Obesity

Less fat, less glucose: Look AHEAD sets the agenda for diabetes care

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The highly favourable impact of modest short-term weight loss, achieved through diet and exercise interventions, on metabolic parameters in type 2 diabetes is well established (Henry et al, 1986). Only recently, however, have large scale, long-term studies been undertaken to evaluate the full potential of this approach to the long-term management of type 2 diabetes.

The Look AHEAD (Action for Health in Diabetes) trial is currently comparing the long-term impact of an "intensive lifestyle intervention" versus a conventional treatment on long-term cardiovascular morbidity and mortality in people with type 2 diabetes. Early encouraging results of this study have been reported previously (Look AHEAD Research Group et al, 2007).

Albu et al (2010; summarised alongside) now report the results of a detailed metabolic study undertaken as part of the 1-year assessment in a subset of participants in the Look AHEAD trial. The main aim was to determine whether weight loss *per se*, or specific changes in regional fat distribution and associated metabolic parameters, were the best predictors of improvements in insulin action and glycaemic control. This was a well-conducted study using accurate and detailed measurements of insulin sensitivity, body fat and its distribution.

The key findings were that the metabolic improvements resulting from weight loss were closely related to overall weight loss, improved fat distribution and especially reduction in hepatic fat content. Other factors associated with improved insulin sensitivity were reductions in free fatty acid levels during insulin infusion and in subcutaneous abdominal fat cell size.

> ***"These findings strongly substantiate weight loss as a major treatment goal. Of course, it remains to determine the optimum ways to enable the wider population of people with diabetes to achieve this."***

This study makes an important contribution to our understanding of the mechanisms responsible for the sustained improvements in metabolic control that result from modest weight loss in type 2 diabetes. These findings strongly substantiate weight loss as a major treatment goal. Of course, it remains to determine the optimum ways to enable the wider population of people with diabetes to achieve this.

Henry RR, Wallace P, Olefsky JM (1986) Effects of weight loss on mechanisms of hyperglycemia in obese non-insulin-dependent diabetes mellitus. *Diabetes* **35**: 990–8

Look AHEAD Research Group, Pi-Sunyer X, Blackburn G et al (2007) Reduction in weight and cardiovascular disease risk factors in individuals with type 2 diabetes: one-year results of the look AHEAD trial. *Diabetes Care* **30**: 1374–83

DIABETES

Diet and exercise improve metabolic variables in T2D

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓✓

1 The aim of this study was to examine the effect of a 1-year lifestyle intervention on metabolic variables in obese people with type 2 diabetes.

2 The authors measured glucose disposal rate (GDR), fasting glucose (FG) and free fatty acids (FFAs) during euglycaemic clamp, and adipose tissue mass and distribution, organ fat and adipocyte size by dual X-ray absorptiometry, CT scan and adipose tissue biopsy in 58 participants (26 men) from the Look AHEAD (Action for Health in Diabetes) trial.

3 A significant decrease was observed both in weight and FG ($P<0.0001$), and significantly more so in men than women ($P<0.05$); FFAs during hyperinsulinaemia decreased and GDR increased significantly ($P<0.00001$).

4 A more favourable fat distribution was achieved by men, losing more upper than lower adipose tissue, and more deeper than superficial adipose tissue ($P<0.01$).

5 Improvements in GDR were predicted by decreases in weight and adipose tissue. No such association was found for FG or fasting FFAs; however, FFA reductions during hyperinsulinaemia significantly determined improvements in GDR.

6 The only regional fat measure whose change contributed independently to changes in metabolic variable was hepatic fat.

7 The authors concluded that a 1-year lifestyle intervention in people with type 2 diabetes induced significant improvements in GDR, FG, FFAs and adipose tissue distribution.

Albu JB, Heilbronn LK, Kelley DE et al (2010) Metabolic changes following a 1-year diet and exercise intervention in patients with type 2 diabetes. *Diabetes* **59**: 627–33

AMERICAN JOURNAL OF MEDICINE

Activity, BMI and diabetes risk in men

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 Although physical activity has been associated with a lower risk of diabetes, several studies in women have found that physical activity only slightly reduced the risk of diabetes associated with high BMI.

2 Using a prospective cohort design, the authors of this US-based study investigated the associations between vigorous physical activity and BMI on diabetes risk in 20 757 men from the Physicians' Health Study who did not have diabetes at baseline.

3 Cox proportional models were based on self-reported BMI and exercise frequency at baseline, first separately and then with a 6-category joint variable combining World Health Organization BMI category (normal, 18.5 to <25 kg/m^2; overweight, 25 to <30 kg/m^2; obese, ≥30 kg/m^2) with activity status – active or inactive – using a threshold of weekly vigorous physical activity.

4 A total of 1836 new cases of diabetes occurred after a median follow-up of 23.1 years.

5 Multivariable-adjusted hazard ratios (HRs) for diabetes in active but overweight and obese men were 2.39 (95% confidence interval [CI], 2.11–2.71) and 6.22 (95% CI, 5.12–7.56).

6 Multivariable-adjusted HRs in inactive men with normal, overweight or obese BMIs were 1.41 (95% CI, 1.19–1.67), 3.14 (95% CI, 2.73–3.62) and 6.57 (95% CI, 5.25–8.21).

7 In this cohort, elevated BMI was found to be a strong risk factor for incident diabetes, with modest yet significant attenuation by activity; no difference in risk was induced by weekly activity in obese men.

Siegel LC, Sesso HD, Bowman TS et al (2010) Physical activity, body mass index, and diabetes risk in men: a prospective study. *Am J Med* **122**: 1115–21

CIRCULATION

Television viewing time and mortality

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓✓✓

1 This study explored the relationship between prolonged television (TV) viewing time and all-cause, cardiovascular disease (CVD), cancer, and non-CVD and non-cancer mortality.

2 A total of 8800 adults (≥25 years of age) were examined and, during 58 087 person-years of follow-up, there were 284 deaths (87 CVD, 125 cancer).

3 After adjustments, hazard ratios (HRs) for each 1-hour increment in TV viewing time per day were: all-cause mortality, 1.11 (95% confidence interval [CI], 1.03–1.20); CVD mortality, 1.18 (95% CI, 1.03–1.35); cancer mortality, 1.09 (95% CI, 0.96–1.23).

4 Compared with TV viewing of <2 hours/day (h/d), HRs for all-cause mortality were 1.13 (95% CI, 0.87–1.36) for ≥2 to <4 h/d and 1.46 (95% CI, 1.04–2.05) for ≥4 h/d; corresponding HRs for CVD mortality were 1.19 (95% CI, 0.72–1.99) and 1.80 (95% CI, 1.00–3.25).

5 The authors concluded that increased duration of TV viewing time was associated with elevated risk of all-cause and CVD mortality.

Dunstan DW, Barr EL, Healy GN et al (2010) Television viewing time and mortality: the Australian Diabetes, Obesity and Lifestyle Study (AusDiab). *Circulation* **121**: 384–91

DIABETES

Mitochondrial protein reduced in insulin-resistant muscle

Readability	✓✓✓
Applicability to practice	✓
WOW! factor	✓✓✓✓✓

1 To investigate the relationship between mitochondrial protein levels and insulin resistance in skeletal muscle, basal muscle biopsies were taken from 24 individuals (lean, n=8; obese, n=8; with type 2 diabetes, n=8) and analysed using mass spectrometry-based quantification.

2 From 1218 proteins assigned, 400 were present in at least half of the participants; of these, 92 were altered by a factor of two in insulin resistance, and of those, 15 were significantly increased or decreased.

3 Analysis revealed a decreased abundance of mitochondrial proteins and altered abundance in those involved with cytoskeletal structure, chaperone function and proteasome subunits.

4 These data demonstrated that expression of a substantial number of mitochondrial proteins is altered in insulin resistant muscle.

Hwang H, Bowen BP, Lefort N et al (2010) Proteomics analysis of human skeletal muscle reveals novel abnormalities in obesity and type 2 diabetes. *Diabetes* **59**: 3–42

APPLIED PHYSIOLOGY, NUTRITION & METABOLISM

Postmeal walking reduces glycaemia

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓

1 This random crossover study examined whether slow postmeal walking would blunt blood glucose (BG) increases after carbohydrate intake.

2 After a carbohydrate-rich meal, 14 participants (aged >50 years) were randomised to one of three groups: postmeal sitting (control), slow walking for 15 minutes (W15) or slow walking 40 minutes (W40).

3 BG levels were lowered in W15 during walking and peak BG levels were delayed (P=0.003); in W40, BG increased during walking were blunted, peak BG levels were delayed (P=0.001) and the incremental area under curve was reduced (P=0.014).

4 This study demonstrated that slow walking after a meal enhances postprandial glycaemic control.

Nygaard H, Tomten SE, Høstmark AT (2010) Slow postmeal walking reduces postprandial glycemia in middle-aged women. *Appl Physiol Nutr Metab* **34**: 1087–92

"Increased duration of television viewing time was associated with elevated risk of all-cause and cardiovascular disease mortality."