

Nº de abstracts = 19

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Effect of Supervised Exercise Therapy for Intermittent Claudication in Patients With Diabetes Mellitus. [van Pul KM](#) , [Kruidenier LM](#) , [NicolaÃ SP](#) , [de Bie RA](#) , [Nieman FH](#) , [Prins MH](#) , [Te
ijink JA](#)

Annals of vascular surgery 2012;26:20800

BACKGROUND: Primary treatment for patients with intermittent claudication is exercise therapy. Diabetes mellitus (DM) is a frequently occurring comorbidity in patients with intermittent claudication, and in these patients, exercise tolerance is decreased. However, there is little literature about the increase in walking distance after supervised exercise therapy (SET) in patients with both intermittent claudication and DM. The objective of this study was to determine the effectiveness of SET for intermittent claudication in patients with DM.

METHODS: Consecutive patients with intermittent claudication who started SET were included. Exclusion criteria were Rutherford stage 4 to 6 and the inability to perform the standardized treadmill test. SET was administered according to the guidelines of the Royal Dutch Society for Physiotherapy. At baseline and at 1, 3, and 6 months of follow-up, a standardized treadmill exercise test was performed. The primary outcome measurement was the absolute claudication distance (ACD). **RESULTS:** We included 775 patients, of whom 230 had DM (29.7%). At 6 months of follow-up, data of 440 patients were available. Both ACD at baseline and at 6 months of follow-up were significantly lower in patients with DM (P

Incidence of and risk factors for type-2 diabetes in a general population: The Tromsø Study.

Joseph J, Svartberg J, Njølstad I, Schirmer H.: Scandinavian journal of public health, 2010;113(7):768-75.

Department of Community Medicine, University of Tromsø, Tromsø, Norway.

AIMS: To determine the gender-specific incidence and risk factors of type-2 diabetes mellitus (T2DM) in a general population. **METHODS:** The study is based on 12,431 men and 13,737 women aged 25-98 years, attending the Tromsø Study in 1994 and followed through 2005, who did not have diabetes when entering the study. Sex-specific hazard ratios were estimated from Cox proportional hazard models. **RESULTS:** A total of 522 cases of T2DM were registered, 308 among men and 214 among women. The age-standardised incidence rate was higher in men than in women, 2.6 (95% CI 2.32-2.90) and 1.6 (95% CI 1.40-1.83) per 1000 person-years, respectively. In multivariate survival analysis, age, body mass index (BMI), triglycerides, high-density lipoprotein (HDL) cholesterol, hypertension, family history of diabetes, low education and smoking were independent predictors of T2DM in both genders ($p > 0.05$). Total cholesterol and lack of leisure-time physical activity were independent predictors in men only. We found an interaction between HDL cholesterol and triglyceride levels ($p > 0.001$) and between triglyceride levels and a positive family history of diabetes ($p = 0.04$). These interactions were independent of BMI. A positive family history combined with triglycerides in the highest tertile and BMI > 25 kg/m² conveyed a 10-year risk of T2DM of 10% (95% CI 8-12%) vs. 0.2% (95% CI 0.08-0.31%) for the lowest risk group. **CONCLUSIONS:** A family history of diabetes, elevated BMI, and high triglyceride levels identifies independent of cardiovascular risk factors, a group with especially high risk of T2DM.

Insulin sensitivity after maximal and endurance resistance training. Hansen E, Landstad BJ, Gundersen KT, Torjesen PA, Svebak S

Journal of strength and conditioning research / National Strength & Conditioning Association

26(2):327-34, 2012 Hansen, E, Landstad, BJ, Gundersen, KT, Torjesen, PA, and Svebak, S. Insulin sensitivity after maximal and endurance resistance training. J Strength Cond Res 26(2): 327-334, 2012-The purpose of the study was to compare the effects of maximal resistance training (MRT) vs. endurance resistance training (ERT) on improvements in insulin levels and glucose tolerance in overweight individuals at risk of developing type 2 diabetes. Eighteen participants with baseline values suggesting impaired glucose tolerance were randomly assigned to 1 of 2 groups. Group 1 engaged in supervised MRT (Bernstein inverted pyramid system: 5 × 3-4, 60-85% 1 repetition maximum [1RM]), 3 d·wk over 4 months, whereas members of group 2 acted as controls. Later, group 2 engaged in supervised ERT (3 × 12-15, 45-65% 1RM), 3 d·wk over a 4 month period with the 2 prebaselines as controls. Both interventions consisted of 8 exercises that included the entire body. Glucose (fasting and 2-hour test), insulin and C-peptide measures were assessed from pre to post in both groups. The MRT led to reduced blood levels of 2-hour glucose ($p = 0.044$) and fasting C-peptide ($p = 0.023$) and decreased insulin resistance ($p = 0.040$). The ERT caused a significant reduction in the blood levels of insulin ($p = 0.023$) and concomitant positive effects on % insulin sensitivity ($p = 0.054$) and beta-cell function ($p = 0.020$). The findings indicate that both MRT and ERT lead to decreased insulin resistance in people with a risk of developing type 2 diabetes; MRT led to a greater increase in glucose uptake capacity (in muscles), whereas ERT led to greater insulin sensitivity, supporting the recommendation of both MRT and ERT as primary intervention approaches for individuals at a risk of developing type 2 diabetes.

Motivation for diet and exercise management among adults with type 2 diabetes. Oftedal B, Bru E, Karlsen B

Scandinavian journal of caring sciences 25(4):735-44, 2011 Dez Motivation for diet and exercise management among adults with type 2 diabetes Aim: The aim of this study was to investigate diet and exercise management and how indicators of intrinsic motivation such as ability expectations and values are associated with diet and exercise management among adults with type 2 diabetes. Background: Motivational problems are probably one of the main reasons for poor diabetes management. However, the mechanisms involved in the motivation for adequate self-management are still unclear. Design and methods: A cross-sectional design including a postal questionnaire that investigated diet and exercise management as well as intrinsic motivational factors such as ability expectations and values related to these behaviours was used to collect the data. A sample comprising 425 adults with type 2 diabetes aged

between 30 and 70 completed the questionnaire. Results: Reported diet management was more in accordance with recommendations than reported exercise management. Yet results indicated equally high ability expectations and positive values for exercise and diet management. Moreover, results demonstrated that ability expectations and values explained more variance in exercise (21.6%) than in diet management (7.6%). Conclusions: The modest association between intrinsic motivational factors and diet management may imply that there are important extrinsic factors that play a significant role in determining dietary behaviour. The combination of lower exercise activity than recommended and high ability expectations and values for such activity may reflect that subjective exercise norms are formed individually in accordance with what most people recognise as the appropriate level of physical activity. Finally, results may indicate that there is potential for improving exercise management by stimulating intrinsic motivation as well as by more clearly communicating recommendations for such management.

Impact of videogame playing on glucose metabolism in children with type 1 diabetes. Phan-Hug F, Thurneysen E, Theintz G, Ruffieux C, Grouzmann E

Pediatric diabetes 12(8):713-7, 2011 Dez Endocrinology-Diabetology Unit, Department of Paediatrics, University Hospital, Lausanne, Switzerland Center of Clinical Epidemiology, Institute of Social and Preventive Medicine, University Hospital, Lausanne, Switzerland Division of Clinical Pharmacology and Toxicology, Department of Internal Medicine, University Hospital, Lausanne, Switzerland.

Phan-Hug F, Thurneysen E, Theintz G, Ruffieux C, Grouzmann E. Impact of videogame playing on glucose metabolism in children with type 1 diabetes. Time spent playing videogames (VG) occupies a continually increasing part of children's leisure time. They can generate an important state of excitation, representing a form of mental and physical stress. This pilot study aimed to assess whether VG influences glycemic balance in children with type

1 diabetes. Twelve children with type 1 diabetes were subjected to two distinct tests at a few weeks interval: (i) a 60-min VG session followed by a 60-min rest period and (ii) a 60-min reading session followed by a 60-min rest period. Heart rate, blood pressure, glycemia, epinephrine (E), norepinephrine (NE), cortisol (F), and growth hormone (GH) were measured at 30 min intervals from -60 to +120 min. Non-parametric Wilcoxon tests for paired data were performed on χ^2 -values computed from baseline (0 min). Rise in heart rate ($p = 0.05$) and NE increase ($p = 0.03$) were shown to be significantly higher during the VG session when compared to the reading session and a significant difference of χ^2 -glycemic values was measured between the respective rest periods. This pilot study suggests that VG playing could induce a state of excitation sufficient to activate the sympathetic system and alter the course of glycemia. Dietary and insulin dose recommendations may be needed to better control glycemic excursion in children playing VG.

Antioxidant and anti-inflammatory effects of exercise in diabetic patients. Golbidi S, Badran M, Laher I

Experimental diabetes research, 2012, 94, 1268,

Department of Pharmacology and Therapeutics, Faculty of Medicine, University of British Columbia, Vancouver, BC, Canada V6T 1Z3.

Diabetes is a chronic metabolic disease which is characterized by absolute or relative deficiencies in insulin secretion and/or insulin action. The key roles of oxidative stress and inflammation in the progression of vascular complications of this disease are well recognized.

Accumulating epidemiologic evidence confirms that physical inactivity is an independent risk factor for insulin resistance and type II diabetes. This paper briefly reviews the pathophysiological pathways associated with oxidative stress and inflammation in diabetes mellitus and then discusses the impact of exercise on these systems. In this regard, we discuss exercise induced activation of cellular antioxidant systems through "nuclear factor erythroid 2-related factor." We also discuss anti-inflammatory myokines, which are produced and released by contracting muscle fibers. Antiapoptotic, anti-inflammatory and chaperon effects of exercise-induced heat shock proteins are also reviewed.

[The effects of aerobic, resistance, and combined exercise on metabolic control, inflammatory markers, adipocytokines, and muscle insulin signaling in patients with type 2 diabetes mellitus.](#) Metabolism

Issue: 9, 1244-52, 2011 Jorge ML et, al.

A randomized trial of telephonic counseling plus walking for depressed diabetes patients.

Piette JD, Richardson C, Himle J, Duffy S, Torres T, Vogel M, Barber K, Valenstein M.: Medical care , 2011, 49(7):641-8 .

BACKGROUND: Patients with diabetes and depression often have self-management needs that require between-visit support. This study evaluated the impact of telephone-delivered cognitive behavioral therapy (CBT) targeting patients' management of depressive symptoms, physical activity levels, and diabetes-related outcomes. **METHODS:** Two hundred ninety-one patients with type 2 diabetes and significant depressive symptoms (Beck Depression Inventory scores ≥ 14) were recruited from a community-based, university-based, and Veterans Affairs health care systems. A manualized telephone CBT program was delivered weekly by nurses for 12 weeks, followed by 9 monthly booster sessions. Sessions initially focused exclusively on patients' depression management and then added a pedometer-based walking program. The primary outcome was hemoglobin A1c levels measured at 12 months. Blood pressure was a secondary outcome; levels of physical activity were determined by pedometer readings; depression, coping, and health-related quality of life were measured using standardized scales.

RESULTS

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Baseline A1c levels were relatively good and there was no difference in A1c at follow-up. Intervention patients experienced a 4.26 mm Hg decrease in systolic blood pressure relative to controls ($P=0.05$). Intervention patients had significantly greater increases in step counts (mean difference, 1131 steps/d; $P=0.0002$) and greater reductions in depressive symptoms (58%

remitted at 12 mo vs. 39%; $P=0.002$). Intervention patients also experienced relative improvements in coping and health-related quality of life.

CONCLUSIONS

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This program of telephone-delivered CBT combined with a pedometer-based walking program did not improve A1c values, but significantly decreased patients' blood pressure, increased physical activity, and decreased depressive symptoms. The intervention also improved patients' functioning and quality of life.

Incidence of and risk factors for type-2 diabetes in a general population: The Tromso Study.

Joseph J, Svartberg J, Njølstad I, Schirmer H.: Scandinavian journal of public health, 2010;113(7):768-75.

Department of Community Medicine, University of Tromsø, Tromsø, Norway.

AIMS: To determine the gender-specific incidence and risk factors of type-2 diabetes mellitus (T2DM) in a general population. **METHODS:** The study is based on 12,431 men and 13,737 women aged 25-98 years, attending the Tromsø Study in 1994 and followed through 2005, who did not have diabetes when entering the study. Sex-specific hazard ratios were estimated from Cox proportional hazard models. **RESULTS:** A total of 522 cases of T2DM were registered, 308 among men and 214 among women. The age-standardised incidence rate was higher in men than in women, 2.6 (95% CI 2.32-2.90) and 1.6 (95% CI 1.40-1.83) per 1000 person-years, respectively. In multivariate survival analysis, age, body mass index (BMI), triglycerides, high-density lipoprotein (HDL) cholesterol, hypertension, family history of diabetes, low education and smoking were independent predictors of T2DM in both genders ($p>0.05$). Total

cholesterol and lack of leisure-time physical activity were independent predictors in men only. We found an interaction between HDL cholesterol and triglyceride levels ($p > 0.001$) and between triglyceride levels and a positive family history of diabetes ($p = 0.04$). These interactions were independent of BMI. A positive family history combined with triglycerides in the highest tertile and BMI > 25 kg/m² conveyed a 10-year risk of T2DM of 10% (95% CI 8-12%) vs. 0.2% (95% CI 0.08-0.31%) for the lowest risk group. **CONCLUSIONS:** A family history of diabetes, elevated BMI, and high triglyceride levels identifies independent of cardiovascular risk factors, a group with especially high risk of T2DM.

Risks of marathon running and hypoglycaemia in Type 1 diabetes

Graveling AJ, Frier BM.: *Diabetic Medicine : a journal of the British Diabetic Association*, 2010, 27(5):585-8.

Department of Diabetes, Royal Infirmary of Edinburgh, Edinburgh, UK.

Background Exercise-induced hypoglycaemia is common in people with insulin-treated diabetes and if severe can provoke neurological morbidity including coma and seizures. Depending on the duration and demands of the physical activity, various strategies can be used to limit the risk of hypoglycaemia with strenuous exercise. However, metabolic events occurring in the 48 h before the exercise can influence the risk and responses to exercise-induced hypoglycaemia. **Case report** A 27-year-old man with Type 1 diabetes suffered an episode of nocturnal hypoglycaemia which provoked a tonic-clonic seizure. Despite this he ran in a marathon the following day during which he collapsed with severe hypoglycaemia and a further associated seizure. He subsequently developed severe myalgia accompanied by a pronounced and persistent elevation of plasma creatine kinase, indicating rhabdomyolysis, and deranged liver function, suggestive of hypoxic hepatitis. The biochemical abnormalities and symptoms lasted for several weeks. **Conclusions** The case highlights the dangers of intense and prolonged physical exercise following severe hypoglycaemia, demonstrating the risks of acute damage to skeletal muscle and to organs such as the liver, in addition to the risk of severe neuroglycopenia and the induction of seizures. The mechanisms underlying these problems are discussed. People with insulin-treated diabetes should be advised not to undertake prolonged intensive exercise after severe hypoglycaemia.

Adaptation of insulin-resistance indicators to a repeated bout of eccentric exercise in human skeletal muscle.

Green MS, Doyle JA, Ingalls CP, Benardot D, Rupp JC, Corona BT.: International Journal of Sport Nutrition and Exercise Metabolism, 2010, 20(3):181-90.

Dept. of Kinesiology and Health Promotion, Troy University, Troy, AL, USA.

This study determined whether disrupted glucose and insulin responses to an oral glucose-tolerance test (OGTT) induced by eccentric exercise were attenuated after a repeated bout. Female participants ($n = 10$, age 24.7 ± 3.0 yr, body mass 64.9 ± 7.4 kg, height 1.67 ± 0.02 m, body fat $29\% \pm 2\%$) performed 2 bouts of downhill running (DTR 1 and DTR 2) separated by 14 d. OGTTs were administered at baseline and 48 hr after DTR 1 and DTR 2. Maximum voluntary isometric quadriceps torque (MVC), subjective soreness (100-mm visual analog scale), and serum creatine kinase (CK) were assessed pre-, post-, and 48 hr post-DTR 1 and DTR 2. Insulin and glucose area under the curve ($38\% \pm 8\%$ and $21\% \pm 5\%$ increase, respectively) and peak insulin (44.1 ± 5.1 vs. 31.6 ± 4.0 $\mu\text{U/ml}$) and glucose (6.5 ± 0.4 vs. 5.5 ± 0.4 mmol/L) were elevated after DTR 1, with no increase above baseline 48 hr after DTR 2. MVC remained reduced by $9\% \pm 3\%$ 48 hr after DTR 1, recovering back to baseline 48 hr after DTR 2. Soreness was elevated to a greater degree 48 hr after DTR 1 (48 ± 6 vs. 13 ± 3 mm), with a tendency for greater CK responses 48 hr after DTR 1 (813 ± 365 vs. 163 ± 43 U/L, $p = .08$). A novel bout of eccentric exercise confers protective effects, with subsequent bouts failing to elicit disruptions in glucose and insulin homeostasis.

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

Black LE, Swan PD, Alvar BA.: Journal of Strength and Conditioning Research / National Strength & Conditioning Association, 2010-04 24(4):1109-16. Department of Exercise and Wellness, Arizona State University, Mesa, Arizona, USA.

This study evaluated the effects of various resistance exercise protocols on 24-hour postexercise insulin sensitivity. Seventeen participants with impaired fasting glucose (100-125 mg/dL) completed 4 separate bouts of resistance exercise under moderate intensity (65% 1 repetition maximum [1RM]) or high intensity (85% 1RM) conditions within the confines of single set and multiple set protocols. Intravenous fasting blood was taken at baseline and 24 hours postexercise for each exercise condition to measure fasting plasma glucose (G0) and fasting serum insulin (I0) to calculate insulin sensitivity (homeostasis model assessment-insulin resistance = $(G0 \cdot I0) / 405$). A minimum of 3 days washout was given between each exercise protocol. A 4 x 2 factorial analysis of variance was performed to compare insulin sensitivity and fasting glucose within subjects and between treatments. All of the exercise protocols improved subsequent insulin sensitivity ($p = 0.002$) and G0 ($p = 0.001$). In comparison with single set, there was a significantly greater decrease in G0 ($p = 0.021$) 24 hours after multiple set bouts. High intensity showed significant decreases in insulin sensitivity as compared with moderate intensity protocols ($p = 0.046$). Effect size data suggest a dose response relationship between program variables of volume and intensity and 24-hour postexercise insulin sensitivity. High-intensity protocols resulted in greater effect sizes for 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 treatment effect in both fasting glucose (0.61) and insulin sensitivity (0.83). Overall, single set protocols were less effective than multiple set protocols in lowering fasting blood glucose. Findings suggest a dose-response relationship between volume and intensity on insulin sensitivity and fasting blood glucose. Results indicate that resistance exercise is an effective treatment for acutely enhancing insulin sensitivity and regulating blood glucose in individuals with impaired fasting glucose.

Inverse association between insulin resistance and gait speed in nondiabetic older men: results from the U.S. National Health and Nutrition Examination Survey (NHANES) 1999-2002.

Kuo CK, Lin LY, Yu YH, Wu KH, Kuo HK.: BMC Geriatrics, 2009 9:49. Department of Emergency Medicine, Chang-Gung Memorial Hospital-Kaohsiung Medical Center, No.123, Dapi Rd., NiasongTownship, Kaohsiung County 833, Taiwan.

Background: Recent studies have revealed the associations between insulin resistance (IR) and geriatric conditions such as frailty and cognitive impairment. However, little is known about the relation of IR to physical impairment and limitation in the aging process, eg. slow gait speed and poor muscle strength. The aim of this study is to determine the effect of IR in performance-based physical function, specifically gait speed and leg strength, among nondiabetic older adults.

Methods: Cross-sectional data were from the population-based National Health and Nutrition Examination Survey (1999-2002). A total of 1168 nondiabetic adults (≥ 50 years) with nonmissing values in fasting measures of insulin and glucose, habitual gait speed (HGS), and leg Strength were analyzed. IR was assessed by homeostasis model assessment (HOMA-IR), whereas HGS and peak leg Strength by the 20-foot timed walk test and an isokinetic dynamometer, respectively. We used multiple linear regression to examine the association between IR and performance-based physical function.

Results

: IR was inversely associated with gait speed among the men. After adjusting demographics, body mass index, alcohol consumption, smoking status, chronic co-morbidities, and markers of nutrition and cardiovascular risk, each increment of 1 standard deviation in the HOMA-IR level was associated with a 0.04 m/sec decrease ($p = 0.003$) in the HGS in men. We did not find such association among the women. The IR-HGS association was not changed after further adjustment of leg strength. Last, HOMA-IR was not demonstrated in association with peak leg strength.

Conclusion

: IR is inversely associated with HGS among older men without diabetes. The results suggest that IR, an important indicator of gait function among men, could be further investigated as an intervenable target to prevent walking limitation.

Effects of aerobic exercise, resistance exercise or both, on patient-reported health status and well-being in type 2 diabetes mellitus: a randomised trial.

Reid RD, Tulloch HE, Sigal RJ, Kenny GP, Fortier M, McDonnell L, Wells GA, Boulé NG, Phillips P, Coyle D.: Diabetologia, 2010, 53(4):632-40. University of Ottawa Heart Institute, 40 Ruskin Street, Ottawa, ON, Canada.

Aims/hypothesis: The Diabetes Aerobic and Resistance Exercise (DARE) study showed that aerobic and resistance exercise training each improved glycaemic control and that a combination of both was superior to either type alone in patients with type 2 diabetes mellitus. Here we report effects on patient-reported health status and well-being in the DARE Trial.

Methods

: We randomised 218 inactive participants with type 2 diabetes mellitus in parallel to 22 weeks of aerobic exercise (n = 51), resistance exercise (n = 58), combined aerobic and resistance exercise (n = 57) or no exercise (control; n = 52). Intervention allocation was managed by a central office. Outcomes included health status as assessed by the physical and mental component scores of the Medical Outcomes Trust Short-Form 36-item version (SF-36) and well-being as measured by the Well-Being Questionnaire 12-item version (WBQ-12); these were measured at the Ottawa Hospital.

Results

: Using a p value of 0.0125 for statistical significance due to multiple comparisons, mixed model analyses indicated that resistance exercise led to clinically but not statistically significant improvements in the SF-36 physical component score compared with aerobic exercise (Delta = 2.7 points; p = 0.048) and control (i.e. no exercise; Delta = 3.3 points; p = 0.015). For mental component scores, there were clinically important improvements favouring no (control) compared with resistance (Delta = 7.6 points; p

Conclusions

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Interpretation

: Resistance exercise was better than aerobic or no exercise for improving physical health status in these patients. No exercise was superior to resistance or combined exercise for improving mental health status. Well-being was unchanged by intervention.

Exercise for the management of type 2 diabetes: a review of the evidence.

Zanuso S, Jimenez A, Pugliese G, Corigliano G, Balducci S.: *Acta Diabetologica*, 2010, 47(1):15-22.

Department of Exercise Science, Faculty of Medicine, University of Padua, Padua, Italy.

The aim is to critically review the more relevant evidence on the interrelationships between

exercise and metabolic outcomes. The research questions addressed in the recent specific literature with the most relevant randomized controlled trials, meta-analysis and cohort studies are presented in three domains: aerobic exercise, resistance exercise, combined aerobic and resistance exercise. From this review appear that the effects of aerobic exercise are well established, and interventions with more vigorous aerobic exercise programs resulted in greater reductions in HbA(1c), greater increase in VO(2max) and greater increase in insulin sensitivity. Considering the available evidence, it appears that resistance training could be an effective intervention to help glycemic control, especially considering that the effects of this form of intervention are comparable with what reported with aerobic exercise. Less studies have investigated whether combined resistance and aerobic training offers a synergistic and incremental effect on glycemic control; however, from the available evidences appear that combined exercise training seems to determine additional change in HbA(1c) that can be seen significant if compared with aerobic training alone and resistance training alone.

Low-intensity exercise reduces the prevalence of hyperglycemia in type 2 diabetes.

Manders RJ, Van Dijk JW, van Loon LJ.: Medicine and Science in Sports and Exercise, 2010, 42(2):219-25.

Department of Human Movement Sciences. NUTRIM School for Nutrition, Toxicology and Metabolism, Maastricht University Medical Centre+, Maastricht, The Netherlands.

Introduction: Glycemic instability is a severely underestimated problem in type 2 diabetes treatment. Therapeutic targets should aim to reduce postprandial blood glucose excursions. Exercise prescription can effectively improve glucose homeostasis and reduce the risk of cardiovascular complications.

Aim: To assess the impact of a single, isoenergetic bout of low- (LI) and high-intensity (HI) exercise on the prevalence of hyperglycemia throughout the subsequent 24-h postexercise period in longstanding type 2 diabetes patients.

Methods

: Nine sedentary, male type 2 diabetes patients (age = 57 +/- 2 yr, body mass index = 29.0 +/- 1.0 kg x m(-2), Wmax = 2.2 +/- 0.2 W x kg(-1) body weight) were selected to participate in a randomized crossover study. Subjects performed an isoenergetic bout of endurance-type exercise for 60 min at 35% Wmax (LI) or 30 min at 70% Wmax (HI) or no exercise at all (NE).

Thereafter, glycemic control was assessed during the subsequent 24-h postexercise period by continuous glucose monitoring under strict dietary standardization but otherwise free-living conditions.

Results

: Average 24-h glucose concentrations were reduced after the LI exercise bout (7.8 ± 0.9 mmol x L⁻¹) when compared with the control experiment (9.4 ± 0.8 mmol x L⁻¹); P

Conclusions

: A single bout of LI, as opposed to HI, exercise substantially reduces the prevalence of hyperglycemia throughout the subsequent 24-h postexercise period in longstanding type 2 diabetes patients.

Does physical activity modify the risk of obesity for type 2 diabetes: a review of epidemiological data.

Qin L, Knol MJ, Corpeleijn E, Stolk RP.: European Journal of Epidemiology, 2010, 25(1):5-12. Department of Epidemiology, University Medical Center Groningen, University of Groningen, P.O. Box 30.001, 9700, RB, Groningen, The Netherlands.

Obesity and physical inactivity are both risk factors for type 2 diabetes. Since they are strongly associated, it has been suggested that they might interact. In this study, we summarized the evidence on this interaction by conducting a systematic review. Two types of interaction have been discerned, statistical and biological interaction, which could give different results. Therefore, we calculated both types of interaction for the studies in our review. Cohort studies, published between 1999 and 2008, that investigated the effects of obesity and physical activity on the risk of type 2 diabetes were included. We calculated both biological and statistical interaction in these studies. Eight studies were included of which five were suitable to calculate interaction. All studies showed positive biological interaction, meaning that the joint effect was more than the sum of the individual effects. However, there was inconsistent statistical interaction; in some studies the joint effect was more than the product of the individual effects, in other studies it was less. The results show that obesity and physical inactivity interact on an additive scale. This means that prevention of either obesity or physical inactivity, not only reduces the risk of diabetes by taking away the independent effect of this factor, but also by preventing the cases that were caused by the interaction between both factors. Furthermore,

this review clearly showed that results can differ depending on what method is used to assess interaction.

The effects of aerobic exercise on metabolic risk, insulin sensitivity and intrahepatic lipid in healthy older people from the Hertfordshire Cohort Study: a randomised controlled trial.

Finucane FM, Sharp SJ, Purslow LR, Horton K, Horton J, Savage DB, Brage S, Besson H, De Lucia Rolfe E, Sleight A, Martin HJ, Aihie Sayer A, Cooper C, Ekelund U, Griffin SJ, Wareham NJ.:

Diabetologia, 2010, 53(4):624-31. MRC Epidemiology Unit, Institute of Metabolic Science, Addenbrooke's Hospital, Box 285, Hills Road, Cambridge CB2 0QQ, UK.

Aims/hypothesis: We sought to determine the effect of an aerobic exercise intervention on clustered metabolic risk and related outcomes in healthy older adults in a single-centre, explanatory randomized controlled trial. **Methods:** Participants from the Hertfordshire Cohort Study (born 1931-1939) were randomly assigned to 36 supervised 1 h sessions on a cycle ergometer over 12 weeks or to a non-intervention control group. Randomisation and group allocation were conducted by the study co-ordinator, using a software programme. Those with prevalent diabetes, unstable ischaemic heart disease or poor mobility were excluded. All data were collected at our clinical research facility in Cambridge. Components of the metabolic syndrome were used to derive a standardised composite metabolic risk score (zMS) as the primary outcome. Trial status: closed to follow-up. **Results:** We randomised 100 participants (50 to the intervention, 50 to the control group). Mean age was 71.4 (range 67.4-76.3) years. Overall, 96% of participants attended for follow-up measures. There were no serious adverse events. Using an intention-to-treat analysis, we saw a non-significant reduction in zMS in the exercise group compared with controls (0.07 [95% CI -0.03, 0.17], $p = 0.19$). However, the exercise group had significantly decreased weight, waist circumference and intrahepatic lipid, with increased aerobic fitness and a 68% reduction in prevalence of abnormal glucose metabolism (OR 0.32 [95% CI 0.11-0.92], $p = 0.035$) compared

with controls. Results were similar in per-protocol analyses.

Conclusions

/interpretation

: Enrolment in a supervised aerobic exercise intervention led to weight loss, increased fitness and improvements in some but not all metabolic outcomes. In appropriately screened older individuals, such interventions appear to be safe.