

Obesity

What role for exercise in diabetes management?



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Although lifestyle change is believed to be key to improving diabetes control and achieving weight loss, there is frequently not a systematic approach to supporting lifestyle change.

This has resulted in greater reliance on treating symptoms and preventing the complications of diabetes through pharmacotherapy. A major drawback of pharmacotherapy has been increased costs and weight gain, without a significant long-term change in HbA_{1c} levels (Gale, 2010).

Several large studies, all from outside the UK, have shown the importance of lifestyle change in reducing the risk of diabetes development in at-risk individuals (Tuomilehto et al, 2001; Knowler et al, 2002; Thomas et al, 2010). The USA-based LookAHEAD (Action For Health in Diabetes) study has shown the value of lifestyle change in achieving weight loss and metabolic control in overweight people with type 2 diabetes (Look AHEAD Research Group and Wing, 2010; Unick et al, 2011).

The Early ACTID (Early Activity In Diabetes) study (Andrews et al, 2011; summarised alongside) was a major primary care-based study in the UK aiming to examine the role of diet and physical activity in diabetes and blood pressure control. The study targeted newly diagnosed people with type 2 diabetes, where early intervention was likely to be most beneficial.

The study found beneficial effects in both diet alone and diet and physical activity groups compared with the control group, which received usual care. The benefits observed for HbA_{1c} level are likely to be clinically significant. Medication use was also lower in the intervention group. Changes in body weight and waist circumference were, however, not so remarkable.

Surprisingly, the study found that physical activity did not confer any additional benefit to diet alone. There are several issues, however,

that may have affected this outcome. Perhaps insufficient numbers of participants achieved the levels of activity required to impact this outcomes? Perhaps walking alone may not be the best form of activity for improving glycaemic control? Or perhaps the emphasis on physical activity was insufficient?

Furthermore, while physical activity conferred no additional benefit to diet alone, it needs to be determined whether exercise has a role to play in the maintenance of weight loss beyond 12 months. Other potential benefits of physical activity, such as improved wellbeing and quality of life, were not reported on.

Unlike the other studies mentioned here, the Early ACTID interventions were designed to be implemented within the NHS setting. More intensive lifestyle change interventions than those employed in Early ACTID have been shown to have a greater impact on diabetes control and body weight (Unick et al, 2011), but whether these interventions are practical or cost-effective in the NHS setting is unclear.

Despite not observing an additional benefit of physical activity, the Early ACTID findings highlight the importance of lifestyle change in diabetes management. Currently, the approach to lifestyle change is haphazard and needs to be organised to support people with diabetes more effectively.

Gale EA (2010) Diabetes in the UK: time for a reality check? *Diabet Med* **27**: 973–6

Knowler WC, Barrett-Connor E, Fowler SE et al (2002) Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* **346**: 393–403

Look AHEAD Research Group, Wing RR (2010) Long-term effects of a lifestyle intervention on weight and cardiovascular risk factors in individuals with type 2 diabetes mellitus: four-year results of the Look AHEAD trial. *Arch Intern Med* **170**: 1566–75

Thomas GN, Jiang CQ, Taheri S et al (2010) A systematic review of lifestyle modification and glucose intolerance in the prevention of type 2 diabetes. *Curr Diabetes Rev* **6**: 378–87

Tuomilehto J, Lindström J, Eriksson JG et al (2001) Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med* **344**: 1343–50

Unick JL, Beavers D, Jakicic JM et al (2011) Effectiveness of lifestyle interventions for individuals with severe obesity and type 2 diabetes: Results from the Look AHEAD trial. *Diabetes Care* **34**: 2152–7

LANCET

No glycaemic benefit of physical activity added to intensive diet intervention

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

1 The authors investigated the effects of diet and physical activity on adults aged 30–80 years, resident in southwest England, in who T2D had been diagnosed within the preceding 5–8 months.

2 In this randomised, controlled trial, participants ($n=593$) were assigned to: (i) usual care (i.e. initial dietary consultation, follow-up every 6 months; control group); (ii) an intensive diet intervention (dietary consultation every 3 months with nurse support); or (iii) the latter plus a pedometer-based activity programme.

3 The primary endpoint was improvement in HbA_{1c} level and blood pressure at 6 months.

4 Of the 593 participants, 99 were assigned usual care, 248 to the dietary intervention, and 246 to diet plus activity; by 6 months data were available for 587 (99%) participants, and 579 (98%) at 12 months.

5 Glycaemic control worsened in the control group (mean baseline HbA_{1c} level 6.7% [50 mmol/mol]), at 6 months 6.9% [52 mmol/mol]), and improved in the diet (–0.3%; $P=0.005$) and diet plus activity (–0.33%; $P<0.001$) groups. These differences persisted to 12 months.

6 Blood pressure change was similar in all groups.

7 The authors concluded that while an intensive diet intervention soon after diagnosis improves HbA_{1c}, an exercise programmes offers no additional glycaemic benefit.

Andrews RC, Cooper AR, Montgomery AA et al (2011) Diet or diet plus physical activity versus usual care in patients with newly diagnosed type 2 diabetes: the Early ACTID randomised controlled trial. *Lancet* **378**: 129–39

SURGERY FOR OBESITY AND RELATED DISEASES

Bariatric surgery well tolerated by obese people with T2D

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

1 Bariatric surgery (BS) has been shown to have benefits for obese people with T2D, the procedure addressing both weight and glycaemia. However, the tolerability of BS in populations with diabetes needs further investigation.

2 The authors undertook this retrospective cohort study using an administrative database from seven Blue Cross/Blue Shield plans in the USA.

3 People ($n=22\,288$) who had undergone BS between 2002 and 2008 were identified and 6754 pairs – one with and one without T2D – were matched by age and sex.

4 The relative odds of postoperative complications for ≤ 12 months following surgery were calculated.

5 Postoperative complications were rare; the most common being nausea, vomiting and abdominal pain (8.8%), need for a gastric revision procedure (5.0%) and upper endoscopy (2.3%).

6 The incidence of cardiac complications was greater in the diabetes group in the 2- to 3-month and 4- to 6-month postoperative periods (both $P<0.001$); the same was true of infectious complications in the 0- to 1-month and 4- to 6-month periods (both $P<0.02$), and renal complications in the 2- to 3-month period ($P=0.01$).

7 The authors concluded that BS in obese individuals with T2D is well tolerated, but strategies to avoid postoperative cardiac, infectious and renal complications are warranted.

Steele KE, Prokopowicz GP, Chang HY et al (2011) Risk of complications after bariatric surgery among individuals with and without type 2 diabetes mellitus. *Surg Obes Relat Dis* [Epub ahead of print]

DIABETES

Weight gain/loss not associated with glucose tolerance

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

1 The authors sought to analyse metabolic predictors of spontaneous weight change.

2 Participants ($n=1028$; mean age, 44 years; BMI range, 19–44 kg/m²; 9% impaired glucose tolerance) were measured for insulin sensitivity (by a euglycemic clamp) and beta-

cell function (C-peptide response modelling; acute insulin response to intravenous glucose).

3 After 3 years' follow-up, insulin sensitivity was similar in weight gainers, weight losers, and weight stable participants across quartiles of baseline BMI; neither insulin sensitivity nor beta-cell function showed an independent association with weight gain.

4 Only baseline waist circumference, BMI and weight were positive, independent predictors of both weight gain and weight loss (odds ratio, 1.48; 95% confidence interval, 1.12–1.97).

Rebelos E, Muscelli E, Natali A et al (2011) Body weight, not insulin sensitivity or secretion, may predict spontaneous weight changes in nondiabetic and prediabetic subjects: the RISC study. *Diabetes* **60**: 1938–45

DIABETES CARE

ILI effective in overweight and obese people with T2D

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

1 An intensive lifestyle intervention (ILI) was assessed for its impact on weight loss and a range of clinical parameters in overweight and obese people with T2D.

2 Participants ($n=2503$; mean age, 58.6 years) in the Look AHEAD (Action for Health in Diabetes) trial were randomly assigned to ILI or diabetes

support and education (DSE; a less intense educational intervention).

3 At 1 year, severely obese participants in the ILI group lost a mean –9.04% of initial body weight, which was significantly greater ($P<0.05$) than ILI participants who were overweight (mean –7.43%); all ILI groups had comparable improvements in fitness, LDL-cholesterol, triglycerides, blood pressure, fasting glucose, and HbA_{1c}.

4 The authors found the ILI intervention to be effective across a range of clinical parameters for overweight and obese people with T2D.

Unick JL, Beavers D, Jakicic JM et al (2011) Effectiveness of lifestyle interventions for individuals with severe obesity and type 2 diabetes: results from the Look AHEAD trial. *Diabetes Care* **34**: 2152–7

DIABETES

Metreleptin not effective in reducing body weight in T2D

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

1 Metreleptin improves metabolic control in those with lipodystrophy; the agent's efficacy in obese people with T2D was assessed in the present study.

2 During a 16-week, double-blind, placebo-controlled, randomised trial, the authors studied the role of

leptin in regulating the endocrine adaptation to long-term caloric deprivation and weight loss in obese people with T2D, in addition to *in vivo*, *ex vivo*, and *in vitro* signalling studies.

3 Metreleptin administration for 16 weeks did not alter body weight or circulating inflammatory markers but did reduce HbA_{1c} ($P=0.03$).

4 In obese people with diabetes, metreleptin administration did not alter body weight or circulating inflammatory markers but reduced HbA_{1c} in the present study.

Moon HS, Matarese G, Brennan AM et al (2011) Efficacy of metreleptin in obese patients with type 2 diabetes: cellular and molecular pathways underlying leptin tolerance. *Diabetes* **60**: 1647–56

“... bariatric surgery in obese individuals with T2D is well tolerated, but strategies to avoid postoperative cardiac, infectious, and renal complications are warranted.”