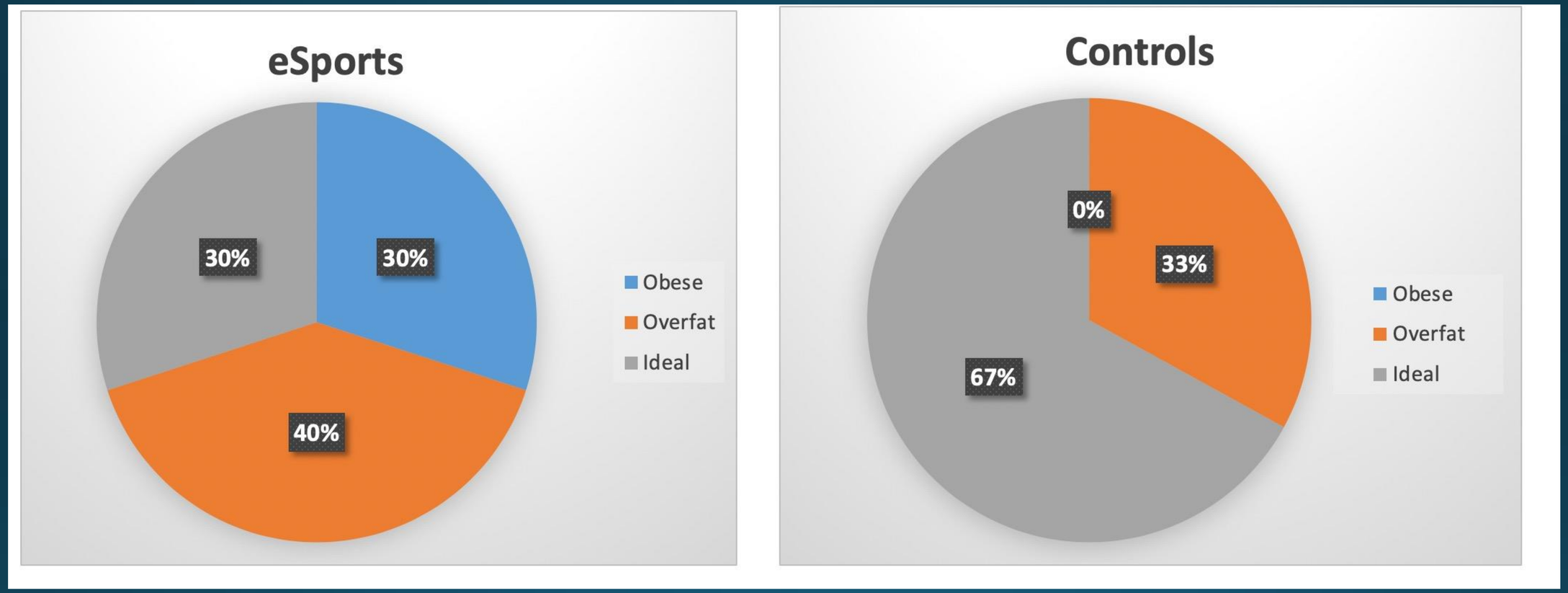

Figure A: Proportion of participants body composition according to BMI. eSports players were split between obese (30%), overweight (40%), and ideal bodies (30%), in comparison, 67% of controls were ideal or were overweight (33%)