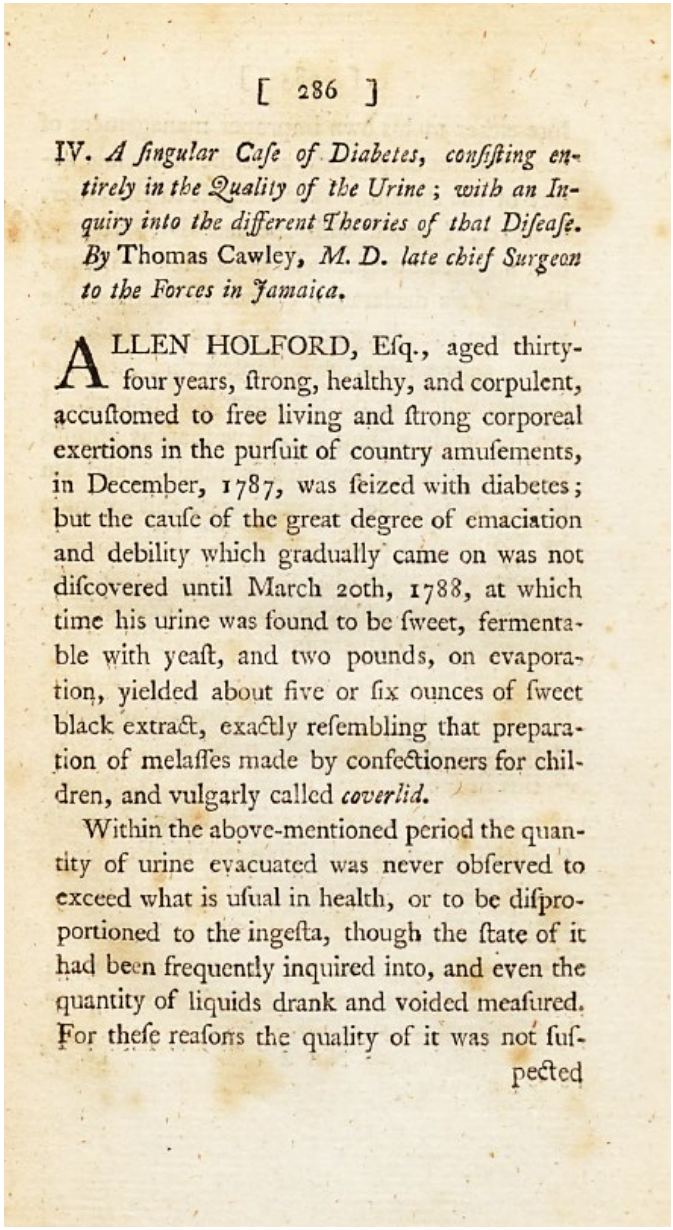


L'Attività Fisica nella cura del Diabete: nuove evidenze

Dott.ssa Lucia Cugusi, PT, PhD
Assegnista di Ricerca in Scienze Cardiovascolari
Specialista in protocolli motori e riabilitativi per soggetti con patologie croniche
Docente nei corsi di Laurea in Medicina e Chirurgia di UNICA

- La dr. ssa Lucia Cugusi dichiara di aver ricevuto negli ultimi due anni compensi o finanziamenti dalle seguenti Aziende Farmaceutiche e/o Diagnostiche:
-
- ***GRANT 2015 SIC-MERCK SHARP & DOHME Italia, per soggiorni di studio e ricerca presso istituzioni italiane ed estere per Dottorandi e Assegnisti di ricerca in Scienze Cardiovascolari ai fini della realizzazione/implementazione del Progetto di ricerca scientifica: "Physical Exercise and Therapy: an integrated approach for the reduction of cardiovascular risk and health promotion", al St George's, University of London, UK.***
-
-
-
- *Dichiara altresì il proprio impegno ad astenersi, nell'ambito dell'evento, dal nominare, in qualsivoglia modo o forma, aziende farmaceutiche e/o denominazione commerciale e di non fare pubblicità di qualsiasi tipo relativamente a specifici prodotti di interesse sanitario (farmaci, strumenti, dispositivi medico-chirurgici, ecc.).*

Search results for DIABETES
Items: 1 to 20 of 648,044



[286]

IV. *A ſingular Caſe of Diabetes, conſiſting entirely in the Quality of the Urine; with an Inquiry into the different Theories of that Diſeaſe.* *By* Thomas Cawley, *M. D. late chief Surgeon to the Forces in Jamaica.*

ALLEN HOLFORD, Eſq., aged thirty-four years, ſtrong, healthy, and corpulent, accuſtomed to free living and ſtrong corporeal exertions in the purſuit of country amuſements, in December, 1787, was ſeized with diabetes; but the cauſe of the great degree of emaciation and debility which gradually came on was not diſcovered until March 20th, 1788, at which time his urine was found to be ſweet, fermentable with yeaſt, and two pounds, on evaporation, yielded about five or ſix ounces of ſweet black extract, exactly reſembling that preparation of melaſſes made by confectioners for children, and vulgarly called *coverlid.*

Within the above-mentioned period the quantity of urine evacuated was never obſerved to exceed what is uſual in health, or to be diſproportioned to the ingeſta, though the ſtate of it had been frequently inquired into, and even the quantity of liquids drank and voided meaſured. For theſe reaſons the quality of it was not ſuſ-

pected

Cawley T. A Singular Case of Diabetes, Consisting Entirely in the Quality of the Urine; with an Inquiry into the Different Theories of That Disease. *Lond Med J.* 1788;9 (Pt 3):286-308.

Search results for (Diabetes) AND (Exercise)
Items: 1 to 20 of 23,642

Hetzel KS. MUSCULAR EXERCISE IN DIABETES MELLITUS. *Br Med J.* 1925 Jan 17;1(3342):102-6.

Muscular exercise in patients suffering from diabetes mellitus depletes the blood glucose provided there is an adequate supply of insulin in the tissues

(L'esercizio muscolare nei pazienti affetti da diabete riduce il glucosio ematico ***a condizione che vi sia un adeguato apporto di insulina nei tessuti)***



102 . JAN. 17, 1925] MUSCULAR EXERCISE IN DIABETES. [THE BRITISH MEDICAL JOURNAL

MUSCULAR EXERCISE IN DIABETES MELLITUS.

BY

K. S. HETZEL, M.B., B.S.ADELAIDE, M.R.C.P.LOND.,
ASSISTANT IN THE MEDICAL UNIT, UNIVERSITY COLLEGE HOSPITAL.

IN conjunction with Mr. C. N. H. Long, M.Sc., experiments are in progress on the effect of muscular exercise in patients suffering from diabetes mellitus. We hope shortly to publish the results in full dealing with lactic acid, acidosis, and the respiratory metabolism. This preliminary communication on the blood sugar and urinary changes brought about by exercise is written more from the clinical standpoint.

Allen and his followers have insisted that in the treatment of patients suffering from diabetes mellitus it is beneficial for them during the time of their dietetic adjustment and subsequently to take moderate exercise and not to remain in bed for prolonged periods. The present experiments show that in a diabetic whose diet contains a moderate proportion of carbohydrate and who receives an adequate supply of insulin the effect of exercise is beneficial, rapidly lowering the blood glucose to a normal level and diminishing the production and therefore the excretion of ketones and so rendering tissue metabolism more complete. But in a patient even with adequate carbohydrate foodstuff or carbohydrate stores whose diabetes is moderately severe and who is without sufficient insulin, endogenous or exogenous, exercise produces little or no effect on blood glucose and ketosis is increased.

The patients who are the subjects of these experiments had been treated for some time previous to the experiments by dietetic restriction and adjustment with insulin, and they are now continuing their ordinary routine life.

The exercise which has been done is that of "standing running" in which the subject doubles rapidly on his toes with the elbows flexed and the arms drawn to the side of the chest, but he does not move forward and he maintains his position on about one to two square feet of floor space in the laboratory, drawing the knees well up. The number of steps a minute is noted, the patient keeping time with a metronome which is set to a certain rate; in this way the subject keeps up the rate of exercise for the stipulated time. The exercise done—for instance, 156 steps per minute—is only moderate, and a normal subject can readily do it for the time over which these patients were exercised, and with no great fatigue. By "all out" exercise is meant that the subject doubles as rapidly as he can so as just to last out the time, at the end of which he is "done." Samples of blood and urine are taken at intervals before and after the exercise. A rough estimate of the amount of urinary ketones has been made by the depth of the colour which is attained in one minute by the Rothera or sodium nitro-prusside test. These are designated ± for a faint trace, + trace, ++ and +++ for deeper colorations. All the samples of urine are examined at the same time and set side by side so as to get the comparative variation in colour produced.

CASE I.

Male, aged 36; decorator. Weight 10 st. 10 lb. Diet 2,090 calories: Carbohydrate 69 grams, protein 77 grams, fat 167 grams. Insulin 30 units a day, given in two doses, of 20 and 10 units each. This patient had received insulin for seven weeks and he had been discharged from hospital on the above diet for three weeks when the first experiments—for example, experiments B and E—were done. The experiments were made at intervals over a period of five and a half months. This man leads an active life and he feels and looks a fit man.

EXPERIMENT A.—*Control for ordinary fall of blood sugar without exercise. Without insulin for thirteen hours—last meal two hours previously.*

Time.		Blood Sugar per Cent.	Urine. Glucose.	Urine. Ketones.
10 a.m.	Resting	0.210	0.06%	±
10.30 a.m.	Resting	0.190		
11.10 a.m.	Resting	0.180	Nil	±
11.35 a.m.	Resting	0.155		
12.10 p.m.	Resting	0.135	Nil	±
12.55 p.m.	Resting	0.115	Nil	±

EXPERIMENT B.—*Insulin two and a half hours and food two hours previously.*

Time.		Blood Sugar per Cent.	Urine. Glucose.	Urine. Ketones.
10.30 a.m.	Resting	0.110	Nil	Nil
10.50 a.m.	Exercise 3½ mins. "standing running" at 210 steps per minute			
11 a.m.	Recovery	0.115		
11.15 a.m.	Recovery	0.105		
11.30 a.m.	Recovery	0.105		
11.45 a.m.	Recovery	0.095	Nil	Nil

EXPERIMENT C.—*Insulin three and a half hours and food three hours previously.*

Time.		Blood Sugar per Cent.	Urine. Glucose.	Urine. Ketones.
10.25 a.m.	Resting	0.150	Nil	Nil
10.33 a.m.	Exercise 1 min. at 156 steps per minute			
11.5 a.m.	Recovery	0.140		
11.21 a.m.	Exercise 8 mins. at 156 steps per minute			
11.31 a.m.	Recovery	0.115		
12.1 p.m.	Recovery	0.105		
12.35 p.m.	Recovery	0.105	Nil	Nil

EXPERIMENT D.—*Insulin and food (with extra carbohydrate) three and a half and three hours before respectively.*

Time.		Blood Sugar per Cent.	Urine. Glucose.	Urine. Ketones.
10.30 a.m.	Resting	0.195	Trace	+
10.45 a.m.	Exercise 3 mins. at 156 steps per minute			
10.51 a.m.	Recovery	0.150		
11.21 a.m.	Recovery	0.115		
11.35 a.m.	Exercise 5 mins. at 156 steps per minute			
11.43 a.m.	Recovery	0.110		
12.35 p.m.	Recovery	0.115	Nil	±

EXPERIMENT E.—*Last insulin fourteen hours and last meal two and a half hours previously.*

Time.		Blood Sugar per Cent.	Urine. Glucose.	Urine. Ketones
10.40 a.m.	Resting	0.240	0.44 %	++
10.46 a.m.	Exercise 3½ mins. at 210 steps per minute			
10.54 a.m.	Recovery	0.140		
11.5 a.m.	Recovery	0.120		
11.30 a.m.	Recovery	0.120		
12 noon	Recovery	0.120		
12.50 p.m.	Recovery	0.110	Faint trace	Nil

EXPERIMENT F.—*Insulin omitted with evening meal eleven hours previously, but taken with breakfast two hours before experiment.*

Time.		Blood Sugar per Cent.	Urine. Glucose.	Urine. Ketones.
10.10 a.m.	Resting	0.290	0.09 %*	Nil
10.15 a.m.	Exercise ½ min. at 156 steps per minute			
10.47 a.m.	Recovery	0.255		
11 a.m.	Exercise 4½ mins. at 156 steps per minute			
11.10 a.m.	Recovery	0.195		
11.40 a.m.	Recovery	0.145		
12.10 p.m.	Recovery	0.110	0.16%†	Nil

* Total 0.05 gram. † Total 0.41 gram.

Search results for (Type 2 Diabetes) AND (Exercise) AND (Guidelines)

Albright A, Franz M, Hornsby G, Kriska A, Marrero D, Ullrich I, Verity LS. American College of Sports Medicine position stand. Exercise and type 2 diabetes. *Med Sci Sports Exerc.* 2000;32(7):1345-60.

Med Sci Sports Exerc. 2000 Jul;32(7):1345-60.

Wolters Kluwer

American College of Sports Medicine position stand. Exercise and type 2 diabetes.

Albright A, Franz M, Hornsby G, Kriska A, Marrero D, Ullrich I, Verity LS.

Abstract

Physical activity, including appropriate endurance and resistance training, is a major therapeutic modality for **type 2 diabetes**. Unfortunately, too often physical activity is an underutilized therapy. Favorable changes in glucose tolerance and insulin sensitivity usually deteriorate within 72 h of the last **exercise** session: consequently, regular physical activity is imperative to sustain glucose-lowering effects and improved insulin sensitivity. Individuals with **type 2 diabetes** should strive to achieve a minimum cumulative total of 1,000 kcal x wk(-1) from physical activities. Those with **type 2 diabetes** generally have a lower level of fitness (VO2max) than nondiabetic individuals. and therefore **exercise** intensity should be at a comfortable level (RPE 10-12) in the initial periods of training and should progress cautiously as tolerance for activity improves. Resistance training has the potential to improve muscle strength and endurance, enhance flexibility and body composition, decrease risk factors for cardiovascular disease, and result in improved glucose tolerance and insulin sensitivity. Modifications to **exercise** type and/or intensity may be necessary for those who have complications of diabetes. Individuals with **type 2 diabetes** may develop autonomic neuropathy, which affects the heart rate response to **exercise**, and as a result, ratings of perceived exertion rather than heart rate may need to be used for moderating intensity of physical activity. Although walking may be the most convenient low-impact mode, some persons, because of peripheral neuropathy and/or foot problems, may need to do non-weight-bearing activities. Outcome expectations may contribute significantly to motivation to begin and maintain an **exercise** program. Interventions designed to encourage adoption of an **exercise** regimen must be responsive to the individual's current stage of readiness and focus efforts on moving the individual through the various "stages of change."

PMID: 10912903

[Indexed for MEDLINE]

Med Sci Sports Exerc. 2000 Jul;32(7):1345-60.

Wolters Kluwer

American College of Sports Medicine position stand. Exercise and type 2 diabetes.

Albright A, Franz M, Hornsby G, Kriska A, Marrero D, Ullrich I, Verity LS.

Physical activity, including appropriate endurance and resistance training, is a major therapeutic modality for type 2 diabetes

Unfortunately, too often physical activity is an underutilized therapy

Favourable changes in glucose tolerance and insulin sensitivity usually deteriorate within 72 h of the last exercise session: consequently, regular physical activity is imperative to sustain glucose-lowering effects and improved insulin sensitivity

Individuals with type 2 diabetes should strive to achieve a minimum cumulative total of 1,000 kcal *per* week from physical activities

Reviews/Commentaries/ADA Statements

Exercise and Type 2 Diabetes

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

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BO FERNHALL, PHD, FACSM[3]
JUDITH G. REGENSTEINER, PHD[4]
BRYAN J. BLISSMER, PHD[5]
RICHARD R. RUBIN, PHD[6]
LISA CHASAN-TABER, SCD, FACSM[7]
ANN L. ALBRIGHT, PHD, RD[8]
BARRY BRAUN, PHD, FACSM[9]

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 (10,40,89,112,176,208,259,294), 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 in individuals with type 2 diabetes.

Colberg SR, Sigal RJ, Fernhall B, et al. Exercise and type 2 diabetes: the American College of Sports Medicine and the American Diabetes Association: joint position statement. *Diabetes Care*. 2010;33(12):e147-67.

Reviews/Commentaries/ADA Statements

Exercise and Type 2 Diabetes

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

Table 1—*Evidence categories for ACSM and evidence-grading system for clinical practice recommendations for ADA*

I. ACSM evidence categories

Evidence category	Source of evidence	Definition
A	Randomized, controlled trials (overwhelming data)	Provides a consistent pattern of findings with substantial studies
B	Randomized, controlled trials (limited data)	Few randomized trials exist, which are small in size, and results are inconsistent
C	Nonrandomized trials, observational studies	Outcomes are from uncontrolled, nonrandomized, and/or observational studies
D	Panel consensus judgment	Panel's expert opinion when the evidence is insufficient to place it in categories A–C

Effetti acuti dell'Esercizio

• L'esercizio determina un incremento dell'assorbimento del glucosio nei muscoli attivi bilanciato dalla produzione epatica di glucosio, con un maggiore ricorso ai carboidrati con l'aumento dell'intensità nell'attivazione muscolare. **Evidenza A**

• L'assorbimento del glucosio ematico insulino-regolato nel muscolo scheletrico predomina a riposo, meccanismo deficitario nel DM2, mentre le contrazioni muscolari ne stimolano il trasporto attraverso un meccanismo complementare e separato, non compromesso dall'insulino-resistenza o dal DM2. **Evidenza A**

• Nonostante l'esercizio aerobico moderato riduca i livelli di glucosio ematico e ottimizzi l'azione insulinica, in acuto il rischio di ipoglicemia esercizio-indotta è minimo nei soggetti che non fanno uso di insulina esogena o secretagoghi. Una iperglicemia transitoria può seguire un esercizio fisico intenso, soprattutto in relazione alla tipologia di training. **Evidenza C**

Effetti acuti dell'Esercizio

• Gli effetti acuti dell'esercizio di forza nel DM2 sono ancora poco indagati, ma è stato riportato un decremento dei livelli di glucosio ematico a digiuno per almeno 24 ore successive all'esercizio nei soggetti con IFG. **Evidenza C**

• Una combinazione di allenamento aerobico e di forza muscolare può essere più efficace nel migliorare il controllo del glucosio ematico rispetto ai training singoli, sono però necessari ulteriori studi per determinare se il consumo calorico totale, la durata dell'allenamento, o modalità di allenamento ne sia responsabile. **Evidenza B**

• Forme non convenzionali di esercizio (Tai Chi, Yoga, etc.) hanno mostrato risultati contrastanti. **Evidenza C**

• L'esercizio può portare a miglioramenti dell'azione insulinica in acuto, protratti per una durata da 2 a 72 h. **Evidenza A**

Effetti cronici dell'Esercizio

• Sia l'esercizio aerobico che quello di forza migliorano l'azione insulinica, il controllo del glucosio ematico, l'ossidazione dei grassi e le riserve energetiche del muscolo. **Evidenza B**

• L'esercizio di forza incrementa la massa muscolare. **Evidenza A**

• La risposta dei lipidi ematici all'esercizio non è ancora del tutto chiara, ma è stata evidenziata una riduzione delle LDL e spesso nessun cambiamento dei valori di HDL e trigliceridi. Mentre, dove si riscontra una perdita di peso combinata all'esercizio, i cambiamenti nel profilo lipidico sono più marcati. **Evidenza C**

• L'allenamento aerobico riduce la pressione sistolica, ma riduzioni della pressione diastolica sono meno comuni nei soggetti con DM2. **Evidenza C**

• Gli incrementi dei livelli di esercizio e fitness sono associati ad un rischio più basso di mortalità cardiovascolare e per tutte le cause. **Evidenza C**

Effetti cronici dell'Esercizio

• I livelli raccomandati di esercizio possono contribuire a produrre la perdita di peso. Tuttavia, sono necessari fino a 60 minuti al giorno di attività fisica se la perdita di peso si ricerca solo con l'esercizio. **Evidenza C**

• I soggetti con DM2 inseriti in un programma di training supervisionato mostrano una maggiore compliance e controllo del glucosio ematico rispetto ai soggetti che svolgono attività fisica autonomamente. **Evidenza B**

• Un incremento dei livelli di esercizio può ridurre i sintomi di depressione, migliorare la salute e la QOL nei soggetti con DM2. **Evidenza B**

Università degli Studi di Cagliari

DOTTORATO DI RICERCA

in Scienze Cardiovascolari

Ciclo XXV

TITOLO TESI

L'ATTIVITÀ MOTORIA ACQUATICA COME NUOVO APPROCCIO TERAPICO ALLA CARDIO-DIABETOLOGIA

Settori scientifici disciplinari di afferenza

MED/11

M-EDF/01 M-EDF/02 MED/48

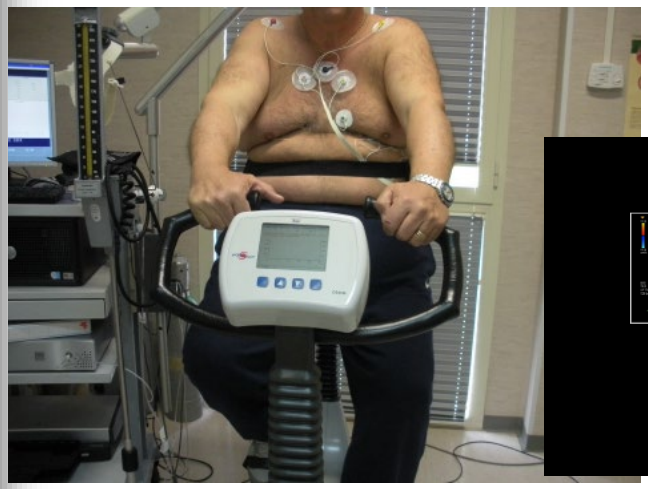
Presentata da: Lucia Cugusi

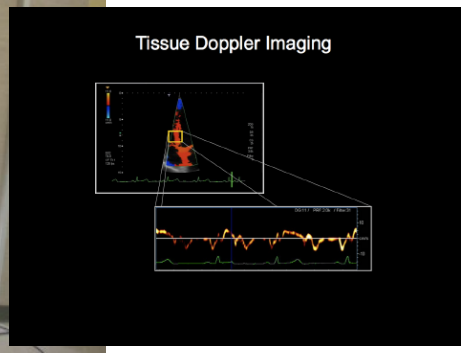
Coordinatore Dottorato: Prof. Francesco Marrosu

Relatore: Prof. Giuseppe Mercuro

Esame finale anno accademico 2011 – 2012

Soggetti maschi(n=18)	Media ± devizione standard
Età (anni)	52,2±9,28
Altezza (cm)	170,44±6,45
Peso (Kg)	89,11±18,03
Indice di Massa Corporea (BMI)	31,14±4,95
Circonferenza Vita (WC, cm)	109,33±14,78
Circonferenza Fianchi (HC, cm)	106,77±13,09
Rapporto Vita/Fianchi (WHR)	1,01±0,05
Frequenza Cardiaca a riposo (bpm)	89±7,83
Pressione Arteriosa Sistolica (mmHg)	149,66±17,45
Pressione Arteriosa Diastolica (mmHg)	88,55±10,14
Abitudine al fumo di sigaretta	6/18












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Original Research—CME

Effects of an Aquatic-Based Exercise Program to Improve Cardiometabolic Profile, Quality of Life, and Physical Activity Levels in Men With Type 2 Diabetes Mellitus

Lucia Cugusi, PhD, Christian Cadeddu, MD, PhD, Silvio Nocco, MD, PhD, Fabio Orrù, MD, Stefano Bandino, MD, Martino Deidda, MD, Alessandra Caria, MSc, Pier Paolo Bassareo, MD, PhD, Alessandra Piras, MD, PhD, Sergio Cabras, MD, Giuseppe Mercuro, MD

Abstract

Background: The role of structured exercise in improving cardiometabolic profile and quality of life in patients with type 2 diabetes mellitus (2DM) has been widely demonstrated. Little is known about the effects of an aquatic-based exercise program in patients with 2DM.
Objective: To evaluate the effects of a supervised aquatic-based exercise program on cardiometabolic profile, quality of life, and physical activity levels in patients with 2DM.
Design and Setting: Observational study, community pre-post aquatic-based exercise program, primary care intervention.
Patients: Eighteen men diagnosed with 2DM (52.2 $\pm$ 9.3 years).
Methods: and Main Outcome Measurements: Cardiometabolic profile, quality of life, and physical activity levels were assessed before and after 12 weeks of an aquatic-based exercise program.
Results: The results show a significant improvement of cardiometabolic assessments (maximum oxygen consumption: 24.1 versus 21.1 mL/kg/min, $P < .05$; blood pressure: 125.4/77 versus 130.7/82.5 mm Hg, $P < .05$; fasting blood glucose: 119.6 versus 132.5 mg/dL, $P < .05$; body mass index: 29.9 versus 31.1 kg/m^2, $P < .005$; low-density lipoprotein cholesterol: 95.2 versus 104.9 mg/dL, $P < .05$; and diastolic function: E/E′ 9.1 versus 10.1, $P < .005$) and an increase in quality of life and physical activity levels (Medical Outcome Study 36-item Short Form Health Survey mental component summary: 72.3 versus 67, $P < .05$; Problems Area About Diabetes: 20.1 versus 33.2, $P < .005$) and energy expenditure in general physical activity (physical activity: 3888.7 versus 1239.5 kcal/wk, $P < .05$).
Conclusions: These findings demonstrate that an aquatic-based exercise program produces benefits for the cardiovascular system and metabolic profile and appears to be safe and effective in improving quality of life and increasing physical activity levels in patients with 2DM.

Diabetes Care Volume 39, November 2016 2065

Physical Activity/Exercise and Diabetes: A Position Statement of the American Diabetes Association

Sheri R. Colberg,[1] Ronald J. Sigal,[2] Jane E. Yardley,[3] Michael C. Riddell,[4] David W. Dunstan,[5] Paddy C. Dempsey,[5] Edward S. Horton,[6] Kristin Castorino,[7] and Deborah F. Tate[8]

Diabetes Care 2016;39:2065–2079 | DOI: 10.2337/dc16-1728

The adoption and maintenance of physical activity are critical foci for blood glucose management and overall health in individuals with diabetes and prediabetes. Recommendations and precautions vary depending on individual characteristics and health status. In this Position Statement, we provide a clinically oriented review and evidence-based recommendations regarding physical activity and exercise in people with type 1 diabetes, type 2 diabetes, gestational diabetes mellitus, and prediabetes.

Physical activity includes all movement that increases energy use, whereas exercise is planned, structured physical activity. Exercise improves blood glucose control in type 2 diabetes, reduces cardiovascular risk factors, contributes to weight loss, and improves well-being (1,2). Regular exercise may prevent or delay type 2 diabetes development (3). Regular exercise also has considerable health benefits for people with type 1 diabetes (e.g., improved cardiovascular fitness, muscle strength, insulin sensitivity, etc.) (4). The challenges related to blood glucose management vary with diabetes type, activity type, and presence of diabetes-related complications (5,6). Physical activity and exercise recommendations, therefore, should be tailored to meet the specific needs of each individual.

TYPES AND CLASSIFICATIONS OF DIABETES AND PREDIABETES

Physical activity recommendations and precautions may vary by diabetes type. The primary types of diabetes are type 1 and type 2. Type 1 diabetes (5%–10% of cases) results from cellular-mediated autoimmune destruction of the pancreatic β-cells, producing insulin deficiency (7). Although it can occur at any age, β-cell destruction rates vary, typically occurring more rapidly in youth than in adults. Type 2 diabetes (90%–95% of cases) results from a progressive loss of insulin secretion, usually also with insulin resistance. Gestational diabetes mellitus occurs during pregnancy, with screening typically occurring at 24–28 weeks of gestation in pregnant women not previously known to have diabetes. Prediabetes is diagnosed when blood glucose levels are above the normal range but not high enough to be classified as diabetes; affected individuals have a heightened risk of developing type 2 diabetes (7) but may prevent/delay its onset with physical activity and other lifestyle changes (8).

TYPES OF EXERCISE AND PHYSICAL ACTIVITY

Aerobic exercise involves repeated and continuous movement of large muscle groups (9). Activities such as walking, cycling, jogging, and swimming rely primarily on aerobic energy-producing systems. Resistance (strength) training includes exercises with free weights, weight machines, body weight, or elastic resistance bands. Flexibility exercises improve range of motion around joints (10). Balance exercises benefit gait and prevent falls (11). Activities like tai chi and yoga combine flexibility, balance, and resistance activities.

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[7]William Sansum Diabetes Center, Santa Barbara, CA
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This position statement was reviewed and approved by the American Diabetes Association Professional Practice Committee in June 2016 and ratified by the American Diabetes Association Board of Directors in September 2016.

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Colberg SR, Sigal RJ, Yardley JE, Riddell MC, Dunstan DW, Dempsey PC, Horton ES, Castorino K, Tate DF. Physical Activity/Exercise and Diabetes: A Position Statement of the American Diabetes Association. *Diabetes Care*. 2016 Nov;39(11):2065-2079.

Diabetes Care Volume 39, November 2016 2065

Physical Activity/Exercise and Diabetes: A Position Statement of the American Diabetes Association

Sheri R. Colberg,[1] Ronald J. Sigal,[2] Jane E. Yardley,[3] Michael C. Riddell,[4] David W. Dunstan,[5] Paddy C. Dempsey,[5] Edward S. Horton,[6] Kristin Castorino,[7] and Deborah F. Tate[8]

Diabetes Care 2016;39:2065–2079 | DOI: 10.2337/dc16-1728

In assenza di controindicazioni, si può considerare un test da sforzo per tutti i soggetti diabetici al fine di individuare la frequenza cardiaca massima effettiva, impostare l'intensità d'esercizio e stabilire la capacità funzionale basale

CONDIZIONE INIZIALE	AZIONI SUGGERITE
Pazienti diabetici con rischio a 10 anni di manifestazione coronarica < 10% in avvio ad attività fisica a bassa intensità	Valutazione medica di routine
Pazienti diabetici con rischio a 10 anni di manifestazione coronarica < 10% in avvio ad attività fisica di moderata intensità	Valutazione medica di routine **Test da sforzo consigliato** ma non obbligatorio
Pazienti diabetici precedentemente sedentari in avvio ad attività fisica di tipo aerobico di intensità eccedente il fabbisogno quotidiano con rischio a dieci anni di manifestazione coronarica > 10%	Valutazione medica di routine e **test da sforzo massimale con ECG**
Pazienti diabetici con altre complicanze specifiche (retinopatia, neuropatia periferica, neuropatia autonomica, microalbuminuria e nefropatia)	Valutazione medica di routine e valutazione clinica delle complicanze, nonché **test da sforzo massimale con ECG in caso di rischio di manifestazione coronarica > 10%**

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ESERCIZIO AEROBICO

	RACCOMANDAZIONI		NOTE
FREQUENZA	Almeno 3 giorni a settimana		Gli esercizi aerobici devono essere eseguiti in aggiunta all'attività fisica giornaliera Le sessioni andrebbero distribuite nell'arco almeno 3 gg a settimana con non oltre 2 giorni consecutivi in assenza di attività
INTENSITA'	Con volume complessivo di circa 150 minuti **40%-60% dell'HRR o VO_2 max** 50%-70% dell'HR max 2-4 del RPE (scala 1-10)	Con volume complessivo di circa 75 minuti* **>60% dell'HRR o VO_2 max** >70% dell'HR max >4 del RPE (scala 1-10)	Nei pazienti con concomitanza di ipertensione o patologia ischemica sintomatica, la prescrizione dovrà essere personalizzata in relazione alle linee guida imposte dalla condizione clinica. * Soggetti giovani e già allenati
VOLUME	Idealmente, almeno 30 minuti		La durata dell'esercizio aerobico dovrebbe essere aumentata gradualmente per il mantenimento
TIPO	Qualsiasi esercizio che interessi i grandi gruppi muscolari, possa essere mantenuto continuativamente e che sia di natura ritmica ed aerobica. Anche l'allenamento a circuito si è dimostrato efficace (HIIT)		Si consiglia di iniziare con cyclette o tapis roulant, e successivamente, una volta raggiunta la condizione adeguata, si consiglia l'utilizzo di altre macchine cardiofitness tra cui l'ellittica e l'ergometro a braccia. I soggetti obesi dovrebbero utilizzare la cyclette per prevenire il sovraccarico articolare
PROGRESSIONE	Graduale. Incrementi in intensità su brevi periodi poi incrementi in durata e frequenza		

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Range Target Frequenza Cardiaca

(40 - 89% HRR)

Esempio: donna di 30 anni, frequenza cardiaca a riposo 78 b/min.
Frequenza cardiaca massima 190 b/min
(stimata da 220 - età)

Formula da Applicare

Frequenza Cardiaca Target = FCmax - (FCbasale x % intensità desiderata) + FCbasale

Più bassa intensità (40%) = 190 - 78 x 0,40 + 78 = F.C. 123 b/min

Più alta intensità (89%) = 190 - 78 x 0,89 + 78 = F.C. 178 b/min

Range Target Frequenza Cardiaca (40 - 89 %HRR) = 123 - 178







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ESERCIZIO DI FORZA

	RACCOMANDAZIONI	NOTE
FREQUENZA	Idealmente, 2-3 volte a settimana in giorni non consecutivi	L'allenamento di forza deve essere complementare e non sostituire l'esercizio aerobico
INTENSITA'	1-4 serie da 8-15 ripetizioni con carico che si riesce a spostare al massimo per 10-15 ripetizioni	Preferire esercizi ad intensità moderata (eseguiti senza sforzo sino all`ultima ripetizione). Evitare l'allenamento con carichi molto pesanti
VOLUME	Tempo necessario all'esecuzione di almeno 3 serie da 8-15 ripetizioni con un minuto di riposo tra le singole serie o da 2 a 3 Circuit Training per 15-20 ripetizioni a circuito con riposo minimo tra gli esercizi	Le attività di potenziamento muscolare sono solitamente costituite da allenamenti con carichi crescenti eseguiti con serie e ripetizioni ma anche da allenamenti a circuito. In caso di modalità a circuito, l'intensità dovrebbe essere diminuita
TIPO	5-10 differenti esercizi dinamici (contrazioni concentriche-eccentriche) eseguiti con il metodo standard di “serie/ripetizioni e riposo” o in modalità Circuit Training	Utilizzare inizialmente macchine per l'allenamento della forza, quindi aggiungere anche pesi liberi
PROGRESSIONE	Graduale. 10-15 ripetizioni con carichi ridotti poi incrementi in carico con riduzione delle ripetizioni	

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ESERCIZIO DI FLESSIBILITA'

	RACCOMANDAZIONI	NOTE
FREQUENZA	Ideale su base giornaliera	Gli esercizi di flessibilità devono interessare i principali gruppi muscolari, con particolare attenzione ai muscoli attivati durante gli esercizi aerobici e di forza
TEMPO	Da 10 secondi a qualche minuto per esercizio a seconda della tecnica	Gli allungamenti statici devono essere mantenuti da 10 a 30 secondi, le tecniche di PNF prevedono contrazioni di 6 secondi seguite da allungamenti assistiti da 10 a 30 secondi. Le “posture”, che coinvolgono più di un gruppo muscolare alla volta, possono essere mantenute per vari minuti
TIPO	Esercizi statici analitici o allungamenti statici posturali interessanti le “catene muscolari” tramite l'adozione di “posture” specifiche o tecniche PNF	Idealmente, gli esercizi di allungamento dovrebbero essere eseguiti dopo un riscaldamento cardiovascolare iniziale (al fine di aumentare il flusso sanguigno ai muscoli). Dovrebbero sempre essere eseguiti al termine delle sessioni di allenamento o tra i singoli esercizi
PROGRESSIONE	Graduale. Incrementi in durata e frequenza delle sessioni	

Br J Sports Med: first published a

Review

Exercise prescription for patients with type 2 diabetes—a synthesis of international recommendations: narrative review

Romeu Mendes,[1,2] Nelson Sousa,[2] António Almeida,[2] Paulo Subtil,[3] Fernando Guedes-Marques,[1] Victor Machado Reis,[2] José Luís Themudo-Barata[4]

Table 1 Guidelines for exercise prescription in patients with type 2 diabetes, issued by several scientific organisations

Organisation	Type	Mode	Duration	Intensity	Frequency
ACSM and ADA[12]	Aerobic	Any form that uses large muscle groups (eg, brisk walking)	Minimum of 150 min/week	Moderate to vigorous	At least 3 days/week with no more than 2 consecutive days without exercising
	Resistance	Resistance machines and free weights involving major muscle groups	1–4 sets 8–15 repetitions 5–10 exercises on each session	Moderate to vigorous	At least twice weekly on non-consecutive days
	Flexibility	Included as part of a physical activity programme; it should not substitute other types of exercise			
FDS[20]	Aerobic		Minimum of 150 min/week	At least moderate	At least 3 days/week with no more than two consecutive days without exercising
	Resistance	Exercises involving major muscle groups	3 sets 8–10 repetitions 5–10 exercises on each session	Moderate to vigorous	At least twice weekly on non-consecutive days
BPTA[13]	Aerobic		Minimum of 150 min/week	Low to moderate	3–5 days/week
	Resistance		3 sets 10–15 repetitions 5–10 exercises on each session	Moderate	Combined with aerobic exercise
ESSA[15]	Aerobic	Large muscle activities (eg, walking, running, cycling and swimming)	Minimum of 150 min/week OR Minimum of 90 min/week	Moderate Vigorous	No more than two consecutive days without exercising
	Resistance	Multi joint exercises involving large muscle groups	2–4 sets 60 min/week 8–10 repetitions OR 8–10 exercises on 35 min/week each session	Moderate Vigorous	Two or more sessions per week
CDA[19]	Aerobic	Large muscle activities (eg, biking, brisk walking and continuous swimming)	Minimum of 150 min/week	Moderate to vigorous	At least 3 days/week with no more than two consecutive days without exercising
	Resistance	Resistance machines or free weights	3 sets 8 repetitions	Moderate to vigorous	At least twice weekly
AHA[14]	Aerobic	Large-muscle activities	Minimum of 150 min/week OR Minimum of 90 min/week	Moderate Vigorous	3–7 days/week 3 days/week
	Resistance	Multi joint exercises; large-muscle groups	2–4 sets 8–10 repetitions Exercises for all muscle groups on each session	Moderate to vigorous	3 days/week
ADA[16]	Aerobic	For example, walking	Minimum of 150 min/week	Moderate	At least 3 days/week with no more than two consecutive days without exercising
	Resistance	Free weights or weight machines involving large muscle groups	At least 1 set 5 or more different exercises on each session		At least twice per week
SNIPH[18]	Aerobic	For example, brisk walking, cycling For example, tennis, swimming	Minimum of 30 min 20–60 min	Moderate Vigorous	Daily 3–5 days/week
	Resistance	Bodyweight, elastic bands, free weights or weight machines	8–12 repetitions of each exercise 8–10 exercises on each session		2–3 days/week
	Flexibility	5–10 min at the end of aerobic and resistance exercise sessions			
IDF[2]	Aerobic Resistance		Minimum of 150 min/week	Moderate	3–5 days/week 3 days/week
ADA and EASD[17]	Aerobic Resistance Flexibility		Minimum of 150 min/week	Moderate	
ESC and EASD[3]	Aerobic Resistance		Minimum of 150 min/week	Moderate to vigorous	

ACSM, American College of Sports Medicine; ADA, American Diabetes Association; AHA, American Heart Association; BPTA, Belgian Physical Therapy Association; CDA, Canadian Diabetes Association; EASD, European Association for the Study of Diabetes; ESC, European Society of Cardiology; ESSA, Exercise and Sports Science Australia; FDS, Francophone Diabetes Society; IDF, International Diabetes Federation; SNIPH, Swedish National Institute of Public Health.

Br J Sports Med: first published a

Review

Exercise prescription for patients with type 2 diabetes—a synthesis of international recommendations: narrative review

Romeu Mendes,[1,2] Nelson Sousa,[2] António Almeida,[2] Paulo Subtil,[3] Fernando Guedes-Marques,[1] Victor Machado Reis,[2] José Luís Themudo-Barata[4]

What are the findings?

- Exercise guidelines agree on a weekly accumulation of a minimum of 150 min of aerobic exercise at moderate-to-vigorous intensity spread over a minimum of 3 days per week. Resistance exercise for muscle strengthening is also recommended at least 2 days a week. Flexibility exercises may complement other types of exercise.
- Individual exercise prescription should include specific information on the type, mode, duration, intensity and weekly frequency.
- Exercise strategies must be adapted for each individual, based on comorbidities, contraindications and realistic personal goals.

Nuove linee di ricerca?

Jing et al. Health and Quality of Life Outcomes (2018) 16:189
https://doi.org/10.1186/s12955-018-1021-9

Health and Quality of Life Outcomes

RESEARCH Open Access

Related factors of quality of life of type 2 diabetes patients: a systematic review and meta-analysis

Xiyue Jing†, Jiageng Chen†, Yanan Dong, Duolan Han, Haozuo Zhao, Xuying Wang, Fei Gao, Changping Li, Zhuang Cui, Yuanyuan Liu and Jun Ma*

Abstract

Background: Diabetes is a chronic disease, and it could affect both health and quality of life (QOL). A lot of studies have reported some predictors of QOL of type 2 diabetes patients. While their results were not completely consistent. So the aim of our study was finding out the related factors (including characteristics related to the disease, life styles and mental health factors) of QOL of type 2 diabetes patients.

Methods: We searched Cochrane library, EmBase, PubMed and CNKI databases for published studies that evaluated the related factors of QOL of type 2 diabetes patients by using a proper statistic method and had effect sizes (*OR* or *β*) and 95% confidence intervals from January 1st 2000 to May 31st 2016. Any study types were acceptable, and we excluded the reviews, letters, editorials and pooled analyses. The data were analyzed using STATA software (Version 12.0; Stata Corporation). Effect sizes and 95% confidence intervals were calculated to evaluate the relationship between these factors and QOL.

Results: Eighteen studies were included into our systematic review and meta-analysis, totaling 57,109 type 2 diabetes patients. Do more physical exercises (The pooled ORs ranged from 0.635 to 0.825 for different scales, less than 1.00), glucose check more frequently [pooled OR (95%CI): 0.175 (0.041, 0.756)] were associated with a better QOL. Presence of complications (The pooled ORs ranged from 1.462 to 3.038 for different scales, more than 1.00), presence of hypertension [pooled OR (95%CI): 1.389 (1.173, 1644)], longer duration of diabetes [pooled OR (95%CI): 1.865 (1.088, 3.197)], diet with more red meat [pooled OR (95%CI): 2.085 (1.063, 4.089)] and depression (The pooled ORs ranged from 3.003 to 11.473 for different scales, higher than 1.00) were associated with a worse QOL.

Conclusion: The results of this study show that physical exercise, glucose check frequently, complications, hypertension, duration of diabetes, diet with more red meat, and depression were associated with the QOL of type 2 diabetes patients.

Keywords: Type 2 diabetes, Quality of life, Related factors, Meta-analysis

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Review

High-intensity interval training versus continuous training on physiological and metabolic variables in prediabetes and type 2 diabetes: A meta-analysis ☆

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ABSTRACT

Aims: To compare the effects of high-intensity interval training (HIIT) versus moderate-intensity continuous training (MICT) on functional capacity and cardiometabolic markers in individuals prediabetes and type 2 diabetes (T2D).

Methods: The search was performed in PubMed (MEDLINE), EMBASE, PEDro, CENTRAL, Scopus, LILACS database, and Clinical Trials from the inception to July 2017, included randomized clinical trials that compared the use of HIIT and MICT in prediabetes and T2D adults. The risk of bias was defined by Cochrane Handbook and quality of evidence by GRADE.

Results: From 818 relevant records, seven studies were included in systematic review (64 prediabetes and 120 T2D patients) and five with T2D were meta-analyzed. HIIT promoted significantly increased of 3.02 mL/kg/min (CI95% 1.42–4.61) of VO_2max, measured for functional capacity, compared to MICT. No differences were found between two modalities of exercises considering the outcomes HbA1c, systolic and diastolic blood pressure, total cholesterol, HDL and LDL cholesterol, triglycerides, BMI, and waist-to-hip ratio. Most of the studies presented unclear risk of bias, and low and very low quality of evidence.

Conclusion: HIIT induces cardiometabolic adaptations similar to those of MICT in prediabetes and T2D, and provides greater benefits to functional capacity in patients with T2D.

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Scientific Review

Impact of Exercise Training on Cardiac Function Among Patients With Type 2 Diabetes

A SYSTEMATIC REVIEW AND META-ANALYSIS

Vidhu Anand, MD; Sushil Garg, MD; Jalaj Garg, MD; Shah Bano, MD; Marc Pritzker, MD

Purpose: Type 2 diabetes (T2D) is associated with subclinical abnormalities in left ventricular function and an increased downstream risk for heart failure. Exercise training has been associated with significant improvement in cardiorespiratory fitness among these patients. However, its impact on cardiac function is not well established.

Methods: We conducted a meta-analysis including all randomized and nonrandomized trials that evaluated effects of exercise training on cardiac function among patients with T2D. Primary outcomes were measures of left ventricular systolic (global longitudinal strain) and diastolic (early diastolic velocity [e´]) function. The effects of exercise training on peak oxygen uptake; other markers of diastolic dysfunction: mitral peak early-to-late diastolic filling velocity (E/A), mitral inflow to annular ratio (E/e´), and deceleration time (DT); and systolic velocity were also assessed.

Results: Our study included 441 patients enrolled in 6 trials. Exercise training significantly improved early diastolic velocity (standardized mean difference [SMD], 0.58; 95% CI, 0.09-1.07), global longitudinal strain (SMD, 0.62; 95% CI, 0.04-1.21), and peak oxygen uptake (SMD, 1.43; 95% CI, 0.51-2.35) as compared with control group. However, no significant changes were observed in other markers of diastolic function (E/A, E/e´ and DT) and systolic velocity.

Conclusion: Exercise training in patients with T2D is associated with a significant improvement in some echocardiographic indicators of systolic and diastolic function and cardiorespiratory fitness. These findings suggest that exercise training may improve subclinical systolic and diastolic dysfunction in patients at risk for clinical heart failure.

mal left ventricular remodeling and subclinical systolic and diastolic dysfunction.[2,3] Subclinical diastolic dysfunction is one of the earliest manifestations of the effects of diabetes on cardiac function seen in up to 75% patients.[4,5]

Numerous studies have shown that higher level of cardiorespiratory fitness is associated with favorable cardiac structural and functional changes and lower risk of incident heart failure.[6-8] Exercise training is a well-established, widely available, and low-cost intervention that has been shown to improve cardiorespiratory fitness levels in patients at risk for heart failure as well as those with established heart failure.[9,10] Several studies have evaluated the impact of exercise training in individuals with diabetes who are at risk for future heart failure development.[10,11] While, these studies have demonstrated improvement in cardiorespiratory fitness with training, the impact of exercise on diastolic performance has not been well defined.

A crucial step in evaluation of interventions such as exercise training as a potential strategy for prevention is to understand their impact on the intermediate cardiac phenotypes such as asymptomatic systolic and diastolic dysfunction, particularly in high-risk patients. Accordingly, we performed a meta-analysis to evaluate the effects of exercise training on cardiac function in patients with type 2 diabetes (T2D).

METHODS

SEARCH METHODS

Hindawi
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Review Article

The Effects of Tai Chi on Type 2 Diabetes Mellitus: A Meta-Analysis

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Objective. To investigate the effects of Tai chi in type 2 diabetes mellitus (type-2 DM) patients using systematic review and meta-analysis. *Methods.* Seven electronic resource databases were searched, and randomized controlled trials on the role of Tai chi in type-2 DM patients were retrieved. The meta-analysis was performed with RevMan 5.3, and research quality evaluation was conducted with the modified Jadad scale. *Results.* Fourteen studies, with 798 individuals related to the intervention of Tai chi on diabetes, were included. The results showed that, compared with nonexercise, Tai chi had the effect of lowering fasting blood glucose [MD = −1.39, 95% CI (−1.95, −0.84), $P < 0.0001$] and the subgroup effect size decreased with the increase of total exercise amount, there is no significant difference between Tai chi and other aerobic exercises [MD = −0.50, 95% CI (−1.02, 0.02), $P = 0.06$]; compared with nonexercise, Tai chi could reduce HbA1c [MD = −0.21, 95% CI (−0.61, 0.19), $P = 0.31$], and the group effect size decreased with the increase of total exercise amount. The reducing HbA1c effect of Tai chi was better than that of other aerobic exercises, but the difference was at the margin of statistical significance [MD = −0.19, 95% CI (−0.37, 0.00), $P = 0.05$]; compared with nonexercise, Tai chi had the effect of reducing 2 h postprandial blood glucose [MD = −2.07, 95% CI (−2.89, −1.26), $P = 0.0002$], there is no significant difference between Tai chi and other aerobic exercises in reducing 2 h postprandial blood glucose [MD = −0.44, 95% CI (−1.42, 0.54), $P = 0.38$]. *Conclusion.* Tai chi can effectively affect the management of blood glucose and HbA1c in type-2 DM patients. Long-term adherence to Tai chi has a better role in reducing blood glucose and HbA1c levels in type 2 DM patients.

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Exercise Timing in Type 2 Diabetes Mellitus: A Systematic Review

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ACCEPTED

Abstract

Purpose: The timing of exercise relative to meal consumption has recently been identified as potentially moderating the effectiveness of exercise on glycemic responses in type 2 diabetes mellitus (T2DM). The aim of this study was to systematically review the literature related to exercise timing, relative to meal consumption, and glycemic control in individuals with T2DM. **Methods:** Systematic searches in PubMed, EMBASE, CINAHL, Cochrane Library and ClinicalTrials.gov Registry databases were performed to identify articles published in English from inception to October 2017. Two authors independently extracted data and evaluated the quality of studies using the Cochrane Collaboration Data Collection Form and Cochrane Collaboration Risk of Bias Assessment Tool respectively. A qualitative synthesis was performed on the included studies, and results summarized in tables. **Results:** 19 randomized controlled trials (RCTs) with a total of 346 participants were included. Improvements in glycemia (glucose concentrations and glucose-AUC) and insulin-AUC appeared more consistent when exercise was performed during the post-meal period as compared to the pre-meal period, however, this observation was largely based on indirect comparisons between studies. **Conclusions:** There is some evidence from RCTs that exercise performed 30 min after meal consumption may convey greater improvements in glycemic control for individuals with T2DM. However, there are only two studies which have directly assessed the role of exercise timing on glycemic management and adopted methodologies are heterogeneous. Future low risk trials in this field are warranted.

Diabetes Care 1

Effect of a Lifestyle Intervention Program With Energy-Restricted Mediterranean Diet and Exercise on Weight Loss and Cardiovascular Risk Factors: One-Year Results of the PREDIMED-Plus Trial

https://doi.org/10.2337/dc18-0836

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OBJECTIVE

The long-term impact of intentional weight loss on cardiovascular events remains unknown. We describe 12-month changes in body weight and cardiovascular risk factors in PREvención con Dieta MEDiterránea (PREDIMED)-Plus, a trial designed to evaluate the long-term effectiveness of an intensive weight-loss lifestyle intervention on primary cardiovascular prevention.

RESEARCH DESIGN AND METHODS

Overweight/obese adults with metabolic syndrome aged 55–75 years ($n = 626$) were randomized to an intensive weight-loss lifestyle intervention based on an energy-restricted Mediterranean diet, physical activity promotion, and behavioral support (IG) or a control group (CG). The primary and secondary outcomes were changes in weight and cardiovascular risk markers, respectively.

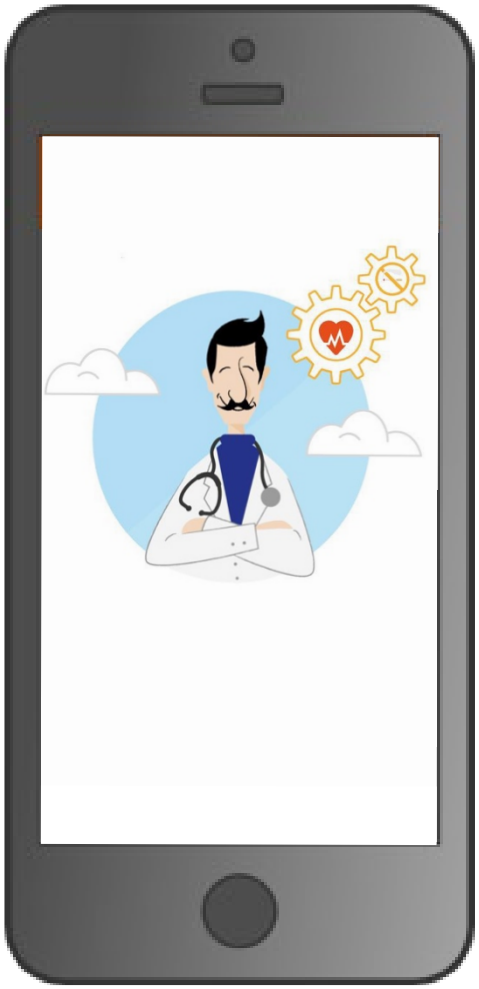
RESULTS

Diet and physical activity changes were in the expected direction, with significant improvements in IG versus CG. After 12 months, IG participants lost an average of 3.2 kg vs. 0.7 kg in the CG ($P < 0.001$), a mean difference of −2.5 kg (95% CI −3.1 to −1.9). Weight loss ≥5% occurred in 33.7% of IG participants compared with 11.9% in the CG ($P < 0.001$). Compared with the CG, cardiovascular risk factors, including waist circumference, fasting glucose, triglycerides, and HDL-cholesterol, significantly improved in IG participants ($P < 0.002$). Reductions in insulin resistance, HbA_{1c}, and circulating levels of leptin, interleukin-18, and MCP-1 were greater in IG than CG participants ($P < 0.05$). IG participants with prediabetes/diabetes significantly improved glycemic control and insulin sensitivity, along with triglycerides and HDL-cholesterol levels compared with their CG counterparts.

CONCLUSIONS

PREDIMED-Plus intensive lifestyle intervention for 12 months was effective in decreasing adiposity and improving cardiovascular risk factors in overweight/obese older adults with metabolic syndrome, as well as in individuals with or at risk for diabetes.

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BMC Public Health

STUDY PROTOCOL Open Access

App-technology to increase physical activity among patients with diabetes type 2 - the DiaCert-study, a randomized controlled trial

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Abstract

Background: Physical activity can decrease the risk of complications related to diabetes type 2. Feasible and scalable strategies to implement support for a healthy lifestyle for patients in primary care are needed. The aim of the DiaCert-study is to evaluate a digital healthcare platform and the effect of a 12-week long smartphone-app physical activity intervention aiming at increasing physical activity (primary outcome) and improve levels of HbA1c (glycated hemoglobin), blood lipids, blood pressure, body composition, as well as other lifestyle factors and overall health in patients with diabetes type 2.

Methods/Design: The DiaCert-study is a two-arm, randomized controlled trial that will include 250 patients with diabetes type 2. At baseline, participants are randomized 1:1 to intervention, i.e. use of the smartphone-app, during 12 weeks, or to a control group receiving only standard care. Physical activity and sedentary behavior, is objectively measured using the Actigraph GT3X. Biomarkers including HbA1c and blood lipids are measured in fasting blood samples. Anthropometrics include height, weight, waist circumference and body composition, and a number of lifestyle factors including sleep, diet, self-efficacy, and quality of life, are assessed through an extensive questionnaire. Measurements are made at baseline and at follow-up after 3, 6 and 12 months.

Discussion: Using new technology, is one way to bridge the gap between what patients need and what health care can offer. This study evaluates a new digital health care platform and will show if use of a smartphone-app to promote daily steps is an effective and feasible method to increase physical activity and improve clinical markers in patients with diabetes type 2.

Trial registration: ClinicalTrials.gov Identifier: NCT03053336, 7 Feb. 2017.

Keywords: Adults, Body composition, Exercise, HbA1c, Metabolic health, Randomized controlled trial, Smartphones

MORGAGNI LEONARDO CESALPINO LANCISI
SOCIETÀ ITALIANA DI CARDIOLOGIA

PROGETTO PERCORSO
PERché Camminare favOrisce la Riduzione del riSchio cardioOvascolare

OBIETTIVO: soggetto diabetico

Range di appartenenza e aspettativa di movimento:
Obiettivo: **8.500 passi al giorno/per 7 gg settimana**

Di questi, circa 15.000 passi alla settimana devono essere eseguiti in un regime di attività fisica da moderata a intensa (almeno 3.000 passi al giorno per 5 giorni oppure almeno 2150 passi al giorno per 7 giorni da eseguire in un regime fra il 40-60% della FCR, cadenza > 100 passi/minuto, con intervalli continuativi di almeno 10 minuti.

Nel caso il soggetto facesse uso di betabloccanti soglie 40-60% - 25 bpm

- *Kirk A, Barnett J, Leese G, Mutrie N: A randomized trial investigating the 12-month changes in physical activity and health outcomes following a physical activity consultation delivered by a person or in written form in Type 2 diabetes: Time2Act. Diabet Med 2009, 26:293-301.*

R.it | Medicina e Ricerca

Sanità: in Sardegna attività fisica nelle ricette come i farmaci



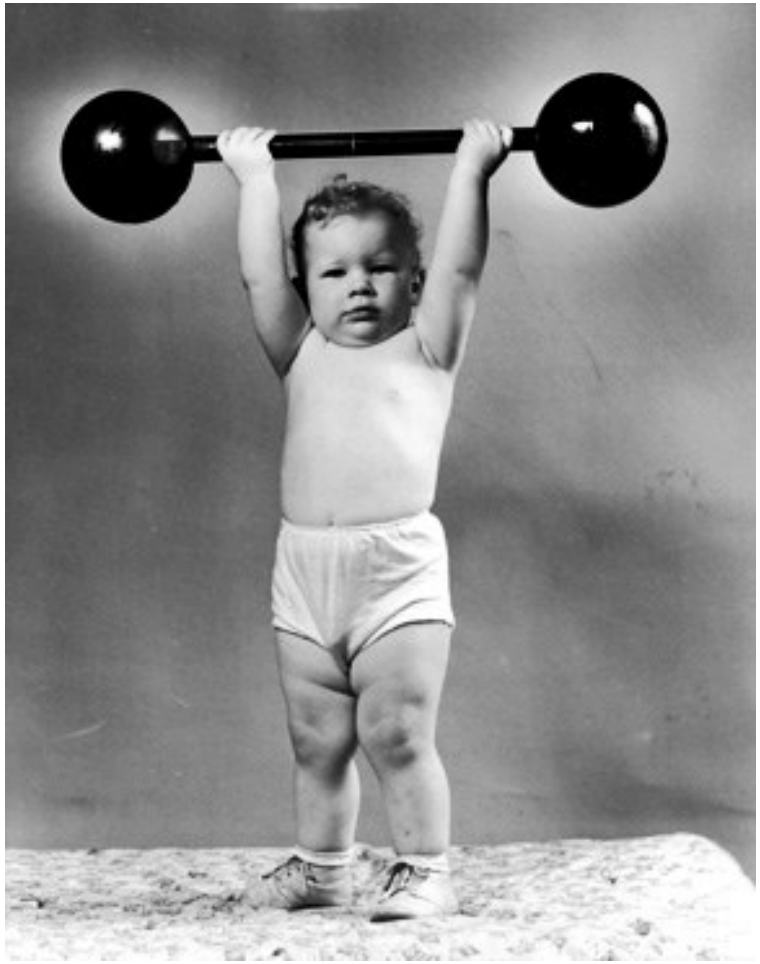
L'obiettivo è rendere più responsabili i pazienti

ABBONATI A

30 novembre 2018

L'ATTIVITA' fisica finisce nella ricetta medica prescritta come un farmaco tradizionale per curare ma anche prevenire alcune patologie croniche. E' questa l'ultima frontiera della sanità pubblica sarda, che dichiara guerra ai farmaci tradizionali introducendo lo sport nei ricettari medici come terapia sostitutiva per la cura di **obesità, diabete, disturbi cardiaci e alcune malattie neurologiche**. Che in Sardegna rappresentano circa il 30 per cento dei pazienti, con una spesa di oltre due terzi del bilancio sanitario regionale.

A gennaio - si legge sull'edizione online de 'La nuova Sardegna - il cosiddetto 'Ricettario dell'attività fisicà sarà operativo in tutta la Sardegna e lo sport, alla stregua dei farmaci, sarà prescritto dal medico curante. Un progetto inserito dall'Ats sarda tra gli indirizzi del Piano regionale di prevenzione, che in attuazione della delibera della Giunta regionale sulla "Promozione e prescrizione dell'attività fisica a persone con patologie croniche", ha dato il via all'inizio di quest'anno alla fase di formazione di equipe multidisciplinari, di laureati in scienze motorie specializzati Apa e dei medici prescrittori, e che proprio in questi giorni ha fatto tappa nel capoluogo barbaricino per le attività di formazione aggiornamento dei professionisti del territorio.



GRAZIE!