



# **ECSS** Virtual Congress 2021

## **BOOK OF ABSTRACTS**

Editors:

Dela, F., Helge, J.W., Müller, E., Tsolakidis, E.

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was positively associated with SER ( $p < .01$ ) and negatively associated with AL ( $p < .01$ ). In the multiple linear regression model, the higher height, heavier weight, and more 1-min rope skipping count were associated with lower SER ( $p < .01$ ) and longer AL ( $p < .01$ ) without controlling for any covariates; when the age and gender were controlled, however, it was found that the higher height was associated with longer AL ( $p < .01$ ) and more 1-min rope skipping count was associated with lower SER ( $p < .01$ ).

**CONCLUSION:**

The higher height was associated with longer AL and more 1-min rope skipping count was associated with lower SER after controlling for age and gender in 6-10 years old Chinese schoolchildren. The results suggested that the development of refraction could be related to physical development, the comprehensive strategies should be applied to prevent myopia as early as possible in schoolchildren.

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**ASSOCIATION OF GRIP STRENGTH INDICES WITH OBESITY, PHYSICAL ACTIVITY AND SCREEN TIME AMONG ADOLESCENTS RELATIVE TO AGE AND GENDER**

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**INTRODUCTION:**

In adults, grip strength is an important indicator of overall health and strongly correlates with a lower risk of cardiovascular disease. Little research has been reported on the relationships of grip strength with adolescents' lifestyle behaviors. Purpose: To investigate the associations of adolescents' grip strength with lifestyle behaviors including physical activity, screen time, sleep duration and dietary habits among secondary school students

**METHODS:**

A multistage stratified cluster sampling technique was used to collect lifestyle data from Saudi adolescents (ages 14 to 19 years). Body weight, height and waist circumference were measured and body mass index (BMI) and waist to height ratio were calculated. Grip strength was measured using digital dynamometer. Lifestyle behaviors data were collected using validated self-reported questionnaires (ATLS questionnaire)

**RESULTS:**

A total of 784 adolescents (52.1% were females) with mean age of  $16.4 \pm 0.95$  years were included in the analysis. Absolute grip strength, relative to body weight, or to waist to height ratio (W-H-ratio) showed significant difference in relation to age ( $p < 0.001$ ) and gender ( $p < 0.001$ ), with males ( $35.4 \pm 7.0$ ) having higher mean values than females ( $19.4 \pm 4.7$ ). Absolute grip strength was significantly ( $p < 0.001$ ) higher in overweight/obese than in non-overweight/non-obese children. However, grip strength relative to body weight or to W-H-ratio was significantly ( $p < 0.001$ ) higher in non-overweight/non-obese children compared with children with overweight or obesity. Also, there were significant ( $p < 0.001$ ) overweight/obesity by gender interactions. No differences were observed in mean effects of all grip strength indices in relation to activity levels or screen time. Absolute mean grip strength, while controlling for age, was positively associated with BMI ( $r = .29$ ,  $p < .001$ ), W-H-ratio ( $r = .36$ ,  $p < .001$ ), and vigorous physical activity ( $r = .13$ ,  $p < .001$ ), negatively with screen time ( $r = -.13$ ,  $p < .001$ ), sleep ( $r = -.17$ ,  $p < .001$ ), and sugary foods intake (cake/donuts ( $r = -.084$ ,  $p < .05$ ) and chocolate/candy ( $r = -.14$ ,  $p < .001$ ). No significant associations were observed between grip strength and other lifestyle parameters. Multiple regression analyses indicated that grip strength can be predicted from gender, body weight, BMI, and age, with an adjusted R squared of 0.720

**CONCLUSION:**

Multiple lifestyle behaviors such as engaging in vigorous physical activity, less screen time, good sleep, and lower intake of sugary foods influence grip strength in adolescents. Lifestyle behaviors as a cluster might affect good health in adolescents, however, such a relationship needs to be investigated further if it can be sustained from adolescence to adulthood. This study highlights the need for assessing overweight/obesity and lifestyle behaviors when examining grip strength differences in patients, as lifestyle behaviors appear to associate with overall health

**RELATIVE HANDGRIP STRENGTH IS A BETTER INDICATOR THAN ABSOLUTE HANDGRIP STRENGTH FOR THE ASSESSMENT OF HEALTH-RELATED MUSCULOSKELETAL FITNESS IN CHILDREN**

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**INTRODUCTION:**

The handgrip strength (HGS) is part of many physical fitness test batteries in children, and it has been the most widely applied field-based test to assess musculoskeletal fitness. The aim of this study was to investigate whether relative HGS in children provides a better assessment than absolute HGS for the evaluation of health-related musculoskeletal fitness.

**METHODS:**

This study included 62 school children (32 boys and 30 girls) from the United Kingdom between 6 and 10 years of age. Written informed consent was obtained from the parents prior to testing. The participants completed the Alpha-Fit test battery, which included HGS, standing long jump, 4x10m shuttle run (4x10m SRT), and 20m shuttle run tests (20m SRT). Percentile scores for the results from each test were calculated. Height and weight were measured, and BMI was calculated. Relative HGS was calculated as the mean absolute HGS from both hands divided by body weight. The participants were divided based on their BMI assessment: 'healthy' ( $n=30$ , BMI percentile score  $< 85$ ) and 'overweight and obese' ( $n=32$ , BMI percentile score  $> 85$ ). Comparisons were made by using the percentile scores. Furthermore, the participants were also divided by BMI and gender to compare both absolute values and percentile scores of all tests: 'healthy boys' ( $n=15$ ), 'overweight and obese boys' ( $n=17$ ), 'healthy girls' ( $n=15$ ), 'overweight and obese girls' ( $n=15$ ).

**RESULTS:**

The percentile scores of the standing long jump, 4x10m SRT, and 20m SRT in the 'healthy' children were significantly better than the 'overweight and obese', and showed better health-related motor, musculoskeletal and cardiorespiratory fitness. However, the absolute HGS percentile score was lower for the 'healthy' children, and did not show a significant difference between the groups (67.8 for 'healthy' vs 74.7 for 'overweight and obese'). Similar findings were registered when the absolute HGS and its percentile score were adjusted for gender:  $14.41 \pm 3.51$  kg for 'healthy' boys vs  $16.26 \pm 4.14$  kg for 'overweight and obese' boys, and percentile score of  $61.61 \pm 23.56$  vs  $68.05 \pm 28.90$ , respectively, ( $p > 0.05$ );  $15.68 \pm 3.79$  kg for 'healthy' girls vs  $17.17 \pm 3.20$  kg for 'overweight and obese' girls, and percentile score of

74.03 ± 26.75 vs 82.28 ± 22.12, respectively, ( $p > 0.05$ ). Therefore, both the absolute value of the HGS and its percentile score did not differentiate between healthy and overweight children. On the other hand, the relative values of the HGS were significantly better in favour of the 'healthy' boys ( $0.50 \pm 0.08$  vs  $0.41 \pm 0.09$  kg/kg body weight,  $p < 0.05$ ) and girls ( $0.52 \pm 0.09$  vs  $0.39 \pm 0.05$  kg/kg body weight,  $p < 0.001$ ).

#### CONCLUSION:

The relative HGS is a better indicator than the absolute HGS for assessing health-related musculoskeletal fitness in children. Future research should establish percentile scores for the relative values of the HGS test in children in order to accurately assess their health-related muscular strength.

### CATEGORIZING TEN SPORTS ACCORDING TO BONE AND SOFT TISSUE PROFILES IN ADOLESCENTS

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#### INTRODUCTION:

Considering the different loading and training characteristics of the sports practiced during growth, it is important to specify and categorize the bone and soft tissue adaptations in adolescent athletes. This study aimed to categorize ten different loading sports and a non-sport group and identify the differences in bone density and soft tissues

#### METHODS:

The sample included 625 adolescents (10 to 17 years old) of ten sports (soccer, basketball, volleyball, track & field, judo, karate, kung-fu, gymnastics, baseball and swimming) and a non-sport group. Dual energy X-ray absorptiometry assessed areal bone mineral density (aBMD), bone mineral apparent density (BMAD) and soft tissues (lean soft tissue and fat mass). The results were adjusted for sex, years from age of peak height velocity (PHV), lean soft tissue, fat mass and weekly training volume.

#### RESULTS:

The comparisons among groups showed that soccer had the highest whole body aBMD (mean ± SEM:  $1.082 \text{ g/cm}^2 \pm 0.007$ ) and lower limbs aBMD ( $1.302 \text{ g/cm}^2 \pm 0.010$ ). Gymnastics presented the highest upper limbs ( $0.868 \text{ g/cm}^2 \pm 0.012$ ) and whole body BMAD ( $0.094 \text{ g/cm}^2 \pm 0.001$ ). Swimming presented the lowest aBMD values in all skeletal sites (except at the upper limbs) and whole body BMAD. The soft tissue comparisons showed that soccer had the highest lean soft tissue ( $43.8 \text{ kg} \pm 0.7$ ). The lowest fat mass was found in gymnastics ( $8.04 \text{ kg} \pm 1.0$ ).

#### CONCLUSION:

The present study investigated and categorised for the first time ten different sports according to bone density and soft tissue profiles. Soccer and gymnastics sport groups found to have the highest bone density in most body segments and both sports were among the groups with the lowest fat mass.

## OP-MH03 Cancer

### EFFECTS OF SUPERVISED AEROBIC-STRENGTH TRAINING ON COGNITIVE FUNCTIONS AND PHYSICAL FITNESS IN TESTICULAR GERM-CELL CANCER SURVIVORS

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#### INTRODUCTION:

Chemotherapy-induced late toxicity can be associated with cognitive impairment in testicular germ cell cancer (TGCC) survivors. On the other hand, regular exercise has a potential to improve cognition. Our study was aimed at evaluating effects of supervised exercise intervention on cognitive functions, fitness and metabolism in TGCC survivors.

#### METHODS:

Ten men (age  $43.0 \pm 8.5$  yrs; examined 6 yrs after platinum-based chemotherapy) underwent 6-month supervised aerobic-strength exercise intervention (strength training 2x1h/week & aerobic training 1x1h/week). Learning ability and working memory were assessed by Ray Auditory Verbal Learning test (RAVL). Body composition (bioimpedance); metabolic parameters (serum glucose, insulin, total & HDL-cholesterol) and fitness performance (hand & leg dynamometry) were assessed. Habitual physical activity and sleep quality were measured by GENEActiv (Activinsights; UK) for 7 consecutive days.

#### RESULTS:

Significant increase in learning ( $p=0.03$ ) was observed after 6-month intervention, with concomitant improvement in working memory assessed by delayed recall ( $p=0.03$ ). No change was observed in body weight, body composition (muscle, fat, visceral fat) and metabolic parameters (fasting serum glucose, insulin, cholesterol). However, muscle strength (knee flexion) increased significantly in response to 6-month training ( $p=0.03$ ). The negative association was observed between sedentary behaviour and learning ability (RAVL;  $p=0.04$ ). Exercise-induced change in length of the sleeping period was positively associated with exercise-induced change in working memory assessed by delayed recall (RAVL;  $r=0.86$ ;  $p=0.01$ ).

#### CONCLUSION:

Supervised 6-month aerobic-strength training improved learning ability, working memory and increased maximal voluntary contraction at knee flexion in testicular germ-cell cancer survivors. Our results support the role of regular physical exercise in the prevention and treatment of chemotherapy-induced late toxicity in TGCC survivors.

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