The role of childhood physical fitness on physical activity in mid-adulthood: A longitudinal study

Introduction

• Numerous environmental factors are thought to be related to adult physical activity (PA) including childhood and adolescent exercise/sport/physical fitness/physical activity

• Most studies cross-sectional

• Majority of childhood data is retrospective collected in adulthood

• Limited prospective data on the same individual across the lifespan linking childhood and adolescent fitness to adult PA
Saskatchewan Growth and Development Study (SGDS)

Conceived in 1963 by Dr W.A.R. Orban, Director of the School of Physical Education

Initiated 1964 – D.A. Bailey et al. recruiting 200, 7 year old boys (pure longitudinal)

1965 add 149 age cohort girls 7 to 17 yrs. (mixed-longitudinal)

Annual measurements through 1964 to 1973, 249 subject remained

Follow up visits in 1980 & 1998/99, 114 remained, 2009-2011, 80 remained

Ellis et al. 1975, Human Biology, 47:263-281
SGDS Purpose

to evaluate annually (May – Aug) changes in anthropometry and body composition
SGDS Purpose

to evaluate longitudinally changes in strength development
SGDS Purpose

to evaluate longitudinally changes in flexibility
SGDS Purpose

to evaluate longitudinally changes in aerobic power (VO\textsubscript{2} max)
SGDS 1963-1973

• to study the changes in these variables as they relate to physical activity, physiological performance and sociological and cultural factors

• to study the effect of physical activity and sport participation on the growth and development of children

(Missing values collected in 1980)
SGDS 1998 & 2010

- to examine the relationship of childhood and adolescent physical activity to adult health status and lifestyle behaviours
- 1998 male participants were 40 years of age and the females were 35 to 39 years of age
- 2009 male participants were 50 years of age and females 46 to 50 years of age
Purpose

To investigate the role of adolescent physical fitness (PF) on mid-adult (40 years of age) physical activity (PA)
SGDS participants measurement occasions
1963-1973
1980
1998 - 1999

Present Analysis
110 individuals measured on all occasions
67 males (48 ± 6 yrs) and 43 females (44 ± 7 yrs)
Methods

Adolescent Physical Fitness Measures

• Measures of cardiovascular endurance, muscular strength, muscular endurance, flexibility and body composition were used to produce a composite fitness score at each age.

• Adolescent age and sex specific z-scores for composite scores were calculated, summed and quartiled; low (bottom 25%), average (middle 50%), and high (top 25%) adolescent fitness.
Methods

Adult Physical Activity Measures

• PA at 40 years was assessed using a questionnaire developed from the Paffenbarger Physical Activity and the Seven-Day Physical Activity questionnaires to calculate a weekly MET score.

• Adult age and sex specific z-scores for PA were calculated
Results

Correlation

Adolescent Fit Score vs. Adult PA Z-score

$r = 0.01$, $p > 0.05$
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Adolescent Fit Z-Score vs. Adult PA Z-score

$r = 0.01$, $p > 0.05$
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ANOVA

Adult PA Z-score

Adolescent Fitness Z-score groups
Discussion

• Although it has been postulated that PF in adolescent may influence PA in middle age, this is not supported by the present data set.

• Previously in this cohort have shown $V_{o_2}$ max has low tracking between adolescence and middle age ($r=0.23$, $p<0.05$) (Van Oort et al. 2013 Ann Hum Biol, 40: 547-553)

• It is possible that the sample was too homogeneous both at adolescence and middle age.

• Alternatively, adult PA may be related to cumulative physical fitness throughout life and not just during adolescence
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