

Exercise and Physical Activity for All Ages:

2012 Research and ACSM/ADA Prediabetes & Diabetes Guidelines

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AGENDA

Overview

Recent important clinical exercise trials

ACSM/ADA physical activity guidelines

Exercise and weight loss: new realities

Pediatric exercise guidelines

Practical strategies

Resources

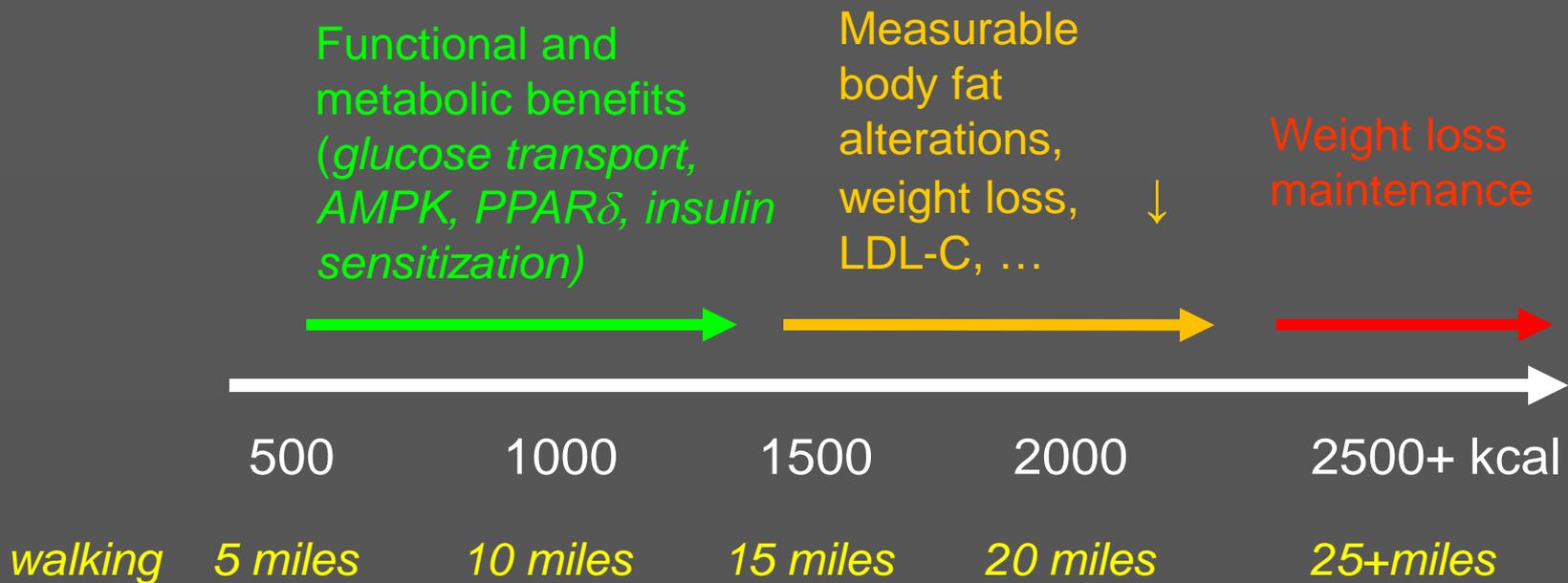
Just get your patients to
move and move often!

You too!!

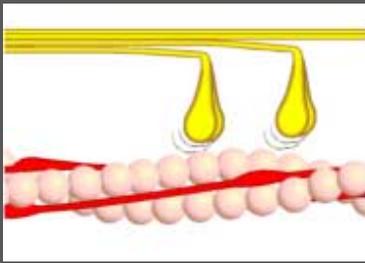
A large amount of evidence shows that exercise provides the best prevention and treatment for insulin resistance and type 2 diabetes

Goodpaster 2003
Hawley 2004
Houmard 2004
Helmrich 1991
Kraus 2004
Ross 2004
Laakosen 2005
Schulze 2005
LaForge 2006
Short 2003
Thyfault 2009
Slentz 2011

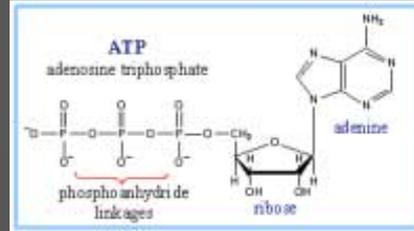




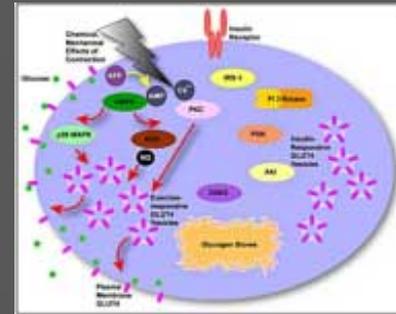
Weekly Physical Activity and Cardiometabolic Benefit



Ca⁺⁺ release



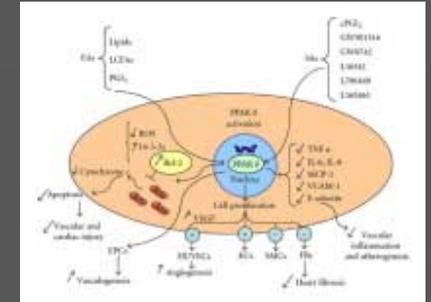
→ AMPK activation



GLUT4 glucose transport

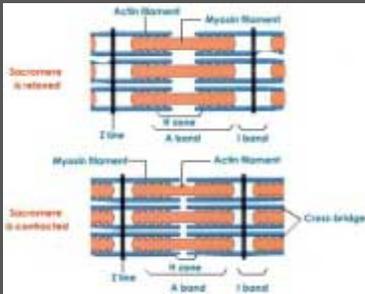
Insulin signaling

+



PPAR δ activation

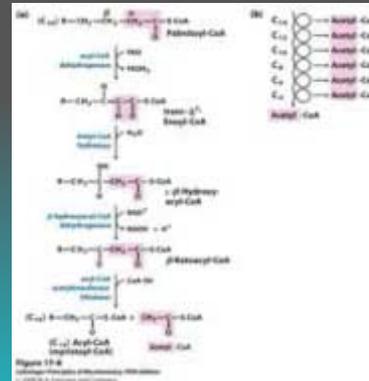
Insulin sensitization



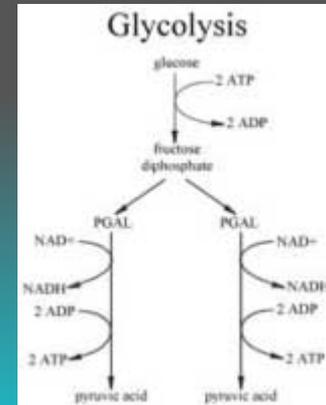
Muscle contraction



TG & adiposity reduction



Glucose and fatty acid oxidation



How Much Physical Activity ?

CMR Reduction

Weekly EE

Wgt Loss

Diabetes

≥ 1000 kcal

≥ 2000 kcal

Prediabetes

≥ 1000 kcal

≥ 2000 kcal

& Metabolic
syndrome

Pediatric

7 hrs, 12,000+ steps

What's New ?

*Recent Important
Publications and Research Trials
2011-2012*

Daily Step Target to Measure Adherence to Physical Activity Guidelines in Children

RACHEL C. COLLEY^{1,2}, IAN JANSSEN³, and MARK S. TREMBLAY^{1,2}

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Med. Sci. Sports Exerc., 2012;44:977–982

Goal: find step count for moderate – vigorous PA
N= 1613, 6-19 years; number of valid days =9879



12,000 steps/day – a target to determine whether children 6-19 yr are meeting the current PA guidelines of 60 minutes of daily MVPA

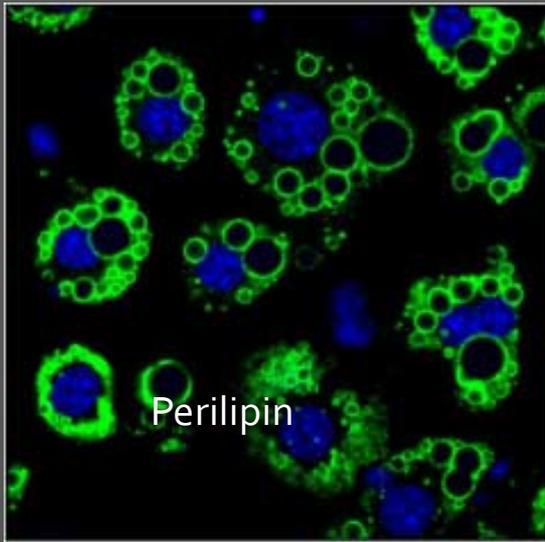
Accelerometer steps/day translation of moderate-to vigorous activity Tudor-Locke C et.al. Prev Med. 2011. Pennington Biomed Res. 2005-2006 NHANES . N= 3,523 ADULTS.



**30 minutes/day of MVPA: 7,900 steps/day for males
8,300 steps/day for females.**

In a subsample of participants (n=1,197) we found 150 minutes/week of MVPA translated to ~ 7,000 steps/day (or 49,000 steps/week).

Accumulating ~ 8,000 steps/day is a good proxy for 30 minutes of daily MVPA, while accumulating 7,000 steps/day every day is consistent with obtaining 150 minutes of weekly MVPA.



Various genotypes influence exercise-generated reductions in cardiometabolic risk including weight loss

- Perilipin 1 is a protein that acts by preventing a "fat-burning" enzyme (HSL) from entering fat cells where it can break down fat molecules and convert them to energy

The protein plays an extremely significant role in whether fat is stored or released for use as energy

- The PLIN1 can determine one's fat oxidation and fat weight loss response to exercise training

Gjelstad IM et.al. Arch Physiol Biochem. 2012 Feb;118:22-30

Shepard S et.al. Exp Physiol. 2012 April

Jenkins NT, et al. J Appl Physiol. 2010; 108: 498–506.



CONSENSUS STATEMENT

Energy balance and its components: implications for body weight regulation^{1–3}

Kevin D. Hall,⁴ Steven B. Heymsfield,⁵ Joseph W. Kemnitz,⁶ Samuel Klein,⁷ Dale A. Schoeller,⁸ and John R. Speakman^{9}*

⁴National Institute of Diabetes and Digestive and Kidney Diseases, NIH, Bethesda, MD; ⁵Pennington Biomedical Research Center, Baton Rouge, LA; ⁶Institute for Clinical and Translational Research, University of Wisconsin, Madison, WI; ⁷Washington University School of Medicine, St Louis, MO; ⁸Nutritional Sciences, University of Wisconsin, Madison, WI; and ⁹Institute of Biological and Environmental Sciences, University of Aberdeen, Aberdeen, United Kingdom

Am J Clin Nutr 2012;95:989–94

1. A popular belief is that exercise training results in body composition changes that generate an additional energy benefit mediated through Resting Energy Expenditure (REE) Measurements that are not so confounded suggest that the impact of exercise training on REE *is negligible*.



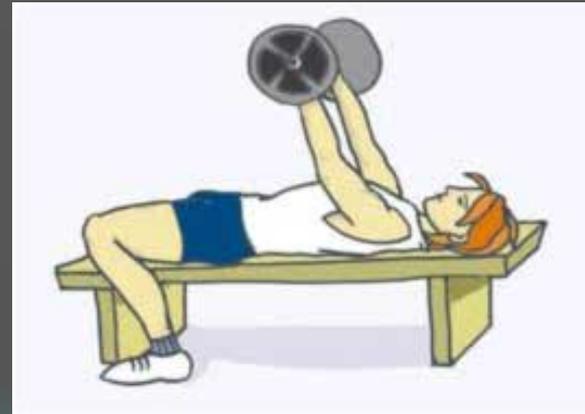
2. The origin of the “3500 kcal per pound” rule is based on the calculated energy content of body weight change and is often misapplied to predict the weight-change time course after a given intervention . This is a fundamental error because no time period is specified for that intervention.



Effects of intensity and volume on insulin sensitivity during acute bouts of resistance training

Black LE et.al. J Strength Cond Res.2010 Apr;24(4):1109-16. ASU

17 adults with IFG completed 4 separate bouts of resistance exercise under moderate intensity (65% 1RMax) or high intensity (85% 1RM) conditions within the confines of single set and multiple set protocols.

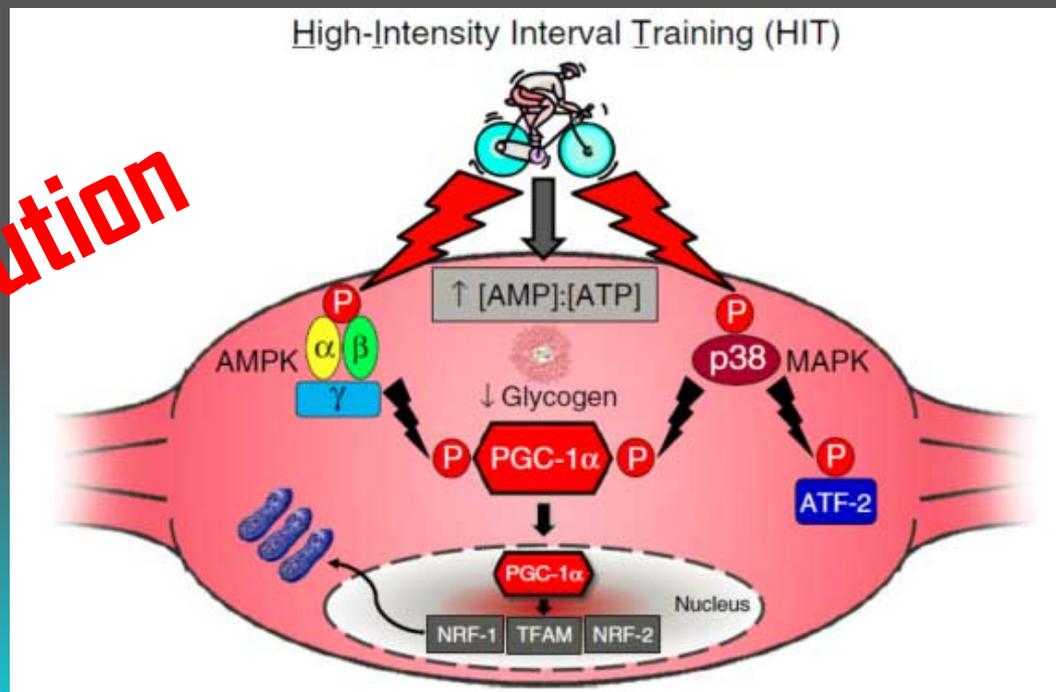


High-intensity protocols resulted in greater insulin sensitivity (0.83 multiple set; 0.53 single set) as compared with moderate-intensity protocols. The high-intensity, multiple set bout yielded the greatest effect in both fasting glucose (0.61) and insulin sensitivity (0.83).

What's new since Hippocrates? Preventing type 2 diabetes by physical exercise and diet

J. A. Hawley • M. J. Gibala

Caution



10 X 60 sec @ 90% HR_{max} (cycling)

Both resistance- and endurance-type exercise reduce the prevalence of hyperglycemia in individuals with impaired glucose tolerance and in insulin-treated and non-insulin-treated type 2 diabetic patients

van Dijk JW et.al. Diabetologia 2012;55:1273-82

15 pts with IGT and 15 pts with T2D

EndEx: 45 min cycling at 50% Wmax **or**

ResEx: 45 min of lat pulls, chest press, leg press and ext.
3-5 sets of 10 reps at 55-75% of 1RMax

A single session of EndEx or ResEx substantially reduces the prevalence of hyperglycemia and improves glycemic control during the subsequent 24 h period in individuals with IGT, and in insulin-treated and non-insulin-treated type 2 diabetic patients.

Impact of exercise intensity and duration on insulin sensitivity in women with T2D

Segerström AB et.al. Eur J Intern Med.2010 Oct;21(5):404-8. Sweden

METHODS: 22 women with T2D participated in a supervised group exercise program for *6 months*. The program combined endurance and resistance exercise.

Improvement in insulin sensitivity after six months is related to *exercise intensity*,

The reduction in HbA_{1c} is related mainly to *training volume* (total kcal expenditure).

Metabolic effects of training may be seen in the absence of improved exercise capacity.

Physical Activity Advice Only or Structured Exercise Training and Association With HbA_{1c} Levels in Type 2 Diabetes

A Systematic Review and Meta-analysis

Daniel Umpierre, MSc

Paula A. B. Ribeiro, MSc

Context Regular exercise improves glucose control in diabetes, but the association of different exercise training interventions on glucose control is unclear.

JAMA. 2011;305(17):1790-1799

- Structured exercise training of *more than 150* minutes per week is associated with greater HbA_{1c} declines than that of 150 minutes or less per week
- Our results demonstrate that in patients with type 2 diabetes, structured aerobic, resistance, or combined exercise training is associated with a HbA_{1c} decline of 0.67%.

So, what did we learn from these recent trials?

- **Step target for MVPA for all kids: 12,000/day**
- **8,000 steps/day is a good proxy for 30 min of MVPA for adults**
- **Genetic factors play a role (20-40%) in exercise-generated weight loss**
- **From a practical point of view the benefit of acute exercise on REE is negligible**
- **It appears that exercise intensity is more related to insulin sensitization whereas total exercise volume (total daily EE) is related to HbA1C**
- **Higher intensity exercise generates somewhat greater insulin sensitization than moderate intensity exercise – but it can be risky**
- **A single 45-min dose of exercise (AE or RT) can decrease hyperglycemia ~30-35% for 24 hours**
- **Structured exercise training ≥ 150 minutes/week is related to greater declines in HbA1C**

Consensus Guidelines on PA

Risk reduction vs Weight loss

Public Health vs. Weight Loss Physical Activity Recommendations

Public Health:

150 minutes/week = 30 min/day x 5 days/wk

~1000 – 1,500 kcal/wk (20-30K+ steps/wk)

Weight Loss:

250-300 minutes/week = ≥ 60 min/day x 5 or more days/wk

~2,000 – 3,000 kcal/wk (40-60K+ +steps/wk)

ACSM/AHA Public Health Guidelines 2007
ACSM Exercise Weight Loss Statement 2009

“The modern world makes it very easy to out-eat exercise, and nearly impossible to out-exercise excessive eating”

David Katz

Yale University Prevention Research Center

Exercise and Type 2 Diabetes

The American College of Sports Medicine and the American Diabetes Association: joint position statement

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JUDITH G. REGENSTEINER, PHD⁴
BRYAN J. BLISSMER, PHD⁵

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BARRY BRAUN, PHD, FACSM⁹

Although physical activity (PA) is a key element in the prevention and management of type 2 diabetes, many with this chronic disease do not become or remain regularly active. High-quality studies establishing the importance of exercise and fitness in diabetes were lacking until recently, but it is now well established that participation in regular PA improves blood glucose control and can prevent or delay type 2 diabetes, along with positively affecting lipids, blood pressure, cardiovascular events, mortality, and quality of life. Structured interventions combining PA and modest weight loss have been shown to lower type 2 diabetes risk by up to 58% in high-risk populations. Most benefits of PA on diabetes management are realized through acute and chronic improvements in insulin action, accomplished with both aerobic and resistance training. The benefits of physical training are discussed, along with recommendations for varying activities, PA-associated blood glucose management, diabetes prevention, gestational diabetes mellitus, and safe and effective practices for PA with diabetes-related complications.

Diabetes Care 33:e147–e167, 2010

disease (CVD), blindness, kidney and nerve disease, and amputation (261). Although regular physical activity (PA) may prevent or delay diabetes and its complications (10,46,89,112,176,208,259,294), most people with type 2 diabetes are not active (193).

In this article, the broader term “physical activity” (defined as “bodily movement produced by the contraction of skeletal muscle that substantially increases energy expenditure”) is used interchangeably with “exercise,” which is defined as “a subset of PA done with the intention of developing physical fitness (i.e., cardiovascular [CV], strength, and flexibility training).” The intent is to recognize that many types of physical movement may have a positive effect on physical fitness, morbidity, and mortality

Diet vs Exercise for Weight Loss

In randomized control trials, about 1 h of daily moderate aerobic exercise produces at least as much *fat loss* as equivalent caloric restriction, with resultant greater insulin action

Ross 2000, 2004

ACSM/ADA 2011

Evidence statement

A combination of aerobic and resistance exercise training may be more effective in improving BG control than either alone;

however, more studies are needed to determine if total caloric expenditure, exercise duration, or exercise mode is responsible.

Supervision of training

Exercise intervention studies showing the greatest effect on blood glucose control have all involved *supervision* of exercise sessions by qualified exercise trainers .

The most direct test of the incremental benefits of supervised training was the Italian Diabetes and Exercise Study.

The optimal volume of exercise to achieve sustained major weight loss is probably much larger than the amount required to achieve improved blood glucose control and CV health

ACSM/ADA 2011

Evidence statement

In addition to aerobic training, persons with type 2 diabetes should undertake moderate to vigorous resistance training at least 2–3 days/week.

Those prescribing exercise are required to understand that those with T2D for > 5-8 years tend to exhibit these exercise responses:

- **Chronotropic incompetence (↓ heart rate)**
- **Blunted systolic blood pressure response**
- **Attenuated $\dot{V}\cdot\text{O}_2$ kinetics (aerobic capacity)**
- **Anhydrosis (inadequate sweat response)**
 - Monitor the signs and symptoms of hypoglycemia
 - Rating Perceived Exertion should also be used to assess exercise intensity

Adequate Convective Cooling



Just get your patients to
move and move often !

You too !!

PEDIATRIC DIABETES GUIDELINES

Aerobic, Muscle-strengthening, and Bone-strengthening Activities

Every day children and adolescents should do **1 hour or more** of physical activity.

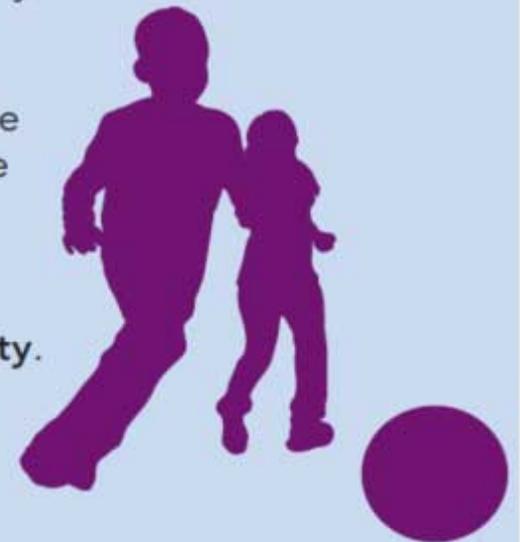
Aerobic activities. Most of the 1 hour a day should be either moderate or vigorous-intensity* aerobic physical activity, and include and include **vigorous-intensity** physical activity **at least 3 days a week**.

As a part of the 1 hour a day of physical activity, the following should be included:

- **Muscle-strengthening on at least 3 days a week.** These activities make muscles do more work than usual during daily life. They should involve a moderate to high level of effort and work the major muscle groups of the body: legs, hips, back, abdomen, chest, shoulders, and arms.
- **Bone-strengthening on at least 3 days of the week.** These activities produce a force on the bones that promotes bone growth and strength through impact with the ground.

Youth should be encouraged to engage in physical activities that are **appropriate** for their age, **enjoyable**, and offer **variety**.

No period of activity is too short to count toward the Guidelines.



Vigorous-Intensity	<ul style="list-style-type: none"> • Active games involving running and chasing, such as tag • Bicycle riding* • Jumping rope • Martial arts, such as karate • Running • Sports such as ice or field hockey, basketball, swimming, tennis or gymnastics • Cross-country skiing 	<ul style="list-style-type: none"> • Active games involving running and chasing, such as flag football • Bicycle riding* • Jumping rope • Martial arts such as karate • Running • Sports such as tennis, ice or field hockey, basketball, swimming, soccer • Vigorous dancing • Aerobics
Muscle-Strengthening	<ul style="list-style-type: none"> • Games such as tug of war • Modified push-ups (with knees on the floor) • Resistance exercises using body weight or resistance bands • Rope or tree climbing • Sit-ups (curl-ups or crunches) • Swinging on playground equipment/bars 	<ul style="list-style-type: none"> • Cross-country skiing • Games such as tug of war • Push-ups • Resistance exercises with exercise bands, weight machines, hand-held weights • Climbing wall • Sit-ups (curl-ups or crunches)
Bone-Strengthening	<ul style="list-style-type: none"> • Games such as hop-scotch • Hopping, skipping, jumping • Jumping rope • Running • Sports such as gymnastics, basketball, volleyball, tennis 	<ul style="list-style-type: none"> • Hopping, skipping, jumping • Jumping rope • Running • Sports such as gymnastics, basketball, volleyball, tennis

International Society for Pediatric and Adolescent Diabetes ISPAD Clinical Practice Consensus Guidelines 2009 Compendium

Exercise in children and adolescents with diabetes

Robertson K, Adolfsson P, Riddell M, Scheiner G, Hanas R. Exercise in children and adolescents with diabetes.
Pediatric Diabetes 2009; 10 (Suppl. 12): 154–168.

**Kenneth Robertson^a,
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Gary Scheiner^c,
Ragnar Hanas^d and
Michael C Riddell^e**

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^bThe Queen Silvia Children's Hospital, Gothenburg, Sweden;

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^dDepartment of Pediatrics, Uddevalla Hospital, Uddevalla, Sweden; ^eSchool of Kinesiology and Health Science, Muscle Health Research Centre, Faculty of Health, York University, Toronto, Canada

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Conflicts of interest: PA has received unrestricted support of medical equipment (monitors and sensors) from Medtronic during studies on exercise. GS has sat on the CDE Advisory Panel for Unomedical and Medingo, has received speaker's fees from Dexcom and Medtronic Diabetes, and has received writer's fees from Becton Dickinson and Medtronic Diabetes. The remaining authors have no potential conflicts to declare.

Editors of the ISPAD Clinical Practice Consensus Guidelines 2009 Compendium: Ragnar Hanas, Kim Donaghue, Georgeanna Klingensmith, and Peter Swift.

This article is a chapter in the *ISPAD Clinical Practice Consensus Guidelines 2009 Compendium*. The complete set of guidelines can be found at www.ispad.org. The evidence grading system used in the ISPAD Guidelines is the same as that used by the American Diabetes Association. See page 2 (the Introduction in *Pediatric Diabetes* 2009; 10 (Suppl. 12): 1–2).



It is especially important to plan for long duration or intense aerobic exercise, or else hypoglycemia is almost inevitable. Nearly all forms of activity lasting > 30 minutes will be likely to require some adjustment to food and/or insulin.

Young people with T₁D have been found to have decreased aerobic capacity as measured by VO₂ max, compared to nondiabetic control subjects



When *regular* (soluble) insulin has been injected prior to exercise, the most likely time for *hypoglycemia* will be 2-3h after injection and the high risk time after *rapid-acting* analog insulin is between 40 and 90 minutes

Key Exercise Recommendations

Pediatric T1D

- Avoid exercise if BG < 100 or > 300 mg/dL
- Check ketones if BG > 250 and exercising
- Take 15 g of carbohydrates for every 30 min
- Check BG every 30-60 min during ex
- Avoid using legs for injections e.g., *running* (increased absorption) – abdomen better

Practical Strategies to Getting Patients to Move

H

~300+ kcal

1
mile

1
mile



Neighborhood Circuit

Time-efficient 1600+ kcal Weekly Program

e.g.,

Monday 20-min walk (or 5 x 4 min at work)

Wednesday 20-min walk (or 5 x 4 min at work)

Friday 20-min walk (or 5 x 4 min at work)

1 weekend day : 2hr+ drop-off *variable terrain walk-hike*

TOTAL EE: 400 + 1200 kcal = 1600+ kcal *

* Add 10-25% at BMI's 35

Overweight and obese prediabetes and diabetes patients expend more calories for a given walking workout that those who are normal weight



Thus, even walking may represent a difficult exercise modality for obese individuals because they can use:

- as much as 56% VO_2max (some at BMI's >40 using 64-98% VO_2max) to meet the demand of such an activity compared with only 35% in normal-weight subjects.

56% vs 35%

Mattsson E et.al. *Int J Obes Relat Metab Disord.* 1997;21:380–386.



Workplace EE

5 min/hr X 7 hrs



35 min @ 3-4 kcal/min

2000-2500 steps

100 – 140 kcal

(insulin sensitization –
e.g., 10-15 mg metformin)

Systematic pedometry

Domestic/household circuit activity

U.S. Indian Health Service Division of Diabetes Treatment and Prevention

The screenshot displays the website for the U.S. Indian Health Service, Division of Diabetes Treatment and Prevention. The page is titled "Quick Guide Cards" and includes a navigation menu on the left with categories such as HOME, ABOUT US, PROGRAMS, PEOPLE, LEARN More, TRAINING, RESOURCES, and TOOLS. The main content area features a graphic of a wooden file folder with a label that reads "Quick Guide Cards". The folder contains several tabs representing different topics: Foot Care, Diabetes Control, Physical Activity, Program Planning & Outreach, Assessment, Chronic Kidney Disease, and Communication Skills. The page also includes a search bar and a date stamp: Thursday, May 10, 2012.

<http://www.ihs.gov/MedicalPrograms/Diabetes/index.cfm?module=toolsQuickGuides>

Exercise Program Screening

Exercise ECG Screening

Exercise Equipment

Resistance Training

Household Circuit

Pedometer Instructions & Calibration

Native Pedometer Trekking

Youth Assessment

Exercise Program Screening



[Best Practice](#)

[PDF - 507KB]



[Standards of Care](#)

[PDF - 540KB]

Why is this important?

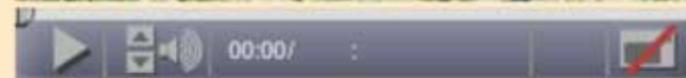
- Regular exercise improves cardiometabolic health and reduces cardiovascular morbidity and mortality.
- Patients with or at high risk for CVD or diabetes have up to a ten-fold increase in cardiovascular events during exercise, compared to healthy persons.
- Patients with CVD should be identified by screening, evaluated and counseled before beginning a moderate to vigorous exercise program.

Action steps:

- Use one of the two screening instruments prior to recommending or starting an exercise program for your patients:
 - [AHA/ACSM Health and Fitness Facility Preparticipation Screening Questionnaire](#)



Audio



[Transcript](#) [PDF - 44KB]

Systematic Clinical Pedometry

The application of the systematic use of well-engineered pedometers as objective activity outcomes measures in prediabetes and diabetes



Pediatric 7-Day Step Activity Assessment

Youth Stepcount Activity Log

Name: |

Instructions:

- Wear the pedometer tightly on your waist (beltline) and directly over your right leg.
- Reset your pedometer to ZERO after each day
- Record your total stepcount for two full SCHOOL DAYS (e.g., 7 a.m. to bedtime)
- Record your total stepcount for two full WEEKEND DAYS (e.g., 7 a.m. to bedtime)

*If you play sports include the pedometer stepcount during that sport (when the pedometer can be worn with your athletic gear)

Return this log to the next Personal Fitness merit badge class

Total # of Steps

School day Date:	
School day Date:	
Weekend day Date:	
Weekend day Date:	
Comments:	



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Lincoln

EXTENSION

Lancaster County

444 Cherrycreek Road, Suite A / Lincoln, NE 68528

(402) 441-7180 / <http://lancaster.unl.edu>

ABCs for Good Health

RECORD SHEET

Week	Instructions	Record Steps Taken Daily						
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Week 1 Dates _____	Wear your pedometer every day. Record the number of steps you normally take on each day. Do not increase your walking in this first week. This will be used to calculate your baseline.							
Baseline (Average Daily Baseline Steps) To calculate your baseline, add the number of steps you took during week 1 and divide by 7. Week 1 Total Steps _____ ÷ 7 = <input type="text"/> steps		After you have calculated your baseline steps, gradually increase your steps as recommended below for each week. Aim for the recommended number of steps for at least 3 or 5 days (as indicated below).						
Week 2 Dates _____	If baseline was: <2,500 steps 2,500-5,000 steps 5,000-7,500 steps >7,500 steps Aim for: 3,000 steps on at least 3 days 3,000-5,500 steps on 3 days 5,500-8,000 steps on 3 days 8,000-10,000 steps on 3 days							
Week 3 Dates _____	If baseline was: <2,500 steps 2,500-5,000 steps 5,000-7,500 steps >7,500 steps Aim for: 3,000 steps on at least 5 days 3,000-5,500 steps on 5 days 5,500-8,000 steps on 5 days 8,000-10,000 steps on 5 days							
Week 4 Dates _____	If baseline was: <2,500 steps 2,500-5,000 steps 5,000-7,500 steps >7,500 steps Aim for: 3,500 steps on at least 3 days 3,500-6,000 steps on 3 days 6,000-8,500 steps on 3 days 8,500-10,000 steps on 3 days							
Week 5 Dates _____	If baseline was: <2,500 steps 2,500-5,000 steps 5,000-7,500 steps >7,500 steps Aim for: 3,500 steps on at least 5 days 3,500-6,000 steps on 5 days 6,000-8,500 steps on 5 days 8,500-10,000 steps on 5 days							
Week 6 Dates _____	If baseline was: <2,500 steps 2,500-5,000 steps 5,000-7,500 steps >7,500 steps Aim for: 4,000 steps on at least 3 days 4,500-7,000 steps on 3 days 7,000-9,500 steps on 3 days 9,500-10,000 steps on 3 days							

<http://lancaster.unl.edu/FOOD/walk.pdf>

Prescription Form – Exercise Pedometry

RX for Outpatient Exercise Pedometry

Patient name:

Date:

Therapeutic code:

Order for following patient physical activity pedometer:

Pedometer: Eagle 2720 pedometer

Rx: steps/day _____ steps/week/month _____ / _____

Other Rx:

Patient instructions: See attached physical activity and pedometer guidelines

M.D.

Referring provider/physician

Pedometer Trekking



3-10 customized paths/trails of varying length and terrain (1-6 miles) with known step count requirements

IHS DDTP PTrekking Rx

Trekking Levels/courses

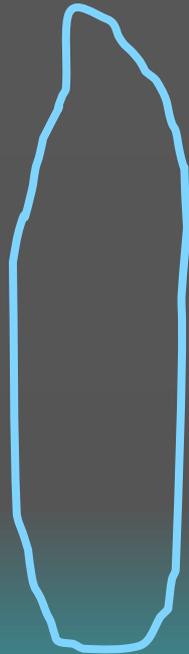
- Level 1: 1000 – 3000 steps (.5-1.5 mile courses)
- Level 2: 3000 - 6000 steps (1.5 – 3 miles)
- Level 3: 6000 – 10,000 steps (3 - 5 miles)
- Level 4: >10,000 steps (>5 miles)

Level of difficulty: Easy (minimum terrain/grade), Moderate (moderate terrain/grade), Difficult (significant variable terrain and graded)

Trek Rx



Ped Rx 1
1-3K steps



Ped Rx 2
3-6K steps



Ped Rx 3
6-10K steps



Ped Rx 4
>10K steps



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Welcome to the premier site for health & physical education teachers, parents and students. Our goal is to provide the latest information about developmentally appropriate physical education programs for children. To motivate, we offer [fun kids fitness programs](#) such as [Log It](#) and the [PEC Challenge](#). We have over 1800 published lesson ideas. We invite you to [share your ideas](#) which are reviewed by our [editorial team](#). Updated: 4-9-12



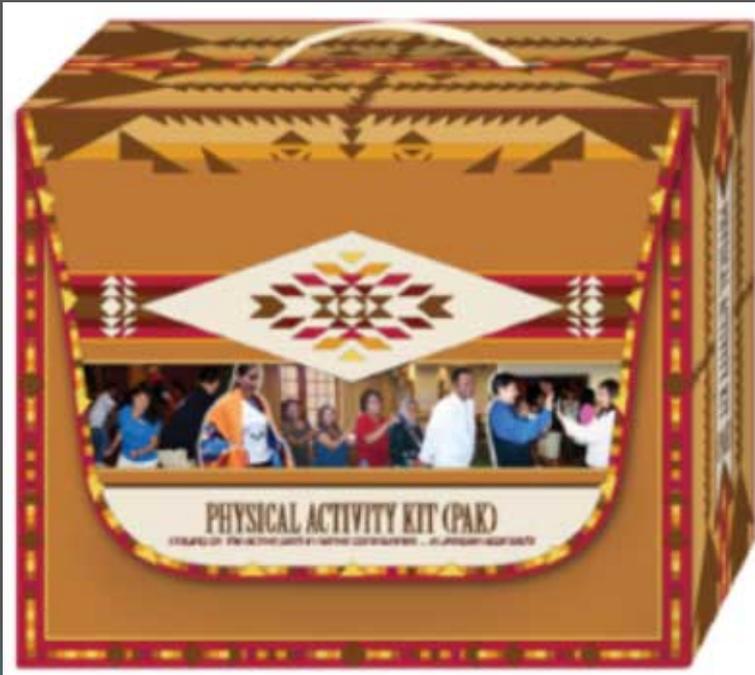
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IHS Physical Activity Kit



PAK Trainer Distribution

http://www.ihs.gov/hpdp/index.cfm?module=dsp_hpdp_resources_physicalactivitykit

PAK BOOKS:

YOUNG PEOPLE - BOOK #1

MT. PATHWAYS CHALLENGE - BOOK #2

MODIFIED AMERICAN INDIAN GAMES - BOOK #3

EXERCISE BREAKS - BOOK #4

YOUNG CHILDREN - BOOK #5

ADULTS/FAMILY - BOOK #6

OLDER ADULTS - BOOK #7

RESOURCES- BOOK #8

Are there risk reduction differences?



1. An active lifestyle expending ≥ 1500 kcal/week from a variety of domestic, recreational and work-related activities



2. An inactive work and recreational lifestyle but works out 3-5 days/week for 1500 kcal/week

Diverse types of moderate exercise is also associated with lower incidence of diabetes and CVD mortality.

This includes such utilitarian activities as *walking, gardening, climbing, and household/yard chores*. Those who expend 1000 - 1500 kcal per week in such utilitarian activities may require very little additional exercise to lower diabetes and CVD risk.

Lakka TA. Et.al. NEJM 1994;330:1549

Thompson P et.al. Circ. 2003;107:3101

Fransson E. et.al. Scan J Pub Health 2003;31:324

Meisinger C et.al. Diabetologia 2005;48:27

Marcus B et.al. Circ. 2006;114: 2739

Holme I et.al. BMC Public Health 2007, 7:154

Household-Community Circuit Rx

Name
Date
Rx:

20 - 90 minutes

- 2-minute rest/water break between stations
- Always start and end session with warm-up/cool down exercise as prescribed
- Do not continue exercise or go the next station if you experience chest discomfort, palpitations, dizziness or unusual fatigue

Utilitarian-domestic Activities do Condition and Reduce Risk

- Yardwork
- Gardening
- Housework
- Painting, cleaning, shoveling, scrubbing, washing
- Repair work
- ADL's

Lifestyle Lab Panel



Triglycerides
Non HDL-C*
Sys BP



FPG &/or A1C
Subscap SF

* *Non HDLC = TC-HDL*

GXT's Prior To Exercise Programming



Diabetic patients who have been previously sedentary and who plan to regularly engage in moderate to vigorous exercise require a medical examination and graded exercise treadmill test with ECG (GXT) prior to participation.

Moderate: 40-60% of V_{O_2} max

Vigorous: 60%+ of V_{O_2} max (>75% HR_{max})

Just get your patients to
move and move often !

You too !!



Questions?



Clinical Exercise Science Resources?

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