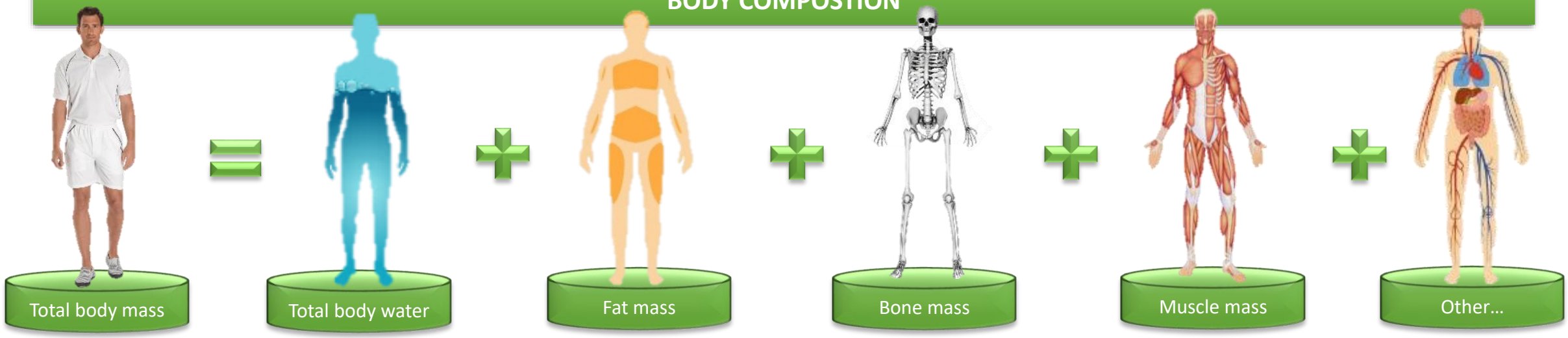
EVALUATING THE IMPACT OF SPORT ACTIVITIES ON BODY COMPOSITION IN INDIVIDUALS WITH PHYSICAL IMPAIRMENTS

V. Cavedon[1], C. Zancanaro[1], C. Milanese[1]

[1] Department of Neurosciences, Biomedicine and Movement Sciences, University of Verona, Verona, Italy.

Amsterdam, 6 September 2019

BODY COMPOSTION



BODY COMPOSTION IN PHYSICALLY IMPAIRED SUBJECTS

Obesity

Osteoporosis

Cardiovascular disease

Dyslipidemia

Type II diabete mellitus

Oedema

Higher risk of mortality

Hypertension

[Gater and Farkas, 2016; Gorgey et al., 2010; Mojtahedi et al., 2009; Maggioni et al., 2003; Spungen et al., 2003]

SCIENTIFIC BACKGROUND AND EXPERIMENTAL APPROACH TO THE PROBLEM

- Both longitudinal and cross-sectional investigations showed that the regular practice of a wheelchair field sport activity has positive effects on body composition in the individuals with a physical impairment and that such effects are likely to be protective against the development of the adverse metabolic consequences resulting from a sedentary lifestyle.
- Despite the tremendous growth in participation in wheelchair field sports, a number of important aspects related to the impact of these sports activities on whole-body and segmental body composition in these individuals remains poorly understood.
- The impact of long-time regular practice of wheelchair field sports on body composition has never been investigated in the Caucasian population.
- When assessing the impact of sport activity on body composition in individuals with a physical impairment it would be useful to compare the pattern of bone mineral, lean mass and fat content of those who are physically active or are involved in sport with those who are sedentary, and also with a reference able-bodied group.

[Gorla et al., 2016; Iturricastillo et al., 2015 ; Sutton et al., 2009; Inukai et al., 2006]

AIMS

1. to assess the impact of different physical impairments on body composition.
2. to evaluate the effect of sport activity vs. sedentary lifestyle on body composition in individual with physical impairment

MATERIAS AND METHODS

PARTICIPANTS

Matching criteria: age; BMI; duration of injury; sex (male); ethnicity (Caucasian).

Wheelchair athletes (Ath_PI, n = 9)

- Wheelchair basketball (n = 7)
- Wheelchair rugby players (n = 2)
- Sport experience: 15.89±7.79 y (consecutive)
- Mean age: 40.0 ± 8.7 y; BMI: 23.4 ± 2.8 kg/m^2

Matched (1:1)

Sedentary physically impaired subjects (Sed_PI, n = 9)

- They were not involved in any regular sports activity or structured physical activity.
- Mean age: 40.3 ± 8.6 y; BMI: 22.9 ± 2.6 kg/m^2

Matched (1:1)

Matching criteria were sex, race, age and BMI.

Matched (1:1)

Able-bodied male athletes (Ath_AB, n = 9)

They were involved in a structured sport activity (basketball, rugby, soccer, tennis, golf) for at least 5 consecutive years.

Sedentary able-bodied subjects (Sed_AB, n = 9)

- They were not involved in regular sports activity or structured physical activity.

MATERIAS AND METHODS

PROCEDURES

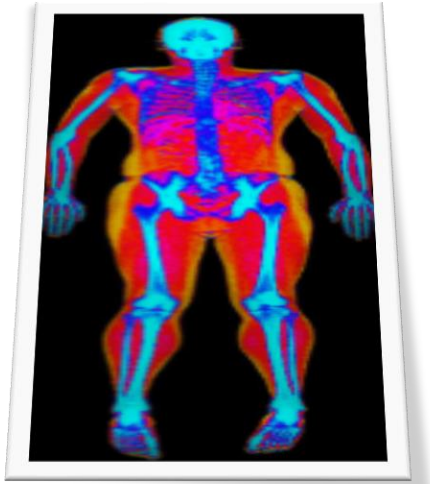
[QDR Explorer W, Hologic]

Variables assessed at the total-body level:

Relative (%) fat-free soft tissue mass (FFSTM);

Relative (%) fat mass (FM);

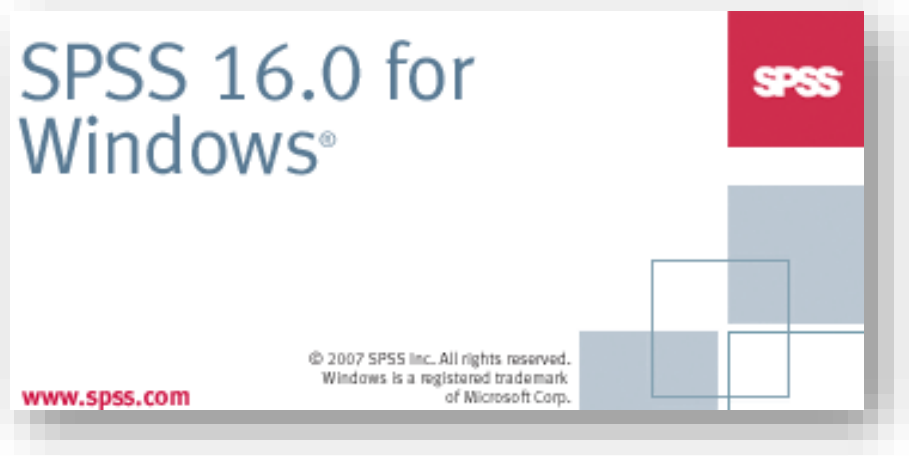
Relative (%) bone mineral content (BMC).



- Scanning took place in the late morning/early afternoon, after a 3-4h fast.
- All participants were asked not to undertake strenuous physical activity the day of the test and the day before each measurement session.
- Prior to scanning, participants were asked to void their bladder and to remove all metal, jewelry or reflective material, including prostheses.
- Care was taken to avoid DXA image artifacts caused by the presence of vertebral stabilization plaques.
- The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Institutional Review Board of the University of Verona.

STATISTICAL ANALYSIS

- Data were assessed for normality with the Kolmogorov-Smirnov test and transformed using the method described by Box and Cox where necessary.
- Descriptive statistics (mean and standard deviation) were computed for all variables.
- The independent-sample t-test was employed to assess differences in body composition variables between groups (i.e., Ath_PI vs. Ath_AB, Sed_PI vs. Sed_AB, and Ath_PI vs. Sed_PI).
- Statistical significance was set at $P<0.05$.



RESULTS

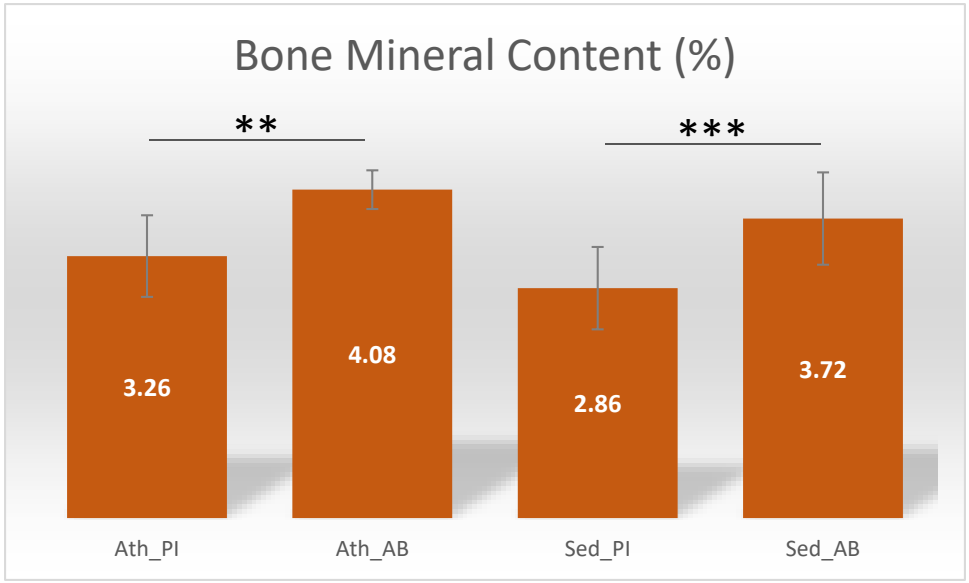
BMI: 22.89 ± 2.60 kg/cm^2

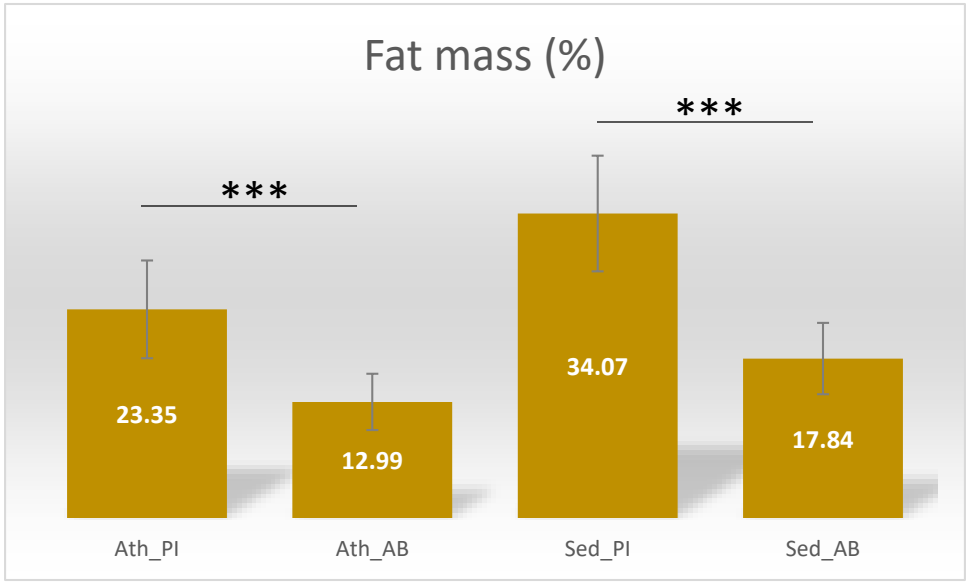
BMI: 23.35 ± 2.80 kg/cm^2

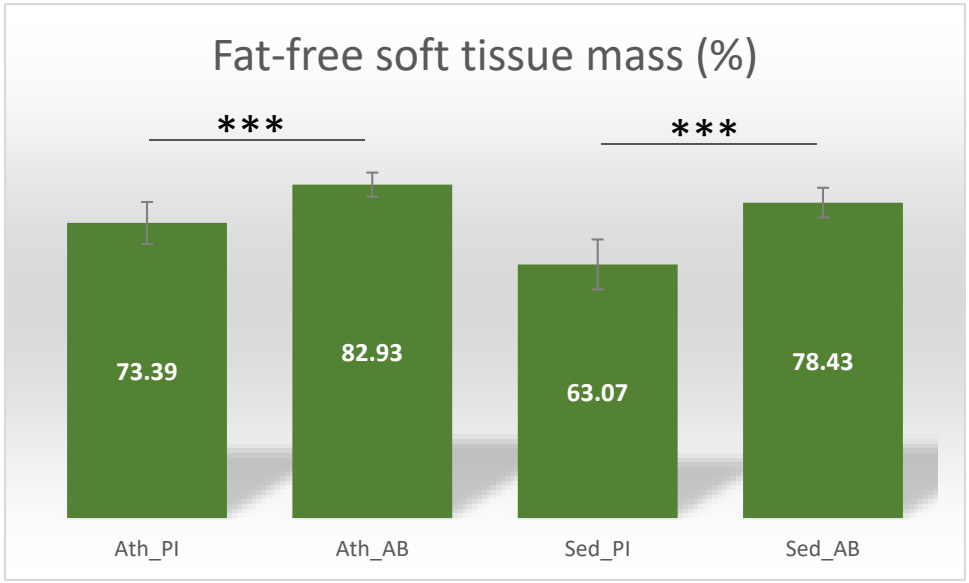
BMI: 23.11 ± 2.16 kg/cm^2

BMI: 23.35 ± 2.11 kg/cm^2

RESULTS: Comparison between Individuals with an Impairment and relative able-bodied group

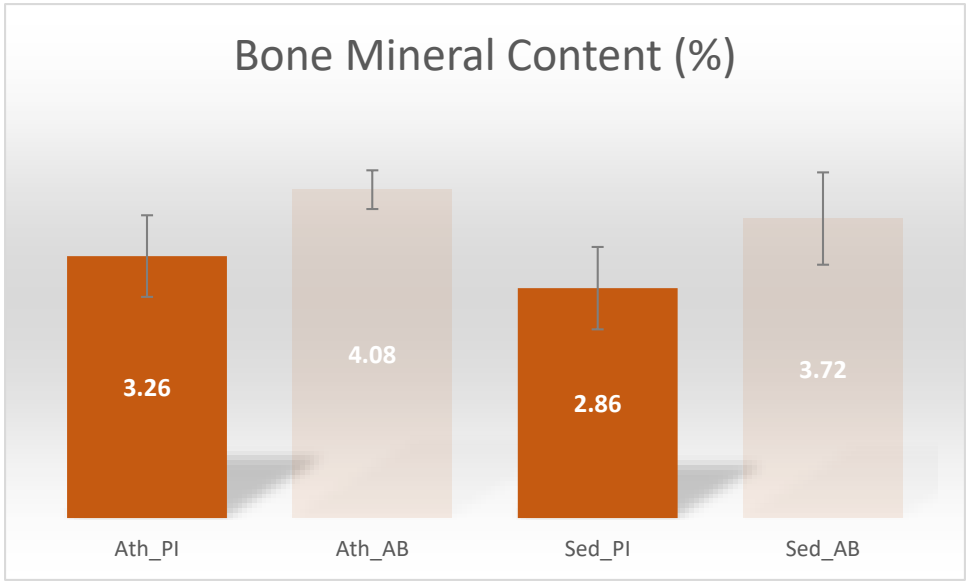


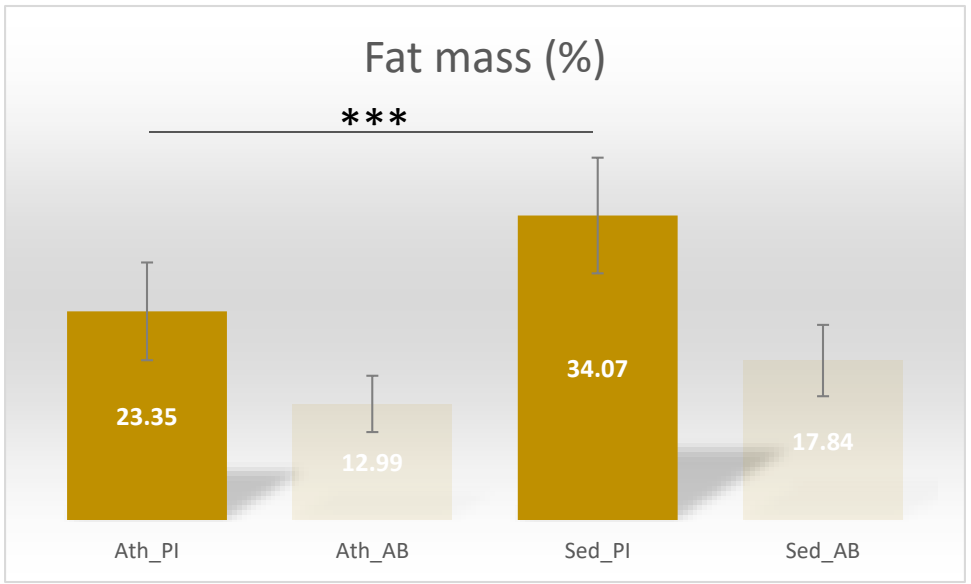


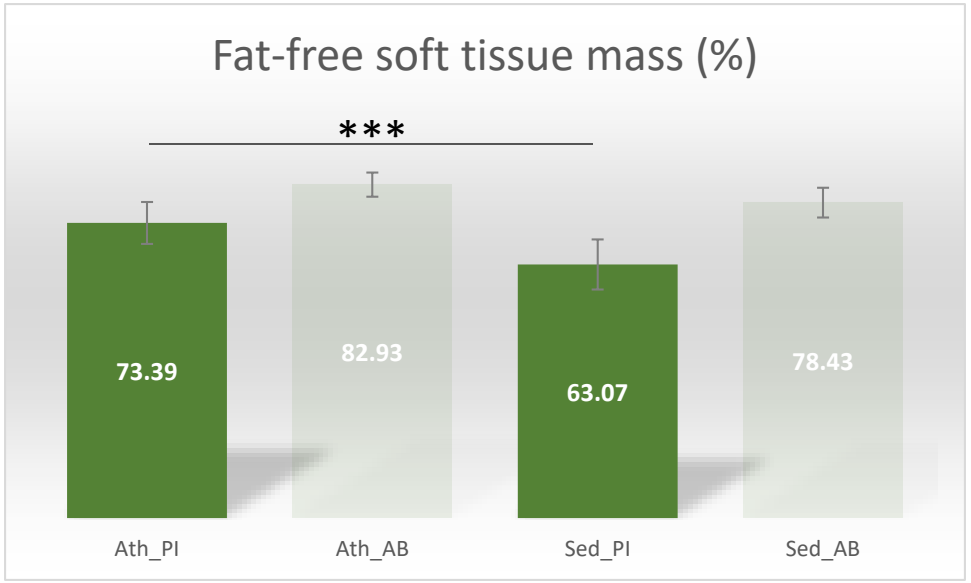


*, P<0.05; **, P<0.01; ***, P<0.001

RESULTS: Comparison between trained and sedentary Individuals with an Impairment







*, P<0.05; **, P<0.01; ***, P<0.001

DISCUSSION

- Our findings suggest that body composition is adversely affected in both athletic and sedentary individuals with a physical impairment vs. their able-bodied counterpart.
- The largest adverse change is found in the relative (%) fat mass of sedentary physically impaired individuals versus their sedentary able-bodied counterpart.
- Adverse body composition changes are to some extent inherent to physical impairment and they are aggravated by sedentary behavior.

STUDY LIMITATIONS

- The limited number of individuals with physical impairment prevented the investigation of the effects of regular, long-term practice of a wheelchair sport activity on body composition according to the type and the severity of physical impairment.
- The lifestyle (e.g. sedentary versus active lifestyle) of participants in the Sed_PI and Sed_AB groups was not known.
- Information on the dietary habits of the subjects were not collected.

CONCLUSION

The results of the present study showed that the regular and prolonged practice of a wheelchair sport activity over time is associated with beneficial body composition adaptations in people with physical impairments.

Thank you for your attention!

Mail to valentina.cavedon@univr.it