POSTER SESSION #01 (MODERATOR: GERALDINE NAUGHTON)

CAN A PHYSICAL ACTIVITY AND NUTRITION INTERVENTION BE EFFECTIVE IN CHILDREN WITH CARDIOVASCULAR RISK FACTORS?

Rui Miguel Batalau, Maria Joana Cruz, João Mendes Leal, Magda Sofia Santos, João Carmo, Joana Cercas Cabrita, Ricardo Filipe Gonçalves, António Labisa Palmeira

Physical activity (PA) and nutrition represent modifiable behavioral risk factors, influencing physical fitness (PF), body weight and adiposity, largely related to metabolic risk factors potentially leading to cardiovascular diseases and diabetes. Several studies have noted the importance of PA and its association with several variables related to children`s health. Scientific evidence shows the relationship between the nutrition and some of major cardiovascular risk factors (CRF) manifested from childhood. Under these assumptions, we designed a randomized controlled trial with the main purpose to determine whether a school intervention program, during 6 months, based on increased energy deficits related behavior is associated with improvements in fitness, body composition (BC) and other CRF, like blood variables and blood pressure.
Participants will be 100 children (7-10 years) previously classified (through a cross-sectional study) as being outside the desirable values on fitness, BC and CRF (blood pressure and blood variables) and will be randomly selected to one of two groups. Intervention group (IG), will have PA intervention with trained experts (more exercise in the classroom, a goal in the number of steps/day, to accomplish in school context with pedometers (Omron Walking Style Pro), based on the age recommendations, and sessions about healthy lifestyles and daily PA possibilities in and out of school context). At the same time, IG will have a nutrition intervention by a nutrition expert, for children and parents, to assess and develop an individualized monthly eating plan, using validated methods (Child Eating Behaviour Questionnaire, Semi-Quantitative Food Frequency Questionnaire, 24-hours recall, and nutritional quantification with food processor). Control Group, will not have any intervention.
With this unusual multidisciplinary intervention, but increasingly necessary and suggested in childhood, combining PA and nutrition trained experts and involving a parental/family component, it is expected to contribute in a statistically and clinically way for the control of several CRF.
These expected results can alert researchers for the need to idealize integrated interventions considering all the variables that influence the CRF. Also, we intend to determine the types and amounts of PA that are needed to reduce excessive adiposity and to maintain cardiovascular and metabolic health during childhood.

POSTER SESSION #01 (MODERATOR: GERALDINE NAUGHTON)

DIFFERENCES IN MOTOR COMPETENCE IN NORMAL-WEIGHT AND OVERWEIGHT PRESCHOOL CHILDREN

Rafael dos Santos Henrique, Thaliane Mayara Pessoa dos Prazeres, Daniel da Rocha Queiroz, Dayana da Silva Oliveira, Claudjane Gonçalves da Silva, Maria Teresa Cattuzzo

The expressive prevalence of pediatric obesity is an important concern of global public health. However, the ability to perform fundamental motor skills, called as motor competence, have been indicated as a crucial factor for engagement in physical activity and for promoting healthy weight (Stodden et al., 2008). The healthy weight, is a product of dynamics and synergetic between high levels of motor competence, perceived competence, physical activity and health-related physical fitness (Stodden et al., 2008), is also a factor that can affect the motor competence of children. The aim of this study was to investigate differences in motor competence in normal-weight preschool children, and overweight preschool children.

Two hundred ninety-eight children aged between 3 to 5 years old were assessed by anthropometric measurements (weight and height) and motor competence (Test of Gross Motor Development - 2) in the second half of 2010. Based on cutoffs of body mass index (kg / m²) of the International Obesity Task Force, for age and gender, 71 children [age = 56.14 months (SD = 5.10)] were identified overweight and formed the G1. The G2 was composed of 71 children of normal weight, paired to G1 by gender and age [age = 59.39 months (SD= 8.99)]. Independent sample tests were used, and statistical significance was set at $p<0.05$.

The results showed better motor competence for children with normal weight in all motor tests (locomotor, object control and motor quotient general).

From the mechanical point of view, the increase in mass of the different body segments may lead to an inefficient movement patterns that affect the motor competence of children overweight (D'Hondt et al. 2010). The data from this study confirm the predictions of the theoretical model of Stodden et al. (2008), in which the motor competence is affected by weight status and both contribute synergistically to the spiral of disengagement in physical activities. Our results suggest that at infancy period, as critical for motor development, the weight status negatively affects motor competence.

POSTER SESSION #01 (MODERATOR: GERALDINE NAUGHTON)

ABSOLUTE AND SCALED PEAK POWER ASSESSMENTS IN YOUNG MALE SOCCER PLAYERS: VARIATION BY PLAYING POSITION

Vítor Severino, Manuel Coelho-e-Silva, João Pedro Marques Duarte, João Rafael Rodrigues Pereira, Filipe Rafael Lopes Simões, Ricardo Rebelo-Gonçalves, João Valente-dos-Santos, Carlo Castagna, António Figueiredo

Due to the length of the game, aerobic metabolism is the main source in soccer. Although episodes of anaerobic effort occur on a smaller scale during the game, they play a decisive role in performance. Variation in physical and functional characteristics of young soccer players by position is not well documented and the literature does not systematically control for variation in body size when profiling players by field position. This study aims to examine variation of Peak Power (WAnT) by position before and after normalizing for body size.
A sample of 41 male soccer players, aged 12.3-14.9 years, were measured by a single trained observer (body mass, BM; stature, h; estimated thigh volume, TV; body composition by air displacement plethysmography). Biological maturation was given by current stature expressed as % of predicted mature stature. The WAnT peak was the performance variable in the analysis. After determining allometric coefficients to obtain size independent performance, variation by playing position was tested on absolute values, traditional ratio and also using power function ratios.
Differences between defenders, midfielders and attackers were noted when WAnT peak was expressed in Watt ($F=8.254$, $p<0.01$, ES-r=0.633). When controlling for size, WAnT was uniquely significant in W per LTV ($F= 3.478$, $p<0.05$, ES-r=0.469) and when expressed in W.LTV-0.911 with slightly changes in the gradient (forwards = defenders < midfielder). No significant differences were noted using the other size descriptors (BM, FFM).
This study claims for the adoption of adequate analytical techniques to compare functional capacities by playing position, especially in variables that are correlated with body size and during years of maximal growth. Research is needed to examine the interrelationship of playing position with growth, maturation, and training effects on functional capacities.

POSTER SESSION #02 (MODERATOR: MARIA EUGENIA PEÑA-REYES)

MODELLING DEVELOPMENTAL CHANGES IN LEFT VENTRICULAR MASS USING MULTIPLICATIVE ALLOMETRIC AND ADDITIVE POLYNOMIAL MULTILEVEL IN BOYS AGED 11-16 YEARS

João Valente-dos-Santos, Manuel Coelho-e-Silva, Joaquim Moreira Castanheira, Marije Titia Elferink-Gemser, Robert Malina

Studies of developmental changes in left ventricular mass (LVM) in children and youth are still limited and have not systematically considered the influence of habitual physical activity as a longitudinal predictor. The current study was designed to identify the developmental predictors of LVM and, in addition, to examine the contribution ofmultiplicative allometric model structures as a relevant alternative to the traditional multilevel model structures (additive polynomial structure)
The sample comprised 110 adolescent Portuguese school boys (age 13.1 ± 1.1 years) randomly selected. Subjects were tested four times over a 2-year period, with 6-monthly intervals. A total of 429 observations (average 3.9 observations per subject) were available for each variable. Anthropometry (stature and body mass), objective measures of physical activity (PA), cardiac chamber dimensions and left ventricular mass (following the recommendations of the American Society of Echocardiography), were measured. After testing for multicollinearity, additive and multiplicative multilevel regression modelling were used to analyse the longitudinal data. The two multilevel models were compared based on the Akaike information criterion (AIC).
All variables generally improved with age. Boys had mean statures (157.9±11.4 cm) and mean body masses (51.1±12.5 kg) which approximated medians of US age-specific percentiles for boys. The registered amount of daily PA was 450.4 ± 146.7 counts·min-1. Among echocardiographic parameters, subjects showed an eccentric remodelling of LV structure within the reference range (i.e., 0.24 - 0.42). The predicted longitudinal scores for LVM, in both multilevel regression analysis, improved with stature ($P<0.01$) and body mass ($P<0.01$). Age was an additional predictor ($P<0.01$) in the additive model structure. The AIC criterion provided stronger support for the multiplicative model [AIC Model 2 = 560.5] compared to the additive model [AIC Model 1 = 569.9].
On the basis of the AIC criterion, the multiplicative allometric model not only provided a superior fit to the LVM data compared with the additive polynomial model, but it also provided a simpler and more plausible interpretation of the data.

POSTER SESSION #02 (MODERATOR: MARIA EUGENIA PEÑA-REYES)

PHYSICAL ACTIVITY, SCREEN-BASED SEDENTARY ACTIVITY AND ACADEMIC SKILLS – A PROSPECTIVE STUDY AMONG 6–8-YEAR-OLD CHILDREN

Eero A. Haapala, Anna-Maija Poikkeus, Katriina Kukkonen-Harjula, Virpi Lindi, Paavo H. T. Leppänen, Timo A. Lakka

Physical activity (PA) promotes the development of brain functionality and may thereby enhance academic achievement. However, children of this millennium spend most of their day in sedentary tasks. We investigated the associations of PA and screen-based sedentary activity (SA) with academic skills during the first three school years among children.
The participants were a population sample of 107 boys and 79 girls 6-8 years of age. Habitual PA (total PA, PA during recess, organized sports and exercise clubs, unsupervised PA, active school transport [AST]) and screen-based SA (total SA, watching television, using computer, playing video or mobile games) were assessed using a questionnaire in Grade 1. Reading fluency, reading comprehension and arithmetic skills were assessed at the end of Grades 1, 2 and 3. Data were analyzed by dichotomizing PA and screen-based SA variables in Grade 1 at median and by comparing the means of academic skills in Grades 1-3 in the PA and screen-based SA groups using repeated measures ANCOVA in boys and girls. Data were adjusted for age, parental education and pubertal status.
Boys with more total PA (>=110 min/day) had better reading fluency (p=0.028) and reading comprehension (p=0.047) in Grades 1-3 than less active boys. Boys with more AST (>=14.3 min/day) had better reading fluency (p=0.021) and reading comprehension (p=0.041) in Grades 1-3 than boys with less AST. Boys with more screen-based SA (>=102.9 min/day) (p=0.044) and more computer use (>=38.6 min/day) (p=0.011) had better arithmetic skills in Grades 1-3 than boys with lower levels of these types of SA. Girls with less total PA (<97.1 min/day) had better reading comprehension (p=0.026) and arithmetic skills (p=0.049) in Grades 1-3 than more active girls.
Total physical activity and active school transport may enhance reading skills and screen-based sedentary activity and computer use may improve arithmetic skills among boys. Moreover, our results suggest sex-differences in associations of time spent in physical activities at Grade 1 and academic achievement at Grades 1-3. This may indicate that different background factors are important for boys and girls for school related skills.

POSTER SESSION #02 (MODERATOR: MARIA EUGENIA PEÑA-REYES)

RATIONALE, DESIGN AND METHODS OF A FOUR-MONTH, SCHOOL-BASED, CLUSTER-RANDOMIZED CONTROLLED STUDY FOR 6TH AND 7TH GRADERS

Anna Bugge, Sidsel Domazet, Anne Kær-Thorsen, Lars Bo Andersen, Karsten Froberg

There is an increasing body of literature suggesting a relationship between physical activity (PA) and cognitive performance across the lifespan. However, not many studies have been conducted in this area on adolescents and only few are of good methodology. The present study will assess the effects of a four months school-based intensive PA intervention on cognitive function, academic achievement and cardiorespiratory fitness (VO2peak) in 12-14 year old adolescents
20 schools will be invited to participate in the study and a total of ~ 680 adolescents are expected to be included. The schools will randomly be assigned to either intervention group (IG) or control group (CG). The primary aim of the intervention is to provide every student with 60 minutes of moderate to vigorous PA/day every school day. The intervention elements will consist of 1) PA incorporated in academic subjects, 2) physical activities in recess initiated by teachers or older students, 3) physical activity "home work" (~ 10 min/day). Participating teachers and older students will receive complementary training in how to conduct the intervention elements and will be provided with relevant materials and equipment. Measurements: at baseline and post-intervention cognitive function (modified Flanker test), academic achievement (standardized math test), anthropometrics (height, weight and waist circumference) and aerobic fitness (Andersen intermittent running test) will be measured. Furthermore, a questionnaire concerning PA level and activities, socio-economic conditions and participant health will be administered. For assessing compliance with and knowledge of the intervention elements SMS-tracking to teachers and students will be conducted during the intervention
Will be published in fall of 2014
This intervention study can provide the society with important knowledge regarding the relationship between PA and cognition in this age group. Supported by the Danish Ministry of Children and Education

POSTER SESSION #02 (MODERATOR: MARIA EUGENIA PEÑA-REYES)

SCHOOLBASED INTERVENTION – EFFECT ON CARDIOVASCULAR RISK FACTORS IN CHILDREN AGED 6-13: THE CHAMPS STUDY-DK

heidi klakk, Malene Heidemann, Lars Bo Andersen, Niels Christian Moller, Niels Wedderkopp

Background: Cardio vascular disease (CVD) originates during childhood and adolescence. Schools are potentially effective settings for early public health prevention strategies, but the magnitude and content of effective intervention is still not determined. The objective was to evaluate the effect of six physical education (PE) lessons on children's CVD risk defined by a composite risk score.
Method: 10 public schools (n=1218), 6 intervention and 4 control schools were part of a natural experiment, where intervention schools altered the PE curriculum qualitatively and tripled to six PE lessons a week compared to the mandatory two PE lessons in the control schools. Baseline (2008) and two years follow up measures were anthropometrics, aerobic fitness, blood pressure and blood samples providing lipids and measures for insulin resistance. Based on these variables, a composite risk score was calculated and used for further analysis. Multilevel mixed regression models were used to estimate the effect of intervention adjusted for age, gender and puberty as fixed effects and schools and classes as random effects.
Results: Intervention significantly lowered mean of composite risk score with 0.17 SD (95%CI: -0.34 to -0.01). Six PE lessons per week had a beneficial effect on triglycerides (TG) levels (-0.18 SD, 95%CI: -0.36 to 0.00), systolic blood pressure (SBP) (-0.22 SD, 95%CI: -0.42 to -0.02) and insulin resistance (HOMA-IR)(-0.17 SD, 95%CI: -0.34 to 0.01)
Discussion: Six PE lessons at school had a beneficial effect on children's cardio vascular risk measured as a composite risk score. Analysis on single risk factors showed that levels of TG, HOMA-IR and SBP accounted for the majority of the beneficial effect. The magnitude of PE lessons might be crucial for en effect on CVD risk factors. The estimated effect sizes are considered substantial in the perspective of public health strategy for preventing CVD in later life.

POSTER SESSION #02 (MODERATOR: MARIA EUGENIA PEÑA-REYES)

SECULAR TREND OF THE NUTRITIONAL STATUS AND CARDIORESPIRATORY FITNESS IN CHILDREN

Gabriela Blasquez, Mariana Biagi Batista, Catiana Leila Possamai Romanzini, Edilson Cyrino, Helio Serassuelo Junior, Enio Ricardo Vaz Ronque

In recent decades, several studies have shown that inadequate cardiorespiratory fitness (CRF) levels have an inverse association with independent risk factors for chronic diseases and may lead to premature death in adults (Blair et al., 1998; Lamonte et al., 2005). In the case of children and adolescents, it was also observed that low CRF levels is strongly associated with the group of risk factors for cardiovascular disease such as high blood pressure, type-II diabetes, dyslipidemia and body fat, regardless of sex and age (Andersen et al., 2007). Thus, the objective of this study was to investigate the secular trend of nutritional status and cardiorespiratory fitness indicators in Brazilian children between 2002 and 2010.
In 2002, the sample consisted of 511 students, while in 2010, 303 subjects participated in the study. The samples had similar characteristics and the subjects analyzed belonged to the age group between seven and ten years of both sexes. Data were collected in two private schools of the city of Londrina, Paraná, Brazil. All subjects and their parents were informed about the study proposal and signed an informed consent form. This study was approved by the local Research Ethics Committee. Body mass (kg) and stature (cm) were measured and the body mass index (BMI) (kg/m2) was calculated, which was used as nutritional status indicator. The cardiorespiratory fitness assessment was performed based on the 9-min run / walk test. All guidelines and procedures adopted during physical and motor assessments followed recommendations of the Physical Best (AAHPERD, 1988).
Significant differences between studies were observed only in age for female sex, and in CRF indicator, both for males and females. Regardless of sex, no significant changes in the nutritional status (BMI) were observed in the period analyzed (2002-2010). Moreover, the 9min test showed significant declines in 2010 compared to 2002 in both sexes ($P < 0.05$).
Therefore, it could be concluded that there were no secular trends in nutritional status along the eight-year period; however, the cardiorespiratory fitness is declining among children.

POSTER SESSION #02 (MODERATOR: MARIA EUGENIA PEÑA-REYES)

INDEPENDENT ASSOCIATIONS BETWEEN CARDIORESPIRATORY FITNESS, WAIST CIRCUMFERENCE, BMI AND CLUSTERED CARDIOVASCULAR DISEASE RISK IN ADOLESCENTS.

Duncan S Buchan, Lynne M Boddy, Niels Wedderkopp, Julien S Baker

The literature is scarce regarding the potential independent roles of both adiposity and cardiorespiratory fitness upon clustered metabolic risk and markers of inflammation in youth. Thus, the purpose of this study was to examine the independent associations between measures of adiposity and cardiorespiratory fitness with clustered metabolic risk in adolescents.
Subjects for this cross-sectional study were 209 adolescents (139 boys), aged 15 - 17.5 years from the West of Scotland, and recruited from a South Lanarkshire school. Participants completed a number of anthropometric measurements (height, weight, and waist circumference (WC)). The 20 m multi-stage fitness test was used to assess cardiorespiratory fitness (CRF). Age- and gender-specific z-scores of systolic blood pressure, triglycerides, ratio total cholesterol/high-density lipoprotein cholesterol, insulin resistance (homeostasis model assessment), interleukin-6, C-reactive protein (CRP) and adiponectin (inverted) were summed to create a clustered metabolic risk score.
Partial correlations revealed weak to moderate negative associations for BMI and WC with CRF ($r = -0.279$ and -0.274, $P < 0.001$) and adiponectin ($r = -0.225$ and -0.263, $P < 0.05$) whereas weak to moderate positive associations were evident for BMI with CRP, and clustered metabolic risk ($r = 0.220$, and 0.277, $P < 0.05$, respectively). Weak to moderate positive associations were apparent for WC with CRP and triglycerides ($r = 0.222$ and 0.253, $P < 0.05$), whilst a moderate to large association was evident for WC with clustered metabolic risk ($r = 0.305$, $P < 0.05$). Regression analyses controlling for age, sex and maturation revealed that BMI was positively associated with clustered metabolic risk ($\beta = 0.240$, $P = 0.002$). Further analysis whilst additionally controlling for WC and CRF strengthened the association between BMI and clustered metabolic risk ($\beta = 0.341$, $P = 0.002$). Finally, participants in the least-fit quartile for CRF had significantly poorer clustered metabolic risk scores than all of those in the other quartiles.
Whilst the observations of this study are limited due to its cross-sectional nature, small sample size and indirect assessment of CRF, our findings do provide evidence of the importance of adiposity and CRF measures upon CVD risk factors and clustered metabolic risk.

POSTER SESSION #02 (MODERATOR: MARIA EUGENIA PEÑA-REYES)

SCREEN TIME: DOES HAVING ELECTRONIC DEVICES IN THE BEDROOM AND NO RULES INFLUENCE IT?

Bebiana Rodrigues Sabino, Ana José Rodrigues, Dulce Carvalhosa, Tiago Fernandes, Janete Marques, Maria Joao Almeida

Sedentary activities are associated with various pathologies, and time spent in those activities tends to increase with age. Sedentary screen-related activities (SedSA) seem to attract young people leading to high prevalence rates of sedentary behaviors. The aim of this study was to examine how sedentary screen-related behaviors may be influenced by having electronic devices in the bedroom and no parental supervision regarding their use.
Participants were 1606 students (900 boys and 706 girls) between the ages of 10 and 15. Type and time spent in SedSA (watching TV, playing non-active computer/video games and using internet), electronic devices in the bedroom, and having rules for using them were assessed by self-report. Participants spent an average of 119.4 minutes/day in SedSA, with 38.9% spending more than 2 hrs/day on those activities, and boys spending more time than girls ($p<.001$). Of all participants, 14,3% had no electronic devices in the bedroom, 26,7% had only one and 59% had two or more. More than half the sample (57.4%) reported having no rules or restrictions regarding the use of those devices. Both boys and girls whose parents did not supervise their time for using electronic devices spent on average more time in SedSA ($p<.001$). Similarly, those who had more types of electronic devices in their bedroom, on average spent also more time viewing TV, playing computer games or using the internet ($p<.001$).
Logistic regression analysis showed that being a boy, being older, having two or more type of electronic devices in the bedroom and not having rules for viewing TV or using the computer were significant predictors for spending more than 2 hrs/day in SedSA (OR:2.099;95%CI:1.678-2.625; OR:0.794;95%CI:0.737-0.854; OR:1.289;95%CI:1.029-1.613; OR:1.452;95%CI:1.165-1.810, respectively). Results suggest that adolescents, who have electronic devices in their bedroom and with no rules for using them, tend to spend more time in SedSA than those with one or no devices and supervision for using them. Therefore, in order for decreasing time spent in sedentary activities, it may be important that parents establish rules and supervise the use of electronic devices.

POSTER SESSION #02 (MODERATOR: MARIA EUGENIA PEÑA-REYES)

PREVALENCE AND ASSOCIATION OF CARDIOVASCULAR RISK FACTORS IN CHILDREN: PRELIMINARY RESULTS ON OVERWEIGHT AND OBESITY.

Joao Alberto Mendes Leal, Rui Miguel Batalau, Maria Joana Cruz, Magda Sofia Santos, Ricardo Filipe Gonçalves, Joana Cercas Cabrita, João Carmo, António Labisa Palmeira

Several variables contribute to the development of cardiovascular risk factors (CRF) since childhood. Worldwide, there is an increased prevalence of overweight and obesity in children and both are associated with numerous health risks. In fact, a high percentage of obese children present comorbidities in dependency of obesity, although many are asymptomatic. The first aim of this cross-sectional study was to determine the prevalence of overweight and obesity, according to body mass index (BMI), and understand the association between BMI and waist circumference (WC), considering also the variation according to age and gender. After, we will explore the associations between BMI and WC, sedentary behavior, physical activity, physical fitness, nutrition and other CRF (history from birth, clinical family history and blood pressure).
227 children (7-10 years) from a convenient sample were surveyed. The body weight was measured to the nearest 0.1kg using an electronic scale (Omron BF511T) with the participants wearing light clothing and no shoes. Height was measured without shoes, to the nearest 0.1cm using a stadiometer (Seca 206). Overweight and obesity were determined using BMI, according to age-specific and sex-specific World Health Organization cut-offs. WC was measured at the narrowest point between the lower rib and the iliac crest. After Kolmogorov-Smirnov and Shapiro-Wilk tests, nonparametric technics were applied to compare results between genders. The associations between age, weight, height and BMI were assessed by Spearman correlation. Statistical significance was established for P value less than .05.
Prevalence of overweight and obesity is 24,2% and 18,5%. Gender only represent a discriminatory variable regarding the height (MW-U=.034, p<=.05). Significant correlations were found between weight and WC (rs=.844, p<=.01), as well as between BMI and WC (rs=.853, p<=.01). Moreover, we verified a significant direct variation of WC according to the age (rs=.221, p<=.01).
We found a high prevalence of overweight and obesity in pediatric ages and a significant direct variation of WC over age. Considering that the prevention of obesity is much easier than her reversion, these preliminary results increase the importance of early multidisciplinary interventions to prevent cardiovascular and metabolic diseases in older ages.

POSTER SESSION #03 (MODERATOR: LAUREN SHERAR)

SPECIALIZATION OF PLAYING POSITIONS IN YOUTH BASKETBALL: MATURITY RELATED ASPECTS

Sanne te Wierike, Alien van der Sluis, Marije Titia Elferink-Gemser, Yvonne Tromp, Chris Visscher

Adult basketball players of various playing positions show different anthropometric and physiological characteristics. In young basketball players, these characteristics might be influenced by the process of maturation. To investigate this role of maturity, the aim of this study was to analyse anthropometric, physiological, and technical differences between three playing positions in basketball (guards, forwards, and centres), while accounting for the maturity status of players. In addition, it was examined whether players change position during two consecutive seasons.
Forty-five male basketball players (15.66 ± 1.83 years) from the Dutch basketball academy participated in this study. Age at peak height velocity (PHV), height, repeated sprint ability (RSA), agility, and ball handling were measured. MAN(C)OVA's were performed to investigate differences between the three playing positions, with age at PHV as covariate.
Results showed that chronological age was not significantly different between positions ($p > .05$). However, centres experienced their PHV at a significantly earlier age (12.80 ± .88) compared to other positions (guards: 13.61 ± .68; forwards: 12.97 ± .70) ($p < .05$). In addition, significant differences between positions were found for height (anthropometric), RSA (physiological), and ball handling (technical) ($p < .05$). Guards were the smallest players and had the best scores regarding RSA, agility, and ball handling. In contrast, centres were the tallest players and had the lowest scores on these characteristics. After controlling for differences in the maturity status between players, the MANCOVA showed only significant differences regarding the aspect of ball handling of players ($p < .05$). An examination of the position changes of players showed that only 7 out of 45 (15.6 %) basketball players changed position (mean age 16.05 ± 1.56).
Many players seem specialized in one position at an early age. Coaches should be careful when assigning a position to young players, in particular when this decision is based on physiological characteristics of players. Since the technical skills of players appeared least influenced by the maturity status, it is recommended to coaches to consider the technical qualities of players when assigning them to one position, rather than their anthropometric or physiological characteristics.

POSTER SESSION #03 (MODERATOR: LAUREN SHERAR)

SPORT INJURIES ALIGNED TO THE TIMING OF PHV IN TALENTED YOUTH SOCCER PLAYERS

Alien van der Sluis, Sanne C.M. te Wierike, Michel S. Brink, Marije Titia Elferink-Gemser, Visscher Chris

Adolescent growth spurt results in increased vulnerability for injuries in talented soccer players. Talented athletes who experience their Peak Height Velocity (PHV) at an older age may be even more at a disadvantage because they possibly have a lower training and match capacity compared to already matured teammates. Aim of this study was to identify differences in traumatic and overuse injuries resulting in days missed from training and competition between players who differ in their age at PHV. 26 talented soccer players (age 11.9 ± 0.84) selected for the talent development program of a Dutch professional soccer club were followed longitudinally for three years around their PHV, calculated according to the Maturity Offset Protocol. Players were divided in two groups by median split, based on the moment they experience their PHV. Number of traumatic and overuse injuries, and days missed due to injuries were calculated for each year. Longitudinal changes were investigated using repeated measures of analysis of variance (ANOVA) in SPSS 17.0.
The repeated measurement analysis showed a main effect for moment of PHV ($F(1,24)=4.308$, $p<.05$). Players who had their PHV at an older age had more overuse injuries than players who had their PHV at a younger age. Large effect sizes between the two groups indicate that this was mainly the case in the year before (0.88) and the year of PHV (0.90). Moderate effect sizes of 0.45 and 0.55 were found for differences between the two groups on days missed due to injuries before and during PHV. Players who had their PHV at an older age missed more days of training and competition.
Talented soccer players having their PHV at an older age have more overuse injuries compared to players having their PHV at an earlier age. In addition they seem to miss more days of training and competition. Soccer clubs should take precautions in terms of differentiation in training and match load and intensity for players having their PHV at an older age.

POSTER SESSION #03 (MODERATOR: LAUREN SHERAR)

THE RELATION BETWEEN BIRTH DISTRIBUTION AND PHV WITH PHYSICAL PERFORMANCE IN JUNIOR DUTCH TENNIS PLAYERS

Tamara Kramer, Barbara Huijgen, Marije Titia Elferink-Gemser, Chris Visscher

Physical performance is influenced by the chronological and biological age of junior athletes. Understanding whether there is a relation between season of birth as well as the age at peak height velocity (PHV) with the physical performance of Dutch junior tennis players may help to improve talent identification and development. Therefore, the aim of this study was to investigate how season of birth and age at PHV of Dutch junior tennis players is distributed and what the relation is with their physical performance.
There were 96 boys (mean age 11.61±1.35) and 57 girls (mean age 11.92±1.43) in this study. All participants were part of the talent development program of the Royal Dutch Lawn Tennis Association (KNLTB). Six groups were made based on born in the first half (1) or the second half of the year (2) and on early PHV (EP), mean PHV (MP), or late PHV (LP) (1-EP, 1-MP, 1-LP, 2-EP, 2-MP, 2-LP). Early PHV is one year or more before whereas late PHV is one year or more after the mean PHV specified for sex. Three physical tests were conducted; the five-meter sprint test, the countermovement jump, and the hexagon agility test. Boys and girls were analysed separately using MANOVA.
For boys four of the six groups were represented (1-EP 6.3%; 1-MP 66.7%; 2-EP 8.3%; 2-MP 18.7%) whereas for girls only two groups were represented in the talent development program of the KNLTB (1-MP 70.2%; 2-MP 29.8%). The boys in group 1-MP scored significantly better on the three physical tests than the 1-EP group ($p<.05$). Between the other groups and the girls, no significant differences were found in physical performance ($p>.05$).
Most of the selected tennis players were born in the first half of the year. No boys or girls who had a late PHV were selected in the talent development program of the KNLTB although early PHV does not seem to be an advantage for better performance on physical tests in this sample. These results suggest that several talented tennis players are being overlooked and not yet scouted for talent development programs.

POSTER SESSION #03 (MODERATOR: LAUREN SHERAR)

AGREEMENT BETWEEN ANAEROBIC PEAK OUTPUTS OBTAINED FROM STANDARDIZED AND ESTIMATED OPTIMAL LOAD IN SOCCER GOALKEEPERS

Ricardo Rebelo-Gonçalves, António Figueiredo, Vítor Severino, João Duarte, Filipe Rafael Lopes Simões, João Valente-dos-Santos, João Rafael Rodrigues Pereira, Rui António Fernandes, Vasco Vaz, Amândio Cupido Santos, Manuel Coelho-e-Silva, Antonio Tessitore, Neil Armstrong

The aim of this study was to examine agreement between peak power outputs derived from the Wingate anaerobic test (WAnT) and the Force-velocity test (FVT).
Thirty-three young male soccer goalkeepers (12.73-18.67 years old) performed three visits to the laboratory. Data included years of training, chronological age (CA), stature, sitting height, leg length, body mass and thigh volume. Fat mass and fat-free mass were assessed by air-displacement plethysmography. The percentage of predicted mature stature (PMS) was used as an indicator of maturation. Each participant completed the WAnT adopting a standardized load of 0.075 kg · kg-1. In the second visit a series of 3-5 maximal bouts against a range of braking forces (0.019 to 0.108 kg · kg-1) was performed. Based on estimated optimal load, participants completed an additional 30-s all-out maximal exercise.
Bivariate correlation between peak power outputs (POL and PWAnT) and CA, PMS, body size, body composition and thigh volume showed a significant association. Years of training did not significantly influence peak power output. A linear relationship between the power outputs (r = 0.891, 95% CI: 0.790 to 0.945) was noted. Upper and lower limits of agreement (ULOA = 278.36; LLOA = -116.94) were determined by plotting the mean differences between methods (80.71 watts). Paired samples t-test noted this differences as significant [mean difference=80.7, 95% CI: 45.0 to 116.5, t(32)=4.598; p<0.001]. Multiple linear regression (stepwise mode) obtained a significant multiple correlation between the combination of leg length and WAnT peak power output, as independent variables, and POL as the predicted variable (R = 0.904, R2 = 0.816, Adjusted R2 = 0.800)
The use of a fixed applied force of 0.075 kg · kg-1 may not be optimal for eliciting anaerobic peak power outputs in cycle-ergometer tests, as this common braking force tends to underestimate peak power. Leg length and maximal-short term fitness explained 80% of variance in peak power in the 30-s cycle-ergometer test when using an estimated optimal load.

POSTER SESSION #03 (MODERATOR: LAUREN SHERAR)

AGREEMENT BETWEEN INVASIVE AND NON-INVASIVE INDICATORS OF BIOLOGICAL MATURATION IN ADOLESCENT SWIMMERS

Luís Pedro Vieira Ribeiro, Manuel J Coelho-e-Silva, Vasco Vaz, António J. Figueiredo, Alien Van der Sluis, Marije T. Elferink-Gemser, Maria E Peña-Reyes, Robert M. Malina

The ability to predict the timing of the adolescent growth spurt is central to the Long Term Athlete Development model (Balyi et al, 2005). This study evaluates the concordance between maturity classifications (early, on time, late) based on skeletal maturation and a non-invasive method, predicted age at peak height velocity (APHV).
The sample included 76 Portuguese male swimmers. Skeletal age (SA) was obtained with the Fels method (Roche et al., 1988). Two swimmers 13.6 and 15.6 years of age were skeletally mature and thus excluded. Predicted age at peak height velocity APHV was based on maturity offset (Mirwald et al., 2002). Players were classified on the basis of SA minus chronological age (CA): average (SA within ±1.0 year of CA), late (SA behind CA by >1.0 year), and early (SA in advance of CA by >1.0 year). Maturity groups based on APHV were defined relative to the mean and standard deviation for APHV of the three samples upon which the protocol was developed: average (12.9-14.7 yrs), late (>14.7 years), and early (<12.9 yrs). Cross-tabulation of maturity classifications were calculated. Cohen Kappa and Spearman rank-order correlation coefficients were used to evaluate the concordance of classifications. Concordance between SA-CA classifications and the non-invasive criteria was 50% (95%CI: 38% - 62%). The Kappa coefficient (unweighted) was 0.04 (95%CI: 0 to 0.26) and the Spearman rank order correlation was 0.43 ($p<0.01$).

The majority of swimmers (78%) were classified as average in maturation on the basis of predicted APHV in contrast to 58% classified as such by SA-CA. Only one swimmer was classified early maturing and 20% were classified late maturing on the basis of APHV. Although classifications were not expected to correspond exactly, the maturity offset protocol requires critical evaluation in samples of youth athletes.

ALLOMETRIC MODELLING OF ANAEROBIC PEAK OUTPUT OBTAINED FROM FORCE-VELOCITY PROTOCOL IN PUBERTAL BOYS

Rafael Baptista, Amândio Cupido-dos-Santos, João Duarte, João Rafael Rodrigues Pereira, Ricardo Rebelo-Gonçalves, Vítor Severino, João Valente-dos-Santos, IVO REGO, Manuel Coelho-e-Silva, Carlos Alberto Fontes-Ribeiro, Laura Capranica, Neil Armstrong

The Wingate (WAnT) is probably the most popular test to assess maximal intensity exercise, although it may not be the best protocol for quantifying maximal peak power because of its reliance on a single braking force. The force-velocity test (FVT) provides a promising alternative and is based on a set of maximal sprints (<10-s). The appropriate normalization of performance outputs for differences in body size underpins the clarification of growth and maturation as independent and combined determinants of peak power.
The sample is composed 66 boys aged 9.0-12.0 years. In addition to stature (33.1-164.5 cm), sitting height and body mass (26.0-86.5 kg), anthropometry included circumferences and lengths needed to determine lower limb volume, LLV (Jones and Pearson, 1969), skinfolds needed to estimate fat-free mass (FFM) and fat mass (Slaughter et al. 1988) and age at peak height velocity (APHV). FVT was assessed using a Monark 814 E (Monark-Crescent AB, Varberg, Sweden). It involved 4-6 maximal exercise bouts against a variety of braking forces (0.030 to 0.110 kg/kg). FVT-PP (peak power), FVT-OF (optimal force) and FVT-OV (optimal velocity) were calculated (Winter, 1991). Simple allometric exponents were obtained and subsequently stepwise multiple linear regression on log-transformed variables was used to obtain proportional multiplicative allometric models (Nevill and Holder 1994). FVT-PP ranged 190-532 watt (mean=330 watt, SD=73 watt). Scaling exponents for body size descriptors were 2.965 for stature, 1.845 for leg length, 0.605 for body mass, 1.006 FFM and 0.828 for LLV. The combination of body mass and APHV produced the most explicative proportional multiplicative allometric model (R=0.774, adjusted R^2=0.586).
The current study obtained allometric exponents to produce FVT-PP outputs independent from body size and identified body mass and an indicator of biological maturation as the main contributors to interindividual variability in peak power.

ADVANCES IN THE ANALYSIS OF ISOKINETIC INDICES OF PEAK TORQUES DERIVED FROM THE HAMSTRINGS AND QUADRICEPS

POSTER SESSION #03 (MODERATOR: LAUREN SHERAR)

João Rafael Rodrigues Pereira, Vasco Vaz, Manuel João Coelho-e-Silva, João Valente-dos-Santos, Rui Soles-Gonçalves, João Páscoa-Pinheiro, Alberto Areces, Greg Atkinson

Differences between local and international adolescent roller hockey players in the ratio of hamstring and quadriceps peak torques were previously reported by Coelho-e-Silva et al., (2012). This particular study was designed to examine the application of more accurate combinations of peak torques obtained from concentric (CC) and eccentric (ECC) modes of knee extension (KE) and knee flexion (KF) as alternatives to traditional ratios. in roller hockey players.
The sample comprised players aged 14.5-16.5 years who were classified as competing at local (n=41) and international (n=32) levels. Isokinetic knee extension and flexion peak torques (PT) were assessed using a calibrated dynamometer (Biodex System 3, Shirley, NY, USA) at an angular velocity of 60º.s-1. Warm-up procedures, positioning, encouragement, familiarisation, number of trials, and data quality have been previously reported (Coelho-e-Silva et al., 2012). The following ratios were scrutinised for their scaling properties: KFCC/KECC, KEECC/KFECC, KEECC/KECC, KFCC/ KFECC (Aagaard et al., 1998). Simple allometric models were obtained from linear regression of logarithmically-transformed data. PT, traditional ratios and allometric indices were compared between the competitive levels. Significance level was set at 5%.
Rather than simple ratio statistics being valid, the following allometric expressions were derived: KFCC/KECC0.777, KEECC/KFECC0.517, KEECC/KECC0.650, KFCC/KFECC0.493. Comparisons between means of local and international players noted significant differences for PTKECC ($t=-2.568$, $p<0.05$, ES-r=0.277) and KEECC/KFCC ($t=4.059$, $p<0.01$, ES-r=0.434), KEECC/KECC-0.650 ($t=3.092$, $p<0.01$, ES-r=0.344) and KFCC/KFECC-0.493 ($t=-2.603$, $p<0.05$, ES-r=0.295).
In conclusion, these findings indicate that the relationship between hamstring and quadriceps peak torque might not always conform to a simple ratio. An allometric approach may be more accurate and lead to more precise inferences in future studies.

REPRODUCIBILITY OF REPEATED DRIBBLING ABILITY

POSTER SESSION #03 (MODERATOR: LAUREN SHERAR)

João Pedro Marques Duarte, Vítor Severino, João Rafael Rodrigues Pereira, Rui António Fernandes, Filipe Rafael Lopes Simões, Ricardo Rebelo-Gonçalves, João Valente-dos-Santos, Vasco Vaz, André Seabra, Manuel Coelho-e-Silva

This study examines the reproducibility of a new test named repeated dribbling ability (RDA) in young soccer players. Additionally, the interrelationship between this new protocol and the traditional repeated sprint ability (RSA) protocol without the ball was explored.
The sample included 25 soccer players aged 12.9-18.6 years. Body mass (BM), stature, triceps and geminal medial skinfolds were measured and estimates of fat mass (FM) and fat-free mass (FFM) calculated. Biological maturation was assessed as % of predicted mature stature (%PMS) based on a non-invasive method. The battery also included circumferences and lengths needed to estimate thigh volume (TV) of the dominant leg. Standing long jump, 60-s sit-ups, repeated sprint ability (RSA: 7 x 34.2-m / 25'') and repeated dribbling ability (RDA: 7 x 34.2-m / 25'') were adopted. The RSA and RDA protocols provided total time, ideal time and decrement score. Based on test and re-test design, the technical error of measurement (TEM) was calculated for RDA scores. ICC, %CV and Bland-Altman plots were performed to examine the agreement between consecutive trials.
Regarding the properties of RDA, values of ICC ranged from 0.543 to 0.808 for the trials, 0.878 for total time and 0.891 for ideal time. The coefficient for decrement score (RDA-DS) was 0.068. TEM fluctuates between 0.45 and 0.99 seconds for the singular trials and 2.78 s and 2.48 s for total time (RDA-TT) and ideal time (RDA-IT), respectively. Reliabilities were below 0.80 for all single trials and > 0.80 for the composite variables, except for RDA-DS (decrement score). For RDA-TT and RDA-IT, %CV was 4.07% and 3.89%, respectively.
RDA is a promising tool to combine physical fitness and soccer-specific ball control. Data suggest that the properties of the test may be influenced by training experience and fitness level in RSA, lower limb and abdominal strength.

MODELING THE EFFECTS OF PHYSICAL ACTIVITY AND BODY MASS INDEX IN PHYSICAL FITNESS LONGITUDINAL CHANGES

POSTER SESSION #03 (MODERATOR: LAUREN SHERAR)

Michele Caroline Souza, Daniel M. V. Santos, Raquel Nichele Chaves, Fernanda Karina dos Santos, Thayse Natacha Gomes, Alessandra Borges, Sara Pereira, Rui Garganta, José A R Maia

Moderate-to-high levels of physical fitness (PF) are considered health markers in youth and have been associated with high levels of physical activity (PA) and inversely related to obesity. The purpose of this study is to present longitudinal changes in students' PF trajectories conditional on their total PA and body mass index (BMI).
802 students (410 girls and 392 boys) aged 11 to 18 years old, from Porto, Portugal, participated in a mixed-longitudinal study. Four cohorts were considered starting at 10, 12, 14, and 16 years, and followed for three consecutive years, with annual assessments. PF was assessed with the AAHPERD test battery [standing long jump (SLJ), handgrip (HG), shuttle-run (SR), 50 yards dash (50YD)]; PA was estimated with the Baecke questionnaire, and BMI the usual way. The time metric was set to start at average age for peak height velocity (PHV) for boys and girls. HLM 6.0 was used in all analysis.
SLJ mean at PHV was 180.75±1.29cm for boys and 137.68±1.23 for girls; the average increase was 11.70 cm/year and 4.64cm/year, respectively; more active teenagers jumped longer, and those with higher BMI jumped less. HG mean was 33.02±0.32kg for boys and 23.26±0.26 for girls; the average increase was 3.96kg/y and 1.56kg/y, respectively; more active and heavier teenagers are stronger. Agility SR mean was 10.82±0.06s for boys and 12.34±1.16s for girls; the average decrease in running time was -0.26s/y and -0.19s/y, respectively; more active teenagers were more agile, and those with higher BMI are less so. 50YD mean was 7.60±0.01s for boys and 8.90±0.05s for girls; the average decrease in running time was -0.34s/y and -0.12s/y, respectively; more active teenagers were faster, those with higher BMI were slower. All results were significant ($p<0.05$).
Results emphasized that more active boys and girls are systematically more physically fit. On the other hand, those who have higher BMI are less fit. The findings highlight that a physically fit and active lifestyle during youth can contribute to a more favorite health profile. Study funded by the Fundação para a Ciência e a Tecnologia (FCT). Contract PTDC/DES/67569/2006 FCOMP-01-0124-FEDEB-09608.

DROP-OUT IN BRAZILIAN YOUTH TENNIS PLAYERS: A COMPARATIVE STUDY

Sanderson Silva, Renato Assis Garcia, Felipe Matos, Dietmar Martin Samulski

In the late of 90s and early of 2000s, Tennis became more popular in Brazil, with an exponential increase in the number of practitioners in the country, including children, youngest and adults. However, the practice of tennis at a high level, requires dedication, physical and psychological preparation. Thus, one of the major problem involving children and competition is burnout. According Smith (1986), burnout is a psychological, emotional and physical withdrawal from a formerly pursued and enjoyable Sport as a result of excessive stress over time. Thus, the main purpose of this study is to compare gender and age to increase the knowledge about burnout in a Brazilian Tennis player´s sample.

The sample included 71 tennis players (30 girls), age 12 - 18 years (15.36 ± 1.64 years) and Sport practice between three and nine years (5.98 ± 1.47 years), who were involved in competition at national level in their respective ages, 14 (N = 22), 16 (N = 28) and 18 (N = 21) years, according to the Brazilian Tennis Confederation. The reasons for Drop-out were measured with the subscale of the Motivos de Início, Manutenção, Troca e Abandono Esportivo, MIMCA-BR (Carmo et al., 2008). The instrument consists of 10 items that address the possible reasons for the abandonment of the sport. The answers are given on a Likert scale of 5 points (totally agree) 1(Totally disagree).

The results showed that "injury" was the main reason for the drop-out of the Tennis competitions. We did not find significant results when compared gender and age.

The current study showed that the main reason for dropout of competitive tennis, by young Brazilian athletes, is injury. Researchers have not found statistical difference between gender and between ages. Thus, there should be more attention from coaches in the preparation and control of training programs in order to prevent injuries and possible shortening of promising careers.

POSTER SESSION #04 (MODERATOR: AMÂNDIO CUPIDO-DOS-SANTOS)

THERMOREGULATORY RESPONSES OF ARTISTIC GYMNAST YOUNG ATHLETES AND NON-ATHLETE GIRLS DURING EXERCISE IN HEAT

Gabriela Tomedi Leites, Paulo Lague Sehl, Giovani dos Santos Cunha, Adriano Detoni Filho, Flavia Meyer

Artistic gymnast (AG) young athletes may restrict fluid intake during trainings and competitions as it is assumed that avoiding body mass increase helps performance. It is also unclear whether the intensive physical training of AG athletes since prepubescent years improve thermoregulatory responses to exercise. It is then possible that a persistent hypohydration state combined with physical adaptations make thermoregulatory responses of AG athletes different from those of non-athletic girls during a continuous exercise. OBJECTIVE: To compare rectal temperature (Tre) and sweating responses between AG young athletes and non-athlete girls during cycling at similar relative intensity both in a heat and in a thermoneutral environment.
Fourteen prepubescent and heat-acclimatized girls participated in the study and they were either in the AG (n=7, age= 8.7±1.3 yrs, body mass= 24.5±4.3Kg, body surface area (BSA)= 0.98±0.11m2) group or in the non-athletic -but physically active- control group (n=7, age=9.4±1.5 yrs, body mass= 26.5±5.1Kg, BSA= 1.02±0.13 m2). All girls cycled (55% of VO2max) for 30 minutes in heat (35oC and 40% RH) and thermoneutral (24°C and 50% RH) conditions, inside an environmental chamber. Tre and heart rate (HR) were measured every 5 minutes. To ensure the similarity of the relative intensity during exercise, VO2 was measured for 3 minutes from the minute 15th. Sweat volume was calculated by the Δ body mass corrected by the volume of water intake and expressed by BSA.
Tre was similar between athletes and non-athletes at each moment and the final Tre was 38.0°C±0.2 and 38.2±0.2°C in the heat, and 37.8±0.2ºC and 37.9 ± 0.2°C in thermoneutral environment. The magnitude of Tre increase was also similar between groups in both environmental conditions. Initial HR was lower in athletes (76±7 vs. 91±11bpm, p=0.01), but, during cycling it became similar between groups in both environmental conditions. Sweat volume (ml.m-2) was similar between AG athletes and non-athletes (respectively, 144±107 vs. 190±134 in the heat and 234±210 vs. 166±182 in thermoneutral).
Prepubescent AG athletes showed similar Tre and sweating responses compared to physically active girls during a continuous cycling at similar intensity either in the heat and thermoneutral conditions.

POSTER SESSION #04 (MODERATOR: AMÂNDIO CUPIDO-DOS-SANTOS)

ASSOCIATION BETWEEN SOMATIC MATURITY, PHYSICAL ACTIVITY AND BLOOD PRESSURE IN ADOLESCENTS FROM LONDRINA (BRAZIL)

Mariana Souza, Sandra Satie Kawagutti, Maiara Tadiotto, David Ohara, Danilo Rodrigues Pereira Silva, Edilson Cyrino, Romulo Araújo Fernandes, Enio Ricardo Vaz Ronque

Hypertension is considered, singly, as an important risk factor for development of cardiovascular disease. This fact becomes especially worrisome when high blood pressure (HBP) has already manifested itself in childhood and adolescence. In this period, which is characterized by several morphological, physiological and behavioral changes, the relationship between HBP and biological maturity remains to be investigated. The aim of this study was to analyze the association between somatic maturity and HBP in adolescents.
A total of 1121 adolescents of both sexes, aged 10 to 17 years, enrolled in public schools in the urban area of Londrina, Brazil were included in the study. As an indicator of somatic maturation, the age at peak height velocity (APHV) was used accordingto the recommendations of Mirwald et al. (2002). The adolescents were classified as early (boys: APHV<13,07;girls: APHV<11,70), on time (boys: 13,07<=APHV<=15,04; girls: 11,70<=APHV<=13,04) and late (boys: APHV>15,04; girls: APHV>13,04). The resting blood pressure was measured with an automatic device (OMRON-HEM-742), previously validated for this population. For classification, the normative tables recommended by the National High Blood Pressure Education Program (2004) were adopted as well asbeing the 90th percentile the cutoff point for the HBP. The questionnaire proposed by Baecke et al. (1982) was used as a tool for assessment of physical activity (PA). Binary logistic regression analysis was used to investigate the relationship between the main variables of the study, adjusted for PA (P <0.05).
No significant association between HBP and somatic maturity status was observed in boys early [OR=1.03(0.56-1.92)] and late[OR=0.52(0.25-1.10)] and girls in early [OR=0.78(0.38-1.58)]. On the other hand, girls classified with late maturity shown to have 65% less chance of having HBP than their peers with early maturity[0.35(0.16-0.78)].
Girls who have the APHV later showed a lower prevalence of HBP, regardless of PA level.

POSTER SESSION #04 (MODERATOR: AMÂNDIO CUPIDO-DOS-SANTOS)

VALIDITY OF ACCELEROMETER REGRESSION MODELS TO ESTIMATE METS IN ADOLESCENTS

David Ohara, Mariana Souza, Marcelo Romanzini, Danilo Rodrigues Pereira Silva, Antônio Carlos Dourado, Enio Ricardo Vaz Ronque, Fernando Adami, Edilson Cyrino

Advancements in technology have increased in both number and type of objective physical activity measurement devices including accelerometers. Accelerometers are lightweight electronic devices, able to measure and store accelerations in one to three axis. Nevertheless, the accelerometer output values, typically called “counts”, still remains without a biological meaning. Thereby, different cut-points of physical activity intensity and predictive energy expenditure equations have been published. We examined validity of two METs regression models of ActiGraph, the most widely used accelerometer.
Seventy-nine adolescents aged 10-15 years (40 boys and 39 girls) enrolled from 5th to 8th grades from a public school of Londrina (Southern Brazil) participated in the study.Oxygen uptake and accelerometer data were collected by Cosmed K4b2 (Cosmed, Rome, Italy) portable metabolic system and ActiGraph model GT3X accelerometer, respectively. The subjects used the accelerometer and the portable metabolic unit at rest and during eleven activities at different intensities. The rest period lasted 20 min and all other activities were performed for 5 min. Subjects rested for 5 min between each activity. MET score was computed by dividing VO2 (ml.kg.min-1) recorded in each activity by the VO2 (ml.kg.min-1) value obtained at rest. Two regression models were examined: Freedson et al.(1997) and Treuth et al.(2004). Root mean squared error (RMSE), bias with 95%CI and analysis of variance (ANOVA) for repeated measures (comparisons between measured and predicted MET values for activities) were used. Statistical significance was set at $P<0.05$.
The RMSE between measured and predicted MET values were greater for Freedson equation (1.7) than Treuth model (1.5). Both Freedson and Treuth regression models overestimated MET values for all activities (Bias 0.54, 95% CI -2.8,3.9) and (Bias 0.54, 95% CI -2.5,3.6) respectively. Significant differences ($P<0.05$) were found between both regression models vs. measured MET values, but did not between models.
Our results suggest that the regression models analyzed in this study are inadequate to estimate the MET values in adolescents aged 10-15 years. Despite the Treuth model have been developed only with girls, no significant differences were found when compared with the Freedson model which includes both sexes.

POSTER SESSION #04 (MODERATOR: AMÂNDIO CUPIDO-DOS-SANTOS)

CRITERION-RELATED VALIDITY OF THE 20-M SHUTTLE RUN TEST IN BRAZILIANS ADOLESCENTS AGED 11-13 YEARS

Mariana Biagi Batista, Gabriela Blasquez, Catiana Leila Possamai Romanzini, Edilson Cyrino, Manuel Coelho-e-Silva, Marcelo Romanzini, Enio Ricardo Vaz Ronque

The 20-m shuttle run test (SR-20m) (Léger et al., 1988) is widely used to investigate the cardiorespiratory fitness of young people, being recommended by several test batteries to evaluate this indicator in the juvenile population, such as EUROFIT (1988) and FITNESSGRAM (1999). The test has some advantages such as low cost, wide applicability, evaluation of various subjects simultaneously, evaluation in the school and training environment (Ruiz et al., 2009). Thus, the aim of this study was to verify the validity of the SR-20m test in Brazilian adolescents based on the direct spirometry method.

The sample consisted of 115 adolescents, 61 boys (12.25 ± 0.9 years) and 54 girls (12.06 ± 0.7 years) enrolled in a High School of Londrina, Paraná, Brazil. Adolescents performed the SR-20m test and the VO2peak was determined using the original equation proposed by Léger et al. (1988). Direct analysis of VO2 (reference method) was performed in laboratory with a portable gas analyzer (K4 b2, Cosmed) in treadmill protocol specific to this sample. The validity of the SR-20m test, by sex, was verified by analysis of variance for repeated measures, Pearson linear correlation coefficient and Bland and Altman analysis (1986), determining the comparison, correlation and concordance between methods, respectively.

The VO2peak measured by the reference method (boys: 49.94 ± 9.5 mL.kg-1.min-1 and girls: 42.18 ± 7.4 mL.kg-1.min-1) was different ($P < 0.05$) from values estimated by the SR-20m test (boys: 41.58 ± 4.2 mL.kg-1.min-1 and girls: 39.73 ± 3.1 mL.kg-1. min-1). The correlation coefficients found were classified as low for girls ($r = 0.49$) and moderate for boys ($r = 0.60$). Moreover, the method tested showed estimate bias, for boys (8.36 mL.kg-1.min-1) and girls (2.45 mL.kg-1.min-1) with wide concordance limits between VO2peak measured by the reference method and estimated by the SR-20m test.

The VO2peak estimated by the SR-20m test was considered different from the direct spirometry method and therefore should be used with caution, especially when the results are individually analyzed.

POSTER SESSION #04 (MODERATOR: AMÂNDIO CUPIDO-DOS-SANTOS)

ENERGY EXPENDITURE AND PHYSICAL ACTIVITY IN PORTUGUESE SIBLINGS

Daniel M. V. Santos, Thayse Natacha Gomes, Fernanda Karina dos Santos, Michele Caroline Souza, Raquel Nichele Chaves, Alessandra Borges, Sara Pereira, Rui Manuel Garganta, José António Ribeiro Maia

Moderate-to-high levels of energy expenditure (EE) and physical activity (PA) are known for their positive impact on health. Moreover, there is consistent evidence confirming the importance of family on determining PA habits. However, not many studies addressed the issue of sibling clustering in EE and/or PA, and the joint effects of age, birth order (BO), sex and body mass index (BMI) influencing their levels. This study addresses these issues.
We sampled 308 Portuguese sibling pairs: 101 males, 136 opposite-sex and 71 female pairs. EE (kcal/kg), moderate-to-vigorous PA (MVPA), low PA (LPA) and sedentary behavior (SB) expressed in minutes were assessed using the Bouchard 3-day dairy. Furthermore, BMI and BO were also assessed. Siblings´ correlations and modeling the joint effects of age, sex, BMI, and BO effects in EE and PA traits were done in S.A.G.E. software, using a mixed-model approach.
Siblings' correlations are significant ($p<0.01$) and varied from 0.220±0.063 (SB) to 0.329±0.057 (EE). On average, EE was greater in females (sex=-166.904±9.396, $p<0.001$) and in second born siblings (BO=11.459±0.698, $p<0.001$). Furthermore, EE increases with increasing age (age=73.965±0.681, $p<0.001$) and BMI (BMI=97.094±0.927, $p<0.001$). As for LPA, all covariates had a significant effect (sex=25.885±0.271, $p<0.001$; age=9.257±0.079, $p<0.001$; BMI=0.607±0.064, $p<0.001$; BO=-9.736±0.265, $p<0.001$). SB and MVPA decrease with increasing age (ageSB=-3.819±0.112, $p<0.001$; ageMVPA=-3.073±0.214, $p<0.001$) and BMI (BMISB=-1.052±0.040, $p<0.001$; BMIMVPA=-0.422±0.001, $p<0.001$).
Portuguese siblings share 22% to 32% of the total variance of EE and PA traits which is consistent with genetic epidemiology data. Surprisingly, females EE is greater, and birth order significantly distinguish within dyads EE and LPA, but not for SB and MVPA. BMI had a significant impact in all the traits, but different directions were observed as it was negative for SB and MVPA. The most important finding is that siblings' PA habits are correlated making family-based intervention programs the appropriate tool to increase health status through PA.

POSTER SESSION #04 (MODERATOR: AMÂNDIO CUPIDO-DOS-SANTOS)

THE ROLE OF SOCIAL COMPETENCE IN THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND MOTOR PERFORMANCE.

Britney Martin, John Dr. Hay, Brent Faught, Jian Liu, John Cairney, Miya Narushima

Lifestyle choices established in childhood are retained in adulthood, emphasizing the importance of establishing physical activity (PA) habits among children. Developmental Coordination Disorder (DCD) is a chronic and permanent condition where motor impairment interferes significantly with daily activities. Children with DCD have an activity deficit even among increasingly inactive Western populations. Socially competent children are more capable of having supportive friendships, which have been shown to aid in adopting active lifestyles. The role that social competence (SC) plays in the relationship between motor performance (MP) and PA is examined in the current research.
Children engaged in the Physical Health Activity Study Team(PHAST) study in Niagara Region of Ontario Canada were examined (n=1958, 50.2% males). PA was measured using the Participation Questionnaire, MP was established with the Bruininks-Oseretsky Test of Motor Proficiency - Short Form (BOTMP-SF) and SC using Harter's Self-Perception Scale. Multiple regression models were created by gender adjusting for known confounders (BMI, SES). Odds ratios (OR) were created with z scores (<0 vs >=0) used as PA and SC cut offs and BOTMP quartiles as high or low motor performance (reference= 3rd/4th BOTMP quartile with Harter z score >=0).
Both MP and SC are independent predictors of PA. Children with low MP and low SC were at significantly greater risk of having low PA (ORmales=3.4240; ORfemales=2.2274) with similar but lessened effects seen with high MP and low SC: ORmales=1.3988; ORfemales=2.0092). Males with low MP and high SC demonstrated no significant risk of low PA (ORmales=0.8328) while females with low MP and high SC displayed significant resilience to inactivity with an ORfemales=0.7306).
Social competence plays an important role in PA among children and appears to attenuate the risk of inactivity associated with low MP. Males low MP but high SC display no increased risk for inactivity. Females with high SC and low MP appear to be significantly less inactive than their low SC peers.
Activity promotion campaigns need to include an understanding of the role of SC among children at risk of low activity and recognize SC as an important factor in childhood (in)activity.

POSTER SESSION #04 (MODERATOR: AMÂNDIO CUPIDO-DOS-SANTOS)

PHYSICAL FITNESS IN OMANI CHILDREN WITH SICKLE CELL DISEASE AND SICKLE CELL TRAIT

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Sickle cell disease (SCD) and sickle cell trait (SCT) are the most common haematological diseases in Oman according to the national survey of genetic blood disorders. The aim of this study was to determine markers of physical fitness and anthropometrics indices in children with sickle cell disease and children with sickle cell trait and compare them with normal healthy children of the same age. One hundred and twenty male children participated in the present study divided to three groups: 40 with sickle disease (SCD; age, 13.3(.80), height, 131.9(3.5), mass, 29.2(3.1)); 40 with sickle cell trait (SCT; age, 12.2(.80), height, 141.0(9.9), mass, 38.0(4.4)); and 40 controls with normal haemoglobin (Con; age, 12.8(.80), height, 139.4(8.7), mass, 37.2(4.3)). All children completed a 5-min running exercise test on a treadmill at speed corresponding to 5 km/hr. Heart rate and was recorded during exercise and during 10-min of recovery. Blood lactate was measured before and 5 min after the completion of exercise.

Children with SCD exhibited a higher mean value ($P < 0.05$) for percent body fat and fat mass than the normal healthy subjects and SCT subjects. Resting values of haemoglobin were similar in SCT (11.04(.78)) and control (10.8(94)) groups, and lower in SCD (8.89(.54); $P < 0.05$). There were a strong correlation between peak heart rate and resting haemoglobin levels for the three groups ($r = -.472$. $n = 120$, $p < .0005$).The SCD group (175.2(10.3)) exhibited higher mean heart rate during exercise than those observed in the SCT (143.7(9.5)) and normal control children (144.5(22.4); $P < 0.05$). Additionally, SCD children showed higher serum lactate values before and after treadmill exercise compared to the other groups ($P < 0.05$).

Children with sickle cell trait demonstrate similar physical fitness level and similar exercise responses to treadmill stress test to normal children. In contrast, SCD children have lower body mass, higher fat mass and lower physical fitness than children with SCT and healthy controls