Hong Kong Association
of Sports Medicine and Sports Science
香港運動醫學及科學學會

香港浸會大學
HONG KONG BAPTIST UNIVERSITY

THE IMPORTANCE OF PHYSICAL FITNESS ON DEVELOPMENT, GROWTH AND HEALTH

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1960s

2016

Fitness Trends

- Baby boomers – Post-war population increased
- 1978 First “Fitness and health benefits of exercises” Position Statement by the American College of Sports Medicine
- 1990 ACSM Position Stand, “The Recommended Quantity and Quality of Exercise for Developing and Maintaining Fitness in Healthy Adults.”
- 1996 Physical Activity and Health: A Report of the Surgeon General.
- 2008 Comprehensive guidelines on physical activity for all Americans.
- Top 10 Fitness Trends Annual Survey by ACSM

Fitness Trends in 2016

2016	
1	Wearable technology
2	Body weight training
3	High-intensity interval training (HIIT)
4	Strength training
5	Educated, certified, and experienced fitness professionals
6	Personal training
7	Functional fitness
8	Fitness programs for older adults
9	Exercise and weight loss
10	Yoga

Definitions

Physical Activity, Exercise, and Physical Fitness: Definitions and Distinctions for Health-Related Research

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GREGORY M. CHRISTENSON, PhD

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Tearsheet requests to Dr. Caspersen.

Synopsis .....

"Physical activity," "exercise," and "physical fitness" are terms that describe different concepts. However, they are often confused with one another, and the terms are sometimes used interchangeably. This paper proposes definitions to distinguish them.

Physical activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure. The energy expenditure can be measured in kilocalories. Physical activity in daily life can be categorized into occupational, sports, conditioning, household, or other activities. Exercise is a subset of physical activity that is planned, structured, and repetitive and has as a final or an intermediate objective the improvement or maintenance of physical fitness. Physical fitness is a set of attributes that are either health- or skill-related. The degree to which people have these attributes can be measured with specific tests.

These definitions are offered as an interpretational framework for comparing studies that relate physical activity, exercise, and physical fitness to health.

Definitions

- Physical fitness is the capacity to perform physical activity, and makes reference to a full range of physiological and psychological qualities.
- Physical fitness consists of:

Health-related fitness – cardiorespiratory fitness, muscular strength & endurance, flexibility, body composition

Performance-related fitness – speed, power, agility, reaction, balance, etc.

Fitness test items used in LCSD

Physical Fitness Level

5.2.1 The mean values of body composition and fitness parameters were shown in the table below.

Age	7–9		10–12	
Parameters / Gender	Boys	Girls	Boys	Girls
Height (*cm*)	130.68	130.05	144.71	146.18
Weight (*kg*)	30.11	28.71	40.48	39.70
BMI (kg/m^2)	17.41	16.80	19.11	18.39
Seated height (*cm*)	70.26	69.88	75.79	77.25
Total Skinfold (Upper Arm + Calf) (*mm*)	23.50	24.45	27.10	27.55
Chest circumference (*cm*)	66.48	65.09	73.36	73.66
Resting Systolic BP (SBP, *mmHg*)	104.62	103.91	108.88	109.72
Resting Diastolic BP (DBP, *mmHg*)	63.97	64.20	66.51	67.36
Resting HR (*bpm*)	87.53	90.34	81.56	86.28
Sit-and-reach (*cm*)	1.13	3.84	-1.15	4.76
Hand Grip (*kg*)	23.21	21.30	32.88	32.80
1-min Sit-ups (*rep*)	17.07	16.02	22.09	21.53
Standing Long Jump (*cm*)	116.24	105.16	133.62	120.72
15m PACER (*turns*)	13.20	12.31	19.97	17.57

Definitions

* Physical activity is any bodily movement produced by muscle action that increases energy expenditure.
  - steps/day by pedometer
  - questionnaires

* Physical exercise refers to planned, structured, systematic and purposeful physical activity.

Cardiorespiratory Fitness

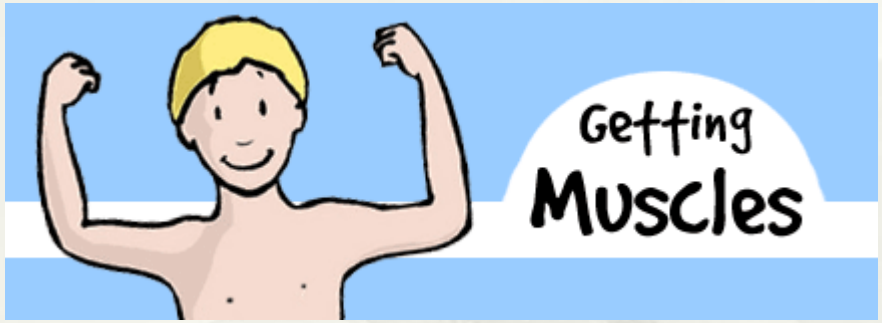
- Maximal aerobic power, is the overall capacity of the cardiovascular and respiratory systems and the ability carry out prolonged strenuous exercise.
- Maximal oxygen consumption (VO_2 max)
- the volume of oxygen consumed per unit of time relative to body mass ($mlO_2/kg/min$)

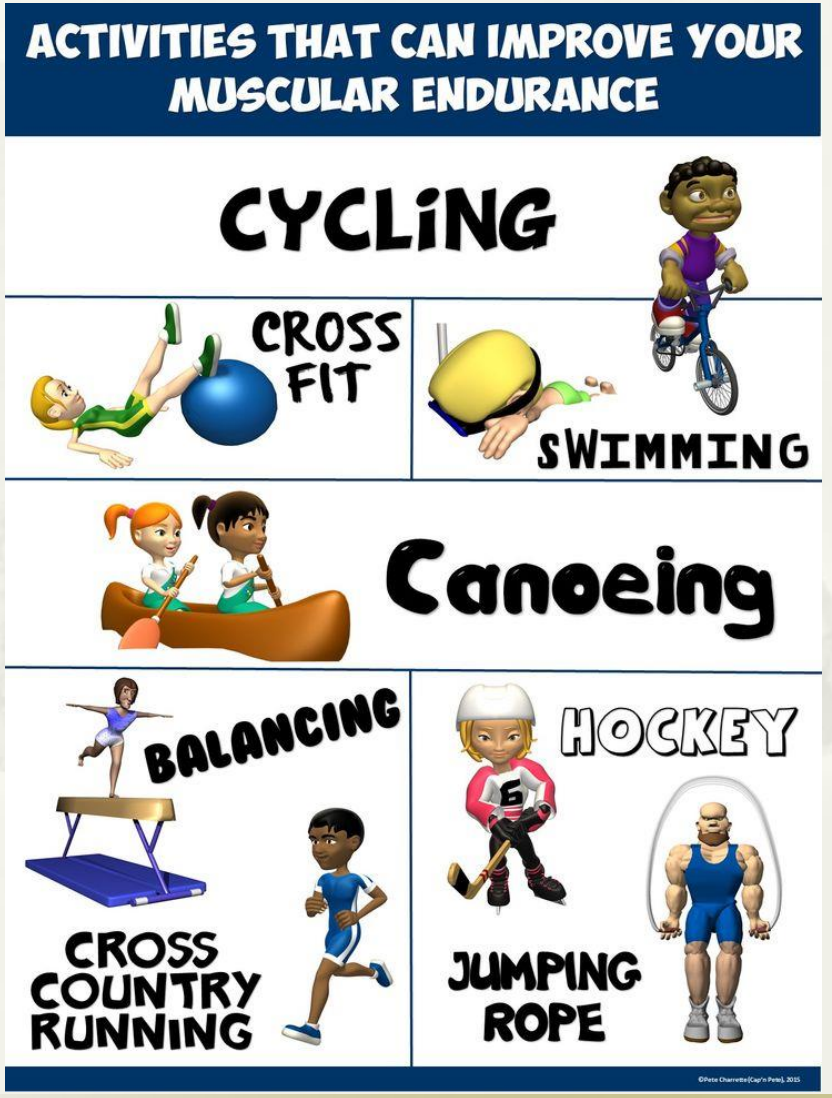
Cardiorespiratory Fitness

Muscular Fitness

- The capacity to carry out work against a resistance.
- Health-related muscular fitness components
  - Maximal strength (isometric and dynamic)
  - Explosive strength
  - Endurance strength
  - Isokinetic strength

Muscular Fitness





Systematic review of the health benefits of physical activity and fitness in school-aged children and youth

Ian Janssen*[1,2] and Allana G LeBlanc[1]

Abstract

Background: The purpose was to: 1) perform a systematic review of studies examining the relation between physical activity, fitness, and health in school-aged children and youth, and 2) make recommendations based on the findings.

Methods: The systematic review was limited to 7 health indicators: high blood cholesterol, high blood pressure, the metabolic syndrome, obesity, low bone density, depression, and injuries. Literature searches were conducted using predefined keywords in 6 key databases. A total of 11,088 potential papers were identified. The abstracts and full-text articles of potentially relevant papers were screened to determine eligibility. Data was abstracted for 113 outcomes from the 86 eligible papers. The evidence was graded for each health outcome using established criteria based on the quantity and quality of studies and strength of effect. The volume, intensity, and type of physical activity were considered.

Results: Physical activity was associated with numerous health benefits. The dose-response relations observed in observational studies indicate that the more physical activity, the greater the health benefit. Results from experimental studies indicate that even modest amounts of physical activity can have health benefits in high-risk youngsters (e.g., obese). To achieve substantive health benefits, the physical activity should be of at least a moderate intensity. Vigorous intensity activities may provide even greater benefit. Aerobic-based activities had the greatest health benefit, other than for bone health, in which case high-impact weight bearing activities were required.

Conclusion: The following recommendations were made: 1) Children and youth 5-17 years of age should accumulate an average of at least 60 minutes per day and up to several hours of at least moderate intensity physical activity. Some of the health benefits can be achieved through an average of 30 minutes per day. *[Level 2, Grade A]*. 2) More vigorous intensity activities should be incorporated or added when possible, including activities that strengthen muscle and bone *[Level 3, Grade B]*. 3) Aerobic activities should make up the majority of the physical activity. Muscle and bone strengthening activities should be incorporated on at least 3 days of the week *[Level 2, Grade A]*.

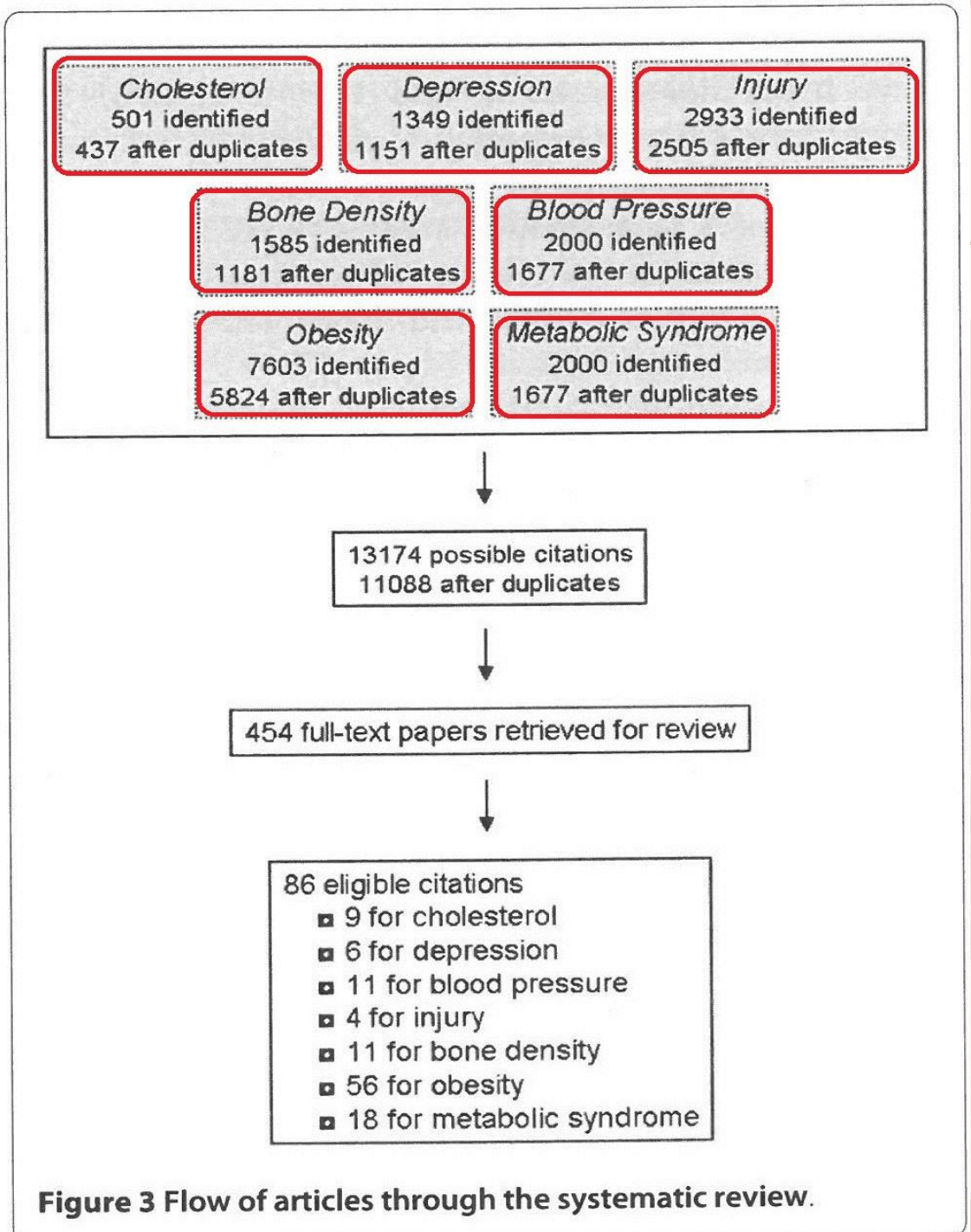


Figure 3 Flow of articles through the systematic review.

International Journal of Obesity (2008) 32, 1–11

0307-0565/08 $30.00
www.nature.com/ijo

PEDIATRIC REVIEW

Physical fitness in childhood and adolescence: a powerful marker of health

FB Ortega[1,2], JR Ruiz[1,2], MJ Castillo[1] and M Sjöström[2]

[1]*Department of Physiology, School of Medicine, University of Granada, Granada, Spain and* [2]*Department of Biosciences and Nutrition at NOVUM, Unit for Preventive Nutrition, Karolinska Institutet, Huddinge, Sweden*

This review aims to summarize the latest developments with regard to physical fitness and several health outcomes in young people. The literature reviewed suggests that (1) cardiorespiratory fitness levels are associated with total and abdominal adiposity; (2) both cardiorespiratory and muscular fitness are shown to be associated with established and emerging cardiovascular disease risk factors; (3) improvements in muscular fitness and speed/agility, rather than cardiorespiratory fitness, seem to have a positive effect on skeletal health; (4) both cardiorespiratory and muscular fitness enhancements are recommended in pediatric cancer patients/survivors in order to attenuate fatigue and improve their quality of life; and (5) improvements in cardiorespiratory fitness have positive effects on depression, anxiety, mood status and self-esteem, and seem also to be associated with a higher academic performance. In conclusion, health promotion policies and physical activity programs should be designed to improve cardiorespiratory fitness, but also two other physical fitness components such us muscular fitness and speed/agility. Schools may play an important role by identifying children with low physical fitness and by promoting positive health behaviors such as encouraging children to be active, with special emphasis on the intensity of the activity.

International Journal of Obesity (2008) **32**, 1–11; doi:10.1038/sj.ijo.0803774; published online 4 December 2007

Keywords: fitness; health; adiposity; cardiovascular disease risk factors; bone; children

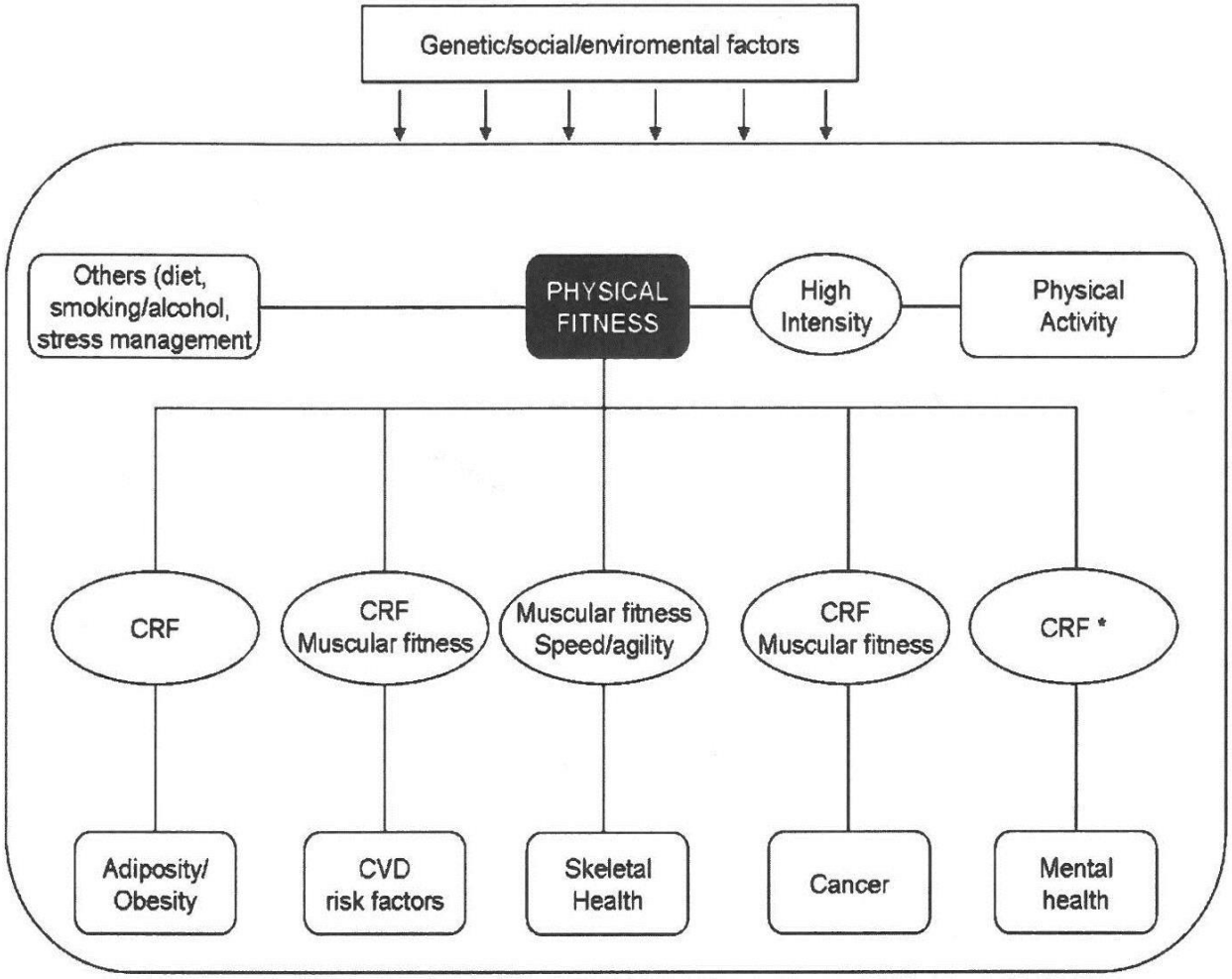


Figure 5 Associations between physical fitness and several health outcomes, showing the main health-related physical fitness components involved in those associations. * No information has been found about the other fitness components.

Physical Fitness and Adiposity

- Cardiorespiratory fitness has shown a stronger association with total adiposity
- Longitudinal data have shown a significant relationship between adolescent cardiorespiratory fitness and later body fatness
- Inverse association with cardiorespiratory fitness and visceral & abdominal subcutaneous adipose tissue

Muscular Fitness & CVD risk factors

* Inverse relationship between muscular fitness and CVD risk factors:
  - max handgrip strength
  - explosive strength
  - endurance
  - LDL (bad cholesterol)

Physical Fitness & Skeletal Health

- Extra gains in bone mass during growth to achieve a high peak bone mass and to prevent osteoporotic fractures later in life
- Strong evidence indicating that adolescent physical activity is related to bone health at the age and also in later life

Physical Fitness & Cancer

- Leukemia is the most common childhood cancer
- Supervised exercise program has the potential to improve children's quality of life and overall health status during treatment periods.

Physical Fitness & Mental Health

- Strong evidence suggesting that physical activity improves mental health in young people
- Possible explanations:
  - increased physical fitness → enhance body image
  - May have a direct effect on neurochemicals in the brain, e.g. serotonin, endorphins that function to elevate mood

Ho et al. BMC Pediatrics (2015) 15:48
DOI 10.1186/s12887-015-0365-0

BMC Pediatrics

RESEARCH ARTICLE Open Access

Physical activity improves mental health through resilience in Hong Kong Chinese adolescents

Frederick Ka Wing Ho[1], Lobo Hung Tak Louie[2], Chun Bong Chow[1], Wilfred Hing Sang Wong[1] and Patrick Ip[1,3*]

Abstract

Background: Adolescent mental health problems are global public health concern. Primary prevention through physical activity (PA) has been suggested as a potential approach to tackling this problem. Studies in Western countries have provided some evidence of a relationship between PA and adolescent mental health, but the evidence in China is not sufficient. Furthermore, the mechanism behind this relationship has not been empirically tested. The present study aimed at testing the association between PA and mental well-being of Chinese adolescents and to investigate whether a psychological (self-efficacy and resilience) and social (school and family connectedness) mediation model is valid to explain such a relationship.

Methods: A total of 775 Chinese students in Grades 7 and 8 were recruited in this cross-sectional study. The participants were given questionnaires to assess their PA level, mental well-being, and the potential mediators. Path models were used to analyse the association between PA and mental well-being, and the roles of potential mediators.

Results: The PA level was significantly correlated with the adolescent's mental well-being ($r = 0.66$, $p < 0.001$), self-efficacy ($r = 0.21$, $p < 0.001$), and resilience ($r = 0.25$, $p < 0.001$), but not with school connectedness ($r = 0.05$, $p = 0.15$) or family connectedness ($r = 0.06$, $p = 0.13$). After adjusting for potential confounders in the path model, the PA level was significantly associated with mental well-being ($b = 0.52$, $p < 0.001$), and resilience was the only significant mediator ($b = 0.31$, $p < 0.001$), which contributed to 60% of this relationship.

Conclusions: There was a significant positive association between the PA level and mental well-being of Chinese adolescents. Resilience mediated the majority of this relationship. Promoting physical activities that build up resilience could be a promising way to improve adolescent mental health.

Sports Med (2014) 44:1209–1223
DOI 10.1007/s40279-014-0196-4

REVIEW ARTICLE

The Health Benefits of Muscular Fitness for Children and Adolescents: A Systematic Review and Meta-Analysis

Jordan J. Smith · Narelle Eather · Philip J. Morgan · Ronald C. Plotnikoff · Avery D. Faigenbaum · David R. Lubans

Published online: 1 May 2014

Abstract

Background Physical fitness during childhood and adolescence has been identified as an important determinant of current and future health status. While research has traditionally focused on the association between cardio-respiratory fitness and health outcomes, the association between muscular fitness (MF) and health status has recently received increased attention.

Objective The aim of this systematic review and meta-analysis was to evaluate the potential physiological and psychological benefits associated with MF among children and adolescents.

Methods A systematic search of six electronic databases (PubMed, SPORTDiscus, Scopus, EMBASE, PsycINFO and OVID MEDLINE) was performed on the 20th May, 2013. Cross-sectional, longitudinal and experimental studies that quantitatively examined the association between MF and potential health benefits among children and adolescents were included. The search yielded 110 eligible studies, encompassing six health outcomes (i.e., adiposity, bone health, cardiovascular disease [CVD] and metabolic risk factors, musculoskeletal pain, psychological health and cognitive ability). The percentage of studies reporting statistically significant associations between MF and the outcome of

Table 1 Summary of studies examining the association between health benefits and muscular fitness

Benefits	Associated with MF References	Not associated with MF References	Summary coding n/N for benefit (%)	 Association (+/−)
Physiological benefits				
Adiposity				
Total	[39, 50, 60, 70, 74–77, 81–83, 99, 130–160], 192, 193]	[161–165]	45/50 (90)	− −
Central	[50, 56, 57, 74–76, 99, 135, 143, 158]	[39, 60, 161, 166]	10/14 (71)	− −
Bone health	[33, 51, 53, 54, 94, 167–173]	[52, 55, 174–176]	12/17 (71)	+ +
CVD and metabolic risk factors	[30, 32, 39, 56–62, 99, 177–180]	[74, 75, 181–183]	15/20 (75)	− −
Musculoskeletal pain	[64, 66, 109, 184–189]	[65, 73, 108, 110, 190, 191]	9/15 (60)	?
Psychological and cognitive benefits				
Self-esteem	[69–73]	[49]	5/6 (83)	+ +
Cognitive ability	[35, 117, 118]	[119–121]	3/6 (50)	?

CVD cardiovascular disease, *MF* muscular fitness, *n/N* number of studies reporting a statistically significant finding/total number of studies reporting on the benefit

+ + strong evidence of a positive association, − − strong evidence of an inverse association, ? inconsistent/uncertain

Muscular Fitness: Conclusions

- Strong evidence for a positive association between muscular fitness and bone health, and self-esteem
- Strong evidence of an inverse association between muscular fitness and total and central adiposity, and CVD and metabolic risk factors

Physical activity and clustered cardiovascular risk in children: a cross-sectional study (The European Youth Heart Study)

Lars Bo Andersen, Maarike Harro, Luis B Sardinha, Karsten Froberg, Ulf Ekelund, Søren Brage, Sigmund Alfred Anderssen*

Background Atherosclerosis develops from early childhood; physical activity could positively affect this process. This study's aim was to assess the associations of objectively measured physical activity with clustering of cardiovascular disease risk factors in children and derive guidelines on the basis of this analysis.

Methods We did a cross-sectional study of 1732 randomly selected 9-year-old and 15-year-old school children from Denmark, Estonia, and Portugal. Risk factors included in the composite risk factor score (mean of Z scores) were systolic blood pressure, triglyceride, total cholesterol/HDL ratio, insulin resistance, sum of four skinfolds, and aerobic fitness. Individuals with a risk score above 1 SD of the composite variable were defined as being at risk. Physical activity was assessed by accelerometry.

Findings Odds ratios for having clustered risk for ascending quintiles of physical activity (counts per min; cpm) were 3·29 (95% CI 1·96–5·52), 3·13 (1·87–5·25), 2·51 (1·47–4·26), and 2·03 (1·18–3·50), respectively, compared with the most active quintile. The first to the third quintile of physical activity had a raised risk in all analyses. The mean time spent above 2000 cpm in the fourth quintile was 116 min per day in 9-year-old and 88 min per day in 15-year-old children.

Interpretation Physical activity levels should be higher than the current international guidelines of at least 1 h per day of physical activity of at least moderate intensity to prevent clustering of cardiovascular disease risk factors.

M. S. Sothern · M. Loftin · R. M. Suskind · J. N. Udall · U. Blecker

The health benefits of physical activity in children and adolescents: implications for chronic disease prevention

Received: 25 November 1998 / Accepted: 25 November 1998

Abstract Clinical, epidemiological and basic research evidence clearly supports the inclusion of regular physical activity as a tool for the prevention of chronic disease and the enhancement of overall health. In children, activities of a moderate intensity may enhance overall health, and assist in preventing chronic disease in at-risk youth. The numerous health benefits of regular exercise are dependent on the type, intensity and volume of activity pursued by the individual. These benefits include reduction of low density lipoproteins while increasing high density lipoprotein; improvement of glucose metabolism in patients with type II diabetes; improved strength, self esteem and body image; and reduction in the occurrence of back injuries. In addition, a progressive, moderate-intensity exercise program will not adversely effect the immune system and may have a beneficial effect on the interleukin-2/natural killer cell system. Furthermore, by decreasing sedentary behaviors and, thus, increasing daily physical activity, individuals may experience many stress-reducing benefits, which may enhance the immune system.

Conclusion Moderate intensity exercise of a non-structured nature seems to facilitate most of the disease prevention goals and health promoting benefits. With new guidelines promoting a less intense and more time-efficient approach to regular physical activity, it is hoped that an upward trend in the physical activity patterns, and specifically children at risk for chronic disease, will develop in the near future.

Sports Med 2006; 36 (12): 1019-1030
0112-1642/06/0012-1019/$39.95/0

Adolescent Physical Activity and Health

A Systematic Review

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2 Childhood Nutrition Research Centre, Institute of Child Health, London, UK

Contents

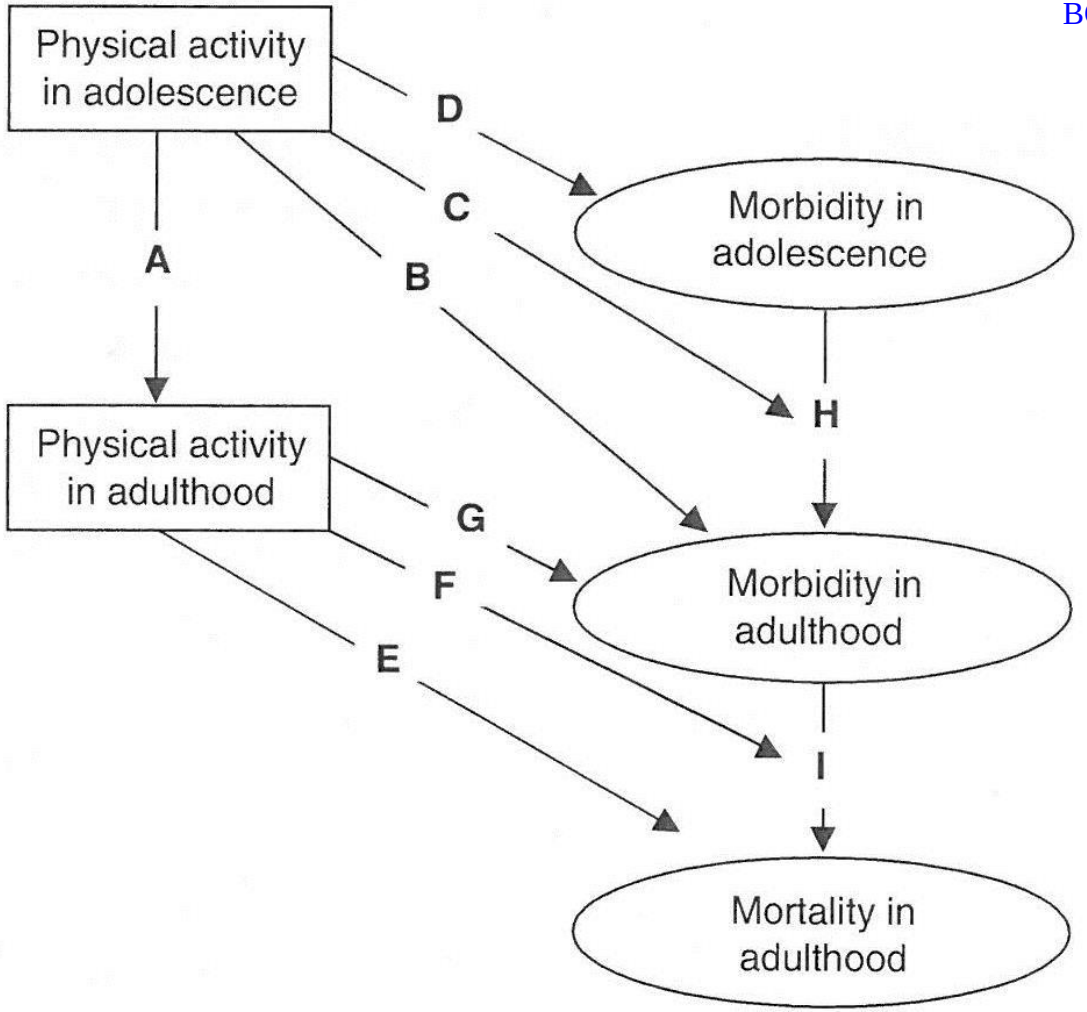

Fig. 1. The association between adolescent physical activity and health: possible pathways. The proposed mechanisms include four direct effects (pathways A–D) and three indirect effects (pathways E–G).

Contents lists available at ScienceDirect

Psychology of Sport and Exercise

journal homepage: www.elsevier.com/locate/psychsport

Modeling relationships between physical fitness, executive functioning, and academic achievement in primary school children

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Center for Human Movement Sciences, University of Groningen, University Medical Center Groningen, The Netherlands

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School performance
Preadolescent

ABSTRACT

Objectives: The relationship between physical fitness and academic achievement in children has received much attention, however, whether executive functioning plays a mediating role in this relationship is unclear. The aim of this study therefore was to investigate the relationships between physical fitness, executive functioning, and academic achievement, more specifically to test whether the relationship between physical fitness and academic achievement is direct or indirect, via executive functioning.
Design: Cross-sectional.
Method: This study examined 263 children (145 boys, 118 girls), aged 7–12 years, who performed tests on physical fitness, executive functioning, and academic achievement.
Results: In a structural equation model linking physical fitness to executive functioning and academic achievement there was a significant relationship between physical fitness and executive functioning ($r = .43$, $R^2 = .19$) and academic achievement ($r = .33$, $R^2 = .11$). Adding a relationship from executive functioning to academic achievement resulted in a non-significant direct link between physical fitness and academic achievement ($r = -.08$, $R^2 = .006$). However, a significant indirect relation through executive functioning persisted. The indirect relation between fitness and academic achievement ($r = .41$), was stronger than both the direct and total relation ($r = .33$).
Conclusion: Executive functioning thus served as a mediator in the relation between physical fitness and academic achievement. This highlights the importance of including executive functioning when studying the relationship between physical fitness and academic achievement in children.

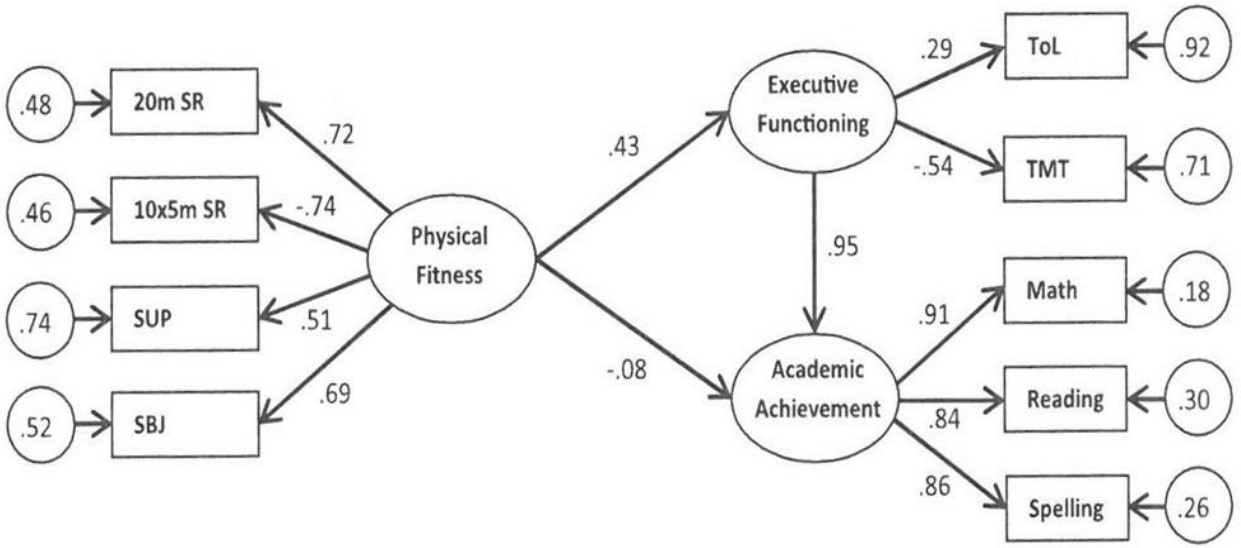

Fig. 1. The estimated structural Model 2 (the direct and indirect effect of physical fitness on academic achievement). 20 m SR = 20-meter shuttle run, 10 × 5 m SR = 10 × 5 m shuttle run, SUP = sit-ups, SBJ = standing broad jump, ToL = Tower of London, TMT = Trailmaking test, Math = mathematics.

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

Review

The association between school-based physical activity, including physical education, and academic performance: A systematic review of the literature ☆,☆☆

Catherine N. Rasberry [a,*], Sarah M. Lee [a], Leah Robin [a], B.A. Laris [b], Lisa A. Russell [b], Karin K. Coyle [b], Allison J. Nihiser [a]

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[b] ETR Associates, 4 Carbonero Way, Scotts Valley, CA 95066, USA

ARTICLE INFO

Available online 1 February 2011

Keywords:
Physical activity
Physical education
Recess
Academic achievement

ABSTRACT

Objective. The purpose of this review is to synthesize the scientific literature that has examined the association between school-based physical activity (including physical education) and academic performance (including indicators of cognitive skills and attitudes, academic behaviors, and academic achievement).

Method. Relevant research was identified through a search of nine electronic databases using both physical activity and academic-related search terms. Forty-three articles (reporting a total of 50 unique studies) met the inclusion criteria and were read, abstracted, and coded for this synthesis. Findings of the 50 studies were then summarized.

Results. Across all the studies, there were a total of 251 associations between physical activity and academic performance, representing measures of academic achievement, academic behavior, and cognitive skills and attitudes. Slightly more than half (50.5%) of all associations examined were positive, 48% were not significant, and 1.5% were negative. Examination of the findings by each physical activity context provides insights regarding specific relationships.

Conclusion. Results suggest physical activity is either positively related to academic performance or that there is not a demonstrated relationship between physical activity and academic performance. Results have important implications for both policy and schools.

Youth Strength Training: Facts and Fallacies

* American College of Sports Medicine (2012)
* by Avery D. Faigenbaum, Ed.D., FACSM

(http://acsm.org/public-information/articles/2012/01/13/youth-strength-training-facts-and-fallacies)

Myth: Strength training is unsafe for children.

- Fact: The risks associated with strength training are not greater than other sports and activities in which children regularly participate.
- However, the key is to provide qualified supervision, age-specific instruction and a safe training environment because, as in many sports, accidents can happen if children do not follow established training guidelines.
- Children should not use strength training equipment at home without supervision from a qualified professional

Myth: Strength training will stunt the growth of children.

Fact: There is no current evidence to indicate a decrease in stature in children who regularly strength train in a supervised environment with qualified instruction.

In all likelihood, participation in weight-bearing physical activities (including strength training) will have a favorable influence on growth at any stage of development but will not affect a child's genetic height potential.

Myth: Children will experience bone growth plate damage as a result of strength training.

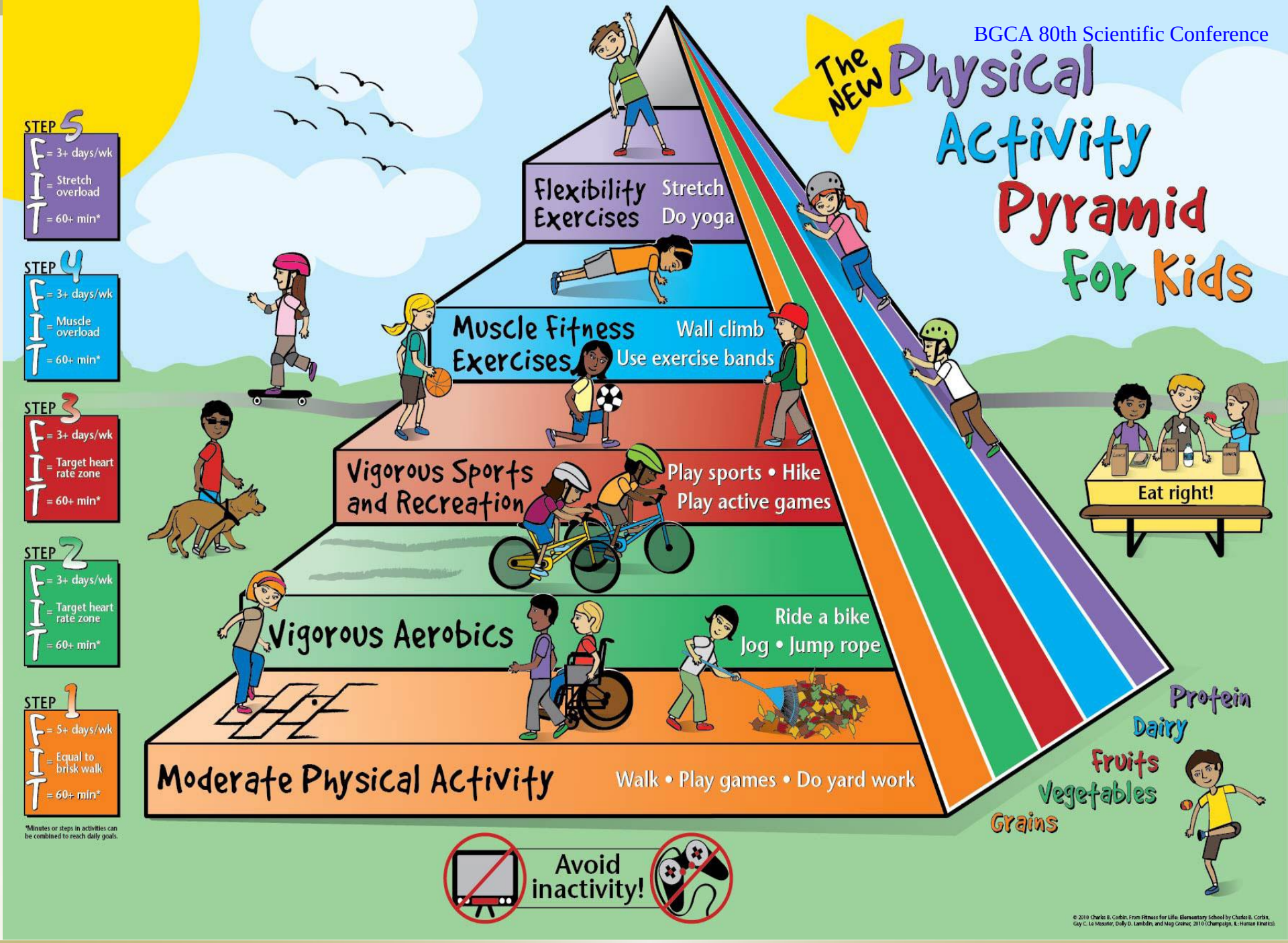
* Fact: A growth plate fracture has not been reported in any research study that was competently supervised and appropriately designed.
* Nonetheless, youth coaches, physical education teachers and fitness instructors must be aware of the inherent risk associated with strength training and should attempt to decrease this risk by following established training guidelines.

Myth: Children cannot increase strength because they do not have enough testosterone.

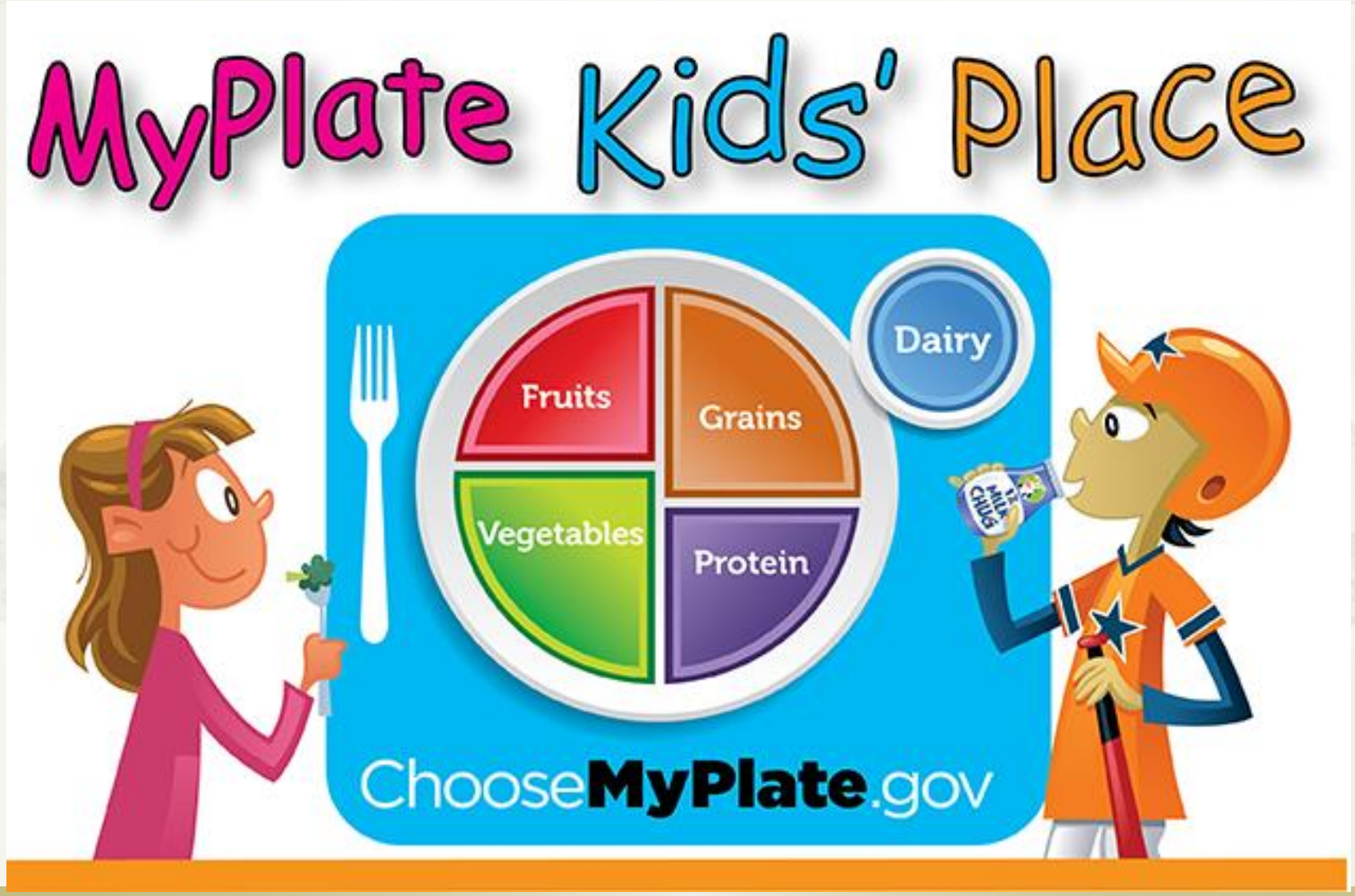
- Fact: Testosterone is not essential for achieving strength gains, as evidenced by women and elderly individuals who experience impressive gains in strength even though they have little testosterone.
- When compared on a relative or percent basis, training-induced strength gains in children are comparable to those in adolescents and adults.

Myth: Strength training is only for young athletes.

- Fact: While regular participation in a strength training program can enhance the performance of young athletes and reduce their risk of sports-related injuries, boys and girls of all abilities can benefit from strength training.
- Strength training can enhance the bone mineral density of girls, decreasing their risk of developing osteoporosis, and can spark an interest in physical activity in overweight children who tend to dislike prolonged periods of aerobic exercise.
- Due to individual differences in fitness experience and training goals, an advanced strength training program for a young athlete would be inappropriate for an inactive child who should be given an opportunity to learn proper exercise technique and experience the mere enjoyment of strength exercise.


The NEW Physical Activity Pyramid for Kids
STEP 5
F = 3+ days/wk
I = Stretch overload
T = 60+ min*
STEP 4
F = 3+ days/wk
I = Muscle overload
T = 60+ min*
STEP 3
F = 3+ days/wk
I = Target heart rate zone
T = 60+ min*
STEP 2
F = 3+ days/wk
I = Target heart rate zone
T = 60+ min*
STEP 1
F = 5+ days/wk
I = Equal to brisk walk
T = 60+ min*
*Minutes or steps in activities can be combined to reach daily goals.
Flexibility Exercises
Stretch
Do yoga
Muscle Fitness Exercises
Wall climb
Use exercise bands
Vigorous Sports and Recreation
Play sports • Hike
Play active games
Vigorous Aerobics
Ride a bike
Jog • Jump rope
Moderate Physical Activity
Walk • Play games • Do yard work
Eat right!
Protein
Dairy
Fruits
Vegetables
Grains
Avoid inactivity!
© 2010 Charles B. Corbin. From Fitness for Life: Elementary School by Charles B. Corbin, Guy C. Le Masurier, Dolly D. Lambdin, and Meg Greiner, 2010 (Champaign, IL: Human Kinetics).

Nutrition


MyPlate Kids' Place
Fruits
Grains
Vegetables
Protein
Dairy
ChooseMyPlate.gov

Physical Activity Guideline Children aged 2 – 5

- Accumulate at least 180 minutes (i.e. 3 hours) of physical activity (which can be split into several bouts) daily;
- Engage in everyday physical activity of different types and intensity levels (light, moderate and vigorous).

Physical Activity Guidelines
Children aged 5 - 17

- Children and youth should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity every day.
- Performing more than 60 minutes of physical activity daily provides additional health benefits.
- Most of the daily physical activity should be aerobic.
- The activity plan should incorporate vigorous-intensity activity, including muscle-strengthening and bone-strengthening activity, at least 3 times per week.

Body weight status by Age (Hong Kong)

表1 按年齡組別劃分的體重狀況

Table 1 Weight status by age group

	過輕 Underweight (%)	正常 Normal (%)	過重 Overweight (%)	肥胖 Obese (%)	總計 Total (%)
幼兒 Infants	19.4	67.1	9.3	4.2	100.0
兒童 Children	8.8	64.3	19.5	7.4	100.0
青少年 Adolescents	18.2	67.8	10.3	3.7	100.0
年輕成人 Young adults	10.9	51.2	15.9	22.1	100.0
中年人 Middle-aged adults	2.8	40.3	23.8	33.1	100.0
長者 Elderly	4.2	34.4	24.0	37.5	100.0

註釋：由於四捨五入關係，個別數字加起來可能不等於100%。 Note: Figures may not add up to 100% due to rounding.

Weight status by Gender & Age

表2 按性别及年齡組別劃分的體重狀況

Table 2 Weight status by gender and age group

	過輕 Underweight		正常 Normal		過重 Overweight		肥胖 Obese	
	男 Male (%)	女 Female (%)	男 Male (%)	女 Female (%)	男 Male (%)	女 Female (%)	男 Male (%)	女 Female (%)
幼兒 Infants	19.3	19.5	67.8	66.4	7.5	11.2	5.5	2.9
兒童 Children	7.8	9.9	61.5	67.2	20.5	18.3	10.1	4.5
青少年 Adolescents	15.5	21.0	66.1	69.6	13.2	7.4	5.3	2.1
年輕成人 Young adults	6.8	14.0	39.1	60.1	19.3	13.3	34.8	12.6
中年人 Middle-aged adults	2.1	3.5	31.4	48.1	26.2	21.7	40.3	26.7
長者 Elderly	5.4	3.0	31.7	37.1	28.7	19.1	34.2	40.8

註釋：由於四捨五入關係，個別數字加起來可能不等於100%。

Note: Figures may not add up to 100% due to rounding.

Physical Activity by Gender & Age

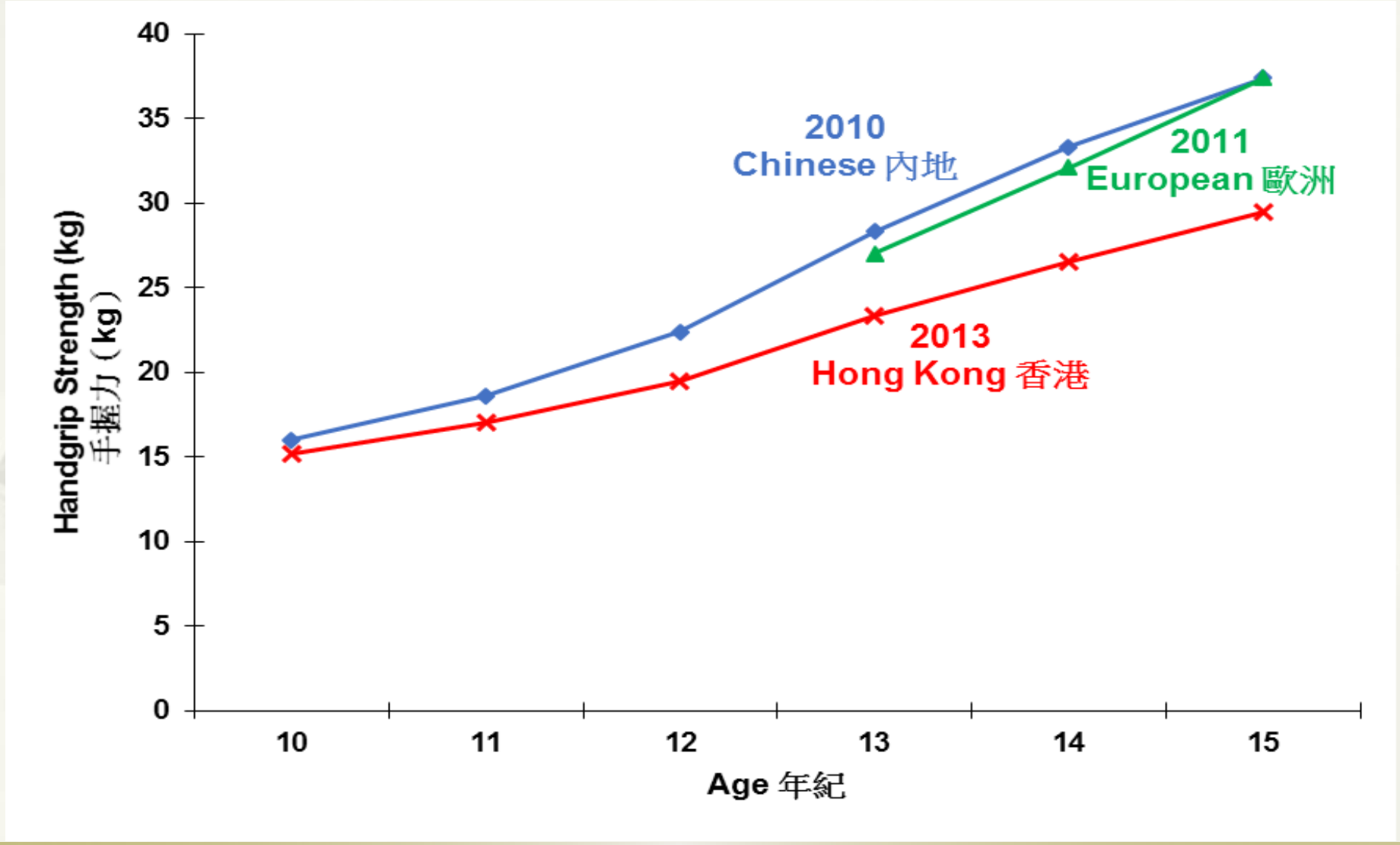
Category (with modification)		P.A. Level	Boys (%)	Girls (%)	Total (%)
III	Active	Accumulation of at least 60 minutes moderate-or-above intensity P.A. everyday in a week in which any three days involved with vigorous intensity P.A.	12.8	4.2	8.4
II	Some active	Accumulation of at least 10 minutes but less than 60 minutes moderate-or-above intensity P.A. everyday in a week	47.6	41.9	44.7
I	Sedentary	Accumulation of less than 10 minutes moderate-or-above intensity P.A. everyday in a week	39.6	53.9	46.9

High Blood Pressure

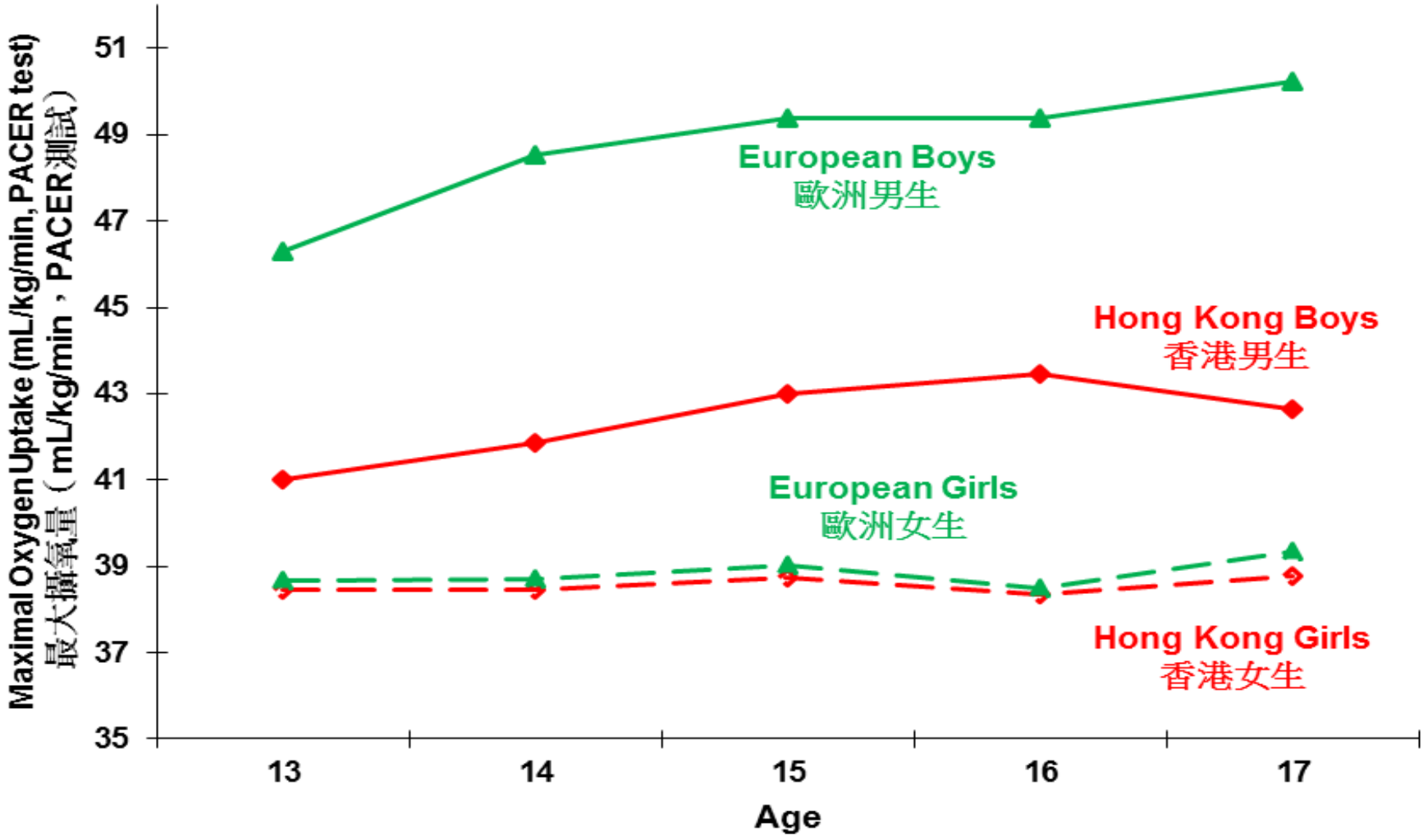
6.2.3 According to SBP ≥ 140*mmHg* or / and DBP ≥ 90*mmHg*, 7.5% of boys and 1.2% of girls were identified with the risk of hypertension [remarks 4] (see the table below).

High Blood Pressure Symptom	SBP ≥140*mmHg* **or / and** DBP ≥ 90*mmHg*		
Age	Boys (%)	Girls (%)	Total (%)
13–15	3.4	1.4	2.4
16–19	10.3	1.1	5.8
Total	7.5	1.2	4.4

Handgrip strength of Hong Kong boys compared with Mainland and European data (Ip et al, HKU; 2015)



Cardiopulmonary fitness of Hong Kong adolescents compared with European data



Evaluating a Model of Parental Influence on Youth Physical Activity

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Objective: To test a conceptual model linking parental physical activity orientations, parental support for physical activity, and children's self-efficacy perceptions with physical activity participation.

Participants and Setting: The sample consisted of 380 students in grades 7 through 12 (mean age, 14.0±1.6 years) and their parents. Data collection took place during the fall of 1996.

Main Outcome Measures: Parents completed a questionnaire assessing their physical activity habits, enjoyment of physical activity, beliefs regarding the importance of physical activity, and supportive behaviors for their child's physical activity. Students completed a 46-item inventory assessing physical activity during the previous 7 days and a 5-item physical activity self-efficacy scale. The model was tested via observed variable path analysis using structural equation modeling techniques (AMOS 4.0).

Results: An initial model, in which parent physical activity orientations predicted child physical activity via parental support and child self-efficacy, did not provide an acceptable fit to the data. Inclusion of a direct path from parental support to child physical activity and deletion of a nonsignificant path from parental physical activity to child physical activity significantly improved model fit. Standardized path coefficients for the revised model ranged from 0.17 to 0.24, and all were significant at the $p<0.0001$ level.

Conclusions: Parental support was an important correlate of youth physical activity, acting directly or indirectly through its influence on self-efficacy. Physical activity interventions targeted at youth should include and evaluate the efficacy of individual-level and community-level strategies to increase parents' capacity to provide instrumental and motivational support for their children's physical activity.

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BMC Public Health

RESEARCH ARTICLE Open Access

Exploring associations between parental and peer variables, personal variables and physical activity among adolescents: a mediation analysis

Maïté Verloigne[1*], Jenny Veitch[2], Alison Carver[2], Jo Salmon[2], Greet Cardon[1], Ilse De Bourdeaudhuij[1] and Anna Timperio[2]

Abstract

Background: This study aimed to investigate how parental and peer variables are associated with moderate- to-vigorous intensity physical activity (MVPA) on week- and weekend days among Australian adolescents (13-15y), and whether perceived internal barriers (e.g. lack of time), external barriers (e.g. lack of others to be physically active with) and self-efficacy mediated these associations.

Methods: Cross-sectional data were drawn from the Health, Eating and Play Study, conducted in Melbourne, Australia. Adolescents (mean age = 14.11 ± 0.59 years, 51% girls) and one of their parents completed a questionnaire and adolescents wore an ActiGraph accelerometer for a week (n = 134). Mediating effects of perceived barriers and self-efficacy were tested using MacKinnon's product-of-coefficients test based on multilevel linear regression analyses.

Results: Parental logistic support was positively related to MVPA on weekdays ($\tau = 0.035$) and weekend days ($\tau = 0.078$), peer interest ($\tau = 0.036$) was positively related to MVPA on weekdays, and parental control ($\tau = -0.056$) and parental concern ($\tau = -0.180$) were inversely related to MVPA on weekdays. Internal barriers significantly mediated the association between parental logistic support and MVPA on weekdays (42.9% proportion mediated). Self-efficacy and external barriers did not mediate any association.

Conclusions: Interventions aiming to increase adolescents' MVPA should involve parents, as parental support may influence MVPA on weekdays by reducing adolescents' perceived internal barriers. Longitudinal and experimental research is needed to confirm these findings and to investigate other personal mediators.

Keywords: Physical activity, Adolescent, Parents, Peers, Self-efficacy, Barriers, Accelerometer

Benefits of physical activity for young children

Physical:

- ✓ Promoting the growth of muscles and bones
- ✓ Promoting cardio-respiratory endurance
- ✓ Enhancing immunity
- ✓ Developing motor skills in preparation for engagement in sports activities in later years
- ✓ Preventing chronic diseases such as hypertension, obesity, cardiovascular diseases and type 2 diabetes mellitus

Benefits of physical activity for young children

Psychological :

- ✓ Building up self-confidence and self-esteem
- ✓ Learning and building of sportsmanship
- ✓ Enhancing willpower and perseverance
- ✓ Shaping the sense of self-worth
- ✓ Learning to control emotions
- ✓ Relieving anxiety and pressure

Benefits of physical activity for young children

Social :

- ✓ Strengthening communication and presentation skills
- ✓ Promoting creativity and imagination
- ✓ Developing a sense of responsibility
- ✓ Learning to observe rules and respect others

Summary

- Physical fitness is a multi-dimensional construct that includes skills and health related components, of which cardiorespiratory fitness (CRF) and muscular fitness in particular are powerful determinants of health in youth.
- Substantial evidence indicates that children's physical fitness levels are markers of their lifestyles and their cardio-metabolic health profile and are predictors of the future risk of chronic diseases, such for obesity, cardiovascular disease, skeletal health and mental health.
- Physical fitness is also inversely associated with metabolic risk and is a valuable part of health monitoring in children and adults.

Overcoming Common Barriers for Being Physically Active in Children

* Prolonged sitting and screen time*
* Lack of Time/Academic pressure
* Lack of Motivation
* Lack of Energy/Feeling Tired
* Lack of Companion
* Lack of Skills or Resources
* Parental attitude/support*
* School support
* Community/Facilities

THE MORE THEY BURN THE BETTER THEY LEARN

YOUR CHILD | AMOUNT OF ACTIVITY | VARIOUS ACTIVITIES | ACADEMIC ACHIEVEMENT

Did you know that kids who are physically active get better grades?

Research shows that students who earn mostly **A**s are almost twice as likely to get regular physical activity than students who receive mostly **D**s and **F**s.

Physical activity can help students focus, improve behavior and boost positive attitudes. Do what you can to help your child be physically active, be it running, biking or swimming. Any type of physical activity is good, and 60 minutes a day is best. Their grades will thank you!

CDC

FOR MORE INFORMATION, VISIT
MakingHealthEasier.org/BurnToLearn

SOURCES | CDC. Physical inactivity and Unhealthy Dietary Behaviors and Academic Achievement.
CDC. The association between school based physical activity, including physical education, and academic performance. Atlanta, GA: U.S. DHHS, 2010.

ACTIVE KIDS

Couch Potato Today, Wheelchair Tomorrow !


Q
A